Universidad del País Vasco   Euskal Herriko Unibertsitatea

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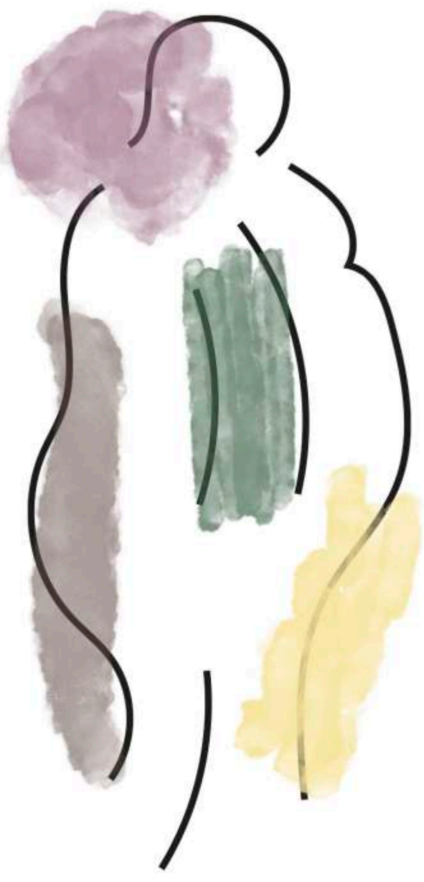

Nerea Telleria Aramburu

PhD Thesis

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PhD Thesis

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.

Glossary of abbreviations

24HR, 24 hour recalls

ABI, attractive body image

ABS, attractive body size

AMDR, acceptable macronutrient distribution ranges

BIA, body image assessment

BID, body image dissatisfaction

BF, body fat

BF%, body fat percentage

BFI, body fat index

BMI, body mass index

BMR, basal metabolic rate

BWD, body weight dissatisfaction

BWP, body weight perception

CBI, current body image

CBS, current body size

CI, confidence interval

DA, don’t answer

DHA, docohexaenoic acid

DK, don’t know

EARs, estimated average requirements

ENRICA, *Estudio de Nutrición y Riesgo Cardiovascular en España*

EO, eating occasions

EPA, eicosapentaenoic acid

FBI, father’s body image

FFM, fat free mass

FFMI, fat free mass index

FFQ, food frequency questionnaire

FMI, fat mass index

GHGE, greenhouse gas emissions

HEI, Healthy Eating Index

HS, Health Sciences

HW, healthy weight

HWP, healthy weight perception

IBI, ideal body image

IBS, ideal body size

ICC, intraclass correlation coefficient

IPAQ, international physical activity questionnaire

KA, knowledge area

MBI, mother's body image

MD, Mediterranean diet

MDS, MedDietScore

METs, metabolic equivalents

MUFA, monounsaturated fatty acids

NA, nutrition attitudes

NHS, Non-Health Sciences

No., number

NS, not significant

OR, odds ratio

PA, physical activity

PE, physical exercise

PUFA, polyunsaturated fatty acids

QoL, quality of life

RBS, reasonable body size

S, sport

SB, sedentary behaviour

SD, standard deviation

SDU, standard drink units

SE, socioeconomic

SENC, Spanish Society of Community Nutrition

SES, socioeconomic status

SFA, saturated fatty acids

SFFQ, short food frequency questionnaire

SL, stress level

TEI, total energy intake

UPV/EHU, University of the Basque Country

WC, waist circumference

WHO, World Health Organization

WHR, waist:hip ratio

Laburduren glosarioa

24 OO, 24 orduko oroitzapenak

AIGI, aitaren gorputz irudia

AF, ariketa fisikoa

AMGI, amaren gorputz irudia

BB, batezbestekoa

BEE, batezbesteko eskakizunei egokitzapena

BEGI, berotegi-efektuko gasen isurtzea

DHA, azido dokohexanoikoa

EA, ezagutza arloa

EAE, Euskal Autonomia Erkidegoa

ED, ez daki

EE, ez du erantzun

EGI, egungo gorputz irudia

EGN, egungo gorputz neurria

EIG, energia ingestio guztia

EJ, elikadurarekiko jarrerak

EKMGM, elikagaien kontsumo maiztasunari buruzko galdetegi motza

ENRICA, *Estudio de Nutrición y Riesgo Cardiovascular en España*

EOZ, Ez-Osasun Zientziak

EPA, azido eikosapentanoikoa

ESE, estatus sozioekonomikoa

EUE, edari unitate estandarra

GAA, gantz azido aseak

GAI, gerria-aldaka indizea

GAM, gantz azido monoasegabeak

GAP, gantz azido poliasegabeak

GIA, gorputz irudiaren atsekabea

GIE, gorputz irudi erakargarria

GII, gorputz irudi ideala

GNE; gorputz neurri erakargarria

GNI, gorputz neurri ideala

GnGMI, gantz gabeko masa indizea

GnM, gantz-masa

GnM%, gantz-masa portzentajea

GnMI, gantz-masaren indizea

GMI, gorputz masaren indizea

GPA, gorpuz pisuarekiko atsekabea

GPP, gorputz pisuaren pertzepzioa

HEI, Healthy Eating index

ihM, ihar masa

ihMI, ihar masaren indizea

KBK, klase barneko korrelazioak

KT, konfiantza tartea

MBTO, makronutrienteen banaketa tarte onargarria

MD, Mediterranear dieta

MDS, MedDietScore

MET, baliokide metabolikoak

MOE, Munduko Osasun Erakundea

OR, odds ratioa

OZ, Osasun Zientziak

OZk, otorduen zenbakiak

PO, pisu osasuntsua

POP, pisu osasuntsuaren pertzepzioa

PP, pisuaren pertzepzioa

PS, portaera sedentarioa

SE, sozioekonomikoa

SEEDO, *Sociedad Española para el Estudio de la Obesidad*

UPV/EHU, Euskal Herriko Unibertsitatea

ZGN, zentzuzko gorputz neurria

Index

ENGLISH VERSION

Aurkibidea

EUSKARAZKO BERTSIOA

ENGLISH VERSION

1. Introduction

1.1. Obesity as a disease state

1.1.1. *Definition and classification*

Obesity is a chronic disease characterised by an abnormal or excessive fat accumulation that may impair health(1). It is a multimetabolic and hormonal disease state based on scientific evidence, rather than the result of individual lifestyle choices(2). Sophisticated tools like magnetic resonance imaging or dual energy x-ray absorptiometry are required to directly measure body fat (BF), but these methods are not widely available and are not cost-effective for routine use in clinical practice. So there are many indirect measures of adiposity that have been used to measure obesity status, such as body mass index (BMI), waist circumference (WC), waist:hip ratio (WHR), and BF percentage (BF %) estimated by skinfold thickness.

BMI is widely accepted to classify overweight and obesity for being easy to measure and closely associated with obesity-related health conditions(3). In spite of not distinguishing weight associated with muscle vs. fat and BF distribution(4), BMI has many advantages such as simplicity and reproducibility(5). Epidemiologic studies have shown an association between high BMI values and increased mortality(6).

This index is defined as a person's weight in kilograms divided by the square of his height in meters and it was described for the first time by Adolphus Quetelet, in the 19th century(7). However, this indirect measure of BF is prone to misclassification, in particular among subjects with low height, elderly, heavily muscled individuals, those with hydrosoline retention and pregnant(8). In a 2010 review(9), it was concluded that the use of BMI to identify an excess of BF at the individual level had good specificity, but poor sensitivity, with approximately half of subjects with excessive BF% being labelled as non-obese.

1.1.2. *Prevalence of overweight/obesity*

In 2016, World Health Organization (WHO) estimated that more than 1.9 billion adults had overweight and of these over 650 million obesity(10). The worldwide prevalence of this disease state nearly tripled between 1975 and 2016(10), and Spain is one of the European countries with the highest prevalence in adults(11,12). This rapid increase in the past three decades cannot be solely explained by sudden changes in the genetic background[13] and it is mainly attributed to cultural and environmental influences, such as high energy density diet, increased portion size or sedentary lifestyle as a consequence of the industrialization of societies[13-15].

If current trends continue, it is expected that by 2030, near 60% of the world's population (3.3 billion people) could suffer overweight or obesity[16]. But the most alarming data correspond to children under the age of 5 years with overweight and obesity because there were 41 million in 2016 worldwide[10]. In this sense, it is known that children with obesity, and particularly adolescents with obesity, are likely to become adults with obesity[17]. Relative to Spanish data, ENRICA study (*Estudio de Nutrición y Riesgo Cardiovascular en España*) was set between 2008-2010. In this study, 18-44 years age group showed a prevalence of overweight of 41.5% and 24.6% in men and women, respectively, and regarding to obesity 18.6% and 11.1%, by sex, respectively[18].

Later, the ANIBES study was designed to set an accurate updating of anthropometric data, among others, of the Spanish population. In this case, the prevalence of overweight and obesity was slightly lower than ENRICA data in the younger age group (18-40 years) of the research. Relative to overweight, it was 37.4% in the case of men and 25.8% in women. Regarding to obesity data, the prevalence was 15.2% and 10.4%, respectively, and in both cases, overweight and obesity, there were significant sex differences[19]. The prevalence of obesity was higher among participants with more age, although BMI and other abdominal indicators increase from 20 to 29 years of age[19], and among people with low socioeconomic status (SES) because they usually have a low physical activity (PA) level and low adherence to the Mediterranean diet (MD)[18]. In addition, this prevalence differs according to autonomous community, as Aranceta-Bartrina *et al.*[20] have reported. Age-adjusted prevalence rates showed that the highest obesity rates in Spain were registered in Asturias and Galicia, followed by Andalusia, and the lowest rates in the Balearic Islands, Catalonia and the Basque Country[20].

1.1.3. Consequences of overweight/obesity

Overweight and obesity have significant impacts in different dimensions that include social, physical and mental health(21), and is accompanied by considerable increases in direct and indirect health costs(22). In relation to the impact on social aspects, the overweight stigma and associated discrimination has been well documented in all the areas of living(23). This weight-related discrimination, in turn, is related to unhealthy lifestyle behaviours, what contributes to create a vicious cycle. The stigma towards persons with obesity contributes to be less confident in the ability to lose weight(24). In this sense, nowadays, thinness is synonymous with success, and on the contrary, obesity means slackness and carelessness(25). This societal pressure about thinness is higher in women than in men(26).

In addition, obesity has been widely associated with: non-insulin dependent diabetes mellitus, type 1 diabetes mellitus, coronary heart disease, hypertension, gallbladder disease, obstructive sleep apnoea syndrome, fatty liver disease, osteoarthritis, certain types of cancer, infertility, among others co-morbidities(27,28). Moreover, this disease state increased risk of disability and decreased life expectancy, especially in younger age groups(29,30). The aforementioned comorbidities of obesity usually appear during adulthood, but today, they are also being developed in childhood due to the increasing prevalence of obesity among children(31). These cardiometabolic and non-cardiometabolic consequences of obesity imply a risk of morbidity and mortality not only in childhood, but also in adulthood(32).

It should be mentioned that the Global BMI Mortality Collaboration Committee's results suggest that if people with overweight/obesity had WHO-defined normal levels of BMI (18.5-25.0 kg/m^2), the premature deaths percentage that could be avoided would be 14.3% in Europe(33). On the other hand, scientific evidence has emphasised that overweight and obesity increase risk of mood disorder, low self-esteem, motivational problems, eating disorders, body image distortion and dissatisfaction and interpersonal communication problems. All these conditions affect directly or indirectly the quality of life(34).

Finally, many studies have observed increases in healthcare costs for individuals with obesity compared with those with normal-weight(22). These expenditures are principally related to social security and disability pension due to obesity-related comorbidities. Obesity, in 2016, in Spain supposes a €1.95 billion extra medical costs, according to Hernáez A *et al.* (2018) data. It is expected that subjects with obesity increase 16% for

2030 in Spain, less than Kelly *et al.* estimation for the world's population[16], but this growing prevalence of excess weight could be economically unsustainable for the Spanish Health System[35]. Additionally, health care cost seems to constitute only a minor part of the total cost associated with obesity, since the absolute change in income supposes more than three times the change in healthcare expenditures. Authors such as DiBonaventura *et al.*[36] have shown associations between increased BMI and decreased work productivity and consequently with decreasing in personal incomes.

1.1.4. Overweight/obesity risk factors

Excessive fat accumulation is a result of a complex interaction between genetic, socioeconomic (SE) and environmental factors, and as a last resort, consequence of personal behaviours. Some of the conditions or measurements included in these factors have been associated with a higher probability of obesity, so they are considered risk factors. The purpose of paying attention to these risk factors is to create the basis of actions to prevent the disease. As regards the genetic factors, in spite of being new syndromes associated with obesity or new forms of obesity due to a single dysfunctional gene such as monogenic obesity, syndromic obesity, or oligogenic obesity, polygenic obesity is the most common form of this pathology, which affects to the general population in developed societies[13]. This form of obesity is due to the interplay between multiple loci (polygenic), in spite of the small effect of each one on BMI, and the obesogenic environment[37].

Until the day, more than one hundred loci associated with polygenic obesity have been identified[13]. Nowadays the etiopathogenic mechanisms of polygenic obesity are not known exactly, although it is known that genetic, epigenetic, physiological, endocrine, neurological, psychological, sociocultural and environmental factors are involved to a greater or lesser degree[38-40]. Moreover, gene-environmental factor interactions may contribute to epigenetic changes, which play an important role in the obesity phenotype[41,42]. Furthermore, numerous studies indicate that fetal programming, probably thought epigenetic mechanisms, result in significant repercussions in life course health. Thus parental lifestyle, diet and other exposures could be implicated in offspring obesity risk, not forgetting parental obesity[43], caloric restriction[44], smoking[45] and endocrine-disrupting[46], as well as weight gain during gestation and gestational diabetes[43,47].

On the other hand, economic factors have had a variable role in obesity risk over time. In the past, obesity was related to wealth. However, over recent few decades, this link has changed. Today, in Western culture, wealth tends to be inversely correlated with obesity, and those who have a low SES tend to have higher prevalence of obesity[(48)]. In addition, educational level has been inversely related to overweight/obesity, particularly in women[(49)]. Regarding environmental risk factors, built environment referring to characteristics of neighbourhoods, educational and work environment plays an important role in obesity, through the promotion of sedentary lifestyles and unhealthy dietary habits. These characteristics include from specific factors (e.g., accessibility and availability of high-energy-density foods, increasing portion sizes, marketing and advertising) to more ambiguous (e.g., healthiness or walkability)[(50)].

Regarding the obesity-risk behaviours, given that obesity is usually the result of an energy imbalance between energy consumed and expended, diet and PA, are two of the behaviours that have received much attention in attempts to explain the actual prevalence of obesity[(51)]. In particular, caloric restriction remains one of the most popular methods of weight control. Beyond overall energy intake, many researchers have focused on the role of diet quality and dietary patterns in overweight/obesity development[(52)]. Certain dietary patterns, such as the MD, are associated with decreased risk of overweight and obesity[(53)].

However, in any case, beyond *what eat*, *where*, *when*, *how* and *who eat with,* are important too, because not only can the volume influence, but the type and variety of foods consumed as well[(54)]. All these characteristics of diet are part of the term “meal pattern”, and have an important role in total energy intake and consequently in the regulation of body weight and adiposity[(55)]. Beyond diet and PA, other behaviours such sedentary habits[(56)], sleep[(57)] and stress[(58)] have also associated with weight gain in adulthood[(50)]. In any case, in most studies, these risk factors individually justify, to a small extent, the increasing prevalence of overweight/obesity, probably because these factors, together with diet, have synergistic and cumulative effects on overweight/obesity risk[(59)].

1.2. Overweight/obesity among university students

1.2.1. Prevalence and associated risk factors of overweight/obesity in university students

Several researchers have observed that students have significant weight gain, in the first year of university[60,61], followed by ongoing slow but steady increase in weight[62]. The prevalence of overweight/obesity among university students is around 22% (24.7% men and 19.3% women)[63], although this prevalence varies among countries according to SE, cultural and epidemiological conditions. In any case, it is known that the overweight/obesity in this age is associated with an increasing incidence of obesity 15 years later[64]. In previous studies[63,65,66] the following factors were identified to be associated with excessive body weight in university students: demographic factors (mainly male gender), SE factors (higher SES), dietary habits (high consumption of red meat, breakfast skipping, eating between meals, among others), low PA level, physical inactivity, excessive alcohol consumption and smoking. However, just like the prevalence of obesity, cross-country variation in these risk factors associated with obesity may reflect differences in SE, cultural and epidemiological conditions.

One of the specific characteristic of the university student population that can promote the adoption of unhealthy lifestyles is the fact that, many times, the beginning of university life coincides with those of living without parents and of turning into responsible of health-related decisions[67]. In this transition from high school to university, it is possible that the abandonment of established habits and routines occurs[68]. Thus, it has been shown that many students who live away from home have an unhealthier diet compared with students who live at home, increasing the intake of unhealthy foods such as sugar, wine, alcohol or fast food intake[69] and decreasing the weekly consumption of fruits and vegetables[69,70]. This reality suggests the importance of the family environment in the formation and maintenance of dietary habits[69-71]. In the case of fruits and vegetables intake, in particular, there is an association between intakes of parents and adolescents[72], because parents play a role in determining the consumption of their children during adolescence[73] and a high accessibility to these food groups makes their intake higher[74].

In addition, according to several authors[75,76], university students argue different barriers for not having healthy dietary habits such as: lack of time due to studies, lack of healthy food at the university canteen and the expensive price of this type of food[75,76], the availability of convenience and fast foods[77], as well as the lack of knowledge and/or cooking experiences[78]. University students' food choices could also be influenced by economic aspects[79], life experiences such psychological and physiological traits, social settings or cultural criteria, preferences, beliefs and expectations relative to food choices[80,81].

Furthermore, respect to the PA and exercise practice, it is known also that some students have difficulty maintaining or incorporating PA and exercise as a routine in their student life[67], and they generally do not comply with recommendations in that regard[82-84]. The prevalence of physical inactivity in university students ranged from 23% to 44% according to several studies[85,86]. Students perceived many barriers to avoid a sedentary lifestyle and maintain physically active. So, for example, lack of time, tiredness, lack of motivation, not having facilities, lack of social or parental support and the lack of friends to do sports together were the main obstacles perceived by university students[87,88]. In contrast, friends' motivation, social support, convenience or diversity of activities could facilitate PA practice[89,90].

Beyond the associations that have been found to date between unhealthy behaviours aforementioned (diet, PA and toxic habits) and obesity risk, relationships between other lifestyle-related risk factors such as sleep and obesity also has been shown in university students[91]. In this sense, previous studies have reported that above 60% of university students were poor-quality sleepers[92] and more than 25% slept less than 7 hours/day, that is, less than USA Sleep Foundation's recommendation[93,94]. This disturbed sleep pattern along with financial strains, academic burden, colleague competition, homesickness and social problems, need to excel lead students to experience stress and anxiety[92,95]. Lastly, although many evidences suggest that unhealthy lifestyle is associated with obesity in university students, the majority of studies to date have focused on a single or few health lifestyle behaviours. There are few studies on interactions among lifestyles related to obesity in the university community[96,97].

1.2.2. Motivation of the present study

Although an energy imbalance over a long period seems to be the main cause of overweight/obesity, this factor is included in a complex biological system that is set within a complex societal framework in which no single influence dominates. The combination of physiological factors, eating habits, activity levels and psychosocial influences drives excess weight gain in an increasing proportion of the population. However, the interactions among the variables related to obesity are poorly understood, and due to this lack of information, designing comprehensive, long-term strategies to fight obesity is challenging.

In this context, the EHU12/24 (code of a survey from the University of the Basque Country/Euskal Herriko Unibertsitatea UPV/EHU) study addresses these research needs using a university community-based approach. This approach allows us to analyse the aetiology of obesity in a population whose life is governed by a large number of similar patterns, allowing for the more effective control of these variables. To the best of our knowledge, very few studies have assessed the aetiology of obesity in university student populations from a broad perspective (that includes different determinants and their possible interactions), even though this population is particularly vulnerable to inadequate lifestyles, which have consequences on their health status.

As is well known, the specific causes of the accumulation of excess fat differ across population groups and a person's life course. This variability is an important feature and highlights a range of different solutions. A rigorous analysis of evidence regarding the causation of obesity in the university student population of the EHU12/24 study could permit the identification of several key issues critical for designing strategies for the prevention and control of overweight/obesity.

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2. Hypotheses and objectives

2.1. Hypotheses

The hypotheses of the thesis are the following:

1. The short food frequency questionnaire (SFFQ) adapted to the population resident in the Basque Country has a good validity and reproducibility to assess food group intake, and is not influenced by associated variables (such as educational level or weight status).
2. The lifestyles, including diet, of university student population of the UPV/EHU are associated with demographic variables (age and sex) and knowledge area (KA) of the degree that they are studying.
3. University student population of UPV/EHU is far of dietary recommendations and healthy lifestyles.
4. Regarding to eating behaviours of the UPV/EHU students, a healthy diet has a lower environmental impact, that is, suppose a lower global greenhouse gas emissions (GHGE) and some factors, such as other lifestyles, SES or KA, could be related to the sustainability of their diet.
5. The prevalence of overweight/obesity in UPV/EHU students is higher than in the general population of this age range.
6. Overweight/obesity in UPV/EHU university students is associated with:
   5.a. Demographic, SE variables and KA.
   5.b. An inadequate body weight perception (BWP) and body weight and image dissatisfaction.
   5.c. Nutrition attitudes (NA) involved in the adoption of a low fat, low-cholesterol diet.
   5.d. A low nutrition knowledge level.
6. Regarding to risk factors of overweight/obesity-related lifestyles in UPV/EHU students:
   6.a. An unsuitable meal pattern and a poor diet quality both are associated with the risk of overweight/obesity.
   6.b. Unhealthy lifestyles such as inactivity, sedentary behaviours and alcohol consumption are associated with the risk of overweight/obesity.

2.2. Objectives

2.2.1. *Main objective*

Taking into account the increasing necessity of researching in obesity and the modifiable risk factors related to this complex illness, especially in the young population, we set the present study with the general objective of **studying risk factors of overweight/obesity-related to lifestyles, particularly those associated with diet, their psychosocial influences and the interactions among these factors, in student population of the University of the Basque Country UPV/EHU**. The identification of these potential risk factors will permit the design and application of strategies for prevention and control for the risk groups (stratified nutrition).

2.2.2. *Specific objectives*

To achieve this general objective, the following specific objectives were set:

1. To adapt a SFFQ and to evaluate the relative validity and reproducibility to assess food group intake in a population resident in the Basque Country. This tool will permit to assess dietary intake in the population under study to tackle the following objectives. **Study 1.**
2. To describe lifestyles of UPV/EHU students from their self-reported data about their habits and to analyse its possible association with demographic variables (age and sex) and KA. **Study 2.**
3. To assess the lifestyles of UPV/EHU students comparing these behaviours with current guidelines on healthy lifestyles. **Study 2.**
4. Regarding to eating behaviours of the UPV/EHU students, to determine potential associations between healthy and sustainable dietary habits and to try to identify lifestyle, SE and demographic factors and KA related to the environmental impact of diets. **Study 3.**
5. To describe the prevalence of overweight/obesity based on BF% in UPV/EHU students and compare it with results of the general population. **Studies 2 and 4.**
6. To identify potential associations in UPV/EHU students between overweight/obesity and:

    5.a. Demographic and SE factors and KA.

5.b. An inadequate BWP, body weight dissatisfaction (BWD) and body image dissatisfaction (BID).

5.c. NA involved in the adoption of a low fat, low-cholesterol diet.

5.d. A low nutrition knowledge level. **Study 4.**

6. Regarding to risk factors of overweight/obesity in UPV/EHU students:

6.a. To identify possible associations between overweight/obesity and eating behaviours (specially meal pattern and diet quality).

6.b. To identify possible associations between overweight/obesity and other lifestyles, such as inactivity, sedentary behaviours or alcohol consumption. **Study 2.**

3. Design, subjects and methods

British Journal of Nutrition, page 1 of 14 doi:10.1017/S0007114519002800

The EHU12/24 cohort: survey design, instruments and participants

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Abstract

Objective:

The EHU12/24 (code of a survey from the University of the Basque Country/Euskal Herriko Unibertsitatea) study was designed to investigate the risk factors of overweight/obesity-related lifestyles, particularly those associated with diet, their psychosocial influences and the interactions among these factors.

Subjects and methods:

This observational cohort study was carried out according to a standardised protocol and involved a representative sample of the University of the Basque Country UPV/EHU student population. Anthropometric measurements, direct behavioural determinants, such as physical activity and diet, and indirect determinants, such as social/psychological factors, are considered. In this paper, we present the survey design, instruments, measurements, and related quality management. We describe the study sample in terms of its socioeconomic and demographic factors and knowledge area and summarise the methodology used to collect the data and obtain the anthropometric measurements.

Results:

The participants were 603 students (59.5% female) aged 18-28 years. The crude participation proportion was 53.5%. Regarding the knowledge area, the lowest response proportions were obtained from the Health Sciences (38.6%) compared with the Non-Health Sciences (48.3%) (*P*=0.003). The mean age was 20.9 years, and 83.1% of the sample were from Basque Country. Regarding the socioeconomic characteristics, there

were significant differences by sex and knowledge area in most studied variables. Moreover, the Health Sciences students were more likely younger, from outside Basque Country, to have parents with university degrees and to have a higher social status.

Discussion:

In conclusion, the EHU12/24 cohort provides valuable data for analysing the complexity and multidimensionality of obesity in university students

Introduction

The prevalence of obesity has tripled in many countries in the European region since the 1980s, and the number of those affected continues to increase at an alarming rate[(1)]. Spain is among the European countries with the highest prevalence in adults[(2,3)]. Although an energy imbalance over a long period seems to be the main cause of overweight/obesity, this factor is included in a complex biological system that is set within a complex societal framework in which no single influence dominates[(4)]. The combination of physiological factors, eating habits, activity levels and psychosocial influences drives excess weight gain in an increasing proportion of the population[(5,6)]. However, the interactions among the variables related to obesity are poorly understood, and due to this lack of information, designing comprehensive, long-term strategies to fight obesity is challenging.

The EHU12/24 (code of a survey from the University of the Basque Country/Euskal Herriko Unibertsitatea) study addresses these research needs using a university community-based approach. This approach allows us to analyse the aetiology of obesity in a population whose life is governed by a large number of similar patterns, allowing for the more effective control of these variables. The general objective of this research is to investigate the risk factors of overweight/obesity related to lifestyles, particularly those associated with diet, their possible psychosocial influences and the interaction among these factors at different levels to untangle the causal pathways underlying this disease state.

This observational cohort study assesses the prevalence of body fat excess and major risk of developing overweight/obesity according to a standardised protocol and involved a representative sample of the University of the Basque Country UPV/EHU student population. Anthropometric measurements, direct behavioural determinants, such as physical activity (PA) and diet (from a health and environmental point of view), and indirect determinants, such as social/psychological factors, are considered. In particular, in this paper, we present the survey design, instruments, measurements, and related quality management. We describe the study sample in terms of its socioeconomic and demographic factors and knowledge area and summarise the methodology used to collect the data and obtain the anthropometric measurements.

According to other studies, the prevalence of obesity in the university student population ranges from 17.5 to 37.5%[(7-10)]. In addition, obesity appears to be associated with demographic factors (mainly the male sex and an older age), risk behaviours (an unhealthy diet, physical inactivity and alcohol and tobacco consumption), etc.[7-9]. Nevertheless, to the best of our knowledge, very few studies[11] have assessed the aetiology of obesity in university student populations from a broad perspective (that includes different determinants and their possible interactions), even though this population is particularly vulnerable to inadequate lifestyles, which have consequences on their health status[12,13].

However, as is well known, the specific causes of the accumulation of excess fat differ across population groups and a person's life course[4]. This variability is an important feature and highlights a range of different solutions. A rigorous analysis of evidence regarding the causation of obesity in the university student population of the EHU12/24 study could permit the identification of several key issues critical for designing strategies for the prevention and control of overweight/obesity. These strategies could take advantage of the naturally occurring opportunities offered by this stage of life (i.e., young adult) to induce behaviour changes. In this sense, taking into account the health benefits[14,15] of sustainable diets and the high sensitivity of young adults to issues related to the environment[16], we considered studying the dietary habits from the sustainability point of view to acquire knowledge that could allow us to design nutritional interventions that target increasing sustainable eating behaviours. Moreover, university students are likely to constitute a significant proportion of the socio-economic elite of the future; thus, their habits and behaviours are most likely to become the norm[17], rendering this population interesting to investigate.

Design, subjects and methods

Overall, the EHU12/24 study is an observational cohort study designed to address aetiological questions regarding overweight/obesity and related morbidities in students from UPV/EHU.

Sampling

The present study was intended to generate a representative sample of the UPV/EHU student population[18]. The sample was drawn from a list of students enrolled at the UPV/EHU in 2012/2013[18]. Assuming that the prevalence of overweight/obesity is 20.6%[19], the sample size was estimated to be 500 for an absolute precision of 3.5% and of 95% confidence using the EPIDAT 3.1 programme. Random sampling was used via the following two-stage process: first, a computer randomly selects the subjects according to their knowledge areas and age, and then the subjects are distributed by sex in each knowledge area. In this research, we assigned a weight to each participant such that the computed statistics based on the gathered data could be more representative of the population from which the data are retrieved[20].

Timeline

The students were assessed according to a standardised protocol between February 2014 and May 2017. The data registration process was planned to avoid data collection during exams to control for external factors that could generate stress or anxiety and affect behaviours, attitudes and weight status.

Study subjects

The present study was conducted according to the guidelines of the Declaration of Helsinki, and all procedures were approved by the Ethical Committee on Human Research of the UPV/EHU (CEISH/193/2013/ARROYO IZAGA). Written informed consent was obtained from all subjects. The students received compensation for undergoing nutritional assessments, including eating habits, body composition, and PA assessments, after participating in the study.

The following eligibility criteria for inclusion were established to recruit a healthy population: (1) Caucasian adults (majority ethnic group in this population) aged between 18-28; (2) no current reported diseases, except for overweight/obesity (the participants could have excess body fat), or conditions (such as being an athlete) that may affect the weight, height, frame size and/or body composition; (3) no relation to other participants; and (4) in the case of female students, no pregnancy or breast-feeding.

Procedures and survey modules

The modules in the present study were selected to cover the assessment of the body composition, including overweight/obesity and co-morbid conditions as the outcome variables and the putative key risk factors. **Figure 1** provides an overview of the major study components. Only instruments suitable for large-scale population-based surveys were eligible, and preference was given to well-proven or validated methods. Questionnaires designed in English were translated into Spanish using the back-translation method (i.e., the questionnaires were translated into Spanish and then translated back into English by a native English-speaker)[21].

Moreover, each instrument and measurement had to be suitable and ethically acceptable for use in this population and time efficient. The average duration of each assessment was approximately 1 h, and the assessments were preferably divided into 2 d to ensure adequate concentration while answering the questions. The study team established a mobile examination site that moved from faculty/university to faculty/university.

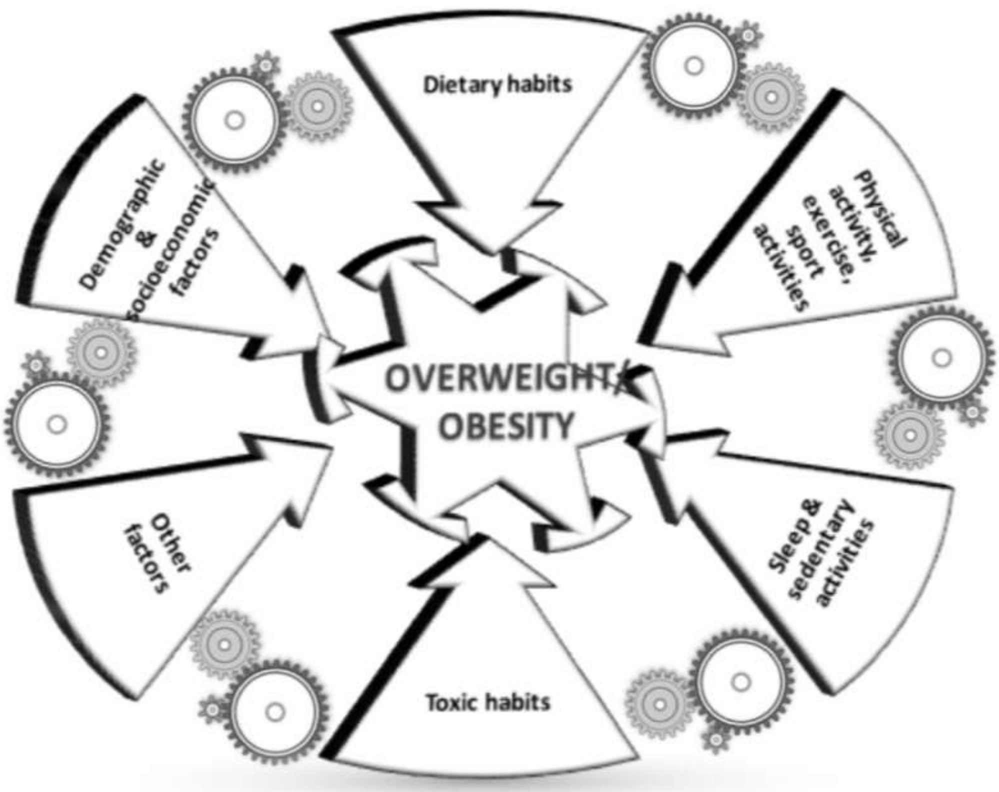

Figure 1. Design and major components of the EHU12/24 study

Questionnaires and measurements

The survey modules listed in **Table 1** included a face-to-face interview to assess the demographic and socioeconomic factors, family and personal history of diseases, academic data, lifestyles, body image and weight assessment, attitudinal factors related to the adoption of a low-fat, low-cholesterol diet, weight control behaviours, and nutrition knowledge and perform the anthropometric measurements.

Demographic and socioeconomic data. This component of the questionnaire included questions related to the age, sex, and place of birth of the participants, their parents' educational level, economic activity and occupation, their parents' professional category, the number of household members and the number of rooms used for sleeping. All these aspects were registered retrospectively with the National Health Survey[22].

To facilitate the data analysis, the parents' economic activity and professional category were recategorised as follows: parents' economic activity (working, retired or pensioner, or other (studying or unpaid leave)) and parents' professional category (service sector (professionals and technicians, executives and managers, administrative services, hotel industry, services or security); primary sector (agriculture and ranching industry, naval or fishermen); industry sector (qualified industry, construction and transport workers, non-qualified workers or cleaners); and other (housewives, unemployed or retired)). Based on the number of household members and number of rooms used for sleeping, an indicator of social status, that is, crowding index (number of household members/number of rooms used for sleeping), was estimated. This index was categorised as proposed by Cabrera de León et al.[23] by assigning a value of 0 if the index was higher than 2, 1 if the index was between 1 and 2, and 2 if the index was lower than 1; thus, the lower the score, the higher the social status.

Academic data. In addition to the school year, we recorded information regarding the bachelor's or postgraduate degree towards which the students were studying. The participants were classified according to the knowledge area of the degree for which they were studying based on the criteria proposed by the Spanish Ministry of Education, Culture and Sport[24] (Arts and Humanities, Sciences, Health Sciences, Social and Legal Sciences, and Engineering and Architecture). The knowledge area was dichotomized into Health Sciences and Non-Health Sciences.

Table 1. Overview of the measurements and variables collected in the EHU12/24 study

Method	Measurements of interest	Variables
Student face-to-face interviews	Demographic data	Age, sex and place of birth.
	Socioeconomic data	Parent's educational level, economic activity and occupation, number of household members and number of rooms used for sleeping. Crowding index.
	Academic data	School year and bachelor's or postgraduate degree. *Knowledge area*
	Medical history	Health state, life quality, stress level, history of personal and family diseases and age of menarche (female students).
	Lifestyles	Who he/she resides with and sentimental status. Dietary habits: food frequency, meal patterns (meal frequency, type of meal, changes in dietary habits on weekends, duration and place of eating, the person responsible for shopping and cooking, changes in the consumption of specific food groups over the past 5 years, and the respondents' perception of the nutritional quality of their diet). *Energy intake, macro/micronutrients (based on food composition tables), adequacy of energy and nutrient intake, diet quality index (Healthy Eating Index and MedDietScore), and the interval between meals.* *Environmental sustainability: kg* eCO_2*/person related to dietary habits.* Environmental motives for choosing foods (subsample). Sleep and sedentary behaviour (time spent sitting). PA (type of activity, days per week, time per day, main activity during the day, frequency of activity during free time, and self-reported levels of PA), practice of physical exercise or sport activities (exercise *vs.* competitive sport and type of exercise/sport activity), and reasons for not practising any exercise/sport activity. *The METs-min/week, classification by activity level.*

To be continued in the next page.

Continuation of Table 1.

Method	Measurements of interest	Variables
Student face-to-face interviews	Lifestyles	Toxic habits: alcohol consumption (frequency and type of alcohol) and smoking habit (yes or no, age at start, and number of cigarettes per day). *SDU.*
	Body image assessment	CBS, IBS, RBS and ABS *t*-scores. CBI, IBI, FBI, MBI, and ABI for the upper and lower parts of the body. *Body image dissatisfaction: CBS - IBS t-scores, CBS - RBS t-scores,* and *CBI - IBI for the upper and lower parts of the body.*
	Attitudinal factors related to the adoption of a low-fat, low-cholesterol diet	Helpless and Unhealthy, Food Exploration, Meat preference and Health Consciousness.
	Weight control	Changes and maintenance of weight, place and frequency of weigh-ins, weight perception, and weight control behaviours.
	Nutrition knowledge	Questions regarding energy and nutrient contents, food comparisons and procedural nutrition knowledge questions regarding the relative contribution of different food groups to a healthy nutrition, the role of fat and the benefit of fruit and vegetable consumption.
Anthropometry	Measurements	Weight (kg), height (cm), circumferences (arm, waist and hip), breadths (biacromial, biiliac, elbow and knee, cm) and skinfold thicknesses (bicipital, tricipital, subscapular, suprailiac, abdominal, front thigh and medial calf, mm). *Anthropometric index and body composition: BMI, BF, FMI, FFM, FFMI, WHR, body fat distribution (arms, legs, and trunk) and frame size (trunk and extremities).*
	Body weight assessment (self-reported and measured data)	Self-reported weight and height, desired weight, and healthy weight. *Body weight perception, BMI perception, body weight dissatisfaction, healthy weight perception.*

ABI, attractive body image; ABS, attractive body size; BF, body fat; CBI, current body image; CBS, current body size; FBI, father's body image; FFM, fat free mass; FFMI, fat free mass index; FMI, fat mass index; IBI, ideal body image; IBS, ideal body size; MBI, mother's body image; METs, metabolic equivalents; PA, physical activity; RBS, reasonable body size; SDU, standard drink units; WHR, waist:hip ratio. Text in italics corresponds to data derived from direct measurements

Medical history. The students were asked about their perceived health[22], life quality and stress level[25]. Their history of personal and family diseases was recorded using the list of the National Health Survey[22,26]. In addition, we recorded the age of menarche because it is related to adiposity[27].

Who he/she resides with and sentimental status. Data related to the respondents' habitual place of residence and sentimental status were recorded using the questionnaire developed by Bennassar[25]. Sentimental status can be defined as the status of each individual in terms of partner relationships regardless of that person's legal marital status. Persons who have the sentimental status of a "partner" can live with or without a spouse or partner, while all other persons who have the sentimental status of "no partner" are not a part of a couple.

Dietary intake. Diet was assessed using a short food frequency questionnaire (SFFQ), which is a modified and validated version of the Rodríguez *et al*. questionnaire[28]. The validity and reproducibility of the SFFQ were assessed by comparing energy, nutrients and food intake, the correlations between the intakes derived from two different dietary survey methods (SFFQ and 24-hour dietary recall) and the correlations between two different surveys (baseline and second FFQ) (manuscript under revision).

Using this questionnaire, the students were first asked whether they consume each specific item. If the participants affirmed consumption, they were asked about the usual frequency of consumption (daily, weekly or monthly) of one standard serving[29]. The daily intakes of each food item were determined based on the average consumption frequency and the amount of each food item consumed. For items that included several foods, each food's contribution was estimated with weighting coefficients obtained from the usual consumption data[30]. Then, to estimate the energy and nutrient intake, all food items consumed were entered into DIAL 2.12[31], which is a dietary assessment programme. The food intake results are expressed as the daily consumption (g) per 1,000 kcal. Moreover, the participants were asked an open question allowing them to report if they had eaten any food or drink not included in the questionnaire during the last month and the frequency. The participants were also asked if they were on a diet and to describe the reasons[32].

To check if the study participants under- or overestimated their dietary intake, we used the method proposed by Goldberg[33] and updated by Black[34], which uses predicted BMR (calculated from age- and sex-specific equations, such as those derived by Schofield, which are the most frequently used in dietary studies[35]) and the ratio of the reported energy intake to BMR to estimate the amount of energy available for activity.

Macronutrients are expressed as a percentage of the total energy intake and were compared with the acceptable macronutrient distribution ranges, that is, ranges associated with a reduced risk of chronic disease that provide an adequate intake of essential nutrients[36]. Lipid consumption was evaluated using the nutritional objectives for the Spanish population[36]. The method used to evaluate the nutrient adequacy was the estimated average requirements, that is, the average daily nutrient intake level estimated to meet the requirement of half of the healthy individuals in a particular life stage or sex group[37,38]. The results are expressed as percentages of the estimated average requirements.

In addition to the adequacy of the energy and nutrient intake, adherence to food-based dietary guidelines was evaluated using the Healthy Eating Index (HEI)[39] and the MedDietScore (MDS)[40]. Although specific to US dietary guidelines, the HEI has has been widely used in European populations and even in studies involving European university students[41,42] which allows us to establish results comparisons. Moreover, information about meal patterns was recorded using a questionnaire based on validated forms[25,32] that included the following: meal frequency, the location where the participants eat on weekdays, whether the participants eat alone or accompanied by others and changes in dietary habits over the weekends.

Furthermore, the participants were asked to describe how they usually ate on an “ordinary” day by specifying the time of meals and choosing the type of meal that best corresponds to their own meal (main meal and snack meal). The aim was to identify all intake occasions, even those consisting of only a drink. Breakfast was identified as a main meal despite usually being a light meal according to the Sociedad Española de Nutrición Comunitaria[43] guidelines, which is similar to the 40-year trends observed in meal and snack eating behaviours in American adults[44]. Based on the recorded data, the mean time between main meals and between all meals was estimated. Information regarding the person responsible for food shopping and cooking[25]; the students’ perception of their eating habits, diet quality and daily energy intake; their nutrition knowledge and changes in consumption of twenty specific food groups over the past 5 years was assessed. These last five items were registered using the questions developed by Scott[32].

Furthermore, dietary habits were assessed from the sustainability point of view because according to the scientific literature, sustainable diets can reduce global greenhouse gas emissions (GHGE) and have simultaneous public health benefits, such as reductions in overweight and obesity levels[14,15]. A literature review was performed using PubMed to identify articles from 2000 to 2015 to identify the quantity of GHGE expressed as kg eCO_2/kg in response to each type of food product. The key words used were “greenhouse gas emissions”, “food consumption”, “sustainable diet”, “life cycle”, "carbon footprint", “cultivated planet” and “environmental impact”. The data were selected by considering the geographical proximity to our environment and were verified by comparing different sources when possible.

To unify the data regarding the life cycle of all products, correction factors were applied to those that did not include the GHGE, corresponding to home transport and/or to waste. Moreover, the food groups were classified according to the same criteria used in other studies investigating the GHGE of diets[45], and the food items in each group were selected from the most frequently consumed items listed in the quantitative study of food consumption in the Basque Autonomous Community[30]. Therefore, we estimated the kg eCO_2 per person and day by considering their dietary intake from the SFFQ and where they eat (at home, in the canteen, etc.), using GHGE data from the literature review.

Regarding the dietary intake, in a subsample of 237 students (44.3% female), the environmental motives for choosing foods were analysed with a short version of the questionnaire developed by Sautron *et al.*[46]. The original questionnaire included 104 questions divided into four categories (environmental, health and well-being, economical and miscellaneous) predefined by experts and using extensive literature reviews. In the short version, we selected fifteen items related to the general aspects of food purchasing and fifteen questions focusing on the motives for choosing specific food groups (meat, fish, fruit and vegetables and dairy products) from the original items related to environmental questions. The reliability of the short version of the questionnaire was verified using Cronbach’s α. The result was 0.905, indicating strong internal consistency.

Sleep, sedentary behaviour, physical activity, exercise and sport activity. The self-reported sleep duration was ascertained by the following question: "On an average school night, how many hours of sleep do you get?"[22]. The PA (type of activity, days per week, time per day, main activity during the day, and frequency of activity during free time) and sedentary behaviour (SB) (time spent sitting) related data were registered through the International Physical Activity Questionnaire in its short-form version (IPAQ short version)[47]. Furthermore, the current self-reported levels of PA ("Compared with other people your age, would you say you are physically more active, less active, or about as active?"), practice of physical exercise or sport activities, exercise and competitive sports, and type of exercise/sport activity (individual or team sport) were also registered. These data were collected with a survey developed and validated by the Adult Physical Activity Questions on the National Health Interview Survey: 1975-2012[48], and the question reasons why they do not practice any exercise/sport activity was registered following Romaguera's questionnaire[49].

Toxic habits. Smoking habit (yes or no, age at start and number of cigarettes per day) and alcohol consumption (yes or no, frequency of consumption and type of alcohol) were registered using the questions from the National Health Survey[22]. Moreover, the SFFQ included specific questions about the frequency of intake of the following five major types of alcoholic beverages: beer, wine, cider, aperitif with alcohol and liquor. The alcohol consumption data are expressed as grams of alcohol and standard drink units (SDUs) per week[50], weekdays (from Monday to Thursday) and weekends (from Friday to Sunday). In the present study, we used the SDU defined for Spain (one SDU is the equivalent to 10 g of alcohol). With this information, the participants were categorised into non-drinker/moderate consumption and risk consumption categories according to the Sociedad Española de Nutrición Comunitaria criteria, which considers moderate drinking up to one SDU per d for women and up to two SDU per d for men[43]. Based on the tobacco consumption, the following subgroups were established: non-smoker, smoker of less than 10 cigarettes/d, smoker of 10-20 cigarettes/day and smoker of more than 20 cigarettes/day[22].

Body image assessment. Body image was evaluated using the figural stimulus method developed by Williamson *et al.*[51] and the scale developed by Brownell[52]. The first assessment was developed for estimating body image in studies of obesity. This methodology was based on self-discrepancy theory[53] and measures a person's estimate of his/her actual or current body size, ideal body size and reasonable body size. The second assessment, that is, Brownell's method[52], involves a set of eight human figures for the upper part of the body and eight for the lower part developed for each sex. The subjects indicate the figures that best represent how they currently look (current body image), how they ideally wish to look (ideal body image), how their parents currently look (father's body image and mother's body image), and how their ideal opposite or same sex person would look depending on their sexual orientation (attractive body image). The discrepancy between the current body image and ideal body image (current body image minus ideal body image) was used as a measure of body image dissatisfaction. In addition, the body image dissatisfaction was measured with a Likert scale ranging from 1 (not satisfied) to 7 (extremely satisfied).

Attitudinal factors related to the adoption of a low-fat, low-cholesterol diet. Nutrition attitudes were assessed using a translation of the questionnaire developed by Hollis et al.[54]. This method measures cognitions and behaviours pertaining to the adoption of a low-fat, low-cholesterol diet, and the items load on the following four primary factors: a) helpless and unhealthy, b) food exploration, c) meat preference and d) health consciousness.

Weight control. Weight control refers to whether effort is exerted to control weight. This aspect was assessed through the Weight Cycling Survey[52,55,56], which includes fifteen questions grouped into the following four primary factors: changes in and maintenance of weight, place and frequency of weigh-ins, weight perception and social attitudes, and weight control behaviours.

Nutrition knowledge. The participants completed the Consumer Nutrition Knowledge Scale[57]. The Consumer Nutrition Knowledge Scale provides consumers a chance to show their nutrition knowledge (rather than their lack of knowledge), particularly for those unfamiliar with scientific nutrition terms. We used a translated version of the original questionnaire, and the only adaptation was the use of a usual cheese in this region instead of mozzarella and Gruyère in the following sentence: "A sandwich with mozzarella contains as many energy intake as the same sandwich with Gruyère cheese".

Anthropometric measurements. A well-trained anthropometrist performed all measurements following the ISAK protocols[58]. The anthropometrical measurements analysed included the following: weight (kg), height (cm), ileoespinal height (cm), sitting height (cm), circumferences (arm, front thigh, medial calf, waist and hip, cm), breadths (biacromial, biiliac, elbow and knee, cm) and skinfold thicknesses (bicipital, tricipital, subscapular, suprailiac, abdominal, front thigh and medial calf, mm). Based on the body weight and height data, we calculated the BMI using the formula weight (kg)/height^2 (m^2). The weight status of the subjects was classified according to their BMI using the criterion of the World Health Organization[59]. The percentage of body fat (BF%) was calculated with skinfold data using the Siri-age-sex equation[60] as recommended by the Spanish Society of Obesity Research[61], and the density was estimated using the Durnin and Womersley formula[62]. The fat mass index (BF (kg)/m^2) was estimated from the BF (kg) and height (m). The fat free mass was derived from the BF% (100-BF%), and the fat free mass index was obtained as follows: fat free mass divided by height (m) squared (kg/m^2).

The subjects' BF% was classified using the criteria proposed by Bray et al.[63]. The regional BF distribution was assessed by the waist circumference, waist:hip ratio and sum of skinfold thicknesses[64]. The waist circumference was interpreted using the SEEDO's criteria[65], and the waist:hip ratio results were interpreted based on the cut-offs proposed by Heymsfield *et al.*[66], which were applied in cases in which the BF% was higher than normal. The sum of the subscapular, abdominal and suprailiac skinfold was used as an indicator of trunk subcutaneous fat. The sum of the biceps and triceps skinfold thicknesses was used as an indicator of arm subcutaneous fat, and front thigh and medial calf skinfold thicknesses were used as an indicator of leg subcutaneous fat. The skeletal frame size was determined using the measured breadth, that is, biacromial and biiliac breadth for the trunk-frame and elbow and knee breadth for the extremity-frame size[64].

Body weight assessment. The self-report form asked for height (without shoes) in centimetres and weight in kilograms (without clothes). The self-reported and measured data were obtained on the same day, but the self-reported values were obtained without the participants knowing that they would be subsequently measured. Therefore, the self-reported values are similar to those obtained in an epidemiological study based only on self-reported measures. The individuals were also asked about their desired weight ("What would you say is your ideal weight?") and healthy weight ("What would your doctor say is your ideal weight according to the standard height-weight charts?")(55).

The body weight perception and the BMI perception were assessed using the differences between the self-reported and measured weight and BMI(67) as follows:

Body weight perception (1)=((self-reported weight - measured weight) / measured weight) x 100

BMI perception=((self-reported BMI - measured BMI) / measured weight) x 100

The variables arising from the desired weight and healthy weight were also operationalized as the "weight difference percentage"(67).

Body weight dissatisfaction =((desired weight - self-reported weight) / self-reported weight) x 100

Healthy weight perception (1)=(healthy weight - self-reported weight) / self-reported weight) x 100

Healthy weight perception (2)=(healthy weight - measured weight) / measured weight) x 100

Healthy weight perception (3)=(desired weight - healthy weight) / healthy weight) x 100

A "weight difference percentage" greater than or equal of 5% was considered a meaningful difference. The 5% cut-off was used in a previous study(68) to assess the desire to weigh less using the discrepancy between the desired and actual weight. This method was preferred due to its simplicity and utility(69).

Quality management

All measurements followed detailed standard operation procedures that were described in the survey manual and finalised after the pilot study of all modules. All subjects who participated in the study interviews received training sessions. All measurements were performed with the same technical equipment. We used unique subject identification numbers that were attached to each recording sheet. To check for quality data, subsamples of study subjects were repeatedly examined to calculate the intra-observer reliability of the anthropometric measurements. In addition, the reliability of the questionnaires was checked by re-administering the questionnaires to a convenient sample of study participants. The data set was made available for analysis on a protected central data server. Access to the data is restricted to authorised members of the study.

Statistical analysis

The data were analysed utilizing SPSS version 22.0 (SPSS Inc., Chicago, IL) and are reported as the mean values and standard deviation and frequencies. The survey results were weighted using weighting coefficients provided by the list of students enrolled in 2012/13(18). The symmetry of the distribution of the continuous variables was determined by a Kolmogorov–Smirnov–Lilliefors test. The differences between the variables were calculated with the Kruskal Wallis H test (the variables were not normally distributed due to weighting the data and the large sampling size, thus the small deviations rendered the variables not normally distributed). The categorical variables were analysed using the χ^2 test. The analyses were conducted separately for male and female students because of their differences in dietary intake(70), other lifestyles(71,72), knowledge area (Health Sciences and Non-Health Sciences) and age variables. This final variable was re-categorised into four subcategories (18, 19, 20 and ≥21 years). The age differences were calculated with respect to the chronological age to analyse the possible differences due to physiological changes (anthropometry and body image) and environment adaptation. All tests were two-sided, and *P*-values < than 0.05 were considered statistically significant.

Results

Participation

Table 2 provides information regarding the UPV/EHU population, the theoretical sample we achieved, the real sample we obtained, the participation rate by knowledge area and age, the weighting coefficient assigned to each participant, and these data stratified by sex. In total, 696 of the 1,300 students who were invited to participate in the study gave their consent and participated, resulting in a response rate of 53.5% (Table 2). To be valid for inclusion in the data analysis, the questionnaire (face-to-face) and anthropometry measurements were required. This requirement was met by 603 study participants, accounting for 46.4% of all participants invited to participate in the research. In **Figure 2**, the number and reasons for participant exclusion are shown.

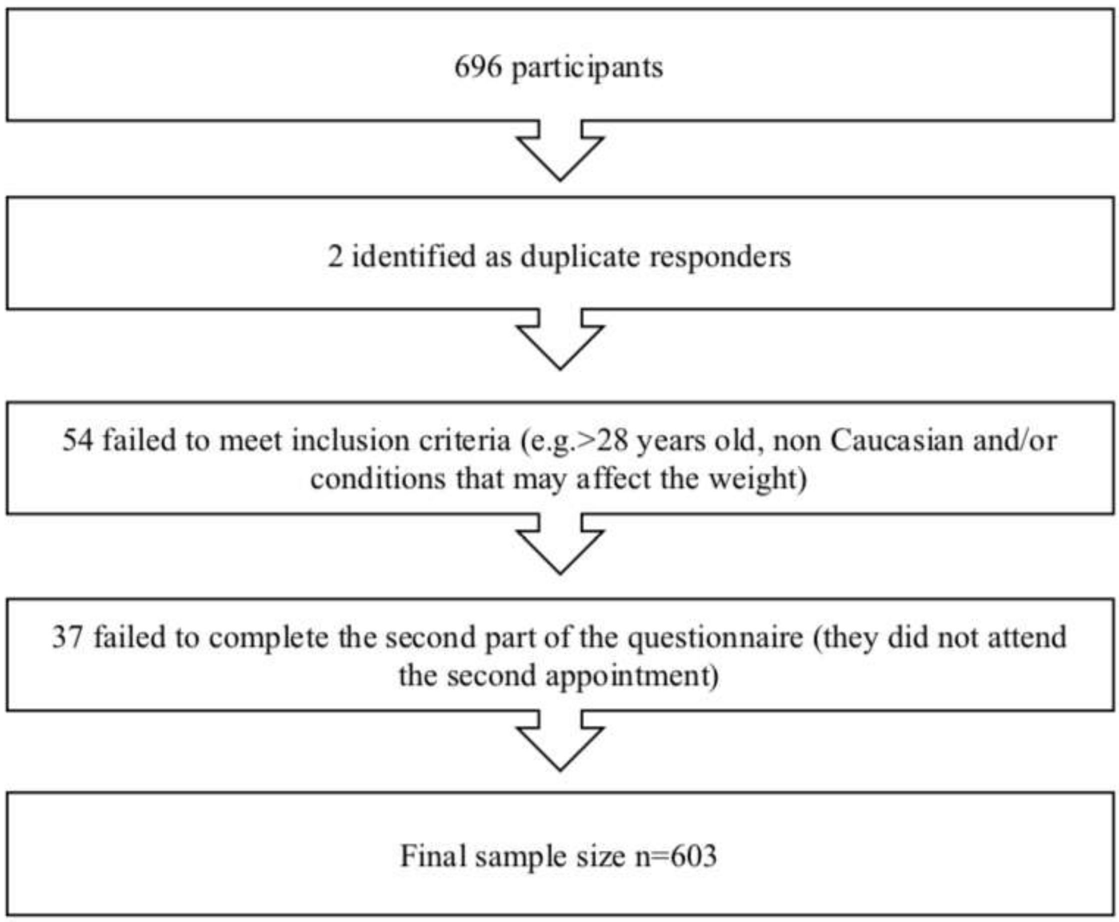

Figure 2. Number of students excluded based on the fulfilment of various eligibility criteria

Regarding the knowledge area, the lowest response proportions were in the Health Sciences (38.6%) and the highest proportions were in the Arts and Humanities (52.5%) ($P<0.001$); this tendency continued when we compared the participation of the Health Sciences and Non-Health Sciences students (38.6% vs. 48.3%; $P=0.003$). Regarding age, the 19-year-old participants were the least represented (20.9%) and the oldest students were the most represented (35.5%) ($P<0.001$).

Table 2. Population and sample of students of the University of the Basque Country (UPV/EHU) by knowledge area, age and sex

Knowledge area	Age	UPV/EHU population[1] n	UPV/EHU population[1] %	Theoretical sample n	Theoretical sample %	Real sample n	Real sample %	Participation rate (%)	Weighting coefficient	Female: UPV/EHU Population n	Female: UPV/EHU Population %	Female: Theoretical sample n	Female: Real sample n
Sciences	18	512	26.7	9	25.7	17	24.3	45.7	30.1	1.955	54.3	21	37
	19	521	27.2	10	28.6	12	17.1	54.0	43.4				
	20	433	22.6	8	22.9	14	20.0	48.3	30.9				
	≥21	450	23.5	8	22.9	27	38.6	37.5	16.7				
	Total	**1,916**	**7.7**	**35**	**100.0**	**70**	**100.0**	**46.4**[2]					
Engineering and Architecture	18	1,362	20.4	27	20.6	30	23.1	42.9	45.4	1.817	25.2	33	41
	19	1,234	18.5	24	18.3	21	16.2	36.9	58.8				
	20	1,238	18.5	24	18.3	31	23.8	48.9	39.9				
	≥21	2,842	42.5	56	42.7	48	36.9	50.5	59.2				
	Total	**6,676**	**26.2**	**131**	**100.0**	**130**	**100.0**	**44.8**[2]					
Health Sciences	18	765	21.0	15	21.4	31	26.3	43.8	24.7	2.936	76.3	52	92
	19	902	24.8	17	24.3	27	22.9	45.9	33.4				
	20	824	22.7	16	22.9	26	22.0	47.9	31.7				
	≥21	1,145	31.5	22	31.4	34	28.8	16.7	33.7				
	Total	**3,636**	**13.7**	**70**	**100.0**	**118**	**100.0**	**38.6**[2]					
Social and Legal Sciences	18	1,869	16.1	37	16.8	39	18.8	40.1	47.9	7.264	59.9	126	142
	19	2,334	20.1	46	20.0	51	24.5	54.9	45.8				
	20	2,436	21.0	48	21.8	46	22.1	47.3	53.0				
	≥21	4,985	42.9	89	40.4	72	34.6	55.9	69.2				
	Total	**11,624**	**42.1**	**220**	**100.0**	**208**	**100.0**	**49.6**[2]					

To be continued in the next page.

Continuation of Table 2.

Knowledge area	Age	UPV/EHU population[1] N	UPV/EHU population[1] %	Theoretical sample n	Theoretical sample %	Real sample n	Real sample %	Participation rate (%)	Weighting coefficient	Female UPV/EHU Population n	Female UPV/EHU Population %	Female Theoretical sample n	Female Real sample n
Arts and Humanities	18	488	21.1	10	20.8	18	23.4	61.4	27.1	1.638	65.3	34	57
	19	545	23.6	11	22.9	15	19.5	37.4	36.3				
	20	592	25.6	12	25.0	11	14.3	52.7	53.8				
	≥21	689	29.8	15	31.3	33	42.9	58.3	20.9				
	Total	**2,314**	**10.4**	**48**	**100.0**	**77**	**100.0**	**52.5[2]**					
	TOTAL	**26,166**		**504**		**603**		**46.4[3]**					

[1]The sample was drawn from the matriculation list of the UPV/EHU in 2012/2013[18]; [2]Participation rate by each knowledge area; [3]Participation rate in the total sample.

Demographic and socioeconomic characteristics

Some demographic and socioeconomic characteristics of the study participants are displayed in **Table 3**. The mean age of the students was 20.9 years, and 59.5% of the participants were girls. Overall, 83.1% of the sample were from the autonomous community of the Basque Country, 2.4% of the participants were from a foreign country, and the remaining participants were from other autonomous communities in Spain. There were sex differences (*P*<0.001) in all variables (age, place of birth, parents' education level, economic activity, occupation and professional category), except for the crowding index.

Table 3. Demographic and socioeconomic characteristics of the sample: students of the University of the Basque Country (UPV/EHU) by sex (Mean values and standard deviations; percentages)

Variables,	Total sample (n=26,165)[5]		Male (n=10,607)[5]		Female (n=15,558)[5]		*P*†
Age, years	20.9	2.1	21.1	2.3	20.7	2.0	***
Place of birth							
Basque Country	83.1		82.6		83.4		
Spain (except for Basque Country)	14.5		15.4		13.9		
Europe (except for Spain)	1.2		1.5		1.1		
South America	1.2		0.4		1.7		***
Parents' education level							
University studies	46.5		54.9		40.7		
Other[1]	53.5		45.1		59.3		***
Father's economic activity							
Work	86.9		89.4		85.3		
Retired or pensioner	7.3		6.4		8.0		
Other[2]	5.7		4.2		6.8		***
Mother's economic activity							
Work	74.6		76.9		73.0		
Retired or pensioner	1.4		0.9		1.8		
Other[2]	24.0		22.3		25.2		***

To be continued in the next page.

Continuation of Table 3.

Variables	Total sample (n=26,165)[5]	Male (n=10,607)[5]	Female (n=15,558)[5]	*P*†
Father's occupation				
Steady salaried employee	68.3	71.7	66.1	
Temporary salaried employee	2.7	2.5	2.9	
Other[3]	28.9	25.8	31.0	***
Mother's occupation				
Steady salaried employee	66.5	67.5	65.7	
Temporary salaried employee	7.3	5.4	8.5	
Other[3]	26.3	27.1	25.7	***
Father's professional category				
Service sector	67.1	76.9	75.4	
Primary sector	2.0	1.9	0.2	
Industrial sector	27.2	17.9	7.2	
Other[4]	3.7	3.2	17.1	***
Mother's professional category				
Service sector	70.5	60.4	67.2	
Primary sector	0.3	2.0	0.4	
Industrial sector	10.6	33.6	12.8	
Other[4]	18.6	4.1	19.6	***
Crowding index				
> 1	40.9	40.5	41.2	
≤ 1	59.1	59.5	58.8	NS

[1]None of both has university degrees; [2]Being sick for 3 months or more, unemployed, studying, unpaid leave or housewife; [3]Studying, unpaid leave or housewife; [4]Housewife, unemployed and retired; [5]Survey results were weighted using the weighting coefficients provided by the UPV/EHU.
P*<0.05; ** *P* <0.01; * *P* <0.001; NS, not significant (*P*>0.05).
†Sex differences.
SD, standard deviation.

Regarding the demographic and socioeconomic characteristics of the students by knowledge area (**Table 4**), compared with the other students, the Health Sciences students were more likely younger, from outside the Basque Country, to have parents with university degrees and to have a higher social status. Relative to the sex distribution by knowledge area, there were more female students than male students pursuing Health Sciences degrees (18.2% vs. 7.5%; *P*<0.001).

Table 4. Demographic and socioeconomic characteristics of the sample: students of the University of the Basque Country (UPV/EHU) by knowledge area (Mean values and standard deviations; percentages)

Variables	Health Sciences (n=3,637)[5]		Non-Health Sciences (n=22,529)[5]		*P*†
Age, years	20.7	2.1	20.9	2.1	***
Place of birth					
Basque Country	71.7		84.9		
Spain (except for Basque Country)	26.7		12.5		
Europe (except for	-		1.5		
Spain)	1.6		1.1		***
South America					
Parents' education level					
University studies	48.1		46.2		
Other[1]	51.9		53.8		*
Father's economic activity					
Work	85.5		87.2		
Retired or pensioner	9.2		7.0		
Other[2]	5.3		5.8		***
Mother's economic activity					
Work	69.5		75.4		
Retired or pensioner	1.8		1.3		
Other[2]	28.6		23.3		***
Father's occupation					
Steady salaried employee	68.3		68.3		
Temporary salaried employee	3.3		2.6		
Other[3]	28.4		29.0		*
Mother's occupation					
Steady salaried	65.5		66.6		
employee	7.4		7.2		
Temporary salaried					
employee	27.1		26.2		NS
Other[3]					

To be continued in the next page.

Continuation of Table 4.

Variables	Health Sciences (n=3,637)[5]	Non-Health Sciences (n=22,529)[5]	*P*†
Father's professional category			
Service sector	67.2	67.0	
Primary sector	4.4	1.6	
Industrial sector	26.5	27.4	
Other[4]	1.9	4.0	***
Mother's professional category			
Service sector	71.1	70.4	
Primary sector	2.3	-	
Industrial sector	5.2	11.4	
Other[4]	21.4	18.1	***
Crowding index			
> 1	33.8	42.1	
≤ 1	66.2	57.9	***

[1]None of both has university degrees; [2]Studying, unpaid leave; [3]Studying, unpaid leave or housewife; [4]Housewife, unemployed and retired; [5]Survey results were weighted using the weighting coefficients provided by the UPV/EHU.
P*<0.05; ** *P* <0.01; * *P* <0.001; NS, not significant (*P*>0.05).
† Knowledge area differences.
SD, standard deviation.

Discussion

The EHU12/24 study was successful in obtaining a large sample of 603 participants, all of whom agreed to participate in the full study protocol (face-to-face interview and anthropometric measurements). The crude participation rate of 53.5% may seem low compared with some studies involving university students(71). However, in our research, this rate is justified because the interview required 1 h of their leisure time and included direct anthropometric measurements without any economic incentives offered to the students. Consideration this requirement, the proportion of participation may be considered quite good and is similar to that in other studies(73) involving university students.

Relative to the distribution of the participants by knowledge area, the data are similar to those obtained in a study involving university students in Balearic Islands(25), except for data related to students in the Social and Legal Sciences and Engineering and Architecture, because fewer students in the first area and more students in the second area were enrolled in the present study compared with other studies. In the present study, random sampling was stratified by the distribution of knowledge area in the UPV/EHU. In addition, these discrepancies should not affect the comparison of studies because in our research, the knowledge area variable was recategorised as Health Sciences and Non-Health Sciences, and the two areas mentioned above are included in the same category (Non-Health Sciences). In our study, the Health Sciences students were the least represented, which could be because the object of the study and the type of reward offered are related to the Health Sciences, and students of this knowledge area are frequently invited to participate in research studies.

The mean age of our subjects was similar to that in other studies conducted in the UK(74) and Greece(75) but was lower than that in another study with similar characteristics to ours involving university students in different regions of Spain(19). This final result could be due to the exclusion of students older than 28 years in our study given that these students represented 3.0% of the total sample (and 2.5% of the UPV/EHU's population). The age differences by knowledge area found in the present study are due to the weighted sample because small deviations in large samples led to significant differences and the fact that a decimal age was used in this research. In the case of female participation, our data were representative of the UPV/EHU population and slightly higher than those of studies involving representative samples from the Balearic Islands(71) and of Almería(76).

The place of birth of more than three quarters of the participants was the same community in which the University is located (the Basque Country), which is similar to other studies involving Spanish students(77,78), and these data are consistent with annual reports titled "The Spanish University in numbers" published by the *Conferencia de Rectores de las Universidades Españolas* (CRUE)(79). There are many reasons that could explain the reduced mobility of students in our country as follows: a) Spanish universities have configured a model of diversified and territorial proximity to students; b) there are also few scholarships, especially for mobility(79); c) in the UPV/EHU, it is possible to study all subjects of a bachelor's degree in Basque; and d) family attachment. The number of scholarships is limited, with fewer scholarships available in Basque than in other European countries with a similar development level(79). The percentage of students from outside Basque Country pursuing Health Sciences degrees was higher than that of students pursuing Non-Health Sciences degrees, which may be because more Health degrees are offered at this university than at the nearest public universities, such as University of Cantabria, La Rioja or Navarra.

Regarding the socioeconomic data, the percentage of students' parents with university education is lower than that observed in data obtained in studies carried out in Sweden(80) and northern Greece[81]. However, notably, the General Education Law in Spain[82] was approved in 1970, and among its fundamental characteristics, compulsory education was provided to the Spanish population between the ages of 6 and 14 years, demonstrating concern for quality education for all; subsequently, the rate of university students has gradually increased. However, our data showed a higher proportion of parents with a university education than that in other research carried out in Spain[49]. Despite both being communities of Spain, Romaguera’s study is performed in the Balearic Islands, and currently, the Basque Autonomous Community is a Spanish community with the highest rates of university students, while the Balearic Islands has the lowest[83]; therefore, it is likely that the trend was similar 30 years ago. Our parents’ economic activity data were similar to those of the public University of Santiago de Compostela (Spain)[84]. These final data could be interesting because some researchers have suggested that the economic level and mother’s studies modulate health behaviours[85,86].

Strengths and limitations

The fact that the present study provides updates regarding a topic with only a few previous studies focusing on the risk factors of overweight/obesity related to lifestyles, especially those associated with diet, in students of the University of the Basque Country could be considered the most important strength. The main limitations of the current research are as follows: First, the cross-sectional design limits the assessment of causality in the observed associations, and the dietary habits, PA, sport practice, leisure time activity and sedentary behaviour data were self-reported by the students and may be subject to respondent bias. In the case of food intake, these data were self-reported, which could imply under- or overestimation, especially in certain groups characterised by weight status or sex[87]. However, the SFFQ can provide valid information regarding intake for a large number of nutrients[88].

Second, the data were collected through face-to-face interviews and, thus, they could be imprecise and prone to bias. However, to reduce the variability due to different interpretations of the questionnaires, all questions were administered by the research team, and some guidance was given to avoid misinterpretations. In epidemiologic research, participants’ answers are dependent on social desirability, but few databases have extended information about lifestyle in a manner similar to the present study.

Third, all anthropometric measurements were performed by the same person, which considerably reduces the total measurement error. Fourth, although we adjusted for several variables considered important in the analysis of possible associations between variables, we cannot exclude the possibility that other sociocultural and environmental factors that were not considered may have attenuated the associations investigated.

Fifth, regarding the selection of the methodology used to analyse the GHGE related to dietary habits, we did not consider several steps in the life cycles of products, such as cooking the products at home, because of the lack of data regarding this item in many foods studied. Finally, sixth, the findings are based on a sample of university students; the educational level could affect the participants' lifestyles. Thus, the results may not be generalizable to all people of the same age group. Replicating this study beyond the university setting is recommended.

Conclusions

In summary, using a set of protocolised measurements, for the first time, the EHU12/24 study generated a large amount of data regarding the determinants of obesity in a community of university students. These data include not only basic indicators of obesity, such as weight, height and other anthropometric measurements, but also healthy and unhealthy behaviours related to this disease, psychosocial influences and possible interactions among these factors. Thus, the EHU12/24 cohort provides valuable data for analyses of the complexity of obesity and the inter-relationships among the determinants of this disease state in university students.

Because the period of university studies is an ideal period to promote healthy living, the data collected in this study could provide further insight into the causal mechanisms and help identify the main driving factors amenable to primary prevention. The authors hope that this report could help other researchers replicate this survey in other student communities in order to easily and accurately compare their results. However, notably, some questionnaires include culturally sensitive topics, such as dietary habits, and should be adapted and validated in the population of interest.

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Conflict of Interest

None.

Authorship

The author contributions are as follows: M. A.-I., A. M. R., E. R. and N. T.-A., contributed to the conception and design of the research; M. A.-I. and N. T.-A acquired and analysed the data, interpreted the results, and finally drafted the manuscript. All authors revised the paper and approved the final version of the manuscript.

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4. Results

Study 1

Public Health Nutrition

Adaptation, validation and reproducibility of a short food frequency questionnaire to assess food group intake in the population resident in the Basque Country (Spain)

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In press.

Abstract

Objective:

To adapt a short food frequency questionnaire (SFFQ) and evaluate its relative validity and reproducibility to assess food group intake in a population resident in the Basque Country. Moreover, the possible influence of associated variables (such as educational level) on its validity and reproducibility was determined.

Design:

Nine-day 24-hour recalls (24HR) were used as a reference to explore validity over the course of 1 year. The degree of misclassification in the SFFQ was evaluated by a contingency table of quartiles and by Bland-Altman plots comparing SFFQ2 and 24HRs. The SFFQ was administered twice to explore reproducibility at 1 year.

Setting:

Basque Autonomous Community.

Participants:

Adults aged ≥21 years (n=99). The sample was randomly selected and representative of the target population.

Results:

For validity, statistically significant correlations were observed for more than half of the food groups, with the lowest correlations (r or rho) for fat (-0.008) and the highest for other foods (0.963). The mean percentage of the subjects' food intake that was classified into the same or adjacent quartile in both methods was 75.2%. Reproducibility was explored by the correlation coefficient and ranged from 0.201-0.809, and 82.6% of the participants were in the same or adjacent quartile in both SFFQs. The associated variables did not seem to influence the validity and reproducibility of the SFFQ.

Conclusions:

An adapted SFFQ presented good reproducibility and validity for measuring most food groups in the target population, and these results did not seem to be influenced by associated variables.

Key words:

Food frequency questionnaire; validity; reproducibility; food groups; 24-hour recalls; dietary intake; Spain.

Introduction

Cancer and circulatory system diseases are the principal causes of mortality in the Basque Autonomous Community[1] and Spain[2], and these data are in line with the mortality rates of the European Region according to World Health Organization's report[3]. Lifestyle, including diet, has an important role in the treatment and prevention of non-transmissible chronic diseases, as previously mentioned[4-6]. In this context, nutrition assessment is the first step to dietary modification in community-based interventional programs[7]; however, it is widely recognised that a cause of uncertainty in the knowledge of the role of diet in the development of diseases is the intrinsic lack of precision of the methods used to assess dietary intake[8], and this inaccuracy may be impeding our ability to understand the impact of dietary factors on these diseases[9].

Some dietary assessment methods, such as dietary records and dietary histories, are expensive and time-consuming, and they are therefore not suitable for epidemiological studies[9]. Thus, Food Frequency Questionnaires (FFQs), among other methods used to assess dietary intake, have been and will probably continue to be the main tool used in epidemiological studies[10,11] because they are easy to administer, they can assess dietary intake for a long period of time, and they are low-cost[12]. In this method, selected food items are listed, and the frequency of intake and usual portion or serving sizes (average quantity of food per intake) are noted. To calculate the consumption of a food item, the portion size is multiplied by its intake frequency[13].

The lower number of food items found in the FFQ compared with open methods makes it easier and cheaper to collect, process and analyse data[14]. Moreover, when using a short FFQ (SFFQ), the time for data processing is reduced, and these questionnaires are less burdensome for the participants to complete[15] than are other dietary evaluation methods. SFFQs have been previously developed and validated for different population groups[16,17], but because of the variety of dietary habits that depend on ethnic, social, and cultural backgrounds and the sensitivity of FFQs to the culture and ethnic background of the study population, FFQs must be tailored to target populations[13,18].

Although some studies have validated different FFQs for various objectives in the Spanish population, to the best of our knowledge, no SFFQ has been validated for use in the population of residents in the Basque Autonomous Community. Therefore, we required an SFFQ to assess the dietary patterns and nutritional improvement in this population[19]. This study was performed to adapt an SFFQ, evaluate its relative validity and reproducibility to assess food group intake in a population resident in the Basque Country, and determine the possible influence of associated variables (such as educational level or weight status) on its validity and reproducibility. The original SFFQ used in this study was a questionnaire validated in the general population in other regions of Spain[20].

Methods

Subjects and study design

The target population consisted of a sample of adults living in the Basque Autonomous Community (a region of Northern Spain). The sampling design was polietapic and stratified by sex and age among individuals drawn randomly from the Basque Country population with the aim of obtaining a representative sample[21]. The sample size was chosen based on the findings of Cade *et al.*[14], which established that a sample size of at least 50 to 100 individuals is sufficient for the analysis of FFQ validity. The eligibility criteria for inclusion were established to recruit a healthy population and were as follows: (1) adults aged 18 years old and older; (2) residents who had lived in the Basque Autonomous Community for longer than 5 years; (3) free-living people without serious diseases requiring a special diet; (4) subjects not on a weight reduction diet; and (5) subjects not related to other participants.

Subjects included in the validation study were recruited from February 2013 to February 2014. In total, 135 subjects were invited to participate in the study and the response rate was 73.3%, that is, a total of 99 subjects consented to join the study and completed the first SFFQ (SFFQ1) and the first serie of 24-hour recalls (24HR). Among these subjects, 82 finished the three series of 24HR and the second SFFQ (SFFQ2) and were included in the final analyses (56.1% were females). Thus, the final participation rate was 60.7%. Each of the series of 24HR included three phone interviews (on non-consecutive days) in which they were asked to describe the foods and amounts consumed over the previous day. Information was collected to 3 days, 2 weekdays and 1 weekend day (one day information in each of the interviews). Series of 24HR interviews were carried out at 4-month intervals during the study period.

The mean age was 47.3 years old (range 21.0-88.0 years old, standard deviation (SD)17.8), the mean body mass index (BMI) was 25.2 kg/m^2 (range 17.0-36.5 kg/m^2, SD 4.2), and no significant differences were observed by sex for age and BMI (P>0.05). The study covered a time period of one year. The study design is shown in **Figure 1**. At the beginning and end of this period, the participants completed the same SFFQ (SFFQ1 and SFFQ2, respectively) through a face-to-face interview conducted by well-trained interviewers. Although the evaluation study was conducted using the SFFQ through face-to-face interviews, in later studies, it has also been used for self report of diet with instructions on how to complete it and assistance by staff members to solve doubts. In any case, both when face-to-face interviews were carried out and when the SFFQ was self-filled, all questionnaires were subsequently checked by a dietician.

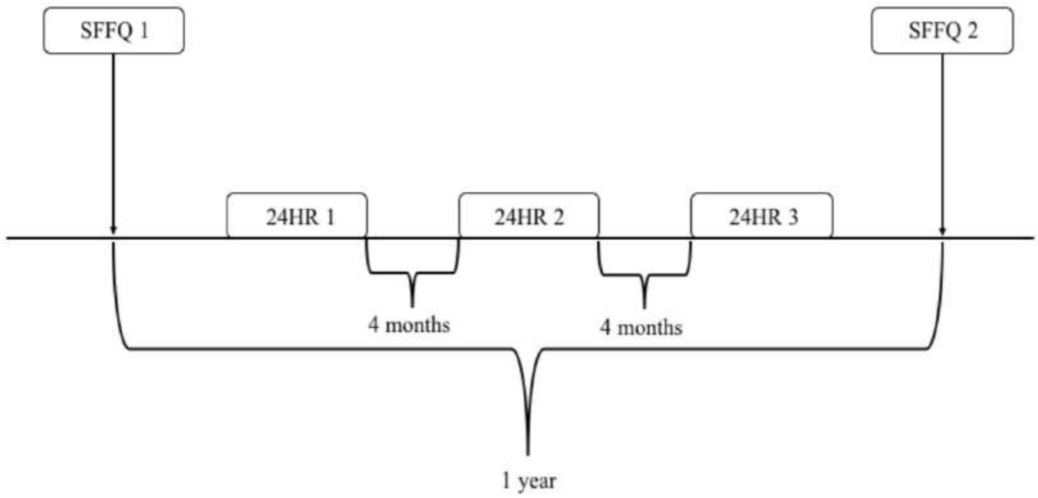

Figure 1. Study flow of the validation study.

SFFQ, short food-frequency questionnaire; 24HR, 24-hour recalls

Short food-frequency questionnaire (SFFQ)

After comparing the original SFFQ[20] with the quantitative study of food consumption in the Basque Autonomous Community[22], we identified 22 new items that corresponded to frequently consumed foods in this population. The food items that we added to the original SFFQ, which consisted of 45 items, were: whole grains (muesli, whole wheat flakes…); cookies with fibre; butter; margarine; sugar (added to milk, yogurt, coffee); honey; garlic and onions; fried foods or foods with added oil; whole bread; fried tomato sauce; mayonnaise; spicy (pepper, paprika, hot chili…); salt; sausages, foie-gras and pates; bacon; raisins, prunes, dried figs and dates; coffee or tea; cider; and aperitifs with alcohol (vermouth…) (food items are ordered in the same way as they were presented in the SFFQ).

Moreover, in the new version of the questionnaire, items corresponding to milk and dairy products were itemised as the following types: whole milk, semi-skimmed milk and skimmed milk; and full-fat yogurt and low-fat yogurt. These introduced an increase of 3 items because in the original there was only an item for each food. In the end, the SFFQ included 67 food items. The distribution of the new food items by food groups was as follows: *processed meat* (two new items), *milk* (two new items), *dairy products* (one new item), *cereals* (two new items), *fruits* (one new item), *vegetables* (one new item), *sweets and sugar* (three new items), *other foods* (three new items), *other alcoholic drinks* (two new items), *fat* (two new items), *coffee or tea* (one new item), *added salt* (one new item) and *spicy foods* (one new item). The distribution of the rest of the food groups remained the same. Additionally, an open question was added with the objective of identifying foods that were not included in the SFFQ, such as soy products. When a food was written in the open questionnaire, we also asked how often they consumed it.

For each food item, participants were first asked whether they consumed that specific item. If the participant affirmed consumption, they were asked about the usual frequency of consumption (weekly or monthly) of one standard serving of specified food items(23). With respect to vegetable oil(s) consumption, due to the difficulty of estimating it, following the same rule as the original authors(20), in all cases, we used the median of the quantity consumed by the study population; in this case, the Basque Country population, this was 29.89 g/day(22). Additionally, we asked about the consumption frequency of fried or stewed foods and foods with oil added (for example, salads), and about the type of vegetable oil(s) usually consumed with these foods (olive, sunflower, corn, soya or other); the combination of both data allowed us to estimate the proportion of daily consumption of each type of oil.

Answers about weekly or monthly intake frequency for each food item were transformed into daily servings. And the daily intake of each food item (g/day) was calculated by multiplying the reported number of daily servings by the standard serving size of each food item in Spain(23). For items that included several foods, each food's contribution was estimated with weighting coefficients obtained from usual consumption data(22). All food items consumed were entered into DIAL 2.12(24), a dietary assessment program, to estimate the total energy intake. The results of food group intake are expressed as daily consumption per 1,000 kcal.

24-hour recalls

To minimise errors in portion size, we used the protocol for 24HR telephone interviews described in the Innovative Dietary Assessment Methods in Epidemiological Studies and Public Health – Standard Operating Procedure (IDAMES SOP)[25]. Based on this protocol, a trained dietician interviewer collected the 24HR, and all completed recalls were checked by a research dietician supervisor for accuracy. As the protocol details, to avoid errors, participants were not informed about the day they would be contacted. Once they were contacted for the interview, a short explanation about the procedure was given to each participant in each of the telephone interviews. They were asked about everything they had eaten or drunk the last 24 hours and they then had to describe in detail all of the items they had declared previously, such as the type of food and its characteristics (full-fat dairy, fresh fish, etc.), the method of preparation, and the dressings (type of oil used) or condiments used. Simultaneously, the dietician interviewer collected all the data in a note file, and once the interview was finished, the dietician completed and reviewed the note file. These data were registered into DIAL 2.12[24], and in the case of mixed dishes for which the participants did not know the ingredients, they were searched[26,27] and included in a database of standardised recipes.

Covariates

Information on socio-demographic and economic characteristics (sex, age, marital status and children, birthplace, place of residence, household members and number of rooms used for sleeping, educational attainment, economic activity and last work) and lifestyle (alcohol consumption, smoking status, duration of sleep and physical activity (PA)) were registered at the beginning of the study, at the same time as SFFQ1 in a face-to-face interview based on questions employed by the Spanish Health Survey[28].

We estimated the crowding index using the household members and the number of rooms used for sleeping. This index is considered a good indicator of social status[29]. The following variables were recategorised for easier data analysis: age was dichotomised taking account the median (younger subjects <46 years old and older ones ≥46 years old);

marital status was separated into the following categories: not part of a couple (single, separated or divorced, widowed) and part of a couple (married and others); birthplace was dichotomised as Basque Country and others (any region apart from Basque Country); economic activity was separated into working, unemployed, retired and others (looking after home or family or others); and last work was categorised as steady salaried employee (cooperative members included), temporary salaried employee and others (employer, businessmen/women or others). Finally, BMI classification, alcohol consumption and smoking status were dichotomised as non-overweight/obesity and overweight/obesity, non-current (those who do not drink or those who drank in the past but not at present) and current drinkers (those who currently drink alcohol), and non-smokers and smokers, respectively.

Additionally, we obtained the following data about weight status: self-reported weight and height, desired weight and healthy weight. These data were obtained by asking the participants the following questions: “What do you usually weigh?”, “How tall are you?”, “What would you say is your ideal weight?” and “What would your doctor say is your ideal weight according to standard height-weight charts?”)(30,31). BMI was estimated from self-reported height and weight and classified according the WHO criteria(32). Apart from BMI, using these data, the following variables were calculated as follows: for body weight dissatisfaction (BWD), the desired weight minus the self-reported weight was divided by the self-reported weight and multiplied by 100(33), and for healthy weight perception (HWP), the healthy weight minus the self-reported weight was divided by the self-reported weight and multiplied by 100. The “weight difference percentage” was considered a meaningful difference if it was greater than or equal to 5%. A 5% cut-off was used in a previous study(34) to assess the desire to weigh less using the ideal-actual weight discrepancy. This method was preferred for its simplicity and utility(35).

Three other categories were created for BWD: desired weight less than self-reported weight (dissatisfaction by excess: relative difference ≤-5%); desired weight greater than self-reported weight (dissatisfaction by defect: relative difference ≥5%); and desired weight same as self-reported weight (satisfaction: -5%< relative difference <5%). Finally, three categories were generated for HWP: healthy weight less than self-reported weight (relative difference ≤-5%); healthy weight greater than self-reported weight (relative difference ≥5%); and healthy weight same as self-reported weight (-5%< relative difference <5%).

Statistical analysis

The data were analysed using SPSS for Windows (version 22.0, SPSS Inc., Chicago, IL, USA) and STATA13.0 (Stata Corp LP, Texas, USA). The results are expressed as the mean (standard deviation, SD) and median daily intake as well as grams per 1,000 kcal/day to adjust for energy density. The distribution of values was examined for normality by the Kolmogorov-Smirnov-Lilliefors test. Data collected through SFFQs and 9-day 24HRs were non-normally distributed, with the exception of cereals, legumes and fat intake assessed by SFFQ1 and SFFQ2. Cereals, legumes and fat intakes were analysed using parametric methods. And for non-normally distributed data, that is, for the rest of food items non-parametric tests were performed. In the case of crude correlations, Spearman's correlation coefficients were used, except for the three food groups whose distribution was normal for which Pearson's correlation coefficients were used.

The validity of the SFFQ was evaluated by comparing the average 9-day 24HRs with the data obtained in the SFFQ. Differences in each comparison are presented as a percentage of the consumption for the 9-day 24HRs. To estimate these percentage of the consumption relative to the 9-day 24HRs, non-intakers' data for the 9-day 24HRs were not taken into account, since the division of a value by zero results in infinite (SFFQ value x 100/0 = ∞). The differences in food group intake between SFFQs, and between SFFQs and the average of the 9-day 24HRs were assessed using paired *t*-tests (Student's *t* or Wilcoxon signed-rank test). To determine if crude and age- and sex-adjusted correlations existed between the two methods, 9-day 24HRs and SFFQs, and between two SFFQs Pearson or Spearman correlations were conducted. To correct the within-person error in the measurement of the questionnaires, the age- and sex-adjusted correlations were multiplied by the de-attenuation factor, $(1+\gamma/n)^{1/2}$, where γ is the ratio of the within- and between-person variances and n is the number of repeats (n=11)[36]. One-way ANOVA was used to calculate this ratio. We also estimated de-attenuation correlations associated with *P*-values[37].

Additionally, to measure the degree of agreement, subjects were classified into quartiles based on the food group intakes obtained by the two methods (SFFQ2 and 24HRs), and the percentages of agreement (same and adjacent quartile) and complete disagreement (distant quartile) are presented. Additionally, the agreement between the two SFFQs was also calculated. Reproducibility and reliability were analysed using Cohen's Kappa statistic for qualitative variables and intraclass correlation coefficients (ICCs) for quantitative variables[38]. The cut-off points for Cohen's kappa were: >0.8, excellent; >0.6, good/moderate and >0.4 acceptable; while those for ICC were: <0.4, poor; 0.40-0.75, good or moderate and >0.75 (excellent)[38].

Bland-Altman[39] plots on energy-adjusted values were also used to graphically check the agreement between the two methods; these plot the difference in intake between the two methods (SFFQ2 – 9-day 24HRs) against the mean intake of the two measures ((SFFQ2 + 9-day 24HRs)/2). The upper and lowest acceptable limits with 95% confidence intervals were calculated with this formula: mean ± (1.96 x SD). For the Bland-Altman plots, the same food groups as were used in Fernández-Ballart *et al.*[40] were selected for this study.

Finally, the possible influences of associated variables on validity and reproducibility were assessed by the Chi-square test and Fisher's exact test. In the present study, the results are shown for the same food groups as Bland-Altman plots. The associated variables examined in this study were marital status, children, education level, economic activity, BMI, BWD and HWP classifications, PA level and smoking status. For these analyses, the dichotomic categories of associated variables were crossed with the quartiles (same/adjacent vs. distant) based on the food group intakes obtained using the two methods (SFFQs and 24HRs). Variables were recategorised in the following way: marital status (without partner vs. with partner), children (yes vs. no), education level (primary education or without studies vs. educational level higher than primary education), economic activity (working vs. others), BMI (under/normal weight vs. overweight/obesity), BWD (dissatisfied vs. satisfied), HWP (dissatisfied vs. satisfied), physical exercise during free time (yes vs. no) and smoking status (yes vs. no) to analyse the influence of the covariates. All tests were 2-sided, and *P*-values less than 0.05 were considered statistically significant.

Results

The general characteristics of the participants are shown in **Table 1.** The mean age was 47.3 years old, and the majority of the subjects were without partners, with children, with residence in an urban area, with at least a secondary education and an active worker. Regarding this last variable (economic activity), more males than females were working; in the case of men, there were more steady salaried employees, while among women, there were more temporary salaried employees. With regard for lifestyle, most of the participants had a normal weight, were current drinkers, were non-smokers and did physical exercise during free time; however, the analysis of these variables by sex showed that males smoked a greater number of cigarettes and had a higher PA level than were found for women. Additionally, with respect to weight status, there were no significant differences by sex in BMI, BWD and HWP classifications.

Table 1. Characteristics of the study sample: adults living in the Basque Autonomous Community

Variables Mean SD or %	Total (n=82)		Males (n=36)		Females (n=46)		*P*
Socio-demographic characteristics							
Age(years)	47.3	17.8	45.2	16.6	48.9	18.8	0.346
Marital status (%)							
Without partner	65.9		61.1		69.6		
With partner	34.1		38.9		30.4		0.423
Children							
Yes (%)	52.4		47.2		56.5		0.403
No. of children	1.0	1.2	0.8	1.0	1.2	1.4	0.172
Birthplace (%)							
Basque Country	81.3		88.9		75.0		
Other[1]	18.8		11.1		25.0		0.113
Place of residence (%)							
Rural	23.1		15.2		28.6		
Urban	76.9		84.8		71.4		0.093
Household crowding index	1.0	0.4	1.2	0.5	1.0	0.4	0.076
Education level (%)							
Primary education or without studies	20.7		19.4		21.7		
Secondary education/ Professional training	42.7		52.8		34.8		
University degree	36.6		27.8		43.5		0.229
Economic activity (multiple answer) (%)							
Working	47.6		55.6		41.3		
Unemployed	18.3		22.2		15.2		
Retired	20.7		22.2		19.6		
Other[2]	13.4		-		23.9		**0.018**

To be continued in the next page.

Continuation of Table 1.

Variables Mean SD or %	Total (n=82)	Males (n=36)	Females (n=46)	*P*
Economic activity (multiple answer) (%)				
Last work (%)				
Steady salaried employee	45.6	47.2	44.2	
Temporary salaried employee	35.4	22.2	46.5	
Other[3]	19.0	30.6	9.3	**0.019**
Weight status				
BMI classification				
Ov/obesity	45.6	55.9	37.8	0.110
BWD (%)				
Dissatisfaction by excess	49.3	40.0	55.8	
Dissatisfaction by defect	6.8	10.0	4.7	
Satisfaction	43.8	50.0	39.5	0.354
HWP (%)				
HW less than self-reported weight[4]	48.6	41.4	53.3	
HW greater than self-reported weight[5]	5.4	6.9	4.4	
HW same as self-reported weight[6]	45.9	51.7	42.2	0.588
Lifestyle factors				
Alcohol consumption (%)				
Current drinkers	79.3	83.3	76.1	0.412
Smoking status				
Smoker (%)	25.6	33.3	19.6	0.156
No. cigarettes	2.9 6.7	4.5 7.8	1.7 5.5	**0.046**
Sleep				
No. hours/day	7.1 1.2	7.1 1.3	7.2 1.2	0.439
Main physical activity (%)				
Sitting	37.8	25.0	47.8	
Standing	34.1	30.6	37.0	
Walking	19.5	27.8	13.0	
High physical Effort	8.5	16.7	2.2	**0.017**
Physical exercise during free time (%)				
Yes	57.3	66.7	50.0	0.130

To be continued in the next page.

Continuation of Table 1.

[1]Any region apart from Basque Country; [2]Looking after home or family and others; [3]Employer, businessman/women or others; [4]relative difference ≤-5%; [5]relative difference ≥5%; [6]-5%<relative difference <5%.
Significant *P*-values are highlighted in bold.
BMI, body mass index; BWD, body weight dissatisfaction; HWP, healthy weight perception; HW, healthy weight; No., number; ov, overweight; SD, standard deviation.

The validation and reproducibility analysis is shown in Tables 2 and 3, Supplementary Tables 1 and 2, and Figure 2. In addition, some of these Tables, in particular Table 2 and Supplementary Table 1, include data on the reproducibility of the data from the SFFQs. The mean daily intake of food groups (g/1,000 kcal) (assessed by 9-day 24HRs, SFFQ1 and SFFQ2) are presented in **Table 2**. Higher intake values were obtained with the SFFQs (SFFQ1 and SFFQ2) than with the 9-day 24HRs for the following foods and beverages (sequenced in order of appearance in Table 2): fatty fish, other foods, light drinks, other alcoholic drinks, fat, broth and soups, added salt and spicy foods ($P<0.05$). Among these products, the highest mean differences were observed for light drinks, fat, and broth and soups. The intake value of the following products was lower for the SFFQ1 and SFFQ2 than for the 9-day 24HRs (sequenced in order of appearance in Table 2): total meat, processed meat, milk and cereals ($P<0.05$). The highest mean differences, in favour of 9-day 24HRs, were observed for total meat and milk. However, no significant differences were found between the mean intakes obtained in the SFFQ1 and SFFQ2. For some foods, such as milk, the SFFQ mean intake was lower than the 9-day 24HRs mean intake; however, the percentage reported in the 9-day 24HRs was higher than 100%, at 230.3%; this result could be due to a wide standard deviation.

Table 3 presents the crude and adjusted coefficients for the association between the SFFQs and the 9-day24HRs. The crude correlation coefficients varied from -0.008 (fat) to 0.705 (alcoholic drinks). The means of the correlation coefficients for all food groups were 0.277 and 0.304 for SFFQ1 and SFFQ2, respectively. The adjusted coefficients ranged between -0.011 (spicy foods) and 0.712 (wine). The mean age- and sex-adjusted coefficient for SFFQ1 was 0.231, while that obtained for SFFQ2 was 0.254.

Table 2. Mean daily intake of food groups by 1,000 kcal estimated from 9-day 24HRs and two SFFQs

Food intake (g per 1,000 kcal)	9-day 24HRs			SFFQ1					SFFQ2					
	Mean	SD	Med	Mean	SD	P^1	Med	% of 9-day 24HR	Mean	SD	P^2	Med	% of 9-day 24HR	P^3
Total meat	97.0	64.0	86.8	60.0	25.1	**<0.001**	60.0	112.3	65.5	47.1	**<0.001**	53.7	112.3	0.636
White meat	35.3	41.9	20.1	23.6	17.4	0.184	22.2	111.7	25.9	20.0	0.256	19.5	133.9	0.342
Red meat	32.9	30.5	30.3	24.7	16.7	**0.031**	22.5	118.6	26.9	23.4	0.140	20.1	138.0	0.487
Processed meat	28.8	27.4	21.9	11.7	8.6	**<0.001**	10.6	72.3	12.7	12.2	**<0.001**	10.3	79.7	0.969
Eggs	23.1	22.7	17.8	10.4	5.9	**<0.001**	8.9	79.1	11.5	9.1	**<0.001**	9.3	89.9	0.604
Total fish	37.2	38.7	26.8	37.6	25.9	0.369	32.7	154.7	38.8	25.8	0.401	35.5	135.8	0.603
Lean fish	19.7	25.4	8.2	18.8	16.2	0.467	15.3	128.1	18.8	15.9	0.409	15.8	90.0	0.885
Fatty fish	10.2	21.2	0.0	15.0	14.5	**0.002**	10.6	243.3	16.6	14.1	**<0.001**	12.0	267.3	0.237
Seafood	7.3	19.8	0.0	3.7	5.0	0.151	3.0	63.2	3.4	3.6	0.549	2.4	15.7	0.963
Milk	128.0	95.4	104.0	91.1	83.2	**0.004**	95.8	230.2	95.8	88.7	**0.017**	107.9	252.0	0.551
Dairy products	55.3	49.6	52.7	67.1	49.8	0.056	62.9	256.2	61.7	48.1	0.135	47.2	258.1	0.388
Cereals	87.5	49.6	78.2	67.4	23.2	**0.007**	64.7	113.8	65.2	30.9	**0.001**	62.1	105.4	0.555
Fruits	154.7	145.8	114.0	164.1	103.7	0.152	166.7	150.2	184.2	134.6	**0.023**	162.5	186.5	0.324
Vegetables	108.2	78.5	91.3	101.5	65.2	0.537	90.6	138.9	95.3	57.5	0.225	84.4	130.0	0.507
Legumes	10.3	12.7	4.4	9.4	5.2	0.807	8.9	122.5	9.3	5.7	0.752	8.3	127.9	0.924
Potatoes	42.3	42.6	31.5	30.8	23.3	0.064	27.8	125.7	31.2	24.3	0.106	27.0	108.2	0.758
Sweets and sugar	12.0	11.7	8.6	14.6	12.1	**0.030**	11.2	181.5	15.1	13.8	0.079	12.3	203.0	0.912
Other foods	0.6	2.8	0.0	5.7	8.2	**<0.001**	3.2	258.4	6.6	11.1	**<0.001**	3.4	186.3	0.585

To be continued in the next page.

Continuation of Table 2.

Food intake (g per 1,000 kcal)	9-day 24HRs			SFFQ1					SFFQ2					
	Mean	SD	Med	Mean	SD	P^1	Med	% of 9-day 24HR	Mean	SD	P^2	Med	% of 9-day 24HR	P^3
Non-alcoholic drinks	93.0	107.9	68.4	65.3	83.2	**0.017**	40.2	181.2	76.7	96.1	0.090	42.2	383.4	0.279
Sugary drinks	42.9	84.4	0.0	46.4	61.7	0.184	21.3	91.4	49.9	66.4	0.198	25.4	130.5	0.819
Light drinks	6.8	23.8	0.0	19.0	45.2	**0.007**	0.0	220.8	26.8	69.9	**0.004**	0.0	421.6	0.224
Alcoholic drinks	57.0	95.7	14.4	34.2	54.6	0.059	16.3	115.7	46.5	96.7	0.593	21.1	245.7	0.095
Wine	18.2	37.9	0.0	13.8	28.5	0.697	0.0	130.3	16.4	33.8	0.437	2.9	156.2	0.382
Beer	34.1	78.8	0.0	14.3	34.7	**0.008**	0.0	49.3	24.4	89.6	0.188	0.0	92.8	0.073
Other alcoholic drinks	5.2	21.8	0.0	6.1	13.4	**0.007**	0.6	190.5	5.8	14.5	**0.015**	0.0	261.6	0.992
Fat	25.9	14.3	23.3	45.6	5.7	**<0.001**	45.3	233.3	45.1	6.9	**<0.001**	44.9	234.2	0.605
Coffee or tea	39.7	44.8	19.8	38.2	35.6	0.818	32.5	769.1	44.2	47.8	0.402	35.2	750.3	0.164
Broth and soups	3.6	9.9	0.0	19.2	17.0	**<0.001**	15.0	105.2	21.6	19.9	**<0.001**	16.4	122.3	0.311
Added salt	1.3	0.8	1.1	1.9	1.1	**<0.001**	1.9	195.6	1.5	0.9	0.185	1.5	153.7	**0.005**
Spicy foods	0.0	0.2	0.0	0.1	0.3	**0.002**	0.0	30.8	0.1	0.2	**0.001**	0.0	66.3	0.823

[1]Differences between intakes of food groups from 24HRs and SFFQ1; [2]differences between intakes of food groups from 24HRs and SFFQ2; [3]differences between intakes of food groups from SFFQ1 and SFFQ2.
24HRs, 24-hour dietary recalls; Med, median; SD, standard deviation; SFFQ, short food-frequency questionnaire.

Table 3. Correlation coefficients between food groups estimated by energy density by nine 24HRs and two SFFQs

Food groups (g per 1,000 kcal)	Crude				Age- and sex-adjusted			
	9-day 24HRs				9-day 24HRs			
	SFFQ1	*P*	SFFQ2	*P*	SFFQ1	*P*	SFFQ2	*P*
Total meat	0.016	0.889	0.286	**0.009**	-0.040	0.727	0.130	0.250
White meat	0.005	0.962	0.383	**<0.001**	**-0.003**	0.981	0.203	0.071
Red meat	0.272	**0.014**	0.379	**<0.001**	0.249	**0.026**	0.213	0.058
Processed meat	0.347	**0.001**	0.254	**0.021**	0.216	0.054	0.042	0.714
Eggs	0.216	0.052	0.287	**0.009**	0.169	0.134	0.085	0.451
Total fish	-0.020	0.859	0.203	0.067	0.019	0.870	0.185	0.100
Lean fish	0.115	0.304	0.154	0.168	0.087	0.441	0.210	0.061
Fatty fish	-0.157	0.158	0.038	0.733	-0.006	0.961	0.061	0.591
Seafood	0.024	0.832	-0.092	0.412	-0.054	0.637	0.083	0.466
Milk	0.266	**0.016**	0.112	0.319	0.346	**0.002**	0.045	0.694
Dairy products	0.447	**<0.001**	0.524	**<0.001**	0.437	**<0.001**	0.595	**<0.001**
Cereals	0.006	0.960	0.116	0.301	0.007	0.953	0.173	0.125
Fruits	0.520	**<0.001**	0.496	**<0.001**	0.416	**<0.001**	0.382	**<0.001**
Vegetables	0.299	**0.006**	0.366	**0.001**	0.264	**0.018**	0.350	**0.001**
Legumes	0.308	**0.005**	0.164	0.141	0.214	0.056	0.076	0.503
Potatoes	0.129	0.249	0.362	**0.001**	0.076	0.504	0.383	**<0.001**
Sweets and sugar	0.473	**<0.001**	0.288	**0.009**	0.345	**0.002**	0.189	0.093
Other foods	0.233	**0.035**	0.176	0.114	0.172	0.127	0.649	**<0.001**
Non-alcoholic drinks	0.311	**0.004**	0.232	0.036	0.270	**0.015**	0.179	0.113
Sugary drinks	0.393	**<0.001**	0.459	**<0.001**	0.489	**<0.001**	0.263	**0.018**
Light drinks	0.318	**0.004**	0.258	**0.019**	0.351	**0.001**	0.290	**0.009**
Alcoholic drinks	**0.632**	**<0.001**	**0.705**	**<0.001**	0.489	**<0.001**	0.609	**<0.001**
Wine	0.610	**<0.001**	0.578	**<0.001**	0.551	**<0.001**	**0.712**	**<0.001**
Beer	0.599	**<0.001**	0.647	**<0.001**	**0.619**	**<0.001**	0.656	**<0.001**
Other alcoholic drinks	0.332	**0.002**	0.428	**<0.001**	0.029	0.799	0.056	0.623

To be continued in the next page.

Continuation of Table 3.

Food groups (g per 1,000 kcal)	Crude				Age- and sex-adjusted			
	9-day 24HRs				9-day 24HRs			
	SFFQ1	*P*	SFFQ2	*P*	SFFQ1	*P*	SFFQ2	*P*
Fat	0.283	**0.010**	**-0.008**	0.941	0.204	0.070	0.092	0.419
Coffee or tea	0.583	**<0.001**	0.536	**<0.001**	0.476	**<0.001**	0.315	**0.004**
Broth and soups	0.229	**0.038**	0.210	0.058	0.261	**0.019**	0.201	0.074
Added salt	0.156	0.163	0.265	**0.016**	0.134	0.237	0.205	0.068
Spicy foods	**0.001**	0.993	0.109	0.331	-0.064	0.575	**-0.011**	0.925

The higher and lower correlation coefficients shown in each column are depicted as bold numbers.
Significant *P*-values are highlighted in bold.
24HRs, 24-hour dietary recalls; SFFQ, short food-frequency questionnaire.

The de-attenuated correlations and ICCs between food intakes estimated from the SFFQs and the 9-day 24HRs are shown in **Supplementary Table 1**. The mean de-attenuated correlation coefficients were 0.286 (for SFFQ1) and 0.301 (for SFFQ2) and ranged from -0.013 (spicy foods) to 0.963 (other foods). According to the ICCs, good/moderate or excellent reproducibility was observed for both SFFQs for the following foods/beverages: dairy products, fruits, vegetables, sugary drinks, alcoholic beverages (especially wine and beer), and coffee or tea (sequenced in order of appearance in Supplementary Table 1). Moreover, Bland-Altman plots showed that for all analysed food groups, fewer than 10% of the participants were out of the limits of agreement (**Figure 2**), indicating fairly good agreement between the SFFQ2 and 9-day 24HRs. This analysis also showed a tendency for the differences to increase as the magnitude of the measurement increased for all food groups except vegetables.

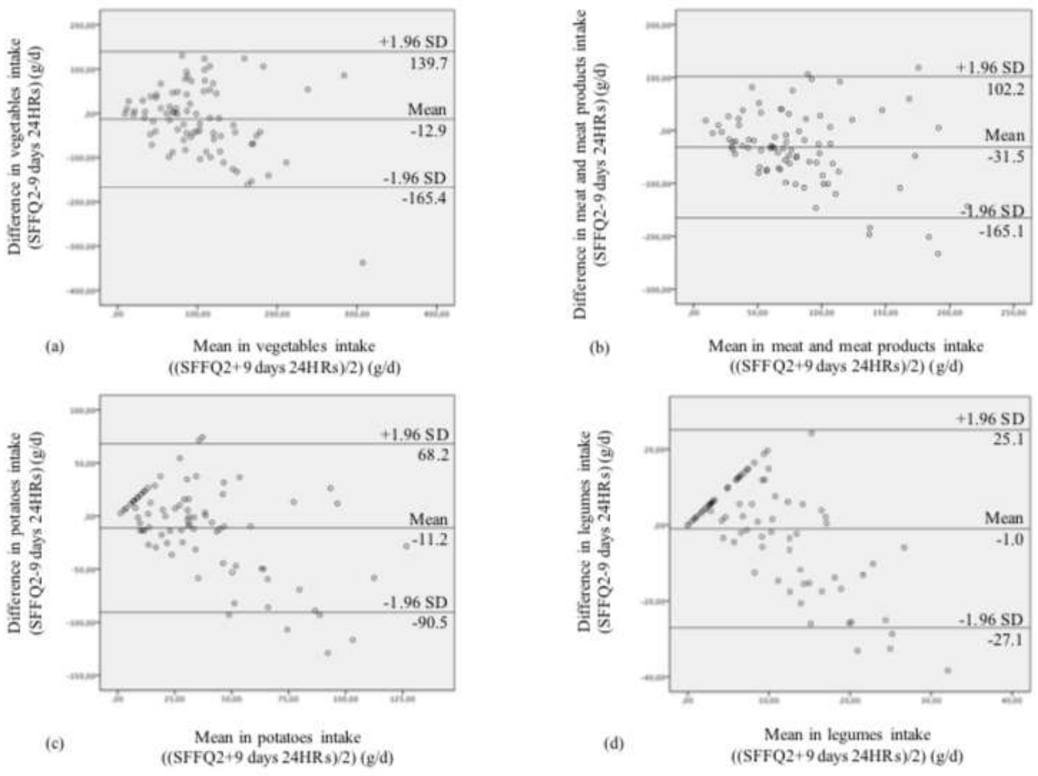

Figure 2. Bland-Altman plot for agreement between SFFQ2 and the mean obtained in the 9 days of 24HR for intake of vegetables (a), meat and meat products (b), potatoes (c) and legumes (d)

24HRs, 24-hour dietary recalls; SD, standard deviation; SFFQ, short food-frequency questionnaire.

Reliability statistics for the SFFQs are presented in **Table 4**. Crude Pearson's correlations ranged from 0.201 (fat) to 0.809 (alcoholic drinks), and age- and sex-adjusted coefficients ranged from 0.219 (spicy foods) to 0.823 (wine). ICCs showed excellent or good reproducibility for the majority of the analysed foods: processed meat, eggs, lean fish, milk, dairy products, fruits, vegetables, sweets and sugar, other foods, non-alcoholic drinks, sugary drinks, light drinks, alcoholic drinks, wine, beer, other alcoholic drinks, and coffee or tea.

The classification of SFFQ1 and SFFQ2 intakes into quartiles showed that the minimum percentage of subjects placed in the same or adjacent quartile was 72.0% (this percentage was obtained for the food group fats). For the rest of the food groups, the percentage of agreement between SFFQ1 and SFFQ2 was equal or higher than 75.6% (**Supplementary Table 3**). The mean percentage of participants placed in the same or adjacent quartile was 82.6%. Cohen's kappa indicated good, moderate or acceptable agreement for the following foods/beverages (ordered from higher to lower Cohen's kappa value): sugary drinks, processed meat, light drinks, total fish and alcoholic drinks. However, a mean percentage of 75.2% of the participants' food intake derived from the SFFQ2 and 9-day 24HRs were classified into the same or adjacent quartile (**Table 5**). The Cohen's kappa values ranged from -0.045 (fat) to 0.632 (alcoholic drinks), with an average value of 0.257, indicating acceptable to good agreement for the following products (ordered from higher to lower Cohen's kappa value): alcoholic drinks, beer, coffee or tea, wine, dairy products, fruits and sugary drinks.

Regarding the influence of associated variables (marital status, having children, education level, economic activity, BMI, BWD and HWP classifications, PA level and smoking status) on validity and reproducibility, no association was found (P>0.05). For example, the results for vegetables (SFFQ1-SFFQ2 and SFFQ2-9-day 24HRs) by marital status were χ^2=0.457 (P>0.05) and χ^2=1.553 (P>0.05), respectively; the results for meat and meat products (SFFQ1-SFFQ2 and SFFQ2-9-day 24HRs) by having or not having children were χ^2=3.579 (P>0.05) and χ^2=0.824 (P>0.05), respectively; the results for potatoes (SFFQ1-SFFQ2 and SFFQ2-9-day 24HRs) by education level were P value from Fisher's exact test=0.526 and 0.175, respectively; and the results for legumes (SFFQ1-SFFQ2 and SFFQ2-9-day 24HRs) by economic activity were χ^2=1.059 (P>0.05) and χ^2=0.010 (P>0.05), respectively.

Table 4. Correlation coefficients between SFFQ1 and SFFQ2 and intraclass correlations

Food groups (g per 1,000 kcal)	Crude	*P*	Age- and sex-adjusted[1]	*P*	ICC	*P*
Total meat	0.406	**<0.001**	0.294	**0.008**	0.277	**0.006**
White meat	0.372	**0.001**	0.254	**0.023**	0.243	**0.013**
Red meat	0.417	**<0.001**	0.288	**0.010**	0.308	**0.002**
Processed meat	0.600	**<0.001**	0.401	**<0.001**	0.427	**<0.001**
Eggs	0.440	**<0.001**	0.507	**<0.001**	0.466	**<0.001**
Total fish	0.488	**<0.001**	0.416	**<0.001**	0.381	**<0.001**
Lean fish	0.433	**<0.001**	0.407	**<0.001**	0.427	**<0.001**
Fatty fish	0.347	**0.001**	**0.216**	0.055	**0.158**	0.077
Seafood	0.434	**<0.001**	0.284	**0.011**	0.377	**0.017**
Milk	0.577	**<0.001**	0.455	**<0.001**	0.492	**<0.001**
Dairy products	0.555	**<0.001**	0.436	**<0.001**	0.468	**<0.001**
Cereals	0.260[1]	**0.018**	0.286	**0.010**	0.250	**0.011**
Fruits	0.492	**<0.001**	0.244	**0.029**	0.451	**0.004**
Vegetables	0.500	**<0.001**	0.577	**<0.001**	0.604	**<0.001**
Legumes	0.361[1]	**0.001**	0.319	**0.004**	0.359	**<0.001**
Potatoes	0.343	**0.002**	0.285	**0.010**	0.297	**0.003**
Sweets and sugar	0.533	**<0.001**	0.530	**<0.001**	0.581	**<0.001**
Other foods	0.661	**<0.001**	0.408	**<0.001**	0.431	**<0.001**
Non-alcoholic drinks	0.702	**<0.001**	0.514	**<0.001**	0.585	**<0.001**
Sugary drinks	0.714	**<0.001**	0.497	**<0.001**	0.625	**<0.001**
Light drinks	0.611	**<0.001**	0.653	**<0.001**	0.738	**<0.001**
Alcoholic drinks	**0.809**	**<0.001**	0.624	**<0.001**	0.542	**<0.001**
Wine	0.755	**<0.001**	**0.823**	**<0.001**	**0.822**	**<0.001**
Beer	0.754	**<0.001**	0.767	**<0.001**	0.527	**<0.001**
Other alcoholic drinks	0.745	**<0.001**	0.735	**<0.001**	0.736	**<0.001**
Fat	**0.201**[1]	0.070	0.228	**0.042**	0.197	**0.037**
Coffee or tea	0.626	**<0.001**	0.641	**<0.001**	0.611	**<0.001**

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Continuation of Table 4.

Food groups (g per 1,000 kcal)	Crude	*P*	Age- and sex-adjusted[1]	*P*	ICC	*P*
Broth and soups	0.455	**<0.001**	0.312	**0.005**	0.349	**0.001**
Added salt	0.293	**0.007**	0.251	**0.025**	0.230	**0.018**
Spicy foods	0.390	**<0.001**	0.219	0.051	0.237	**0.016**

ICC, intraclass correlation coefficient.
[1]Pearson correlation coefficient; higher and lower correlation coefficients in each column are depicted as bold numbers.
Significant *P*-values are highlighted in bold.

Table 5. Misclassification and weighted kappa between SFFQ2 and 9-day 24HRs

Food groups	Percentage of agreement SFFQ2/9-day24HRs		
	Same or adjacent(%)	Weighted kappa	*P*
Total meat	69.5	0.194	**0.040**
White meat	72.0	0.400	**<0.001**
Red meat	73.2	0.304	**0.003**
Processed meat	70.7	0.204	**0.032**
Eggs	78.0	0.264	**0.009**
Total fish	75.6	0.154	0.081
Lean fish	65.9	0.121	0.132
Fatty fish	72.0	-0.043	0.662
Seafood	65.9	-0.098	0.821
Milk	64.6	0.114	0.150
Dairy products	81.7	0.433	**<0.001**
Cereals	70.7	0.184	**0.048**
Fruits	80.5	0.433	**<0.001**
Vegetables	69.5	0.264	**0.009**
Legumes	61.0	0.053	0.314
Potatoes	79.3	0.353	**<0.001**
Sweets and sugar	73.2	0.304	**0.003**
Other foods	78.0	0.130	**0.048**
Non-alcoholic drinks	69.5	0.204	**0.032**
Sugary drinks	82.9	0.430	**<0.001**
Light drinks	76.8	0.205	**0.017**
Alcoholic drinks	86.6	0.632	**<0.001**
Wine	87.8	0.466	**<0.001**
Beer	92.7	0.605	**<0.001**
Other alcoholic drinks	82.9	0.374	**<0.001**
Fat	62.2	-0.045	0.657
Coffee or tea	86.6	0.532	**<0.001**
Broth and soups	79.3	0.199	**0.016**
Added salt	73.2	0.234	**0.017**
Spicy foods	75.6	0.092	0.132

24HRs, 24-hour dietary recalls; SFFQ, short food-frequency questionnaire.
Significant *P*-values are highlighted in bold.

Supplementary Table 1. De-attenuated correlations and intraclass correlation coefficients between food intakes estimated by the SFFQs and the 9-day 24HRs

Food groups (g per 1,000 kcal)	Age- and sex-adjusted and de-attenuated[1]				ICC			
	SFFQ1	*P*	SFFQ2	*P*	SFFQ1	*P*	SFFQ2	*P*
Total meat	-0.060	0.592	0.196	0.078	0.062	0.388	0.418	**0.008**
White meat	**-0.003**	0.979	0.236	**0.033**	**0.005**	0.492	0.321	**0.042**
Red meat	0.276	**0.012**	0.236	**0.033**	0.394	**0.013**	0.459	**0.003**
Processed meat	0.381	**<0.001**	0.074	0.509	0.280	0.071	0.174	0.196
Eggs	0.279	**0.011**	0.140	0.210	0.160	0.217	0.148	0.237
Total fish	0.019	0.865	0.186	0.094	0.052	0.406	0.290	0.063
Lean fish	0.087	0.437	0.210	0.058	0.186	0.178	0.337	**0.003**
Fatty fish	-0.007	0.950	0.069	0.538	-0.204	0.797	0.135	0.258
Seafood	-0.060	0.592	0.092	0.411	-0.037	0.565	**0.021**	0.463
Milk	0.406	**<0.001**	0.053	0.636	0.522	**0.001**	0.124	0.277
Dairy products	0.460	**<0.001**	0.626	**<0.001**	0.604	**<0.001**	0.747	**<0.001**
Cereals	0.010	0.929	0.236	**0.033**	0.045	0.418	0.315	**0.045**
Fruits	0.436	**<0.001**	0.401	**<0.001**	0.598	**<0.001**	0.589	**<0.001**
Vegetables	0.273	**0.013**	0.362	**<0.001**	0.455	**0.003**	0.529	**<0.001**
Legumes	0.217	0.050	0.077	0.492	0.307	0.050	0.148	0.237
Potatoes	0.088	0.432	0.441	**<0.001**	0.153	0.229	0.484	**0.002**
Sweets and sugar	0.367	**<0.001**	0.201	0.070	0.553	**<0.001**	0.377	**0.017**
Other foods	0.255	**0.020**	**0.963**	**<0.001**	0.174	0.196	0.459	**0.003**
Non-alcoholic drinks	0.290	**0.008**	0.192	0.084	0.543	**<0.001**	0.397	**0.012**
Sugary drinks	0.493	**<0.001**	0.265	**0.016**	0.695	**<0.001**	0.501	**0.001**
Light drinks	0.401	**<0.001**	0.331	**0.002**	0.461	**0.003**	0.306	0.051
Alcoholic drinks	0.521	**<0.001**	0.649	**<0.001**	0.604	**<0.001**	0.771	**<0.001**
Wine	0.560	**<0.001**	0.723	**<0.001**	**0.710**	**<0.001**	**0.838**	**<0.001**
Beer	0.661	**<0.001**	0.701	**<0.001**	0.658	**<0.001**	0.809	**<0.001**

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Continuation of Supplementary Table 1.

Food groups (g per 1,000 kcal)	Age- and sex-adjusted and de-attenuated[1]				ICC			
	SFFQ1	*P*	SFFQ2	*P*	SFFQ1	*P*	SFFQ2	*P*
Other alcoholic drinks	0.029	0.796	0.056	0.617	0.028	0.449	0.043	0.421
Fat	**0.673**	**<0.001**	0.304	**0.005**	0.291	0.062	0.081	0.353
Coffee or tea	0.485	**<0.001**	0.321	**0.003**	0.633	**<0.001**	0.483	**0.002**
Broth and soups	0.505	**<0.001**	0.389	**<0.001**	0.378	**0.017**	0.288	0.064
Added salt	0.188	0.091	0.287	**0.009**	0.189	0.174	0.381	**0.016**
Spicy foods	-0.075	0.503	**-0.013**	0.908	-0.044	0.577	0.086	0.343

[1]Corrected for within-persons variation.
The higher and lower correlation coefficients in each column are depicted by bold numbers.
Significant *P*-values are highlighted in bold.
24HRs, 24-hour dietary recalls; ICC, intraclass correlation coefficient; SFFQ, short food-frequency questionnaire.

Supplementary Table 2. Mean daily absolute intake of food groups estimated from two SFFQs

Food intake (g)	SFFQ1			SFFQ2			*P*
	Mean	SD	Median	Mean	SD	Median	
Total meat	135.7	68.6	139.1	125.9	75.3	112.4	0.143
White meat	51.3	38.7	42.9	48.9	31.5	42.9	0.802
Red meat	56.1	42.1	47.9	50.8	38.6	44.5	0.266
Processed meat	28.3	24.7	22.5	26.2	22.5	20.5	0.342
Eggs	22.1	12.4	23.6	22.3	13.1	23.6	0.814
Total fish	77.3	44.1	72.1	76.4	45.8	69.0	0.849
Lean fish	38.3	27.4	42.9	36.8	27.5	32.5	0.741
Fatty fish	30.8	25.3	21.4	33.0	26.5	21.4	0.183
Seafood	8.3	10.0	7.0	6.7	6.6	4.7	0.301
Milk	192.4	163.7	250.0	181.2	148.6	250.0	0.153
Dairy products	149.5	112.1	125.0	118.7	81.8	114.2	**0.017**
Cereals	145.3	53.8	142.9	127.7	45.7	131.4	**0.003**
Fruits	358.9	242.3	348.3	365.8	248.5	338.5	0.790
Vegetables	211.9	123.0	200.7	189.4	105.7	178.0	**0.012**
Legumes	20.1	9.9	20.0	19.0	11.8	20.0	0.224
Potatoes	67.6	48.8	72.9	60.3	40.6	48.6	0.174
Sweets and sugar	37.5	47.9	22.2	30.4	26.7	21.5	0.117
Other foods	14.4	21.0	6.7	12.7	19.8	6.7	0.213
Non-alcoholic drinks	158.7	216.8	94.3	149.5	176.1	94.3	0.538
Sugary drinks	119.1	174.1	47.1	96.6	120.1	47.1	0.101
Light drinks	39.6	91.0	0.0	52.8	129.7	0.0	0.160
Alcoholic drinks	70.2	99.4	42.6	82.7	132.5	38.6	0.140
Wine	27.1	53.9	0.0	30.1	56.1	6.0	0.210
Beer	30.3	63.3	0.0	42.0	119.7	0.0	0.142
Other alcoholic drinks	12.8	26.7	1.7	10.7	24.9	0.0	0.351
Fat	36.5	6.0	34.2	35.8	6.4	32.8	0.196
Coffee or tea	82.0	79.2	75.0	85.6	80.4	75.0	0.285
Broth and soups	42.9	40.4	28.6	43.7	40.9	28.6	0.866
Added salt	4.1	2.0	4.0	2.9	1.5	3.7	**<0.001**
Spicy foods	0.3	0.8	0.0	0.3	0.4	0.0	0.902

SD, standard deviation; SFFQ, short food-frequency questionnaire.

Supplementary Table 3. Misclassification and weighted kappa between SFFQs

Food groups	Percentage of agreement SFFQ1-SFFQ2		
	Same or adjacent(%)	Weighted kappa	*P*
Total meat	80.5	0.366	**0.001**
White meat	79.3	0.341	**0.001**
Red meat	78.0	0.051	0.645
Processed meat	86.6	0.529	**<0.001**
Eggs	75.6	0.295	**0.007**
Total fish	80.5	0.438	**<0.001**
Lean fish	79.3	0.349	**0.002**
Fatty fish	76.8	0.292	**0.008**
Seafood	78.0	0.360	**0.001**
Milk	84.1	0.384	**<0.001**
Dairy products	80.5	0.379	**0.001**
Cereals	76.8	0.213	**0.049**
Fruits	80.5	0.103	0.348
Vegetables	81.7	0.398	**<0.001**
Legumes	76.8	0.266	**0.015**
Potatoes	76.8	0.162	0.127
Sweets and sugar	78.0	0.202	0.050
Other foods	85.4	0.146	0.187
Non-alcoholic drinks	91.5	0.375	**0.001**
Sugary drinks	89.0	0.643	**<0.001**
Light drinks	86.6	0.477	**<0.001**
Alcoholic drinks	93.9	0.415	**<0.001**
Wine	91.5	0.281	**0.010**
Beer	95.1	0.376	**0.001**
Other alcoholic drinks	91.5	0.372	**0.001**
Fat	72.0	0.149	0.176
Coffee or tea	89.0	0.388	**<0.001**
Broth and soups	80.5	0.383	**0.001**
Added salt	78.0	0.199	0.067
Spicy foods	82.9	0.296	**0.007**

Significant *P*-values are highlighted in bold.
SFFQ, short food-frequency questionnaire.

Discussion

In the present study, we adapted and assessed the validity and reproducibility of an SFFQ in a population resident in the Basque Country; additionally, we analysed the influence of some variables (such as educational level or weight status) on validity and reproducibility. To our knowledge, no previous study has investigated these aspects in this population. The general characteristics of the sample, with regard for children, place of residence, educational level and economic activity, were similar to those of the Basque population(41). Relative to weight status, the percentage of overweight/obesity in our sample was similar to data obtained in the last Health Survey carried out in the Basque Autonomous Community(42), and in both cases, the percentage of men with overweight/obesity was higher than that of women.

The results indicate that the SFFQ is a reasonably good method for dietary assessment in relation to 24HRs for many food groups. In addition, the number of items of this FFQ could be considered optimal, because it is similar to the median number used in other studies(14). It is important to emphasize that there is no a fixed number of items for FFQs, and each item should be designed to provide the information for which it was intended(43).

Regarding the design, the design of the present study was the same as that used in other validation and reproducibility studies(44,45). In our case, SFFQs were administered at the beginning and the end of the study, and 24HRs were performed during the year at 4-month intervals, in agreement with the theory that considers a sufficient number of days to be necessary during a term (typically one year) to represent average dietary intakes(14).

In relation to the validity of the SFFQ and in agreement with other authors we also found that food group intakes assessed by SFFQ were, in general, higher than the intakes calculated by the average of the 9-day 24HRs(44,46,47). A possible explanation for the fact that the intake estimated by SFFQs was higher than those estimated by 9-day 24HRs is that participants might overestimate the consumption of ingredients of mixed dishes or meals and they might consider these quantities as a full portion even though they are smaller(44). The foods with the highest mean differences between SFFQs and 9-day 24HRs (in favour of SFFQs) were light drinks, fat, and broth and soups. In the case of drinks (light drinks and broth and soups), the overestimation could be because the consumption of these products is not frequent, which means estimations are less accurate(48). In relation to fat intake, it should be noted that for the SFFQs, in all cases, we used the median of the quantity consumed by the study population, which was in this study the Basque Country population[22], and this quantity was higher than those registered by the 24HRs. It should be noted that individual fat intake is difficult to estimate because it is usually added in the cooking of main courses for the whole family[8].

The correlations between SFFQs and 9-day 24HRs were significant for more than half of the studied food groups, with the lowest correlations for fat and spicy foods and the highest correlations for alcohol drinks and other foods. The low correlation for spicy foods could be related to the low accuracy of the estimation of foods consumed in small quantities[48]. With regard for fat, as mentioned above, in the FFQs, in all cases, we used the median of the quantity consumed by the study population. In this sense, the data recorded by the 9-day 24HRs for fat showed high intra- and inter-individual variability, and this is why the de-attenuated correlation coefficient was higher than that found for the crude correlation for this food. In addition, in some food groups, especially those that were divided into different categories, such as meat or fish, the correlation coefficients were below 0.4, and this might reflect difficulties in recognising and classifying these categories[49] even though there were some examples of each item in our questionnaire. On the other hand, the high correlation found for alcohol drinks and other foods could be due to the use of beverage-specific questions in the SFFQs[50] and may indicate that the intake of these products is associated with particular situations, such as weekends; thus, it may be easier for participants to remember the quantity more precisely. Relative to de-attenuated correlations, they were in almost all cases similar to adjusted correlations, and as Fernández-Ballart *et al.*[40] described, this small difference could be due to relatively low within-individual variation with regard for the between-individual variation observed in the participants and/or because of the large number of days recorded (9 days).

In general, correlations between the SFFQ2 and 9-day 24HRs were slightly higher than those found between the SFFQ1 and 9-day24HRs. This has also been reported in other studies and could be the result of changes that occur throughout the year of participation in the study[45] or because of a learning effect[44] by which participants were able to observe more of their diet during the study year and were therefore able to more conscientiously complete the second SFFQ[51].

The results of both Bland-Altman plots and the classification by quartiles confirmed that the agreement between SFFQ2 and 9-day 24HRs was fairly good, with the percentage of the participants who were out of the limits of agreement was lower than 10%, and the mean percentage of the participants' food intake that was classified into the same or adjacent quartile was 75.2%. Although meat and meat products showed worse agreement when the intake of these foods was higher, other authors have also observed this phenomenon and considered it a measurement error proportional to mean intake[(40)].

With regard for the reproducibility of the adapted SFFQ, in our study, the intakes of more than half of the food groups were higher in the SFFQ2 than in the SFFQ1. The same result occurred in the Shanghai Women's Health Study[(18)] and in the Tehran Lipid and Glucose Study[(52)]. This could be due to learning effects because the participants, after the first SFFQ1 and nine 24HRs, would have been more aware of their intakes; however, other researchers have suggested the same reason for the contrary effect, that is, that intake was lower in the second FFQ than in the first one[(44,53)]. Moreover, it should be noted that, in our case, the interval between the two FFQs was one year; thus, the differences observed in between them could have been due to changes in the participant's diet and variation in their responses[(47)].

The crude and age- and sex-adjusted correlation coefficients for reproducibility in our study were similar to the values reported in Ogawa *et al.*[(54)] and higher than the data reported by other researchers[(44,55)]. Regarding the significant level of the correlations between SFFQs, we found that all the coefficients were significant except those for fat in the crude correlations and those for fatty fish and spicy foods in adjusted correlations. These results are similar to previously reported data[(56)]. In addition, the results of the classification by quartiles confirmed that the agreement between the SFFQs was good as the mean percentage of the participants' food intakes that were classified into the same or adjacent quartile was 82.6%, similar to other studies[(44,45)]. Finally, associated variables, such as educational level, having children, weight status or lifestyle, did not seem to influence the validity and reproducibility of the SFFQ. In any case, a larger sample size would be needed to confirm the results observed in this study. Although few data are available regarding the influence of variables on the validity and reproducibility of FFQs, other authors[(57)] also did not find a relationship between educational level and the reproducibility of an FFQ, and, to our knowledge, there are no studies that have evaluated the possible association between educational level and validity of an FFQ.

Strengths and limitations

A possible limitation of this study, as has been reported in other validation and reproducibility studies, is the fact that these results may not be generalisable to other populations[(58)]. Study strengths include that the results are presented in detail, which show the challenges associated with registration of different foods. Food items were not regrouped because single items are usually better than grouping of items, since similar foods can be differentiated and grouped items can complicate the question for participants(14). In addition, this SFFQ will be used in studies on the effect of dietary factors on diseases, so it can be very useful to estimate the intake of some specific foods such as different types of alcoholic beverages (with different alcoholic graduation and bioactive compounds), as well as foods that are usually consumed in small quantities (e.g. spicy foods). In any case, in view of the results obtained in the present research and in order to improve accuracy in self-reported data, the final version of this SFFQ included, in addition to quantities of food servings (grams or milliliters)(23), its equivalent in household measures. The main strengths of this study are the design and the fact that we analysed the independent influence of associated variables on reproducibility and validity.

Conclusions

In summary, the adapted SFFQ presents good reproducibility and validity for measuring most food groups in a population resident in the Basque Country, and it did not seem to be influenced by associated variables, such as educational level or weight status. However, in future studies, the intakes of food groups estimated by the SFFQ that showed poor evaluation, should be used and interpreted with caution.

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Conflict of interest

None.

Authorship

The authors' contributions were as follows: M. A.-I. contributed to the conception and design of the research; I.A.-L., M. A.-I. and N. T.-A acquired and analysed the data, interpreted the results, drafted the manuscript, revised the paper and approved the final version of the manuscript.

Ethical Standards Disclosure

This study was conducted according to the guidelines laid down in the Declaration of Helsinki and all procedures involving research study participants were approved by the Ethical Committee on Human Research of the UPV/EHU (CEISH/181/2012/ARROYO IZAGA). Written informed consent was obtained from all subjects

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Study 2

Risk factors of overweight/obesity-related lifestyles in university students: Results from the EHU12/24 study

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Abstract

Background/Objective;

Unhealthy lifestyle behaviours are the main contributors to obesity. Consequently, the aim of this paper was to investigate the prevalence and interactions of overweight/obesity-related lifestyles, in a representative sample of university students.

Subjects and methods:

This study is part of the project EHU12/24, an observational cohort study, designed to assess the prevalence of excess body fat (BF) and major risk of developing overweight/obesity, according to a standardised protocol and involved a representative sample of the University of the Basque Country students. In a cohort of 603 students, information about meal patterns, diet quality, physical activity (PA), sitting time, toxic habits, sleeping time and anthropometric measurements were collected.

Results:

The prevalence of overweight/obesity, according to BF percentage was 14.4%. The variables analysed related to meal pattern were associated with diet quality, and less healthy food habits were associated with other less health-related behaviours. Among men, a moderate/low PA (OR=3.77, 95%CI 3.28, 4.33), breakfast skipping (OR=3.66, 95%CI 3.02, 4.44), a non-adequate breakfast duration (OR=1.58, 95%CI 1.39, 1.79), number of eating occasion (OR=1.43, 95%CI 1.27, 1.61) and eating breakfast alone/depending on the occasion (OR=1.37, 95%CI 1.14, 1.63) were associated with excess BF. Among women, the selected variables were: low MDS (OR=2.34, 95%CI 2.09, 2.62), moderate/high alcohol consumption (OR=2.23, 95%CI 1.90, 2.61), non-adequate sleep duration (OR=1.72, 95%CI 1.56, 1.90), eating breakfast and lunch alone/depending on the occasion (OR=1.47, 95%CI 1.29, 1.66; OR=1.42, 95%CI 1.27, 1.58, respectively).

Discussion:

Our results suggest that certain unhealthy lifestyle behaviours coexist, interact and increase the risk of overweight/obesity in this population. Sex-specific differences in risk factors of excess adiposity has important implications for interventions for primary prevention of obesity within this environment.

Key words:

Meal patterns; diet quality; lifestyles; physical activity; drinking behaviour; smoking; sleep; University students; Spain

Introduction

The prevalence of obesity is increasing worldwide[1] and nearly a third of the world population is now classified as overweight or obese[2]. This increase in obesity likely results from a complex interaction between changes in the food environment, physical activity (PA), socioeconomic, environmental, and genetic factors[1]. In general, a substantial proportion of young adults, in particular higher education students, follow unhealthy lifestyles[3,4], what is cause for concern.

Regarding diet, the consumption of certain dietary patterns, such as the Mediterranean diet is associated with decreased risk of overweight and obesity[5]. But, in this sense, beyond *what eat*, *where*, *when*, *how* and *who eat with,* are important too, because not only can the volume influence, but the type and variety of foods consumed as well[6]. All these characteristics of diet are part of the term "meal pattern", and have an important role in total energy intake and therefore in the regulation of adiposity and body weight[7].

To date, diet, PA and sedentary behaviours have received much attention in attempts to explain the actual prevalence of obesity. However, many other factors have been identified that may have contributed to this epidemic, such sleep duration that are related to metabolic and endocrine alterations[8]. Moreover, until now, the majority of studies have focused on a single or few health lifestyle behaviours, even though research has shown that health behaviours often coexist, interact and increase the likelihood of multiplicative illnesses[9]. Thus, the interactions among lifestyles related to obesity are poorly understood.

Consequently, the aim of this paper was to investigate the prevalence and interactions of overweight/obesity-related lifestyles (specifically, examining whether subjects meet the recommended criteria), in a representative sample of students at a Spanish university, in order to identify the best strategies to combat obesity in this population. These strategies could take advantage of the naturally occurring opportunities offered by this stage of life (i.e. young adult) to induce behaviour changes. In addition, university students are likely to constitute a significant proportion of the socioeconomic elite of the future; thus, their habits and behaviours are most likely to become the norm, rendering this population interesting to investigate.

Subjects and methods

This study is part of the project EHU12/24 which is an observational cohort study designed to assess the prevalence of excess body fat (BF) and major risk of developing overweight/obesity, according to a standardised protocol and involved a representative sample of the UPV/EHU student population[10]. The design, sampling and procedures of the EHU12/24 have been described in detail elsewhere[10].

Study population

Briefly, EHU12/24 project was carried out from February 2014 to May 2017 in a cohort of 603 university students (59.5% women) aged between 18 and 28 years. Moreover, we assigned a weight to each participant such that the computed statistics based on the gathered data could be more representative of the population from which the data are retrieved. The study was conducted according to the guidelines laid down in the Declaration of Helsinki, and all procedures involving human subjects/patients were approved by the Ethical Committee on Human Research of the UPV/EHU (CEISH/193/2013/ARROYO IZAGA). Written informed consent was obtained from all subjects/patients.

Body measurements and other characteristics

The percentage of BF (BF%) was estimated using skinfold measurements and the Siri-age-sex equation[11], and the density was estimated using the Durnin and Womersley formula[12]. The subjects' BF% was classified using the criteria proposed by Bray *et al.*[13]. A well-trained anthropometrist performed all measurements following the ISAK protocols[14]. In addition, data related to the place of habitual residence, responsible for shopping and cooking were recorded using the questionnaires developed by Bennassar[15] and St. Jeor[16]. Responsible for shopping and cooking were multiple-answers questions.

Diet

Meal patterns were assessed using time-of-day and participant-identified approaches[17] through a questionnaire based on validated forms[15,16] that included the following items: frequency of eating occasion (EO) (mean number of EO/meals/snacks per day), spacing of EO (mean time between EO/meals/snacks), breakfast skipping (usually omits breakfast), meal duration (time spent on breakfast and on lunch/dinner), presence of others at a meal (eat alone vs. with others or depending on the occasion). These data were collected through a face-to-face interview.

A meal pattern score, incorporating the eight variables studied in this section and assigning a score (from 0 to 1) to each one was constructed. We used as a model two scores designed previously by other authors(18,19). Each variable of the present score was compared with the established recommendations to prevent overweight/obesity, when these were available, or on current evidence in the general population. Detailed information on the operationalization of our score can be found in **Table 1**. The total meal pattern score ranged from 0 to 8, with higher scores indicating greater concordance with the recommendations.

Moreover, the dietary habits were assessed by using a short food frequency questionnaire (SFFQ), in a face-to-face interview, that is a modified and validated version(20). To estimate the energy and nutrient intake, all food items consumed were entered into DIAL 2.12, which is a dietary assessment programme. From the data obtained on food groups, energy and nutrient intake, adherence to food-based dietary guidelines was evaluated. For this end, we used two diet quality indices: the Healthy Eating Index (HEI-2010)(21) and the MedDietScore (MDS)(22). MDS is an index between 0 and 55, that estimates the adherence level to the Mediterranean diet and is associated with biomarkers of cardiovascular disease risk(23).

The HEI-2010 is a measure of diet quality, with a range from 0-100, used to assess how well a set of food aligns with key recommendations of the Dietary Guidelines for Americans. Although specific to US dietary guidelines, the HEI-2010 has been widely used in European populations and even in studies involving European university students(24) which allows us to establish results comparisons. We used HEI-2010 instead of HEI-2015 for many reasons. First, HEI-2010 was applied previously in university students of the UPV/EHU and in other university student population(24), which allows us to establish comparisons between them. A second reason is that HEI-2010 includes the assessment of alcohol consumption (within the "empty calories" component), while HEI-2015 does not include it. These two diet quality indices were incorporated into the meal pattern score to construct the diet total score (Table 1). The weight of each index was estimated taking into account the number of items within each one (HEI-2010 consists of twelve components and MDS of eleven).

Lifestyle (different from diet)

The PA and sedentary behaviours (time spent sitting) related data were registered through the International Physical Activity Questionnaire in its short-form version(25). The self-reported sleep duration per night was ascertained by the following question: "On an average school night, how many hours of sleep do you get?"(26). And information about alcohol consumption was registered using the questions from the National Health Survey(27). Moreover, the short food frequency questionnaire included specific questions about the frequency of intake of alcoholic beverages. The alcohol consumption data were expressed as standard drink units per week and the results were compared with the Spanish Society of Community Nutrition' criteria(27).

A lifestyle score, incorporating the five analysed variables in this section was constructed (Table 1). Established risk factors of obesity (PA level and time spent sitting) were given more points on the score than emerging risk factors(28,29). We have not included smoking habit in the lifestyle score because the relationship between smoking and obesity is confuse(30,31). The total score ranged from 0 to 3, with higher scores indicating greater concordance with the recommendations. Finally, a healthy lifestyle score derived from the diet total score and the lifestyle score. This last score ranged from 0 to 34 points, with a higher score reflecting adherence to lifestyles recommendations.

Table 1. Diet and lifestyle score construction

Score	Variables[References]	Operationalisation	Scoring (point)
Meal pattern (0-8 points)	No. of EO per day[53]	Adequate (5-7 EO/day)	1
		Barely adequate (3-4 EO/day)	0.5
		Inadequate (<3 or >7 EO/day)	0
	Interval between EO[53]	Adequate (120-210 min.)	1
		Barely adequate (210-300 min.)	0.5
		Inadequate (<120 or >300 min.)	0

To be continued in the next page.

Continuation of Table 1.

Score	Variables[References]	Operationalisation	Scoring (point)
Meal pattern (0-8 points)	Breakfast skipping[45]	Never (eating breakfast 5-7 days/week)	1
		Sometimes (eating breakfast 3-4 days/week)	0.5
		Daily or almost daily (eating breakfast ≤2 days/week)	0
	Eating breakfast alone vs. with others[54]	With others	1
		Depending on the occasion	0.5
		Always alone[*]	0
	Eating lunch alone vs. with others[54]	With others	1
		Depending on the occasion	0.5
		Always alone	0
	Eating dinner alone vs. with others[54]	With others	1
		Depending on the occasion	0.5
		Always alone	0
	Breakfast duration[5,56]	Adequate (≥15 min.)	1
		Barely adequate (≥7 and <15 min)	0.5
		Inadequate (<7 min.)	0
	Lunch/dinner duration[56]	Adequate (≥30 min.)	1
		Barely adequate (≥15 and <30 min.)	0.5
		Inadequate (<15 min.)	0
Diet total (Meal pattern score+ HEI-2010 + MDS) (0-31 points)	HEI-2010, classification[21]	Good (score >80)	12
		Need improvement (score 51-80)	6
		Poor (score <51)	0
	MDS, classification[23]	High adherence (>35)	11
		Intermediate adherence (≥18 and ≤34)	5.5
		Low adherence (0-18)	0
Lifestyle (0-3 points)	PA level[25]	High	1
		Moderate	0.5
		Low	0
	Sitting time[57,58]	Adequate (≤3.3 h/day)[**]	1
		Barely adequate (>3.3 and ≤7.5 h/day)	0.5
		Inadequate (>7.5 h/day)	0

To be continued in the next page.

Continuation of Table 1.

Score	Variables[References]	Operationalisation	Scoring (point)
Lifestyle (0-3 points)	Alcohol consumption[19,27]	Abstemious	0.5
		Moderate consumption	0.25
		High consumption	0
	Sleep duration per night[19,59]	Adequate (7-8 hours/day)	0.5
		Barely adequate (6-7 or 8-10 h/day)	0.25
		Inadequate (<6 or >10 h/day)	0

*In the case of participants who skipped breakfast >4 days/week, the score assigned to have breakfast alone or with others and to length of breakfast was 0.
**We used the cut-off of ≤3.3 h/day of sitting time on the basis of studies suggesting that longer duration incurred a greater risk of cardiovascular disease .
EO, eating occasions; HEI-2010, Healthy Eating Index-2010; MDS, MedDietScore; No., number; PA, physical activity.

Statistical analysis

The data were analysed utilizing SPSS version 22.0 (SPSS Inc., Chicago, IL) and are reported as the mean values, standard deviation (SD) and frequencies. All analysis were conducted separately for male and female students because of their differences in lifestyle behaviours(32). The survey results were weighted using weighting coefficients provided by the list of students enrolled in 2012/13(33). The symmetry of the distribution of the continuous variables was determined by a Kolmogorov–Smirnov–Lilliefors test. The differences between variables were calculated with the Kruskal Wallis H test and associations between scores and indices with Spearman's correlations (the variables were not normally distributed due the large sampling size). The categorical variables were analysed using χ^2 test.

Finally, to analyse the possible associations between the variables of the healthy lifestyle score and risk of excess adiposity, binary logistic regressions adjusted to age and daily energy intake were performed. The 95% confidence intervals (CIs) were calculated and Wald's test used for comparison of the odds ratios (ORs). All the variables of the healthy lifestyle score were dichotomised considering, on the one hand, the healthiest category, and, on the other, the intermediate and the least healthy; except for "sitting time", variable in which the categories were: adequate + barely adequate vs. inadequate, because the frequency for the healthiest category was very low. All tests were two-sided and *P*-values less than 0.05 were considered statistically significant.

Results

Regarding to BF classification results, 14.4% of the target population was classified as excessive, being higher the prevalence of excessive BF in men (16.1%) than in women (13.3%) (*P*<0.001). On the other hand, the percentage of students who resided with parents was 53.2%. In the case of the person responsible for food shopping and cooking, more than half of the students indicated that their parents were the responsible, 56% for food shopping and 53.3% for food cooking. There were sex differences in the last three analysed variables; being higher the percentage of women who lived with parents than in men (61.5% vs. 47.5%, *P*<0.001). However, women were more likely than men to be responsible of their own buying and cooking food (36.6% vs. 34.0% for food shopping; and 38.3% vs. 35.8% for food cooking; *P*<0.001 in both variables).

Diet characteristics of the studied population, according to sex are described in **Table 2**. Between 40.3 and 50.1% of the participants had an adequate number of EO daily, interval between EO, time spent on breakfast and/or lunch/dinner. Sex differences were found for all these variables analysed (*P*<0.05). The percentage of men who had an adequate number of EO daily, interval between EO and never skipped breakfast was higher than in women (*P*<0.05). Whereas, women showed a significantly higher adequacy in time spent on breakfast and on lunch/dinner compared with men (*P*<0.001).

In addition, there was a significant correlation between the meal pattern score and HEI-2010 (Spearman' rho, 0.145, *P*<0.001 for the total sample; 0.161, *P*<0.001 for women; and 0.114, *P*<0.001 for men), and between the meal pattern score and MDS (Spearman' rho, 0.096, *P*<0.001 for the total sample; 0.149, *P*<0.001 for women; and 0.089, *P*<0.001 for men). In this line, the average scores for MDS and HEI-2010 were higher in subjects who meet the recommendations for each of the variables of meal pattern score vs. those who did not (**Supplementary Table 1**). In addition, the average scores for meal pattern and the diet total score were higher in students who did not live with parents than those who live with them (meal pattern score: "living with parents" 5.4(1.1), "living with others" 5.5(1.4), *P*<0.001; diet total score; "living with parents" 20.7(4.8), "living with others" 21.0(4.7), *P*<0.001).

Table 2. Diet characteristics by sex of the population under study: students of the University of the Basque Country UPV/EHU, EHU12/24 study

	Total (n=26,165)		Men (n=10,607)		Women (n=15,558)		P^{*}
	Mean or %	SD	Mean or %	SD	Mean or %	SD	
No. of EO/day	4.5	0.8	4.5	0.9	4.5	0.8	0.038
No. of EO daily, %							
Adequate	50.1		50.5		49.8		
Barely adequate	48.9		48.3		49.3		
Inadequate	1.0		1.1		0.9		**0.039**
Interval between EO, min.	244.4	66.5	247.0	69.6	242.6	64.3	**<0.001**
Interval between EO, %							
Adequate	41.0		41.4		40.6		
Barely adequate	46.6		45.4		47.4		
Inadequate	12.4		13.2		12.0		**0.001**
Breakfast skipping, %							
Never	90.7		91.9		89.9		
Sometimes	5.2		5.7		4.9		
Daily or almost daily	4.0		2.4		5.1		**<0.001**
Eating breakfast alone vs. with others, %							
With others	22.5		14.3		28.0		
Depending on the occasion	16.4		13.5		18.3		
Always alone	61.2		72.2		53.7		**<0.001**
Eating lunch alone vs. with others, %							
With others	65.5		62.9		67.4		
Depending on the occasion	16.9		13.7		19.1		
Always alone	17.6		23.5		13.5		**<0.001**
Eating dinner alone vs. with others, %							
With others	76.1		71.9		79.0		

To be continued in the next page.

Continuation of Table 2.

	Total (n=26,165)		Men (n=10,607)		Women (n=15,558)		P^*
	Mean or %	SD	Mean or %	SD	Mean or %	SD	
Eating dinner alone vs. with others, %							
Depending on the occasion	12.0		14.2		10.4		
Always alone	11.9		13.9		10.5		**<0.001**
Breakfast duration, minutes/day	12.7	7.6	12.4	7.7	12.9	7.6	**<0.001**
Breakfast duration, classification, %							
Adequate	40.3		38.2		41.9		
Barely adequate	39.7		38.4		40.6		
Inadequate	20.0		23.5		17.5		**<0.001**
Lunch/dinner duration, minutes/day	26.9	9.7	25.6	8.7	27.8	10.2	**<0.001**
Lunch/dinner duration, classification, %							
Adequate	42.2		35.4		46.9		
Barely adequate	55.6		62.0		51.3		
Inadequate	2.2		2.6		1.9		**<0.001**
HEI-2010	74.5	8.0	73.3	7.9	75.3	7.9	**<0.001**
HEI-2010, classification[1], %							
Good	24.6		19.4		28.2		
Needs improvement	75.4		80.6		71.8		**<0.001**
MDS	33.5	5.5	32.7	5.2	34.1	5.6	**<0.001**
MDS, classification, %							
High adherence	43.5		37.1		47.9		
Intermediate adherence	56.4		62.7		52.1		
Low adherence	0.1		0.2		-		**<0.001**
Meal pattern score[2] (0-8 points)	5.5	1.2	5.3	1.2	5.6	1.2	**<0.001**
Diet total score[3] (0-31 points)	20.8	4.7	20.0	4.4	21.4	4.8	**<0.001**

[1]None of the participants was classified as poor (<51 points);[2]Meal pattern score included the following variables: no. of EO daily, interval between meals, breakfast skipping, time spent on breakfast and time spent on meals;[3]Diet total score: meal pattern score +HEI-2010+MDS.
[*]Sex differences. Significant *P*-values are highlighted in bold.
EO, eating occasions; HEI-2010, Healthy Eating Index; MDS, MedDietScore; No., number; SD, standard deviation.

Results of lifestyle characteristics (different from the diet) of the target population are presented in **Table 3**. Students were characterised by having a moderate PA level, an inadequate time spent sitting, being moderate drinkers and having an adequate time spent sleeping. The percentage of men who had a high PA level and a moderate consumption of alcohol was higher than women (*P*<0.001), and the average lifestyle score was higher in men than women (*P*<0.001). Whereas women showed a significantly higher adequacy in time spent sleeping compared with men (*P*<0.05). Regarding smoking habit, 81.7% was non-smokers/ex-smokers, being higher the proportion of men than women non-smokers/ex-smokers (86.9 vs. 78.1%, *P*<0.001).

Positive and significant correlations were found between the diet total score and the lifestyle score in the total sample (Spearman' rho= 0.096, *P*<0.001) and in both sexes (men, rho= 0.209, *P*<0.001; and women, rho= 0.105, *P*<0.001). The analysis of contingency tables between variables of the diet total score and the lifestyle score showed that students who meet the recommendations related to number of EO daily were more likely to have a high PA level (χ^2 =413.6, *P*<0.001), prolonged sitting times (χ^2 =82.6, *P*<0.001), moderate intakes of alcohol (χ^2 =301.7, *P*<0.001) and be non-smokers (χ^2 =263.2, *P*<0.001). And those who meet the recommendations for the interval between EO and for time spent on breakfast were more likely to have a high PA level (χ^2 =45.0, *P*<0.001 and χ^2 =43.6, *P*<0.001, respectively) and an optimal sleep duration (χ^2 =593.5, *P*<0.001 and χ^2 =352.4, *P*<0.001, respectively).

The mean score of the healthy lifestyle score for the total sample was 22.2(4.8), being higher in women than in men (22.7(4.9) vs. 21.3(4.5), *P*<0.001). In addition, subjects with non-excess BF had a higher average score on the healthy lifestyle than those with excess BF (22.4(4.7) vs. 21.3(5.0), *P*<0.001). Dividing the population, according to BF% classification, there were differences in favour of those who did not have excessive BF in adequacy in number of EO daily, interval between EO and time spent on breakfast (*P*<0.001) (**Table 4**).

Table 3. Lifestyle characteristics (different from diet) by sex of the population under study: students of the University of the Basque Country UPV/EHU, EHU12/24 study

	Total (n=26,165)		Men (n=10,607)		Women (n=15,558)		P^{*}
	Mean or %	SD	Mean or %	SD	Mean or %	SD	
PA level, %							
High	24.1		40.7		12.7		
Moderate	59.9		51.5		65.8		
Low	16.0		7.8		21.5		**<0.001**
Sitting time, hours/day	7.9	2.2	7.8	2.3	7.9	2.2	**0.006**
Sitting time, classification, %							
Adequate	0.8		1.2		0.6		
Barely adequate	48.0		46.9		48.8		
Inadequate	51.1		51.9		50.6		**<0.001**
Alcohol consumption, classification, %							
Abstemious	15.3		14.2		16.1		
Moderate	58.6		72.7		49.0		**<0.001**
High	26.0		13.1		34.8		
Sleep duration per night, hours/day	7.7	1.0	7.6	1.0	7.7	1.0	**<0.001**
Sleep duration per night, classification, %							
Adequate	62.0		61.1		62.6		
Barely adequate	33.8		33.5		34.0		
Inadequate	4.2		5.3		3.4		**<0.001**
Lifestyle score (0-3 points)	1.4	0.5	1.5	0.5	1.3	0.5	**<0.001**

*Sex differences. Significant *P*-values are highlighted in bold
PA, physical activity; SD, standard deviation.
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Table 4. Diet characteristics according to body fat classification of the population under study: students of the University of the Basque Country (UPV/EHU), EHU12/24 study

	Total (n=26,165)					Men (n=10,607)					Women (n=15,558)				
	Normal BF% (n=22,391)		Excessive BF% (n=3,375)		P^*	Normal BF% (n=8,902)		Excessive BF% (n=1,705)		P^*	Normal BF% (n=13,489)		Excessive BF% (n=2,069)		P^*
	Mean or %	SD	Mean or %	SD		Mean or %	SD	Mean or %	SD		Mean or %	SD	Mean or %	SD	
No. of EO/day	4.5	0.8	4.2	0.9	**<0.001**	4.6	0.9	4.2	0.8	**<0.001**	4.5	0.8	4.3	0.9	**<0.001**
No. of EO daily, %															
Adequate	51.1		44.0			53.1		36.9			49.8		49.7		
Barely adequate	48.1		53.7			45.5		63.1			49.9		45.9		
Inadequate	0.7		2.4		**<0.001**	1.4		0.0		**<0.001**	0.3		4.4		**<0.001**
Interval between EO, min.	241.8	64.1	260.0	77.8	**<0.001**	243.5	66.8	265.8	80.3	**<0.001**	240.7	62.2	255.3	75.4	**<0.001**
Interval between EO, %															
Adequate	41.2		39.5			42.0		38.1			40.7		40.5		
Barely adequate	47.9		38.7			46.6		39.3			48.8		38.3		
Inadequate	10.9		21.8		**<0.001**	11.4		22.6		**<0.001**	10.6		21.2		**<0.001**
Breakfast skipping, %															
Never	91.8		84.5			94.2		79.8			90.2		88.4		
Sometimes	4.4		10.3			3.6		16.8			4.9		4.9		
Daily or almost daily	3.8		5.2		**<0.001**	2.2		3.5		**<0.001**	4.9		6.7		**0.003**

To be continued in the next page.

Continuation of Table 4.

	Total (n=26,165)					Men (n=10,607)					Women (n=15,558)				
	Normal BF% (n=22,391)		Excessive BF% (n=3,375)		*P**	Normal BF% (n=8,902)		Excessive BF% (n=1,705)		*P**	Normal BF% (n=13,489)		Excessive BF% (n=2,069)		*P**
	Mean or %	SD	Mean or %	SD		Mean or %	SD	Mean or %	SD		Mean or %	SD	Mean or %	SD	
Eating breakfast alone vs. with others, %															
With others	23.5		16.0			14.9		11.0			29.2		20.0		
Depending on the occasion	16.2		17.6			12.7		17.7			18.4		17.5		
Always alone	60.3		66.4		**<0.001**	72.3		71.3		**<0.001**	52.3		62.5		**<0.001**
Eating lunch alone vs. with others, %															
With others	66.6		59.0			62.8		63.2			69.2		55.6		
Depending on the occasion	16.7		18.1			14.4		9.8			18.2		24.9		
Always alone	16.7		22.9		**<0.001**	22.8		27.1		**<0.001**	12.6		19.5		**<0.001**
Eating dinner alone vs. with others, %															
With others	76.4		74.6			72.7		67.6			78.8		80.4		
Depending on the occasion	12.2		10.7			14.7		11.5			10.5		10.0		
Always alone	11.4		14.7		**<0.001**	12.6		20.9		**<0.001**	10.7		9.5		0.188
Breakfast duration, min./day	12.6	7.3	13.2	9.3	**<0.001**	12.3	7.1	12.9	10.0	**<0.001**	12.9	7.4	13.4	8.6	0.221
Breakfast duration, classification, %															
Adequate	40.9		37.1			39.8		29.9			41.6		43.4		
Barely adequate	40.2		36.5			37.2		44.3			42.2		29.6		

To be continued in the next page.

Continuation of Table 4.

	Total (n=26,165)					Men (n=10,607)					Women (n=15,558)				
	Normal BF% (n=22,391)		Excessive BF% (n=3,375)		P^*	Normal BF% (n=8,902)		Excessive BF% (n=1,705)		P^*	Normal BF% (n=13,489)		Excessive BF% (n=2,069)		P^*
	Mean or %	SD	Mean or %	SD		Mean or %	SD	Mean or %	SD		Mean or %	SD	Mean or %	SD	
Breakfast duration, classification, %															
Inadequate	18.9		26.4		**<0.001**	23.0		25.8		**<0.001**	16.1		27.0		**<0.001**
Lunch/dinner duration, min./day	27.1	9.9	25.8	8.1	**<0.001**	25.7	9.1	25.4	6.4	**0.001**	28.0	10.3	26.1	9.2	**<0.001**
Lunch/dinner duration, classification, %															
Adequate	42.3		41.7			34.0		42.6			47.8		40.9		
Barely adequate	55.5		56.3			62.9		57.4			50.6		55.4		
Inadequate	2.2		2.0		0.609	3.1		-		**<0.001**	1.6		3.7		**<0.001**
HEI-2010	74.5	8.1	74.5	7.6	0.722	73.4	8.2	72.7	6.5	**0.002**	75.2	7.9	76.1	8.0	**<0.001**
HEI-2010 classification[1]															
Good	24.9		22.8			20.6		12.9			27.7		30.8		
Needs improvement	75.1		77.2		**0.004**	79.4		87.1		**<0.001**	72.3		69.2		**0.004**
MDS	33.7	5.6	32.8	4.7	**<0.001**	32.9	5.2	31.9	4.9	**<0.001**	34.1	5.7	33.6	4.5	**<0.001**
MDS classification															
High adherence	45.0		34.8			38.4		30.3			49.4		38.6		
Intermediate adherence	54.9		65.2			61.4		69.7			50.6		61.2		

To be continued in the next page.

Continuation of Table 4.

	Total (n=26,165)					Men (n=10,607)					Women (n=15,558)				
	Normal BF% (n=22,391)		Excessive BF% (n=3,375)		P*	Normal BF% (n=8,902)		Excessive BF% (n=1,705)		P*	Normal BF% (n=13,489)		Excessive BF% (n=2,069)		P*
	Mean or %	SD	Mean or %	SD		Mean or %	SD	Mean or %	SD		Mean or %	SD	Mean or %	SD	
MDS classification															
Low adherence	0.1		-		**<0.001**	0.2		-		**<0.001**	-		-		**<0.001**
Meal pattern score[2] (0-8 points)	5.5	1.2	5.1	1.4	**<0.001**	5.3	1.2	5.0	1.3	**<0.001**	5.7	1.2	5.3	1.5	**<0.001**
Diet total score[3] (0-12 points)	21.0	4.6	19.9	5.0	**<0.001**	20.2	4.4	18.9	4.1	**<0.001**	21.5	4.7	20.8	5.5	**<0.001**

[1]None of the participants was classified as poor (<51 points); [2]Meal pattern score included the following variables: no. of EO daily, interval between meals, breakfast skipping, time spent on breakfast and time spent on meals; [3]Diet total score: meal pattern score + HEI-2010 + MDS.
*Differences between normal BF and excess BF. Significant *P*-values are highlighted in bold.
BF, body fat; EO, eating occasions; HEI-2010, Healthy Eating Index; MDS, MedDietScore; No., number; SD, standard deviation..

On the other hand, people without excess BF had higher PA level, lower consumption of alcohol, a higher adequacy to sleep duration than those with excess BF (*P*<0.001) (**Table 5**). Analysis of lifestyle according to BF by sexes showed similar results, except for PA level, adequacy of the recommendations for sitting time and the average lifestyle score among women (*P*<0.05). In relation to smoking habit, the percentage of men smokers with excessive BF% (17.3%) was higher than those without excessive BF (12.6%) (*P*<0.001); whereas, the opposite happened in women smokers (22.2% with normal BF% vs. 20.1% with excessive BF%, *P*=0.031).

The proportion of students with excessive BF% who did not live with parents was higher than those who live with parents, although the differences were not significant (14.7% vs. 14.2%, *P*=0.275). Among men, the following variables were associated with excess BF (from largest to smallest magnitude of effect): a moderate/low PA level, breakfast skipping, a non-adequate breakfast duration and number of EO, and eating breakfast alone or depending on the occasion (sometimes alone/sometimes with others) (**Table 6**). Among women, a low MDS, a moderate/high alcohol consumption, a non-adequate sleep duration, eating breakfast and lunch alone or depending on the occasion were associated with excess BF (variables ordered from largest to smallest magnitude of effect) (Table 6).

Discussion

In this representative sample of university students, the prevalence of overweight/obesity, according to BF% was 14.4%, which was lower than in other studies involving university students[(4)], but higher than those from Basque Health Survey[(34)]. It should be noted that our study compared with those aforementioned used BF% as diagnostic criteria to identify cases with overweight/obesity, and thus, the results between the studies are not directly comparable. In agreement with results of the Italian[(35)] and other Spanish university students[(36)], we registered a higher prevalence of excessive BF in men than in women (*P*<0.001).

Table 5. Lifestyle characteristics according to body fat classification of the population under study: students of the University of the Basque Country (UPV/EHU), EHU12/24 study

	Total (n=26,165)					Men (n=10,607)					Women (n=15,558)				
	Normal BF% (n=22,391)		Excessive BF% (n=3,375)		*P*[*]	Normal BF% (n=8,902)		Excessive BF% (n=1,705)		*P*[*]	Normal BF% (n=13,489)		Excessive BF% (n=2,069)		*P*[*]
	Mean or %	SD	Mean or %	SD		Mean or %	SD	Mean or %	SD		Mean or %	SD	Mean or %	SD	
PA level, %															
High	25.1		17.9			44.9		18.6			12.0		17.2		
Moderate	58.6		68.2			48.0		69.7			65.6		67.0		
Low	16.3		13.9		**<0.001**	7.1		11.7		**<0.001**	22.4		15.8		**<0.001**
Sitting time, h/day	7.8	2.2	8.3	2.3	**<0.001**	7.6	2.2	8.6	2.4	**<0.001**	7.9	2.2	7.7	1.0	0.274
Sitting time, classification, %															
Adequate	1.0		-			1.4		-			0.7		-		
Barely adequate	47.8		49.1			48.3		40.1			47.5		56.8		
Inadequate	51.2		50.9		**<0.001**	50.3		59.9		**<0.001**	51.8		43.2		**<0.001**
Alcohol consumption, classification, %															
Abstemious	15.5		14.6			13.5		17.8			16.8		12.0		
Moderate	59.0		56.8			73.9		66.8			49.1		48.5		
High	25.6		28.7		**<0.001**	12.6		15.5		**<0.001**	34.1		39.5		**<0.001**
Sleep duration per night, h/day	7.7	1.0	7.4	1.1	**<0.001**	7.6	1.0	7.3	1.1	**<0.001**	8.0	2.2	7.6	1.0	**<0.001**
Sleep duration per night, classification, %															
Adequate	63.3		54.2			61.8		57.8			64.4		51.3		
Barely adequate	32.5		41.3			33.2		35.3			32.1		46.2		
Inadequate	4.1		4.5		**<0.001**	5.0		6.9		**<0.001**	3.5		2.6		**<0.001**

To be continued in the next page.

Continuation of Table 5.

	Total (n=26,165)					Men (n=10,607)					Women (n=15,558)				
	Normal BF% (n=22,391)		Excessive BF% (n=3,375)		P^*	Normal BF% (n=8,902)		Excessive BF% (n=1,705)		P^*	Normal BF% (n=13,489)		Excessive BF% (n=2,069)		P^*
	Mean or %	SD	Mean or %	SD		Mean or %	SD	Mean or %	SD		Mean or %	SD	Mean or %	SD	
Lifestyle score(0-5 points)	1.4	0.5	1.3	0.5	**<0.001**	1.6	0.5	1.4	0.4	**<0.001**	1.3†	0.5	1.3†	0.5	**0.001**

*Differences between normal BF and excess BF. Significant *P*-values are highlighted in bold.
†Differences were found between women with normal BF% and with excessive BF% (1.29(0.46); 1.33(0.47)).
PA, physical activity; SD, standard deviation.

Table 6. Factors related to diet and lifestyles associated with an increased risk of excess BF in the population under study: students of the University of the Basque Country UPV/EHU, EHU12/24 study

Variables[1]	Model 1			Model 2		
	OR	95% CI	*P*	OR	95% CI	*P*
Men (n=10 607)						
No. of EO daily						
Barely adequate/Inadequate	2.08	1.86, 2.32	**<0.001**	1.43	1.27, 1.61	**<0.001**
Interval between EO						
Barely adequate/Inadequate	1.26	1.13, 1.41	**<0.001**			
Breakfast skipping						
Sometimes/Daily or almost daily	4.92	4.22, 5.74	**<0.001**	3.66	3.02, 4.44	**<0.001**
Eating breakfast alone vs. with others						
Alone/Depending on the occasion	1.36	1.15, 1.61	**<0.001**	1.37	1.14, 1.63	**0.001**
Eating lunch alone vs. with others						
Alone/Depending on the occasion	1.01	0.91, 1.13	0.823			

To be continued in the next page.

Continuation of Table 6.

Variables[1]	Model 1			Model 2		
	OR	95% CI	*P*	OR	95% CI	*P*
Men (n=10 607)						
Eating dinner alone vs. with others						
Alone/Depending on the occasion	1.25	1.11, 1.39	**<0.001**			
Breakfast duration						
Barely adequate/Inadequate	1.59	1.42, 1.78	**<0.001**	1.58	1.39, 1.79	**<0.001**
Lunch/dinner duration						
Barely adequate/Inadequate	0.71	0.64, 0.79	**<0.001**	0.60	0.53, 0.68	**<0.001**
HEI-2010						
Needs improvement	1.81	1.55, 2.10	**<0.001**			
MDS						
Low adherence	1.54	1.38, 1.73	**<0.001**			
PA level						
Moderate/Low	4.00	3.50, 4.56	**<0.001**	3.77	3.28, 4.33	**<0.001**
Sitting time						
Inadequate	1.44	1.29, 1.60	**<0.001**			
Alcohol consumption						
Moderate/High	0.71	0.61, 0.81	**<0.001**	0.51	0.44, 0.60	**<0.001**
Sleep duration per night						
Barely adequate/Inadequate	1.20	1.08, 1.33	**0.001**			
Women (n=15 558)						
No. of EO daily						
Barely adequate/Inadequate	1.03	0.94, 1.13	0.534			
Interval between EO						
Barely adequate/Inadequate	1.06	0.97, 1.17	0.215			
Breakfast skipping						
Sometimes/Daily or almost daily	1.16	1.00, 1.34	0.052			

To be continued in the next page.

Continuation of Table 6.

Variables[1]	Model 1			Model 2		
	OR	95% CI	*P*	OR	95% CI	*P*
Women (n=15 558)						
Eating breakfast alone vs. with others						
Alone/Depending on the occasion	1.79	1.59, 2.01	**<0.001**	1.47	1.29, 1.66	**<0.001**
Eating lunch alone vs. with others						
Alone/Depending on the occasion	1.81	1.65, 1.99	**<0.001**	1.42	1.27, 1.58	**<0.001**
Eating dinner alone vs. with others						
Alone/Depending on the occasion	0.91	0.81, 1.02	0.092			
Breakfast duration						
Barely adequate/Inadequate	0.94	0.86, 1.04	0.243			
Lunch/dinner duration						
Barely adequate/Inadequate	1.33	1.21, 1.46	**<0.001**	1.31	1.18, 1.44	**<0.001**
HEI-2010						
Needs improvement	0.86	0.78, 0.96	**0.004**	0.52	0.46, 0.59	**<0.001**
MDS						
Low adherence	1.60	1.45, 1.76	**<0.001**	2.34	2.09, 2.62	**<0.001**
PA level						
Moderate/Low	0.64	0.57, 0.73	**<0.001**	0.59	0.51, 0.67	**<0.001**
Sitting time						
Inadequate	0.72	0.65, 0.79	**<0.001**	0.76	0.69, 0.84	**<0.001**
Alcohol consumption						
Moderate/High	1.45	1.26, 1.67	**<0.001**	2.23	1.90, 2.61	**<0.001**
Sleep duration per night						
Barely adequate/Inadequate	1.71	1.56, 1.88	**<0.001**	1.72	1.56, 1.90	**<0.001**

[1]All the variables were dichotomised considering, on the one hand, the healthiest category (that is the reference category in the regression analysis), and, on the other, the intermediate and the least healthy; except for "sitting time", variable in which the categories were: adequate + barely adequate vs. inadequate, because the frequency for the healthiest category was very low.

Model 1: effect of each variable adjusted by age and daily energy intake (kJ/d); Model 2: multivariate Wald's test adjusted by age and energy intake. Significant *P*-values are highlighted in bold.

CI, confidence interval; No., number; EO, eating occasions; HEI, Healthy Eating Index; MDS, MedDietScore; OR, odds ratio; PA, physical activity.

Supplementary Table 1. Diet quality indices according to adequacy to recommendations of variables of the meal pattern score in the population under study: students of the University of the Basque Country (UPV/EHU), EHU12/24 study

Variables[1]	MDS			HEI-2010		
	Mean	SD	*P*	Mean	SD	*P*
No. of EO daily						
Adequate	34.1	5.3		75.1	8.2	
Barely adequate/inadequate	32.9	5.5	**<0.001**	73.9	7.7	**<0.001**
Interval between EO						
Adequate	34.2	5.3		75.1	8.0	
Barely adequate/inadequate	33.1	5.5	**<0.001**	74.1	8.0	**<0.001**
Breakfast skipping						
Adequate	33.6	5.5		74.8	7.9	
Barely adequate/inadequate	32.6	5.2	**<0.001**	71.3	7.9	**<0.001**
Eating breakfast alone vs. with others						
With others	34.2	5.7		75.4	7.6	
Barely adequate/inadequate	33.3	5.4	**<0.001**	74.2	8.1	**<0.001**
Eating lunch alone vs. with others						
With others	33.6	5.2		74.6	7.6	
Barely adequate/inadequate	33.4	5.9	**0.043**	74.2	8.7	**<0.001**
Eating dinner alone vs. with others						
With others	33.7	5.4		74.7	7.7	
Barely adequate/inadequate	32.9	5.7	**<0.001**	73.6	8.9	**<0.001**
Breakfast duration						
Adequate	34.3	5.4		76.3	7.9	
Barely adequate/inadequate	33.0	5.5	**<0.001**	73.4	7.9	**<0.001**
Lunch/dinner duration						
Adequate	33.4	5.1		74.6	7.8	
Barely adequate/inadequate	33.6	5.7	**<0.001**	74.3	8.2	**<0.001**

[1]All the variables were dichotomised considering, on the one hand, the healthiest category, and, on the other, the intermediate and the least healthy.
Significant *P*-values are highlighted in bold.
No., number; EO, eating occasions; HEI, Healthy Eating Index; MDS, MedDietScore; SD, standard deviation..

With regard to the meal patterns, nearly half of the target population had an adequate number of EO daily, spacing of EO and meal duration. The average scores for meal pattern and diet total were higher than the mean value of these scales (5.5 out of 8 and 20.8 out of 31, respectively). Surprisingly a high meal pattern and the diet total score was obtained in students who did not live with parents than those who live with them. However, other authors observed that students who live with their parents have healthier eating habits than those living on-campus(37).

Some studies have suggested that different meal patterns are related to overall diet quality, with the most consistent finding being an inverse relationship between breakfast skipping and diet quality(17). Although, little research has looked at the how other variables of meal pattern influence diet quality, the findings in our work showed that all variables of the meal pattern score were associated with diet quality. A possible explanation for these results is that probably a better meal pattern implies a higher food variety and dietary diversity, and a higher choice of healthy foods than empty foods and therefore, a higher diet quality.

On the other hand, UPV/EHU students women followed more adequate dietary habits than men, taking more time on meals, eating generally with others and having a higher quality of diet. These results are consistent with findings reported in previous studies(38) and probably related to the fact that women were generally more prone than men to make conscious efforts to try to eat a healthy diet(39). On the other hand, students men of the present study were more likely to have an adequate interval between EO, just as an adequate number of EO/day and to eat breakfast usually compared with women (P<0.05). The sex differences in the interval between EO could be related to discrepancies in the distribution of energy intake throughout the day, as other authors have pointed out(40).

In relation to lifestyles (different from diet), population under study was characterised by having a moderate PA level, an excessive time spent sitting, being moderate drinkers and non-smokers/ex-smokers and having an adequate time spent sleeping. UPV/EHU students men had better lifestyles than women with regard to PA, drinking behaviour and smoking. However, students women presented a higher adequacy in time spent sleeping compared with men (P<0.05). The sex difference observed in the PA level was similar to that of other studies(37,41). Nevertheless, sex differences in the alcohol consumption and smoking habits were not in agreement with those previously published(37,42). These discrepancies could be due to methodological reasons and to changes in the consumption pattern by sex[43].

On the other hand, positive and significant correlations were found between the diet total score and the lifestyle score, with the most consistent finding being a direct relationship between an adequate number of EO daily and a high PA level, prolonged sitting times, moderate intakes of alcohol and being non-smokers; and between an adequate interval between EO and breakfast duration and a high PA level and an optimal sleep duration. These results agree with those of other authors[3,37], who have shown that less healthy food habits is combined with a cluster of less healthy lifestyle factors (e.g. smoking, high alcohol consumption and low PA level).

In addition, subjects with excess BF had a lower average score on the healthy lifestyle scale than those with non-excess BF ($P<0.001$). Students with excess BF were more likely to have an inadequate number of EO daily, interval between EO and breakfast duration, omitting breakfast, eating alone, have a low score for MDS, meal pattern and diet total ($P<0.01$). Regarding the number of EO and breakfast duration, our findings agreed with those reported by Shang *et al.*[44], who showed that eating more frequently and slowly independently entails a lower risk of overweight/obesity.

Moreover, there is strong evidence of an association between breakfast skipping and overweight and obesity, regardless of age, sex, cultural and economic conditions[45]. With respect to patterns of eating alone in relation to the risk of overweight/obesity, our results agree with results of Lee[46]. In this sense, it should remember that the association of social relationships with diet quality is well characterised in the literature[6].

Some studies have shown that, in general, people with overweight/obesity are more likely to have unhealthy lifestyles (e.g. insufficiently physically active, sedentary behaviours, binge drinking, smoking and sleeping time)[4,47]. These results are consistent with the finding of our work, in which students with excess BF had a low-moderate PA level, a moderate-high consumption of alcohol, a higher sitting time and a lower time spent sleeping than those with a normal BF% ($P<0.001$). In any case, in this study, excess BF has associated with different variables of the healthy lifestyle score in men than women. Among men, a moderate/low PA level, breakfast skipping, a non-adequate breakfast duration and number of EO and eating breakfast alone or depending on the occasion; and among women a low MDS, a moderate/high alcohol consumption, a non-adequate sleep duration, eating breakfast and lunch alone or depending on the occasion were associated with excess BF. The largest effects (magnitudes of ORs) were found for the variables breakfast skipping and PA level in men, and for adherence to the Mediterranean diet in women.

In general, these sex differences observed here could be due to the fact that women are more likely to find healthy eating more important[48], and therefore they followed more adequate dietary habits than men, eating a greater number of EO daily, skipping fewer breakfast, taking more time on those meals, and they had a better diet quality, as other authors have highlighted[38]. Respect to other lifestyles such as PA, probably, cultural practices and habits from children can be associated with a higher PA level in men than women[49].

Contrary to what one might expect, UPV/EHU men students with excess BF were more likely to have an adequate lunch/dinner duration and to be abstemious; and women students with excess BF were more likely to have an adequate sitting time, a high HEI-2010 and a high PA level. These results could be related to adoption of healthy behaviours for weight loss (e.g. eating less or different food, or exercising to lose weight)[50]. Contradictory results obtained in women for the two diet quality indices estimated, this result could be related to discrepancies in constructs and scoring criteria of diet quality indices used.

The findings of the study should be considered within the context of its limitations. First, recall bias inherent in a convenience sample cannot be ruled out. The decision to participate or not may have been influenced by several factors, including social, educational and health conditions, which may again correlate with outcome risk factors. Second, self-reports of the behaviours may be subject to social desirability bias, thus the findings may be under or overestimated. Despite that, previous validation studies indicate that the self-reported information, e.g. those related to diet, is reported with sufficient accuracy for use in epidemiology analysis[51]. It should be noted that we used previously well-proven or validated questionnaires.

Third, the study was based on a large survey that included a face-to-face interview and anthropometric measurements, thus the considerable length of each assessment may have influenced answers and response rate. To avoid it, the assessments were preferably divided into 2 days to ensure adequate concentration while answering the questions and to promote the participation. Finally, fourth, the design itself was cross-sectional so causal conclusions cannot be drawn from the behaviour factors selected. In future research, we will follow a cohort of students through their programme of studies to assess how the university environment affects upon their health behaviours over a period.

The main strength of this work compared with other researches[52] is that we used the BF% instead of body mass index as a diagnostic criterion for overweight/obesity, in order to avoid false positives and negatives. In addition, the set of protocolised measurements set in this study generated a large amount of data regarding behavioural determinants of overweight/obesity and interrelationships among them, in a community of university students.

Conclusions

Our results suggest that certain unhealthy lifestyle behaviours coexist, interact and increase the risk of overweight/obesity in this population. The sex-specific differences in risk factors of excess adiposity have important implications for interventions for primary prevention of obesity within this environment. Anyway, more studies are needed to confirm the complex interconnection between underlying factors of overweight/obesity.

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Conflict of interest

None.

Authorship

The author contributions are as follows: N. T.-A. and M. A.-I. contributed to the conception and design of the research, acquired and analysed the data, interpreted the results, and finally drafted the manuscript. Both authors read and approved the final manuscript.

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Study 3

Environmental impact and health-nutrition dimension of dietary habits in university students: Results from the EHU12/24 study

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Abstract

Objective:

To evaluate the environmental impact and health-nutrition dimension of diet and to explore the possible associations with one another, in university students.

Design:

In this observational cohort study, dietary intake was evaluated with a validated short food frequency questionnaire and diet quality through the Healthy Eating Index (HEI-2010) and MedDietScore (MDS). The environmental impact of diet was estimated with greenhouse gas emissions (GHGE) data obtained from the literature.

Setting:

Basque Autonomous Community.

Participants:

A representative sample of students of a Spanish public university, the University of the Basque Country.

Results:

Students' diet was characterised by a low consumption of carbohydrates (38.7% of total energy intake (TEI)) and fibre (23.4 g/d), and a high intake of lipids (39.1% of TEI). The mean HEI-2010 score was 74.5/100 and the MDS 33.5/55. The mean diet-related GHGE was 4.7 kg eCO_2/d. High levels of diet-related GHGE were associated with high scores on HEI-2010 and low scores on MDS. Participants with higher scores in diet quality indices were mainly women, with more age and with normal body fat percentage (BF%); and those with higher diet-related GHGE were mainly men, with more age, health sciences students, with a high socioeconomic status and excessive BF%.

Conclusions:

The compatibility of environmental impact and health-nutritional dimension of the diet depends in part on the constructs and criteria used in the indicators of this last dimension. Health-nutrition and environmental sustainability of diet were associated with sex, age, health sciences vs. non-health sciences courses, socioeconomic and BF status.

Key words:

Nutritional sustainability; dietary quality; environmental impact; greenhouse gas emission; university student.

Introduction

The growing concern about climate change and food security has led to an increased interest in sustainable and healthy diets[1,2]. According to the Food and Agriculture Organization, sustainable diets are “protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimising natural and human resources”[3]. To date, many authors have assessed the impact of food consumption of greenhouse gas emissions (GHGE)[4-6]. However, addressing the sustainable diet concept implies not only assessing the environmental dimension, but also the health-nutrition, affordability and acceptability dimensions[3].The sustainability of diets is not easy to assess because it requires high-quality indicators for each dimension as well as the possibility to link them.

Regarding the health-nutrition dimension or nutritional sustainability, it is generally assessed through nutritional quality indicators and/or health outcomes[7]. In this sense, some studies have modelled more environmentally friendly diets using for it food-based[8,9] or nutrient-based[10,11] recommendations or predictive public health models[12,13]. In other cases, it has been explored the health and environmental consequences of adopting dietary patterns such as Mediterranean diets (MD)[14]. Many studies have indicated that healthier diets are generally lower in their environmental impact, thus, higher quality diets have been associated with lower GHGE[15,16]. However, other authors have not found the same results, showing that sustainability dimensions like the environmental impact and the health-nutrition dimension of diet were not necessarily compatible with one another[17-21],what may be related to the known inverse relationship between nutrition and dietary energy density[22,23].

Even though high-nutritional quality diets were characterised by a high content in low-GHGE foods (expressed per 100 g), finally these diets had a greater impact than low-quality diets because they contained higher food quantities[7]. Obviously, more studies providing insight into the relationships between environmental impact of diets and nutritional sustainability are needed. Moreover, university young adults, have different consumption patterns and nutritional requirements compared with the general adult population[24-27], such associations might be different for this particular community.

To our knowledge, no previous studies have analysed these two sustainability dimensions of university students’ diet. The aims of the present study were therefore to evaluate the environmental impact and the health-nutrition dimension of diet and to explore the possible associations with one another, in a representative sample of students at the University of the Basque Country (UPV/EHU). Additionally, we tried to identify factors (such as socioeconomic status (SES) and demographic characteristics, the fact of studying Health Sciences (HS) and Non-Health Sciences (NHS) courses and body fat (BF) status) associated with these sustainability dimensions of diet.

Based on literature data, the hypotheses were raised that: i) depending on the constructs and criteria used in the indicators of nutritional sustainability (diet quality indices), health-nutritional and environmental goals can either match or be incompatible[(21)]; ii) participants who are older than 20-years (supposedly are more frequent meat consumers)[(28-30)] those with a low/medium SES[(31-33)], those with a high BF status[(34-36)] and NHS students[(37-39)] follow an unsustainable diet (taking into account both dimensions, health-nutrition and environmental impact).

Since the health benefits of sustainable diets, such as reductions in overweight and obesity levels[(40,41)], and the high sensitivity of young adults to issues related to the environment[(42)], the results of the present study could be used for planning food-based dietary guidelines and intervention strategies. These guidelines and strategies will contribute to improving diet quality while simultaneously reducing environmental impact, and could take advantage of the naturally occurring opportunities offered by this stage of life to induce behaviour changes. Moreover, university students are likely to constitute a significant proportion of the SE elite of the future; thus, their habits and behaviours are most likely to become the norm[(43)], rendering this population interesting to investigate.

Methods

Subjects and study design

This study is part of the EHU12/24 project, which is an observational cohort study designed to assess the prevalence of BF excess and major risk of developing overweight/obesity, according to a standardised protocol and involved a representative sample of the UPV/EHU student population[(44)]. The study design, sampling and procedures of EHU12/24 have been described in detail elsewhere[(44)]. During this survey, comprehensive information on demographic, SES and academic data, medical history, body image assessment, attitudinal factors related to diet, weight control and nutrition knowledge information was collected supplemented by anthropometric measurements(44). In this paper, we present results on eating habits and some factors (SES, demographic, and academic data (HS and NHS courses), and BF status) potentially associated with a healthier and sustainable diet.

Briefly, the survey was conducted from February 2014 to May 2017 in a cohort of 603 university students (59.5% women) aged between 18 and 28 years, after excluding 93 participants because of missing data on variables relevant to this study, according to a standardised protocol. Moreover, we assigned a weight to each participant such that the computed statistics based on the gathered data could be more representative of the population from which the data are retrieved(45).

Dietary intake assessment

Diet was assessed using a short food frequency questionnaire (SFFQ), which is a modified and validated version of the Rodríguez *et al.* questionnaire(46). The validity and reproducibility of the SFFQ were assessed by comparing energy, nutrients and food intake, the correlations between the intakes derived from two different dietary survey methods (SFFQ and 24-hour dietary recall) and the correlations between two different surveys (baseline and second SFFQ) (manuscripts under revision).

A detailed description of the dietary assessment in the EHU12/24 study has been already published(44). To estimate the energy and nutrient intake, all food items consumed were entered into DIAL 2.12(47), which is a dietary assessment program. As it was described previously(44), we checked if students under- or overestimated their dietary intake using the method proposed by Goldberg(48), and updated by Black(49), using a physical activity level of 1.55(50). This suggest that 38% of participants under-reported their intake and 2.1% over-reported their intake, being higher the underestimation in men than in women (48.3% vs. 31%, respectively; $P<0.001$) and in students with BF excess in comparison with those with normal BF (58% vs. 34.6%, respectively; $P<0.001$).

Macronutrients are expressed as a percentage of the total energy intake and were compared with the acceptable macronutrient distribution ranges, that is, ranges associated with a reduced risk of chronic disease that provide an adequate intake of essential nutrients(51). Lipid consumption was evaluated using the nutritional objectives for the

Spanish population[51]. In addition to the adequacy of the energy and nutrient intake, adherence to food-based dietary guidelines was evaluated using the *Healthy Eating Index*-2010 (HEI-2010)[52] and the *MedDietScore* (MDS)[53].

HEI-2010 is a measure of diet quality used to assess how well a set of food aligns with key recommendations of the Dietary Guidelines for Americans. Although specific to US dietary guidelines, the HEI-2010 has been widely used in European populations and even in studies involving European university students[54,55] which allows us to establish results comparisons. We used HEI-2010 instead of HEI-2015 for many reasons. First, HEI-2010 was applied previously in university students of the UPV/EHU and in other university students population[54,55], which allows us to establish comparisons between them. A second reason is that HEI-2010 includes the assessment of alcohol consumption (within the “empty calories” component), while HEI-2015 does not include it. In the present study, the evaluation of this food item in the context of the diet quality is of interest because university students usually consume large amounts of alcoholic drinks[56-57], even higher than their non-college attending peers[58]. The HEI-2010 consists of twelve components, including nine on adequacy and three on moderation. The theoretical range of the HEI-2010 is from 0-100. We scored data with the simple HEI scoring algorithm method[59]. MDS is an index that estimates the adherence level to the MD and is associated with biomarkers of cardiovascular disease risk[53]. This diet score has eleven main components, each was scored separately. The total score (sum) is between 0 and 55. Higher values of this score indicate greater adherence to the MD pattern.

Furthermore, environmental impact of diet was assessed, using diet-related GHGE data (specifically kg eCO_2/kg of food) obtained from the literature. A literature review was performed using PubMed to identify articles from 2000 to 2015 that provide data on the quantity of GHGE expressed as kg eCO_2/kg in response to each type of food product. Detailed procedures have been previously described[44]. **Table 1** summarizes the GHGE data applied to estimate the kg eCO_2 per person and day or year by considering their dietary intake from the SFFQ, using GHGE data from the literature review[18,60-67]. Briefly, the data were selected considering the geographical proximity to our environment and correction factors[60,61] were applied to those data that did not include the GHGE corresponding to home transport and/or to waste. The food groups were classified according to the same criteria used in other studies investigating the GHGE of diets[66], and the food items in each group were selected from the most frequently consumed items listed in the quantitative study of food consumption in the Basque Autonomous Community[68].

Table 1. Greenhouse gas emission for each food item used in the EHU12/24 study obtained from a literature review performed in Pubmed

Food types	Food item[References]	GHGE (kg eCO_2/kg of food)
Fruits	Citric fruits: orange[56-58]	1.58
	Other fruits: apple[56-58]	1.34
	Dried fruits: dates[56,57,59]	1.15
Fruit drinks	Commercial fruit juices[56-58]	1.26
Vegetables	Garlic[56-58]	0.94
	Garnish vegetables: carrot[56-58]	1.84
	Green beans[56-58]	1.94
	Onion[56-58]	0.94
	Salad: lettuce[56-58]	1.99
Starchy foods	Bread[60]	1.47
	Breakfast cereals[18,56,57]	3.42
	Lentils[56-58]	0.56
	Pasta[56-58]	0.49
	Potatoes[56-58]	0.54
	Rice[56-58]	1.31
	Whole breakfast cereals[18,56,57]	3.42
	Whole wheat bread[56-58]	1.29
Cheese	Low-energy cheese: white cheese[56-58]	2.15
	Other cheeses: gruyère[56-58]	13.53
Milk and dairy foods	Cream[56-58]	3.28
	Dairy dessert: custard[56-58]	2.50
	Semi-skimmed milk[56-58]	1.61
	Skimmed milk[56-58]	1.61
	Skimmed yogurt[61]	1.33
	Whole milk[60]	1.00
	Whole yogurt[56-58]	2.50
Red meat and deli meat	Bacon[56,57,62]	9.93
	Ham[56-58]	7.26
	Lamb[56-58]	25.57
	Mincemeat[56-58]	20.56
	Sausages[56,57,62]	8.01
Eggs and white meat	Chicken[56-58]	7.04
	Eggs[56-58]	6.06
Fish and shellfish	Blue fish: pink salmon[56-58]	6.83
	White fish: hake[56-58]	4.44
	Shellfish: prawn[56-58]	18.03
Sweets and salted snacks	Biscuits[61]	2.50
	Cream or chocolate biscuits[61]	2.50

To be continued in the next page.

Continuation of Table 1.

Food types	Food item(References)	GHGE (kg eCO_2/kg of food)
Sweets and salted snacks	Cream or chocolate cakes(56-58)	2.09
	Chocolate(59)	1.00
	Donuts(18,56,57)	2.41
	Honey(56-58)	1.03
	Sugar(56-58)	0.96
	Sweeties: sweets(61)	2.60
	Whole wheat biscuits(61)	2.50
	Fried tomato sauce(56,57,62)	1.47
	Spicy: chillies and peppers, dry(56,57,59)	1.65
	Chocolate bread(18,56,57)	2.50
	Pizza(61)	2.50
	Snacks bags: fried potato chips(56-58)	2.64
	Soups(56,57,62)	0.36
	Soy drink(61)	0.43
Oil and fat	Butter(56-58)	26.60
	Corn oil(61)	2.29
	Margarine(61)	1.75
	Mayonnaise(56,57,63)	2.05
	Olive oil(56-58)	2.35
	Sunflower oil(56-58)	1.24
Alcoholic drinks	Alcohol aperitifs(56-58)	1.13
	Beer(56-58)	0.46
	Cider(56-58)	1.13
	Distilled beverages(56-58)	1.13
	Wine(56-58)	1.13
Non-alcoholic beverages	Coffee(56-58)	0.47
	Low-energy drinks(61)	1.00
	Sugary drinks(56-58)	0.47
Nuts	Nuts(56-58)	2.93

GHGE, greenhouse gas emissions.

Covariates

Demographic data (including decimal age and sex) and SES (based on parents' educational level and crowding index) were registered retrospectively with the National Health Questionnaire[69]through face-to-face interviews. The crowding index was estimated as a ratio of the number of household members and the number of rooms used for sleeping[70].To facilitate the data analysis, covariates were regrouped: parents' educational level (at least one of the parents had university studies or not) and crowding index (score greater than 1; lower than or equal to 1). Moreover, information regarding the bachelor´s or postgraduate degree towards which the students were studying was also recorded. The participants were classified according to the knowledge area of the degree for which they were studying based on the criteria proposed by the Spanish Ministry of Education, Culture and Sport(71) (Arts and Humanities, Sciences, Health Sciences, Social and Legal Sciences, and Engineering and Architecture) and this variable was dichotomized into HS and NHS. Of the total sample, 86.1% were NHS students and the rest HS ones (13.9%). General characteristics of the sample, age, parents' educational level and crowding index, have been already published(44).

Additionally, anthropometric data included the measurement of skinfold thickness (bicipital, tricipital, subscapular and suprailiac). A detailed description of the anthropometric measurements in the EHU12/24 study has been already published(44). The BF% was calculated with skinfold data using the Siri-age-sex equation(72) as recommended by the Spanish Society of Obesity Research(73), and the density was estimated using the Durnin and Womersley formula(74). The subjects' BF% was classified using the criteria proposed by Bray *et al.*(75).

Statistical analysis

Data were analysed using SPSS for Windows (version 22.0, SPSS Inc., Chicago, IL, USA) and are reported as the mean values, standard deviation and frequencies. The survey results were weighted using weighting coefficients provided by the list of students enrolled in 2012/13(76). The symmetry of the distribution of continuous variables was determined by a Kolmogorov–Smirnov–Lilliefors test. The differences between variables were calculated with Kruskal Wallis H test (the variables were not normally distributed, due to data being weighted and the large sampling size, thus the small deviations rendered the variables not normally distributed). The categorical variables were analysed using χ^2 test.

Spearman correlation coefficients (r) and kappa coefficients were calculated to investigate the degree of agreement between the two dietary quality indices. The kappa coefficient is a measure of agreement: $\kappa=1$ is perfect agreement while $\kappa=0$ is the weakest agreement. For the κ coefficient analysis, we divided the dietary quality data into two categories according to definitions of HEI-2010 and MDS authors. HEI-2010 was divided into the following categories: needs improvement (0-80 points) and good (>80 points), and MDS into the following ones: low adherence to MD (0-34 points) and high adherence

(>35 points). The cut-off point of MDS was established taking into account that scores below 34 points were associated with higher risk of coronary heart disease, being the relative odds ≥1.42[53].

Covariates associated with a high score of HEI-2010 and MDS were identified using binary logistic regression models. In these models, we considered the following covariates: age, knowledge area that they were studying, SES (based on parents' educational level and crowding index) and BF status. The effect of each variable was adjusted by daily energy intake (kJ/day) and sex, and the models 2 included all factors that were associated with a healthier diet. These all explanatory variables were deemed to be fixed effects.

Finally, to analyse the possible association between dietary quality (the categorization of both indices was done as previously described) and GHGE associated with dietary habits, GHGE variable was dichotomized into low- and high-scores, using the sample median (lowest GHGE, ≤4.4 kg eCO_2/day; highest GHGE, >4.4). Bivariate and partial correlations between the two indices of dietary quality and GHGE were calculated. Partial correlations were adjusted by daily energy intake (kJ/day) and sex. In addition, binary logistic regressions were performed to examine associations between two indices of dietary quality and diet-related GHGE and above-mentioned covariates. All tests were two-sided, and P values <0.05 were considered statistically significant.

Results

According to BF%, 14.4% of study population was classified as excessive, being higher the prevalence of excessive BF in men (16.1%) than in women (13.3%) (P<0.001). The average energy, nutrients and alcohol intake is described in **Table 2**. Participants' diet was characterised by a low consumption of carbohydrates and fibre (especially in the case of men), and a high intake of lipids, particularly saturated fatty acids (SFA) and cholesterol. Sex differences were found for energy, nutrients (except for SFA) and alcohol intake. The results of all these variables were higher in men than in women (P<0.01), with the exception of the percentage of carbohydrates in total dietary intake, which was higher in women (P<0.001)

Table 2. Energy, nutrients and alcohol intake in the study population: students of the University of the Basque Country UPV/EHU, EHU12/24 study

Variables	Total (n=26,165)		Men (n=10,607)		Women (n=15,558)[1]		P^2	AMDR[(51)]
	Mean	SD	Mean	SD	Mean	SD		
Energy (kJ/d)	8,891.9	2,741.5	9,793.3	2880.9	8,277.3	2459.7	***	
Proteins (%TEI)	15.1	2.7	15.1	3.0	15.0	2.5	**	10-15
Carbohydrates (%TEI)	38.7	5.6	38.2	5.6	39.1	5.6	***	50-60
Lipids (%TEI)	39.1	6.6	39.6	6.6	38.7	6.5	***	30-35
SFA (%TEI)	13.1	3.0	13.1	3.0	13.0	3.0	NS	<7-8
MUFA (%TEI)	16.8	4.1	17.0	4.1	16.6	4.0	***	20
PUFA (%TEI)	6.1	2.5	6.2	2.8	5.9	2.3	***	5
Linoleic acid (%TEI)	11.8	7.9	13.5	9.5	10.7	6.3	***	3
α-linolenic acid (%TEI)	1.4	0.8	1.6	0.9	1.3	0.7	***	1-2
Cholesterol (mg/d)	314.7	199.8	366.8	241.8	279.3	155.5	***	<300
Fibre (g/d)	23.4	9.6	24.1	9.6	23.0	9.6	***	>22-25(women) >30-35(men)
Alcohol (g/d)	9.1	9.0	10.2	10.5	8.4	7.7	***	>30-35

[1]Survey results were weighted using the weighting coefficients provided by the UPV/EHU; [2]Sex differences; [(51)]Serra & Aranceta, 2011.
***P*<0.01; ****P*<0.001.
AMDR, acceptable macronutrient distribution range; NS; not significant; MUFA, monounsaturated fatty acids; PUFA, polyunsaturated fatty acids; SD, standard deviation; SFA, saturated fatty acids; TEI, total energy intake.

Results of HEI-2010and MDS are presented in **Table 3**. In the total sample, the HEI-2010 score was 74.5(8.0) of a maximum of 100, with differences by sex (men's score 73.3(7.9) vs. women's score 75.3(7.9), P<0.001). The scores for the majority of HEI-2010 components (total fruits, whole fruits, total vegetables, greens and beans, whole grains, dairy, seafood and plant proteins, refined grains and sodium) were higher in women than in men (P<0.01). In general, the food groups that obtained the lowest scores were total vegetables and whole grains.

On the other hand, total MDS score was 33.5(5.5) of a maximum of 55, with sex differences (men's score 32.7(5.2) vs. women's score 34.1(5.6), P<0.001). Furthermore, in five of the eleven MDS components the scores were higher in women than in men (P<0.001), in particular in non-refined cereals, fruits, vegetables, red meat and products, poultry and full fat dairy products.

Table 3. *Healthy Eating Index*-2010 and *MedDietScore* in the study population: students of the University of the Basque Country UPV/EHU, EHU12/24 study

	Total (n=26,165)[1]		Men (n=10,607)		Women (n=15,558)		P^2
HEI components (score range)	Mean	SD	Mean	SD	Mean	SD	
Total fruit (0-5)	3.5	1.6	3.3	1.7	3.6	1.6	***
Whole fruit (0-5)	4.0	1.6	3.8	1.6	4.1	1.5	***
Total vegetables (0-5)	1.8	1.1	1.6	1.0	1.9	1.1	***
Greens and beans (0-5)	4.7	0.8	4.5	1.0	4.8	0.6	***
Whole grains (0-10)	2.3	3.2	1.8	2.9	2.6	3.4	***
Dairy (0-10)	5.4	2.5	5.3	2.4	5.4	2.6	**
Total protein foods (0-5)	4.3	0.9	4.4	0.8	4.2	1.0	***
Seafood and plant proteins (0-5)	3.2	1.3	3.2	1.3	3.3	1.3	***
Fatty acids (0-10)	6.8	2.3	6.9	2.2	6.8	2.4	***
Refined grains (0-10	8.9	1.9	8.6	2.1	9.1	1.7	***
Sodium (0-10)	9.9	0.6	9.9	0.7	10.0	0.4	***
"Empty energy" (0-20)	19.7	0.9	19.8	0.6	19.7	1.0	NS
Total score (0-100)	74.5	8.0	73.3	7.9	75.3	7.9	***
MDS components (score range)[3]							
Non-refined cereals	2.2	2.3	2.0	2.3	2.4	2.3	***
Potatoes	2.0	1.4	2.3	1.5	1.8	1.3	***
Fruits	4.5	1.2	4.5	1.2	4.5	1.2	**
Vegetables	4.6	0.9	4.5	1.0	4.7	0.9	***
Legumes	2.2	1.1	2.3	1.1	2.1	1.1	***

To be continued in the next page.

Continuation of Table 3.

	Total (n=26,165)[1]		Men (n=10,607)		Women (n=15,558)		P^2
MDS components (score range)[3]							
Fish	2.8	1.4	2.9	1.4	2.7	1.5	***
Red meat and products	2.3	1.4	1.9	1.3	2.6	1.3	***
Poultry	2.5	1.4	2.4	1.4	2.6	1.4	***
Full fat dairy products	1.5	1.9	1.2	1.8	1.7	1.9	***
Olive oil	4.7	1.0	4.7	1.1	4.8	0.8	NS
Alcoholic beverages	4.2	1.8	4.2	1.8	4.2	1.8	NS
Total score	33.5	5.5	32.7	5.2	34.1	5.6	***

[1]Survey results were weighted using the weighting coefficients provided by the UPV/EHU; [2]Sex differences; [3]Each component can contribute five points to the total score and the theoretical range is 0-55 and reverse scale was applied to four components of the MDS (red meat and products, poultry, full fat dairy products, and alcoholic beverages).
***P*<0.01; ****P*<0.001.
HEI, Healthy Eating Index; MedDietScore; NS, not significant; SD, standard deviation.

Percentages of participants classified into the same and opposite category, and agreement between the two diet quality methods (HEI-2010 and MDS) are presented in **Table 4.** There was a fair agreement between HEI-2010 and MDS measures of diet quality (κ=0.332).

Table 4. Percentage of participants classified into the same or opposite category and agreement between the two diet quality methods (*Healthy Eating Index*-2010 and *MedDietScore*) in the study population: students of the University of the Basque Country UPV/EHU, EHU12/24 study

Total sample (n=26,165)[1]	HEI-2010				r^4	kappa coefficient
	Needs improvement[2]		Good[3]			
	n	%	n	%		
MDS						
Low adherence[5]	13,164	50.3	1,608	6.1		
High adherence[6]	6,563	25.1	4,830	18.5		
Total	19,727		6,438		0.507(***)	0.332
Men (n=10,607)						
MDS						
Low adherence[5]	6,089	57.4	580	5.5		
High adherence[6]	2,461	23.2	1,477	13.9		
Total	8,550		2,057		0.507(***)	0.319

To be continued in the next page.

Continuation of Table 4.

	HEI-2010				r[4]	kappa coefficient
	Needs improvement[2]		Good[3]			
	n	%	n	%		
Women (n=15,558)						
MDS						
Low adherence[5]	7,074	45.5	1,028	6.6		
High adherence[6]	4,102	26.4	3,354	21.6		
Total	11,176		4,382		0.494(***)	0.328

[1]Survey results were weighted using the weighting coefficients provided by the UPV/EHU; [2]51-80 points (no participant scored less than 51); [3]>80 points; [4]correlation coefficients; [5]0-34 points; [6]>34 points.
*** *P*<0.001.
HEI, Healthy Eating Index; MDS, MedDietScore.

Regarding the factors associated with a higher diet quality, older age (>20.4) and non-excessive adiposity were associated with higher scores for HEI-2010 and MDS (*P*<0.001) (**Table 5**); and in the case of HEI-2010, higher SES (measured through parents' educational level) was also associated with a higher diet quality (*P*<0.001). The knowledge area HS was associated with a higher score for HEI-2010, while, in the case of MDS, it was associated with a lower score (*P*<0.001). HS students obtained a higher score than NHS students in seven of the twelve HEI-2010components: total fruits (HS, 3.6(1.6) vs. NHS, 3.5(1.6); *P*<0.001), whole fruits (HS, 4.1(1.6) vs. NHS, 4.0(1.6); *P*<0.001), total vegetables (HS, 1.8(1.0) vs. NHS, 1.7(1.1); *P*<0.001), greens and beans (HS, 4.8(0.7) vs. NHS, 4.8(0.8); *P*<0.001), dairy (HS, 6.0(2.3) vs. NHS, 5.3(2.5); *P*<0.001), sodium (HS, 10.0(0.3) vs. NHS, 9.9(0.6); *P*<0.001) and "*empty energy*" components (HS, 19.8(0.7) vs. NHS, 19.7(0.9); *P*<0.001). And in the case of MDS, HS students obtained a significant higher score in four of the eleven components compared with NHS ones: vegetables (HS, 4.7(0.8) vs. NHS, 4.6(1.0); *P*<0.001), fish (HS, 3.0(1.4) vs. NHS, 2.7(1.4); *P*<0.001), red meat and derivatives (HS, 2.5(1.2) vs. NHS, 2.3(1.4); *P*<0.001) and olive oil (HS, 4.8(0.8) vs. NHS, 4.7(1.0); *P*<0.001).

Table 6 shows the data on the GHGE by food group and their contribution to total GHGE (%). The mean GHGE per person per year was 1,719.6 (618.1) kg eCO_2: 1,920.6 (698.8) kg eCO_2 for men and 1,582.5 (513.2) kg eCO_2 for women (*P*<0.001). The food groups with the greatest contribution to GHGE was red meat and deli meat (28.2%), and the lowest was from alcoholic drinks (1.5%). Men showed a total diet GHGE higher than women and higher GHGE values in the following food items: cheese, milk and dairy products, starchy foods, red meat and deli meat, eggs and white meat, sweets and salted snacks, non-alcoholic drinks, alcoholic drinks and total GHGE ($P<0.001$); while, fruit and vegetables and oil and fat had higher GHGE values in women than men ($P<0.001$). Percent contributions from food groups to total GHGE were higher in women than in men for: fruit and vegetables, cheese, starchy foods, fish and shellfish, sweets and salted snacks and oil and fat ($P<0.01$); whereas, men showed a higher percent contribution for: red meat and deli meat, eggs and white meat, non-alcoholic drinks and alcoholic drinks ($P<0.05$).

In addition, significant bivariate correlations were identified between total diet GHGE and HEI-2010 (rho=0.078, $P<0.001$) and between total diet GHGE and MDS (rho=-0.075, $P<0.001$); and also, when they were adjusted by daily energy intake (kJ/d) (r=0.294, $P<0.001$; r=-0.117, $P<0.001$, respectively). Regarding the factors associated with diet-related GHGE, subjects with more age, HS students, with a high SES, with a high score for HEI-2010, with a low score for MDS and with BF excess displayed a higher diet GHGE, in both simple and adjusted model (**Table 7**). Relative to meat and derivatives intake (the food group contributing most to diet-related GHGE), this was higher in older students than in younger ones (older students, 138.2(84.6) vs. younger students, 126.3(67.0); $P<0.001$).

Discussion

In the present study, we analysed the environmental impact and the health-nutrition dimension of university students' dietary habits, just as we identified some factors associated with these sustainability measurements. The prevalence of excessive BF in the population studied was 14.4%, which was lower than in other studies involving university students[77,78]. However, in agreement with other authors, we registered a higher prevalence of excessive BF in men than in women ($P<0.001$)[77]. Regarding dietary habits from the health perspective, the students' diet was characterised by a low consumption of carbohydrates and fibre and a high intake of lipids, especially saturated fatty acids (SFA) and cholesterol. These characteristics are typical of the Western dietary pattern that is associated with higher obesity risk[79-81] and are consistent with those of other researchers have identified in European university students[82-85].

Table 5. Factors associated with a higher score in *Healthy Eating Index*-2010 and *MedDietScore* in the study population: students of the University of the Basque Country UPV/EHU, EHU12/24 study

	HEI-2010						MDS					
	Model 1[1]			Model 2[2]			Model 1[1]			Model 2[2]		
	OR	95% CI	*P*	OR	95% CI	*P*	OR	95% CI	*P*	OR	95% CI	*P*
Age (categorical)[3]												
>20.4	1.11	1.05, 1.18	***	1.14	1.07, 1.20	***	1.26	1.0, 1.33	***	1.28	1.22, 1.35	***
Knowledge area												
HS	1.18	1.09, 1.28	***	1.19	1.10, 1.29	***	0.78	0.73, 0.84	***	0.80	0.74, 0.86	***
Parents'												
educational level	1.06	1.00, 1.13	*	1.07	1.01, 1.13	*	1.00	0.95, 1.05	NS			
University studies												
Crowding index												
≤1.0	0.99	0.93, 1.05	NS				0.96	0.92, 1.01	NS			
BF classification												
Non-excess	1.18	1.09, 1.29	***	1.20	1.11, 1.31	***	1.50	1.39, 1.61	***	1.53	1.42, 1.65	***

[1]Effect of each variable adjusted only by daily energy intake (kJ/d) and sex; [2]Final multivariate model included all variables associated with HEI-2010 and MDS in the simple model (*P*<0.001) also adjusted by energy intake and sex; [3]Age was divided at the simple median, thereby defining high and low groups of the variable in question.

P*<0.05; * *P*<0.001.

BF, body fat; CI, confidence interval; HEI, Healthy Eating Index; HS, Health Sciences; MDS, MedDietScore; NS, no significant; OR, odds ratio.

Table 6. Greenhouse gas emissions (GHGE) associated with food consumption in the study sample: students of the University of the Basque Country UPV/EHU, EHU12/24 study

Food groups	Total (n=26,165)[1]				Men (n=10,607)				Women (n=15,558)				P^2	P^3
	kg eCO_2/ person/day		Contribution to total GHGE (%)		kg eCO_2/ person/day		Contribution to total GHGE (%)		kg eCO_2/ person/day		Contribution to total GHGE (%)			
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
Fruit and vegetables	0.9	0.6	19.2	12.0	0.9	0.7	16.7	9.9	0.9	0.5	20.9	13.0	***	***
Starchy foods	0.2	0.1	4.8	2.6	0.2	0.1	4.8	2.3	0.2	0.1	4.9	2.9	***	***
Cheese	0.2	0.2	3.3	4.3	0.2	0.2	3.1	3.4	0.2	0.3	3.5	4.8	***	*
Milk and dairy products	0.5	0.4	12.1	7.0	0.6	0.4	12.1	6.4	0.5	0.3	12.2	7.4	***	NS
Red meat and deli meat	1.4	1.3	28.2	13.3	1.7	1.1	32.0	12.6	1.2	0.8	25.7	13.2	***	***
Eggs and white meats	0.5	0.5	11.5	5.9	0.6	0.6	11.6	5.8	0.5	0.3	11.5	6.0	***	**
Fish and shellfish	0.4	0.3	9.6	5.7	0.4	0.3	8.6	4.8	0.4	0.3	10.2	6.1	NS	***
Sweets and salted snacks	0.2	0.2	5.3	3.5	0.3	0.2	5.2	3.6	0.2	0.2	5.3	3.4	***	***
Oil and fat	0.1	0.1	2.2	2.3	0.1	0.1	2.0	1.8	0.2	0.2	2.4	2.6	***	***
Non-alcoholic drinks	0.1	0.2	2.5	3.1	0.1	0.2	2.6	3.3	0.1	0.1	2.4	3.0	***	***
Alcoholic drinks	0.1	0.1	1.5	1.7	0.1	0.1	1.6	1.8	0.10.1		1.5	1.7	***	**
Total	4.7	1.7			5.2	1.9					4.3	1.4	***	

[1]Survey results were weighted using the weighting coefficients provided by the UPV/EHU; [2]Sex differences in GHGE expressed as kg eCO_2/person/day; [3]Sex differences in food group contributions to total diet-associated GHGE.
*P<0.05; ** P<0.01; *** P<0.001.
GHGE, greenhouse gas emissions; NS, no significant.

Table 7. Factors associated with a higher greenhouse gas emission related to food consumption in the study population: students of the University of the Basque Country UPV/EHU, EHU12/24 study

	GHGE					
	Model 1[1]			Model 2[2]		
	OR	95% CI	*P*	OR	95% CI	*P*
Age (categorical)[3]						
<20.4	0.72	0.68,0.77	***	0.68	0.64, 0.72	***
Knowledge area						
NHS	0.70	0.64, 0.76	***	0.76	0.69, 0.83	***
Parents' educational level						
Non-university studies	0.93	0.87, 0.99	*	0.90	0.85, 0.96	**
Crowding index						
>1.0	0.65	0.61, 0.69	***	0.65	0.60, 0.69	***
HEI						
51-80 points[4]	0.46	0.43, 0.49	***	0.31	0.29, 0.34	***
MDS						
0-34 points[5]	1.48	1.39, 1.58	***	2.13	1.98, 2.28	***
BF classification						
Excess	2.39	2.19, 2.61	***	2.42	2.21, 2.64	***

[1]Effect of each variable adjusted only by daily energy intake (kJ/d) and sex; [2]Final multivariate model included all variables associated with GHGE in the simple model (*P*<0.001) also adjusted by energy intake and sex; [3]The independent ordinal variable (age) was divided at the sample median, thereby defining high and low groups of the variable in question; [4]Needs improvement (no participant scored less than 51); [5]Low adherence.

P*<0.05; ** *P*<0.01; * *P*<0.001.

BF, body fat; CI, confidence interval; GHGE, greenhouse gas emissions; HEI, Healthy Eating Index; MDS, MedDietScore; NHS, Non-Health Sciences; OR, odds ratio.

With respect to diet quality analysed by HEI-2010 and MDS, results seemed to be acceptable, but improvable (74.5 of 100 for HEI-2010 and 33.5 of 55 for MDS); in comparison with other authors, the results were higher for the same diet quality indices[54,55,86]. For both indices, women had higher scores than men (P<0.001), which confirms the findings of other studies[29,54], and it is probably due to a greater health concern and increased concerns about body image because of social pressures on women[87,88]. Male students tend to discuss nutrition with their friends less frequently than women and to hold less strong beliefs related to nutrition[89], accordingly, they may be more vulnerable to having unhealthy dietary patterns compared with women. In any case, as in other researches[90,91], the two diet quality indices analysed were moderately correlated and had a fair agreement in the study population, probably due to differences in their constructs and scoring criteria.

With respect to the possible association between other studied factors and health-nutritional dimension of diet, those participants with higher scores in two analysed diet quality indices were mainly students with more age and with normal BF%. The first of these associations (high quality diet and older age) did not confirm our initial hypothesis. Other authors have found opposite associations[29,92,93], but it should be noted that we used a close age range (between 18 and 28 years old separated into two categories) in comparison with those used by these other researchers. Predictably, students with normal BF% were more likely to have a healthier diet, which is in line with the association of diet quality indices with obesity in adults found in other studies[34,35].

With regard to the knowledge area, construct and scoring criteria differences between diet quality indices could also be the reasons why HS students had higher HEI-2010 scores and lower MDS scores compared with NHS ones. Anyway, other authors have not found differences between students of HS and those of other knowledge areas[94]. Our findings were also consistent with previous studies showing an association between high quality diet (in our case, measured through HEI-2010) and SES (specifically parents' educational level as proxies for SES in the present study)[95,96]. In this sense, other authors have found evidence of substantial mediation by diet quality in the association between SES and obesity[96,97].

Regarding dietary habits from the sustainability perspective, our mean estimate of diet-related GHGE was 1,719.6 (618.1) kg eCO_2/person/year, that is, 4.7 kg eCO_2/d on average (women: 4.3kg eCO_2/d; men: 5.2 kg eCO_2/d), which is consistent with those reported in other European countries, such as France (4.1 kg eCO_2/d)[17], Netherlands (women: 3.7 kg eCO_2/d; men: 4.8 kg eCO_2/d)[98], Ireland (6.5 kg eCO_2/d)[99], and Sweden (women: 4.1 kg eCO_2/d; men: 5.5 kg eCO_2/d)[100]. These discrepancies could be due not only to differences in dietary assessment methods and participant characteristics (such as age range and dietary habits), but also to differences in data source used and in system boundaries in the emission factors adopted[99]. In any case, total GHGE for women was lower than for men (P<0.001), which is consistent with other studies, and could be related to total energy intake and consumption of red meat and deli meats[99,101].

Meat is typically marketed and modelled as a masculine food[102], and modern attitudes to meat reflect a strong meat-masculinity association[103]. The fact that men eat more, especially in food groups with higher impacts per gram like meats, drives their higher impacts when compared with women. Our results also showed that red meat and deli meats was the top contributor to diet-related GHGE, in the total population (28.2%), as observed by other authors[104-106]. The following food groups in order of contribution to the total GHGE were fruits and vegetables (19.2%) and milk and dairy products (12.1%), also as reported by other studies[17]. In contrast, food group with the lowest contribution to total diet-related GHGE was alcoholic drinks (1.6% in men and 1.5% in women), probably due to their low consumption, and similar to other authors' results (5% in men and 3% in women)[98]. In addition, it could be noted that women had a greater contribution from fruit and vegetables and fish and shellfish groups to total GHGE, in comparison with men. The sex difference in the contribution from fruit and vegetables to GHGE was in agreement with those obtained by Walker *et al*.[107]. On the other hand, it should be noted that in the present study, there was a tendency for under-reporting of energy intake, especially in men, so GHGE may be underestimated as well in similar order of magnitude.

Considering our results, efforts to reduce the environmental-impact of diet and improve health could focus on decreasing slightly the consumption of animal-based foods (taking into account that proteins expressed as total energy intake % were around 15%) and on increasing the starchy food intake (in order to increase, at the same time, the percentage of carbohydrates and the amount of dietary fibre). Anyway, consumption of animal-based foods is rooted in our current culture; therefore, lowering their consumption will not be easy and could result in unfavourable nutritional consequences (especially in risk groups for inadequate intakes). Avoidance or lower intake of animal foods such as red meat may also contribute to nutritional inadequacy of several micronutrients such as Fe, Zn and vitamin B_{12}[108].

Just like the two analysed diet quality indices, the high-GHGE diets were associated with the following factors: age, knowledge area, SES and BF status. The significant associations between diet-related GHGE and age suggested that older students (>20.4 years) had a high-environmental-load diet compared with younger ones, which confirms our hypothesis and could be related to a frequent meat consumption. However, contrary to our hypothesis, HS students had a high level of diet-related GHGE. This result could be related to the learning strategy in environmental education of the UPV/EHU, which is based on a transversal and integrated approach on the subjects, so we can deduce that there are not differences in matters of environmental education between HS and NHS students.

Relative to SES, those with higher SES had a high diet-related GHGE level, which is inconsistent with our hypothesis. In any case, other authors have observed that high nutritional quality is associated with higher cost as well as with greater environmental impact[31,109,110], even though healthy and sustainable diets are not necessarily more expensive compared with other ones[11]. Besides, our results suggest that students with obesity had a high diet-related environmental impact, even after adjustment for demographic and socioeconomic factors and diet quality. This result is in accordance with previous studies in French adults[36]. Apparently, sustainable dietary patterns prevent the risk of overweight and obesity and just efforts to balance energy intakes with energy requirements are one of the most efficient to reduce the environmental impact of diets. In this sense, Vieux and colleagues showed that when energy intakes were reduced to meet individual energy needs the diet-associated GHGE may be reduced up to 10%[66].

Finally, with respect to the potential association between diet quality and diet-related GHGE, students with the highest HEI-2010 scores tended to have a high level of diet-related GHGE as well; while, those with the lowest MDS tended to have a high level of GHGE. HEI-2010 results were in agreement with findings of other studies[17] who suggest that diets with the highest dietary quality are currently not those with the lowest diet-related GHGE. Even so, the differences in the association between GHGE and HEI-2010 and MDS could be related to discrepancies in constructs and scoring criteria of diet quality indices used. In fact, 40% of HEI-2010 score corresponds to food groups that contribute the most to GHGE of diets (red meat and deli meat, fruits and vegetables, milk and dairy products, eggs and white meat and fish and shellfish). While in the case of MDS, the five most contaminating food groups have a weight of 54% of the total score, but half, that is, 27% of the total MDS have an inverse score. So, the higher the intake of red meat and products, poultry and full fat dairy products, the lower the score in MDS. Therefore, only 27% of MDS (fruits, vegetables and fish) corresponds to the second and fifth most contaminating food groups, in terms of GHGE. Simultaneously, the differences in the association between GHGE and the two diet quality indices used could explain, at least in part, the controversy in this regard. The reality is that healthy diets do not always imply a low GHGE. With different combinations of food it is possible to consume a diet that meets health dietary requirements, but has a high GHGE(17,111). As other authors have pointed out: "diet quality and environmental sustainability are not necessarily interdependent, and improving diet quality and reducing environmental impact are efforts that should be pursued concurrently"(112).

Our study has several limitations worth noting. First, the data on dietary habits were self-reported, which is assumed to introduce some degree of under-reporting, especially in specific groups of the populations defined by weight or sex, as other authors have also observed(113,114). However, FFQs can provide valid information on intake for a large number of nutrients(115) and there is not alternative without limitations. Second, in the methodology to analyse the GHGE related to dietary habits, we did not consider several steps in the life cycles of products, because of the lack of data about cooking way, geographic origin and seasonality of foods. In this sense, it should be noted that it is extremely difficult and expensive to analyse all steps of the life cycle of food at population level. Anyway, method used for determining GHGE is a feasible alternative that has been applied in previous studies of GHGE quantification(62,66,116). Third, the university students' diet was assessed focusing on environmental and nutritional dimensions and for further investigations, it should be considered the use of indices like Sustainable Diet Index which include other fields of sustainability such as economic and sociocultural aspects(36). Moreover, only one of the relevant environmental indicators associated with food consumption was used, it would be convenient to consider multiple measures of sustainability, such as, food waste, irrigation water, among others.

Last, the lack of control of some possible confounders and other conditions that could have affected food consumption should be noted. We do not think that the above limitations lead to major flaws in the results. Caution, however, is needed when results are extrapolated to other populations. All of these limitations broaden the scope of future research. The strength of the present study is that it incorporated a set of protocolised measurements in a representative sample of university students and that combines the disciplines of environmental impact assessment and public health nutrition.

Conclusions

This population group follows an acceptable, but improvable diet from the point of view of health and sustainability. The compatibility of environmental impact and health-nutritional dimension of the diet depends in part on the constructs and criteria used in the indicators of this last dimension. Both health-nutrition and environmental sustainability aspects of dietary habits were associated with sex, age, HS vs. NHS courses, SES and BF status. Thus, participants with higher scores in two analysed diet quality indices were mainly women, with more age and with normal BF%; and those with higher diet-related GHGE were mainly men, with more age, HS students, with a high SES and excessive BF%. In general, these results may provide input for future intervention strategies aimed to encourage healthy and sustainable diets of UPV/EHU students.

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Conflict of interest

None.

Authorship

The author contributions are as follows: M. A.-I., A. M. R., S. T., N.B., E. R., and N. T.-A., contributed to the conception and design of the research; N. T.-A, N. B.-M and M. A.-I. acquired and analysed the data, interpreted the results, and finally drafted the manuscript. All authors revised the paper and approved the final version of the manuscript.

Ethical Standards Disclosure

This study was conducted according to the guidelines laid down in the Declaration of Helsinki and all procedures involving research study participants were approved by the Ethical Committee on Human Research of the UPV/EHU (CEISH/193/2013/ARROYO IZAGA). Written informed consent was obtained from all subjects.

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Study 4

Study 4: Descriptive results and discussion

Descriptive results and discussion

This section shows a description of all analysed variables, according to sex, age, KA and BF status.

4.1. Demographic and socioeconomic (SE) characteristics

Demographic and SE characteristics of the participants under study by sex are displayed in the *Results* section of the Material and Methods article. **Table 4.1** shows data on these same characteristics according to age. Regarding the differences in demographic and SE characteristics by BF status, students who had excess BF were students with more age, from Basque Country, with parents working and with a lower social status than students who did not have excess body fat (*P*<0.001) (**Table 4.2**). Previous studies have also shown associations between social status and obesity in Taiwan university students(1).

Table 4.1. Demographic and SE characteristics of the target population by age: students of the University of the Basque Country (UPV/EHU)

Variables, %	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥21 y old (n=10,110)	P^*
Sex					
Men	42.8	36.7	34.3	44.9	
Women	57.2	63.3	65.7	55.1	**<0.001**
Place of birth					
Basque Country	82.3	81.3	84.2	83.9	
Spain (apart from Basque Country)	16.3	17.3	13.9	12.4	
Europe (apart from Spain)	0.9	0.7	1.9	1.4	
South America	0.5	0.8	-	2.3	**<0.001**
Parents' education level					
University studies	56.5	47.6	51.5	38.1	
Others[1]	43.5	52.4	48.5	61.9	**<0.001**
Father's economic activity					
Working	93.4	86.3	90.6	82.0	
To be time off sick during 3 months or more	0.6	0.8	0.6	0.6	
Unemployed	2.0	4.6	4.2	6.1	
Retired or pensioner	4.0	7.2	4.6	10.6	
Others[2]	-	1.1	-	0.7	**<0.001**

To be continued in the next page.

Continuation of Table 4.1.

Variables, %	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥21 y old (n=10,110)	P^*
Mother's economic activity					
Working	83.8	70.9	74.9	71.9	
To be time off sick during 3 months or more	1.6	1.5	2.3	1.1	
Unemployed	2.6	8.3	11.1	6.3	
Housewife	10.5	16.8	9.2	17.7	
Retired or pensioner	-	0.6	1.8	2.3	
Others[2]	1.5	1.9	0.7	0.8	**<0.001**
Father's occupation					
Business owner with workers	16.1	10.1	9.9	12.1	
Business owner without workers	8.0	13.0	21.0	11.7	
Family help	-	-	1.0	0.7	
Permanent worker	67.4	69.7	62.6	68.4	
Temporary worker	2.6	3.4	4.2	1.6	
Cooperative member	1.0	2.3	0.7	0.7	
Others[3]	4.9	1.7	0.6	4.7	**<0.001**
Mother's occupation					
Business owner with workers	10.1	5.5	4.8	5.0	
Business owner without workers	7.9	5.6	4.2	4.9	
Family help	1.9	-	-	-	
Permanent worker	63.6	62.8	70.7	67.1	
Temporary worker	6.5	7.7	10.5	5.6	
Cooperative member	0.6	-	-	0.2	
Others[3]	9.3	18.4	9.8	17.2	**<0.001**
Father's professional category					
Service sector	70.4	62.7	72.5	64.8	
Primary sector	3.8	3.1	-	1.4	
Industrial sector	22.4	31.0	25.0	28.8	
Others[4]	3.4	3.1	2.5	4.9	**<0.001**
Mother's professional category					
Service sector	72.3	69.8	76.2	66.9	
Primary sector	1.0	7.3	11.4	0.3	
Industrial sector	12.2	-	-	11.2	
Others[4]	14.5	22.9	12.4	21.6	**<0.001**
Crowding index					
>1	40.6	38.5	37.5	44.3	
≤1	59.4	61.5	62.5	55.7	**<0.001**

[1]None of two has university studies; [2]studying, unpaid leaving; [3]studying, unpaid leaving or housewife; [4]housewife, unemployed and retired.
[*]Age differences. Significant results are highlighted in bold.
SD, standard deviation.

Table 4.2. Demographic and SE characteristics of the target population by BF status: students of the University of the Basque Country (UPV/EHU)

Variables, mean(SD) or %	Non-excess BF (n=22,391)	Excess BF (n=3,775)	P^*
Age, years	20.8(2.1)	21.3(2.2)	**<0.001**
Place of birth			
Basque Country	82.9	84.4	
Spain (apart from Basque	14.8	12.5	
Country)	1.2	1.6	
Europe (apart from Spain)	1.1	1.6	**<0.001**
South America			
Parents' education level			
University studies	46.6	45.7	
Others[1]	53.4	54.3	0.320
Father's economic activity			
Working	86.6	89.0	
To be time off sick during 3 months or more	0.8	-	
Unemployed	4.6	4.3	
Retired or pensioner	7.4	6.7	
Others[2]	0.7	-	**<0.001**
Mother's economic activity			
Working	73.9	78.4	
To be time off sick during 3 months or more	1.8	-	
Unemployed	7.4	5.1	
Housewife	14.8	11.8	
Retired or pensioner	-	1.6	
Others[2]	0.8	3.1	**<0.001**
Father's occupation			
Business owner with workers	12.8	7.0	
Business owner without workers	13.3	12.5	
Family help	0.3	1.5	
Permanent worker	66.4	72.7	
Temporary worker	2.4	5.0	
Cooperative member	1.3	-	
Others[3]	3.6	1.3	**<0.001**
Mother's occupation			
Business owner with workers	6.4	4.0	
Business owner without workers	5.8	3.5	
Family help	0.4	-	
Permanent worker	64.7	75.7	
Temporary worker	7.5	5.5	
Cooperative member	0.2	-	
Others[3]	15.0	11.3	**<0.001**

To be continued in the next page.

Continuation of Table 4.2.

Variables, mean(SD) or %	Non-excess BF (n=22,391)	Excess BF (n=3,775)	*P*[*]
Father's professional category			
Service sector	66.0	73.7	
Primary sector	2.1	0.9	
Industrial sector	28.0	22.9	
Others[4]	3.9	2.5	**<0.001**
Mother's professional category			
Service sector	70.3	71.9	
Primary sector	0.2	0.9	
Industrial sector	10.8	9.4	
Others[4]	18.7	17.9	**<0.001**
Crowding index			
>1	40.7	42.5	
≤1	59.3	57.5	**0.029**

[1]None of two has university studies; [2]studying, unpaid leaving; [3]studying, unpaid leaving or housewife; [4]housewife, unemployed and retired.
[*]BF status differences. Significant results are highlighted in bold.
BF, body fat; SD, standard deviation.

4.2. Objective and perceived health data

Before presenting the results of this section, the method used to estimate parents' overweight/obesity should be mentioned. To estimate it, the diagrams of figures (upper and lower) drawn in a way to represent men and women of ascending size and weight, which was included in the Weight-Cycling Questionnaire, was used[(2)]. In this methodology, cut-off points were not established to classify overweight/obesity, so we searched for data from nearby population. We reviewed the prevalence of overweight/obesity in the same age group of students' parents (45-64 years) in the last Health Survey set in the Basque Autonomous Community[(3)] that was 65.9% in men and 38.2% in women. Taking into account these data and the frequency distribution of the selected Brownell's silhouettes for parents, we categorised as overweight/obesity those ≥5 in the lower or upper figure, because it was the case that best suited the Basque population results (case 3 of the **Table 4.3**).

Table 4.3. Prevalence of overweight/obesity in adults, according to the Basque Health Survey and different cut-off points in Brownell's silhouettes (data corresponding to the participating students' parents)

Prevalence of overweight/obesity, %	Basque Health Survey[1]	Case 1[2]	Case 2[3]	**Case 3[4]**	Cases 4[5]
Men	65.9	32.2	9.0	**65.9**	26.0
Women	38.2	32.3	4.4	**50.1**	11.5

[1]Data from Health Survey from Basque Autonomous Community (2018), corresponding to the age range of 45-64 years; [2]Brownell's silhouettes ≥5 in the lower and upper figure; [3]Brownell's silhouettes >5 in the lower and upper figure; [4]Brownell's silhouettes ≥5 in the lower or upper figure; [5]Brownell's silhouettes >5 in the lower or upper figure.
The case that best suited the Basque population is highlighted in bold.

Just like in the case of the participating students' parents, we considered the prevalence of overweight/obesity in the Basque population and the frequency distribution of the selected Brownell's silhouettes for students, to identify the cut-off point of the figures from which it would be considered as overweight/obesity (Brownell's silhouettes ≥5 in the lower and upper figure, case 1 of the **Table 4.4**).

Table 4.4. Prevalence of overweight/obesity of young adults, according to the Basque Health Survey and different cut-off points in Brownell's silhouettes (data corresponding to the participating students)

Prevalence of overweight/obesity, %	Basque Health Survey[1]	**Case 1[2]**	Case 2[3]	Case 3[4]	Cases 4[5]
Total sample	11.6	**5.6**	1.1	27.8	4.0
Men	14.3	**8.1**	2.7	24.8	6.7
Women	11.6	**4.0**	0.0	29.8	2.2

[1]Data from the Health Survey from Basque Autonomous Community (2018), corresponding to the age range of 15-24 years; [2]Brownell's silhouettes ≥5 in the lower and upper figure; [3]Brownell's silhouettes >5 in the lower and upper figure; [4]Brownell's silhouettes ≥5 in the lower or upper figure; [5]Brownell's silhouettes >5 in the lower or upper figure.
The case that best suited the Basque population is highlighted in bold.

Regarding objective and perceived health data, "obesity related diseases (without obesity)" was the most referred category respect to parents' diseases, while in the students "without disease" and "other diseases" categories were the most referred (**Table 4.5**). According to the history of personal diseases, the prevalence of self-reported obesity by students was 0.6%, a result that is in line with the underreporting of weight found in most studies(4,5). In relation to the parents' obesity status, the results showed that parents of EHU12/24 project participants had a higher prevalence of obesity than Christian and Muslim students in Melilla(6). These differences could be due to the registration of this information was not done in the same way. In our case, Brownell silhouettes were used to classify parents' obesity and in their case, participants presented a medical certificate stating the presence or absence of obesity in their parents(6). However, comparing our data with those from Spanish Health National Survey and data from Europe for this age range, results were similar(7,8).

Besides, 84.7% of the students considered their health in the last year "good" or "very good". These data are in line with those observed in a study set in university students from other Spanish autonomous community(9). However, the percentage of students who declared a regular, bad or very bad health was slightly higher than data of university students from Germany, Poland and Bulgaria(10). These results are similar to those registered by other authors such as Seo *et al.*(11) who observed a quality of life (QoL) of 55.00 out of 80.00 and a stress level (SL) of 20.02 out of 40.00. Many stressors such as adaptation to university life, maintaining good grades, financial pressures, lack of skills to manage the time, future planning, and attempting to live independently from their parents can often contribute to health problems for university students(12,13). In terms of sex differences, as in other researches(14,15), the women of the present study tended to declare a higher degree of stress than men (P<0.001). This might be explained by the fact that females are more prone to report stress than males(16) and to react to stressors such as frustration or academic pressure and to problems in familial and social relationships with higher levels of stress than males(17,18).

With respect to objective and perceived health data by age, younger students were more likely to describe their health as "very good" but to declare a lower SL as well as a lower QoL compared with students of other age groups (P<0.001) (**Table 4.6**). Despite the fact that data are not comparable because the age ranges are not the same, another author(15) found that students with more age had a better self-rated health, the opposite to us, but in the case of SL, as age increases, the SL increases as in our study(15).

In relation to these same data by KA, HS students were more likely to have obesity (without or with co-morbidities) and paternal or maternal history of obesity, to consider their health "good" or "very good" and to have a higher QoL and SL, compared with NHS students (P<0.001) (**Table 4.7**). In spite of not having studies to compare our health data by KA, it is known that the probability to have overweight or obesity increases if one or both parents present overweight or obesity[(19)], although our hypothesis was that NHS students were more likely to have obesity than HS students due to their less knowledge about nutrition and health. There are researches that suggest that nutrition knowledge could have influence on dietary intake[(20)]. However, other studies suggest that students' correct nutritional knowledge by itself seems useful, but not sufficient for an appropriate diet, because to achieve it, students should change their unhealthy eating habits[(21,22)].

Finally, students with higher BF were more likely to report more diseases, to consider their health "regular", "bad" or "very bad", and also to declare a lower QoL and a higher SL, in comparison with Non-excess BF group (P<0.001) (**Table 4.8**). As it has been suggested in other studies set in university students, obesity in young adults is associated with a higher prevalence of diseases, especially, abnormal levels of cardio-metabolic risk factors[(23,24)]. Besides, in another study set in university students from nine Autonomous Community of Spain, it was shown an association between obesity and QoL because students with lower BMI had higher QoL[(25)].

Table 4.5. Objective and perceived health data of the target population by sex: students of the University of the Basque Country (UPV/EHU)

Variables, mean(SD) or %	Total sample (n=26,165)	Men (n=10,607)	Women (n=15,558)	P^*
Father's diseases[1]				
Without disease	17.9	14.4	20.3	
Obesity (without co-morbidities)	9.9	17.1	5.0	
Obesity with co-morbidities	22.0	23.8	20.7	
Obesity related diseases (without obesity)	35.5	34.6	36.1	
Other diseases	14.7	10.0	17.9	<0.001
Brownell silhouettes[2] (father)				
Normal weight	34.1	26.6	39.1	
Overweight/obesity	65.9	73.4	60.9	<0.001
Father's diseases[1]				
Without disease	17.9	14.4	20.3	

To be continued in the next page.

Continuation of Table 4.5.

Variables, mean(SD) or %	Total sample (n=26,165)	Men (n=10,607)	Women (n=15,558)	*P*[*]
Father's diseases[1]				
Obesity (without co-morbidities)	9.9	17.1	5.0	
Obesity with co-morbidities	22.0	23.8	20.7	
Obesity related diseases (without obesity)	35.5	34.6	36.1	
Other diseases	14.7	10.0	17.9	**<0.001**
Brownell silhouettes[2] (father)				
Normal weight	34.1	26.6	39.1	
Overweight/obesity	65.9	73.4	60.9	**<0.001**
Mother's diseases[1]				
Without disease	15.1	19.2	12.4	
Obesity (without co-morbidities)	19.6	22.3	17.8	
Obesity with co-morbidities	12.8	11.5	13.6	
Obesity related diseases (without obesity)	23.8	19.3	26.9	
Other diseases	28.7	27.8	29.3	**<0.001**
Brownell silhouettes[2] (mother)				
Normal weight	49.9	52.1	48.4	
Overweight/obesity	50.1	47.9	51.6	**<0.001**
Subject's diseases[3]				
Without disease	49.3	55.3	45.2	
Obesity (without co-morbidities)	0.3	0.3	0.2	
Obesity with co-morbidities	0.3	0.7	-	
Obesity related diseases (without obesity)	8.0	8.0	8.0	
Other diseases	42.1	35.7	46.6	**<0.001**
Brownell silhouettes[4] (subjects)				
Normal weight	94.4	91.9	96.0	
Overweight/obesity	5.6	8.1	4.0	**<0.001**
In the last year your health was…?				
Very good	24.9	32.1	20.0	
Good	59.8	55.3	62.9	
Regular	13.0	9.9	15.1	
Bad	1.8	2.1	1.5	
Very bad	0.5	0.6	0.5	**<0.001**
QoL, 0-100	78.7(10,3)	80.1(10.0)	77.7(10.4)	**<0.001**
SL, 0-100	52.3(25.0)	48.1(24.6)	55.2(24.9)	**<0.001**

[1]History of family disease; [2]Brownell's silhouettes ≥5 in the lower or upper figure; [3]history of personal disease; [4]Brownell's silhouettes ≥5 in the lower and upper figure.
[*]Sex differences. Significant results are highlighted in bold.
QoL, quality of life; SL, stress level.

Table 4.6. Objective and perceived health data of the sample of the target population by age: students of the University of the Basque Country (UPV/EHU)

Variables, mean(SD) or %	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥ 21 y old (n=10,110)	P^*
Father's diseases[1]					
Without disease	18.2	27.1	17.0	13.3	
Obesity (without co-morbidities)	14.7	9.6	12.7	6.1	
Obesity with co-morbidities	21.6	18.1	22.1	24.2	
Obesity related diseases (without obesity)	28.9	29.2	30.3	45.2	
Other diseases	16.7	16.0	17.9	11.1	**<0.001**
Brownell silhouettes[2] (father)					
Normal weight	32.0	37.2	38.1	31.1	
Overweight/obesity	68.0	62.8	61.9	68.9	**<0.001**
Mother's diseases[1]					
Without disease	15.2	16.0	9.9	17.5	
Obesity (without co-morbidities)	19.5	22.2	27.1	14.2	
Obesity with co-morbidities	12.5	12.9	14.2	12.0	
Obesity related diseases (without obesity)	19.8	19.4	24.2	28.1	
Other diseases	33.0	29.6	24.7	28.2	**<0.001**
Brownell silhouettes[2] (mother)					
Normal weight	47.5	49.3	48.2	52.4	
Overweight/obesity	52.5	50.7	51.8	47.6	**<0.001**
Subject's diseases[3]					
Without disease	51.0	51.7	45.0	49.5	
Obesity (without co-morbidities)	-	-	1.0	0.7	
Obesity with co-morbidities	-	-	-	0.2	
Obesity related diseases (without obesity)	6.8	3.2	8.2	11.2	
Other diseases	42.1	45.1	45.9	38.5	**<0.001**
Brownell silhouettes[4] (subjects)					
Normal weight	94.1	96.0	96.4	92.5	
Overweight/obesity	5.9	4.0	3.6	7.5	**<0.001**
In the last year your health was…?					
Very good	29.9	20.4	22.8	26.0	
Good	54.1	63.9	66.4	56.9	
Regular	14.6	13.1	8.1	14.9	
Bad	0.9	1.7	1.7	2.3	
Very bad	0.5	1.1	1.0	-	**<0.001**
QoL, 0-100	77.5(11.8)	78.6(9.4)	79.0(8.8)	79.1(10.7)	**<0.001**

To be continued in the next page.

Continuation of Table 4.6.

Variables, mean(SD) or %	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥ 21 y old (n=10,110)	P^*
SL, 0-100	46.4(23.4)	49.5(24.8)	56.4(24.2)	54.6(25.7)	**<0.001**

[1]History of family disease; [2]Brownell's silhouettes ≥5 in the lower or upper figure; [3]history of personal disease; [4]Brownell's silhouettes ≥5 in the lower and upper figure.

[*]Age differences. Significant results are highlighted in bold.
QoL, quality of life; SL, stress level.

Table 4.7. Objective and perceived health data of the target population by KA: students of the University of the Basque Country (UPV/EHU)

Variables, mean(SD) or %	HS (n=3,637)	NHS (n=22,529)	P^*
Father's diseases[1]			
Without disease	15.6	18.3	
Obesity (without co-morbidities)	8.5	10.1	
Obesity with co-morbidities	24.1	21.6	
Obesity related diseases (without obesity)	37.3	35.3	
Other diseases	14.6	14.7	**<0.001**
Brownell silhouettes[2] (father)			
Normal weight	32.5	34.3	
Overweight/obesity	67.5	65.7	**0.030**
Mother's diseases[1]			
Without disease	6.7	16.5	
Obesity (without co-morbidities)	18.4	19.8	
Obesity with co-morbidities	15.5	12.3	
Obesity related diseases (without obesity)	29.7	22.9	
Other diseases	29.7	28.5	**<0.001**
Brownell silhouettes[2] (mother)			
Normal weight	48.9	50.1	
Overweight/obesity	51.1	49.9	0.204
Subject's diseases[3]			
Without disease	46.9	49.7	
Obesity (without co-morbidities)	1.9	0.3	
Obesity with co-morbidities	-	-	
Obesity related diseases (without obesity)	6.9	8.2	
Other diseases	44.3	41.8	**<0.001**
Brownell silhouettes[4] (subjects)			
Normal weight	93.1	94.6	
Overweight/obesity	6.9	5.4	**<0.001**

To be continued in the next page.

Continuation of Table 4.7.

Variables, mean(SD) or %	HS (n=3,637)	NHS (n=22,529)	P^*
In the last year your health was…?			
Very good	25.7	24.7	
Good	60.4	59.7	
Regular	13.0	13.0	
Bad	0.9	1.9	
Very bad	-	0.6	**<0.001**
QoL, 0-100	79.1(11.1)	78.6(10.2)	**<0.001**
SL, 0-100	54.1(24.3)	52.0(25.1)	**<0.001**

[1]History of family disease; [2]Brownell's silhouettes ≥5 in the lower or upper figure; [3]history of personal disease; [4]Brownell's silhouettes ≥5 in the lower and upper figure.
[*]KA differences. Significant results are highlighted in bold.
HS, Health Sciences; KA, knowledge area; NHS; Non-Health Sciences; QoL, quality of life; SL, stress level.

Table 4.8. Objective and perceived health data of the target population by BF status: students of the University of the Basque Country (UPV/EHU)

Variables, mean(SD) or %	Non-excess BF (n=22,391)	Excess BF (n=3,775)	P^*
Father's diseases[1]			
Without disease	23.0	21.7	
Obesity (without co-morbidities)	0.5	2.6	
Obesity with co-morbidities	4.8	4.0	
Obesity related diseases (without obesity)	51.7	59.6	
Other diseases	20.1	12.0	**<0.001**
Brownell silhouettes[2] (father)			
Normal weight	33.3	38.4	
Overweight/obesity	66.7	61.6	**<0.001**
Mother's diseases[1]			
Without disease	21.9	22.9	
Obesity (without co-morbidities)	1.4	1.4	
Obesity with co-morbidities	1.1	3.3	
Obesity related diseases (without obesity)	35.5	33.1	
Other diseases	40.1	39.3	**<0.001**
Brownell silhouettes[2] (mother)			
Normal weight	50.2	48.2	
Overweight/obesity	49.8	51.8	**0.025**
Subject's diseases[3]			
Without disease	49.9	46.0	
Obesity (without co-morbidities)	0.2	0.9	
Obesity with co-morbidities	0.1	1.4	

To be continued in the next page.

Continuation of Table 4.8.

Variables, mean(SD) or %	Non-excess BF (n=22,391)	Excess BF (n=3,775)	P^*
Subject's diseases³			
Obesity related diseases (without obesity)	7.6	10.5	
Other diseases	42.3	41.2	**<0.001**
Brownell silhouettes⁴ (subjects)			
Normal weight	96.7	80.4	
Overweight/obesity	3.3	19.6	**<0.001**
In the last year your health was…?			
Very good	27.5	9.4	
Good	58.4	68.0	
Regular	12.4	16.4	
Bad	1.1	5.4	
Very bad	0.5	0.7	**<0.001**
QoL, 0-100	79.0(10.0)	76.4(11.4)	**<0.001**
SL, 0-100	51.6(25.3)	56.7(23.1)	**<0.001**

[1]History of family disease; [2]Brownell's silhouettes ≥5 in the lower or upper figure; [3]history of personal disease; [4]Brownell's silhouettes ≥5 in the lower and upper figure.
[*]BF status differences. Significant results are highlighted in bold.
BF, body fat; QoL, quality of life; SL, stress level.

4.3. Lifestyles results

4.3.1. Residence place and sentimental status

The percentage of students who resided with parents was 53.2% (**Table 4.9**), similar to that of Irish university students[(26)] and in both cases, there were more men living at home (that is, at parents' house) than women. However, these data were higher than studies set in Greece, where more than half of the students lived alone or with others, but not with relatives[(27)]. These differences could be due to the fact that more than three-quarters of the target population came from Basque Country[(28)], thus, more of them preferred staying at home than at students residences or shared flats because there is good communication regarding public transport and because it represents an economic saving for families among other reasons.

In the EHU12/24 study, 71.5% of the target population declared their sentimental status as single, being higher the percentage of men than women (*P*<0.001) (Table 4.9), what it does not agree with results from Sweden where nearly 50% were singles[(15)]. Analysing data on the residence place and sentimental status by age, students with more age, compared with younger ones, were more likely to live with parents and to have a steady partner (*P*<0.001) (**Table 4.10**). The fact that participants with more age live with parents is surprising. But taking into account that this is a cross-sectional study, it could be due to differences in the distance between the parents' residence and the campus where the students study, among the age groups analysed.

NHS students, in comparison with HS students were more likely to live with parents and to be single (*P*<0.001) (**Table 4.11**). This fact is linked to the percentage of students from outside Basque Country pursuing HS degrees was higher than that of students pursuing NHS degrees, which may be due to a greater offer of HS degrees at this University than at the nearest public universities as it is displayed in Material and Methods article. On the contrary, among students with excess BF the percentages of those who lived away from parents and were singles were higher than students without excess BF (*P*<0.001) (**Table 4.12**). It agrees with authors who suggest that many students who live away from home have an unhealthier diet compared with students who live at home increasing their sugar, wine, alcohol and fast food intake(29) and decreasing the weekly consumption of fruits and vegetables(29,30). This fact suggests the importance of the family environment in the formation and maintenance of dietary habits(29,30,31).

Table 4.9. Residence place and sentimental status of the target population by sex: students of the University of the Basque Country (UPV/EHU)

Variables, %	Total sample (n=26,165)	Men (n=10,607)	Women (n=15,558)	*P*[*]
Place of residence				
Parents' house	53.2	61.5	47.5	
Others[1]	46.8	38.5	52.5	**<0.001**
Sentimental status				
Single	71.5	77.6	67.4	
With steady partner	28.5	22.4	32.6	**<0.001**

[1]With steady partner, with other relatives, with room mates, student residence or alone.
[*]Sex differences. Significant results are highlighted in bold.

Table 4.10. Residence place and sentimental status of the target population by age: students of the University of the Basque Country (UPV/EHU)

Variables, %	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥21 y old (n=10,110)	P^*
Place of residence					
Parents' house	51.6	46.0	41.5	64.3	
Others[1]	48.4	54.0	58.5	35.7	**<0.001**
Sentimental status					
Single	79.1	75.9	73.7	64.2	
With steady partner	20.9	24.1	26.3	35.8	**<0.001**

[1]With steady partner, with other relatives, with room mates, student residence or alone.
*Age differences. Significant results are highlighted in bold.

Table 4.11. Residence place and sentimental status of the target population by KA: students of the University of the Basque Country (UPV/EHU)

Variables, %	HS (n=3,637)	NHS (n=22,529)	P^*
Place of residence			
Parents' house	43.4	54.7	
Others[1]	56.6	45.3	**<0.001**
Sentimental status			
Single	58.0	73.7	
With steady partner	42.0	26.3	**<0.001**

[1]With steady partner, with other relatives, with room mates, student residence or alone.
*KA differences. Significant results are highlighted in bold.
HS, Health Sciences; KA, knowledge area; NHS; Non-Health Sciences.

Table 4.12. Residence place and sentimental status of the target population by BF status: students of the University of the Basque Country (UPV/EHU)

Variables, %	Non-excess BF (n=22,391)	Excess BF (n=3,775)	P^*
Place of residence			
Parents' house	53.3	52.3	
Others[1]	46.7	47.7	0.275
Sentimental status			
Single	71.3	73.0	
With steady partner	28.7	27.0	**0.036**

[1]With steady partner, with other relatives, with room mates, student residence or alone.
*BF status differences. Significant results are highlighted in bold.
BF, body fat.

4.3.2. Dietary habits

4.3.2.1. Energy and nutrients intake

The mean energy intake of the sample was 2,123.8 kcal, being higher in men than in women (P<0.001) (**Table 4.13**) and results of other studies set at other Spanish university (University of Granada in Melilla) are in the same line[(6)]. In the present study, the intake per 1,000 kcal of proteins, fatty acids, monounsaturated fatty acids (MUFA), polyunsaturated fatty acids (PUFA) and cholesterol was higher in men than in women, while carbohydrates and fibre intake was higher in females than in males (P<0.01) (Table 4.13). Regarding vitamins and minerals intake per 1,000 kcal, it was higher in women than in men except for niacin, B_{12} and vitamin D (P<0.05) (Table 4.13), and the intakes of vitamin E, B_6 and folate, in both sexes, were higher than in other studies set in university students[(32)].

With respect to cholesterol intake of this population, it was higher than intermediate and final nutritional objectives for the Spanish population[(33)]. Dietary fibre was also below recommendations, in both men and women (Table 4.13). According to *Spanish Society of Community Nutrition* (SENC) recommendations, it would be a desirable daily intake of 14 g/1,000 kcal of fibre from different foods[(34)]. In this sense, it is worth pointing out the association between a high fibre intake and the prevention of chronic diseases such as type 2 diabetes or cardiovascular disease[(35,36,37)]; although the same time, reduction of fibre intake is inherent in changes from traditional food patterns to Western food models[(38)], due to the low consumption of fruits, vegetables and legumes observed in college students[(39)]. In any case, the fibre intake of Basque university students was higher than the intake of Spanish, Tunisian and American students[(38)].

Comparing energy and nutrient intake per 1,000 kcal by age, KA and BF status significant differences were observed in the majority of the nutrients (P<0.05) (**Tables 4.14, 4.15 and 4.16**). Contrary to what happens in other studies, in our population, energy intake decrease with age[(40)]. This fact together with a higher intake of fatty acids and SFA by younger students as well as a low consumption of many micronutrients could contribute to the "Freshman 15" phenomenon, that is, the popular belief that most students will gain 15 lbs (6.8 kg) of weight in the first year of college [(41)].

According to KA, the energy intake of HS students was higher than those of NHS ones (P<0.001). And the HS students of the UPV/EHU had a slightly higher energy intake than students from other universities[32, 39,42], but similar to those students of HS degrees of the Spanish University of Murcia[40]. Comparing the percentages of macronutrients intake, according to KA, as in other studies[39], the percentage of carbohydrates was higher and that of fats was lower in students from HS degrees than in NHS ones. Respect to intake of SFA, expressed per 1,000 kcal, HS students' intake was lower than Greek university students; and in the case of total fatty acids, MUFA and cholesterol, it was higher than Greek's ones[32]. Finally, contrary to our hypothesis and other studies set in university students and adult population[43,44], our data show, in general, a higher micronutrient intake in students with excess BF compared with those without excess BF (Table 4.16).

Table 4.13. Energy and nutrients intake per 1,000 kcal of the target population by sex: students of the University of the Basque Country (UPV/EHU)

Variables, units per 1,000 kcal with the exception of energy item, mean(SD)	Total sample (n=26,165)	Men (n=10,607)	Women (n=15,558)	*P**
Energy, kcal	2,123.8(654.8)	2,339.1(688.1)	1,977.0(587.5)	**<0.001**
Proteins, g	37.7(6.8)	37.9(7.4)	37.6(6.3)	**0.002**
Carbohydrates, g	103.3(15.0)	101.9(14.9)	104.2(14.9)	**<0.001**
Fatty acids, g	43.4(7.3)	44.0(7.4)	43.1(7.2)	**<0.001**
SFA, g	14.5(3.4)	14.6(3.4)	14.5(3.4)	0.122
MUFA, g	18.6(4.5)	18.9(4.6)	18.5(4.5)	**<0.001**
PUFA, g	6.7(2.8)	6.9(3.1)	6.6(2.5)	**<0.001**
Cholesterol, mg	145.9(59.1)	154.8(66.4)	139.8(56.6)	**<0.001**
Fibre, g	11.4(4.4)	10.5(3.5)	12.0(4.8)	**<0.001**
Thiamine, mg	0.7(0.3)	0.7(0.2)	0.7(0.3)	**<0.001**
Riboflavin, mg	0.9(0.3)	0.9(0.3)	1.0(0.3)	**<0.001**
Niacin, mg	17.2(3.9)	17.2(4.3)	17.1(3.7)	**<0.001**
Vitamin B_6, mg	1.1(0.3)	1.0(0.3)	1.1(0.3)	**<0.001**
Folic acid, μg	155.5(56.6)	148.6(53.3)	160.1(58.2)	**<0.001**
Vitamin B_{12}, μg	2.7(0.8)	2.7(0.8)	2.6(0.8)	**<0.001**
Ascorbic acid, mg	84.8(47.3)	81.2(51.0)	87.3(44.5)	**<0.001**
Vitamin A, μg	268.3(97.4)	256.3(95.2)	276.5(98.1)	**<0.001**
Vitamin D, μg	1.2(0.8)	1.3(0.8)	1.2(0.7)	**<0.001**
Vitamin E, mg	4.3(2.3)	4.2(2.5)	4.3(2.1)	**<0.001**
Vitamin K, μg	81.6(39.6)	76.4(37.0)	85.2(40.8)	**<0.001**
Ca, mg	435.1(121.4)	415.2(108.9)	448.6(127.5)	**<0.001**
P, mg	706.0(137.6)	695.0(140.3)	713.6(135.2)	**<0.001**
Fe, mg	8.0(2.3)	7.7(2.1)	8.2(2.5)	**<0.001**

To be continued in the next page.

Continuation of Table 4.13.

Variables, units per 1,000 kcal with the exception of energy item, mean(SD)	Total sample (n=26,165)	Men (n=10,607)	Women (n=15,558)	P^*
Fe, mg	8.0(2.3)	7.7(2.1)	8.2(2.5)	**<0.001**
Cu, mg	0.6(0.1)	0.6(0.1)	0.6(0.1)	**<0.001**
I, μg	46.8(13.2)	46.1(10.4)	47.3(14.8)	**<0.001**
Zn, mg	5.0(1.3)	4.9(1.4)	5.1(1.2)	**<0.001**
K, mg	1,449.4(282.8)	1,401.6(279.0)	1,482.1(280.9)	**<0.001**
Se, μg	48.6(11.7)	48.6(11.3)	48.6(11.9)	0.907
Mg, mg	151.7(34.2)	144.4(30.0)	156.7(36.0)	**<0.001**
C20_5 (EPA), g	0.1(0.1)	0.1(0.1)	0.1(0.1)	**0.047**
C22_6 (DHA), g	0.2(0.2)	0.2(0.2)	0.2(0.2)	**0.027**

*Sex differences. Significant results are highlighted in bold.
DHA, docosahexaenoic acid; EPA, eicosapentaenoic acid; MUFA, monounsaturated fatty acids; PUFA, polyunsaturated fatty acids; SD, standard deviation; SFA, saturated fatty acids.

Table 4.14. Energy and nutrients intake per 1,000 kcal of the target population by age: students of the University of the Basque Country (UPV/EHU)

Variables, units per 1,000 kcal with the exception of energy item, mean(SD)	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥21 y old (n=10,110)	P^*
Energy, kcal	2,193.6 (676.8)	1,988.7 (559.0)	2,177.3 (807.2)	2,134.0 (585.1)	**<0.001**
Proteins, g	37.2(6.8)	38.3(7.2)	37.4(7.0)	37.7(6.3)	**<0.001**
Carbohydrates, g	102.9(13.3)	102.1(15.4)	104.6(15.7)	103.3(15.0)	**<0.001**
Fatty acids, g	44.3(7.0)	43.2(7.6)	43.3(7.0)	43.2(7.4)	**<0.001**
SFA, g	15.1(3.1)	14.1(3.4)	14.8(3.3)	14.3(3.5)	**<0.001**
MUFA, g	18.7(4.5)	18.5(4.1)	18.7(4.6)	18.7(4.7)	0.636
PUFA, g	7.0(2.9)	7.1(3.5)	6.3(2.3)	6.6(2.5)	**<0.001**
Cholesterol, mg	143.0(52.4)	144.3(54.0)	144.9(73.9)	148.6(55.5)	**<0.001**
Fibre, g	10.9(3.8)	11.9(4.9)	10.7(3.9)	11.7(4.6)	**<0.001**
Thiamine, mg	0.7(0.2)	0.7(0.3)	0.7(0.2)	0.7(0.3)	**<0.001**
Riboflavin, mg	0.9(0.3)	1.0(0.3)	0.9(0.3)	0.9(0.3)	**<0.001**
Niacin, mg	16.8(3.5)	17.8(4.3)	17.2(4.3)	17.1(3.7)	**<0.001**
VitaminB_6, mg	1.0(0.3)	1.1(0.3)	1.0(0.3)	1.1(0.3)	**<0.001**
Folic acid, μg	151.4(51.1)	161.9(54.1)	149.4(51.4)	157.3(62.4)	**<0.001**
Vitamin B_{12}, μg	2.7(0.9)	2.7(0.8)	2.6(0.8)	2.7(0.8)	**<0.001**
Ascorbic acid, mg	82.2(42.4)	84.4(40.5)	80.6(46.5)	88.7(52.9)	**<0.001**
Vitamin A, μg	262.7(95.0)	282.7(100.6)	256.7(92.0)	269.5(98.7)	**<0.001**
Vitamin D, μg	1.2(0.6)	1.3(0.8)	1.3(0.8)	1.2(0.8)	**<0.001**

To be continued in the next page.

Continuation of Table 4.14.

Variables, units per 1,000 kcal with the exception of energy item, mean(SD)	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥21 y old (n=10,110)	P^*
Vitamin E, mg	4.6(2.3)	4.6(2.8)	4.0(2.1)	4.2(2.0)	**<0.001**
Vitamin K, µg	81.5(41.7)	87.6(44.7)	74.0(32.7)	82.6(38.2)	**<0.001**
Ca, mg	439.6 (113.3)	431.3 (116.1)	433.5 (120.5)	436.0 (128.4)	**<0.001**
P, mg	695.7 (152.0)	721.0 (137.1)	700.5 (129.8)	706.0 (133.7)	**<0.001**
Fe, mg	7.8(2.2)	8.1(2.4)	7.8(2.1)	8.2(2.4)	**<0.001**
Cu, mg	0.6(0.1)	0.6(0.1)	0.6(0.1)	0.6(0.1)	**<0.001**
I, µg	47.3(20.7)	45.9(11.4)	46.4(10.6)	47.2(10.2)	**<0.001**
Zn, mg	4.8(1.1)	5.1(1.3)	4.8(1.0)	5.1(1.4)	**<0.001**
K, mg	1,430.7 (283.4)	1,483.7 (303.1)	1,405.2 (280.4)	1,464.1 (268.5)	**<0.001**
Se, µg	47.6(11.1)	49.9(13.6)	48.2(12.0)	48.6(10.5)	**<0.001**
Mg, mg	148.0(34.9)	154.5(37.1)	148.4(31.0)	153.8(33.6)	**<0.001**
C20_5 (EPA), g	0.1(0.1)	0.1(0.1)	0.1(0.1)	0.1(0.1)	**<0.001**
C22_6 (DHA), g	0.2(0.2)	0.2(0.2)	0.2(0.2)	0.2(0.2)	**<0.001**

*Age differences. Significant results are highlighted in bold.
DHA, docosahexaenoic acid; EPA, eicosapentaenoic acid; MUFA, monounsaturated fatty acids; PUFA, polyunsaturated fatty acids; SD, standard deviation; SFA, saturated fatty acids.

Table 4.15. Energy and nutrients intake per 1,000 kcal of the target population by KA: students of the University of the Basque Country (UPV/EHU)

Variables, units per 1,000 kcal with the exception of energy item, mean(SD)	HS (n=3,637)	NHS (n=22,529)	P^*
Energy, kcal	2,140.1(585.8)	2,121.1(665.3)	**<0.001**
Proteins, g	38.2(5.7)	37.6(6.9)	**<0.001**
Carbohydrates, g	104.9(16.2)	103.0(14.7)	**<0.001**
Fatty acids, g	43.2(7.5)	43.5(7.3)	**0.021**
SFA, g	14.4(3.4)	14.5(3.4)	**<0.001**
MUFA, g	18.8(4.6)	18.6(4.5)	**0.046**
PUFA, g	6.5(2.4)	6.8(2.9)	**<0.001**
Cholesterol, mg	145.1(39.9)	145.0(61.6)	**<0.001**
Fibre, g	11.2(4.1)	11.4(4.5)	0.083
Thiamine, mg	0.7(0.2)	0.7(0.3)	**<0.001**
Riboflavin, mg	1.0(0.3)	0.9(0.3)	**<0.001**
Niacin, mg	17.4(3.8)	17.1(4.0)	**<0.001**
Vitamin B_6, mg	1.1(0.3)	1.1(0.3)	0.155
Folic acid, µg	155.4(48.7)	155.5(57.7)	0.113

To be continued in the next page.

Continuation of Table 4.15.

Variables, units per 1,000 kcal with the exception of energy item, mean(SD)	HS (n=3,637)	NHS (n=22,529)	P^*
Vitamin B_{12}, μg	2.6(0.7)	2.7(0.8)	**<0.001**
Ascorbic acid, mg	88.0(42.7)	84.3(48.0)	**<0.001**
Vitamin A, μg	261.2(87.7)	269.5(98.9)	**<0.001**
Vitamin D, μg	1.3(0.9)	1.2(0.7)	**<0.001**
Vitamin E, mg	4.1(1.9)	4.3(2.4)	**<0.001**
Vitamin K, μg	70.2(27.2)	83.5(40.9)	**<0.001**
Ca, mg	461.4(117.9)	430.8(121.4)	**<0.001**
P, mg	715.0(105..4)	704.6(142.0)	**<0.001**
Fe, mg	8.1(2.2)	8.0(2.3)	**0.019**
Cu, mg	0.6(0.1)	0.6(0.1)	**<0.001**
I, μg	48.3(10.5)	46.5(13.6)	**<0.001**
Zn, mg	5.0(1.1)	5.0(1.3)	**<0.001**
K, mg	1,426.1(250.3)	1,453.2(287.6)	**<0.001**
Se, μg	50.4(12.2)	48.3(11.6)	**<0.001**
Mg, mg	152.2(31.0)	151.6(34.7)	**0.025**
C20_5 (EPA), g	0.1(0.1)	0.1(0.1)	**0.001**
C22_6 (DHA), g	0.3(0.2)	0.2(0.2)	**0.001**

*KA differences. Significant results are highlighted in bold.
DHA, docosahexaenoic acid; EPA, eicosapentaenoic acid; HS, Health Sciences; KA, knowledge area; MUFA, monounsaturated fatty acids; NHS; Non-Health Sciences; PUFA, polyunsaturated fatty acids; SD, standard deviation; SFA, saturated fatty acids.

Table 4.16. Energy and nutrients intake per 1,000 kcal of the target population by BF status: students of the University of the Basque Country (UPV/EHU)

Variables, units per 1,000 kcal with the exception of energy item, mean(SD)	Non-excess BF (n=22,391)	Excess BF (n=3,775)	P^*
Energy, kcal	2,147.3(662.4)	1,984.4(589.0)	**<0.001**
Proteins, g	37.4(6.7)	39.1(6.8)	**<0.001**
Carbohydrates, g	103.4(15.0)	102.3(14.5)	**<0.001**
Fatty acids, g	43.5(7.2)	43.1(8.0)	**0.004**
SFA, g	14.6(3.3)	14.1(3.7)	**<0.001**
MUFA, g	18.6(4.5)	18.8(4.9)	0.398
PUFA, g	6.8(2.8)	6.6(2.6)	**0.004**
Cholesterol, mg	145.2(60.1)	150.0(52.6)	**<0.001**
Fibre, g	11.5(4.5)	11.1(3.7)	0.721
Thiamine, mg	0.7(0.3)	0.6(0.2)	**<0.001**
Riboflavin, mg	0.9(0.3)	0.9(0.3)	**<0.001**
Niacin, mg	17.1(4.0)	17.4(3.9)	**<0.001**
Vitamin B_6, mg	1.1(0.3)	1.0(0.3)	**0.002**
Folic acid, μg	155.4(57.2)	155.9(52.8)	0.158
Vitamin B_{12}, μg	2.6(0.8)	2.8(0.8)	**<0.001**
Ascorbic acid, mg	84.2(47.1)	88.4(48.8)	**<0.001**

To be continued in the next page.

Continuation of Table 4.16.

Variables, units per 1,000 kcal with the exception of energy item, mean(SD)	Non-excess BF (n=22,391)	Excess BF (n=3,775)	P^*
Vitamin A, μg	267.2(97.7)	275.1(95.7)	**<0.001**
Vitamin D, μg	1.3(0.8)	1.2(0.8)	**<0.001**
Vitamin E, mg	4.3(2.3)	4.3(2.2)	**<0.001**
Vitamin K, μg	81.1(40.0)	84.9(36.6)	**<0.001**
Ca, mg	429.7(113.8)	466.9(155.6)	**<0.001**
P, mg	702.2(135.5)	728.7(147.4)	**<0.001**
Fe, mg	8.0(2.4)	7.8(2.1)	**<0.001**
Cu, mg	0.6(0.1)	0.6(0.1)	**<0.001**
I, μg	46.3(13.2)	49.6(12.7)	**<0.001**
Zn, mg	5.0(1.3)	5.1(1.3)	**0.001**
K, mg	1,442.6(279.2)	1,489.9(300.4)	**<0.001**
Se, μg	48.4(11.5)	49.7(12.4)	**<0.001**
Mg, mg	151.3(34.6)	153.9(32.0)	**<0.001**
C20_5 (EPA), g	0.1(0.1)	0.1(0.2)	**0.001**
C22_6 (DHA), g	0.2(0.2)	0.2(0.2)	0.823

*BF status differences. Significant results are highlighted in bold.
BF, body fat; DHA, docosahexaenoic acid; EPA, eicosapentaenoic acid; MUFA, monounsaturated fatty acids; PUFA, polyunsaturated fatty acids; SD, standard deviation; SFA, saturated fatty acids.

4.3.2.2. Adequacy of the macronutrient intake to acceptable distribution ranges

Regarding adequacy of the macronutrient intake to acceptable distribution ranges, none of the nutrients met the acceptable range, except those of protein in the case of 18 and 20 years of age students, HS students and participants without excess BF (**Tables 4.17, 4.18, 4.19 and 4.20**). There were sex, age, KA and BF status differences (P<0.01) in all the analysed variables, with specific exceptions, such as, SFA by sex or MUFA by age (Tables 4.17, 4.18, 4.19 and 4.20). According to several researches[(40)] the typical diet described for Spanish population, university population included, tends to be a Western diet, rich in protein and fats, specially SFA and poor in carbohydrates and fibre. This dietary pattern has been associated with an increase risk of chronic diseases, such as cardiovascular illness[(45)] and some types of cancer[(46)].

In our case, the target population met the recommendations by SENC[(33)] for proteins, solely, but the intakes of carbohydrates and MUFA were below the recommendations and the rest of nutrients analysed in this section (fatty acids, SFA and PUFA) the consumptions were above the recommendations (Table 4.17). UPV/EHU' students had higher intakes of total fatty acids and MUFA and lower of proteins and PUFA than Croatian students[(47)]. In the case of acceptable macronutrient distribution ranges (AMDR) by age, there are not excessive differences between categories (Table 4.18) due to the narrow age range, but it was expected that younger students would have a worse diet pattern because for them, this is the first time that they are living without parents and they are responsible for health-related decisions[(48)]. Moreover, in this transition from high school to university, it is possible that the abandonment of established food habits and routines occurs in the family environment[(49)].

Regarding the KA, even though the percentage contribution of calories from macronutrients was significantly different between UPV/EHU' HS students and NHS ones (P<0.05) (Table 4.19), the adequacy of the macronutrient intake to AMDR was similar in both groups. This result is contrary to what would be expected to take into account that nutrition education could improve students' dietary intake[(50)] and these students could pay more attention to nutrition and self-care[(51)]. On the other hand, UPV/EHU' HS students had a lower intake of proteins and carbohydrates, and a higher intake of total fat and MUFA than HS students from other Spanish, Dutch and Greek universities[(22,40,42,52,53)].

At last, the adequacy of the macronutrient intake to AMDR was similar in groups according to BF, although students with excess BF had a high intake of protein and a low consumption of carbohydrates and fatty acids compared with those without excess BF. These results do not agree with other studies set in university students[(54)] but could be due especially to an underestimation of some foods rich in these macronutrients; as well as to a desire for weight loss and the fact of being on a diet by their self, reducing the intake of starchy and fatty foods. In general, other researchers have previously reported that overweight and obese individuals tend to underreport food consumption in dietary assessment studies[(55,56)].

Table 4.17. Adequacy of the macronutrient intake to acceptable distribution ranges in the target population by sex: students of the University of the Basque Country (UPV/EHU)

Variables, %TEI, mean(SD)	Total sample (n=26,165)	Men (n=10,607)	Women (n=15,558)	*P*[*]	AMDR[1], %TEI
Proteins	15.1(2.7)	15.1(3.0)	15.0(2.5)	**0.002**	10-15
Carbohydrates	38.7(5.6)	38.2(5.6)	39.1(5.6)	**<0.001**	50-55

To be continued in the next page.

Continuation of Table 4.17.

Variables, %TEI, mean(SD)	Total sample (n=26,165)	Men (n=10,607)	Women (n=15,558)	P^*	AMDR[1], %TEI
Fatty acids	39.1(6.6)	39.6(6.6)	38.7(6.5)	**<0.001**	30-35
SFA	13.1(3.0)	13.1(3.0)	13.0(3.0)	0.122	7-8
MUFA	16.8(4.1)	17.0(4.1)	16.6(4.0)	**<0.001**	20
PUFA	6.1(2.5)	6.2(2.8)	5.9(2.3)	**<0.001**	5

[1]Serra L & Aranceta J (2011) Objetivos nutricionales para la población española: consenso de la Sociedad Española de Nutrición Comunitaria. *Rev Esp Nutr Com* **17**, 178-199.
[*] Sex differences. Significant results are highlighted in bold.
AMDR, acceptable macronutrient distribution ranges; MUFA, monounsaturated fatty acids; PUFA, polyunsaturated fatty acid; SD, standard deviation; SFA, saturated fatty acids; TEI, total energy intake.

Table 4.18. Adequacy of the macronutrient intake to acceptable distribution ranges in the target population by age: students of the University of the Basque Country (UPV/EHU)

Variables, %TEI, mean(SD)	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥ 21 y old (n=10,110)	P^*	AMDR[1], %TEI
Proteins	14.9(2.7)	15.3(2.9)	15.0(2.8)	15.1(2.5)	**<0.001**	10-15
Carbohydrates	38.6(5.0)	38.3(5.8)	39.2(5.9)	38.7(5.6)	**<0.001**	50-55
Fatty acids	39.9(6.3)	38.9(6.8)	38.9(6.3)	38.9(6.7)	**<0.001**	30-35
SFA	13.6(2.8)	12.7(3.0)	13.3(3.0)	12.8(3.1)	**<0.001**	7-8
MUFA	16.8(4.1)	16.6(3.7)	16.8(4.2)	16.8(4.2)	0.636	20
PUFA	6.3(2.6)	6.4(3.1)	5.7(2.1)	6.0(2.3)	**<0.001**	5

[1]Serra L & Aranceta J (2011) Objetivos nutricionales para la población española: consenso de la Sociedad Española de Nutrición Comunitaria. *Rev Esp Nutr Com* **17**, 178-199.
[*]Age differences. Significant results are highlighted in bold.
AMDR, acceptable macronutrient distribution ranges; MUFA, monounsaturated fatty acids; PUFA, polyunsaturated fatty acid; SD, standard deviation; SFA, saturated fatty acids; TEI, total energy intake.

Table 4.19. Adequacy of the macronutrient intake to acceptable distribution ranges in the target population by KA: students of the University of the Basque Country (UPV/EHU)

Variables, % TEI, mean(SD)	HS (n=3,637)	NHS (n=22,529)	P^*	AMDR[1], %TEI
Proteins	15.3(2.3)	15.0(2.8)	**<0.001**	10-15
Carbohydrates	39.3(6.1)	38.6(5.5)	**<0.001**	50-55
Fatty acids	38.9(6.7)	39.1(6.5)	**0.021**	30-35
SFA	13.0(3.0)	13.1(3.0)	**<0.001**	7-8
MUFA	16.9(4.2)	16.8(4.1)	**0.046**	20
PUFA	5.9(2.2)	6.1(2.6)	**<0.001**	5

[1]Serra L & Aranceta J (2011) Objetivos nutricionales para la población española: consenso de la Sociedad Española de Nutrición Comunitaria. *Rev Esp Nutr Com* **17**, 178-199.
[*]KA differences. Significant results are highlighted in bold.
AMDR, acceptable macronutrient distribution ranges; HS, Health Sciences; KA, knowledge area; MUFA, monounsaturated fatty acids; NHS; Non-Health Sciences; PUFA, polyunsaturated fatty acid; SD, standard deviation; SFA, saturated fatty acids; TEI, total energy intake.

Table 4.20. Adequacy of the macronutrient intake to acceptable distribution ranges in the target population by BF status: students of the University of the Basque Country (UPV/EHU)

Variables, % TEI, mean(SD)	Non-excess BF (n=22,391)	Excess BF (n=3,775)	*P*[*]	AMDR[1], %TEI
Proteins	15.0(2.7)	15.6(2.7)	**<0.001**	10-15
Carbohydrates	38.8(5.6)	38.4(5.4)	**<0.001**	50-55
Fatty acids	39.1(6.5)	38.8(7.2)	**0.004**	30-35
SFA	13.1(3.0)	12.7(3.3)	**<0.001**	7-8
MUFA	16.7(4.0)	16.9(4.4)	0.398	20
PUFA	6.1(2.5)	5.9(2.3)	**0.004**	5

[1]Serra L & Aranceta J (2011) Objetivos nutricionales para la población española: consenso de la Sociedad Española de Nutrición Comunitaria. *Rev Esp Nutr Com* **17**, 178-199.
[*]BF status differences. Significant results are highlighted in bold.
AMDR, acceptable macronutrient distribution ranges; BF, body fat; MUFA, monounsaturated fatty acids; PUFA, polyunsaturated fatty acid; SD, standard deviation; SFA, saturated fatty acids; TEI, total energy intake.

4.3.2.3. Nutrient intake adequacy to estimated average requirements (EARs)

Nutrient intake adequacy to EARs are shown in **Tables 4.21, 4.22, 4.23** and **4.24**. Vitamin D and E were the sole nutrients below EARs, the rest met the requirements and vitamin A and I were nearly 100% of EARs. Our results on vitamin D and E are in line with those of the Spanish ANIBES population[(57,58)]. The analysis of these data by sex showed differences in all the variables studied (*P*<0.001), except in thiamine (Table 4.21); being in general higher the percentage of EARs in men than in women. In the case of the nutrient intake adequacy to EARs by age, KA and BF status, there were differences for the majority of the studied variables, apart from vitamin B_{12} and vitamin E by KA and I by BF status (*P*<0.001) (Tables 4.22, 4.23 and 4.24). To our knowledge, there are no data in the literature about nutrient adequacy by sex, age or KA in university students to be able to compare our results. However, studies on nutrient adequacy in non-overweight and overweight children indicated that adequacy of the nutrients intake was similar in both groups[(59)].

Table 4.21. Nutrient intake adequacy to estimated average requirements (EARs) in the target population by sex: students of the University of the Basque Country (UPV/EHU)

Variables, %EARs, mean(SD)	Total sample (n=26,165)	Men (n=10,607)	Women (n=15,558)	*P**
Proteins	191.4(66.5)	185.4(65.1)	195.5(67.1)	**<0.001**
Thiamine	151.5(67.5)	151.4(63.5)	151.5(70.2)	0.897
Riboflavin	200.8(79.0)	191.6(76.8)	207.1(79.9)	**<0.001**
Niacin	314.8(108.6)	331.6(125.5)	303.4(93.7)	**<0.001**
Vitamin B_6	199.7(76.9)	215.1(84.8)	189.2(69.0)	**<0.001**
Folic acid	100.4(43.2)	106.1(46.6)	96.4(40.3)	**<0.001**
Vitamin B_{12}	281.4(117.1)	315.5(122.5)	258.2(107.3)	**<0.001**
Ascorbic acid	266.9(165.0)	246.6(177.8)	280.8(154.2)	**<0.001**
Vitamin A	102.2(47.5)	94.3(44.6)	107.6(48.6)	**<0.001**
Vitamin D	26.3(18.9)	29.5(22.3)	24.2(15.9)	**<0.001**
Vitamin E	75.8(50.0)	82.3(59.2)	71.3(42.1)	**<0.001**
Ca	113.6(43.6)	119.2(42.4)	109.8(44.1)	**<0.001**
P	254.9(83.0)	275.9(86.2)	240.6(77.5)	**<0.001**
Fe	236.5(101.6)	294.8(109.9)	196.9(72.4)	**<0.001**
Cu	181.7(59.8)	194.4(57.6)	173.1(59.7)	**<0.001**
I	103.1(40.4)	111.6(37.9)	97.3(41.0)	**<0.001**
Zn	135.4(50.1)	120.8(43.7)	145.3(51.7)	**<0.001**
Se	226.1(79.5)	249.4(88.9)	210.1(67.9)	**<0.001**
Mg	111.4(35.4)	100.2(29.3)	119.1(37.2)	**<0.001**

*Sex differences. Significant results are highlighted in bold.
EAR, estimated average requirements; SD, standard deviation.

Table 4.22. Nutrient intake adequacy to estimated average requirements (EARs) in the target population by age: students of the University of the Basque Country (UPV/EHU)

Variables, %EARs, mean(SD)	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (5,523)	≥21 y old (n=10,110)	*P**
Proteins	197.1(68.2)	182.8(58.6)	196.2(73.3)	190.7(65.2)	**<0.001**
Thiamine	154.9(69.0)	147.8(64.1)	151.3(66.0)	151.9(69.4)	**<0.001**
Riboflavin	205.8(80.2)	193.8(63.9)	204.5(90.7)	200.2(78.7)	**<0.001**
Niacin	316.3(99.0)	303.2(85.5)	324.5(143.4)	315.1(101.6)	**<0.001**
Vitamin B_6	199.2(72.9)	196.0(66.3)	199.6(91.5)	202.0(75.3)	**<0.001**
Folic acid	101.1(39.5)	97.4(35.0)	97.9(42.7)	103.0(48.7)	**<0.001**
Vitamin B_{12}	291.8(118.7)	260.9(82.1)	285.4(142.5)	285.3(115.9)	**<0.001**
Ascorbic acid	265.2(152.0)	250.5(125.9)	259.6(162.5)	280.8(188.6)	**<0.001**
Vitamin A	102.2(42.9)	101.2(42.8)	101.8(57.0)	102.9(46.3)	**<0.001**
Vitamin D	26.1(15.1)	26.1(15.0)	28.0(24.0)	25.7(19.3)	**<0.001**
Vitamin E	82.3(49.7)	76.4(57.5)	711.9(49.1)	74.4(45.8)	**<0.001**

To be continued in the next page.

Continuation of Table 4.22.

Variables, %EARs, mean(SD)	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (5,523)	≥21 y old (n=10,110)	P^*
Ca	118.9(43.0)	105.1(35.0)	115.0(46.9)	115.0(45.7)	**<0.001**
P	259.7(88.6)	242.8(68.9)	258.3(95.1)	257.3(79.4)	**<0.001**
Fe	238.2(94.8)	221.0(83.0)	233.3(120.0)	246.1(102.1)	**<0.001**
Cu	189.4(63.8)	173.3(62.7)	182.2(63.2)	182.3(53.3)	**<0.001**
I	106.8(50.0)	93.6(26.7)	104.9(44.8)	105.6(37.9)	**<0.001**
Zn	134.2(48.9)	130.9(43.1)	135.7(50.4)	138.2(53.7)	**<0.001**
Se	226.5(71.2)	215.2(63.0)	231.5(101.9)	228.9(77.0)	**<0.001**
Mg	111.9(37.4)	107.0(32.8)	112.5(36.5)	113.0(35.1)	**<0.001**

*Age differences. Significant results are highlighted in bold.
EAR, estimated average requirements; SD, standard deviation.

Table 4.23. Nutrient intake adequacy to estimated average requirements (EARs) in the target population by KA: students of the University of the Basque Country (UPV/EHU)

Variables, %EARs, mean(SD)	HS (n=3,637)	NHS (n=22,529)	P^*
Proteins	206.3(71.7)	189.0(65.3)	**<0.001**
Thiamine	157.9(58.6)	150.4(68.8)	**<0.001**
Riboflavin	217.8(70.6)	198.1(79.9)	**<0.001**
Niacin	327.2(98.2)	312.8(110.1)	**<0.001**
Vitamin B_6	204.9(75.1)	198.9(77.1)	**<0.001**
Folic acid	100.6(33.9)	100.3(44.5)	**<0.001**
Vitamin B_{12}	278.3(98.4)	281.9(119.8)	0.124
Ascorbic acid	286.2(129.7)	263.8(169.8)	**<0.001**
Vitamin A	103.2(37.4)	102.0(48.9)	**<0.001**
Vitamin D	27.9(19.3)	26.1(18.8)	**<0.001**
Vitamin E	70.8(35.0)	76.6(52.0)	0.610
Ca	121.4(38.3)	112.4(44.3)	**<0.001**
P	260.8(69.9)	254.0(84.9)	**<0.001**
Fe	226.7(89.7)	238.1(103.3)	**<0.001**
Cu	178.1(54.9)	182.3(60.5)	**0.029**
I	107.3(31.9)	102.5(41.5)	**<0.001**
Zn	146.1(49.1)	133.6(50.0)	**<0.001**
Se	235.8(74.7)	224.5(80.1)	**<0.001**
Mg	118.3(31.3)	110.3(36.0)	**<0.001**

*KA differences. Significant results are highlighted in bold.
EAR, estimated average requirements; HS, Health Sciences; KA, knowledge area; NHS, Non-Health Sciences; SD, standard deviation.

Table 4.24. Nutrient intake adequacy to estimated average requirements (EARs) in the target population by BF status: students of the University of the Basque Country (UPV/EHU)

Variables, % EARs, mean(SD)	Non-excess BF (n=22,391)	Excess BF (n=3,775)	P^*
Proteins	196.9(67.2)	159.1(51.2)	**<0.001**
Thiamine	154.9(69.8)	131.2(47.2)	**<0.001**
Riboflavin	203.6(80.2)	184.1(69.0)	**<0.001**
Niacin	318.1(111.5)	295.2(87.0)	**<0.001**
Vitamin B_6	202.6(78.9)	182.6(60.5)	**<0.001**
Folic acid	101.7(44.9)	92.6(30.0)	**<0.001**
Vitamin B_{12}	283.0(120.2)	271.9(96.5)	**0.033**
Ascorbic acid	269.0(169.1)	254.3(137.7)	**0.001**
Vitamin A	103.2(48.3)	96.4(41.8)	**<0.001**
Vitamin D	26.8(19.3)	23.6(16.1)	**<0.001**
Vitamin E	76.6(51.0)	71.1(43.5)	**<0.001**
Ca	113.6(42.6)	113.9(49.2)	**<0.001**
P	256.7(84.2)	244.6(74.8)	**<0.001**
Fe	240.0(104.4)	216.1(80.0)	**<0.001**
Cu	184.6(60.3)	164.9(54.0)	**<0.001**
I	103.4(41.2)	101.8(35.3)	0.509
Zn	137.0(50.8)	125.8(44.4)	**<0.001**
Se	227.8(80.3)	215.8(73.6)	**<0.001**
Mg	112.6(35.9)	104.5(31.8)	**<0.001**

*BF status differences. Significant results are highlighted in bold.

BF, body fat; EAR, estimated average requirements; SD, standard deviation.

4.3.2.4. Dietary quality indices

With the objective to study the diet quality of the target population, two dietary quality indices were applied (HEI-2010 and MDS) and in both cases, the results were acceptable but improvable. Results of HEI-2010 of the total sample and by sex are presented in **Study 2**. Regarding results of HEI-2010 by age (**Table 4.25**), by KA (**Table 4.26**) and by BF status (**Table 4.27**), significant differences were observed in all HEI-2010 components (P<0.01), except for whole grains, total fatty acids and empty calories by KA and refined grains, empty calories and total score by BF status.

As it was expected, students with more age had a better diet quality than younger ones, probably due to the influence of the transition from high school to college or university over routines and habits, including dietary habits(49). Moreover, UPV/EHU' HS students had higher scores in the diet quality indices than NHS ones, this result could be due to nutrition knowledge and health self-care(50,51). Lastly, as in the Third National Health and

Nutrition Examination Survey (NHANES III)[60], we have not found differences in the total score of HEI-2010 between students with and without excess BF. Other authors[61-63]; however, have confirmed that adherence to dietary guidelines for Americans positively affects body fatness.

Table 4.25. Healthy Eating Index (HEI-2010) of the target population by age: students of the University of the Basque Country (UPV/EHU)

Healthy Eating Index HEI-2010	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥21 y old (n=10,110)	*P**
Variables (scores range)	mean(SD)				
Total fruit (0-5)	3.6(1.6)	3.5(1.5)	3.3(1.7)	3.5(1.7)	**<0.001**
Whole fruit (0-5)	4.2(1.5)	4.2(1.4)	3.8(1.7)	3.9(1.7)	**<0.001**
Total vegetables (0-5)	1.7(1.1)	1.9(1.1)	1.6(1.0)	1.8(1.1)	**<0.001**
Greens and beans (0-5)	4.7(0.8)	4.8(0.7)	4.6(0.9)	4.7(0.8)	**<0.001**
Whole grains (0-10)	1.7(2.7)	2.7(3.7)	2.0(3.1)	2.5(3.3)	**<0.001**
Dairy (0-10)	5.7(2.1)	5.3(2.5)	5.5(2.5)	5.2(2.6)	**<0.001**
Total protein food (0-5)	4.2(0.9)	4.3(0.9)	4.3(0.9)	4.3(1.0)	**<0.001**
Seafood and plants (0-5)	3.2(1.3)	3.1(1.4)	3.2(1.3)	3.3(1.3)	**<0.001**
Fatty acids (0-10)	6.7(2.2)	7.0(2.3)	6.4(2.6)	7.0(2.2)	**<0.001**
Refined grains (0-10)	8.8(1.7)	9.0(1.9)	8.8(1.9)	9.0(1.9)	**<0.001**
Sodium (0-10)	10.0(0.0)	9.9(0.8)	10.0(0.4)	9.9(0.6)	**<0.001**
Empty calories (0-20)	19.8(0.7)	19.5(1.4)	19.8(0.7)	19.8(0.7)	**<0.001**
Total (0-100)	74.0(6.8)	75.3(8.2)	73.4(8.3)	74.8(8.2)	**<0.001**

*Age differences. Significant results are highlighted in bold.
SD, standard deviation.

Table 4.26. Healthy Eating Index (HEI-2010) of the target population by KA: students of the University of the Basque Country (UPV/EHU)

Healthy Eating Index HEI-2010	HS (n=3,637)	NHS (n=22,529)	*P**
Variables (scores range)	mean(SD)		
Total fruit (0-5)	3.6(1.6)	3.5(1.6)	**<0.001**
Whole fruit (0-5)	4.1(1.6)	4.0(1.6)	**<0.001**
Total vegetables (0-5)	1.8(1.0)	1.7(1.1)	**<0.001**
Greens and beans (0-5)	4.8(0.7)	4.7(0.8)	**<0.001**
Whole grains (0-10)	2.4(3.4)	2.3(3.2)	0.670
Dairy (0-10)	6.0(2.3)	5.3(2.5)	**<0.001**
Total protein food (0-5)	4.3(1.0)	4.3(0.9)	**0.010**
Seafood and plants (0-5)	3.1(1.3)	3.2(1.3)	**<0.001**
Fatty acids (0-10)	6.9(2.1)	6.8(2.4)	0.496

To be continued in the next page.

Continuation of Table 4.26.

Healthy Eating Index HEI-2010	HS (n=3,637)	NHS (n=22,529)	*P**
Variables (scores range)	mean(SD)		
Refined grains (0-10)	8.9(1.8)	8.9(1.9)	**0.007**
Sodium (0-10)	10.0(0.3)	9.9(0.6)	**0.003**
Empty calories (0-20)	19.8(0.7)	19.7(0.9)	0.568
Total (0-100)	75.7(7.9)	74.3(8.0)	**<0.001**

*KA differences. Significant results are highlighted in bold.
HS, Health Sciences; KA, knowledge area; NHS, Non-Health Sciences; SD, standard deviation.

Table 4.27. Healthy Eating Index (HEI-2010) of the target population by BF status: students of the University of the Basque Country (UPV/EHU)

Healthy Eating Index HEI-2010	Non-excess BF (n=22,391)	Excess BF (n=3,775)	*P**
Variables (scores range)	mean(SD)		
Total fruit (0-5)	3.5(1.6)	3.3(1.6)	**<0.001**
Whole fruit (0-5)	4.0(1.6)	3.9(1.6)	**<0.001**
Total vegetables (0-5)	1.7(1.0)	1.9(1.2)	**<0.001**
Greens and beans (0-5)	4.7(0.8)	4.8(0.7)	**<0.001**
Whole grains (0-10)	2.3(3.3)	1.9(2.9)	**<0.001**
Dairy (0-10)	5.3(2.4)	5.8(2.8)	**<0.001**
Total protein food (0-5)	4.2(1.0)	4.4(0.8)	**<0.001**
Seafood and plants (0-5)	3.3(1.3)	2.9(1.3)	**<0.001**
Fatty acids (0-10)	6.8(2.3)	7.0(2.4)	**<0.001**
Refined grains (0-10)	8.9(1.8)	8.8(2.1)	0.300
Sodium (0-10)	10.0(0.5)	9.9(0.8)	**<0.001**
Empty calories (0-20)	19.7(0.9)	19.8(0.6)	0.068
Total (0-100)	74.5(8.1)	74.5(7.6)	0.722

*BF status differences. Significant results are highlighted in bold.
BF, body fat; SD, standard deviation.

In the Study 2, the scores for MDS for the total sample and by sex are shown. Regarding MDS by age, differences were observed in all MDS components ($P<0.001$) (**Table 4.28**). Just like in the case of the HEI-2010, students with more age had a better quality diet according to MDS than younger ones. Relative to MDS by KA, HS students had higher scores for vegetables, fish, red meat and derivatives, olive oil and total score than NHS students; while, NHS students obtained higher scores for fruits, legumes and poultry than HS students ($P<0.01$) (**Table 4.29**). The mean score obtained for MDS by UPV/EHU' HS students was higher than those of nutrition students from Amsterdam and Thessaloniki[(53)]. In any case, our results and those of other authors suggest that knowledge alone is not enough to stimulate individuals to practice healthy habits[(64)].

Finally, students without excess BF had higher scores for non-refined cereals, potatoes, fruits, legumes, poultry and total score than students with BFexcess (*P*<0.001) (**Table 4.30**). Relative to the total score, our results agree with other author's findings[65], in spite of analysing adherence to the MD with different tools.

Table 4.28. MedDietScore (MDS) of the target population by age: students of the University of the Basque Country (UPV/EHU)

MedDietScore	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥21 y old (n=10,110)	*P**
Variables[1]	mean(SD)				
Non-refined cereals	2.0(2.2)	2.2(2.4)	2.0(2.3)	2.5(2.3)	**<0.001**
Potatoes	2.0(1.3)	2.0(1.6)	2.0(1.4)	2.0(1.4)	**0.036**
Fruits	4.6(1.1)	4.6(1.0)	4.4(1.4)	4.5(1.2)	**<0.001**
Vegetables	4.5(1.0)	4.7(0.9)	4.5(1.0)	4.6(0.9)	**<0.001**
Legumes	2.3(1.2)	2.1(1.0)	2.1(1.1)	2.1(1.1)	**<0.001**
Fish	2.7(1.4)	2.8(1.4)	2.7(1.5)	2.8(1.4)	**<0.001**
Red meat and deli meat	2.3(1.4)	2.4(1.3)	2.3(1.3)	2.3(1.4)	**<0.001**
Poultry	2.7(1.3)	2.5(1.4)	2.6(1.3)	2.4(1.4)	**<0.001**
Full fat dairy products	1.4(1.8)	1.5(1.9)	1.5(1.9)	1.5(1.9)	**<0.001**
Olive oil	4.6(1.2)	4.7(1.0)	4.9(0.6)	4.8(0.9)	**<0.001**
Alcohol	4.3(1.7)	4.2(1.8)	4.3(1.7)	4.1(1.9)	**<0.001**
Total	33.4(5.0)	33.7(5.2)	33.2(5.9)	33.7(5.6)	**<0.001**

[1]Each component can contribute five points to the total score and the theoretical range is 0-55.
*Age differences. Significant results are highlighted in bold.
SD, standard deviation.

Table 4.29. MedDietScore (MDS) of the target population by KA: students of the University of the Basque Country (UPV/EHU)

MedDietScore	HS (n=3,637)	NHS (n=22,529)	*P**
Variables[1]	mean(SD)		
Non-refined cereals	2.2(2.3)	2.2(2.3)	0.704
Potatoes	2.0(1.4)	2.0(1.4)	0.687
Fruits	4.5(1.2)	4.5(1.2)	**0.004**
Vegetables	4.7(0.8)	4.6(1.0)	**<0.001**
Legumes	2.0(1.1)	2.2(1.1)	**<0.001**
Fish	3.0(1.4)	2.7(1.4)	**<0.001**
Red meat and deli meat	2.5(1.2)	2.3(1.4)	**<0.001**

To be continued in the next page.

Continuation of Table 4.29.

Mediterranean Diet Score	HS (n=3,637)	NHS (n=22,529)	P^*
Variables[1]	mean(SD)		
Poultry	2.5(1.3)	2.5(1.4)	**0.003**
Full fat dairy products	1.4(1.9)	1.5(1.9)	**<0.001**
Olive oil	4.8(0.8)	4.7(1.0)	**<0.001**
Alcohol	4.2(1.8)	4.2(1.8)	0.539
Total	33.9(5.1)	33.5(5.5)	**0.021**

[1]Each component can contribute five points to the total score and the theoretical range is 0-55.
[*]KA differences. Significant results are highlighted in bold.
HS, Health Sciences; KA, knowledge area; NHS, Non-Health Sciences; SD, standard deviation.

Table 4.30. Mediterranean Diet Score (MDS) of the target population by BF status: students of the University of the Basque Country (UPV/EHU)

Mediterranean Diet Score	Non-excess BF (n=22,391)	Excess BF (n=3,775)	P^*
Variables[1]	mean(SD)		
Non-refined cereals	2.2(2.3)	2.0(2.3)	**<0.001**
Potatoes	2.0(1.4)	1.9(1.5)	**<0.001**
Fruits	4.5(1.2)	4.4(1.3)	**<0.001**
Vegetables	4.6(0.9)	4.6(1.0)	**<0.001**
Legumes	2.2(1.1)	2.1(1.1)	**<0.001**
Fish	2.8(1.4)	2.7(1.4)	0.165
Red meat and deli meat	2.3(1.4)	2.3(1.4)	0.497
Poultry	2.6(1.4)	2.3(1.3)	**<0.001**
Full fat dairy products	1.5(1.9)	1.4(1.8)	0.250
Olive oil	4.7(1.0)	4.7(1.0)	0.324
Alcohol	4.2(1.8)	4.2(1.8)	0.289
Total	33.7(5.6)	32.8(4.7)	**<0.001**

[1]Each component can contribute five points to the total score and the theoretical range is 0-55.
[*]BF status differences. Significant results are highlighted in bold.
BF, body fat; SD, standard deviation.

4.3.2.5. Meal patterns

Diet characteristics of the total sample and by sex and according to BF classification are described in the Study 2. Younger students and those of HS were likely to eat more frequently (*P*<0.001) and to meet the recommendations about that (**Tables 4.31** and **4.32**). Conversely, a study set in Navarra university students, NHS students showed a higher adequacy of the number of meals daily compared with HS ones[(66)]. The frequency of lunch and dinner in UPV/EHU' students was similar to those observed in Dietetic and Nursing students from the University of Alicante[(52,67)].

On the other hand, 19 years of age students and NHS ones were more likely to have lunch and dinner alone compared with students of other ages and HS students (*P*<0.001). And both analyses by age and KA showed a tend to change dietary habits on weekends, making more EO and eating out more (Tables 4.31 and 4.32). Lastly, students with more age and those of HS were more likely to be responsible for food shopping and cooking than younger ones and NHS students.

Table 4.31. Meal patterns of the target population by age: students of the University of the Basque Country (UPV/EHU)

Variables, % or mean (SD)	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥21 y old (n=10,110)	P^*
Breakfast, frequency					
7 times/week	80.2	79.6	78.6	72.8	
5-6 times/week	11.1	11.4	15.0	16.0	
3-4 times/week	3.5	2.4	4.0	8.3	
1-2 times/week	3.4	4.9	1.0	1.3	
Never	1.8	1.7	1.5	1.6	**<0.001**
Mid-morning snack, frequency					
7 times/week	14.9	21.4	8.8	19.4	
5-6 times/week	24.2	23.9	29.8	24.5	
3-4 times/week	20.0	16.5	20.5	26.2	
1-2 times/week	19.8	19.7	15.2	14.4	
Never	21.0	18.5	25.7	15.5	**<0.001**
Lunch, frequency					
7 times/week	99.0	97.7	99.0	97.5	
5-6 times/week	-	2.3	1.0	2.1	
3-4 times/week	1.0	-	-	0.2	
1-2 times/week	-	-	-	0.2	
Never	-	-	-	-	**<0.001**
Afternoon snack, frequency					
7 times/week	27.4	24.9	19.8	26.2	
5-6 times/week	28.2	26.0	29.0	28.9	
3-4 times/week	25.9	24.7	20.7	25.5	
1-2 times/week	8.8	13.2	23.4	8.7	
Never	9.8	11.2	7.2	10.8	**<0.001**
Dinner, frequency					
7 times/week	95.7	93.8	91.5	95.8	
5-6 times/week	1.5	4.1	7.9	4.0	
3-4 times/week	2.8	2.1	0.6	0.2	
1-2 times/week	-	-	-	-	
Never	-	-	-	-	**<0.001**

To be continued in the next page.

Continuation of Table 4.31.

Variables, % or mean (SD)	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥21 y old (n=10,110)	P*
After dinner, frequency					
7 times/week	1.5	4.5	3.2	3.3	
5-6 times/week	1.0	0.8	3.0	2.0	
3-4 times/week	1.1	3.4	5.7	5.4	
1-2 times/week	19.6	12.8	14.4	16.4	
Never	76.8	78.5	73.7	72.9	**<0.001**
In the middle of the night, frequency					
7 times/week	-	-	-	-	
5-6 times/week	-	-	-	-	
3-4 times/week	-	0.8	-	0.2	
1-2 times/week	3.0	4.3	1.9	4.7	
Never	97.0	94.8	98.1	95.1	**<0.001**
Number of EO					
<3	0.9	0.8	-	1.1	
3-5	93.9	92.9	92.8	89.5	
>5	5.2	6.3	7.2	9.4	**<0.001**
Time between EO					
Time between main meals	401.6 (46.9)	390.0 (36.8)	394.3 (37.5)	399.2 (42.9)	**<0.001**
Time between all meals	245.6 (64.4)	238.7 (60.4)	247.2 (66.4)	258.8 (174.1)	**<0.001**
Time recommendation between EO, classification					
240-300 minutes	44.1	37.9	32.6	28.1	
<240 or >300 minutes	55.9	62.1	67.4	71.9	**<0.001**
EO duration (minutes)					
Breakfast	10.8(5.6)	13.0(7.5)	12.6(6.6)	13.1(7.9)	**<0.001**
Lunch and dinner	24.6(7.7)	26.9(9.4)	27.1(8.7)	27.9(10.1)	**<0.001**
Snacks	8.3(4.4)	10.1(8.4)	9.5(5.3)	9.7(5.6)	**<0.001**
Place of EO (weekdays)					
Breakfast	(n=4,830)	(n=5,230)	(n=5,439)	(n=9,890)	
Usual residence	97.1	95.8	94.8	96.5	
Home-made meal at University	2.0	1.5	1.0	1.1	
Others[1]	0.9	2.6	4.3	2.3	**<0.001**
Mid-morning snack	(n=2,715)	(n=3,301)	(n=2,935)	(n=6,178)	
Usual residence	11.7	8.7	7.4	12.9	
Home-made meal at University	53.3	48.9	53.4	44.0	
Others[1]	35.1	42.4	39.2	43.1	**<0.001**
Lunch	(n=4,996)	(n=5,457)	(n=5,470)	(n=10,110)	
Usual residence	97.4	89.6	91.7	88.2	
Home-made meal at University	1.1	8.5	3.5	6.2	
Others[1]	-	1.9	4.8	5.6	**<0.001**

To be continued in the next page.

Continuation of Table 4.31.

Variables, % or mean (SD)	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥21 y old (n=10,110)	*P*[*]
Afternoon snack	(n=3,921)	(n=4,149)	(n=4,231)	(n=8,059)	
Usual residence	86.5	85.9	76.2	73.4	
Home-made meal at University	1.5	4.6	4.9	11.5	
Others[1]	12.0	9.5	18.9	15.1	**<0.001**
Dinner	(n=4,996)	(n=5,502)	(n=5,470)	(n=10,110)	
Usual residence	100.0	100.0	99.4	100.0	
Others[1]	-	-	0.6	-	
After dinner	(n=298)	(n=365)	(n=605)	(n=877)	**<0.001**
Usual residence	100.0	100.0	100.0	100.0	
Others[1]	-	-	-	-	**-**
Who are you eating with?					
Breakfast (n=25,336)					
Alone	60.7	57.2	49.2	67.1	
Accompanied	24.4	22.7	30.8	18.6	
Alone and accompanied	14.9	20.1	20.0	14.3	**<0.001**
Mid-morning snack (n=25,336)					
Alone	7.3	6.7	8.2	18.0	
Accompanied	82.1	89.1	82.3	68.0	
Alone and accompanied	10.6	4.2	9.5	14.0	**<0.001**
Lunch (n=25,336)					
Alone	15.0	26.2	11.7	16.5	
Accompanied	-	-	-	-	
Alone and accompanied	85.0	73.8	88.3	83.5	**<0.001**
Afternoon snack (n=25,336)					
Alone	58.1	40.8	46.9	44.2	
Accompanied	27.1	42.8	31.5	33.4	
Alone and accompanied	14.8	16.4	21.6	22.4	**<0.001**
Dinner (n=25,336)					
Alone	11.6	11.6	12.4	11.0	
Accompanied	75.2	82.9	75.4	74.1	
Alone and accompanied	13.1	5.4	12.2	14.9	**<0.001**
After dinner (n=25,336)					
Alone	27.9	65.0	50.1	67.0	
Accompanied	54.5	22.5	33.9	25.1	
Alone and accompanied	17.7	12.5	16.1	7.9	**<0.001**
Changes of dietary habits at weekends					
Yes	73.1	76.7	80.0	75.0	
No	26.9	23.3	20.0	25.0	**<0.001**

To be continued in the next page.

Continuation of Table 4.31.

Variables, % or mean (SD)	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥21 y old (n=10,110)	*P*[*]
Weekends' changes					
Fewer meals/snacks	10.8	8.1	6.0	9.1	
More meals/snacks	30.4	12.1	10.2	6.7	
Less overall food	10.8	7.5	10.3	7.8	
More overall food	30.4	21.0	25.7	23.9	
Eat out more	21.8	24.0	22.0	23.6	
Eat out less	8.3	8.5	8.9	10.7	
Eat other foods	-	3.7	3.8	1.4	
Eat healthier	5.5	4.7	6.0	5.2	
Eat less healthier	1.0	2.4	1.2	1.7	
Changes of schedules	7.3	5.5	4.0	7.7	
More time to eat	1.5	2.5	1.9	2.2	**<0.001**
Responsible for food shopping					
Parents	55.5	42.6	40.6	53.3	
Himself	13.8	25.0	25.8	19.4	
Parents and himself	29.3	30.1	29.3	26.8	
Others	1.4	2.3	4.3	0.5	**<0.001**
Responsible for food cooking					
Parents	52.2	36.3	39.2	49.7	
Himself	13.2	22.3	25.3	21.5	
Parents and himself	31.4	36.6	32.1	28.2	
Others	3.3	4.8	3.4	0.6	**<0.001**

[1]University canteen, in the street or pub, working or at gym.
[*]Age differences. Significant results are highlighted in bold.
EO, eating occasions.

Table 4.32. Meal patterns of the target population by KA: students of the University of the Basque Country (UPV/EHU)

Variables, % or mean (SD)	HS (n=3,637)	NHS (n=22,529)	*P*[*]
Breakfast, frequency			
7 times/week	81.4	76.1	
5-6 times/week	16.3	13.5	
3-4 times/week	1.4	5.9	
1-2 times/week	0.9	2.6	
Never	-	1.9	**<0.001**
Mid-morning snack, frequency			
7 times/week	17.0	16.7	
5-6 times/week	32.4	24.3	
3-4 times/week	13.3	23.2	
1-2 times/week	17.0	16.7	
Never	20.3	19.2	**<0.001**

To be continued in the next page.

Continuation of Table 4.32.

Variables, % or mean (SD)	HS (n=3,637)	NHS (n=22,529)	P^*
Lunch, frequency			
7 times/week	100.0	97.9	
5-6 times/week	-	1.7	
3-4 times/week	-	0.3	
1-2 times/week	-	0.1	
Never	-	-	**<0.001**
Afternoon snack, frequency			
7 times/week	30.4	23.9	
5-6 times/week	30.0	27.9	
3-4 times/week	23.6	24.5	
1-2 times/week	9.3	13.3	
Never	6.8	10.4	**<0.001**
Dinner, frequency			
7 times/week	97.3	94.0	
5-6 times/week	1.8	4.8	
3-4 times/week	0.9	1.2	
1-2 times/week	-	-	
Never	-		**<0.001**
After dinner, frequency			
7 times/week	0.9	3.6	
5-6 times/week	1.8	1.7	
3-4 times/week	2.7	4.5	
1-2 times/week	16.2	15.8	
Never	78.4	74.4	**<0.001**
In the middle of the night, frequency			
7 times/week	-	-	
5-6 times/week	-	-	
3-4 times/week	-	0.3	
1-2 times/week	0.7	4.2	
Never	99.3	95.5	**<0.001**
Number of EO			
<3	-	0.9	
3-5	93.9	91.4	
>5	6.1	7.7	**<0.001**
Time between EO			
Time between main meals	403.0(27.6)	395.6(43.4)	**<0.001**
Time between all meals	232.1(43.2)	252.4(127.5)	**<0.001**
Time recommendation between EO, classification			
240-300 minutes	40.4	33.2	
<240 or >300 minutes	59.6	66.8	**<0.001**
EO duration (minutes)			
Breakfast	12.0(5.7)	12.6(7.5)	0.148
Lunch and dinner	27.3(8.9)	26.8(9.4)	**<0.001**
Snacks	10.7(5.5)	9.3(6.2)	**<0.001**

To be continued in the next page.

Continuation of Table 4.32.

Variables, % or mean (SD)	HS (n=3,637)	NHS (n=22,529)	P^*
Place of EO (weekdays)			
Breakfast	(n=3,603)	(n=21,785)	
Usual residence	96.3	96.1	
Home-made meal at University	0.9	1.4	
Others[1]	2.7	2.5	**0.044**
Mid-morning snack	(n=2,339)	(n=12,790)	
Usual residence	5.8	11.6	
Home-made meal at University	53.1	47.7	
Others[1]	41.1	40.7	**<0.001**
Lunch	(n=3,603)	(n=22,430)	
Usual residence	91.7	90.9	
Home-made meal at University	2.8	5.5	
Others[1]	5.5	3.6	**<0.001**
Afternoon snack	(n=3,143)	(n=17,217)	
Usual residence	88.4	77.4	
Home-made meal at University	1.1	7.8	
Others[1]	10.5	14.8	**<0.001**
Dinner	(n=3,603)	(n=22,476)	
Usual residence	99.1	100.0	
Others[1]	0.9	-	**<0.001**
After dinner	(n=253)	(n=1,893)	
Usual residence	100.0	100.0	
Others[1]	-	-	**-**
Who are you eating with?			
Breakfast (n=25,336)			
Alone	46.3	62.2	
Accompanied	36.3	21.0	
Alone and accompanied	17.4	16.8	**<0.001**
Mid-morning snack (n=15,132)			
Alone	7.2	12.5	
Accompanied	87.3	76.3	
Alone and accompanied	5.5	11.3	**<0.001**
Lunch (n=26,063)			
Alone	10.8	18.3	
Accompanied	-	-	
Alone and accompanied	89.2	81.7	**<0.001**
Afternoon snack (n=20,385)			
Alone	59.5	44.4	
Accompanied	19.4	36.3	
Alone and accompanied	21.1	19.2	**<0.001**
Dinner (n=26,063)			
Alone	10.6	11.7	
Accompanied	80.2	75.8	
Alone and accompanied	9.2	12.5	**<0.001**

To be continued in the next page.

Continuation of Table 4.32.

Variables, % or mean (SD)	HS (n=3,637)	NHS (n=22,529)	P^*
After dinner (n=2,172)			
Alone	65.1	55.5	
Accompanied	34.9	30.5	
Alone and accompanied	-	14.0	**<0.001**
Changes of dietary habits at weekends			
Yes	76.6	76.0	
No	23.4	24.0	0.361
Weekends' changes			
Fewer meals/snacks	9.0	8.5	
More meals/snacks	9.9	7.4	
Less overall food	2.6	10.0	
More overall food	38.2	22.0	
Eat out more	26.6	22.4	
Eat out less	1.3	10.9	
Eat other foods	2.8	2.9	
Eat healthier	6.3	5.2	
Eat less healthier	2.2	1.5	
Changes of schedules	2.8	7.0	
More time to eat	0.5	2.3	**<0.001**
Responsible for food shopping			
Parents	51.2	48.4	
Himself	25.5	20.1	
Parents and himself	20.8	29.7	
Others	2.5	1.8	**<0.001**
Responsible for food cooking			
Parents	45.7	45.0	
Himself	30.1	19.4	
Parents and himself	22.6	32.8	
Others	1.5	2.7	**<0.001**

[1]University canteen, in the street or pub, working or at gym.
[*]KA differences. Significant results are highlighted in bold.
EO, eating occasions; HS, Health Sciences; KA, knowledge area; NHS, Non-Health Sciences.

Regarding perceived eating habits, two thirds of the target population considered their eating habits and nutritional quality "good" and nearly 50% of the students declared their daily calorie intakes as "just about right" (**Table 4.33**). Relative to the perceived diet quality, these results are similar to those found in the NHANES study for the same age group, although in this study not all were university students[(68)]. The percentage of women who consider their eating habits and nutritional quality "good" was higher compared with men, but the percentage of students that considered their daily calories intake "just about right" was higher in men than women (P<0.001) (Table 4.33).

There were age, KA and BF status differences in all variables analysed in this section, being higher the percentages of younger, HS students and those without excess BF who considered their nutritional quality "good" and their daily calories intake "just about right" (P<0.001) (**Tables 4.34, 4.35** and **4.36**). To our knowledge, there are no data in the literature to compare with our results, but they are in line with what was expected.

Table 4.33. Perceived dietary habits of the target population by sex: students of the University of the Basque Country (UPV/EHU)

Variables, %	Total sample (n=26,165)	Men (n=10,607)	Women (n=15,558)	P^*
Eating habits				
Poor	2.7	3.4	2.2	
Fair	29.0	26.5	30.8	
Good	62.4	61.4	63.1	
Excellent	5.3	8.1	3.4	
DK/DA	0.5	0.6	0.5	**<0.001**
Nutritional quality				
Poor	1.6	0.5	2.4	
Fair	24.0	21.3	25.9	
Good	65.1	65.0	65.1	
Excellent	6.4	10.7	3.5	
DK/DA	2.9	2.6	3.1	**<0.001**
Daily calories intake				
Somewhat low	6.1	7.0	5.5	
Just about right	44.7	46.6	43.4	
Somewhat high	38.9	38.1	39.4	
Much too high	1.9	2.2	1.7	
DK/DA	8.5	6.1	10.1	**<0.001**

*Sex differences. Significant results are highlighted in bold.
DK/DA, Don't know, Don't answer.

Table 4.34. Perceived dietary habits of the target population by age: students of the University of the Basque Country (UPV/EHU)

Variables, %	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥21 y old (n=10,110)	P^*
Eating habits					
Poor	0.5	0.8	4.7	3.7	
Fair	31.4	31.3	31.7	25.2	
Good	63.5	59.7	58.2	65.6	
Excellent	4.2	7.3	4.5	5.3	
DK/DA	0.5	0.8	1.0	0.2	**<0.001**

To be continued in the next page.

Continuation of Table 4.34.

Variables, %	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥21 y old (n=10,110)	P^*
Nutritional quality					
Poor	1.4	0.8	2.8	1.6	
Fair	22.5	22.5	29.2	22.7	
Good	68.0	65.0	61.0	65.9	
Excellent	6.1	8.4	5.5	6.0	
DK/DA	2.0	3.3	1.5	3.8	**<0.001**
Daily calories intake					
Somewhat low	5.8	4.8	7.6	6.1	
Just about right	53.2	47.3	39.2	42.0	
Somewhat high	36.0	38.3	38.8	40.7	
Much too high	1.4	2.1	1.0	2.5	
DK/DA	3.5	7.5	13.5	8.7	**<0.001**

*Age differences. Significant results are highlighted in bold.
DK/DA, Don't know, Don't answer.

Table 4.35. Perceived dietary habits of the target population by KA: students of the University of the Basque Country (UPV/EHU)

Variables, %	HS (n=3,637)	NHS (n=22,529)	P^*
Eating habits			
Poor	2.5	2.7	
Fair	24.0	29.8	
Good	70.3	61.1	
Excellent	2.5	5.8	
DK/DA	0.7	0.5	**<0.001**
Nutritional quality			
Poor	2.5	1.5	
Fair	20.3	24.6	
Good	72.1	63.9	
Excellent	3.6	6.9	
DK/DA	1.5	3.1	**<0.001**
Daily calories intake			
Somewhat low	5.2	6.2	
Just about right	47.4	44.2	
Somewhat high	38.6	38.9	
Much too high	2.5	1.8	
DK/DA	6.1	8.8	**<0.001**

*KA differences. Significant results are highlighted in bold.
DK/DA, Don't know, Don't answer; HS, Health Sciences; KA, knowledge area; NHS, Non-Health Sciences.

Table 4.36. Perceived dietary habits of the target population by BF status: students of the University of the Basque Country (UPV/EHU)

Variables, %	Non-excess BF (n=22,391)	Excess BF (n=3,775)	P*
Eating habits			
Poor	2.4	4.5	
Fair	27.5	38.4	
Good	63.7	54.7	
Excellent	5.8	2.4	
DK/DA	0.6	-	**<0.001**
Nutritional quality			
Poor	1.8	0.9	
Fair	22.5	33.0	
Good	67.2	52.5	
Excellent	6.6	5.5	
DK/DA	2.0	8.1	**<0.001**
Daily calories intake			
Somewhat low	6.6	3.2	
Just about right	48.3	23.5	
Somewhat high	36.0	55.9	
Much too high	1.7	3.2	
DK/DA	7.5	14.2	**<0.001**

*BF status differences. Significant results are highlighted in bold.
BF, body fat; SD, standard deviation.

In relation to changes in dietary habits over the past 5 years, the tendency was to decrease the intake of whole milk and commercial baked goods, and to increase the consumption of non-fat milk, vegetables, fruits and alcohol (**Table 4.37**). These findings agree with those of Spanish population surveys respect to vegetables and the type of milk(69,70), although in our questionnaire we did not differentiate between semi-skimmed and skimmed milk. On the other hand, the tendency was similar by sex, age, KA and BF status, and significant differences were observed in all foods studied (P<0.01) (**Tables** 4.37, **4.38, 4.39** and **4.40**). We have been unable to trace any literature references to this subject by sex, age, KA or BF status, but in all the groups of the present study the tendency was similar.

Table 4.37. Changes in the consumption of specific food groups over the past five years of the target population by sex: students of the University of the Basque Country (UPV/EHU)

Variables, %	Total sample (n=26,165)	Men (n=10,607)	Women (n=15,558)	P^*
Whole milk				
Decreased	42.9	39.6	45.5	
About the same	17.9	23.5	14.1	
Increased	7.0	9.9	5.0	
Don't use	32.2	27.0	35.8	**<0.001**
Non-fat milk				
Decreased	16.5	14.7	17.6	
About the same	26.4	27.4	25.3	
Increased	29.9	26.4	32.3	
Don't use	27.2	31.5	24.3	**<0.001**
Butter				
Decreased	32.8	30.0	34.8	
About the same	21.1	19.7	22.1	
Increased	4.1	5.2	3.3	
Don't use	42.0	45.2	39.8	**<0.001**
Margarine				
Decreased	17.9	19.4	16.9	
About the same	15.1	15.3	14.9	
Increased	4.3	3.7	4.7	
Don't use	62.8	61.6	63.6	**<0.001**
Red meats				
Decreased	28.3	16.3	36.5	
About the same	58.0	62.3	55.1	
Increased	11.9	20.9	5.7	
Don't use	1.8	0.5	2.7	**<0.001**
Fish				
Decreased	18.6	18.4	18.7	
About the same	42.0	45.2	39.7	
Increased	36.9	34.7	38.3	
Don't use	2.6	1.6	3.3	**<0.001**
Poultry				
Decreased	8.0	6.7	8.8	
About the same	55.5	53.9	56.6	
Increased	34.9	38.9	32.2	
Don't use	1.7	0.6	2.4	**<0.001**
Vegetables				
Decreased	7.9	8.8	7.3	
About the same	44.6	47.5	42.7	
Increased	46.8	43.1	49.4	
Don't use	0.6	0.6	0.7	**<0.001**

To be continued in the next page.

Continuation of Table 4.37.

Variables, %	Total sample (n=26,165)	Men (n=10,607)	Women (n=15,558)	P^*
Fruits				
Decreased	20.6	24.9	17.7	
About the same	34.9	35.3	34.6	
Increased	42.8	37.2	46.6	
Don't use	1.7	2.6	1.1	**<0.001**
Eggs				
Decreased	19.1	15.9	21.2	
About the same	58.6	52.1	63.1	
Increased	20.4	29.2	14.3	
Don't use	1.9	2.7	1.4	**<0.001**
Whole grains				
Decreased	12.9	14.0	12.1	
About the same	19.2	15.3	21.9	
Increased	27.7	21.1	32.2	
Don't use	40.2	49.5	33.8	**<0.001**
Commercial baked goods				
Decreased	52.5	50.8	53.6	
About the same	27.6	26.9	28.1	
Increased	8.1	8.3	8.0	
Don't use	11.8	14.0	10.3	**<0.001**
Homemade baked goods				
Decreased	20.7	22.9	19.1	
About the same	43.9	40.5	46.3	
Increased	13.4	11.5	14.8	
Don't use	21.9	25.1	19.8	**<0.001**
Alcohol				
Decreased	21.9	21.1	22.5	
About the same	24.0	22.5	25.0	
Increased	47.8	50.0	46.2	
Don't use	6.3	6.4	6.3	**<0.001**
Sugar				
Decreased	33.5	36.9	31.4	
About the same	53.2	48.5	56.1	
Increased	7.8	8.7	7.1	
Don't use	5.6	5.9	5.4	**<0.001**
Cheese				
Decreased	17.8	18.6	17.3	
About the same	49.5	51.3	48.3	
Increased	22.8	23.6	22.3	
Don't use	9.9	6.5	12.2	**<0.001**
Salt				
Decreased	24.9	26.7	23.7	
About the same	66.2	64.5	67.3	
Increased	7.5	8.0	7.2	**<0.001**
Don't use	1.4	0.8	1.7	

To be continued in the next page.

Continuation of Table 4.37.

Variables, %	Total sample (n=26,165)	Men (n=10,607)	Women (n=15,558)	P^*
Canned foods				
Decreased	14.9	14.0	15.5	
About the same	54.9	54.7	55.0	
Increased	13.7	17.5	11.1	
Don't use	16.5	13.8	18.4	**<0.001**
Frozen foods				
Decreased	17.0	14.6	18.6	
About the same	49.3	54.9	45.5	
Increased	22.4	22.5	22.3	
Don't use	11.3	8.0	13.6	**<0.001**
Fresh produce				
Decreased	9.4	9.8	9.2	
About the same	63.8	66.5	62.0	
Increased	26.3	23.1	28.4	
Don't use	0.5	0.7	0.3	**<0.001**

*Sex differences. Significant results are highlighted in bold.

Table 4.38. Changes in the consumption of specific food groups over the past five years of the target population by age: students of the University of the Basque Country (UPV/EHU)

Variables, %	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥ 21 y old (n=10,110)	P^*
Whole milk					
Decreased	41.5	43.1	46.5	41.4	
About the same	20.4	15.8	17.9	17.8	
Increased	6.7	9.7	6.8	5.8	
Don't use	31.4	31.4	28.8	35.0	**<0.001**
Non-fat milk					
Decreased	16.9	11.9	17.1	18.4	
About the same	26.7	28.7	22.4	27.2	
Increased	28.8	32.3	36.7	25.4	
Don't use	27.6	27.1	23.9	29.0	**<0.001**
Butter					
Decreased	34.0	35.3	28.5	33.3	
About the same	24.9	20.7	25.4	17.1	
Increased	2.9	7.1	1.0	4.7	
Don't use	38.2	36.9	45.1	45.0	**<0.001**
Margarine					
Decreased	20.1	22.7	12.3	17.3	
About the same	19.9	16.4	17.5	10.6	
Increased	3.3	3.0	2.5	6.4	
Don't use	56.7	57.9	67.7	65.8	**<0.001**

To be continued in the next page.

Continuation of Table 4.38.

Variables, %	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥ 21 y old (n=10,110)	P^*
Red meats					
Decreased	23.2	25.8	30.2	31.2	
About the same	61.9	59.7	59.8	54.1	
Increased	13.0	14.5	8.3	11.9	
Don't use	1.9	-	1.7	2.8	**<0.001**
Fish					
Decreased	18.3	19.5	26.0	14.1	
About the same	47.7	42.6	36.1	42.0	
Increased	30.7	35.7	36.0	41.1	
Don't use	3.3	2.2	1.9	2.8	**<0.001**
Poultry					
Decreased	9.2	9.0	6.0	7.8	
About the same	63.3	54.3	59.4	50.1	
Increased	26.5	35.0	34.0	39.5	
Don't use	1.0	1.7	0.6	2.6	**<0.001**
Vegetables					
Decreased	9.0	8.4	9.0	6.5	
About the same	48.3	51.3	40.8	41.3	
Increased	41.8	40.3	50.2	51.1	
Don't use	1.0	-	-	1.1	**<0.001**
Fruits					
Decreased	19.1	22.4	22.8	19.2	
About the same	33.2	36.4	33.7	35.5	
Increased	46.7	40.4	41.8	42.7	
Don't use	1.0	0.8	1.7	2.6	**<0.001**
Eggs					
Decreased	15.5	20.5	16.4	21.5	
About the same	60.3	57.5	64.2	55.4	
Increased	23.3	19.5	16.2	21.6	
Don't use	1.0	2.5	3.2	1.4	**<0.001**
Whole grains					
Decreased	15.1	12.3	9.8	13.9	
About the same	16.7	21.5	25.7	15.7	
Increased	29.6	26.7	25.8	28.3	
Don't use	38.6	39.5	38.6	42.1	**0.005**
Commercial baked goods					
Decreased	54.2	54.7	46.7	53.5	
About the same	27.4	26.3	34.9	24.4	
Increased	10.5	7.5	6.8	7.9	
Don't use	7.9	11.5	11.5	14.1	**<0.001**
Homemade baked goods					
Decreased	17.8	24.7	16.6	22.1	
About the same	51.2	46.7	50.5	35.2	
Increased	8.5	13.7	9.8	17.8	
Don't use	22.5	14.9	23.1	24.8	**<0.001**

To be continued in the next page.

Continuation of Table 4.38.

Variables, %	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥ 21 y old (n=10,110)	P^*
Alcohol					
Decreased	7.3	12.5	20.6	35.0	
About the same	10.7	24.6	30.6	26.5	
Increased	75.9	57.2	42.0	31.9	
Don't use	6.1	5.6	6.7	6.6	**<0.001**
Sugar					
Decreased	25.6	31.6	30.2	40.2	
About the same	59.9	54.1	53.4	49.3	
Increased	11.1	7.3	8.5	5.9	
Don't use	3.5	7.0	8.0	4.6	**<0.001**
Cheese					
Decreased	13.6	16.0	16.6	21.5	
About the same	53.8	47.5	53.5	46.3	
Increased	21.2	26.1	23.1	21.6	
Don't use	11.4	10.3	6.8	10.6	**<0.001**
Salt					
Decreased	21.3	26.9	24.8	25.7	
About the same	68.1	65.0	66.5	65.7	
Increased	9.7	5.7	8.7	6.8	
Don't use	0.9	2.4	-	1.8	**<0.001**
Canned foods					
Decreased	10.8	15.5	10.1	19.2	
About the same	59.7	57.8	55.6	50.5	
Increased	14.3	9.3	16.2	14.4	
Don't use	15.2	17.4	18.1	15.9	**<0.001**
Frozen foods					
Decreased	14.2	17.3	15.0	19.2	
About the same	51.3	53.3	45.3	48.4	
Increased	24.3	24.2	24.7	19.2	
Don't use	10.2	5.1	15.1	13.2	**<0.001**
Fresh produce					
Decreased	8.0	17.0	10.1	5.7	
About the same	71.5	54.1	67.1	63.5	
Increased	20.5	28.9	22.2	29.9	
Don't use	-	-	0.6	0.9	**<0.001**

*Age differences. Significant results are highlighted in bold.

Table 4.39. Changes in the consumption of specific food groups over the past five years of the target population by KA: students of the University of the Basque Country (UPV/EHU)

Variables, %	HS (n=3,637)	NHS (n=22,529)	P^*
Whole milk			
Decreased	42.2	42.9	
About the same	19.7	17.6	
Increased	7.3	7.0	
Don’t use	30.6	32.5	**0.007**
Non-fat milk			
Decreased	20.9	15.7	
About the same	27.9	26.2	
Increased	32.4	29.5	
Don’t use	18.9	28.6	**<0.001**
Butter			
Decreased	26.0	34.0	
About the same	24.2	20.6	
Increased	6.0	3.7	
Don’t use	43.8	41.7	**<0.001**
Margarine			
Decreased	14.6	18.4	
About the same	12.0	15.5	
Increased	4.3	4.2	
Don’t use	69.0	61.8	**<0.001**
Red meats			
Decreased	31.8	27.8	
About the same	59.6	57.7	
Increased	8.6	12.4	
Don’t use	-	2.1	**<0.001**
Fish			
Decreased	13.6	19.4	
About the same	36.8	42.8	
Increased	48.0	35.1	
Don’t use	1.6	2.8	**<0.001**
Poultry			
Decreased	3.2	8.7	
About the same	55.1	55.5	
Increased	40.8	33.9	
Don’t use	0.9	1.8	**<0.001**
Vegetables			
Decreased	8.8	7.7	
About the same	45.8	44.5	
Increased	44.4	47.2	
Don’t use	0.9	0.6	**<0.001**

To be continued in the next page.

Continuation of Table 4.39.

Variables, %	HS (n=3,637)	NHS (n=22,529)	*P*[*]
Fruits			
Decreased	17.2	21.2	
About the same	35.1	34.8	
Increased	47.2	42.0	
Don't use	-	2.0	**<0.001**
Eggs			
Decreased	15.3	19.7	
About the same	68.5	57.0	
Increased	16.2	21.0	
Don't use	-	2.3	**<0.001**
Whole grains			
Decreased	11.9	13.1	
About the same	23.2	18.6	
Increased	27.6	27.7	
Don't use	37.4	40.6	**<0.001**
Commercial baked goods			
Decreased	54.0	52.2	
About the same	26.1	27.8	
Increased	7.0	8.3	
Don't use	12.9	11.6	**0.001**
Homemade baked goods			
Decreased	16.7	21.3	
About the same	47.7	43.3	
Increased	15.3	13.1	
Don't use	20.3	22.2	**<0.001**
Alcohol			
Decreased	28.9	20.8	
About the same	14.4	25.5	
Increased	51.8	47.1	
Don't use	4.9	6.5	**<0.001**
Sugar			
Decreased	26.8	34.5	
About the same	62.3	51.7	
Increased	5.0	8.2	
Don't use	5.9	5.6	**<0.001**
Cheese			
Decreased	16.8	18.0	
About the same	48.1	49.7	
Increased	23.0	22.8	
Don't use	12.1	9.5	**<0.001**
Salt			
Decreased	28.4	24.4	
About the same	67.0	66.0	
Increased	4.5	8.0	
Don't use	-	1.6	**<0.001**

To be continued in the next page.

Continuation of Table 4.39.

Variables, %	HS (n=3,637)	NHS (n=22,529)	P^*
Canned foods			
Decreased	10.9	15.5	
About the same	58.6	54.3	
Increased	17.4	13.1	
Don't use	13.2	17.1	**<0.001**
Frozen foods			
Decreased	13.3	17.6	
About the same	50.0	49.2	
Increased	27.4	21.6	
Don't use	9.3	11.6	**<0.001**
Fresh produce			
Decreased	11.8	9.1	
About the same	61.2	64.2	
Increased	26.1	26.3	
Don't use	0.9	0.4	**<0.001**

*KA differences. Significant results are highlighted in bold.
HS, Health Sciences; KA, knowledge area; NHS, Non-Health Sciences.

Table 4.40. Changes in the consumption of specific food groups over the past five years of the target population by BF status: students of the University of the Basque Country (UPV/EHU)

Variables, %	Non-excess BF (n=22,391)	Excess BF (n=3,775)	P^*
Whole milk			
Decreased	43.1	41.6	
About the same	18.4	14.6	
Increased	7.5	4.3	
Don't use	31.0	39.5	**<0.001**
Non-fat milk			
Decreased	15.4	22.6	
About the same	26.5	25.8	
Increased	29.6	31.8	
Don't use	28.5	19.8	**<0.001**
Butter			
Decreased	33.3	30.5	
About the same	20.7	23.8	
Increased	3.9	5.0	
Don't use	42.2	40.7	**<0.001**
Margarine			
Decreased	17.1	22.8	
About the same	15.0	15.5	
Increased	4.1	5.3	
Don't use	63.9	56.4	**<0.001**

To be continued in the next page.

Continuation of Table 4.40.

Variables, %	Non-excess BF (n=22,391)	Excess BF (n=3,775)	*P*[*]
Red meats			
Decreased	29.2	23.2	
About the same	56.4	67.4	
Increased	12.6	7.6	
Don't use	1.8	1.8	**<0.001**
Fish			
Decreased	18.6	18.2	
About the same	41.8	42.9	
Increased	37.0	35.8	
Don't use	2.5	3.0	0.120
Poultry			
Decreased	8.7	3.8	
About the same	55.7	54.2	
Increased	34.0	40.2	
Don't use	1.6	1.8	**<0.001**
Vegetables			
Decreased	8.5	4.1	
About the same	45.5	39.8	
Increased	45.3	56.1	
Don't use	0.7	-	**<0.001**
Fruits			
Decreased	19.9	24.8	
About the same	34.6	36.4	
Increased	43.9	36.0	
Don't use	1.5	2.8	**<0.001**
Eggs			
Decreased	19.1	18.6	
About the same	57.9	63.1	
Increased	21.1	16.0	
Don't use	1.9	2.3	**<0.001**
Whole grains			
Decreased	12.9	13.3	
About the same	19.1	20.3	
Increased	28.6	22.2	
Don't use	39.5	44.2	**<0.001**
Commercial baked goods			
Decreased	52.8	50.6	
About the same	28.3	23.8	
Increased	7.3	12.7	
Don't use	11.6	12.9	**<0.001**
Homemade baked goods			
Decreased	19.8	26.1	
About the same	46.2	30.8	
Increased	12.9	16.4	
Don't use	21.1	26.6	**<0.001**

To be continued in the next page.

Continuation of Table 4.40.

Variables, %	Non-excess BF (n=22,391)	Excess BF (n=3,775)	P^*
Alcohol			
Decreased	21.4	25.1	
About the same	24.0	23.9	
Increased	48.3	44.5	
Don't use	6.3	6.5	**<0.001**
Sugar			
Decreased	32.4	39.6	
About the same	54.8	43.9	
Increased	7.1	11.8	
Don't use	5.8	4.8	**<0.001**
Cheese			
Decreased	17.1	22.1	
About the same	49.3	51.0	
Increased	23.5	19.1	
Don't use	10.2	7.1	**<0.001**
Salt			
Decreased	23.2	35.2	
About the same	67.3	59.2	
Increased	7.9	5.6	
Don't use	1.6	-	<0.001
Canned foods			
Decreased	13.9	20.6	
About the same	54.5	57.0	
Increased	14.4	9.8	
Don't use	17.1	12.7	<0.001
Frozen foods			
Decreased	16.3	21.1	
About the same	49.2	50.1	
Increased	23.5	15.8	
Don't use	11.0	12.9	<0.001
Fresh produce			
Decreased	9.6	8.3	
About the same	65.3	55.2	
Increased	25.1	33.3	
Don't use	-	3.2	<0.001

*BF status differences. Significant results are highlighted in bold.
BF, body fat.

4.3.3. Environmental impact of dietary habits

The environmental impact of diet was assessed, using diet-related GHGE data (specifically kg eCO_2/kg of food) obtained from the literature, these data are shown in the **Study 3**, as well as the results in the total sample and by sex. Age, KA, and BF status differences were observed in GHGE associated with the consumption of all foods and their contribution to total GHGE (*P*<0.001) (**Tables 4.41, 4.42** and **4.43**); except for the contribution of starchy foods and eggs and white meat to total GHGE in the analysis by KA; and the contribution of red meat and deli meat and alcoholic drinks to total GHGE in the analysis by BF status (Tables 4.41, 4.42 and 4.43).

Other authors have found lower GHGE as the age of the participants increased[(71)], but our age range is so narrow to establish comparisons with studies set in the adult population. However, as in other studies[(72)], red meat and deli meat and cheese contributed about 40% to daily GHGE and this percentage remained the same in all age groups. Contrary to our hypothesis, HS students had a high level of diet-related GHGE. This result could be related to the learning strategy in environmental education of the UPV/EHU, which is based on a transversal and integrated approach on the subjects, so we can deduce that there are not differences in matters of environmental education between HS and NHS students as it was displayed in **Study 3**. In the case of total GHGE data by BF status, it was expected that students with excess BF would have a higher GHGE than those without excess BF as in the NutriNet-Santé study[(73)], but our results do not support this finding.

4.3.4. Environmental motives for choosing foods

In a subsample of 236 students (44.3% females), the environmental motives for choosing foods were analysed with a short version of the questionnaire developed by Sautron *et al.*[(74)], as we described in Telleria-Aramburu *et al.*[(28)]. It should be noted that, in general, 42.4% of men "never or hardly ever" was responsible for food purchase (**Table 4.44**). These results are in line with those found in students of another Spanish university[(39)].

Relative to the specific food groups purchase, students used to buy fruits and vegetables, and milk and dairy products more often than meat and fish. This fact could be related to factors that influence food-purchasing behaviour in young adults, such as convenience (since meat and fish normally requires be processed for consumption), cost and healthiness[(75,76)]. Sex differences were observed in fruits and vegetables purchase, women tended to buy them often or sometimes while men never or hardly ever (*P*<0.01) (Table 4.44). This finding was observed in other studies[(77)], which seems to indicate that health could be an important factor to make food choices in women.

Table 4.41. Greenhouse gas emissions (GHGE) associated with food consumption of the target population by age: students of the University of the Basque Country (UPV/EHU)

Food groups, mean(SD)	18 y old (n=4,996)		19 y old (n=5,536)		20 y old (n=5,523)		21 y old (n=10,110)		P^*	$P^†$
	kg eCO_2/ person/ day	Contribution to total GHGE (%)	kg eCO_2/ person/ day	Contribution to total GHGE (%)	kg eCO_2/ person/ day	Contribution to total GHGE (%)	kg eCO_2/ person/ day	Contribution to total GHGE (%)		
Fruits and vegetables	0.8(0.5)	18.7(10.5)	0.8(0.5)	19.6(11.4)	0.8(0.6)	17.6(11.2)	0.9(0.7)	20.1(13.3)	**<0.001**	**<0.001**
Starchy foods	0.2(0.1)	4.9(2.5)	0.2(0.1)	5.0(2.7)	0.2(0.1)	4.8(2.3)	0.2(0.1)	4.7(2.9)	**<0.001**	**<0.001**
Cheese	0.2(0.2)	3.6(4.9)	0.1(0.2)	3.3(4.0)	0.1(0.2)	2.9(3.4)	0.2(0.3)	3.5(4.5)	**<0.001**	**<0.001**
Milk and dairy products	0.6(0.3)	13.1(6.2)	0.5(0.3)	11.8(7.0)	0.6(0.4)	12.6(6.6)	0.5(0.4)	11.7(7.6)	**<0.001**	**<0.001**
Red meat and deli meat	1.4(0.9)	28.3(12.9)	1.3(0.8)	27.8(12.4)	1.5(1.0)	29.3(13.4)	1.4(1.0)	27.0(14.0)	**<0.001**	**<0.001**
Eggs and white meat	0.5(0.3)	10.6(5.1)	0.5(0.4)	12.3(6.8)	0.5(0.7)	11.2(6.2)	0.7(0.4)	11.7(5.5)	**<0.001**	**<0.001**
Fish and seafoods	0.4(0.3)	9.3(5.4)	0.4(0.3)	9.6(5.6)	0.5(0.4)	9.9(6.0)	0.4(0.3)	9.5(5.7)	**<0.001**	**<0.001**
Sweets and salted snacks	0.3(0.2)	5.6(3.3)	0.2(0.2)	4.7(3.5)	0.2(0.2)	5.2(3.5)	0.2(0.1)	4.5(3.1)	**<0.001**	**<0.001**
Oil and fats	0.1(0.1)	2.2(2.3)	0.1(0.2)	2.2(2.9)	0.1(0.1)	2.3(2.2)	0.1(0.1)	2.2(2.0)	**<0.001**	**<0.001**
Non-alcoholic drinks	0.1(0.1)	2.4(2.5)	0.1(0.1)	2.3(2.6)	0.1(0.2)	2.5(3.3)	0.1(0.2)	2.6(3.5)	**<0.001**	**<0.001**
Alcoholic drinks	0.1(0.1)	1.2(1.4)	0.1(0.1)	1.5(1.8)	0.1(0.1)	1.6(1.5)	0.1(0.1)	1.7(1.9)	**<0.001**	**<0.001**
Total	4.6(1.5)		4.4(1.3)		4.7(2.0)		4.8(1.7)		**<0.001**	

*Age differences relative to GHGE expressed as kg eCO_2/person/day. Significant results are highlighted in bold.
†Age differences relative to contribution of each food group to total GHGE. Significant results are highlighted in bold.
GHGE, greenhouse gas emissions; SD, standard deviation.

Table 4.42. Greenhouse gas emissions (GHGE) associated with food consumption of the target population by KA: students of the University of the Basque Country (UPV/EHU)

Food groups, mean(SD)	HS (n=3,637)		NHS (n=22,529)		*P**	*P*†
	kg eCO_2/ person/day	Contribution to total GHGE (%)	kg eCO_2/ person/day	Contribution to total GHGE (%)		
Fruits and vegetables	0.9(0.5)	19.5(10.4)	0.9(0.6)	19.1(12.3)	**<0.001**	**<0.001**
Starchy foods	0.2(0.1)	4.9(2.5)	0.2(0.1)	4.8(2.7)	**<0.001**	0.190
Cheese	0.2(0.2)	3.6(4.1)	0.2(0.2)	3.3(4.3)	**<0.001**	**<0.001**
Milk and dairy products	0.6(0.3)	13.4(6.3)	0.5(0.4)	11.9(7.1)	**<0.001**	**<0.001**
Red meat and deli meat	1.3(0.8)	26.7(12.2)	1.4(1.0)	28.5(13.5)	**<0.001**	**<0.001**
Eggs and white meat	0.5(0.2)	11.3(5.2)	0.5(0.5)	11.6(6.0)	**<0.001**	0.618
Fish and seafoods	0.5(0.3)	10.0(5.3)	0.4(0.3)	9.5(5.7)	**<0.001**	**<0.001**
Sweets and salted snacks	0.2(0.1)	4.3(2.8)	0.2(0.2)	5.0(3.4)	**<0.001**	**<0.001**
Oil and fats	0.1(0.1)	2.3(2.2)	0.1(0.1)	2.2(2.3)	**<0.001**	**0.011**
Non-alcoholic drinks	0.1(0.2)	3.0(3.8)	0.1(0.1)	2.4(3.0)	**<0.001**	**<0.001**
Alcoholic drinks	0.0(0.1)	1.0(1.2)	0.1(0.1)	1.6(1.8)	**<0.001**	**<0.001**
Total	4.7(1.3)		4.7(1.7)		**<0.001**	

*KA differences relative to GHGE expressed as kg eCO_2/person/day. Significant results are highlighted in bold.
†KA differences relative to contribution of each food group to total GHGE. Significant results are highlighted in bold.
GHGE, greenhouse gas emissions; HS, Health Sciences; KA, knowledge area; NHS, Non-Health Sciences; SD, standard deviation.

Table 4.43. Greenhouse gas emissions (GHGE associated with food consumption of the target population by BF status: students of the University of the Basque Country (UPV/EHU)

Food groups, mean(SD)	Non-excess BF (n=22,391)		Excess BF (n=3,775)		P^*	$P^\dagger$
	kg eCO_2/ person/day	Contribution to total GHGE (%)	kg eCO_2/ person/day	Contribution to total GHGE (%)		
Fruits and vegetables	0.9(0.6)	19.4(12.3)	0.8(0.5)	18.1(10.1)	**<0.001**	**<0.001**
Starchy foods	0.2(0.1)	4.9(2.7)	0.2(0.1)	4.3(2.3)	**<0.001**	**<0.001**
Cheese	0.1(0.2)	3.2(3.9)	0.2(0.4)	4.2(6.0)	**<0.001**	**<0.001**
Milk and dairy products	0.5(0.3)	12.0(6.8)	0.6(0.4)	13.2(8.1)	**0.044**	**<0.001**
Red meat and deli meat	1.4(1.0)	28.2(13.3)	1.3(0.8)	28.4(13.4)	0.640	0.729
Eggs and white meat	0.5(0.5)	11.4(6.0)	0.5(0.2)	12.1(5.1)	**<0.001**	**<0.001**
Fish and seafoods	0.4(0.3)	9.7(5.7)	0.4(0.3)	9.1(5.7)	**<0.001**	**<0.001**
Sweets and salted snacks	0.2(0.2)	5.0(3.4)	0.2(0.1)	4.2(2.6)	**<0.001**	**<0.001**
Oil and fats	0.1(0.1)	2.3(2.4)	0.1(0.1)	2.0(1.5)	**<0.001**	**0.009**
Non-alcoholic drinks	0.1(0.1)	2.5(3.0)	0.1(0.2)	2.6(3.5)	0.231	**0.018**
Alcoholic drinks	0.1(0.1)	1.5(1.7)	0.1(0.1)	1.7(2.1)	0.421	0.628
Total	4.7(1.7)		4.5(1.3)		0.851	

*BF status differences relative to GHGE expressed as kg eCO_2/person/day. Significant results are highlighted in bold.

†BF status differences relative to contribution of each food group to total GHGE. Significant results are highlighted in bold.

BF, body fat; GHGE, greenhouse gas emissions; SD, standard deviation.

Table 4.44. Responsible for food purchase (by food groups) of the subsample by sex: students of the University of the Basque Country (UPV/EHU)

Variables, %	Yes, often	Yes, sometimes	No, never or hardly ever	P^{**}
Are you usually responsible for food purchase?				
Total sample (n=237)	28.7	35.0	36.3	0.308
Men (n=132)	24.2	33.3	42.4	**0.038**
Women (n=105)	34.3	37.1	28.6	0.549
P^{*}			0.068	
Do you buy meat (red meat, poultry, cold meat?				
Total sample (n=237)	18.6	39.7	41.8	**<0.001**
Men (n=132)	17.4	36.4	46.2	**<0.001**
Women (n=105)	20.0	43.8	36.2	**0.009**
P^{*}			0.296	
Do you buy fish?				
Total sample (n=237)	13.1	26.6	60.3	**<0.001**
Men (n=132)	9.8	24.2	65.9	**<0.001**
Women (n=105)	17.1	29.5	53.3	**<0.001**
P^{*}			0.104	
Do you buy fruits and vegetables?				
Total sample (n=237)	30.8	45.1	24.1	**<0.001**
Men (n=132)	24.2	43.9	31.8	**0.020**
Women (n=105)	39.0	46.7	14.3	**<0.001**
P^{*}			**0.003**	
Do you buy milk and dairy products?				
Total sample (n=237)	29.1	47.7	23.2	**<0.001**
Men (n=132)	22.7	51.5	25.8	**<0.001**
Women (n=105)	37.1	42.9	20.0	**0.012**
P^{*}			0.052	

*Sex differences. Significant results are highlighted in bold.
**Frequency distribution differences. Significant results are highlighted in bold.

Regarding environmental motives for choosing food, in the case of reasons related to factor “Ethical and environment”, the majority of participants agreed or disagreed with these items, except for the question that concerned the amount of packaging, where more than two-thirds agreed and strongly agreed with it (**Table 4.45**). The items of this factor with which the subjects showed the greatest disagreement were: “energy expenditure” (69.2% disagreed or strongly disagreed) and “pollution caused by transport” (66.7% disagreed to a greater or lesser extent). In this same factor, sex differences were observed in “Pollution caused by production”, being higher the percentage of men strongly disagreed compared with women (P<0.05). Due to the sample size, statistical analysis of the difference between groups was only conducted by sex, neither by age, nor KA and nor BF% classification.

Most of the participants agreed or strongly agreed with the factor "Local and traditional production". The items of this factor with which the students showed the greatest agreement were: "seasonality" (79.8% agreed to a greater or lesser extent) and "proximity of production" (74.6% agreed to a greater or lesser extent). The percentage of students strongly agreed with "Proximity of production for fruits and vegetables" was higher in men than in women (*P*<0.05). This result contrasts with previously reported by Allès *et al.*[78] that showed a higher concern about food sustainability dimensions in women than men. Respect to the factor "Environmental limitations", the majority of the participants strongly disagreed or disagreed with these items, being higher the percentage that disagreed to a greater or lesser extent with the items "Not buying fruits and vegetables for environmental reasons" (91.6%) and "Not buying fish for environmental reasons" (88.2%).

Sex differences were observed only in the item "Not buying meat for environmental reasons", being higher the percentage of women who agreed or strongly agreed compared with men (*P*<0.05). In other studies involving adult populations[79] environmental impact was also one of the main reasons to reduce meat consumption. Relative to the factor "Absence of contaminants", more than 40% of the students, both men and women, strongly agreed with the item "Exposure to chemicals". Specifically, 73.4% of the participants agreed or strongly agreed with this item. This last factor was also one of the main motives for food choice in a study set in French adults[80].

Table 4.45. Environmental motives for choosing food in a subsample by sex: students of the University of the Basque Country (UPV/EHU)

Factors and items, %	Strongly disagree	Disagree	Agree	Strongly agree	P^{**}
Ethics and environment					
Environmental impact (M)					
Total sample	21.5	32.1	38.0	8.4	**<0.001**
Men	24.2	28.0	38.6	9.1	**<0.001**
Women	18.1	37.1	37.1	7.6	**<0.001**
P^{*}				0.436	
Environmental impact (F)					
Total sample	22.4	28.7	39.7	9.3	**<0.001**
Men	25.8	28.0	38.6	7.6	**<0.001**
Women	18.1	29.5	41.0	11.4	**<0.001**
P^{*}				0.458	

To be continued in the next page.

Continuation of Table 4.45.

Factors and items, %	Strongly disagree	Disagree	Agree	Strongly agree	P^{**}
Ethics and environment					
Environmental impact (FV)					
Total sample	16.9	32.5	38.4	12.2	**<0.001**
Men	19.7	28.0	42.4	9.8	**<0.001**
Women	13.3	38.1	33.3	15.2	**<0.001**
P^{*}				0.118	
Environmental impact (D)					
Total sample	24.1	33.8	35.4	6.8	**<0.001**
Men	22.7	34.1	37.1	6.1	**<0.001**
Women	25.7	33.3	33.3	7.6	**<0.001**
P^{*}				0.879	
Pollution caused by production (G)					
Total sample	29.5	35.9	27.8	6.8	**<0.001**
Men	35.6	28.0	28.0	8.3	**<0.001**
Women	21.9	45.7	27.6	4.8	**<0.001**
P^{*}				**0.019**	
Pollution caused by production (G)					
Total sample	29.5	35.9	27.8	6.8	**<0.001**
Men	35.6	28.0	28.0	8.3	**<0.001**
Women	21.9	45.7	27.6	4.8	**<0.001**
P^{*}				**0.019**	
Production waste (G)					
Total sample	21.1	40.1	27.0	11.8	**<0.001**
Men	22.0	39.4	25.8	12.9	**<0.001**
Women	20.0	41.0	28.6	10.5	**<0.001**
P^{*}				0.896	
Impact on earth's resources (G)					
Total sample	16.5	27.4	38.8	17.3	**<0.001**
Men	18.9	31.1	31.8	18.2	**0.032**
Women	13.3	22.9	47.6	16.2	**<0.001**
P^{*}				0.092	
Pollution caused by transport (G)					
Total sample	28.3	38.4	22.8	10.5	**<0.001**
Men	30.3	40.2	20.5	9.1	**<0.001**
Women	25.7	36.2	25.7	12.4	**0.007**
P^{*}				0.576	
Energy expenditure (G)					
Total sample	20.7	48.5	23.6	7.2	**<0.001**
Men	18.9	47.7	25.0	8.3	**<0.001**
Women	22.9	49.5	21.9	5.7	**<0.001**
P^{*}				0.191	
Amount of packaging (G)					
Total sample	13.1	18.1	32.1	36.7	**<0.001**
Men	12.9	22.0	34.1	31.1	**<0.001**
Women	13.3	13.3	29.5	43.8	**<0.001**
P^{*}				0.146	

To be continued in the next page.

Continuation of Table 4.45.

Factors and items, %	Strongly disagree	Disagree	Agree	Strongly agree	P^{**}
Local and traditional production					
Proximity of production (G)					
Total sample	9.7	22.8	40.5	27.0	**<0.001**
Men	12.1	19.7	37.9	30.3	**<0.001**
Women	6.7	26.7	43.8	22.9	**<0.001**
P^{*}				0.062	
Proximity of production (FV)					
Total sample	9.3	16.0	40.9	33.8	**<0.001**
Men	12.1	12.1	36.4	39.4	**<0.001**
Women	5.7	21.0	46.7	26.7	**<0.001**
P^{*}				**0.021**	
Artisanal product (G)					
Total sample	8.0	19.0	48.9	24.1	**<0.001**
Men	8.3	26.5	47.7	23.5	**<0.001**
Women	7.6	17.1	50.5	24.8	**<0.001**
P^{*}				0.918	
Seasonal product (G)					
Total sample	7.6	12.7	38.4	41.4	**<0.001**
Men	8.3	15.2	38.6	37.9	**<0.001**
Women	6.7	9.5	38.1	45.7	**<0.001**
P^{*}				0.466	
Origin of production (M)					
Total sample	11.8	21.5	35.0	31.6	**<0.001**
Men	14.4	15.9	38.6	31.1	**<0.001**
Women	8.6	28.6	30.5	32.4	**0.001**
P^{*}				0.066	
Environmental limitations					
Not buying for environmental reasons (M)					
Total sample	62.4	21.5	10.5	5.5	**<0.001**
Men	59.1	27.3	10.6	3.0	**<0.001**
Women	66.7	14.3	10.5	8.6	**<0.001**
P^{*}				**0.039**	
Not buying for environmental reasons (F)					
Total sample	67.9	20.3	6.3	5.5	**<0.001**
Men	65.9	22.7	7.6	3.8	**<0.001**
Women	70.1	17.5	4.8	7.6	**<0.001**
P^{*}				0.337	
Not buying for environmental reasons (FV)					
Total sample	73.0	18.6	4.6	3.8	**<0.001**
Men	68.9	19.7	7.6	3.8	**<0.001**
Women	78.1	17.1	1.0	3.8	**<0.001**
P^{*}				0.079	

To be continued in the next page.

Continuation of Table 4.45.

Factors and items, %	Strongly disagree	Disagree	Agree	Strongly agree	P^{**}
Environmental limitations					
Not buying for environmental reasons (D)					
Total sample	64.1	20.7	9.7	5.5	**<0.001**
Men	60.6	24.2	12.1	3.0	**<0.001**
Women	68.6	16.2	6.7	8.5	**<0.001**
P^{*}				0.058	
Absence of contaminants					
Exposure to chemicals (G)					
Total sample	9.3	17.3	29.5	43.9	**<0.001**
Men	10.6	20.5	22.7	46.2	**<0.001**
Women	7.6	13.3	38.1	41.0	**<0.001**
P^{*}				0.146	
Exposure to chemicals (F)					
Total sample	9.3	18.1	29.5	43.0	**<0.001**
Men	12.1	20.5	25.0	42.4	**<0.001**
Women	5.7	15.2	35.2	43.8	**<0.001**
P^{*}				0.135	

*Sex differences. Significant results are highlighted in bold.
**Frequency distribution differences. Significant results are highlighted in bold.
Items constituting the part of the questionnaire regarding food choice motives for dairy products (D), fish (F), fruits and vegetables (FV), general foods (G), and meat (M).

4.3.5. Sleep, sedentary behaviour (SB), physical activity (PA), physical exercise (PE) and sport (S)

Lifestyle characteristics related to sleep, SB and PA in the total sample, by sex and BF status are shown in the Study 2**.** More than half of students, both men and women, reported practicing PE/S, principally individual PE/S but not competitive level (**Table 4.46**). The men, youngest ones, HS students, and those without excess BF were most likely to have a high PA level and to practice PE/S (**Tables 4.47**, **4.48** and **4.49**), except in the case of an NHS that despite practicing PE/S less frequently, they presented a higher level of PA (Table 4.49). This last finding differs with other researches[81]. About a third was considered as active as other people his/her age, and the main motives for not exercising as much as they wanted were: lack of time, lack of goodwill and schedule (Table 4.48). These reasons coincided with those reported by Balearic university students[82].

On the other hand, the youngest students were the most likely to meet sleep recommendations (Table 4.47), not like in other studies[83]; these discrepancies could be due to differences in schedules depending on the grade. And finally, Basque university students spent nearly the same time sitting than Korean students[(84)], and students with more age had a higher SB than younger ones which could be due to a higher academic demand. On the other hand, HS students spent more hours sitting than NHS students, and it could be related to a low PA level among students from HS degrees as occurred in other university students[(85)].

Table 4.46. Physical exercise (PE)/sport (S) characteristics of the target population by sex: students of the University of the Basque Country (UPV/EHU)

Variables, %	Total sample (n=26,165)	Men (n=10,607)	Women (n=15,558)	*P*[*]
PE/S				
Yes	60.9	74.0	51.9	
No	39.1	26.0	48.1	**<0.001**
Type of PE/S				
Individual	61.3	61.3	68.0	
Team	29.7	29.7	24.8	
Individual and Team	9.0	9.0	7.2	**<0.001**
Competitive level				
Yes	37.3	51.6	23.4	
No	62.7	48.4	76.6	**<0.001**
Reasons for not practicing PE/S (in case don't practice everything he/she wants)				
Lack of company	0.2	0.4	-	
Money	1.8	1.9	1.7	
Schedule	21.9	22.6	21.4	
Lack of interest	0.2	0.4	-	
Place	3.8	6.4	2.1	
Health	5.1	5.6	4.8	
Lack of time	44.4	43.1	45.2	
Lack of goodwill	22.1	18.8	24.2	
DK	0.7	0.7	0.6	**<0.001**
Compared with other people his/her age, he/she is...				
Much more active	3.0	2.2	3.6	
More active	26.4	19.2	31.4	
About as active	34.1	30.5	36.6	
Less active	28.1	33.2	24.5	
Much less active	7.0	13.5	2.6	
DK	1.4	1.4	1.4	**<0.001**

[*]Sex differences. Significant results are highlighted in bold.
DK, don't know; PE, physical exercise; S, sport.

Table 4.47. Sleep, sedentary behaviour (SB), physical activity (PA), physical exercise (PE) and sport (S) characteristics of the target population by age: students of the University of the Basque Country (UPV/EHU)

Variables, mean(SD) or %	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥21 y old (n=10,110)	*P*[*]
Sleep					
7-9 hours	85.2	85.9	79.6	72.6	
<7 and>9 hours	14.8	14.1	20.4	27.4	**<0.001**
Sitting, hours/day	7.6(2.3)	7.7(1.8)	7.9(2.2)	8.0(2.4)	**<0.001**
PA					
Low/moderate	72.3	78.6	79.6	74.3	
High	27.7	21.4	20.4	25.7	**<0.001**
PE/S					
Yes	64.2	54.7	63.9	61.0	
No	35.8	45.3	36.1	39.0	**<0.001**
Type of PE/S					
Individual	66.0	67.2	59.4	57.0	
Team	30.2	28.9	29.4	30.0	
Individual and Team	3.8	3.9	11.2	13.0	**<0.001**
Competitive level					
Yes	44.3	31.8	35.2	37.4	
No	55.7	68.2	64.8	62.6	**<0.001**
Reasons for not practicing PE/S (in case don't practice everything he/she wants)					
Lack of company	-	0.8	-	-	
Money	2.2	0.4	4.0	1.2	
Schedule	19.6	19.1	25.6	22.7	
Lack of interest	-	-	-	0.4	
Place	5.4	2.7	3.4	3.9	
Health	5.9	6.1	1.8	6.1	
Lack of time	47.4	43.0	44.4	44.6	
Lack of goodwill	19.1	26.8	19.8	20.7	
DK	0.4	1.2	1.1	0.3	**<0.001**
Compared with other people his/her age, he/she is...					
Much more active	5.0	6.3	6.8	8.5	
More active	30.3	26.9	29.2	27.0	
About as active	35.5	34.4	32.4	34.2	
Less active	26.4	27.4	29.4	24.3	
Much less active	1.0	4.4	1.0	4.4	
DK	1.9	0.6	1.3	1.6	**<0.001**

[*]Age differences. Significant results are highlighted in bold.
DK, don't know; PA, physical activity; PE, physical exercise; S, sport; SD, standard deviation.

Table 4.48. Sleep, sedentary behaviour (SB), physical activity (PA), physical exercise (PE) and sport (S) characteristics of the target population by KA: students of the University of the Basque Country (UPV/EHU)

Variables, mean(SD) or %	HS (n=3,637)	NHS (n=22,529)	*P*[*]
Sleep			
7-9 hours	79.5	79.2	
<7 and>9 hours	20.5	20.8	0.702
Sitting, hours/day	8.3(2.2)	7.8(2.2)	**<0.001**
PA			
Low/moderate	84.5	74.6	
High	15.5	25.4	**<0.001**
PE/S			
Yes	63.4	60.5	
No	36.6	39.5	**0.001**
Type of PE/S			
Individual	73.4	59.2	
Team	18.3	31.7	
Individual and Team	8.3	9.1	**<0.001**
Competitive level			
Yes	18.4	40.3	
No	81.6	59.7	**<0.001**
Reasons for not practicing PE/S (in case don't practice everything he/she wants)			
Lack of company	-	0.2	
Money	1.1	2.0	
Schedule	25.3	21.5	
Lack of interest	-	0.2	
Place	3.3	3.9	
Health	2.4	5.7	
Lack of time	46.5	44.7	
Lack of goodwill	20.5	21.9	
DK	1.0	-	**<0.001**
Compared with other people his/her age, he/she is...			
Much more active	6.9	7.0	
More active	20.6	29.3	
About as active	39.2	33.3	
Less active	27.4	26.3	
Much less active	2.3	3.1	
DK	3.7	1.0	**<0.001**

[*]KA differences. Significant results are highlighted in bold.
DK, don't know; HS, Health Sciences; KA, knowledge area; NHS, Non-Health Sciences; PA, physical activity; PE, physical exercise; S, sport; SD, standard deviation.

Table 4.49. Physical exercise (PE)/sport (S) characteristics of the target population by BF status: students of the University of the Basque Country (UPV/EHU)

Variables, %	Non-excess BF (n=22,391)	Excess BF (n=3,775)	*P*[*]
PE/S			
Yes	61.7	56.0	
No	38.3	44.0	**<0.001**
Type of PE/S			
Individual	62.4	53.7	
Team	29.5	31.1	
Individual and Team	8.1	15.3	**<0.001**
Competitive level			
Yes	38.0	32.2	
No	62.0	67.8	**<0.001**
Reasons for not practicing PE/S (in case don't practice everything he/she wants)			
Lack of company	0.2	0.6	
Money	0.9	-	
Schedule	22.0	24.1	
Lack of interest	0.2	-	
Place	3.2	7.3	
Health	5.3	4.7	
Lack of time	47.0	37.2	
Lack of goodwill	21.0	26.2	
DK	0.2	-	**<0.001**
Compared with other people his/her age, he/she is...			
Much more active	7.8	2.3	
More active	29.1	21.6	
About as active	34.9	29.6	
Less active	24.0	40.9	
Much less active	2.9	3.8	
DK	1.3	1.7	**<0.001**

[*]BF status differences. Significant results are highlighted in bold.
BF, body fat; DK, don't know; PE, physical exercise; S, sport.

4.3.6. Toxic habits

Alcohol consumption for the total sample, by sex and BF status is shown in the **Study 2.** The rest of the data on toxic habits analysed by sex, age, KA and BF status were provided in **Tables 4.50, 4.51, 4.52** and **4.53**. Three-quarters of the sample were non-smokers or ex-smokers. The smoking prevalence among Basque students was lower than reported in university students from other European countries: Serbia[(86)], Greece[(87)] or Italy[(88)]; but similar to studies set in Ireland[(26)] and the United Kingdom[(89)]. Relative to age, as in another study[(90)], in the present research smoking prevalence increases with age.

Regarding data by KA, in accordance with other students(32), the percentage of HS students who did not smoke was high (93.5%), probably because they were more aware of the dangers of this toxic habit. Nevertheless, other researchers found a higher percentage of smokers among HS students(81,86) than those obtained by UPV/EHU' students. Furthermore, the percentage of smokers was higher among students with excess BF than those without excess BF, as it has been observed in other university student populations(93). But, the relationship between smoking and obesity is complex and not completely understood(94), and published results are contradictory. Some studies have not found a significant association between smoking status and BMI(95), while others have suggested that tobacco may be associated with a lower BMI(94) and smoking cessation with increased BMI(95). Differently from previous studies(96), our results did not confirm that smokers with excess BF consume more cigarettes per day than smokers without excess BF.

Relative to alcohol consumption by age, 19 years of age students were more likely to be high drinkers than students of other ages, as it was observed in other researches(97). Young adults justify alcohol intake with many reasons such as shyness, escaping their inhibitions or as a way of being accepted by their peers(98), but it has to be taken into account that drinking at a younger age may lead to risky drinking behaviours in later years(99). As in other studies, differences were observed between students from different KA (Table 4.52), identifying a higher percentage of risky drinkers among NHS students than those ones from HS degrees(26).

Table 4.50. Smoking characteristics of the target population by sex: students of the University of the Basque Country (UPV/EHU)

Variables, %	Total simple (n=26,165)	Men (n=10,607)	Women (n=15,558)	*P*[*]
Smoking habit				
Smokers	18.3	13.1	21.9	
Non-smokers/ex-smokers	81.7	86.9	78.1	**<0.001**
Smoking intensity, number of cigarettes/day				
<10	91.4	96.5	89.4	
10-20	6.4	3.5	7.4	
>20	2.3	-	3.2	**<0.001**

[*]Sex differences. Significant results are highlighted in bold.

Table 4.51. Toxic habits characteristics of the target population by age: students of the University of the Basque Country (UPV/EHU)

Variables, %	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥21 y old (n=10,110)	P^*
Smoking habit					
Smokers	14.5	15.7	18.6	21.5	
Non-smokers/ex-smokers	85.5	84.3	81.4	78.5	**<0.001**
Smoking intensity, number of cigarettes/day					
<10	100.0	89.4	85.5	91.3	
10-20	-	5.3	14.5	5.5	
>20	-	5.3	-	3.2	**<0.001**
Alcohol consumption					
Low/moderate	78.6	69.7	73.6	74.3	
High	21.4	30.3	26.4	25.7	**<0.001**

*Age differences. Significant results are highlighted in bold.

Table 4.52. Toxic habits characteristics of the target population by KA: students of the University of the Basque Country (UPV/EHU)

Variables, %	HS (n=3,637)	NHS (n=22,529)	P^*
Smoking habit			
Smokers	6.5	20.3	
Non-smokers/ex-smokers	93.5	79.7	**<0.001**
Smoking intensity, number of cigarettes/day			
<10	90.3	91.5	
10-20	9.7	5.9	
>20	-	2.6	**<0.001**
Alcohol consumption			
Low/moderate	79.9	73.0	
High	20.1	27.0	**<0.001**

*KA differences. Significant results are highlighted in bold.

HS, Health Sciences; KA, knowledge area; NHS, Non-Health Sciences.

Table 4.53. Smoking characteristics of the target population by BF status: students of the University of the Basque Country (UPV/EHU)

Variables, %	Non-excess BF (n=22,391)	Excess BF (n=3,775)	P^*
Smoking habit			
Smokers	18.3	18.8	
Non-smokers/ex-smokers	81.7	81.2	0.397

To be continued in the next page.

Continuation of Table 4.53.

Variables, %	Non-excess BF (n=22,391)	Excess BF (n=3,775)	P*
Smoking intensity, number of cigarettes/day			
<10	90.2	97.0	
10-20	7.1	3.0	
>20	2.8	-	**<0.001**

*BF status differences. Significant results are highlighted in bold.
BF, body fat.

4.4. Body image perception and dissatisfaction

Respect to body image perception, men's *t*-scores of current body size (CBS), ideal body size (IBS) and reasonable body size (RBS) were higher than women's ones (**Table 4.54**), as expected. The same occurred for younger students, NHS students and students with excess BF compared with the other categories (**Tables 4.55, 4.56** and **4.57**). BID was higher in women, youngest and NHS students than the other categories (*P*<0.001). Regarding BID in populations with obesity, our findings are in accordance with previous assumptions[100]. BID direction was different between the two groups according to BF%, being this dissatisfaction by excess in students with excess BF and by default in those without excess BF (*P*<0.001). This dissatisfaction by default could be related to the desire for an increase in muscle mass, especially in men and younger students[101].

Table 4.54. Body image perception and dissatisfaction of the target population by sex: students of the University of the Basque Country (UPV/EHU)

Variables, *t*-score, mean(SD)	Total sample (n=26,165)	Men (n=10,607)	Women (n=15,558)	P*
CBS	51.9(9.2)	55.0(8.8)	49.8(9.0)	**<0.001**
IBS	58.7(14.2)	60.7(15.1)	57.4(13.3)	**<0.001**
RBS	56.0(12.8)	60.7(13.5)	52.8(11.2)	**<0.001**
CBS-IBS	-6.9(6.6)	-5.7(7.7)	-7.6(5.6)	**<0.001**
CBS-RBS	-4.1(9.5)	-5.7(10.2)	-3.1(8.9)	**<0.001**

*Sex differences. Significant results are highlighted in bold.
CBS, current body size; IBS, ideal body size; RBS, reasonable body size.

Table 4.55. Body image perception and dissatisfaction of the target population by age: students of the University of the Basque Country (UPV/EHU)

Variables, *t*-score, mean(SD)	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥21 y old (n=10,110)	*P*[*]
CBS	52.5(9.4)	52.3(9.0)	50.5(9.1)	52.0(9.3)	**<0.001**
IBS	54.4(10.1)	53.9(12.4)	51.4(10.1)	53.7(12.6)	**<0.001**
RBS	56.5(12.8)	56.5(11.8)	55.3(13.5)	55.5(12.9)	**<0.001**
CBS-IBS	-1.9(10.1)	-1.6(11.6)	-0.9(9.8)	-1.6(11.6)	**0.023**
CBS-RBS	-3.9(10.0)	-4.3(7.9)	-4.8(8.7)	-3.8(10.5)	0.067

[*]Age differences. Significant results are highlighted in bold.
CBS, current body size; IBS, ideal body size; RBS, reasonable body size.

Table 4.56. Body image perception and dissatisfaction of the target population by KA: students of the University of the Basque Country (UPV/EHU)

Variables, *t*-score, mean(SD)	HS (n=3,637)	NHS (n=22,529)	*P*[*]
CBS	50.3(9.1)	52.1(9.3)	**<0.001**
IBS	50.8(10.1)	53.8(11.8)	**<0.001**
RBS	53.0(11.2)	56.5(13.0)	**<0.001**
CBS-IBS	-0.5(8.9)	-1.7(11.3)	**<0.001**
CBS-RBS	-2.7(7.6)	-4.4(9.8)	**<0.001**

[*]KA differences. Significant results are highlighted in bold.
CBS, current body size; HS, Health Sciences; IBS, ideal body size; KA, knowledge area; NHS, Non-Health Sciences; RBS, reasonable body size.

Table 4.57. Body image perception and dissatisfaction of the target population by BF status: students of the University of the Basque Country (UPV/EHU)

Variables, *t*-score, mean(SD)	Non-excess BF (n=22,391)	Excess BF (n=3,775)	*P*[*]
CBS	51.3(8.8)	55.4(10.8)	**<0.001**
IBS	53.4(11.8)	53.3(11.0)	**0.009**
RBS	55.2(12.5)	60.6(13.7)	**<0.001**
CBS-IBS	-2.1(10.7)	2.0(11.8)	**<0.001**
CBS-RBS	-3.9(8.9)	-5.3(12.5)	**<0.001**

[*]BF status differences. Significant results are highlighted in bold.
BF, body fat; CBS, current body size; IBS, ideal body size; RBS, reasonable body size.

Information about BID characteristics of the sample by sex, age, KA and BF status are provided in **Tables 4.58, 4.59, 4.60** and **4.61**. In the total sample, the highest percentages were obtained in BID by excess respect to IBS and in satisfaction respect to RBS (Table 4.58). Women, 19 years of age students, HS students and students with excess BF were more dissatisfied by excess respect to IBS than the corresponding categories (*P*<0.001).

In the case of female's BID respect to IBS, other authors have previously reported this association[102-105] and these results could be related to commonly spread social stereotypes of beauty. Young females in Western countries, where thinness is considered the norm for the ideal body image, feel great mental and social pressure to be thin[106], while young males prefer the heavy body shape because they think it is more masculine[107].

In the case of BF excess, it has been suggested that adiposity is a significant predictor of BID[108]. Lastly, men, 20 years of age students, HS students and students without excess BF were more satisfied with RBS than the other categories (P<0.001) (Tables 4.58, 4.59. 4.60 and 4.61). In all cases, the percentage of satisfied with RBS was higher than with IBS and these results could be due to the awareness of the possibility or impossibility of maintaining the IBS[109,110]. Considering that body dissatisfaction perception and the BID are associated with partly unfavourable obesity-related behaviours[111], the development of prevention and intervention strategies is essential.

Table 4.58. Body image dissatisfaction characteristics of the target population by sex: students of the University of the Basque Country (UPV/EHU)

BID	Total sample (n=26,165)	Men (n=10,607)	Women (n=15,558)	P^*
BID respect to IBS, %	CBS-IBS (*t*-score)			
BID by excess[1]	48.0	33.2	58.1	
BID by defect[2]	18.3	27.3	12.1	
Satisfied[3]	33.7	39.4	29.7	**<0.001**
BID respect to RBS, %	CBS-RBS (*t*-score)			
BID by excess[4]	17.8	15.8	19.2	
BID by defect[5]	21.7	24.6	19.8	
Satisfied[6]	60.4	59.6	61.0	**<0.001**

[1]CBS-IBS (*t*-score)>0; [2]CBS-IBS<0; [3]CBS-IBS=0; [4]CBS-RBS>0; [5]CBS-RBS<0; [6]CBS-RBS=0.
[*]Sex differences. Significant results are highlighted in bold.
BID, body image dissatisfaction; CBS, current body size; IBS, ideal body size; RBS, reasonable body size.

Table 4.59. Body image dissatisfaction characteristics of the target population by age: students of the University of the Basque Country (UPV/EHU)

BID	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥21 y old (n=10,110)	*P**
BID respect to IBS, %	CBS-IBS (*t*-score)				
BID by excess[1]	46.4	52.7	44.9	48.0	
BID by defect[2]	22.9	16.3	14.6	19.1	
Satisfied[3]	30.6	31.1	40.5	32.8	**<0.001**
BID respect to RBS, %	CBS-RBS (*t*-score)				
BID by excess[4]	18.4	16.8	12.7	20.9	
BID by defect[5]	23.5	20.2	22.6	21.1	
Satisfied[6]	58.1	63.0	64.7	57.9	**<0.001**

[1]CBS-IBS (*t*-score)>0; [2]CBS-IBS<0; [3]CBS-IBS=0; [4]CBS-RBS>0; [5]CBS-RBS<0; [6]CBS-RBS=0.
*Age differences. Significant results are highlighted in bold.
BID, body image dissatisfaction; CBS, current body size; IBS, ideal body size; RBS, reasonable body size.

Table 4.60. Body image dissatisfaction characteristics of the target population by KA: students of the University of the Basque Country (UPV/EHU)

BID	HS (n=3,637)	NHS (n=22,529)	*P**
BID respect to IBS, %	CBS-IBS (*t*-score)		
BID by excess[1]	51.9	47.4	
BID by defect[2]	15.2	18.8	
Satisfied[3]	32.9	33.8	**<0.001**
BID respect to RBS, %	CBS-RBS (*t*-score)		
BID by excess[4]	18.6	17.7	
BID by defect[5]	15.7	22.7	
Satisfied[6]	65.7	59.6	**<0.001**

[1]CBS-IBS (*t*-score)>0; [2]CBS-IBS<0; [3]CBS-IBS=0; [4]CBS-RBS>0; [5]CBS-RBS<0; [6]CBS-RBS=0.
*KA differences. Significant results are highlighted in bold.
BID, body image dissatisfaction; CBS, current body size; HS, Health Sciences; IBS, ideal body size; KA, knowledge area; NHS; Non-Health Sciences; RBS, reasonable body size.

Table 4.61. Body image dissatisfaction characteristics of the target population by BF status: students of the University of the Basque Country (UPV/EHU)

BID	Non-excess BF (n=22,391)	Excess BF (n=3,775)	*P**
BID respect to IBS, %	CBS-IBS (*t*-score)		
BID by excess[1]	42.2	82.6	
BID by defect[2]	20.6	4.6	
Satisfied[3]	37.2	12.8	**<0.001**

To be continued in the next page.

Continuation of Table 4.61.

BID	Non-excess BF (n=22,391)	Excess BF (n=3,775)	P^*
BID respect to RBS, %	CBS-RBS (*t*-score)		
BID by excess[4]	14.9	35.6	
BID by defect[5]	22.4	17.4	
Satisfied[6]	62.7	47.0	**<0.001**

[1]CBS-IBS (*t*-score)>0; [2]CBS-IBS<0; [3]CBS-IBS=0; [4]CBS-RBS>0; [5]CBS-RBS<0; [6]CBS-RBS=0.
*BF status differences. Significant results are highlighted in bold.
BID, body image dissatisfaction; BF, body fat; CBS, current body size; IBS, ideal body size; RBS, reasonable body size.

Self-perception of upper and lower body part is shown in **Table 4.62**. Regarding dissatisfaction with different body parts (upper and lower), men were more dissatisfied with their upper part than women, and the opposite occurred with the lower part of the body ($P<0.001$) (**Table 4.63**). According to other authors(112,113), these findings could indicate that males are concerned with increasing the size of the upper body (especially muscular size and strength), whereas females want to decrease the size of the lower part (that is, to have smaller hip, thighs, etc.). Analysing body image assessment (BIA) by upper and lower part of the body, 20-years old students were the most satisfied with the upper part and younger ones (18 y old group) with the lower part ($P<0.001$) (**Table 4.65**).

Regarding for KA, HS students were more satisfied with the upper part of the body while NHS students were more satisfied with the lower part ($P<0.001$) (**Table 4.67**). The analysis by BF status showed that the students with excess BF were more dissatisfied by excess with both upper and lower part of the body compared with those with normal BF ($P<0.001$) (**Table 4.69**). These last results are in agreement with those of other authors who showed that body dissatisfaction is frequent in individuals with obesity compared with normal weight(100)in the general population, as well as in university students(108).

Table 4.62. Self-perception of upper and lower body part of the target population by sex: students of the University of the Basque Country (UPV/EHU)

Silhouette number, % of subjects	Total sample (n=26,165)	Men (n=10,607)	Women (n=15,558)	P^*
CBI (upper part of the body)				
1	7.4	1.4	11.6	
2	14.2	17.6	11.8	

To be continued in the next page.

Continuation of Table 4.62.

Silhouette number, % of subjects	Total sample (n=26,165)	Men (n=10,607)	Women (n=15,558)	P^*
CBI (upper part of the body)				
3	33.8	32.8	34.4	
4	34.2	30.5	36.7	
5	9.3	14.9	5.5	
6	1.2	2.8	-	
7	-	-	-	
8	-	-	-	**<0.001**
CBI (lower part of the body)				
1	2.5	1.5	3.1	
2	14.0	11.4	15.8	
3	20.0	31.8	11.9	
4	40.6	40.2	40.9	
5	19.0	8.5	26.1	
6	3.5	5.4	2.2	
7	0.5	1.2	-	
8	-	-	-	**<0.001**
IBI (upper part of the body)				
1	4.3	0.4	7.0	
2	18.2	9.7	24.0	
3	36.9	20.3	48.3	
4	40.0	68.7	20.4	
5	0.6	1.0	0.3	
6	-	-	-	
7	-	-	-	
8	-	-	-	**<0.001**
IBI (lower part of the body)				
1	1.8	0.6	2.6	
2	18.4	4.7	27.7	
3	33.3	20.9	41.8	
4	42.8	65.4	27.4	
5	2.9	6.5	0.4	
6	0.7	1.8	-	
7	0.1	0.2	-	
8	-	-	-	**<0.001**
FBI (upper part of the body)				
1	0.5	0.3	0.6	
2	5.3	1.8	7.8	
3	13.0	11.4	14.1	
4	16.4	14.4	17.7	
5	41.1	42.7	39.9	
6	23.3	28.9	19.6	
7	0.4	0.5	0.3	
8	-	-	-	**<0.001**

To be continued in the next page.

Continuation of Table 4.62.

Silhouette number, % of subjects	Total sample (n=26,165)	Men (n=10,607)	Women (n=15,558)	P^*
FBI (lower part of the body)				
1	3.3	1.4	4.6	
2	9.8	7.4	11.4	
3	19.6	18.0	20.7	
4	34.0	30.5	36.3	
5	22.1	26.9	18.9	
6	9.9	13.8	7.3	
7	1.3	2.0	0.8	
8	-	-	-	**<0.001**
MBI (upper part of the body)				
1	3.0	1.8	3.8	
2	6.1	5.1	6.7	
3	16.5	20.6	13.7	
4	34.0	34.2	33.8	
5	32.7	32.3	32.9	
6	7.3	6.0	8.2	
7	0.5	-	0.8	
8	-	-	-	**<0.001**
MBI (lower part of the body)				
1	2.5	1.1	3.4	
2	10.4	6.8	12.8	
3	16.1	18.6	14.4	
4	29.1	30.2	28.3	
5	33.9	35.7	32.7	
6	7.5	6.9	7.8	
7	0.6	0.7	0.5	
8	-	-	-	**<0.001**
ABI (upper part of the body)				
1	0.6	0.3	0.8	
2	15.9	8.7	20.8	
3	39.8	51.8	31.7	
4	42.3	37.9	45.3	
5	1.4	1.3	1.5	
6	-	-	-	
7	-	-	-	
8	-	-	-	**<0.001**
ABI (lower part of the body)				
1	0.6	0.3	0.8	
2	10.4	8.2	11.8	
3	41.9	50.3	36.2	
4	44.1	38.0	48.2	
5	2.7	2.9	2.5	
6	0.4	0.3	0.4	
7	-	-	-	
8	-	-	-	**<0.001**

*Sex differences. Significant results are highlighted in bold.
ABI, attractive body image; CBI, current body image; FBI, father's body image; IBI, ideal body image; MBI, mother's body image.

Table 4.63. Dissatisfaction with upper and lower body part of the target population by sex: students of the University of the Basque Country (UPV/EHU)

Classification according to BID, %	Total sample (n=26,165)	Men (n=10,607)	Women (n=15,558)	P^*
Upper part		CBI – IBI		
Dissatisfaction by excess[1]	9.6	8.3	10.5	
Dissatisfaction by default[2]	8.8	10.9	7.4	
Satisfied[3]	81.6	80.8	82.1	**<0.001**
Lower part		CBI – IBI		
Dissatisfaction by excess[1]	16.1	6.3	22.8	
Dissatisfaction by default[2]	5.5	8.9	3.1	
Satisfied[3]	78.4	84.7	74.1	**<0.001**

[1]CBI-IBI>1; [2]CBI-IBI<-1; [3]-1≥CBI-IBI≤1.
*Sex differences. Significant results are highlighted in bold.
BID, body image dissatisfaction; CBI, current body image; IBI, ideal body image.

Table 4.64. Self-perception of upper and lower body part of the target population by age: students of the University of the Basque Country (UPV/EHU)

Silhouette number, % of subjects	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥ 21 y old (n=10,110)	P^*
CBI (upper part of the body)					
1	5.5	8.3	7.5	7.8	
2	20.0	14.2	17.5	9.5	
3	33.6	32.8	36.6	32.9	
4	31.8	38.0	31.6	34.6	
5	8.2	5.6	6.0	13.7	
6	1.0	1.1	0.7	1.5	
7	-	-	-	-	
8	-	-	-	-	**<0.001**
CBI (lower part of the body)					
1	-	1.2	2.8	4.2	
2	12.8	14.2	13.0	15.1	
3	21.6	19.9	19.1	19.7	
4	43.4	39.1	46.0	37.0	
5	17.3	20.9	16.4	20.2	
6	4.9	3.6	2.7	3.2	
7	-	1.1	-	0.7	
8	-	-	-	-	**<0.001**

To be continued in the next page.

Continuation of Table 4.64.

Silhouette number, % of subjects	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥ 21 y old (n=10,110)	P^*
IBI (upper part of the body)					
1	5.4	3.5	1.7	5.7	
2	16.3	16.8	20.1	18.8	
3	32.8	39.4	40.9	35.4	
4	45.5	40.3	36.4	39.0	
5	-	-	1.0	1.0	
6	-	-	-	-	
7	-	-	-	-	
8	-	-	-	-	**<0.001**
IBI (lower part of the body)					
1	1.5	2.0	2.1	1.6	
2	14.5	18.2	19.6	19.8	
3	31.8	34.5	38.4	30.6	
4	47.0	42.5	36.7	44.3	
5	3.7	2.7	3.2	2.4	
6	1.0	-	-	1.4	
7	0.5	-	-	-	
8	-	-	-	-	**<0.001**
FBI (upper part of the body)					
1	-	-	0.6	0.9	
2	4.5	7.3	4.8	5.0	
3	12.9	15.5	10.7	13.0	
4	16.5	16.4	22.5	12.9	
5	42.5	42.7	40.5	39.7	
6	23.1	18.2	20.1	28.1	
7	0.5	-	0.7	0.4	
8	-	-	-	-	**<0.001**
FBI (lower part of the body)					
1	2.6	3.5	3.6	3.4	
2	9.1	10.0	8.1	11.0	
3	18.0	19.2	17.8	21.5	
4	31.9	37.7	34.8	32.4	
5	26.1	23.8	23.0	18.7	
6	10.9	5.8	9.2	12.2	
7	1.5	-	3.4	0.7	
8	-	-	-	-	**<0.001**
MBI (upper part of the body)					
1	4.5	2.0	2.1	3.2	
2	4.4	8.7	5.3	5.8	
3	17.3	14.1	12.9	19.4	
4	38.2	33.7	33.4	32.4	
5	31.2	35.0	40.8	27.7	
6	4.4	5.0	4.6	11.5	
7	-	1.4	1.0	-	
8	-	-	-	-	**<0.001**

To be continued in the next page.

Continuation of Table 4.64.

Silhouette number, % of subjects	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥ 21 y old (n=10,110)	P^*
MBI (lower part of the body)					
1	3.0	3.7	1.5	2.1	
2	12.8	11.0	9.9	9.1	
3	12.7	8.9	20.1	19.6	
4	22.6	32.0	21.8	34.7	
5	42.3	37.5	42.7	23.0	
6	6.6	6.1	3.5	10.8	
7	-	0.8	0.6	0.7	
8	-	-	-	-	**<0.001**
ABI (upper part of the body)					
1	1.5	1.5	-	-	
2	11.4	14.0	23.0	15.3	
3	45.9	47.4	31.6	37.2	
4	39.8	36.0	44.5	45.7	
5	1.5	1.1	1.0	1.8	
6	-	-	-	-	
7	-	-	-	-	
8	-	-	-	-	**<0.001**
ABI (lower part of the body)					
1	1.0	1.4	0.6	-	
2	7.6	7.2	17.3	9.7	
3	51.4	50.9	33.7	36.8	
4	35.1	39.0	45.9	50.3	
5	4.3	1.4	2.1	2.9	
6	0.6	-	0.6	0.3	
7	-	-	-	-	
8	-	-	-	-	**<0.001**

*Age differences. Significant results are highlighted in bold.
ABI, attractive body image; CBI, current body image; FBI, father's body image; IBI, ideal body image; MBI, mother's body image.

Table 4.65. Dissatisfaction with upper and lower body part of the target population by age: students of the University of the Basque Country (UPV/EHU)

Classification according to BID, %	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥ 21 y old (n=10,110)	P^*
Upper part		CBI – IBI			
Dissatisfaction by excess[1]	6.3	9.8	5.9	13.2	
Dissatisfaction by default[2]	9.4	12.6	8.4	6.6	
Satisfied[3]	84.3	77.6	85.7	80.2	**<0.001**

To be continued in the next page.

Continuation of Table 4.65.

Classification according to BID, %	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥ 21 y old (n=10,110)	P^*
Lower part			CBI – IBI		
Dissatisfaction by excess[1]	13.7	17.3	16.4	16.6	
Dissatisfaction by default[2]	4.4	5.9	2.7	7.2	
Satisfied[3]	81.9	76.8	80.9	76.1	**<0.001**

[1]CBI-IBI>1; [2]CBI-IBI<-1; [3]-1≥CBI-IBI≤1.
[*]Age differences. Significant results are highlighted in bold.
BID, body image dissatisfaction; CBI, current body image; IBI, ideal body image.

Table 4.66. Self-perception of upper and lower body part of the target population by KA: students of the University of the Basque Country (UPV/EHU)

Silhouette number, % of subjects	HS (n=3,637)	NHS (n=22,529)	P^*
CBI (upper part of the body)			
1	5.9	7.7	
2	15.4	14.0	
3	33.1	33.9	
4	35.4	34.0	
5	10.3	9.1	
6	-	1.3	
7	-	-	
8	-	-	**<0.001**
CBI (lower part of the body)			
1	2.7	2.4	
2	12.4	14.3	
3	12.7	21.1	
4	46.9	39.6	
5	20.5	18.7	
6	4.8	3.3	
7	-	0.6	
8	-	-	**<0.001**
IBI (upper part of the body)			
1	6.0	4.1	
2	20.8	17.8	
3	38.5	36.7	
4	33.8	41.0	
5	0.9	0.5	
6	-	-	
7	-	-	
8	-	-	**<0.001**

To be continued in the next page.

Continuation of Table 4.66.

Silhouette number, % of subjects	HS (n=3,637)	NHS (n=22,529)	*P*[*]
IBI (lower part of the body)			
1	4.5	1.3	
2	23.1	17.6	
3	38.1	32.5	
4	31.8	44.6	
5	1.8	3.0	
6	0.7	0.8	
7	-	-	
8	-	-	**<0.001**
FBI (upper part of the body)			
1	-	0.5	
2	2.5	5.8	
3	16.5	12.5	
4	14.4	16.7	
5	48.6	39.8	
6	17.4	24.3	
7	0.7	0.3	
8	-	-	**<0.001**
FBI (lower part of the body)			
1	2.5	3.5	
2	8.7	10.0	
3	22.1	19.2	
4	33.3	34.1	
5	22.6	22.0	
6	10.2	9.9	
7	0.7	1.4	
8	-	-	**<0.001**
MBI (upper part of the body)			
1	4.1	2.8	
2	4.0	6.4	
3	17.1	16.4	
4	33.1	34.1	
5	31.7	32.8	
6	9.1	7.0	
7	0.9	0.4	
8	-	-	**<0.001**
MBI (lower part of the body)			
1	4.1	2.2	
2	9.9	10.5	
3	12.1	16.7	
4	30.6	28.8	
5	36.2	33.5	
6	6.2	7.7	
7	0.9	0.5	
8	-	-	**<0.001**

To be continued in the next page.

Continuation of Table 4.66.

Silhouette number, % of subjects	HS (n=3,637)	NHS (n=22,529)	P^*
ABI (upper part of the body)			
1	0.7	0.6	
2	20.2	15.2	
3	37.0	40.3	
4	40.6	42.6	
5	1.6	1.4	
6	-	-	
7	-	-	
8	-	-	**<0.001**
ABI (lower part of the body)			
1	0.9	0.6	
2	12.0	10.1	
3	39.2	42.3	
4	43.6	44.2	
5	2.5	2.7	
6	1.8	0.1	
7	-	-	
8	-	-	**<0.001**

*KA differences. Significant results are highlighted in bold.
ABI, attractive body image; CBI, current body image FBI, father's body image; HS, Health Sciences; IBI, ideal body image; KA, knowledge area; NHS; Non-Health Sciences; MBI, mother's body image.

Table 4.67. Dissatisfaction with upper and lower body part of the target population by KA: students of the University of the Basque Country (UPV/EHU)

Classification according to BID, %	HS (n=3,637)	NHS (n=22,529)	P^*
Upper part	CBI – IBI		
Dissatisfaction by excess[1]	5.9	10.2	
Dissatisfaction by default[2]	6.6	9.1	
Satisfied[3]	87.5	80.6	**<0.001**
Lower part	CBI – IBI		
Dissatisfaction by excess[1]	20.6	15.4	
Dissatisfaction by default[2]	1.4	6.1	
Satisfied[3]	78.0	78.5	**<0.001**

[1]CBI-IBI>1; [2]CBI-IBI<-1; [3]-1≥CBI-IBI≤1.
*KA differences. Significant results are highlighted in bold.
BID, body image dissatisfaction; CBI, current body image; HS, Health Sciences; IBI, ideal body image; KA, knowledge area; NHS; Non-Health Sciences.

Table 4.68. Self-perception of upper and lower body part of the target population by BF status: students of the University of the Basque Country (UPV/EHU)

Silhouette number, % of subjects	Non-excess BF (n=22,391)	Excess BF (n=3,775)	P^*
CBI (upper part of the body)			
1	8.7	-	
2	16.2	2.4	
3	37.5	11.6	
4	30.7	54.5	
5	6.9	23.5	
6	-	8.0	
7	-	-	
8	-	-	**<0.001**
CBI (lower part of the body)			
1	2.9	-	
2	15.6	4.6	
3	21.9	8.2	
4	41.7	33.8	
5	15.5	39.6	
6	2.3	10.4	
7	-	3.4	
8	-	-	**<0.001**
IBI (upper part of the body)			
1	4.9	0.9	
2	18.3	17.8	
3	36.1	41.8	
4	40.4	37.7	
5	0.4	1.8	
6	-	-	
7	-	-	
8	-	-	**<0.001**
IBI (lower part of the body)			
1	1.8	1.6	
2	19.7	11.0	
3	33.7	31.2	
4	41.3	51.8	
5	2.8	3.1	
6	0.6	1.3	
7	0.1	-	
8	-	-	**<0.001**
FBI (upper part of the body)			
1	0.2	1.9	
2	5.6	4.0	
3	12.5	16.2	
4	15.7	20.2	
5	42.4	33.2	
6	23.5	22.4	

To be continued in the next page.

Continuation of Table 4.68.

Silhouette number, % of subjects	Non-excess BF (n=22,391)	Excess BF (n=3,775)	P^*
FBI (upper part of the body)			
7	0.1	2.2	
8	-	-	**<0.001**
FBI (lower part of the body)			
1	2.9	6.0	
2	9.6	11.1	
3	19.8	18.4	
4	34.4	31.4	
5	22.0	22.8	
6	10.5	6.7	
7	0.9	3.7	
8	-	-	**<0.001**
MBI (upper part of the body)			
1	3.0	2.7	
2	6.6	2.9	
3	15.9	20.4	
4	34.9	28.8	
5	32.3	34.9	
6	6.8	10.4	
7	0.6	-	
8	-	-	**<0.001**
MBI (lower part of the body)			
1	2.9	-	
2	10.4	10.4	
3	15.6	18.8	
4	29.5	26.6	
5	34.6	29.9	
6	6.6	12.4	
7	0.3	1.8	
8	-	-	**<0.001**
ABI (upper part of the body)			
1	0.7	-	
2	16.6	11.7	
3	40.2	37.3	
4	41.5	47.0	
5	1.0	4.0	
6	-	-	
7	-	-	
8	-	-	**<0.001**
ABI (lower part of the body)			
1	0.7	-	
2	11.3	4.9	
3	43.1	34.6	
4	42.2	55.2	
5	2.2	5.3	

To be continued in the next page.

Continuation of Table 4.68.

Silhouette number, % of subjects	Non-excess BF (n=22,391)	Excess BF (n=3,775)	P*
ABI (lower part of the body)			
6	0.4	-	
7	-	-	
8	-	-	**<0.001**

*BF status differences. Significant results are highlighted in bold.
ABI, attractive body image; BF, body fat; CBI, current body image; IBI, ideal body image; FBI, father's body image; MBI, mother's body image.

Table 4.69. Dissatisfaction with upper and lower body part of the target population by BF status: students of the University of the Basque Country (UPV/EHU)

Classification according to BID, %	Non-excess BF (n=22,391)	Excess BF (n=3,775)	P*
Upper part	CBI – IBI		
Dissatisfaction by excess[1]	6.7	13.6	
Dissatisfaction by default[2]	10.1	5.9	
Satisfied[3]	83.2	80.5	**<0.001**
Lower part	CBI – IBI		
Dissatisfaction by excess[1]	27.0	31.4	
Dissatisfaction by default[2]	1.2	2.8	
Satisfied[3]	71.8	65.9	**<0.001**

[1]CBI-IBI>1; [2]CBI-IBI<-1; [3]-1≥CBI-IBI≤1.
*BF status differences. Significant results are highlighted in bold.
BF, body fat; CBI, current body image; IBI, ideal body image.

4.5. Nutrition attitudes (NA)

The results obtained about attitudes relevant to low-fat diets are shown in **Table 4.70**. Sex differences were observed in four factors included in this tool, being higher the scores for women than men in "helpless and unhealthy" and "health consciousness" factors, while males obtained higher scores than females in "food exploration" and "meat preference" (P<0.05) (Table 4.70). Just like in other studies[114], preference for meat was associated with sex, being males more likely to prefer this type of foods. This fact could be due to the fact that men consider masculine the intake of animal products, and it could be for this reason that they eat higher amounts of this food[115].

Furthermore, age differences were observed in the scores obtained in the four factors, being higher the scores for students with more age than younger ones in all factors, apart from "health consciousness" (P<0.001) (**Table 4.71**). In the case of "meat preference" factor, it could be related to the fact that students with more age supposedly are more frequent meat consumers[116-118]. Regarding "health consciousness", students with more age was the group with the highest score on this factor, compared with other age groups. It should be noted that this factor predominantly indexes willingness to change rather than concerns about health that currently govern food choice[119]. Respect to the attitudes of the sample by KA, NHS students had higher scores than HS students in all factors, except for "food exploration" factor (P<0.05) (**Table 4.72**); which do not support at all our hypothesis taking into account that HS students are supposed to be better informed concerning health issues and therefore, to adopt healthier practices[32].

Last, BF status differences were observed in the four factors, being higher the scores for students with excess BF than for those without excess BF in "helpless and unhealthy" and "food exploration" factors, while students without excess BF obtained higher scores than students with excess BF in "meat preference" and "health consciousness" (P<0.01) (**Table 4.73**), as it was expected. It is not surprising that excess BF was the group with the highest score on the "helpless and unhealthy" factor compared with Non-excess BF, and with sex, age and KA groups, since this factor combines items about convenience, mood and affect, and low self-efficacy[119]. These three food choice motives were positively associated with a higher intake of unhealthy foods[120-122].

Table 4.70. Nutrition attitudes of the target population by sex: students of the University of the Basque Country (UPV/EHU)

Factors (scores range)	Total sample (n=26,165)	Men (n=10,607)	Women (n=15,558)	P^*
		mean(SD)		
Helpless and unhealthy (0-40)	16.3(6.0)	15.7(6.3)	16.7(5.7)	**<0.001**
Food exploration (0-20)	12.8(5.2)	13.2(5.0)	12.5(5.3)	**<0.001**
Meat preference (0-16)	6.6(2.5)	7.3(2.6)	6.1(2.3)	**<0.001**
Health consciousness (0-20)	15.1(2.2)	15.0(2.2)	15.1(2.2)	**0.046**

*Sex differences. Significant results are highlighted in bold.
SD, standard deviation.

Table 4.71. Nutrition attitudes of the target population by age: students of the University of the Basque Country (UPV/EHU)

Factors (scores range)	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥21 y old (n=10,110)	*P**
	mean(SD)				
Helpless and unhealthy (0-40)	16.2(5.8)	15.1(5.7)	16.7(5.6)	16.8(6.3)	**<0.001**
Food exploration (0-20)	12.1(4.8)	12.4(5.5)	12.4(5.3)	13.5(5.1)	**<0.001**
Meat preference (0-16)	6.7(2.6)	5.0(2.3)	6.7(2.4)	6.9(2.4)	**<0.001**
Health consciousness (0-20)	15.2(2.0)	15.0(2.4)	15.2(2.2)	15.1(2.2)	**<0.001**

*Age differences. Significant results are highlighted in bold.
SD, standard deviation.

Table 4.72. Nutrition attitudes of the target population by KA: students of the University of the Basque Country (UPV/EHU)

Factors (scores range)	HS (n=3,637)	NHS (n=22,529)	*P**
	mean(SD)		
Helpless and unhealthy (0-40)	15.5(5.7)	16.4(6.0)	**<0.001**
Food exploration (0-20)	13.0(4.9)	12.8(5.3)	**0.041**
Meat preference (0-16)	6.1(2.4)	6.7(2.5)	**<0.001**
Health consciousness (0-20)	14.8(2.4)	15.1(2.2)	**<0.001**

*KA differences. Significant results are highlighted in bold.
HS, Health Sciences; KA, knowledge area; NHS; Non-Health Sciences; SD, standard deviation.

Table 4.73. Nutrition attitudes of the target population by BF status: students of the University of the Basque Country (UPV/EHU)

Factors (scores range)	Non-excess BF (n=22,391)	Excess BF (n=3,775)	*P**
	mean(SD)		
Helpless and unhealthy (0-40)	16.0(5.9)	18.0(6.1)	**<0.001**
Food exploration (0-20)	12.6(5.2)	13.8(5.2)	**<0.001**
Meat preference (0-16)	6.6(2.5)	6.5(2.5)	**0.001**
Health consciousness (0-20)	15.1(2.3)	14.8(2.0)	**<0.001**

*BF status differences. Significant results are highlighted in bold.
BF, body fat; SD, standard deviation.

4.6. Changes in body weight, weight perception and control behaviour

Regarding changes in self-reported weight self-reported, nearly 90% of students maintained his/her weight during the last 4 months, and nearly 70% maintained it in the last year. But compared with the weight of 3 and 5 years ago, the percentage of maintaining weight decreased till 30 and 43%, respectively (*P*<0.001) (**Table 4.74**). The weight gain registered in the last 3 and 5 years would be related in many cases to the transitional period between adolescence and young adulthood. Students with more age and those with excess BF were more likely to gain weight the last 4 months and year compared with the other categories (**Tables 4.75** and **4.77**). In regard to the amount of weight gained, higher amounts were registered in men, NHS students and those with excess BF than in the other categories (**Tables** 4.75, **4.76** and 4.77). Other authors[123,124] also observed a greater weight gain in men than women over the 3 or 4-year college period. The result about the amount of weight gained by KA could be due to a high awareness of health-promoting habits in HS students[32].

Table 4.74. Changes in body weight of the target population by sex: students of the University of the Basque Country (UPV/EHU)

Variables, mean(SD) or %	Total sample (n=26,165)	Men (n=10,607)	Women (n=15,558)	P^*
Comparing with weight of 4 months ago				
Weight maintained[1]	86.4	85.8	86.9	
Weight gained[2]	9.4	8.5	10.1	
Weight lost[3]	4.2	5.7	3.0	**<0.001**
Among those who have lost weight				
Lost weight, kg	5.6(2.9)	6.6(3.3)	4.1(1.1)	**<0.001**
Among those who have gained weight				
Gained weight, kg	4.8(1.9)	5.7(1.7)	4.2(1.8)	**<0.001**
Comparing with weight of a year ago				
Weight maintained[1]	68.6	64.2	71.8	
Weight gained[2]	21.4	25.7	18.2	
Weight lost[3]	10.0	10.1	10.0	**<0.001**
Among those who have lost weight				
Lost weight, kg	6.1(2.7)	7.0(2.9)	5.4(2.3)	**<0.001**
Among those who have gained weight				
Gained weight, kg	5.6(2.7)	5.9(2.5)	5.2(2.9)	**<0.001**
Comparing with weight of 3 years ago				
Weight maintained[1]	42.6	34.4	48.4	
Weight gained[2]	45.4	57.3	37.0	
Weight lost[3]	12.0	8.2	14.6	**<0.001**

To be continued in the next page.

Continuation of Table 4.74.

Variables, mean(SD) or %	Total sample (n=26,165)	Men (n=10,607)	Women (n=15,558)	P^*
Among those who have lost weight				
Lost weight, kg	8.4(7.3)	12.7(10.8)	6.7(4.3)	**<0.001**
Among those who have gained weight				
Gained weight, kg	6.9(3.9)	8.1(4.6)	5.8(2.3)	**<0.001**
Comparing with weight of 5 years ago				
Weight maintained[1]	31.4	23.5	36.9	
Weight gained[2]	56.1	67.5	48.1	
Weight lost[3]	12.6	9.1	15.0	**<0.001**
Among those who have lost weight				
Lost weight, kg	7.9(6.0)	10.4(8.3)	6.8(4.3)	**<0.001**
Among those who have gained weight				
Gained weight, kg	8.8(5.7)	11.2(6.6)	6.4(3.0)	**<0.001**

[1]Current weight <5% or >-5% regarding the weight of 4 months; a year; 3 years and 5 years ago; [2]Current weight ≥5% regarding the weight of 4 months; a year; 3 years and 5 years ago; [3]Current weight ≥-5% regarding the weight 4 months; a year; 3 years and 5 years ago.
[*]Sex differences. Significant results are highlighted in bold.
SD, standard deviation.

Table 4.75. Changes in body weight of the target population by age: students of the University of the Basque Country (UPV/EHU)

Variables, mean(SD) or %	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥21 y old (n=10,110)	P^*
Comparing with weight of 4 months ago					
Weight maintained[1]	85.1	76.7	87.3	91.5	
Weight gained[2]	11.8	15.1	10.3	4.8	
Weight lost[3]	3.1	8.2	2.4	3.7	**<0.001**
Among those who have lost weight					
Lost weight, kg	4.7(0.8)	4.3(1.3)	5.1(0.8)	7.7(3.9)	**<0.001**
Among those who have gained weight					
Gained weight, kg	4.7(2.0)	5.0(1.3)	4.5(1.8)	5.1(2.5)	**<0.001**
Comparing with weight of a year ago					
Weight maintained[1]	59.6	67.2	71.8	72.0	
Weight gained[2]	31.2	22.4	19.2	17.2	
Weight lost[3]	9.2	10.4	9.0	10.8	**<0.001**
Among those who have lost weight					
Lost weight, kg	5.0(1.6)	6.9(2.8)	5.4(3.2)	6.4(2.6)	**<0.001**
Among those who have gained weight					
Gained weight, kg	6.0(3.2)	5.3(2.5)	5.7(1.9)	5.4(2.8)	**<0.001**
Comparing with weight of 3 years ago					
Weight maintained[1]	28.7	38.0	50.8	47.2	
Weight gained[2]	62.7	51.7	39.4	37.3	
Weight lost[3]	8.7	10.3	9.8	15.5	**<0.001**

To be continued in the next page.

Continuation of Table 4.75.

Variables, mean(SD) or %	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥21 y old (n=10,110)	P^*
Among those who have lost weight					
Lost weight, kg	7.0(3.0)	8.5(4.9)	4.7(1.8)	9.9(9.2)	**<0.001**
Among those who have gained weight					
Gained weight, kg	8.4(5.8)	6.2(2.8)	7.1(3.5)	6.2(2.3)	**<0.001**
Comparing with weight of 5 years ago					
Weight maintained[1]	13.6	29.5	36.7	36.9	
Weight gained[2]	78.5	63.3	58.2	42.1	
Weight lost[3]	7.9	7.2	5.2	21.0	**<0.001**
Among those who have lost weight					
Lost weight, kg	6.5(3.0)	9.5(5.0)	4.9(1.7)	8.2(6.6)	**<0.001**
Among those who have gained weight					
Gained weight, kg	11.7(8.5)	8.0(4.2)	8.1(4.5)	7.7(3.7)	**<0.001**

[1]Current weight <5% or >-5% regarding the weight of 4 months; a year; 3 years and 5 years ago; [2]Current weight ≥5% regarding the weight of 4 months; a year; 3 years and 5 years ago; [3]Current weight ≥-5% regarding the weight 4 months; a year; 3 years and 5 years ago.
[*]Age differences. Significant results are highlighted in bold.
SD, standard deviation.

Table 4.76. Changes in body weight of the target population by KA: students of the University of the Basque Country (UPV/EHU)

Variables, mean(SD) or %	HS (n=3,637)	NHS (n=22,529)	P^*
Comparing with weight of 4 months ago			
Weight maintained[1]	85.0	86.6	
Weight gained[2]	11.2	9.2	
Weight lost[3]	3.8	4.3	**<0.001**
Among those who have lost weight			
Lost weight, kg	3.6(0.4)	5.9(3.0)	**<0.001**
Among those who have gained			
Gained weight, kg	4.4(1.3)	4.9(2.0)	**<0.001**
Comparing with weight of a year ago			
Weight maintained[1]	75.4	67.4	
Weight gained[2]	17.5	22.0	
Weight lost[3]	7.1	10.6	**<0.001**
Among those who have lost weight			
Lost weight, kg	5.9(1.6)	6.1(2.8)	0.105
Among those who have gained weight			
Gained weight, kg	5.2(2.3)	5.6(2.8)	**<0.001**
Comparing with weight of 3 years ago			
Weight maintained[1]	45.9	42.0	
Weight gained[2]	36.6	47.1	
Weight lost[3]	17.5	10.9	**<0.001**

To be continued in the next page.

Continuation of Table 4.76.

Variables, mean(SD) or %	HS (n=3,637)	NHS (n=22,529)	P^*
Among those who have lost weight			
Lost weight, kg	5.5(2.9)	9.3(8.0)	**<0.001**
Among those who have gained weight			
Gained weight, kg	6.0(2.8)	7.0(4.0)	**<0.001**
Comparing with weight of 5 years ago			
Weight maintained[1]	39.5	29.8	
Weight gained[2]	51.2	57.0	
Weight lost[3]	9.3	13.2	**<0.001**
Among those who have lost weight			
Lost weight, kg	7.0(3.8)	8.0(6.2)	0.166
Among those who have gained weight			
Gained weight, kg	7.0(3.4)	9.1(5.9)	**<0.001**

[1]Current weight <5% or >-5% regarding the weight of 4 months; a year; 3 years and 5 years ago; [2]Current weight ≥5% regarding the weight of 4 months; a year; 3 years and 5 years ago; [3]Current weight ≥-5% regarding the weight 4 months; a year; 3 years and 5 years ago.
[*]KA differences. Significant results are highlighted in bold.
HS, Health Sciences; KA, knowledge area; NHS; Non-Health Sciences; SD, standard deviation.

Table 4.77. Changes in body weight of the target population by BF status: students of the University of the Basque Country (UPV/EHU)

Variables, mean(SD) or %	Non-excess BF (n=22,391)	Excess BF (n=3,775)	P^*
Comparing with weight of 4 months ago			
Weight maintained[1]	86.6	84.9	
Weight gained[2]	9.0	11.7	
Weight lost[3]	4.3	3.5	**<0.001**
Among those who have lost weight			
Lost weight, kg	5.6(3.1)	5.6(0.5)	**<0.001**
Among those who have gained			
Gained weight, kg	4.6(1.6)	6.0(2.5)	**<0.001**
Comparing with weight of a year ago			
Weight maintained[1]	71.0	52.0	
Weight gained[2]	18.5	40.7	
Weight lost[3]	10.4	7.3	**<0.001**
Among those who have lost weight			
Lost weight, kg	6.2(2.8)	5.2(1.3)	**<0.001**
Among those who have gained weight			
Gained weight, kg	5.2(2.3)	6.7(3.6)	**<0.001**
Comparing with weight of 3 years ago			
Weight maintained[1]	45.1	26,6	
Weight gained[2]	41.8	68.9	
Weight lost[3]	13.1	4.5	**<0.001**

To be continued in the next page.

Continuation of Table 4.77.

Variables, mean(SD) or %	Non-excess BF (n=22,391)	Excess BF (n=3,775)	P*
Among those who have lost weight			
Lost weight, kg	8.6(7.5)	4.4(0.2)	**<0.001**
Among those who have gained weight			
Gained weight, kg	6.7(3.9)	7.9(3.6)	**<0.001**
Comparing with weight of 5 years ago			
Weight maintained[1]	33.4	17.4	
Weight gained[2]	52.5	80.0	
Weight lost[3]	14.0	2.6	**<0.001**
Among those who have lost weight			
Lost weight, kg	8.0(6.1)	5.4(1.2)	**0.006**
Among those who have gained weight			
Gained weight, kg	8.5(5.5)	10.0(6.1)	**<0.001**

[1]Current weight <5% or >-5% regarding the weight of 4 months; a year; 3 years and 5 years ago; [2]Current weight ≥5% regarding the weight of 4 months; a year; 3 years and 5 years ago; [3]Current weight ≥-5% regarding the weight 4 months; a year; 3 years and 5 years ago.
*BF status differences. Significant results are highlighted in bold.
BF, body fat; SD, standard deviation.

Tables 4.78, 4.79, 4.80 and **4.81** provide information about weight perception and weight behaviour of the total sample and by sex, age, KA and BF status, respectively. In the total sample, 28.6% of students perceived his/her weight as excessive, being higher this perception in women, students with more age, HS students and those with excess BF than students of other categories. In our case, the percentage of students who considered their current weight as heavy was lower than data of Korean adults [125], although in both surveys the self-perception of heavy weight was higher in women than in men. These sex differences could be due to the fact that norms about ideal body weight may be different between sexes[125]. Results about self-reported BMI by sex, age, KA and BF status are displayed in 4.8. Section.

More than half of the participants were likely to describe their "current weight as right", to think "sometimes about their weight", to consider "their weight to their self concept as somewhat important", not to think that "it looks worse for women to be overweight than for men" and to think that "our society discriminates against persons who are overweight". In all variables except for overweight discrimination, sex differences were observed ($P<0.001$) (Table 4.78). These results reflected that body and physical appearance seem to be more important in women than men, which are in align with previous studies[126,127]. The place and frequency of weigh-ins for the majority was at home and once per month and there were sex, age, KA and BF status differences (*P*<0.001) (Tables 4.78, 4.79, 4.80 and 4.81).

For most of the people, to maintain and to lose their weight was "neither easy nor difficult" and to gain weight "moderately/extremely easy", and they considered that they "ate what they wanted". Differences by sex, age, KA and BF status were observed in all variables (*P*<0.001). Respect to students with excess BF, for more than one-third was "difficult to maintain their weight", and for two-thirds it was "moderately easy to gain weight" and "moderately/extremely difficult to lose weight" (Tables 4.78, 4.79, 4.80 and 4.81). This difficulty to lose weight found among students with excess BF, it is also observed in Arab female university students with overweight or obesity[(128)]. Weight loss and maintenance are still a challenge because of the interaction between human biology, behaviour and surrounding environment[(129)].

More than 60% of the sample declared not to be doing nothing to change their body weight. Among people who were doing something to change the weight, PA and diet were the main options as in the case of Romanian[(130)] and Lebanese[(131)] students or Korean adults[(125)]. Differences by sex, age, KA and BF status (*P*<0.001) were observed (Tables 4.78, 4.79, 4.80 and 4.81). As in other studies involving university students and adult population[(132,133)], unhealthy dieting practices (skipping meals, vomiting or taking pills) were not common among target population (10.3% of the total sample). The percentage of students who was on a diet was 9.9%, this percentage was similar to that reported in an Italian study[(134)] but less than in a study involving Romanian university students[(130)]. Among people on a diet, the majority type of diet was self-imposed and the main reason to lose weight. Sex differences were found in diet's main reason, men did it mainly to gain muscle and women to lose weight (*P*<0.001) (Table 4.79), probably as a consequence of social stereotypes of beauty, where female's thinness is considered the ideal body image[(106)], and male's heavy body is their beauty model[(107)].

Results relative to diet behaviour by age, KA and BF status showed that those participants with more age, NHS and those with excess BF were more likely to be on a diet compared with other categories (*P*<0.001) (Tables 4.79, 4.80 and 4.81). The percentage of students with excess BF on a diet could be related to the fact that they considered their weight "somewhat/extremely heavy" and that they felt dissatisfied, by excess, with their body image (both generally and separately upper and lower parts of the body). This body image dissatisfaction, as it has been suggested in other surveys set in university students[135,136], results in increased weight loss behaviour.

Table 4.78. Weight perception and weight control behaviour of the target population by sex: students of the University of the Basque Country (UPV/EHU)

Variables, mean(SD) or %	Total sample (n=26,165)	Men (n=10,607)	Women (n=15,558)	P^*
Self-perception of weight				
Desired weight, kg	61.8(13.4)	72.3(11.9)	55.1(9.4)	**<0.001**
Healthy weight, kg	63.2(11.0)	72.8(7.5)	56.4(7.5)	**<0.001**
Current weight perception				
Somewhat/extremely thin	15.2	20.9	12.3	
Just about right	55.1	51.3	57.7	
Somewhat/extremely heavy	28.6	27.9	29.1	
DK/DA	1.1	-	1.9	**<0.001**
How often they think about their weight				
Never	9.9	13.0	7.8	
Sometimes	49.6	48.4	50.4	
Often	32.2	30.9	33.0	
Always	8.3	7.7	8.7	**<0.001**
Weight importance to self concept				
Not important	15.0	17.5	13.3	
Somewhat important	59.9	59.4	60.2	
Very important	23.8	21.6	25.3	
Extremely important	1.3	1.6	1.2	**<0.001**
Weigh-ins				
Place of weigh-ins				
Home	66.7	68.4	65.6	
Health professional	25.4	17.1	30.9	
Self-estimated	1.7	1.6	1.7	
Related to exercise/sport practice	5.5	12.3	1.0	
Other[1]	0.7	0.6	0.8	**<0.001**
Frequency of weight				
Once per day	3.9	5.0	3.2	
Once per week	22.5	26.2	20.0	
Once per month	39.1	40.7	38.0	
Once per year or less	34.0	28.1	38.1	
DK/DA	0.4	-	0.7	**<0.001**

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Continuation of Table 4.78.

Variables, mean(SD) or %	Total sample (n=26,165)	Men (n=10,607)	Women (n=15,558)	P^*
Maintenance/change of weight				
If they do not pay attention on their diet, they would weight				
Less	10.5	13.4	7.0	
About the same	18.6	21.1	16.9	
More	69.4	63.6	73.4	
DK/DA	2.4	2.0	2.7	**<0.001**
The maintenance of weight is...				
Moderately/extremely easy	27.7	41.4	18.4	
Neither easy nor difficult	49.8	42.1	55.0	
Moderately/extremely difficult	20.5	15.6	23.9	
DK/DA	2.0	0.9	2.7	**<0.001**
To gain weight is...				
Moderately/extremely easy	43.9	38.2	47.7	
Neither easy nor difficult	28.3	17.7	35.6	
Moderately/extremely difficult	25.4	41.3	14.5	
DK/DA	2.5	2.8	2.3	**<0.001**
To lose weight is...				
Moderately/extremely easy	21.5	25.5	18.7	
Neither easy nor difficult	35.2	34.8	35.6	
Moderately/extremely difficult	40.1	34.8	43.7	
DK/DA	3.2	4.9	2.0	**<0.001**
Eating less/more than wanted				
Somewhat/much less than wanted	35.1	23.6	42.9	
Just what wanted	57.2	63.7	52.7	
Somewhat/much more than wanted	7.3	11.7	4.4	
DK/DA	0.4	1.1	-	**<0.001**
Strategies for weight control				
To maintain weight	11.6	10.1	12.6	
To lose weight	16.3	15.2	17.1	
To gain weight	8.2	17.8	1.7	
Nothing	63.7	56.7	68.5	
DK/DA	0.2	0.2	0.1	**<0.001**
Type of strategy				
Exercising more	53.9	60.9	46.9	
"Go on a diet"	41.1	35.3	46.9	
Skipping meals	0.6	-	1.1	
Vomiting and/or taking pills	0.6	-	1.3	
DK/DA	3.8	3.8	3.8	**<0.001**
On a diet				
Yes	9.9	9.8	9.9	
No	90.1	90.2	90.1	0.700

To be continued in the next page.

Continuation of Table 4.78.

Variables, mean(SD) or %	Total sample (n=26,165)	Men (n=10,607)	Women (n=15,558)	P^*
Type of diet				
Self-imposed	67.6	60.4	72.4	
Sanitary's advice	19.3	18.3	20.1	
Sport training	2.7	6.7	-	
Others[2]	10.4	14.6	7.5	**<0.001**
Diet's main reason				
To lose weight	40.3	26.1	48.4	
To maintain weight	10.7	19.3	5.7	
To live healthier	14.4	2.1	21.4	
Disease	13.2	3.9	18.6	
To gain muscle	12.7	32.2	1.5	
Sport	8.7	16.3	4.3	**<0.001**
Weight social attitudes				
Stigmatization of overweight women vs. men				
Yes	45.3	39.7	49.1	
No	50.6	56.3	46.7	
DK/DA	4.1	4.0	4.2	**<0.001**
Social discrimination of overweight people				
Yes	92.3	92.6	92.1	
No	4.5	4.4	4.6	
DK/DA	3.1	3.0	3.2	0.321

[1]Naturist, survey and shopping centre; [2]Others, he/she does not tolerate some foods well, a relative is on a diet.
[*]Sex differences. Significant results are highlighted in bold.
DK/DA, Don't know, Don't answer.

Table 4.79. Weight control characteristics of the target population by age: students of the University of the Basque Country (UPV/EHU)

Variables, mean(SD) or %	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥ 21 y old (n=10,110)	P^*
Self-perception of weight					
Desired weight, kg	63.3(14.7)	63.4(11.0)	61.2(14.6)	63.3(10.8)	**<0.001**
Healthy weight, kg	64.4(11.3)	63.8(10.4)	63.7(11.5)	63.7(10.1)	**<0.001**
Current weight perception					
Somewhat/extremely thin	16.2	10.5	11.9	20.1	
Just about right	58.7	59.2	65.3	45.5	
Somewhat/extremely heavy	22.9	29.6	22.9	34.0	
DK/DA	2.3	0.7	-	1.4	**<0.001**

To be continued in the next page.

Continuation of Table 4.79.

Variables, mean(SD) or %	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥ 21 y old (n=10,110)	P^*
How often they think about their weight					
Never	10.2	5.4	9.8	12.4	
Sometimes	53.2	54.7	46.6	46.7	
Often	27.8	33.9	34.4	32.1	
Always	8.8	6.0	9.3	8.7	**<0.001**
Weight importance to self concept					
Not important	19.2	8.4	15.3	16.3	
Somewhat important	56.4	65.6	59.0	58.9	
Very important	24.4	25.2	25.0	22.1	
Extremely important	-	0.8	0.7	2.6	**<0.001**
Weigh-ins					
Place of weigh-ins					
Home	64.8	75.8	57.5	67.9	
Health professional	31.4	20.7	33.6	22.6	
Self-estimated	0.9	0.9	1.0	2.8	
Related to exercise/sport practice	2.0	0.6	8.1	7.7	
Other[1]	1.5	2.0	-	-	**<0.001**
Frequency of weight					
Once per day	5.1	2.3	2.4	5.0	
Once per week	17.4	19.9	23.1	26.2	
Once per month	42.1	43.5	40.1	34.7	
Once per year or loss	35.3	33.5	34.3	33.5	
DK/DA	-	0.8	-	0.7	**<0.001**
Maintenance/change of weight					
If they do not pay attention on their diet, they would weight					
Less	8.9	12.3	9.3	8.5	
About the same	22.6	11.3	18.6	20.6	
More	64.0	75.0	70.6	68.5	
DK/DA	4.4	1.4	1.5	2.4	**<0.001**
The maintenance of weight is...					
Moderately/extremely easy	30.3	22.4	22.7	32.1	
Neither easy nor difficult	49.6	53.2	55.4	44.9	
Moderately/extremely difficult	20.1	19.0	20.3	21.7	
DK/DA	-	5.4	1.5	1.4	**<0.001**
To gain weight is...					
Moderately/extremely easy	39.1	46.1	44.3	44.8	
Neither easy nor difficult	30.1	36.3	29.0	22.7	
Moderately/extremely difficult	29.8	16.3	23.3	29.1	
DK/DA	1.0	1.4	3.4	3.4	**<0.001**

To be continued in the next page.

Continuation of Table 4.79.

Variables, mean(SD) or %	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥ 21 y old (n=10,110)	P^*
To lose weight is…					
Moderately/extremely easy	24.6	15.5	21.6	23.1	
Neither easy nor difficult	36.4	41.3	34.4	31.8	
Moderately/extremely difficult	36.6	41.1	38.8	42.0	
DK/DA	2.4	-	5.1	3.1	**<0.001**
Eating less/more than wanted					
Somewhat/much less than wanted	37.1	35.8	34.2	34.2	
Just what wanted	53.4	57.5	60.5	57.0	
Somewhat/much more than wanted	9.5	6.8	5.4	7.6	
DK/DA	-	-	-	1.1	**<0.001**
Strategies for weight control					
To maintain weight	8.9	9.3	14.4	12.6	
To lose weight	13.8	18.1	15.1	17.3	
To gain weight	8.5	9.4	6.0	8.7	
Nothing	68.8	63.3	64.5	61.0	
DK/DA	-	-	-	0.4	**<0.001**
Type of strategy					
Exercising more	60.4	55.9	81.2	51.6	
“Go on a diet”	36.3	38.8	14.6	42.6	
Skipping meals	-	-	-	1.4	
Vomiting and/or taking pills	-	-	-	1.6	
DK/DA	3.3	5.3	4.3	2.8	**<0.001**
On a diet					
Yes	3.4	11.5	7.8	13.3	
No	96.6	88.5	92.2	86.7	**<0.001**
Type of diet					
Self-imposed	100.0	69.3	34.8	73.3	
Sanitary’s advice	-	23.5	43.8	11.8	
Sport training	-	-	-	9.7	
Others[2]	-	7.2	21.4	5.2	**<0.001**
Diet’s main reason					
To lose weight	50.8	38.4	28.2	44.9	
To maintain weight	16.7	9.3	37.1	27.3	
To live healthier	-	6.8	21.3	9.0	
Disease	-	17.7	-	-	
To gain muscle	32.5	18.5	13.5	5.6	
Sport	-	9.3	-	13.2	**<0.001**

To be continued in the next page.

Continuation of Table 4.79.

Variables, mean(SD) or %	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (n=5,523)	≥ 21 y old (n=10,110)	*P*[*]
Weight social attitudes					
Stigmatization of overweight women vs. men					
Yes	43.3	44.2	49.3	44.7	
No	53.5	49.3	47.2	51.7	
DK/DA	3.2	6.5	3.5	3.7	**<0.001**
Social discrimination of overweight people					
Yes	91.1	93.0	92.2	92.6	
No	4.8	3.2	6.1	4.3	
DK/DA	4.0	3.7	1.7	3.1	**<0.001**

[1]Naturist, survey and shopping centre; [2]Others, he/she does not tolerate some foods well, a relative is on a diet.
[*]Age differences. Significant results are highlighted in bold.
DK/DA, Don't know, Don't answer.

Table 4.80. Weight control characteristics of the target population by KA: students of the University of the Basque Country (UPV/EHU)

Variables, mean(SD) or %	HS (n=3,637)	NHS (n=22,529)	*P*[*]
Self-perception of weight			
Desired weight, kg	60.0(10.4)	62.3(13.8)	**<0.001**
Healthy weight, kg	60.4(9.2)	63.7(11.2)	**<0.001**
Current weight perception			
Somewhat/extremely thin	12.2	15.7	
Just about right	60.0	54.3	
Somewhat/extremely heavy	27.1	28.8	
DK/DA	-	1.2	**<0.001**
How often they think about their weight			
Never	6.9	10.4	
Sometimes	40.9	51.0	
Often	42.3	30.5	
Always	10.0	8.0	**<0.001**
Weight importance to self concept			
Not important	10.5	15.7	
Somewhat important	57.0	60.3	
Very important	32.5	22.4	
Extremely important	-	1.6	**<0.001**
Weigh-ins			
Place of weigh-ins			
Home	51.5	69.2	
Health professional	45.8	22.1	
Self-estimated	-	1.9	
Related to exercise/sport practice	2.8	3.8	
Other[1]	-	0.8	**<0.001**

To be continued in the next page.

Continuation of Table 4.80.

Variables, mean(SD) or %	HS (n=3,637)	NHS (n=22,529)	P^*
Frequency of weight			
Once per day	0.7	4.4	
Once per week	23.7	22.3	
Once per month	50.3	37.3	
Once per year or less	25.3	35.4	
DK/DA	-	0.5	**<0.001**
Maintenance/change of weight			
If they do not pay attention on their diet, they would weight			
Less	8.4	9.7	
About the same	16.3	19.0	
More	74.7	68.6	
DK/DA	0.7	2.7	**<0.001**
The maintenance of weight is...			
Moderately/extremely easy	15.9	29.6	
Neither easy nor difficult	58.4	48.4	
Moderately/extremely difficult	23.9	20.9	
DK/DA	1.8	2.0	**<0.001**
To gain weight is…			
Moderately/extremely easy	49.4	43.0	
Neither easy nor difficult	33.6	27.5	
Moderately/extremely difficult	12.1	27.5	
DK/DA	5.0	2.1	**<0.001**
To lose weight is…			
Moderately/extremely easy	26.4	20.7	
Neither easy nor difficult	31.3	35.9	
Moderately/extremely difficult	41.7	39.9	
DK/DA	0.7	3.6	**<0.001**
Eating less/more than wanted			
Somewhat/much less than wanted	48.4	33.0	
Just what wanted	46.4	58.9	
Somewhat/much more than wanted	4.3	7.8	
DK/DA	0.9	0.4	**<0.001**
Strategies for weight control			
To maintain weight	13.5	11.3	
To lose weight	12.7	16.9	
To gain weight	4.0	8.9	
Nothing	69.7	62.8	
DK/DA	-	0.2	**<0.001**
Type of strategy			
Exercising more	54.1	57.6	
"Go on a diet"	41.1	38.0	
Skipping meals	0.6	-	
Vomiting and/or taking pills	0.7	-	
DK/DA	3.4	4.4	**<0.001**

To be continued in the next page.

Continuation of Table 4.80.

Variables, mean(SD) or %	HS (n=3,637)	NHS (n=22,529)	*P*[*]
On a diet			
Yes	6.0	10.5	
No	94.0	89.5	**<0.001**
Type of diet			
Self-imposed	53.7	68.9	
Sanitary's advice	46.3	16.8	
Sport training	-	2.9	
Others[2]	-	11.4	**<0.001**
Diet's main reason			
To lose weight	17.4	42.5	
To maintain weight	12.8	10.5	
To live healthier	-	15.8	
Disease	52.3	9.4	
To gain muscle	17.5	12.2	
Sport	-	9.6	**<0.001**
Weight social attitudes			
Stigmatization of overweight women vs. men			
Yes	52.0	44.2	
No	45.6	51.4	
DK/DA	2.5	4.4	**<0.001**
Social discrimination of overweight people			
Yes	90.0	92.7	
No	9.1	3.8	
DK/DA	0.9	3.5	**<0.001**

[1]Naturist, survey and shopping centre; [2]Others, he/she does not tolerate some foods well, a relative is on a diet.
[*]KA differences. Significant results are highlighted in bold.
DK/DA, Don't know, Don't answer; HS, Health Sciences; KA, knowledge area; NHS; Non-Health Sciences.

Table 4.81. Weight control characteristics of the target population by BF status: students of the University of the Basque Country (UPV/EHU)

Variables, mean(SD) or %	Non-excess BF (n=22,391)	Excess BF (n=3,775)	*P*[*]
Self-perception of weight			
Desired weight, kg	62.1(10.9)	67.2(9.9)	**<0.001**
Healthy weight, kg	62.6(11.1)	67.0(9.6)	**<0.001**
Current weight perception			
Somewhat/extremely thin	16.7	-	
Just about right	59.9	26.7	
Somewhat/extremely heavy	21.2	69.2	
DK/DA	1.1	4.1	**<0.001**

To be continued in the next page.

Continuation of Table 4.81.

Variables, mean(SD) or %	Non-excess BF (n=22,391)	Excess BF (n=3,775)	P^*
How often they think about their weight			
Never	10.8	4.9	
Sometimes	48.8	54.8	
Often	33.1	26.5	
Always	7.4	13.8	**<0.001**
Weight importance to self concept			
Not important	15.6	11.4	
Somewhat important	60.0	59.1	
Very important	23.2	27.7	
Extremely important	1.3	1.8	**<0.001**
Weigh-ins			
Place of weigh-ins			
Home	66.2	70.0	
Health professional	25.1	26.8	
Self-estimated	1.6	2.0	
Related to exercise/sport practice	6.2	1.1	
Other[1]	0.8	-	**<0.001**
Frequency of weight			
Once per day	3.8	4.4	
Once per week	21.6	28.0	
Once per month	39.6	36.4	
Once per year or less	34.5	31.3	
DK/DA	0.5	-	**<0.001**
Maintenance/change of weight			
If they do not pay attention on their diet, they would weight			
Less	10.1	6.4	
About the same	19.8	11.2	
More	67.6	80.0	
DK/DA	2.4	2.3	**<0.001**
The maintenance of weight is...			
Moderately/extremely easy	28.6	22.2	
Neither easy nor difficult	52.8	31.7	
Moderately/extremely difficult	16.6	44.0	
DK/DA	2.0	2.0	**<0.001**
To gain weight is...			
Moderately/extremely easy	39.0	72.6	
Neither easy nor difficult	30.1	17.6	
Moderately/extremely difficult	28.3	8.1	
DK/DA	2.6	1.7	**<0.001**

To be continued in the next page.

Continuation of Table 4.81.

Variables, mean(SD) or %	Non-excess BF (n=22,391)	Excess BF (n=3,775)	P^*
To lose weight is...			
Moderately/extremely easy	23.1	11.6	
Neither easy nor difficult	38.8	14.1	
Moderately/extremely difficult	34.7	72.2	
DK/DA	3.4	2.0	**<0.001**
Eating less/more than wanted			
Somewhat/much less than wanted	30.8	60.1	
Just what wanted	61.3	32.8	
Somewhat/much more than wanted	7.4	7.1	
DK/DA	0.5	-	**<0.001**
Strategies for weight control			
To maintain weight	12.2	8.0	
To lose weight	12.5	39.2	
To gain weight	9.2	2.0	
Nothing	66.0	50.2	
DK/DA	0.1	0.6	**<0.001**
Type of strategy			
Exercising more	53.8	56.6	
“Go on a diet”	40.5	41.2	
Skipping meals	0.7	-	
Vomiting and/or taking pills	0.2	2.2	
DK/DA	4.8	-	**<0.001**
On a diet			
Yes	9.7	11.1	
No	90.3	88.9	**0.005**
Type of diet			
Self-imposed	64.5	83.4	
Sanitary’s advice	19.9	16.6	
Sport training	3.2	-	
Others[2]	12.4	-	**<0.001**
Diet’s main reason			
To lose weight	29.8	83.4	
To maintain weight	10.2	12.6	
To live healthier	17.9	-	
Disease	15.5	4.0	
To gain muscle	15.8	-	
Sport	10.8	-	**<0.001**
Weight social attitudes			
Stigmatization of overweight women vs. men			
Yes	45.4	44.4	
No	51.7	44.0	
DK/DA	2.9	11.6	**<0.001**

To be continued in the next page.

Continuation of Table 4.81.

Variables, mean(SD) or %	Non-excess BF (n=22,391)	Excess BF (n=3,775)	P^*
Social discrimination of overweight people			
Yes	92.1	93.6	
No	4.4	5.0	
DK/DA	3.4	1.4	**<0.001**

[1]Naturist, survey and shopping centre; [2]Others, he/she does not tolerate some foods well, a relative is on a diet.
[*]BF status differences. Significant results are highlighted in bold.
DK/DA, Don't know, Don't answer.

4.7. Nutrition knowledge

With respect to perception of nutrition knowledge, more than half of the participants considered it as "good", being higher the percentage in the case of men, younger students, those of HS degrees and students with excess BF compared with those ones of other categories (*P*<0.001). However, the percentage of correct answers in younger students and those with excess BF was not higher than in the other categories of these groups. In the nutrition knowledge questionnaire used, the percentage of correct answer was higher in men than women (*P*<0.001) (**Table 4.82**). This result is contrary to what was expected and found by other authors(20,51,137), since women tend to be interested in topics related to diet, nutrition and body weight, particularly during the university period(132,138). It should be noted that in the present study, females left more questions unanswered than males (*P*<0.001).

Regarding results by age, students with more age answered more questions correctly than the rest than other age categories (*P*<0.001) (**Table 4.83**). This result is consistent with others found by other authors(20). And as it was expected HS students obtained a higher percentage of correct answers than NHS ones (*P*<0.001) (**Table 4.84**), as it was observed also in the study set by Bottcher *et al.*(139). Finally, students without excess BF obtained a higher percentage of incorrect answers than those with excess BF (*P*<0.01) (**Table 4.85**), that could be related to a low interest in the topics included in this section nutrition advice(140). Similarly, to that previously reported(141), findings did not support a significant relationship between nutrition knowledge and overweight/obesity. These data suggest that providing education to improve knowledge of diet and nutrition could be not a critical component of intervention for achieving weight loss in the population studied.

Table 4.82. Nutrition knowledge of the target population by sex: students of the University of the Basque Country (UPV/EHU)

Percentage of answers, mean(SD)	Total sample (n=26,165)	Men (n=10,607)	Women (n=15,558)	P^*
Correct	61.5(14.8)	63.2(13.4)	60.3(15.5)	**<0.001**
Incorrect	15.6(9.2)	15.7(9.1)	15.5(9.3)	0.426
DK/DA	23.0(15.8)	21.1(15.0)	24.2(16.2)	**<0.001**

*Sex differences. Significant results are highlighted in bold.
DK/DA, Don't know, Don't answer.

Table 4.83. Nutrition knowledge of the target population by age: students of the University of the Basque Country (UPV/EHU)

Percentage of answers, mean(SD)	18 y old (n=4,996)	19 y old (n=5,536)	20 y old (5,523)	≥21 y old (10,110)	P^*
Correct	60.9(13.2)	58.7(15.1)	60.5(14.8)	63.7(14.9)	**<0.001**
Incorrect	17.3(9.3)	16.3(9.5)	15.2(9.1)	14.5(9.0)	**<0.001**
DK/DA	21.7(13.6)	25.0(16.2)	24.3(16.2)	21.8(16.1)	**<0.001**

*Age differences. Significant results are highlighted in bold.
DK/DA, Don't know, Don't answer.

Table 4.84. Nutrition knowledge of the target population by KA: students of the University of the Basque Country (UPV/EHU)

Percentage of answers, mean(SD)	HS (n=3,637)	NHS (n=22,529)	P^*
Correct	69.9(14.0)	60.1(14.4)	**<0.001**
Incorrect	13.2(7.5)	16.0(9.4)	**<0.001**
DK/DA	16.9(12.8)	23.9(16.0)	**<0.001**

*KA differences. Significant results are highlighted in bold.
DK/DA, Don't know, Don't answer; HS, Health Sciences; KA, knowledge area; NHS; Non-Health Sciences.

Table 4.85. Nutrition knowledge of the target population by BF status: students of the University of the Basque Country (UPV/EHU)

Percentage of answers, mean(SD)	Non-excess BF (n=22,391)	Excess BF (n=3,775)	P^*
Correct	61.5(14.7)	61.3(15.1)	0.396
Incorrect	15.7(9.3)	15.1(8.9)	**0.005**
DK/DA	22.9(15.8)	23.5(15.8)	**0.029**

*BF status differences. Significant results are highlighted in bold.
BF, body fat; SD, standard deviation.

4.8. Anthropometry and derived indices

Table 4.86 gives information about anthropometric measurements of the target population. The participating students' mean BMI was 22.3 kg/m^2, similar to data found in university students from other Spanish Autonomous Community(142) and from Iran(143). Nearly three-quarters of the sample were classified as normal weight according to BMI classification, and the percentage of overweight/obesity, according to BMI and BF%, was higher in men than in women (*P*<0.001). The prevalence of overweight/obesity, according to BMI was 15.2%, lower than in other studies set in Europe(89,143,145,146).

On the other hand, the mean of BF% (14.4% in the total sample; 16.1% in men and 13.3% in women; *P*<0.001) was lower than those registered in university students of other Spanish regions(6,146) but higher than those of Dutch and Greek students(53). The higher prevalence of obesity in men than in women could be due to the fact that males adopt unhealthier habits than females, such as, less adherence to dietary guidelines(117,147,148) or worse meal pattern as it was displayed in **Study 2** and to the higher social pressure that women suffered to be thin(149).

Results by age showed that students with more age compared with younger ones were more likely to have a higher BMI within the range considered normal weight (*P*<0.001), and to have the highest prevalence of overweight/obesity according to BMI and BF% compared with the other age categories (*P*<0.001) (**Table 4.87**). This increase of BMI and BF% with age has been also observed in other European and American university students(150,151) and two reasons have been suggested for this. The first reason is that in the last year of university, students have a high workload what makes time management difficult, these aspects could affect energy balance-related behaviours, and these, in turn, are associated with overweight and obesity(150). The second is that students with more age are more independent and self-responsible than younger ones(150).

With respect to results by KA, all the circumferences were higher in NHS students than HS students, but the percentage of people with excess BF was higher in HS students (*P*<0.001) (**Table 4.88**). These data do not support our initial hypothesis, probably due to HS students had a higher energy intake, lower high PA, lower scores in NA and they perceived more barriers to lose weight and to eat what they wanted compared with NHS students.

Among students with excess BF, 39.7% was classified as normal weight according to measured BMI, and 51%, according to self-reported BMI; while around 7.0% without excess BF was categorised as overweight/obese using measured or self-reported BMI (**Table 4.89**). These results are similar to that obtained in another study of Spanish university students(152), showing that BMI could be a poor predictor of body fatness. In this same line, the comparison of the three methods used for identifying students with overweight/obesity (measured and self-reported BMI and Brownell's silhouettes) compared with BF%, as the gold standard method, showed good levels of specificity but low sensitivity, specially of BMI, resulting in a high percentage of false negatives (**Table 4.90**). These findings agreed with Okorodudu(153) and would be justified by the fact that BMI does not distinguish weight associated with muscle vs. fat and body fat distribution(154). However, the use of the BMI in epidemiological studies on obesity is widely accepted(155) due to its simplicity and reproducibility(156).

The WHR was only evaluated in students with excess BF to define central obesity. The mean WHR was 0.89(0.1) (men 0.92(0.0; women 0.87(0.1), respectively), and the percentage of students classified as WHR risk was 28.2%, being higher in women than in men (50.7% vs. 1%, $P<0.001$ respectively). The prevalence of high levels of the WHR in women was similar to that found in Slovak university students(157); while in the group of men, the prevalence of high levels of WHR was higher in Slovak university than UPV/EHU students, probably due to use of different cut-off points for the men. This WHR may be a better predictor of cardiovascular diseases than BMI(158). Finally, in the present study, students with excess BF declared an earlier menarche than students with Non-excess BF as in other researches(159), which confirms that obesity may be causally related to earlier puberty(160-162).

Table 4.86. Anthropometric measurements of the target population by sex: students of the University of the Basque Country (UPV/EHU)

Variables, mean(SD) or %	Total sample (n=26,165)	Men (n=10,607)	Women (n=15,558)	P^*
Weight, kg	64.1(11.5)	72.7(9.7)	58.2(8.5)	**<0.001**
Height, cm	169.0(8.9)	176.7(6.9)	163.7(5.7)	**<0.001**
Height, m	1.69(0.1)	1.8(0.1)	1.6(0.1)	**<0.001**
Ileospinal height, cm	98.6(6.7)	103.5(5.5)	95.3(5.3)	**<0.001**
Sitting height, cm	84.3(4.9)	87.4(4.6)	82.2(3.9)	**<0.001**

To be continued in the next page.

Continuation of Table 4.86.

Variables, mean(SD) or %	Total sample (n=26,165)	Men (n=10,607)	Women (n=15,558)	P^*
BMI, kg/m^2	22.3(2.9)	23.3(2.7)	21.7(2.8)	**<0.001**
BMI classification				
Underweight	6.5	3.8	8.4	
Normal weight	78.3	72.4	82.4	
Overweight/obesity	15.2	23.9	9.2	**<0.001**
Self-reported BMI, kg/m^2	22.2(2.7)	23.2(2.6)	21.5(2.6)	**<0.001**
Self-reported BMI, classification				
Normal weight	87.3	79.1	93.0	
Overweight/obesity	12.7	20.9	7.0	**<0.001**
BF, %	22.9(6.4)	16.8(4.1)	27.1(3.7)	**<0.001**
BF% classification				
Non-excess BF	85.6	83.9	86.7	
Excess BF	14.4	16.1	13.3	**<0.001**
BFI, kg/m^2	5.2(1.8)	4.0(1.4)	5.9(1.6)	**<0.001**
Circumferences, cm				
Wrist	15.6(1.2)	16.6(0.9)	14.9(0.8)	**<0.001**
Relaxed arm	28.2(3.5)	30.5(3.0)	26.7(2.9)	**<0.001**
Maximum arm flexion	29.4(3.8)	32.4(3.0)	27.3(2.7)	**<0.001**
Front thigh	53.4(4.7)	54.1(4.7)	52.9(4.7)	**<0.001**
Medial calf	36.3(2.7)	37.4(2.5)	35.5(2.6)	**<0.001**
Upper waist	73.7(8.1)	79.8(6.3)	69.4(6.3)	**<0.001**
Lower waist	81.4(8.3)	83.9(7.9)	79.7(8.1)	**<0.001**
Hip	97.0(6.3)	96.7(6.2)	97.2(6.4)	**<0.001**
BF distribution, mm				
Arm	25.2(8.6)	19.9(7.6)	28.7(7.2)	**<0.001**
Trunk	42.8(14.3)	42.1(15.9)	43.2(13.1)	**<0.001**
Legs	35.2(11.4)	27.6(9.8)	40.4(9.4)	**<0.001**
FFM, %	77.1(6.4)	83.2(4.1)	72.9(3.7)	**<0.001**
FFMI, kg/m^2	17.2(2.3)	19.3(1.7)	15.7(1.4)	**<0.001**
Breadths, cm				
Biacromial	36.6(4.0)	39.8(3.3)	34.4(2.7)	**<0.001**
Biiliac	24.0(4.1)	24.9(3.7)	23.3(4.3)	**<0.001**
Elbow	6.2(0.7)	6.8(0.5)	5.8(0.5)	**<0.001**
Knee	8.9(0.8)	9.3(0.7)	8.7(0.7)	**<0.001**
First menarche, age			12.6(1.4)	

*Sex differences. Significant results are highlighted in bold.
BMI, body mass index; BF, body fat; BFI, body fat index; FFM, fat free mass; FFMI, fat free mass index; SD, standard deviation.

Table 4.87. Anthropometric measurements of the target population by age: students of the University of the Basque Country (UPV/EHU)

Variables, mean(SD) or %	18 y old (n=4.995)	19 y old (n=5,536)	20 y old (n=5,523)	≥21 y old (n=10,110)	P^*
Weight, kg	63.1(10.1)	63.6(10.7)	63.4(12.4)	65.2(12.0)	**<0.001**

To be continued in the next page.

Continuation of Table 4.87.

Variables, mean(SD) or %	18 y old (n=4.995)	19 y old (n=5,536)	20 y old (n=5,523)	≥21 y old (n=10,110)	P^*
Height, cm	169.0(8.7)	169.0(8.8)	168.3(9.9)	169.3(8.5)	**<0.001**
Height, m	1.7(0.1)	1.7(0.1)	1.7(0.1)	1.7(0.1)	**<0.001**
Ileospinal height, cm	98.3(6.7)	98.2(6.7)	98.6(7.3)	99.0(6.2)	**<0.001**
Sitting height, cm	84.0(4.3)	84.1(5.6)	84.4(5.2)	84.6(5.6)	**<0.001**
BMI, kg/m^2	22.0(2.6)	22.2(2.6)	22.2(2.9)	22.6(3.1)	**<0.001**
BMI classification[a]					
Underweight	5.2	7.7	6.2	6.2	
Normal weight	83.5	79.9	77.3	75.5	
Overweight/obesity	11.4	12.5	16.5	17.8	**<0.001**
Self-reported BMI, kg/m^2	21.8(2.6)	22.1(2.4)	22.0(2.8)	22.4(2.9)	**<0.001**
Self-reported BMI classification					
Normal weight	90.0	90.2	87.0	84.5	
Overweight/obesity	10.0	9.8	13.0	15.5	**<0.001**
BF, %	22.1(6.1)	23.2(6.2)	23.4(6.8)	22.8(6.3)	**<0.001**
BF% classification					
Non-excess BF	90.5	87.0	87.6	81.2	
Excess BF	9.5	13.0	12.4	18.8	**<0.001**
BFI, kg/m^2	4.9(1.6)	5.2(1.7)	5.3(1.9)	5.2(1.8)	**<0.001**
Circumferences, cm					
Wrist	15.6(1.1)	15.5(1.1)	15.5(1.2)	15.6(1.2)	**<0.001**
Relaxed arm	27.8(2.8)	28.1(3.2)	28.0(3.6)	28.6(3.8)	**<0.001**
Maximum arm flexion	29.1(3.2)	29.1(3.4)	29.0(3.8)	29.8(4.2)	**<0.001**
Front thigh	53.2(3.8)	53.2(4.3)	53.4(5.1)	53.6(5.1)	**<0.001**
Medial calf	36.2(2.4)	36.2(2.7)	36.1(2.9)	36.4(2.8)	**<0.001**
Upper waist	72.7(7.2)	73.0(7.2)	72.7(7.7)	75.0(9.0)	**<0.001**
Lower waist	79.8(7.7)	80.9(7.2)	80.2(8.3)	83.0(8.7)	**<0.001**
Hip	96.2(5.8)	96.7(5.6)	96.8(6.7)	97.7(6.6)	**<0.001**
BF distribution, mm					
Arm	24.7(8.2)	25.5(8.0)	25.1(8.9)	25.2(8.8)	0.129
Trunk	40.3(12.3)	43.1(14.0)	42.1(14.1)	44.2(15.2)	**<0.001**
Legs	33.8(10.6)	36.1(11.7)	36.1(11.5)	34.9(11.5)	**<0.001**
FFM, %	77.9(6.1)	76.8(6.2)	76.6(6.8)	77.2(6.3)	**<0.001**
FFMI, kg/m^2	17.1(2.1)	17.0(2.1)	17.0(2.4)	17.4(2.4)	**<0.001**
Breadths, cm					
Biacromial	36.1(3.7)	36.0(4.2)	36.6(4.0)	37.1(3.9)	**<0.001**
Biiliac	23.9(3.9)	24.0(4.6)	24.0(3.9)	24.0(4.1)	0.491
Elbow	6.1(0.6)	6.2(0.7)	6.2(0.7)	6.3(0.7)	**<0.001**
Knee	8.8(0.7)	8.9(0.8)	8.9(0.8)	9.0(0.7)	**<0.001**
First menarche, age	12.5(1.9)	12.6(1.4)	12.6(1.2)	12.6(1.3)	**<0.001**

[*]Age differences. Significant results are highlighted in bold.
BMI, body mass index; BF, body fat; BFI, body fat index; FFM, fat free mass; FFMI, fat free mass index; SD, standard deviation.

Table 4.88. Anthropometric measurements of the target population by KA: students of the University of the Basque Country (UPV/EHU)

Variables, mean(SD) or %	HS (n=3,637)	NHS (n=22,529)	P^*
Weight, kg	61.3(10.5)	64.5(11.6)	**<0.001**
Height, cm	167.5(8.3)	169.2(9.0)	**<0.001**
Height, m	1.7(0.1)	1.7(0.1)	**<0.001**
Ileospinal height, cm	97.4(7.0)	98.8(6.6)	**<0.001**
Sitting height, cm	83.1(4.3)	84.5(5.0)	**<0.001**
BMI, kg/m^2	21.7(2.5)	22.4(2.9)	**<0.001**
Self-reported BMI, kg/m^2	21.5(2.4)	22.3(2.8)	**<0.001**
BMI classification[a]			
Underweight	7.6	6.4	
Normal weight	78.9	78.2	
Overweight/obesity	13.5	15.4	**0.001**
Self-reported BMI classification			
Normal weight	91.2	86.6	
Overweight/obesity	8.8	13.4	**<0.001**
BF, %	24.6(5.4)	22.6(6.5)	**<0.001**
BF% classification			
Non-excess BF	85.7	85.6	
Excess BF	14.3	14.4	0.889
BFI, kg/m^2	5.4(1.4)	5.1(1.8)	**<0.001**
Circumferences, cm			
Wrist	15.3(1.0)	15.6(1.2)	**<0.001**
Relaxed arm	27.2(3.4)	28.4(3.5)	**<0.001**
Maximum arm flexion	28.2(3.6)	29.6(3.8)	**<0.001**
Front thigh	53.3(5.4)	53.4(4.6)	0.195
Medial calf	36.1(2.5)	36.3(2.8)	**<0.001**
Upper waist	71.2(7.5)	74.1(8.1)	**<0.001**
Lower waist	80.7(7.8)	81.5(8.3)	**<0.001**
Hip	96.4(6.6)	97.1(6.3)	**<0.001**
BF distribution, mm			
Arm	26.3(8.0)	25.0(8.6)	**<0.001**
Trunk	42.1(11.6)	42.9(14.7)	0.856
Legs	39.0(10.5)	34.6(11.5)	**<0.001**
FFM, %	75.4(5.4)	77.4(6.5)	**<0.001**
FFMI, kg/m^2	16.4(2.1)	17.3(2.3)	**<0.001**
Breadths, cm			
Biacromial	35.5(3.7)	36.8(4.0)	**<0.001**
Biiliac	25.4(3.4)	23.8(4.2)	**<0.001**
Elbow	6.1(0.6)	6.3(0.7)	**<0.001**
Knee	8.9(0.8)	8.9(0.8)	0.362
First menarche, age	12.7(1.2)	12.6(1.4)	**<0.001**

*KA differences. Significant results are highlighted in bold.
BMI, body mass index; BF, body fat; BFI, body fat index; FFM, fat free mass; FFMI, fat free mass index; HS, Health Sciences; KA, knowledge area; NHS; Non-Health Sciences; SD, standard deviation.

Table 4.89. Anthropometric measurements of the target population by BF status: students of the University of the Basque Country (UPV/EHU)

Variables, mean(SD) or %	Non-excess BF (n=22,391)	Excess BF (n=3,775)	P^*
Weight, kg	62.3(10.4)	74.5(12.3)	**<0.001**
Height, cm	169.1(9.1)	168.2(7.8)	**0.002**
Height, m	1.7(0.1)	1.7(0.1)	**0.002**
Ileospinal height, cm	98.5(6.8)	99.3(6.2)	**<0.001**
Sitting height, cm	84.3(5.0)	84.6(4.5)	**<0.001**
BMI, kg/m^2	21.7(2.2)	26.2(3.2)	**<0.001**
BMI classification[a]			
Underweight	7.6	-	
Normal weight	84.8	39.7	
Overweight/obesity	7.5	60.3	**<0.001**
Self-reported BMI, kg/m^2	21.6(2.2)	25.6(2.9)	**<0.001**
Self-reported BMI classification			
Normal weight	93.0	51.0	
Overweight/obesity	7.0	49.0	**<0.001**
BF, %	21.9(6.0)	28.8(5.2)	**<0.001**
BFI, kg/m^2	4.7(1.4)	7.6(1.9)	**<0.001**
Circumferences, cm			
Wrist	15.5(1.1)	16.1(1.1)	**<0.001**
Relaxed arm	27.6(3.2)	31.8(2.9)	**<0.001**
Maximum arm flexion	28.8(3.6)	32.5(3.0)	**<0.001**
Front thigh	52.6(4.3)	58.0(4.8)	**<0.001**
Medial calf	35.9(2.5)	38.5(3.1)	**<0.001**
Upper waist	72.1(6.8)	82.8(9.1)	**<0.001**
Lower waist	79.5(6.4)	92.7(8.8)	**<0.001**
Hip	95.9(5.4)	103.8(6.9)	**<0.001**
BF distribution, mm			
Arm	23.2(7.0)	36.8(7.3)	**<0.001**
Trunk	38.6(9.7)	67.5(11.9)	**<0.001**
Legs	33.1(9.9)	47.9(11.5)	**<0.001**
FFM, %	78.1(6.0)	71.2(5.2)	**<0.001**
FFMI, kg/m^2	16.9(2.2)	18.6(2.3)	**<0.001**
Breadths, cm			
Biacromial	36.4(3.9)	37.6(4.3)	**<0.001**
Biiliac	23.6(4.0)	26.0(4.1)	**<0.001**
Elbow	6.2(0.7)	6.4(0.6)	**<0.001**
Knee	8.8(0.7)	9.5(0.8)	**<0.001**
First menarche, age	12.6(1.4)	12.5(1.4)	**<0.001**

*BF status differences. Significant results are highlighted in bold.
BMI, body mass index; BF, body fat; BFI, body fat index; FFM, fat free mass; FFMI, fat free mass index; SD, standard deviation.

Table 4.90. Comparison of methods for identifying overweight/obese students

%	BF% (gold standard method)		
	BMI	Self-reported BMI	Brownell's silhouettes
Sensitivity	60.3	49.0	19.6
Specificity	92.5	93.0	96.7
Positive predictive value	67.6	64.0	60.6
Negative predictive value	89.9	87.5	82.3

BF%, body fat percentage; BMI, body mass index.

4.9. Body weight perception and dissatisfaction

In relation to weight perception, more than 80% of the sample perceived their body weight and BMI adequately, this percentage was higher than in another study set also in university students(163). More than 45.5% of the participants had an adequate perception of his/her healthy weight (that is, healthy weight was similar to self-reported, measured and desired weight) and more than 50.9% was satisfied with their body weight and/or image; being more adequate the perception of healthy weight in women than men and being more satisfied with body weight and image men than women (**Table 4.91**). Our results support notion that women are more likely to be concerned with their body weight compared with men(164,165).

In the case of HWP (3) (which calculates the perception of their desired weight respect to healthy weight, the same criteria applied for BWD were used, thus, those with a result ≤ -5% desired to weigh less than healthy weight and those with a result ≥ 5% wanted to weigh more than healthy weight. Data obtained in this variable showed that the percentage of women who wanted to weight less than estimated healthy weight was higher than men, indicating that these young women were more concern for beauty than for health. This tendency has also been observed by other authors(166) and it is possibly influenced by several factors, such as social processes, role of advertisements and mass media, local and global trends in the fashion industry, among others. Whereas, the percentage of men who wanted to weigh more than estimated healthy weight was higher than women. This result is probably related to the desire to increase lean muscle mass what, in turn, is possibly influenced by similar factors as above mentioned for women. On one hand, media images and advertisements contribute to the promotion of masculine images of unattainable muscularity(167). And on the other hand, traits such as power and strength are typically associated with masculinity in Western cultures(168).

Regarding the age, students with more age, compared with younger ones, were more likely to have an adequate perception of their weight, a higher BWD by excess and to be dissatisfied with their body image ($P<0.001$) (**Table 4.92**). Regarding students by KA, HS students, compared with NHS students, were more likely to have an adequate perception of healthy weight, to be satisfied with their body weight, but more dissatisfied with body image ($P<0.05$) (**Table 4.93**).

Lastly, participants with excess BF, compared with those without excess BF, were more likely to underestimate their body weight and BMI and to be more dissatisfied with their body weight and body image ($P<0.001$) (**Table 4.94**). In this sense, the underestimation of self-perceived weight status[(169)] and body image dissatisfaction among individuals with overweight and obesity has frequently observed[(170)]. Taking into account that to recognise one's weight status is a necessary step for addressing obesity, as well as an important predictor of weight control behaviours[(171,172)], our results highlighted the need to increase awareness of the importance of healthy behaviours to improve BF and weight status and body satisfaction among university students.

Table 4.91. Weight perception and dissatisfaction in the target population by sex: students of the University of the Basque Country (UPV/EHU)

Variables, %	Total sample[1]	Men[1]	Women[1]	P^*
BWP	(n=25,477)	(n=10,405)	(n=15,072)	
Underestimation[2]	3.8	3.9	3.7	
Overestimation[3]	5.6	6.1	5.3	
Adequate perception[4]	90.6	90.0	91.0	**0.017**
BMIP	(n=24,510)	(n=10,125)	(n=14,385)	
Underestimation[5]	9.5	6.9	11.3	
Overestimation[6]	5.9	6.7	5.4	
Adequate perception[7]	84.6	86.4	83.3	**<0.001**
BWD	(n=23,125)	(n=9,117)	(n=14,008)	
By defect[8]	13.8	20.1	9.6	
By excess[9]	35.4	23.8	42.9	
Satisfied[10]	50.9	56.1	47.5	**<0.001**
HWP (1)	(n=23,187)	(n=9,712)	(n=13,475)	
Underestimation[11]	19.7	28.5	13.4	
Overestimation[12]	31.8	25.1	36.6	
Adequate perception[13]	48.5	46.4	50.0	**<0.001**

To be continued in the next page.

Continuation of Table 4.91.

Variables, %	Total sample[1]	Men[1]	Women[1]	*P*[*]
HWP (2)	(n=23,615)	(n=9,914)	(n=13,701)	
Underestimation[14]	24.1	31.1	19.1	
Overestimation[15]	30.3	25.3	33.9	
Adequate perception[16]	45.5	43.6	47.0	**<0.001**
HWP (3)	(n=21,822)	(n=8,813)	(n=13,008)	
Underestimation[17]	15.9	13.6	17.5	
Overestimation[18]	9.1	12.9	6.5	
Adequate perception[19]	75.0	73.5	76.0	**<0.001**
BID	(n=26,129)	(n=10,607)	(n=15,522)	
Dissatisfied[20]	37.6	31.4	41.8	
Satisfied[21]	62.4	68.6	58.2	**<0.001**

[1]Differences in samples sizes among variables are due to the fact that the questions were not mandatory; [2]BWP, ((self-reported weight - measured weight)/measured weight)x100: ≤ -5%; [3]BWP, ((self-reported weight - measured weight)/measured weight)x100: ≥ 5%; [4]BWP, ((self-reported weight - measured weight)/measured weight)x100: -5% <relative difference < 5%; [5]BMIP, ((self-reported BMI - measured BMI)/measured BMI)x100: ≤ -5%; [6]BMIP, ((self-reported BMI - measured BMI)/measured BMI)x100: ≥ 5%; [7]BMIP, ((self-reported BMI - measured BMI)/measured BMI)x100: -5% <relative difference < 5%; [8]BWD, ((desired weight - self-reported weight)/self-reported weight)x100: ≥ 5%; [9]BWD, ((desired weight - self-reported weight)/self-reported weight)x100: ≤ -5%; [10]BWD, ((desired weight - self-reported weight)/self-reported weight)x100: -5% <relative difference < 5%; [11]HWP (1), ((healthy weight - self-reported weight)/self-reported weight)x100: ≥ 5%; [12]HWP (1), ((healthy weight - self-reported weight)/self-reported weight)x100: ≤ -5%; [13]HWP (1), ((healthy weight - self-reported weight)/self-reported weight)x100: -5% <relative difference < 5%). [14]HWP (2), ((healthy weight - measured weight)/measured weight)x100: ≥ 5%; [15]HWP (2), ((healthy weight - measured weight)/measured weight)x100: ≤ -5%; [16]HWP (2), ((healthy weight - measured weight)/measured weight)x100: -5% <relative difference < 5%); [17] HWP (3), ((desired weight - healthy weight)/healthy weight)x100: ≤ -5%;
[18]HWP (3), ((desired weight - healthy weight)/healthy weight)x100: ≥ 5%;[19]HWP (3), ((desired weight - healthy weight)/healthy weight)x100: -5% <relative difference < 5%); [20]Likert scale≤ 4; [21]Likert scale>4.
[*]Sex differences. Significant results are highlighted in bold.
BID, body image dissatisfaction; BMIP, body mass index perception; BWD, body weight dissatisfaction; BWP, body weight perception; HWP, healthy weight perception

Table 4.92. Weight perception and dissatisfaction in the target population by age: students of the University of the Basque Country (UPV/EHU)

Variables, %	18 y old[1]	19 y old[1]	20 y old[1]	≥ 21 y old[1]	*P*[*]
BWP	(n=4,752)	(n=5,490)	(n=5,417)	(n=9,819)	
Underestimation[2]	5.9	3.9	3.7	2.8	
Overestimation[3]	7.9	8.6	4.3	3.6	
Adequate perception[4]	86.2	87.5	92.0	93.6	**<0.001**
BMIP	(n=4,511)	(n=5,301)	(n=5,142)	(n=9,557)	
Underestimation[5]	7.0	9.3	10.6	10.1	
Overestimation[6]	6.1	11.6	2.8	4.4	
Adequate perception[7]	86.8	79.1	86.6	85.5	**<0.001**
BWD	(n=4,267)	(n=4,900)	(n=5,199)	(n=8,759)	
By defect[8]	15.4	13.2	13.1	13.7	
By excess[9]	32.5	41.3	32.7	35.0	
Satisfied[10]	52.1	45.5	54.2	51.3	**<0.001**

To be continued in the next page.

Continuation of Table 4.92.

Variables, %	18 y old[1]	19 y old[1]	20 y old[1]	≥ 21 y old[1]	*P*[*]
HWP (1)	(n=4,377)	(n=4,883)	(n=5,071)	(n=8,855)	
Underestimation[11]	25.4	17.9	16.4	19.9	
Overestimation[12]	26.6	40.7	26.1	32.7	
Adequate perception[13]	48.0	41.5	57.4	47.4	**<0.001**
HWP (2)	(n=4,573)	(n=4,883)	(n=5,178)	(n=8,981)	
Underestimation[14]	27.6	21.7	18.4	26.9	
Overestimation[15]	28.0	36.2	26.6	30.5	
Adequate perception[16]	44.4	42.1	55.0	42.6	**<0.001**
HWP (3)	(n=4,154)	(n=4,571)	(n=4,938)	(n=8,159)	
Underestimation[17]	15.2	12.6	16.1	18.1	
Overestimation[18]	7.5	9.8	7.8	10.3	
Adequate perception[19]	77.3	77.6	76.1	71.6	**<0.001**
BID	(n=4,996)	(n=5,499)	(n=5,523)	(n=10,110)	
Dissatisfied[20]	34.6	36.9	33.6	41.5	
Satisfied[21]	65.4	63.1	66.4	58.5	**<0.001**

[1]Differences in samples sizes among variables are due to the fact that the questions were not mandatory; [2]BWP, ((self-reported weight - measured weight)/measured weight)x100: ≤ -5%; [3]BWP, ((self-reported weight - measured weight)/measured weight)x100: ≥ 5%; [4]BWP, ((self-reported weight - measured weight)/measured weight)x100: -5% <relative difference < 5%; [5]BMIP, ((self-reported BMI - measured BMI)/measured BMI)x100: ≤ -5%; [6]BMIP, ((self-reported BMI - measured BMI)/measured BMI)x100: ≥ 5%; [7]BMIP, ((self-reported BMI - measured BMI)/measured BMI)x100: -5% <relative difference < 5%; [8]BWD, ((desired weight - self-reported weight)/self-reported weight)x100: ≥ 5%; [9]BWD, ((desired weight - self-reported weight)/self-reported weight)x100: ≤ -5%; [10]BWD, ((desired weight - self-reported weight)/self-reported weight)x100: -5% <relative difference < 5%; [11]HWP (1), ((healthy weight - self-reported weight)/self-reported weight)x100: ≥ 5%; [12]HWP (1), ((healthy weight - self-reported weight)/self-reported weight)x100: ≤ -5%; [13]HWP (1), ((healthy weight - self-reported weight)/self-reported weight)x100: -5% <relative difference < 5%). [14]HWP (2), ((healthy weight - measured weight)/measured weight)x100: ≥ 5%; [15]HWP (2), ((healthy weight - measured weight)/measured weight)x100: ≤ -5%; [16]HWP (2), ((healthy weight - measured weight)/measured weight)x100: -5% <relative difference < 5%); [17] HWP (3), ((desired weight - healthy weight)/healthy weight)x100: ≤ -5%;
[18]HWP (3), ((desired weight - healthy weight)/healthy weight)x100: ≥ 5%;[19]HWP (3), ((desired weight - healthy weight)/healthy weight)x100: -5% <relative difference < 5%); [20]Likert scale≤ 4; [21]Likert scale>4.
[*]Age differences. Significant results are highlighted in bold.
BID, body image dissatisfaction; BMIP, body mass index perception; BWD, body weight dissatisfaction; BWP, body weight perception; HWP, healthy weight perception.

Table 4.93. Weight perception and dissatisfaction in the target population by KA: students of the University of the Basque Country (UPV/EHU)

Variables, %	HS[1]	NHS[1]	*P*[*]
BWP	(n=3,569)	(n=21,908)	
Underestimation[2]	3.2	3.9	
Overestimation[3]	7.2	5.4	
Adequate perception[4]	89.6	90.7	**<0.001**
BMIP	(n=3,411)	(n=21,099)	
Underestimation[5]	7.7	9.7	
Overestimation[6]	2.7	6.5	
Adequate perception[7]	89.6	83.8	**<0.001**

To be continued in the next page.

Continuation of Table 4.93.

Variables, %	HS[1]	NHS[1]	*P*[*]
BWP	(n=3,569)	(n=21,908)	
Underestimation[2]	3.2	3.9	
Overestimation[3]	7.2	5.4	
Adequate perception[4]	89.6	90.7	**<0.001**
BMIP	(n=3,411)	(n=21,099)	
Underestimation[5]	7.7	9.7	
Overestimation[6]	2.7	6.5	
Adequate perception[7]	89.6	83.8	**<0.001**
BWD	(n=3,246)	(n=19,879)	
By defect[8]	10.3	14.3	
By excess[9]	32.2	35.9	
Satisfied[10]	57.5	49.8	**<0.001**
HWP (1)	(n=3,354)	(n=19,833)	
Underestimation[11]	15.7	20.4	
Overestimation[12]	33.5	31.5	
Adequate perception[13]	50.8	48.1	**<0.001**
HWP (2)	(n=3,421)	(n=20,194)	
Underestimation[14]	19.1	25.0	
Overestimation[15]	29.7	30.4	
Adequate perception[16]	51.3	44.6	**<0.001**
HWP (3)	(n=3,165)	(n=18,656)	
Underestimation[17]	13.0	16.4	
Overestimation[18]	8.9	9.2	
Adequate perception[19]	78.1	74.4	**<0.001**
BID	(n=3,637)	(22,492)	
Dissatisfied[20]	39.4	37.3	
Satisfied[21]	60.6	62.7	**0.014**

[1]Differences in samples sizes among variables are due to the fact that the questions were not mandatory; [2]BWP, ((self-reported weight - measured weight)/measured weight)x100: ≤ -5%; [3]BWP, ((self-reported weight - measured weight)/measured weight)x100: ≥ 5%; [4]BWP, ((self-reported weight - measured weight)/measured weight)x100: -5% <relative difference < 5%; [5]BMIP, ((self-reported BMI - measured BMI)/measured BMI)x100: ≤ -5%; [6]BMIP, ((self-reported BMI - measured BMI)/measured BMI)x100: ≥ 5%; [7]BMIP, ((self-reported BMI - measured BMI)/measured BMI)x100: -5% <relative difference < 5%; [8]BWD, ((desired weight - self-reported weight)/self-reported weight)x100: ≥ 5%; [9]BWD, ((desired weight - self-reported weight)/self-reported weight)x100: ≤ -5%; [10]BWD, ((desired weight - self-reported weight)/self-reported weight)x100: -5% <relative difference < 5%; [11]HWP (1), ((healthy weight - self-reported weight)/self-reported weight)x100: ≥ 5%; [12]HWP (1), ((healthy weight - self-reported weight)/self-reported weight)x100: ≤ -5%; [13]HWP (1), ((healthy weight - self-reported weight)/self-reported weight)x100: -5% <relative difference < 5%). [14]HWP (2), ((healthy weight - measured weight)/measured weight)x100: ≥ 5%; [15]HWP (2), ((healthy weight - measured weight)/measured weight)x100: ≤ -5%; [16]HWP (2), ((healthy weight - measured weight)/measured weight)x100: -5% <relative difference < 5%); [17] HWP (3), ((desired weight - healthy weight)/healthy weight)x100: ≤ -5%;
[18]HWP (3), ((desired weight - healthy weight)/healthy weight)x100: ≥ 5%;[19]HWP (3), ((desired weight - healthy weight)/healthy weight)x100: -5% <relative difference < 5%); [20]Likert scale≤ 4; [21]Likert scale>4.
[*]KA differences. Significant results are highlighted in bold.
BID, body image dissatisfaction; BMIP, body mass index perception; BWD, body weight dissatisfaction; BWP, body weight perception; HS, Health Sciences; HWP, healthy weight perception; KA, knowledge area; NHS; Non-Health Sciences.

Table 4.94. Weight perception and dissatisfaction in the target population by BF status: students of the University of the Basque Country (UPV/EHU)

Variables, %	Non-excess BF[1]	Excess BF[1]	*P*[*]
BWP	(n=22,017)	(n=3,461)	
Underestimation[2]	3.1	8.6	
Overestimation[3]	6.2	1.7	
Adequate perception[4]	90.7	89.7	**<0.001**
BMIP	(n=21,152)	(n=3,358)	
Underestimation[5]	8.5	15.8	
Overestimation[6]	6.4	3.1	
Adequate perception[7]	85.1	81.1	**<0.001**
BWD	(n=19,814)	(n=3,311)	
By defect[8]	55.5	23.4	
By excess[9]	15.6	2.7	
Satisfied[10]	28.9	73.9	**<0.001**
HWP (1)	(n=20,073)	(3,114)	
Underestimation[11]	22.0	5.2	
Overestimation[12]	25.1	75.0	
Adequate perception[13]	52.9	19.8	**<0.001**
HWP (2)	(n=20,304)	(n=3,311)	
Underestimation[14]	27.5	3.6	
Overestimation[15]	22.6	77.9	
Adequate perception[16]	49.9	18.6	**<0.001**
HWP (3)	(n=18,660)	(n=3,161)	
Underestimation[17]	17.5	6.9	
Overestimation[18]	9.2	8.9	
Adequate perception[19]	73.4	84.3	**<0.001**
BID	(n=22,354)	(n=3,775)	
Dissatisfied[20]	32.7	66.1	
Satisfied[21]	67.3	33.9	**<0.001**

[1]Differences in samples sizes among variables are due to the fact that the questions were not mandatory; [2]BWP, ((self-reported weight - measured weight)/measured weight)x100: ≤ -5%; [3]BWP, ((self-reported weight - measured weight)/measured weight)x100: ≥ 5%; [4]BWP, ((self-reported weight - measured weight)/measured weight)x100: -5% <relative difference < 5%; [5]BMIP, ((self-reported BMI - measured BMI)/measured BMI)x100: ≤ -5%; [6]BMIP, ((self-reported BMI - measured BMI)/measured BMI)x100: ≥ 5%; [7]BMIP, ((self-reported BMI - measured BMI)/measured BMI)x100: -5% <relative difference < 5%; [8]BWD, ((desired weight - self-reported weight)/self-reported weight)x100: ≥ 5%; [9]BWD, ((desired weight - self-reported weight)/self-reported weight)x100: ≤ -5%; [10]BWD, ((desired weight - self-reported weight)/self-reported weight)x100: -5% <relative difference < 5%; [11]HWP (1), ((healthy weight - self-reported weight)/self-reported weight)x100: ≥ 5%; [12]HWP (1), ((healthy weight - self-reported weight)/self-reported weight)x100: ≤ -5%; [13]HWP (1), ((healthy weight - self-reported weight)/self-reported weight)x100: -5% <relative difference < 5%). [14]HWP (2), ((healthy weight - measured weight)/measured weight)x100: ≥ 5%; [15]HWP (2), ((healthy weight - measured weight)/measured weight)x100: ≤ -5%; [16]HWP (2), ((healthy weight - measured weight)/measured weight)x100: -5% <relative difference < 5%); [17] HWP (3), ((desired weight - healthy weight)/healthy weight)x100: ≤ -5%;
[18]HWP (3), ((desired weight - healthy weight)/healthy weight)x100: ≥ 5%;[19]HWP (3), ((desired weight - healthy weight)/healthy weight)x100: -5% <relative difference < 5%); [20]Likert scale≤ 4; [21]Likert scale>4.
[*]BF status differences. Significant results are highlighted in bold.
BID, body image dissatisfaction; BMIP, body mass index perception; BWD, body weight dissatisfaction; BWP, body weight perception; HWP, healthy weight perception.

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5. Discussion

The main objective of the present thesis was to study the risk factors of overweight/obesity related to lifestyles, especially to diet, their psychosocial influences and the interactions among these factors in students of the University of the Basque Country UPV/EHU. To achieve this aim, the EHU12/24 observational cohort study was set, which was based on a standardised protocol, including anthropometric measurements, direct behavioural determinants, such as PA and diet (from the health and sustainability points of view), and indirect determinants, like social/psychological factors. In order to get all this information, face-to-face interviews were conducted to collect: demographic and SE data, family and personal history of diseases, academic data, lifestyles, body image and weight assessment, attitudinal factors related to the adoption of a low-fat, low-cholesterol diet, weight control behaviours and nutrition knowledge; and anthropometric measurements were performed.

Participants, demographic and SE characteristics and KA

To contextualize the present thesis, it should be mentioned the participation proportion, just as demographic and SE characteristics of the EHU12/24 cohort. From 1,300 students who were invited to participate in the present study, 696 accepted to join it. However, 93 students did not meet the inclusion criteria or did not complete the full study protocol, thus, they had to be excluded and the final sample consisted of 603 students, that is, a 53.5% of the participation rate, similar to that obtained in other studies involving university students[1]. Although, the participation in other researches set in university population has been higher[2], it must be taken into account that this face-to-face interview required one hour of the students' free time and none economic incentive was offered to them. With the objective of having data more representative of the population from which the information was retrieved[3], the survey results were weighted using weighting coefficients provided by the list of students enrolled in 2012/2013 academic year[4].

In the EHU12/24 study, random sampling was stratified by the distribution of UPV/EHU's KA and afterwards, these KAs were re-categorised as HS and NHS. Data about participants of each area were similar to those obtained in other study set in Spanish university students[5]. Regarding the age of participants, it was also similar to other studies involving European university students[6,7] but lower than other research set in different Spanish universities[8]. These differences in this last study could be due to the decision of applying as exclusion criteria to be older than 28 years old because they represented 3.0% of the total sample.

Continuing with the demographic characteristics of the sample, female participation was higher than in other studies from Spanish universities, such as the Balearic Islands[(2)] or Almeria[(9)], but it was representative of the UPV/EHU population. In the case of place of birth, as it occurs in other Spanish universities[(10,11)], the majority of the students came from the same community in which the University is located. This fact could be due to the reduced mobility of Spanish students because of the diversified and the territorial model of the Spanish universities[(12)], the limitation of mobility scholarships, the UPV/EHU's offer to study degrees in Basque and family attachment.

Finally, relative to SE data of the target population measured as parents' university education level and their economic activity, the percentage of subjects' parents with university studies was lower than data obtained in different European countries, such as Sweden[(13)] or Greece[(14)]. The reason of this difference was that General Education Law in Spain was not approved until 1970[(15)]. Therefore, the rate of Spanish university students has been gradually increasing since then. Besides, Basque parents' economic activity was similar to parents of Galician university students[(16)]. In summary, the EHU12/24 cohort provides valuable data for analysis of the complexity of obesity and the interrelationships among the determinants of this disease state in university students.

Adaptation, validation and reproducibility of the SFFQ

To assess the dietary intake of the target population a SFFQ was used. To the best of our knowledge, no FFQ has been validated previously for use in population resident in the Basque Autonomous Community. Thus, before assessing students' diet, an original SFFQ developed for a population resident in other region of Spain was adapted[(17)]. The relative validity and reproducibility of the adapted questionnaire were evaluated in an adult population resident in the Basque Country. We analysed the validity and reproducibility of this new SFFQ in population resident in the Basque Autonomous Community, not only in university students, because we intend to use it in other researches to assess the dietary patterns and nutritional improvement in this population. Anyway, we determined the possible influence of associated variables, such as educational level or weight status, on its validity and reproducibility to confirm its usefulness in dietary intake assessment of the EHU12/24 cohort.

In the analysis of the validity and reproducibility of the adapted questionnaire, a representative sample of the Basque Country population consisted of 82 adults older than 21 years participated. Respect to the original SFFQ, it included 45 food items, but we added 22 new items considered as frequently consumed in this population, so the adapted questionnaire had 67 items, a number that could be considered optimal and similar to the median number used in other studies(18). The 82 participants completed the first SFFQ at the beginning of the study, three series of 24-h recalls at 4-month intervals and the second SFFQ, at the end, in the period of a year. This study design is the same that has been used in other studies(19,20). On the other hand, the validity and reproducibility of the SFFQ were performed by comparing food group intake, the correlations between the intakes derived from SFFQ and 24-h dietary recall and the correlations between two different surveys (baseline and second SFFQ).

Regarding general characteristics of the study subjects, nearly half of the sample had children and stayed working, while, the majority lived in urban areas of the Basque Country and had at least secondary education. These characteristics are similar to those of the general Basque population(21). Additionally, in relation to anthropometric measurements, as may be observed in the present study, nearly half of the sample under study had overweight/obesity, and women seemed to have a healthier weight status than men. These data are similar to those obtained in the last Basque Health Survey(22).

Regarding the validation of this SFFQ, the food group intakes registered with the SFFQ were, generally, higher than the intakes calculated by the average of the 24HRs, as it has been observed in other studies(19,23,24). These differences in the intake estimation of the two methods could be the consequence of an overestimation of ingredients of mixed dishes or meals considering each food of them as a full portion(19). With respect to correlations between the two methods, they were significant for more than half of the studied food groups and the lowest correlations were observed in fat and spicy foods because of a low precision in the estimation of small quantities(25). Moreover, in food groups divided into different categories, such as meat or fish, the correlations were low due to the difficulties of the subjects to recognise and classify these foods in the corresponding category(26). Furthermore, high correlations were obtained for alcoholic drinks and it could be due to the intake of this type of food is associated with specific moments of the week favouring the memory of these quantities[27].

Regarding comparisons between the SFFQ2 and 9-day 24HRs and between the SFFQ1 and 9-day24HRs, the first ones were slightly higher than second ones as it has been observed in other studies[19,20]. There are authors who have suggested that these differences are consequences of diet changes, during the study period[20], while, others claimed the learning effect[19], that is, the acquisition during the year of study of a greater awareness to complete the second SFFQ[28]. To graphically check the agreement between SFFQ2 and the mean of 24HRs, Bland-Altman analysis were performed confirming a fairly good agreement between both methods. Moreover, in the classification into the same or adjacent quartile between the two methods, the mean percentage was 75.2%. Although meat and meat products showed worse agreement when their intake was higher, other authors have also observed this fact and considered it a measurement error proportional to mean intake[29].

In the case of the reproducibility of the SFFQ, the intakes of many food groups were higher in the second SFFQ than in the first one, as it was observed in other studies[30,31]. This change in the intake could be justified as a learning effect, while, others authors have suggested this reason to justify lower intakes in the second SFFQ2 than in SFFQ1[19,32]. In our case, after a period of a year it was possible to occur that subjects changed their diet and varied their responses[23]. Assessing the reproducibility of the adapted SFFQ, through crude and age- and sex-adjusted correlation coefficients, the results were higher than those observed by other authors[19,33]. All coefficients were significant apart from those for fat in the crude correlations and those from fatty fish and spicy foods in adjusted correlations, similar to data obtained by other researchers[34]. It should be also mentioned that the agreement between the two SFFQs was well as in other studies[19,20].

On the other hand, in the present study the influence of associated variables such as educational level, having children, weight status or lifestyle, in the validity and reproducibility of the SFFQ was analysed but they did not seem to have any influence and to our knowledge, although there are few data about the influence of these factors, there are authors[35] who did not find any relationship between educational level and the reproducibility of an FFQ. Overall, the adapted SFFQ presents good reproducibility and validity for measuring most food groups in a population resident in the Basque Country, and it did not seem to be influenced by associated variables, such as educational level or weight status. These results confirm the hypothesis (Hypothesis 0 of the thesis) that the SFFQ adapted to the population resident in the Basque Country has a good validity and reproducibility to assess food group intake, and is not influenced by associated variables (such as educational level or weight status). However, in future studies, the intakes of food groups estimated by the SFFQ that showed poor evaluation, should be used and interpreted with caution.

Diet of the EHU12/24 cohort

After analysing the validation and reproducibility of the SFFQ, this adapted SFFQ was administered to all the participants to collect data about their dietary habits. SFFQ data were used to estimate energy and nutrient intake, and this information together with data on meal pattern allowed us to assess diet from several points of views: (1) misestimation of self-reported dietary consumption; (2) adequacy of the nutrient intake; (3) diet quality; (4) meal pattern; and (5) environmental impact of diet.

First, we identified possible under- and overestimations of self-reported data using the method proposed by Goldberg(36) and updated by Black(37). The obtained results suggest that 38% of the university students underestimated their dietary intake, being this underestimation higher in men than in women (P <0.001) and in students with excess BF than those with normal BF (P<0.001). These percentages of under-reported energy were higher than those obtained in other researches set in adults(38-40). Lutomski *et al.* (41) observed, men were more likely to be under-reporters, although this finding is less common in studies of misreporting(39,42).

On the other hand, obesity was also associated with under-reporting as it has been suggested in other studies(38,42). In the case of students who overestimated their intake, it was low (2.1%) and lower than the percentages of adult populations(39). In spite of identifying pausible under- and over-reporters, the exclusion of misreports, as other authors suggest, introduces unknown bias because they are systematically different from plausible reporters regarding lifestyles, nutritional status and chronic disease risk(43). Although they differ on nutrient intake, the exclusion of misreporters has no implications in the estimates in population studies of nutritional intake assessment(42). Thus, there are authors(42,43) who maintain that misreporters subjects should not be excluded from the sample, as we did in ours.

Second, university students' diet tended to follow the Western pattern. This dietary pattern is characterised by a high protein, fat and SFA intake; and a low consumption of carbohydrates and dietary fibre, as the typical diet of the Spanish population(44); and has been associated with increased risk of chronic diseases, such as cardiovascular illness(45) or certain cancer(46). Contrary to what we expected, the adequacy of the macronutrient intake to AMDR was not better in HS students than in NHS ones. This result suggested that knowledge is not sufficient to ensure healthy dietary habits(47,48). It has to be taken into account that in the choice of food, apart from knowledge, many factors are implied, such as, availability, convenience, cost or healthiness(49,50). With respect to micronutrients adequacy, evaluated through EARs, all the vitamin and mineral intakes were adequate apart from Vitamin D and E, which agreed with the ANIBES study set in the Spanish population(51,52).

Third, the diet quality indices, HEI-2010 and MDS, turned out to be acceptable, but improvable and better than other university students' diet(53-55). As other authors observed(2,53), sex differences were found in diet quality, being women who had higher scores than men. The reasons for explaining it lie in the social pressure on women to be thin(56,57) and the vulnerability of men to have unhealthy dietary patterns because of a low strong beliefs related to nutrition(58). As regards the diet quality indices by age and KA, students with more age and those of HS obtained higher scores than students of other categories. In the case of age, it could be a consequence of the transition from high school to university, which implies a change in routines and dietary habits(59). In addition, regarding to the KA, health conscious could influence in dietary habits, but it is known that is not sufficient to affect them(47,48). These findings support the hypothesis (Hypothesis 1 of the thesis) that the diet of the university student population of the UPV/EHU is associated with demographic variables and KA and partially the hypothesis (Hypothesis 2 of the thesis) that this student population is far of dietary recommendations.

Forth, with regard to meal patterns, nearly half of the Basque students had an adequate number of EO daily, spacing of EO and meal duration. Moreover, we found that all the variables related to meal pattern were associated with diet quality, which agreed with other researchers(59). A possible explanation for these results is that probably a better meal pattern implies a higher food variety and dietary diversity, and a higher choice of healthy foods than empty foods and therefore, a higher diet quality. When this meal pattern was analysed by sex, it was concluded that women tended to have more adequate dietary habits than men because they spent more time on meals, ate accompanied and had a higher quality of diet (measured through HEI-2010 and MDS as previously was described). These findings are in line with what was found previously in the literature[60-62] and it could be related to the fact that women consciously try to eat healthy[63]. Conversely, men of the sample under study had a better meal pattern than women in terms of number of EO/day, breakfast frequency and interval between EO. This last sex difference could be due to discrepancies in the distribution of energy intake throughout the day, as other authors have indicated[64].

On the other hand, it was observed that younger students were more likely to meet the recommendation of number of EO daily. However, students with more age tended to have lunch and dinner accompanied. In the case of meal pattern by KA, those of HS degrees had a better adequacy to number of EO and they usually ate meals accompanied compared with NHS students. Conversely, a study set in university students of Navarra, NHS students showed a higher adequacy of the number of EO daily compared with HS ones[65]. These results confirm the hypotheses "1-The lifestyles, including diet, of the university student population of the UPV/EHU are associated with demographic variables and KA of the degree that they are studying" and "2-University student population of UPV/EHU is far of dietary recommendations".

Finally, fifth, when dietary habits were analysed from the sustainability perspective, the mean estimate of diet-related GHGE was 1,719.6 (618.1) kg eCO_2/person/year, that is, 4.7 kg eCO_2/d on average (women: 4.3kg eCO_2/d; men: 5.2 kg eCO_2/d), similar to data from other European countries[66-69]. The total GHGE in men was higher than in women ($P<0.001$), as it was observed in other studies, what suggests that this higher GHGE is associated with a higher intake of red meat and deli meats[66,70], which is considered a masculine food[71]. In this same line, results on nutrition attitudes of UPV/EHU students showed that the "meat preference" was associated with male sex. Analysing the contribution of each food group to total GHGE, this was similar to that observed by other authors[68,69,72-74], being the highest contributors red meat and deli meats, followed by fruits and vegetables and milk and dairy products and the lowest alcoholic drinks, probably because their consumption is low.

With regard to the possible association between diet quality and GHGE related to diet, it was observed that students with the highest score in HEI-2010 tended to have a high GHGE; while, students with the lowest score in MDS tended to have high GHGE. This difference in results may have been due to variations in aspects taken into account to construct and score these diet quality indices. Since the 40% of the HEI-2010 score corresponds to the most contributing food groups such as red meat and deli meat, fruits and vegetables, milk and dairy products, eggs and white meat and fish and shellfish. Whereas in the case of MDS, three of the most contaminating food groups, red meat and products, poultry and full fat dairy products have an inverse score, that is, the higher the intake of these products, the lower the score in the index. However, apart from this fact, it should be mentioned that healthy diets do not always imply sustainable diets, as it has been observed in different studies(69,75). Thus, our results did not support the hypothesis (Hypothesis 3 of the thesis) that a healthy diet has a lower environmental impact, that is, suppose a lower GHGE.

With respect to factors associated with high GHGE diets, age, KA, SES and BF status were identified. Therefore, students with more age, HS students, those with higher SES and students with BF excess had high GHGE diets. These results are in line with our initial hypothesis (Hypothesis 3 of the thesis) except for KA, but this contradictory result could be due to the transversal and integrated approach of environmental education set in the UPV/EHU. In the case of age, this association could be related to a frequent meat consumption of older students. Relative to SES, as other researchers have suggested higher diet quality is associated with higher economic cost and higher environmental impact(76-78), although healthy and sustainable diets are not always more expensive than other type of diets(79). Lastly, relative to BF, it has been suggested that reductions in energy intake to adjust to individual energy requirements are accompanied by reductions in GHGE(70).

In summary, from the nutritional point of view, the diet of UPV/EHU students was characterised by high intakes of protein, fat, SFA, and low intakes of carbohydrates and dietary fibre; thus, it was a western dietary pattern. Moreover, both meal pattern and two of the diet-related sustainability dimensions, health-nutrition and environmental sustainability, seemed to be acceptable, but improvable in UPV/EHU students. In addition, the compatibility of environmental impact and health-nutritional dimension of the diet depends in part on the constructs and criteria used in the indicators of this last dimension. Moreover, these two diet-related sustainability dimensions were associated with sex, age, HS vs. NHS courses, SES and BF status. These findings could be used for planning food-based dietary guidelines and intervention strategies aimed at UPV/EHU's students. These guidelines and strategies will contribute to improving diet quality while simultaneously reducing environmental impact, and could take advantage of the naturally occurring opportunities offered by this stage of life to induce behaviour changes.

Lifestyles (different from diet) of the EHU12/24 cohort

In relation to lifestyles (different from diet), the target population was characterised by having a moderate PA level, an excessive time spent sitting, being moderate drinkers and non-smokers/ex-smokers and having an adequate time spent sleeping. Men were more likely to have better lifestyles than women what concerns to PA, drinking behaviour and smoking. The sex difference in the PA level was observed previously in other studies(2,80). In general, more than half of the total sample, both men and women reported practicing PE/S, principally individual PE/S but not competitive level. Sex differences in the alcohol consumption and smoking habits were contrary to findings from previous studies (2,81-83), what may be due to methodological reasons and to changes in the consumption pattern by sex(84-86).

Additionally, younger students showed a higher PA level and practice of PE/S and they were more likely to meet sleep recommendations compared with students with more age. However, in other studies(87) it has been shown that younger students had less sleep time compared with students of other ages, this discrepancy could be due to differences in schedules depending on the degree. Finally, regarding toxic habits by KA, HS students had less toxic habits, like tobacco and alcohol consumption than NHS students, probably because they are aware of the consequences of these habits on their health. The results of this section allow us to confirm the hypotheses “1-The lifestyles, including diet, of the university student population of the UPV/EHU are associated with demographic variables and KA of the degree that they are studying” and “2-University student population of UPV/EHU is far of healthy lifestyles”.

Prevalence of overweight/obesity and risk factors-related lifestyles in the EHU12/24 cohort

The prevalence of overweight/obesity in the population under study was 14.4%, which was lower than in other studies involving university students(88,89) and data from Spanish Health Survey for the same age range(90). However, our result was higher than those of the last Basque Health Survey for the age range between 15 to 24 years[22]. This last data confirmed the Hypothesis 4, that the prevalence of overweight/obesity in UPV/EHU students is higher than in the general population of this range, at least when compared with the Basque population. Nevertheless, these differences could be due to the different criteria used in the diagnosis. In fact, in the present thesis, different methods were used to estimate this prevalence such as silhouettes scale (for the assessment of body image), measured and self-reported BMI, in addition to BF%.

The comparison of measured and self-reported BMI with BF% showed good levels of specificity but low sensitivity, resulting in a high percentage of false negatives. Other authors have shown similar findings[91] and it could be related to the fact that BMI does not distinguish muscle weight vs. fat weight nor distribution of body fat[92]. In spite of being widely accepted the use of the BMI in epidemiological studies[93], due to its simplicity and reproducibility[94], it should be mentioned the great effort made in the EHU12/24 cohort to take anthropometric measurements in order to guarantee precision and to classify students with obesity according to BF%, and not to BMI.

In agreement with the results of the Italian[89] and other Spanish university students[2,95,96], we registered a higher prevalence of excessive BF in men than in women (P<0.001). Respect to lifestyles which can explain this higher prevalence in males compared with females, we concluded that women students of the present cohort had a better diet quality, measured through HEI-2010 and MDS, and a better meal pattern than men as it has been observed in previous researches[2,96]. There are other lifestyles, previously reported, related to an increased risk of obesity independent of diet and PA, such as SB[97-100] and in this case, men tended to spend more hours sitting than women just like in another study set in Spanish university students[101]. With respect to women's group, other authors have reported an association between obesity and earlier puberty[102-104] and this association between them was also confirmed in the present study.

Regarding the differences in age and SE characteristics by BF status, students who had excess BF were students with more age and with a lower SES than students who did not have excess body fat (P<0.001). These results confirm the hypothesis (Hypothesis 5.a of the thesis) that overweight/obesity in university students is associated with demographic and SE variables. Relative to the increased prevalence of obesity as age increased, this fact has been observed also in a study involving Japanese university students[105]. This result could be a consequence of the students' workload during the last year of university and to the development of independence and self-responsibility. However, apart from these facts, it should be mentioned that students with more age presented higher risk factors of obesity than younger ones, such as, higher rates of smokers, high drinkers, spent more time sitting and had a worse adequacy to sleep recommendations, as it has been observed in other studies involving university students(106). With regard to SES, previous studies have also shown associations between SES and obesity in Taiwan university students(107).

However, contrary to what we expected (Hypothesis 5.a of the thesis), HS students were more likely to have overweight/obesity than NHS ones. Even though students of the HS KA seem to have a greater knowledge of health behaviour risk awareness(108), the lack of translation of this knowledge to healthy behaviours could be associated with a higher SL as it has been observed in our study and has been reported by other authors(109-111). Moreover, as it has been reported in other studies, HS students do not put in practice the knowledge acquired during their degree(112) and there is no significant differences respect to health risk behaviours between HS and NHS students. In the present thesis, HS students tended to intake higher energy and did lower PA than NHS students, which can contribute to a higher risk of overweight/obesity. In addition, HS students were more likely to have a personal and familiar history of obesity than NHS students. It is well known that the probability to have overweight or obesity is increased if one or both parents suffer it(113).

On the other hand, UPV/EHU students with excess BF compared with those without excess BF, reported more diseases, they had a worse self-perception of health, a lower QoL and higher SL. This data, in turn, could be related to the perception and satisfaction with body weight and image and in the adoption of weight control behaviours. Apart from socio-cultural influences, friends, family members, age or gender, there are psychological elements(114) which could lead to an over or underestimation of body size(115). In the present thesis, students with excess BF showed a high level of dissatisfaction with their body weight and image and a low ability to recognise one's weight status, what confirms the hypothesis (5.b of the thesis) that overweight/obesity is associated with and inadequate BWP, BWD and BID. In the scientific literature, adiposity has been identified as a predictor of dissatisfaction(116), but it has been suggested too, that BID could be a predictive factor of future overweight/obesity and eating disorders(117).

With respect to the recognition of the overweight/obesity, other researchers have observed that women with obesity who perceived themselves as obese tried to lose weight. Whereas, those who perceived themselves as normal weight or overweight gained weight(118,119), what suggests that a misperception among individuals with overweight/obesity can hinder the adoption of healthy attitudes and behaviours(120,121), perhaps as a consequence of a lower weight loss motivation(122). Conversely, a correct weight perception is associated with less weight gain. It has been shown, also, that the early perception of one's overweight or obesity is a successful factor to lose weight in men and women(123).

In agreement with the Hypothesis 6.a of the thesis, an unsuitable meal pattern and a poor diet quality both are associated with the risk of overweight/obesity in students of the UPV/EHU. Specifically, in the case of men, an inadequate number of EO and breakfast duration, eating breakfast alone or depending on the occasion and skipping breakfast were identified as risk factors for excessive BF. While, in the case of women, eating breakfast and lunch alone or depending on the occasion, having an inadequate lunch/dinner duration and a low MDS were associated with higher risk for excessive BF. Sex differences observed in this meal pattern could be due to the importance of healthy eating for women(124). So, it is habitual that women followed more adequate dietary habits than men, such as eating a greater number of EO daily, skipping fewer breakfast, taking more time on those meals, and they had a better diet quality, as other authors have highlighted(125-127).

Students without BF excess had higher scores in HEI-2010 and MDS, this association has been observed in adult population as well(128,129). As for the comparison of macronutrient with the AMDR by BF status, the intake of proteins of students with excessive BF was higher than those with normal BF%, while carbohydrates and fat consumption was lower. In other studies(130), contrary results were obtained, but this unexpected result could be due to the underestimation of foods rich in carbohydrates and fat or to the reduction of these foods with the objective to lose weight. Furthermore, as we checked with Goldberg method and other studies have previously reported, people with BF excess were more likely to underestimate the energy and food intake(131,132).

On the other hand, student responses regarding nutrition attitudes showed, as it was expected (Hypothesis 5.c of the thesis), that helpless and unhealthy factor (that combines items about convenience, mood and affect, and low self-efficacy), and food exploration factor were associated with overweight/obesity among UPV/EHU students. However, in disagreement over the Hypothesis 5.d of the thesis, nutrition knowledge was similar for both BF groups. In this line, previous research did not support a significant association between nutrition knowledge and overweight/obesity[133], what suggest that providing education to improve knowledge of diet and nutrition could be not a critical component of intervention for achieving weight loss in the population studied.

In relation to other lifestyles of the EHU12/24 cohort, students with excess BF were more likely to live without parents and not to have a steady partner. A higher BF excess in students who live away from parents could be related to a higher intake of sugar, wine, alcohol and fast food[134] and a lower intake of fruits and vegetables[134,135], which may reflect the importance of family environment in the maintenance of dietary habits also during this university period[134-136]. Moreover, a low-moderate PA level, a higher sitting time, a lower time spent sleeping, a moderate-high consumption of alcohol and smoking habit were more frequent among students with overweight/obesity than those with normal BF%. These results agree with that of other studies which have reported that, in general, people with overweight/obesity tend to characterise by having unhealthy lifestyles (e.g. insufficiently physically active, SB, binge drinking, smoking and sleeping time)[137-140]. It should be also mentioned that among men a moderate/low PA, and among women a moderate-high consumption of alcohol and a non-adequate sleep duration were associated with increased risk of excess BF. These data confirmed our Hypothesis 6.b., that is, unhealthy lifestyles, such as inactivity and SB and alcohol consumption, are associated with the risk of overweight/obesity.

To sum up, the prevalence of overweight/obesity of the UPV/EHU students, using the BF% as diagnostic criterion was higher than those of the general population of this same age range. The excess BF was associated with demographic and SE variables, being men, students with more age and those with lower SES more likely to have overweight/obesity. The excess BF was also associated with more diseases, a worse self-reported health, QoL and SL; these results could be related to a worse self-perception of the body size and a high BWD and BID; and consequently, associated with the adoption of unhealthy weight-loss behaviours. In view of the results obtained, we can conclude that inadequate meal pattern, poor diet quality and unhealthy lifestyles, including PA, SB and toxic habits, were associated with overweight/obesity in this population.

Strengths and limitations

The main strength of the present thesis is the fact that provides updates regarding a topic with only few previous studies focusing on the risk of overweight/obesity related to lifestyles, especially those associated with diet, in students of the University of the Basque Country. However, it has many limitations that should be mentioned. First, the cross-sectional design of the present study limits the assessment of causality in the observed associations. Second, data about dietary habits, PA/PE, sport activity, leisure time activity and SB were self-reported by the participants and may be subject to respondent bias. In the case of diet, these data were self-reported which could imply under- or overestimation, especially in certain groups characterised by weight status or sex[(141)]. To check it, we applied the Goldberg's method[(36)] and updated by Black[(37)], using a PA level of 1.55[(142)]. Although, the SFFQ may have limitations, it provides valid information about the intake of a large number of nutrients[(143)] and it must take into account that there is not alternative to assess diet without limitations. Besides, the adapted SFFQ presents good reproducibility and validity for measuring most food groups in a population resident in the Basque Country.

Third, in the methodology used to analyse the GHGE related to diet, many steps in the life cycle of the products were not considered due to the lack of information about cooking way, geographic origin and seasonality of foods. It must keep in mind that the analysis of all steps of the life cycle of foods is extremely difficult and expensive. However, the methodology to calculate GHGE is an alternative that has been used in previous studies to quantify the GHGE[(144-146)]. Fourth, all data were collected through face-to-face interviews, what could be imprecise and prone to bias. However, to reduce the variability due to different interpretations of the questionnaires, the research team administered all questions, and some guidance was given to avoid misinterpretations. In epidemiologic research, participants' answers are dependent on social desirability, but few databases have extended information about lifestyle in a manner similar to the present study. Fifth, to reduce the total measurement error in anthropometry, the same person performed all these measurements.

Sixth, in spite of having adjusted for variables, which were considered important to analyse the association between variables, the possibility that other sociocultural and environmental factors, which were not considered, may have attenuated these associations cannot be excluded. Finally, seventh, all these findings are based on a sample of university students, thus, they cannot be generalised to young adults because the educational level of students could affect their lifestyles. Replicating this study beyond the university setting is recommended.

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6. Conclusions

Based on the results obtained in this doctoral thesis, the following conclusions were derived:

1. The adapted SFFQ presented good reproducibility and validity for measuring most food groups in population resident in the Basque Country, and both reproducibility and validity were not influenced by associated variables, such as educational level or weight status.

2. Dietary habits, of the EHU12/24 cohort were associated with demographic variables and KA of the degree that they were studying. In particular, diet quality and meal pattern were more adequate in women and in students of HS degrees, compared with the other categories (men and NHS degrees). In addition, women, younger students, NHS students and those with a low SES were more likely to follow diets with low environmental impact.

3. Lifestyles (different from the diet) were also associated with demographic variables and KA, in the EHU12/24 cohort. Specifically, men had a high PA level and a low consumption of alcohol and tobacco. Likewise, HS students reported a low consumption of alcohol and tobacco. Moreover, younger students were more likely to be non-smoker, meet the recommendations for alcohol consumption, SB and sleep duration.

4. The diet of the EHU12/24 cohort was characterised by high intakes of protein, fat, SFA, and low intakes of carbohydrates and dietary fibre. Both meal pattern and two of the diet-related sustainability dimensions, health-nutrition and environmental sustainability, seemed to be acceptable. In addition, lifestyles (different from the diet) of this population were characterised by having a moderate PA level, an excessive time spent sitting, being moderate drinkers and non-smokers and having an adequate sleep duration.

5. In the EHU12/24 cohort, the compatibility of environmental impact and health-nutritional dimension of the diet depended in part on the constructs and criteria used in the indicators of this last dimension. Moreover, the two diet-related sustainability dimensions were associated with sex, age, HS vs. NHS courses and SES. Specifically, women tended to follow diets with high quality scores and low environmental impact; students with more age and those of HS degrees tended to follow diets with high quality scores; and younger students and those of NHS degrees diets with low environmental impact.

6. The prevalence of overweight/obesity, using as diagnostic criterion BF%, was 14.4% in the EHU12/24 cohort, which was higher than those from the general population of this same age group. Nevertheless, these differences could be due to the different criteria used in the diagnosis.

7. In the population under study, men, students with more age, those with low SES and those of HS degrees were more likely to suffer overweight/obesity. Additionally, students with overweight/obesity presented a high level of dissatisfaction with their body weight and image just as a low ability to recognise one’s weight status. Moreover, NA, specifically helpless and unhealthy factor and food exploration factors, were associated with overweight/obesity. However, nutrition knowledge was similar in students with and without overweight/obesity, what suggest that providing education to improve knowledge of diet and nutrition could be not a critical component of intervention for achieving weight loss in the population studied.

8. Inadequate meal pattern, poor diet quality and unhealthy lifestyles (including PA, SB and toxic habits) were associated with increased risk of overweight/obesity in this population. Some of these unhealthy lifestyle behaviours coexisted and interacted with each other, modulating increased risk of overweight/obesity. Among men, the largest effect on overweight/obesity risk was found for breakfast skipping and PA level, and among women for adherence to MD.

EUSKARAZKO BERTSIOA

1. Sarrera

1.1. Obesitatea gaixotasun gisa

1.1.1. *Definizioa eta sailkapena*

Obesitatea gorputzean gantz gehiegi izatearen ondorioz sortzen den gaixotasun kronikoa da eta osasun-arazoak izateko arriskua sor dezake(1). Ebidentzia zientifikoaren arabera gaixotasun multimetaboliko eta hormonala da, bizi-ohituren banakako aukeraren emaitza baino(2). Badaude gantz masa (GnM) fidagarritasunarekin neurtzeko erresonantzia magnetiko edo energia dualeko X izpia absortziometria bezalako tresna sofistikatuak, baina hauek ez daude denon eskura. Hortaz, obesitate estatusa neurtzeko adipositatearen zeharkako hainbat neurri erabiltzen dira, gorputz masaren indizea (GMI), gerriaren zirkunferentzia, gerria-aldaka indizea (GAI) eta GnMren portzentajea (GnM %) (larruazalpeko izurrekin kalkulatuta) bezala.

GMIren erabilera gainpisua eta obesitatea sailkatzeko oso hedatuta dago, neurtzeko erraza delako eta obesitatearekin lotutako osasun baldintzekin oso erlazionatuta dagoelako(3). Nahiz eta giharrari edo gantzari lotutako pisua ez bereiztu eta ezta gorputz gantzaren banaketa ere(4), GMIk abantaila asko ditu, sinpletasuna eta errepikatzeko gaitasuna adibidez(5). Honez gain, epidemiologiako ikerketek GMIren balio urrunen eta areagotutako hilkortasunaren arteko lotura erakutsi dute(6).

GMI pisua eta altueraren arteko indizea da eta pertsonaren pisua (kilogramotan) garaieraren karratuaz (metrotan) zatituz lortzen da. Indize hau Adolphus Quetelet-ek deskribatu zuen lehenengo aldiz XIX. mendean(7). Hala ere, GnMren zeharkako neurri hau altuera baxuko pertsonetan, nagusietan, gihartsuetan, erretentzio hidrosalinoa duten pertsonetan eta haurdun dauden emakumeetan adierazle txarra dela kontuan hartu behar da(8). 2010. urtean egindako errebisio batean(9), GMI paziente mailan gehiegizko GnM identifikatzeko berariazkotasun ona baina sentsibilitate eskasa zuela ondorioztatu zen, gehiegizko GnM zuten pertsonen erdia gutxi gorabehera obesitatea ez zuten pertsona bezala sailkatu eta gero.

1.1.2. Gainpisua/obesitatearen prebalentzia

2016an, Munduko Osasun Erakundeak (MOE) munduan 1,9 bilioi helduk gainpisua zuela eta hauetatik 650 milioik obesitatea zuela estimatu zuen(10). 1975etik 2016. urte arte munduko obesitatearen prebalentzia hirukoiztu egin da[10] eta Espainiaren prebalentzia Europako altuenetarikoa da[11,12]. Azkenengo hiru hamarkadetan egondako areagotze hau ezin daiteke azaldu bat-bateko aldaketa genetikoekin[12], eta bere arduradun nagusienetarikoak influentzia kulturalak eta ingurumenekoak dira, hala nola, energia dentsitate altuko dietak, anoaren tamainaren handitzea edo gaur egun gizarte industrializatuen ondorioz dugun bizimodu sedentarioa[13-15].

Gaur egungo tendentziek joera berdinarekin jarraitzen badute, 2030. urtean, mundu osoko populazioaren % 60ak (3,3 bilioi pertsona) gainpisua edo obesitatea pairatuko du[16]. Baina, 2016an, munduan 5 urte baino gutxiagoko 41 milioi umek gainpisua eta obesitatea izateak gehien larritzen duen datua da[10]. Gainera, ezaguna da obesitatea duten umeek, nerabeek bereziki, obesitatea duten heldu bihurtzeko probabilitate gehiago dituztela[17]. Espainiako datuei dagokionez, ENRICA ikerketa (*Estudio de Nutrición y Riesgo Cardiovascular en España*) 2008-2010. urte bitartean egin zen. 18-44 adin taldean gainpisuaren prebalentzia % 41,5 eta % 24,6koa izan zen, gizon eta emakumeetan, hurrenez hurren, eta obesitateari dagokionez % 18,6 eta % 11,1ekoa, sexuaren arabera, hurrenez hurren[18].

Geroago, ANIBES ikerketa egin zen Espainiako populazioaren antropometriako datuak, besteak beste, eguneratzeko helburuarekin. Kasu honetan, gainpisu eta obesitatearen prebalentzia gazte taldean (18-40 urte), ENRICA ikerketarekin konparatuz, pixka bat baxuagoa izan zen. Gainpisuari dagokionez, gizonezkoen % 37,4k pairatzen zuen eta emakumeen % 25,8k. Obesitatearen kasuan, bitartean, prebalentzia % 15,2 eta % 10,4koa zen gizon eta emakumeetan, hurrenez hurren. Eta gainpisu eta obesitatean, sexuaren araberako desberdintasun esanguratsuak zeuden[19]. Obesitatearen prebalentzia altuagoa nagusien artean behatu zen, nahiz eta GMI eta beste adierazle abdominal batzuk 20-29 urte tartean hazita egon[19], eta baita estatus sozioekonomiko (ESE) baxua zuten pertsonen artean ere, orokorrean, ariketa fisiko (AF) baxua eta Mediterranear Dieta (MD) jarraitzen ez dutelako[18]. Honez gain, prebalentzia hau desberdina da autonomia erkidegoen arabera, Aranceta-Bartrina *et al.*-ek[20] aipatu duten bezala. Adinari doitutako Espainiako obesitate prebalentzia tasen arabera, Asturias, Galizia eta Andaluzian prebalentzia altuenak behatu ziren, Balear Uharteetan, Katalunian eta Euskal Autonomia Erkidegoan, berriz, baxuenak[20].

1.1.3. Gainpisua/obesitatearen ondorioak

Gainpisuak eta obesitateak eragin garrantzitsuak dituzte osasun soziala, fisikoa eta mentala barne hartzen dituzten hainbat dimentsioetan[21] eta osasun kostuan eragin zuzena eta zeharkakoa dute[22]. Alderdi sozialetan izan dezaketen eraginari dagokionez, gainpisuaren estigma eta diskriminazioa bizitzaren area guztietan ondo egiaztatu izan da[23]. Pisuari lotutako diskriminazio hau bizi-ohitura ez-osasuntsuekin lotuta dago eta honek gurpil zoro bat eragiten du. Obesitatea duten pertsonenganako estigmak, pertsona hauek pisua galtzeko gaitasunean konfiantza galaraztea eragiten du[24]. Zentzu honetan, gaur egun, argaltasuna arrakastaren sinonimotzat hartzen da, eta obesitatea, bestalde, nagikeriatzat eta arduragabekeriatzat[25], baina argaltasunari buruzko presio sozial hau emakumeetan gizonetan baino gehiago antzematen da[26].

Honez gain, obesitatea hurrengo gaixotasunekin erlazionatu da: diabetes mellitus ez-intsulina menpeko, 1. motako diabetes mellitusa, gaixotasun kardiobaskularrak, hipertentsioa, behazun litiasia, loaldiko apnea buxatzailearen sindromea, gibeleko esteatosia, osteoartritisa, minbizi mota batzuk edo ugalkortasun-eza, besteak beste[27,28]. Gainera, gaixotasun honek ezintasun arriskua areagotu eta bizi-itxaropena murriztu egiten du, batez ere heldu gazteetan[29,30]. Aurretik aipatutako komorbilitate hauek normalean, heldutasunean agertzen dira, baina gaur egun, haurtzaroan ere garatzen ari dira obesitatearen prebalentziaren igoeraren ondorioz[31]. Obesitatearen ondorio kardiometaboliko eta ez-kardiometabolikoek morbilitate eta hilkortasun arriskua inplikatzen dute haurtzaroan eta baita heldutasunean ere[32].

Global BMI Mortality Collaboration komitearen ikerkuntzek aditzera ematen dute gainpisua eta obesitatea duten pertsonek MOEk definitutako GMIren balio normalak (18,5-25,0 kg/m^2) izango balituztela, Europan, 7 heriotz goiztiarretatik 1 saihestuko litzatekeela[33]. Bestalde, ebidentzia zientifikoak azpimarratu egin du gainpisua/obesitateak aldarte-nahasteko arriskua, autoestimu baxua, motibazio arazoak eta elikadura-trastornoak areagotzen dituztela, baina baita gorputz irudian eta pertsonen arteko komunikazioan eragina dutela ere. Baldintza hauek guztiek bizi-kalitatean zuzeneko edo zeharkako eragina dute[34].

Azkenik, hainbat ikerketek behatu dute obesitatea duten pertsonen osasun sistemako kostua pisu normaleko pertsonena baino altuagoa dela[22]. Kostu altuago hauek gizarte segurantzaren eta ezgaitasun pentsioen ondorio dira. 2016an, Espainian, obesitatearen osasun kostua 1,95 bilioi eurokoa izan zen, Hernáez *et al*.-en datuen arabera[35]. 2030 urterako, Espainian, obesitatearen igoera % 16a izatea espero da, Kelly *et al.*-ek munduko populaziorako egindako estimazioena baino baxuagoa(16), baina gehiegizko pisuaren prebalentziaren igoera Espainiako Osasun Sistemarako jasanezina izan daiteke(35). Honez gain, osasun kostua obesitateari lotutako kostu osoaren atal txiki bat besterik ez dela ematen du, diru-sartzearen aldaketa absolutua hiru aldiz baino gehiago osasun gastuen aldaketa suposatzen baitu. DiBonaventura *et al*.-ek(36) aditzera eman dute areagotutako GMI eta beheratutako lan produktibitatearen artean erlazioa dagoela, eta honen ondorioz, bakoitzaren diru-sartzea murriztu egiten dela.

1.1.4. Gainpisua/obesitatearen arrisku faktoreak

Gehiegizko GnM pilaketa faktore genetikoen, sozioekonomikoen (SE) eta ingurumenenaren arteko interakzio konplexuaren emaitza da, eta azken baliabide gisa, portaera pertsonalen ondorio. Faktore hauen barne dauden kondizio edo neurri batzuk obesitatea pairatzearen arrisku altuagoarekin lotu izan dira, hortaz, arrisku faktoreak kontsideratzen dira. Arrisku faktore hauetan arreta jartzearen helburua gaixotasun hau saihesteko egingo diren estrategien oinarriak ezartzea da. Faktore genetikoei dagokionez, nahiz eta obesitateari lotutako sindrome berriak egon edo obesitate era berriak, obesitate monogenikoa, obesitate sindromikoa edo oligogenikoa bezala, obesitate poligenikoa obesitatearen era ohikoena da, hau da, garatutako herrialdeetan gehien ematen dena(13). Obesitate mota hau hainbat lociren arteko interakzioen (poligenikoa), nahiz eta GMIan bakoitzak duen efektua txikia izan, eta ingurumen obesogenikoaren ondorioa da(37).

Gaur egun arte, obesitate poligenikoari lotutako ehun loci baino gehiago identifikatu izan dira(13). Gaur, obesitate poligenikoaren mekanismo etiopatogenikoak ez dira zehazki ezagutzen, baina jakina da obesitatearen garapenean faktore genetikoek, epigenetikoek, endokrinoek, neurologikoek, psikologikoek, soziokulturalek eta ingurumenekoek parte hartzen dutela(38-40). Gainera, gene-ingurumenaren artean ematen diren interakzioek aldaketa epigenetikoak eragin ditzakete, eta honek obesitatearen fenotipoan garrantzi handia du(41,42). Honez gain, ikerketa askok adierazi dute programazio fetalak; mekanismo epigenetikoen bidez, osasunean ondorio esanguratsuak dituela. Beraz, gurasoen bizi-ohiturek, dietak eta bestelako esposizio batzuek seme-alaben obesitatearen arriskuan eragina izan dezakete, eta baita gurasoen obesitateak(43), kaloria murrizteak(44), erretzeak(45), disrupzio endokrinoek(46), haurdunaldian irabazitako pisuak eta diabetes gestazionalak(43,47) ere.

Bestalde, faktore ekonomikoek obesitatearen arriskuan eragin aldakorra izan dute denboran zehar. Iraganean, obesitatea aberastasunarekin lotzen zen. Alabaina, azkenengo hamarkadetan, erlazio hau aldatu egin da. Gaur egun, Mendebaldeko kulturan, aberastasuna eta obesitatearen arteko erlazioa alderantzizkoa da, eta ESE baxua duten pertsonek obesitate prebalentzia altuagoa izateko joera dute[(48)]. Honez gain, emakumeetan bereziki, hezkuntza maila eta gainpisua/obesitatea alderantziz erlazionatu izan dira[(49)]. Ingurumen arrisku faktoreei dagokionez, eraikitako auzoen, hezkuntza eta lan inguruneen ezaugarriek, eginkizun garrantzitsua dute obesitatean, bizimodu sedentarioak eta dieta ohitura ez-osasuntsuak sustatzen dituztelako. Ezaugarri hauen barne berariazko faktore batzuk daude (energia-dentsitate altuko elikagaien eskuragarritasuna eta erabilgarritasuna, handitutako anoen tamaina, marketina eta iragarkiak) eta baita anbiguoagoak (osasuna edo ibiltzeko gaitasuna)[(50)] izan daitezkeen beste batzuk ere.

Obesitatearen arrisku-portaerei dagokionez, kontuan hartuta obesitatea askotan kontsumitutako eta gastatutako energiaren arteko desorekaren ondorioa dela, dieta eta AF, egungo obesitatearen prebalentzia azaltzeko arreta handia jaso duten bi portaera ditugu[(51)]. Kaloria murrizteak, bereziki, pisua kontrolatzeko metodo ospetsuenetariko bat izan da. Baina, energia ahorakinaz gain, hainbat ikertzaileek arreta jarri dute dieta kalitatea eta elikadura patroien gainpisu/obesitatearen garapenean duten eraginean[(52)]. Elikadura patroi batzuk, MD bezala, gainpisu/obesitatearen arrisku gutxiagorekin erlazionatu izan dira[(53)]. Hala ere, edozein kasutan, *zer jan, non, noiz, nola* eta *norekin* bere garrantzia du, ez bakarrik jaten den bolumenak, motak eta aniztasunak[(53)]. Ezaugarri guzti hauek “elikadura patroia” kontzeptuaren barne daude, eta energiaren ahorakinean garrantzi handia dute eta horren ondorioz, adipositatearen eta gorputz pisuaren erregulazioan ere[(55)]. Baina dieta eta AFz gain, beste portaera batzuk, ohitura sedentarioak[(56)], loaldia[(57)] eta estresa[(58)] bezala, heldutasunean pisua hartzearekin erlazionatu izan dira[(50)]. Nolanahi ere, ikerketa gehienetan, arrisku faktore hauek, banaka, gainpisua/obesitatearen areagotutako prebalentzia neurri txikian azaltzen dute, seguru aski faktore hauek, dietarekin batera, gainpisu/obesitatearen arriskuan eragin sinergikoak eta metagarriak dituztelako[(59)].

1.2. Gainpisua/obesitatea unibertsitate ikasleetan

1.2.1. Unibertsitate ikasleen gainpisua/obesitatearen prebalentzia eta erlazionatutako arrisku faktoreak

Ikasleek unibertsitateko lehenengo urtean pisua hartzen dutela hainbat ikerlariek behatu dute(60,61), eta pisu hartze honen ondoren pisuaren igotze motela baina egonkorra ematen dela(62) ere. Unibertsitate ikasleen gainpisua/obesitatearen prebalentzia % 22koa da gutxi gorabehera (gizonetan, % 24,7koa eta emakumeetan % 19,3koa)(63), baina prebalentzia hau desberdina da herrialdeen artean, baldintza SE, kultural eta epidemiologikoen arabera. Edozein kasutan, jakina da, adin honetako gainpisua/obesitatea lotuta dagoela ondorengo 15 urteko areagotutako intzidentziarekin(64). Aurretik egindako ikerketetan(63,65,66), unibertsitate ikasleen gehiegizko pisuarekin hurrengo faktoreak identifikatu izan dira: faktore demografikoak (gizona izatea), faktore SEk (ESE altua), ohitura dietetikoak (haragi gorriaren kontsumo altua, ez gosaltzea, otorduen artean jatea, besteak beste), AF baxua, AF eza, gehiegizko alkohol kontsumoa eta erretzea. Hala ere, herrialdeen arabera obesitatearen prebalentziak aldatzen duen bezala, obesitateari lotutako arrisku faktoreak ere aldatu egiten dira baldintza SEn, kulturalen eta epidemiologikoen desberdintasunak islatzen.

Bizi-ohitura ez-osasuntsuak jarraitzea unibertsitate ikasleen ezaugarrietako bat izaten da, askotan, unibertsitate bizitzaren hasiera eta gurasoekin ez bizitzea eta bere osasunari lotutako erabakien arduradun izatea aldi berean gertatzen direlako(67). Eskolatik unibertsitatera gertzen den trantsizioan, ondo ezarritako ohitura eta errutinak alde batera lagatzea gerta daiteke(68). Beraz, gurasoekin bizi ez diren hainbat ikasleetan behatu izan da bere dieta gurasoekin bizi diren ikasleena baino ez-osasuntsuagoa dela, osasuntsuak ez diren elikagaien kontsumoa, azukrea, ardoa, alkohola edo janari azkarrarena bezala, areagotzen dutelako(69) eta fruta eta barazkien asteko kontsumoa murrizten dutelako(69,70). Errealitate honek aditzera ematen du familiak garrantzi handia duela ohitura dietetikoen formakuntzan eta mantentzean(69-71). Fruta eta barazkien kasuan, gurasoen eta nerabeen ahorakinen artean erlazioa dago(72), alde batetik, gurasoek eragina dutelako nerabeen kontsumoan(73) eta bestetik, elikagai hauek eskuragarri badaude, hauen kontsumoa altuagoa izaten delako(74).

Gainera, hainbat ikerlarien arabera[75,76], unibertsitate ikasleek hainbat oztopo sumatzen dituzte ohitura dietetiko osasuntsuak ez jarraitzeko. Zailtasun hauen artean hurrengoak aipatu daitezke: denbora gutxi izatea ikasketak direla eta, unibertsitateko kafetegietan elikagai osasuntsu gutxi edukitzea eta elikagai hauen kostu ekonomiko[75,76], janari azkarraren eskuragarritasuna[77], eta baita jakintza falta eta/edo bazkaria prestatzeko gaitasun eza ere[78]. Unibertsitate ikasleen elikagaien aukeraketan faktore ekonomikoek[79], bizi-esperientziek, hala nola ezarpen sozialek edo irizpide kulturalek, ezaugarri psikologiko eta fisiologikoek, gustuek, elikagaien aukeraketari lotutako sinesmenek eta ikusminak eragina izan dezakete[80,81].

Honez gain, AF eta kirol praktikari dagokionez, jakina da ere ikasle batzuek zailtasunak dituztela ikasle bizitzan zehar AF mantentzeko edo ohitura bezala ezartzeko[67], eta normalean, ez dituztela AFri buruzko gomendioak betetzen[82,84]. AF ezaren prebalentzia unibertsitate ikasleetan % 23tik % 44ra doa hainbat ikerketen arabera[85,86]. Ikasleek hainbat oztopo sumatzen dituzte bizi-ohitura sedentario bat saihesteko eta aktibo mantentzeko, hala nola, nagitasuna, denbora, motibazio, erraztasun, gizartearen eta gurasoen laguntza eta lagunen falta[87,88]. Lagunen motibazioak, gizarte laguntzak, komenigarritasunak edo aktibitateen aniztasunak, aldiz, AF praktikatzea erraztu dezakete[89,90].

Aurretik aipatutako bizi-ohitura ez-osasuntsuen (dieta, AF eta ohitura toxikoak) eta obesitatearen arteko erlazioez gain, unibertsitate ikasleetan beste bizi-ohitura batzuk ere arrisku faktoreak kontsideratu izan dira, loaldia bezala, adibidez[91]. Zentzu honetan, aurrez egindako ikerketa batzuek ikasleen % 60k kalitate eskaseko loaldia zutela aditzera eman dute[92] eta % 25ek 7 ordu baino gutxiago egiten zutela lo, hau da, *USA Sleep Foundation* erakundearen gomendioa baino gutxiago[93,94]. Loaldiaren patroian egon daitezkeen arazoei zama akademikoa, zailtasun ekonomikoak, kideen arteko lehia, hobetzeko beharra, oroimina eta gizarte arazoak gehitzen badiegu, ikasleek estresa eta antsietatea pairatzen dute[92,95]. Azkenik, nahiz eta ebidentziak aditzera eman bizi-ohitura ez osasuntsuak unibertsitate ikasleetan obesitatearekin erlazionatuta daudela, ikerketa gehienek bizi-ohitura bakar batean edo gutxi batzuetan ardaztu dituzte bere lanak. Unibertsitate komunitatean, obesitateari lotutako bizi-ohituren arteko interakzioak ikertu dituzten ikerketak eskasak dira[96,97].

1.2.2. Ikerketa honen motibazioa

Nahiz eta, denboraldi luze bateko energia desoreka gainpisua/obesitatearen arrazoi nagusia dela iruditu, faktore hau sistema biologiko konplexu baten parte da eta sistema honetan ez dago menderatzen duen influentzia bakarra. Faktore fisiologiko, ohitura dietetiko, aktibitate maila eta influentzia psikologikoek gehiegizko pisura eramaten dute populazioaren proportzio altu bat. Hala ere, obesitateari lotutako aldagaien arteko interakzioak ez dira ondo ulertzen, eta informazio honen faltak obesitatearen aurkako epe luzeko estrategiak diseinatzea erronka baten bihurtzen du.

EHU12/24 ikerketak (Euskal Herriko Unibertsitateko UPV/EHU ikerketa baten kodea) unibertsitate komunitatean oinarritutako ikuspegia erabiltzen du. Ikuspegi honi esker, antzeko patroiak dituen populazio batean obesitatearen etiologia aztertu daiteke, aldagaien kontrola eraginkorragoa izanez. Gainera, gure ezaguera arte, unibertsitate ikasleetan obesitatearen etiologia ikuspuntu zabal batetik (determinatzaile desberdinak barne hartzen dituena eta baita beraien artean egon daitezkeen interakzioak ere) aztertu duten ikerketak eskasak dira, nahiz eta populazio hau oso sentibera izan bizi-ohitura desegokiarekiko, eta honek osasunean ondorioak izan.

Alabaina, jakina da, gehiegizko GnMren pilaketaren berariazko arrazoiak populazio talde eta pertsonen arabera desberdinak direla. Aldakortasun hau ezaugarri garrantzitsua da eta konponbide desberdinak azpimarratzen ditu. EHU12/24 ikerketako unibertsitate ikasleen populazioan egindako obesitatearen kausalitatearen analisi zorrotzak direla eta, gainpisu/obesitatea prebenitzeko eta kontrolatzeko estrategiak diseinatu ahalko dira hainbat gakoren identifikazioari esker.

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2. Hipotesiak eta helburuak

2.1. Hipotesiak

Tesiaren hipotesiak hurrengoak dira:

0. Euskal Autonomia Erkidegoan (EAE) bizi den populazioari egokitutako elikagaien kontsumo maiztasunari buruzko galdetegi motzak (EKMGM) elikagai taldeen ahorakina aztertzeko baliozkotze eta errepikapen gaitasun ona aurkezten du eta lotutako aldagaiek, hala nola hezkuntza maila edo pisu estatusa, ez dute eraginik baliozkotzean eta errepikapenean.
1. UPV/EHUko unibertsitate ikasleen bizi-ohiturak, dieta barne, aldagai demografiko (adina eta sexua) eta ikasten ari diren graduko ezagutza arloarekin (EA) lotuta daude.
2. UPV/EHUko ikasle populazioa elikadura gomendio eta bizi-ohitura osasuntsuetatik urrun dago.
3. Partaideen elikadura portaerei dagokionez, dieta osasuntsuak ingurumenean inpaktu txikiagoa du, hau da, berotegi-efektuko gasen isurtze (BEGI) baxuagoa suposatzen du eta beste faktore batzuk, bizi-ohiturak, ESE edo EA, esate baterako dietaren jasangarritasunarekin lotuta egon daitezke.
4. UPV/EHUko ikasleen gainpisua/obesitatearen prebalentzia adin tarte berdineko populazio orokorrarena baino altuagoa da.
5. Gainpisua/obesitatea UPV/EHUko unibertsitate ikasleetan hurrengo aldagaiekin lotuta dago:
   - 5.a. Aldagai demografiko eta SE eta EArekin.
   - 5.b. Gorputz pisuaren pertzepzio (GPP) desegokia eta gorputz pisu eta irudiarekiko atsekabearekin.
   - 5.c. Gantz eta kolesterol baxuko dieta jarraitzearen elikadura jarrerekin (EJ).
   - 5.d. Nutrizioari buruzko hezkuntza maila baxuarekin.
6. UPV/EHUko ikasleen gainpisu/obesitatea izatearen arrisku faktoreei dagokionez:
   - 6.a. Elikadura patroi desegokiak eta dieta kalitate eskasa gainpisua/obesitatea izatearen arriskuarekin lotuta daude.
   - 6.b. Bizi-ohitura ez osasuntsuen arteko asoziazioak, gelditasuna, portaera sedentarioak (PS) eta alkohol kontsumo bezalakoak, UPV/EHUko ikasleetan gainpisua/obesitatea sufritzeko arriskua areagotzen du.

2.2. Helburuak

2.2.1. *Helburu nagusia*

Obesitatea eta gaixotasun konplexu honi lotutako arrisku faktoreei buruz ikertzeko dagoen beharra kontuan hartuta, gazte populazioan bereziki, ikerketa honen helburu nagusia hurrengoa izan zen: **gainpisua/obesitatea izateko bizi-ohiturekin lotutako arrisku faktoreak, dietarekin erlazionaturikoak bereziki, eragin psikosozialak eta faktore hauen arteko interakzioa, UPV/EHUko ikasleetan ikertzea**. Aldakorrak diren faktore hauen identifikazioari esker arrisku taldeentzako prebentzio eta kontrol estrategiak diseinatu ahalko dira.

2.2.2. *Helburu espezifikoak*

Helburu nagusi hau lortzeko, hurrengo helburu espezifikoak egin ziren:

0. EKMGM bat egokitu eta EAEn bizi den populazio talde baten elikagai taldeen ahorakina aztertzeko bere baliozkotasuna eta errepikapena ebaluatu zen. Tresna hau laginaren ahorakin dietetikoa ebaluatzeko erabiliko da hurrengo helburuak egin ahal izateko. **1. ikerketa**.
1. Ikasleek bere ohiturei buruz adierazitako datuei esker bere bizi-ohiturak deskribatzea eta aldagai demografiko (adina eta sexua) eta EArekin izan dezaketen asoziazioa aztertzea. **2. ikerketa**.
2. UPV/EHUko ikasleen bizi-ohiturak ebaluatzea egungo bizi-ohitura osasuntsuen giden gomendioekin erkatuz. **2. ikerketa**.
3. UPV/EHUko ikasleen elikadura portaerei dagokionez, ohitura dietetiko osasuntsu eta jasangarrien artean egon daitezkeen loturak ezartzea eta dieten ingurumen inpaktuari lotutako bizi-ohitura, aldagai SE, demografiko eta EA identifikatzea. **3. ikerketa**.
4. UPV/EHUko ikasleen GnM portzentajean oinarritutako gainpisu eta obesitatearen prebalentzia deskribatzea eta populazio orokorreko datuekin konparatzea. **2.** eta **4. ikerketak**.
5. UPV/EHUko ikasleen gainpisua/obesitatea eta beste faktore batzuen artean egon daitezkeen erlazioak identifikatzea:
   5.a. Aldagai demografiko eta SE eta EArekin.

5.b. GPP desegokia, gorpuz pisuarekiko atsekabea (GPA) eta gorputz irudiarekiko atsekabearekin (GIA).

5.c. Gantz eta kolesterol baxuko dieta jarraitzearen EJrekin.

5.d. Nutrizioari buruzko hezkuntza maila baxuarekin. **4. ikerketa**.

6. UPV/EHUko ikasleen gainpisu/obesitatearen arrisku faktoreei dagokionez:

6.a. Gainpisu/obesitatea eta elikadura portaeren (elikadura patroia eta dieta kalitatea, bereziki) artean eman daitezkeen asoziazioak ezagutzea.

6.b. Gainpisu/obesitatea eta beste bizi-ohitura batzuen artean egon daitezkeen asoziazioak identifikatzea, gelditasuna, PS edo alkohol kontsumoa esate baterako. **2. ikerketa**.

3. Diseinua, parte-hartzaileak eta metodoak

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The EHU12/24 cohort: survey design, instruments and participants

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EHU12/24 kohortea: ikerketaren diseinua, baliabide metodologikoak eta parte hartzeaileak

Laburpena

Helburua:

EHU12/24 ikerketa (Euskal Herriko Unibertsitateko ikerketa baten kodea) gainpisua/obesitateari lotutako bizi-ohituren arrisku faktoreak, dietarekin lotutakoak bereziki, bere eragin psikosozialak eta faktore hauen arteko interakzioak ikertzeko diseinatu zen.

Partaideak eta metodoak:

Behaketako kohorte ikerketa hau estandarizatutako protokoloa jarraituz egin zen Euskal Herriko Unibertsitateko UPV/EHU ikasle-lagin adierazgarri batean. Antropometriako neurriak, determinatzaileak ziren jarrerak, ariketa fisikoa eta dieta bezala, eta zeharkako jarrerak, faktore sozio/psikologikoak bezala, kontuan hartu ziren. Testu honetan, ikerketaren atal etiologikoaren diseinua aurkezten da, erabilitako tresnak, neurriak eta datu-prozesamendua.

Emaitzak:

Ikerketako lagina bere ezaugarri sozioekonomiko, demografiko eta ezagutza arloaren arabera deskribatzen da, eta datuak jasotzeko eta antropometriako neurriak hartzeko erabilitako metodologia ere azaltzen da. 18-28 urte bitarteko 603 ikasle izan ziren (% 59,5 emakumeak). Parte-hartze gordina % 53,5ekoa izan zen. Ezagutza arloari dagokionez, Osasun Zientzietan parte-hartze baxuena egon zen (% 38,6) Ez-Osasun Zientzietako arloekin erkatuz (% 48,3) (P = 0,003). Partaideen batezbesteko adina 20,9 urtekoa izan zen eta % 83,1 Euskal Autonomia Erkidegokoa zen. Ezaugarri sozioekonomikoei dagokionez, ikertutako aldagai gehienetan sexu eta ezagutza arloko araberako desberdintasunak zeuden. Osasun Zientzietako ikasleen joera gazteagoak izatea, Euskal Autonomia Erkidegotik kanpokoak, gurasoek unibertsitate ikasketak izatea eta gizarte estatus altuagoa izatea zela antzeman zen.

Ondorioak:

Laburbilduz, EHU12/24 kohorteak unibertsitate ikasleen obesitatearen konplexutasuna eta dimentsio-aniztasuna aztertzeko baliozko datuak ematen ditu.

Sarrera

1980ko hamarkadatik, obesitatearen prebalentzia hirukoiztu egin da Europako hainbat herrialdeetan, eta prebalentzia honek gora egiten ari du era kezkagarrian(1). Helduetan, Espainiako prebalentzia Europako herrialdeetako gorenetakoa da(2,3). Nahiz eta, denboraldi luze bateko energia desoreka gainpisua/obesitatearen arrazoi nagusia dela iruditu, faktore hau sistema biologiko konplexu baten parte da eta sistema honetan ez dago menderatzen duen influentzia bakarra(4). Faktore fisiologiko, ohitura dietetiko, aktibitate maila eta influentzia psikologikoek gehiegizko pisura eramaten dute populazioaren proportzio altu bat(5,6). Hala ere, obesitateari lotutako aldagaien arteko interakzioak ez dira ondo ulertzen, eta informazio honen faltak obesitatearen aurkako epe luzeko estrategiak diseinatzea erronka baten bihurtzen du.

EHU12/24 ikerketak (Euskal Herriko Unibertsitateko ikerketa baten kodea) unibertsitate komunitatean oinarritutako ikuspegia erabiltzen du. Ikuspuntu honi esker, antzeko patroiak dituen populazio batean obesitatearen etiologia aztertu daiteke, aldagaien kontrola eraginkorragoa izanez. Bere helburu nagusia hurrengoa izan zen: gainpisua/obesitatearen bizi-ohiturekin lotutako arrisku faktoreak, dietarekin erlazionatuak bereziki ikertzea, Euskal Herriko Unibertsitateko (UPV/EHU) ikasle-lagin adierazgarri batean.

Behaketako kohorte ikerketa honek gehiegizko gantz masaren (GnM) prebalentzia eta gainpisua/obesitatea garatzeko arrisku faktore nagusienak aztertzen ditu, estandarizatutako protokolo bat jarraituz UPV/EHUko ikasle-lagin adierazgarri batean. Ikerketa honetan, neurri antropometrikoak, determinatzaileak diren jarrerak, ariketa fisikoa (AF) eta dieta (osasun eta ingurumenaren ikuspuntuetatik) bezala, eta zeharkako jarrerak faktore sozio/psikologikoak bezala kontuan hartzen dira. Artikulu honetan, ikerketaren atal etiologikoaren diseinua aurkezten da, erabilitako tresnak, neurriak eta datu-prozesamendua. Ikerketako lagina bere ezaugarri sozioekonomiko, demografiko eta ezagutza arloaren arabera deskribatzen da, eta datuak jasotzeko eta antropometriako neurriak hartzeko erabilitako metodologia ere azaltzen da.

Unibertsitate populazioaren prebalentzia, bereziki, % 17,5 eta % 37,5 bitartean estimatzen da(7-10), eta dirudienez faktore demografikoei (gizonezkoetan eta adin nagusiagokoetan, prebalentzia altuagoa da) eta arrisku faktoreei lotuta dago (dieta ez osasuntsua, AF eza, alkohola eta tabakoa), besteak beste(7-9). Gainera, gure ezaguera arte, ikerketa gutxik(11) aztertu dute obesitatearen etiologia unibertsitate ikasleetan ikuspuntu zabal batetik (determinatzaile desberdinak barne hartzen dituena eta baita beraien artean egon daitezkeen interakzioak ere), nahiz eta populazio hau oso sentibera izan bizi-ohitura desegokiarekiko, eta honek osasunean ondorioak izan[12,13].

Alabaina, jakina da, gehiegizko GnMren pilaketaren berariazko arrazoiak populazio talde eta pertsonen arabera desberdinak direla[4]. Aldakortasun hau ezaugarri garrantzitsua da eta konponbide desberdinak azpimarratzen ditu. EHU12/24 ikerketako unibertsitate ikasleen populazioan egindako obesitatearen kausalitatearen analisi zorrotzak direla eta, gainpisu/obesitatea prebenitzeko eta kontrolatzeko estrategiak diseinatu ahalko dira hainbat gakoren identifikazioari esker. Estrategia hauek bizitzaren etapa honetan era naturalean agertzen diren aukerei abantaila hartu diezaiekete jarreran aldaketak eragiteko. Zentzu honetan, dieta jasangarriek dituzten osasun onurak[14,15] eta gazte helduek ingurumenarekiko duten sentsibilitatea[16] kontuan hartuta, ohitura dietetikoak jasangarritasunaren ikuspuntutik ere aztertzea hausnartu zen elikadura jarrera jasangarriak sustatzen dituzten estrategia nutrizionalak diseinatzeko helburuarekin. Gainera, unibertsitateko ikasleak segur aski etorkizuneko elite sozioekonomikoaren proportzio adierazgarria izango dira eta bere ohiturek eta jarrerek eredu izateko aukera gehiago dituzte[17], horregatik, ikertzeko populazio interesgarria da.

Diseinua, parte-hartzaileak eta metodoak

EHU12/24 behaketako kohorte ikerketa bezala diseinatuta dago eta obesitate eta komorbilitatearekin erlazionatutako galdekizun etiologikoei heltzen dio.

Lagina

UPV/EHUko ikasle populazioaren[18] lagin adierazgarria jasotzea zen helburu. Lagina 2012/2013. ikasturteko matrikulatze zerrendatik[18] atera zen, eta bere tamaina, gehiegizko pisu eta obesitate prebalentzia % 20,6koa[19] zela onartuz, kalkulatu zen. Horrela, % 3,5eko doitasun absolutuarekin eta % 95eko konfiantzarekin EPIDAT programaren arabera lagina 500 ikaslekoa izan behar zen. Aukeraketa zorizkoa izan zen eta bi etapako prozesua erabili zen lortzeko: lehenengo, zorizko aukeraketa egin zen ezagutza arloen eta adinean geruzatuta eta azkenik, sexu banaketa ezagutza arlo bakoitzeko kontuan hartuta egin zen.

Ikerlan honetan, haztapenak[20] erabili ziren populazioan jaso ziren datuak adierazgarriagoak egiteko. Lagina geruzatzean sartutako aldagaien haztapena kalkulatzeko (ezagutza arloa eta adina), parte-hartzaile bakoitzari haztapen koefiziente bat esleitu zitzaion.

Kronologia

Ikasleen parte hartzea 2014ko otsailetik 2017ko maiatzera arte egin zen estandarizatutako protokoloa jarraituz. Datuen erregistroa beti azterketa denboraldiaz kanpo egin zen, estresean edo antsietatean, eta portaeran, jarreran eta pisuan eragina izan dezaketen kanpoko faktoreak kontrolatzeko helburuarekin.

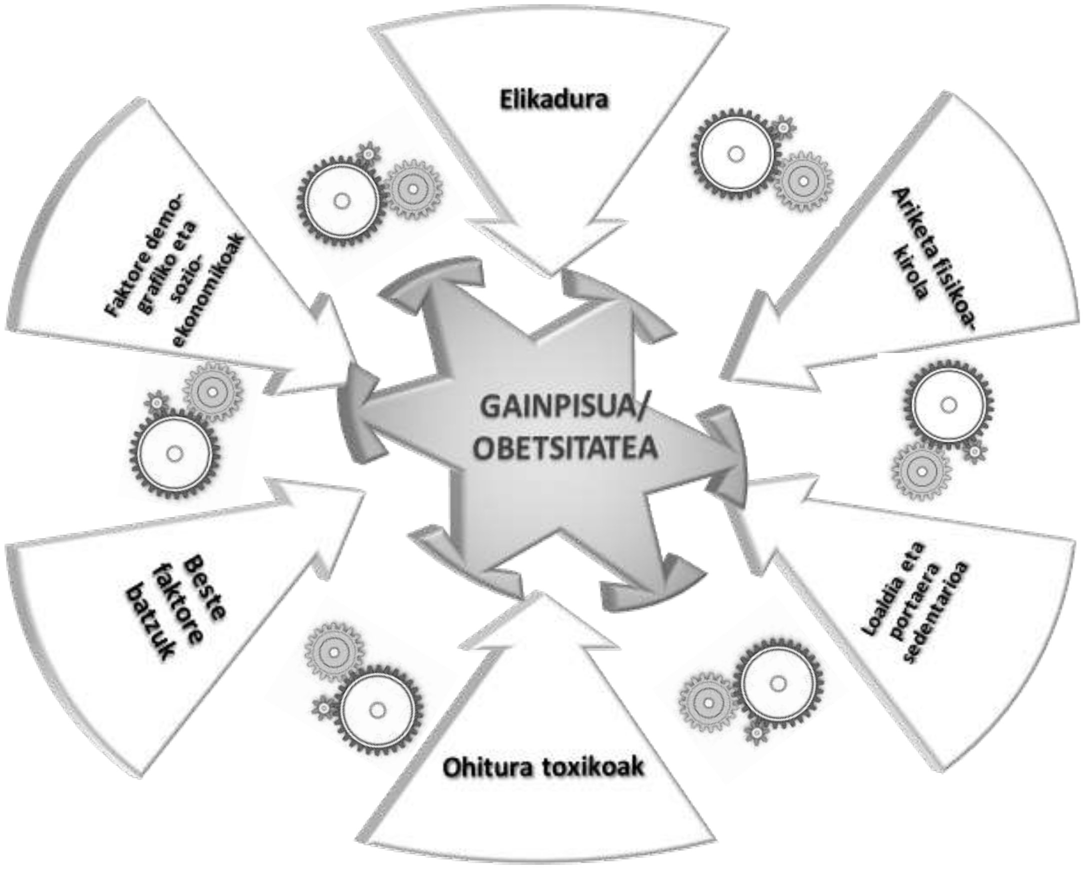
Parte-hartzaileak

Ikerketa hau Helsinkiko Adierazpenaren ildoak jarraituz egin zen eta UPV/EHUko Gizakiekin lotutako Ikerketetarako Etika Batzordeak proiektuko prozedura guztiak onartu zituen (CEISH/193/2013/ARROYO IZAGA). Parte-hartzaile guztiek idatzizko onespen informatua sinatu zuten. Pertsona bakoitzak bere ebaluazio nutrizionala, ohitura dietetikoak eta gorputz konposizioa barne, eta norberaren ariketa fisikoaren ebaluazioa jaso zuen ordain gisa ikerketan parte hartu ondoren.

Populazio osasuntsua biltzeko hurrengo inklusio irizpideak ezarri ziren: (1) 18 eta 28 urte bitarteko heldu kaukasoarrak (gehiengoko talde etnikoa) izatea; (2) metabolismoari, pisuari edo gorputz konposizioari eragina dion gaixotasun kronikorik ez jasatea edo egoera berezirik ez izatea (atleta izatea, adibidez); (3) familia harremanik ez izatea partaideen artean; eta (4) emakumeen kasuan, haurdun edo edoskitzaroan ez egotea.

Prozedurak eta ikerketaren moduluak

Ikerketako moduluak gorputz konposizioa ebaluatzeko aukeratu ziren, eta honen barne gainpisua/obesitatea eta komorbilitateak eta baita aldagaiak eta arrisku faktoreak ere daude. **1. irudiak** ikertu beharreko elementu nagusien begirada ematen du. Populazio handiko ikerketetarako baliabideak aukeratu ziren, eta hauetatik lehentasuna izan zuten ondo frogatutako edo baliozkotutako metodoak. Ingelesez diseinatutako galdetegiak gaztelaniara itzuli ziren alderantzizko itzulpen metodoa[21] erabiliz (hau da, galdetegiak gaztelaniara itzuli ziren eta ondoren, bertako batek ingelesera itzuli zituen berriro). Gainera, baliabide eta neurri bakoitzak, denbora aldetik efizientea izateaz gain, populazio honetan erabiltzeko egokia eta etikoki onargarria izan behar zuen. Elkarrizketak, ordubeteko iraupena zuen eta bi egunetan banatzen zen, galderei erantzuteko behar zen kontzentrazioa bermatzeko. Ikerketa taldeak fakultate edo unibertsitate eskoletatik mugitzeko unitate mugikorra sortu zuen.



1. irudia: EHU12/24 ikerketako diseinua eta aldagai nagusiak.

Galdetegiak eta neurriak

1. taulan azaldutako ikerketako moduluak aurrez aurreko elkarrizketaren bidez egin ziren: faktore demografiko eta sozioekonomikoak, familia eta norberaren gaixotasun aurrekariak, datu akademikoak, bizi-ohiturak, gorputz irudi eta pisuaren ebaluazioa, gantz eta kolesterol gutxiko dieta jarraitzearekin erlazionatutako jarrerak, gorputz pisua kontrolatzeko portaerak, nutrizioarekiko jakintzak; eta baita antropometria ere.

Datu demografiko eta sozioekonomikoak. Galdetegiaren atal honen barne hurrengo galderak zeuden: adina, sexua, partaideen jaiotza-lekua, gurasoen ikasketa maila, jarduera ekonomikoa eta lanbidea, gurasoen kategoria profesionala, etxean bizi diren pertsonen zenbakia eta lotarako erabilitako logelen zenbakia. Alderdi guzti hauek atzera begirako erara erregistratu ziren Osasun Inkesta Nazionalaren bidez(22).

Datuen analisia errazteko, aldagai batzuk kategorizatu ziren: gurasoen jarduera ekonomikoa (lanean, jubilatuak edo pentsionistak, eta besteak (ikasten edo ordaintze gabe)), eta gurasoen kategoria profesionala horrela sailkatu zen: zerbitzu sektorea (profesionalak eta teknikoak, exekutibo eta managerrak, zerbitzu administratiboak, ostalaritza, zerbitzuak eta segurtasuna), lehenengo sektorea (nekazaritza eta abeltzaintza, arrantza), sektore industriala (industria, eraikuntza eta garraioko langile gaituak, langile ez gaituak eta garbitzaileak) eta besteak (etxeko andreak, langabetuak eta jubilatuak).

Etxean bizi diren pertsonen zenbakia eta lotarako erabilitako logelen zenbakian oinarrituta metaketa indizea kalkulatu zen (etxean bizi diren pertsonak/lotarako erabilitako logelen zenbakia). Metaketa indizea Cabrera de León *et al.*-ek(23), proposatutako irizpidea jarraituz sailkatu zen, indizea 2 baino altuagoa bazen 0 balioa eman zen, 1 eta 2ren artean bazegoen 1 balioa, eta 1 baino gutxiago bazen 2 balioa, horrela, zenbat eta puntuazio baxuagoa izan, gero eta altuagoa izango da estatus soziala.

Datu akademikoak. Urte akademikoaz gain, ikasten ari ziren graduen informazioa ere erregistratu zen. Graduak Hezkuntza, Kultura eta Kirol Ministerioak(24) proposatutako ezagutza arloen arabera sailkatu ziren (Arteak eta Giza Zientziak, Zientziak, Osasun Zientziak, Gizarte eta Lege Zientziak eta Ingeniaritza eta Arkitektura). Ondoren, ezagutza arloa Osasun Zientzietan eta Ez-Osasun Zientzietan kategoriatan banatu zen.

Datu medikoak. Hautemandako osasun eta gaixotasun kronikoei buruz galdetu zitzaien ikasleei(22). Era berean, hautemandako bizi kalitatea eta estres maila erregistratu zen(25). Norbera eta familiaren (gurasoen) gaixotasun aurrekariak Osasun Inkesta Nazionalaren(22,26) zerrendaren bidez erregistratu ziren. Datu hauekin batera, menarkiaren adina galdetu zen, adipositatearekin erlazionatuta egon daitekeelako(27).

Norekin bizi dira eta egoera sentimentala. Partaideen bizilekuarekin erlazionatutako datuak eta egoera sentimentala Bennassarr-en[25] galdetegiarekin jaso ziren. Egoera sentimentala pertsona bakoitzaren egoera bikotearekiko definitu daiteke, egoera zibila kontuan hartu gabe. "Bikotea" duten partaideek bikotearekin bizi daitezke edo ez, eta "ez bikotea" duten partaideak, bitartean, ez dira bikote baten parte.

Ahorakin dietetikoa. Dieta egokitutako eta baliozkotutako elikagaien kontsumoaren maiztasunari buruzko galdetegi motz batekin (EKMGM)[28] ebaluatu zen. EKMGMren baliotasuna eta errepikatzeko gaitasuna energia, nutriente eta elikagaien ahorakinak neurtzen dituzten bi ikerketa metodoak (EKMGM vs. 24 orduko oroitzapena) konparatuz egin zen (artikulua prentsan).

Galdetegi hau erabiliz, ikasleei lehenengo galdetzen zitzaien ea berariazko item bakoitza kontsumitzen zuten. Partaideek itema jaten bazuten, anoa bakoitzeko maiztasunari buruz galdetzen zitzaien (egunero, astero edo hilabetero)[29]. Elikagai bakoitzeko eguneroko ahorakina batezbesteko kontsumo maiztasunean eta elikagai item bakoitzaren kantitatean oinarritzen zen. Hainbat elikagai zituzten itemetan, elikagai bakoitzaren ekarpena ohiko kontsumoaren haztapen koefizienteekin[30] kalkulatu zen. Gero, elikagai item guztiak DIAL 2.12[31], dietak baloratzeko programan sartu ziren, eta horrela energia eta nutriente guztien ahorakina estimatu zen. Emaitzak eguneko kontsumo (g)/4,184kJ bezala adierazten dira. Gainera, partaideek galdera ireki bat zuten azkenengo hilabetean galdetegian agertzen ez zen elikagai edo edariren bat hartu bazuten, adierazi ahal izateko eta bere maiztasuna idazteko. Dietan zeuden edo ez eta arrazoiak[32] deskribatzeko ere eskatu zitzaien.

Ikasleek bere ahorakin dietetikoa gutxiesten zuten edo ez egiaztatzeko helburuarekin, Black-ek[33] eguneratutako Goldberg-en[34] metodoa erabili zen. Honek iragarritako oinarrizko metabolismo tasa erabiltzen du (nutrizio ikerketa askotan erabilitako adin eta sexu berariazko Schofield-en[35] ekuazioak aplikatu ziren) eta baita adierazitako ahorakin dietetikoa/oinarrizko metabolismo tasa ratioa ere jarduera fisikorako eskuragai dagoen energia kantitatea kalkulatzeko.

Makronutrienteak energia-ingestio guztiaren portzentaje bezala aurkeztu eta makronutrienteen banaketa tarte onargarriekin erkatu ziren, hau da, gaixotasun kronikoen arrisku baxuarekin lotutako ahorakin tarte eta oinarrizko nutrienteen ahorakin egokiak[36] hornitzen dituzten balioekin konparatu ziren. Gantzen kontsumoa Espainiako populazioarentzat erabiltzen diren helburu nutrizionalekin[36] aztertu ziren. Batezbesteko eskakizuna (ingelesez *EARs, estimated average requirements*) nutrienteen egokitzapena aztertzeko erabilitako metodoa izan zen. Bizitzaren aro edo sexu talde[37,38] zehatz baten % 50ek duten nutrizio-beharra asetzeko egunero kontsumitu behar duten mantenugai-kantitatea azaltzen du. Emaitzak batezbesteko eskakizun portzentaje bezala adierazi dira. Energia eta nutrienteen ingestioaren egokitzapena aztertzeaz gain, elikagaietan oinarritutako gida dietetikoen egokitzapena *Healthy Eating Index* (HEI)[39] eta *MedDietScore* (MDS)[40] bitartez ebaluatu zen. Nahiz eta, HEI amerikar gidetan oinarrituta egon, Europako populazioetan egindako ikerketa askotan eta baita Europako unibertsitate ikasleetan[41,42] ere erabili izan da, eta honek emaitzak erkatzen laguntzen digu.

Jatorduen patroiei buruzko informazioa[25,32] erregistratu zen baliozkotutako formularioetan oinarritutako galdetegia erabiliz. Honek hurrengo atalak zituen: otorduen maiztasuna, lan egunetan jaten zuten lekua, bakarrik edo konpainian jaten zuten eta asteburuetan gerta daitezkeen ohitura dietetikoen aldaketak. Parte-hartzaileei egun "normal" batean zer jaten zuten, jateko behar zuten denbora eta otordu nagusia edo mokadua zen zehazteko eskatu zitzaien. Ingestio guztiak ezagutzea zen helburua, nahiz eta edari bat izan. Orokorrean, otordu arina bada ere, gosaria otordu nagusitzat hartu zen komunitate-elikadurarako Espainiako Elkartearen[43] gomendioak jarraituz eta "40-year trends in meal and snack eating behaviors of American adults"[44] artikuluan bezala. Jasotako datuetan oinarrituta, otordu nagusi eta otordu guztietako batezbesteko denbora kalkulatu zen. Bestalde, elikagaien erosketen eta prestakuntzaren arduradunaren buruzko informazioa[25], partaideen ohitura dietetikoen, dieten nutrizio kalitatearen eta eguneko kaloria ahorakinaren pertzepzioa, nutrizio jakintzak eta azkenengo 5 urtean 20 elikagai taldeetan gertatutako aldaketak ere erregistratu ziren Scott-ek garatutako galderekin[32].

Bestetik, ohitura dietetikoak jasangarritasunaren ikuspuntutik ere aztertu ziren, literaturaren arabera, dieta jasangarriek berotegi-efektuko gasen isurtzea (BEGI) murriztu dezaketelako eta aldi berean, osasun publikoko onurak izan, gainpisu eta obesitatearen maila murriztea bezala[14,15]. Pubmed-en 2000. urtetik 2015. urtera arte publikatutako artikuluen azterketa egin zen, elikagai bakoitzeko BEGI isurtzea eCO_2kg/elikagai kg identifikatzeko. Erabilitako gako-hitzak hurrengoak izan ziren "greenhouse gas emissions", "food consumption", "sustainable diet", "life cycle", "carbon footprint", "cultivated planet" eta "environmental impact". Datuak aukeratzerako orduan hurbiltasun geografikoa kontuan hartu zen eta posible izanez gero iturri desberdinetako informazioa erkatu zen.

Produktu guztien bizi-zikloaren azterketa datuak bateratzeko helburuarekin, etxerako garraio edo sastarren datuak ez zuten elikagaietan, zuzenketa faktoreak ezarri ziren. Elikagai taldeek dieten BEGIren ikerketetan erabilitako irizpidea jarraituz sailkatu ziren[45] eta elikagai itemak Euskal Autonomia Erkidegoan (EAE) kontsumitzen diren elikagaien azterketa kuantitatibotik aukeratu ziren[30]. Datu hauek eCO_2kg/pertsona eta eguna kalkulatzeko erabili ziren, EKMGMtik kalkulatutako ahorakin dietetikoa eta non jaten zuten kontuan hartuta (etxean, unibertsitateko kafetegian…) literaturatik ateratako BEGI datuak erabiliz.

Azkenik, 237 ikasleko azpilagin batean (% 44,3 emakumeak) elikagaien erosketan eragina duten jasangarritasunarekin lotutako arrazoiak aztertu ziren Sautron *et al.*-ek[46] garatutako galdetegiaren bertsio laburrarekin. Galdetegi originalak 104 galdera zituen eta adituen eta literaturaren irizpideak jarraituz 4 kategoriatan banatuta zeuden (ingurumena, osasuna eta ongizatea, ekonomikoa eta besteak). Bertsio motzean, galdetegi originaletik elikagaien erosketei buruzko hamabost galdera orokorrak aukeratu ziren eta, baita, beste hamabost berariazko elikagai taldeen erosketak egiteko arrazoiak (haragia, arraina, frutak eta barazkiak eta esnekiak). Bertsio motzeko fidagarritasuna Cronbach-eko α-rekin aztertu zen. Emaitza 0,905ekoa izan zen eta honek barne sendotasun altua adierazten du.

Loaldia, portaera sedentarioa, AF eta kirol praktika. Adierazitako loaldiaren iraupena hurrengo galderarekin aztertu zen, "Unibertsitateko egun normal batean, zenbat ordu egiten dituzu lo?"[22]. AF (ariketa mota, astean zenbat egun eta zenbat denbora egunean, aktibitate nagusia egunean zehar eta aisialdian egiten den ariketaren maiztasuna) eta portaera sedentarioak (PS) (eserita igarotzen den denbora) *International Physical Activity Questionnaire*-ren (IPAQ)[47] galdetegiaren bertsio motzarekin erregistratu ziren.

Gainera, adierazitako AF maila ("Zure adinekoekin konparatuz askoz aktiboagoa, aktiboagoa, bezain aktiboa, gutxiago, askoz gutxiago zara?"), kirola edo kirol aktibitateen praktika, kirola vs lehiaketako kirola eta kirol mota (banaka edo taldean) erregistratu ziren. Azken datu hauek *Adult Physical Activity Questions on the National Health Interview Survey:* 1975-2012[48] ikerketan garatutako eta baliozkotutako galdetegiarekin erregistratu ziren eta AF/kirola ez egitearen arrazoiak Romaguerak[49] garatutako galdetegiaren bidez jaso ziren.

Ohitura toxikoak. Erretzeko ohitura (bai edo ez, hasierako adina eta zigarro zenbakia/egun) eta alkohol kontsumoa (bai edo ez, kontsumo maiztasuna eta alkohol mota) Osasun Inkesta Nazionalaren[22] galderekin jaso ziren. Gainera, elikagaien kontsumo maiztasunaren galdetegiak 5 edari motari buruzko galdera zehatzak zituen: garagardoa, ardoa, sagardoa, alkoholdun aperitiboak eta likoreak. Alkohol kontsumoaren datuak alkohol gramo eta edari unitate estandarra bezala (EUE)[50] astean, astean zehar (astelehenetik ostegunera) eta asteburuetan (ostiraletik igandera) adierazi ziren. Ikerketa honetan, Espainiak definitutako EUE erabili zen (EUE esan nahi du edari unitate batek 10 gramo etanol puru dituela). Komunitate-elikadurarako Espainiako Elkartek[43] kontsideratzen dituen ebaki puntuak kontuan hartuta, arriskuko edaleak 2 EUE/egunean edaten ditu gizonen kasuan eta 1 EUE/egunean, emakumeen kasuan. Tabako kontsumoa kontuan hartuta hurrengo taldeak osatu ziren: ez-erretzaileak, < 10 zigarro/egun erretzen zutenak, 10-20 zigarro/egun erretzen zutenak eta > 20 zigarro/egun erretzen zutenak[22].

Gorputz Irudiaren Ebaluazioa. Williamson *et al*-ek[51] garatutako irudien metodoarekin eta Brownell-ek[52] garatutako eskalarekin aztertu zen. Lehenengoa obesitate ikerketetan gorputz irudia estimatzeko garatu zen. Metodologia hau norberaren desadostasun teorian[53] oinarritzen da eta norberak estimatzen duen egungo gorputz neurria, gorputz neurri ideala eta zentzuzko gorputz neurria neurtzen du.

Bigarrena, Brownell-en metodoak[52], gorputzaren goiko atalerako 8 giza irudi ditu, eta beste 8 behe atalerako, sexu bakoitzerako garatuak. Partaideek bere egungo gorputz irudia, hobeto irudikatzen zuen irudia aukeratu behar zuten, baina baita, bere gorputz irudi ideala, aitaren gorputz irudia, amaren gorputz irudia eta baita gorputz irudi erakargarria bai sexu berdinekoa bai kontrako sexukoa norberaren orientazio sexualaren arabera ere hautatu behar zuten. Gorputz irudiaren atsekabearen neurri bezala egungo gorputz neurria eta gorputz neurri idealaren arteko desberdintasuna erabili zen. Honez gain, gorputz irudiaren atsekabea 1etik (ez asea) 7ra (oso asea) arteko Likert eskala batekin neurtu zen.

Gantz eta kolesterol baxuan oinarritutako dietei lotutako elikadurarekiko jarrerak. Nutriziorekiko jarrerak Hollis *et al.*-ek[54] garatutako galdetegiaren itzulpenarekin ebaluatu ziren. Metodo honek gantz eta kolesterol gutxiko dieta jarraitzearen kognizio eta portaerak neurtzen ditu, eta itemak oinarrizko lau faktoretan sailkatu ziren: a) borondate eza eta ez osasungarria, b) elikagaien araketa, c) haragia gogoko izatea eta d) kontzientzia osasuntsua.

Pisu kontrola. Atal honek pisua kontrolatzeko ahaleginei buruzkoa da eta *Weight Cycling Survey*[52,55,56] metodologiarekin aztertu zen. Galdetegiaren atal honek lau faktoretan banatutako hamabost galdera zituen: pisuaren aldaketak eta mantentzea, pisatzearen lekua eta maiztasuna, pisuaren pertzepzioa eta giza jarrerak, eta pisua kontrolatzeko portaerak.

Nutrizioarekiko jakintzak. Partaideek *Consumer Nutrition Knowledge Scale*[57] galdetegia erantzun zuten. Galdetegi honen bidez parte-hartzaileek bere nutrizio jakintzak erakutsi ditzakete (edo bere jakintza falta), nutrizio gaiekin erlaziorik ez duten ikasleek batez ere. Jatorrizko galdetegiaren itzulpena erabili zen ikerketan, eta egindako egokitzapen bakarra hemengo ohiko gazta erabiltzea izan zen mozzarella eta Gruyère ordez hurrengo esaldian: “Mozzarellarekin egindako sandwich batek eta Gruyèrekin egindako beste batek kaloria berdinak dituzte”.

Neurri antropometrikoak. ISAK[58] protokoloa jarraituz ondo entrenatutako antropometrista batek egin zituen neurketa guztiak. Aztertutako antropometriako neurriak hurrengoak izan ziren: pisua (kg), altuera (zm), garaiera ileoespinala (zm), altuera eserita (zm), zirkunferentziak (besoa, izterra, zangosarra, gerria eta aldaka; zm), diametroak (biakromiala, bikrestala, ukondoa eta belauna; zm) eta larruazalpeko izurrak (bizipitala, trizipitala, subeskapularra, abdominala, izterra eta zangosarra; mm).

Pisua eta altuerarekin Gorputz Masaren Indizea (GMI) kalkulatu zen, pisua (kg)/altuera (m^2) formula erabiliz. Ikasleen pisu egoera Munduko Osasun Erakundeak[59] GMI sailkatzeko dituen irizpideak jarraituz egin zen. GnM % larruazalpeko izurren datuekin eta Durnin-ek eta Womersley-ek[60] eta Siri-k[61] proposatutako adin eta sexu berariazko ekuazioarekin kalkulatu zen, *Sociedad Española para el Estudio de la Obesidad* (SEEDO)[62] erakundeak gomendatzen duen bezala. Gantz masaren indizea (GnM (kg)/m^2) GnM (kg) eta altuerarekin (m) kalkulatu zen. Ihar masa GnM %atik kalkulatu zen (100-% GnM), eta ihM indizea gantz gabeko masa (kg) eta altuerarekin (m) kalkulatu zen (kg/m^2).

Partaideen GnM % Bray *et al.*-en[63] irizpidea jarraituz sailkatu zen. Gorputz gantzaren banaketa gerriaren zirkunferentzia, gerria/aldaka indizea eta larruazalpeko izurren gehiketarekin aztertu zen[64]. Gerriaren perimetroa SEEDOren[65] irizpidea jarraituz kalkulatu zen. Gerria/aldaka indizearen emaitzak Heymsfiled *et al.*-ek[66] proposatutako ebaki-puntuekin sailkatu ziren eta hauek, GnM % normala baino altuagoa bazen bakarrik erabili ziren. Larruazalpe subeskapularra, abdominala eta suprailiakoaren gehiketa gorputz enborreko gantzaren adierazgarri bezala erabili zen. Larruazalpe bizipitala eta trizipitalaren gehiketa, aldiz, besoko larruazalpeko gantzaren adierazgarri gisa erabili zen eta hankako larruazalpeko gantzaren adierazletzat izterreko eta zangoko larruazalpeen gehiketa hartu zen. Eskeletoaren tamaina neurtutako zabalerarekin zehaztu zen, biakromiala eta biiliakoa gorputz tamaina zehazteko erabili ziren eta ukondoa eta belauna, berriz, gorputz-adarrak determinatzeko[64].

Gorputz pisuaren pertzepzioa. Norberak adierazitako altuera (zapatarik gabe) zm-tan eta pisua kg-tan (arroparik gabe) erregistratu zen. Adierazitako eta neurtutako datuak egun berdinean hartu ziren baina adierazitakoak lehenago jaso ziren, ondoren neurtu egin behar zituztela jakin gabe. Horregatik, adierazitako balioak epidemiologiako ikerketa baten lortu daitezkeen antzerakoak dira. Pisu idealari buruz (“Gustatuko litzaizukeen pisua zein izango litzateke?”) eta pisu osasuntsuari buruz (“Medikuaren esanetan, zein izango litzateke zure pisu osasuntsua?”)[55] ere galdetu zitzaien.

Pisuaren pertzepzioak eta GMI pertzepzioak[67] norberak adierazitako eta neurtutako pisu eta GMIren arteko desberdintasunekin aztertzen zituzten:

Pisuaren pertzepzioa (1) = ((adierazitako pisua – neurtutako pisua) / neurtutako pisua) x 100

GMI pertzepzioa = ((adierazitako GMI - neurtutako GMI) / neurtutako GMI) x 100

Pisu ideala eta pisu osasuntsuko aldagaiak “pisuen arteko desberdintasun portzentajea”[67] bezala kalkulatu zen.

Gorputzarekiko atsekabea = ((pisu ideala – adierazitako pisua) / adierazitako pisua) x 100

Pisu osasuntsuaren pertzepzioa (1)= (pisu osasuntsua – adierazitako pisua) / adierazitako pisua) x 100

Pisu osasuntsuaren pertzepzioa (2)= (pisu osasuntsua – neurtutako pisua) / neurtutako pisua) x 100

Pisu osasuntsuaren pertzepzioa (3)= ((pisu ideala – pisu osasuntsua) / pisu osasuntsua) x 100

“Pisuaren desberdintasun portzentajea”, pisuen arteko desberdintasuna ≥ % 5ekoa bazen onartu zen. % 5eko ebaki puntu hau aurrez egindako ikerketa batean[(68)] erabili zen, gutxiago pisatzeko desira ebaluatzeko pisu ideala eta egungokoaren arteko diskrepantzia neurtuz. Bere erraztasuna eta baliagarritasunagatik[(69)] aukeratu zen metodo hau.

Datu-prozesamendua

Neurri guztiak ikerketaren gidaliburuan zehaztutako prozedurak jarraituz egin ziren eta modulu guztien ikerketa pilotua egin ondoren. Ikerketan parte hartu zuten pertsona guztiek entrenamendu saioak jaso zituzten. Neurri guztiak tresneria berdinarekin egin ziren. Partaide bakoitza identifikatzeko zenbakiak erabili ziren, eta hauek galdetegi bakoitzari lotuta zeuden. Datuen kalitatea egiaztatzeko, neurri antropometrikoen *inter* eta barne fidagarritasuna baliozkotzeko partaideen azpi-laginak behin eta berriro aztertu ziren. Horrez gain, galdetegien fidagarritasuna egiaztatzeko komeniko ikasle-lagin bateri, galdetegia berriro eman zitzaion. Datuak babesteko, hauek, zentral batean zeuden eta datuen eskuratzea baimena zuten ikertzaileen esku zegoen.

1. taula: EHU 12/24 ikerketan hartutako neurrien eta aldagaien laburpena

Aurrez aurreko elkarrizketa	Datu demografikoak	Parte-hartzaileen adina, sexua eta jaiotza-lekua.
	Datu sozioekonomikoak	Gurasoen ikasketa maila, jarduera ekonomikoa eta lanbidea, etxean bizi diren pertsona kopurua eta logela zenbakia. *Metaketa indizea*.
	Datu akademikoak	Ikasturtea eta gradua edo graduondoa. *Ezagutza arloa*.
	Datu medikoak	Osasun-egoera, bizi-kalitatea, estres maila, norberaren eta familiaren gaixotasunak eta menarkia adina (emakumeen kasuan).
	Bizi-ohiturak	Norekin bizi diren, egoera sentimentala. Elikadura ohiturak: elikagaien maiztasuna, elikadura patroiak (eguneroko MedDietScore, otordu motak, elikadura ohituren aldaketak asteburuetan, otorduen iraupena eta lekua, erosketa eta bazkari prestaketaren arduraduna, elikadura ohituretan egondako aldaketak azkenengo 5 urtean eta norberaren dietaren nutrizio kalitatearen pertzepzioa. *Energia ahorakina, makro/mikronutrienteak (elikagai konposizio tauletan oinarrituta), energia eta nutrienteen egokitzapena, dietaren kalitate indizeak (Healthy Eating Index-2010, Med Diet Score) eta otorduen arteko denbora*. *Ingurumen jasangarria: ohitura dietetikoei lotutako kg eCO_2/pertsona.* Elikagaiak aukeratzeko ingurumen arrazoiak (azpilagina). Loaldia, portaera sedentarioa (eserita igarotako denbora). AF (ariketa mota, zenbat egun/astean eta zenbat denbora/egunean, ariketa nagusia egunean zehar, AFren maiztasuna aisialdian, norberak adierazitako AF maila), AF edo kirola praktika, eta AF edo kirola ez egitearen arrazoiak. *MET-minutu/aste, ariketa mailaren araberako sailkapena.* Ohitura toxikoak: alkohol kontsumoa (maiztasuna eta alkohol mota) eta tabako ohitura (bai edo ez, hasteko adina eta zigarro zenbakia/egunean). *EUE*

Hurrengo orrialdean jarraitzen du.

1. taularen jarraipena.

Metodoa	Intereseko neurria	Aldagaiak*
Aurrez aurreko elkarrizketa	Gorputz irudiaren ebaluazioa	EGN, GNI, ZGN eta GNE *t*-scores. EGI, GII, AIGI, AMGI, GIE gorputzeko goiko eta beheko ataletarako. *Gorputz irudi atsekabea: EGN - GNI t-score-ak, EGN - ZGN t-score-ak, EGI - GII gorputzeko goiko eta beheko ataletarako.*
	Gantz eta kolesterol baxuan oinarritutako dietei lotutako elikadurarekiko jarrerak	Borondate eza eta ez osasungarria, elikagaien araketa, haragia gogoko izatea eta kontzientzia osasuntsua.
	Pisua kontrolatzeko portaerak	Pisu aldaketak eta mantentzea, pisatzearen maiztasuna eta lekua, norberaren pisuaren pertzepzioa eta pisua kontrolatzeko portaerak.
	Nutrizioarekiko jakintzak	Kaloria eta nutrienteen edukiak, elikagaien arteko konparaketak, elikagai taldeek elikadura osasuntsu batean duten garrantzia, gantzaren garrantzia eta fruta eta barazkien onurei buruzko galderak.
Antropometria	Neurriak	Neurtutako pisua (kg), altuera (zm), zirkunferentziak (besoa, gerria eta aldaka, zm), gorputzeko diametroak (biakromiala, bikrestala, ukondoa eta belauna, zm) eta larruazalpeko izurrak (bizipitala, trizipitala, subeskapularra, suprailiakoa, abdominala, izterrekoa eta zangosarra, mm). *Antropometriako indizeak eta gorputz konposizioa: GMI, GnM, GnMI, ihM, ihMI, GAI, gorputz gantzaren banaketa (besoak, hankak, gerrialdea) eta gorputz neurria (gerrialdea, gorputz-adarrak).*
	Gorputz pisuaren pertzepzioa (norberak adierazitako eta neurtutako datak)	Adierazitako pisua eta altuera, desiratutako pisua, pisu osasuntsua. *Adierazitako pisua, adierazitako GMI, Gorputz pisuarekiko atsekabea, adierazitako pisu osasuntsua.*

Laburdurak: AF, ariketa fisikoa; AIGI, aitaren gorputz irudia; AMGI, amaren gorputz irudia; EGI, egungo gorputz irudia; EGN, egungo gorputz neurria; EUE, edari unitate estandarra; GAI, gerria-aldaka indizea; GIE, gorputz irudi erakargarria; GII, gorputz irudi ideala; GMI, gorputz masaren indizea; GNE; gorputz neurri erakargarria; GNI, gorputz neurri ideala; GnM, gantz-masa; GnMI, gantz-masaren indizea; ihM, ihar masa; ihMI, ihar masaren indizea; MET, baliokide metabolikoak; ZGN, zentzuzko gorputz neurria.

*Letra etzanez idatzitako testua neurri zuzenetatik eratorritako datuei dagokie.

Analisi estatistikoa

Datuen analisi estatistikoa SPSS 22.0 bertsioarekin egin zen (SPSS Inc., Chicago, IL) eta emaitzak batezbestekoa (desbideratze tipikoa, DT) eta maiztasun moduan aurkeztu ziren. Ikerketaren emaitzak haztatu egin ziren UPV/EHUko 2012/2013ko matrikulazio zerrendatik ateratako haztapen koefizienteak(18) erabiliz. Datu kuantitatiboen normaltasun analisia Kolmogorov–Smirnov–Lilliefors probarekin aztertu zen. Aldagaien arteko desberdintasunak Kruskal Wallis H testarekin kalkulatu ziren (datuak haztatu zirenez aldagaiek ez dute banaketa normala jarraitzen, hau da, lagina handia zen eta desbideratze txikiek aldagaiak banaketa normala ez jarraitzea egiten zuten). Aldagai kualitatiboak χ^2 testarekin aztertu ziren. Analisiak sexu bakoitzeko egin ziren, ahorakin dietetikoan desberdintasunak daudelako(70) eta baita beste bizi-ohitura batzuetan, ezagutza arloa eta adina bezala, ere(71,72). Azken hau, 4 kategoriatan banatu zen (18, 19, 20 eta >= 21 urte). Adin desberdintasunak adin kronologikoa errespetatuz kalkulatu ziren, aldaketa fisiologikoetan (antropometria eta gorputz irudia) eta ingurumenaren egokitzapenean egon daitezkeen desberdintasunak aztertzeko. Proba estatistiko guztiak 2 aldekoak izan ziren, eta balio adierazgarri gisa $P < 0,05$ zutenak hartu ziren, % 95eko konfiantza-tartearekin.

Emaitzak

Parte-hartzea

2. taulan UPV/EHUko populazioaren, lortu beharreko lagin teorikoaren, lortutako laginaren, ezagutza arloaren eta adinaren araberako eta partaide bakoitzeko haztapen koefizientearen eta baita datu hauek sexu araberaren informazioa ere ageri gelditzen da. Guztira, 1.300 gonbidatutako partaideetatik 696 bere baimena eman zuten eta ikerketan parte hartu zuten, horrela erantzun proportzioa % 53,5ekoa izan zen (2. taula). Datuak aztertzeko, aurrez aurreko galdetegia eta neurri antropometrikoak eskatzen ziren. Eskakizun hau, 603 partaideek betetzen zuten, hau da, gonbidatutako partaideetatik % 46,4k. **2. irudian**, baztertutako parte-hartzaileen zenbakiak eta arrazoiak azaltzen dira.

Ezagutza arloari dagokionez, Osasun Zientzietan parte-hartze proportzio baxuena lortu zen (% 38,6) eta Arte eta Giza Zientzietan altuena (% 52,5) ($P < 0,001$); eta joera hau mantentzen da, Osasun Zientzietako eta Ez-Osasun Zientzietako ikasleak erkatzen direnean (% 38,6 vs. % 48,3; $P = 0{,}003$). Adinaren kasuan, 19 urtekoek gutxiago parte hartu zuten (% 20,9) eta nagusienek gehiago (% 35,5) ($P < 0{,}001$).

Ezaugarri demografiko eta sozioekonomikoak

3. taulan ikerketako partaideen zenbait ezaugarri demografiko eta sozioekonomikoak azaltzen dira. Parte-hartzaileen batezbesteko adina 20,9 urtekoa zen eta % 59,5ekoa neskak ziren. Orokorrean, laginaren % 83,1 EAEkoa zen eta % 2,4 atzerriko herrialdeetakoak. Gainerakoak, Espainiako beste autonomia batetik zetozen. Aldagai guztietan (adina, jaiotza-lekua, gurasoen ikasketa maila, aktibitate ekonomikoa, jarduera eta kategoria profesionala), metaketa indizean izan ezik, sexu desberdintasunak zeuden ($P < 0{,}001$).

Ikasleen ezagutza arloaren araberako ezaugarri demografiko eta sozioekonomikoari dagokionez (**4. taulan**) ageri gelditzen zen Osasun Zientzietako ikasleen joera gazteagoak izatea, EAEtik kanpokoak, gurasoek unibertsitate ikasketak izatea eta gizarte estatus altuagoa izatea zela. Eta sexu banaketa ezagutza arloaren arabera dagokionez, emakume gehiago zeuden gizonak baino Osasun Zientzietako graduetan (% 18,2 vs. % 7,5; $P < 0{,}001$).

Eztabaida

EHU12/24 proiektuak arrakasta izan zuen 603ko lagina lortzen, eta guztiek bete zuten protokolo osoa (aurrez aurreko elkarrizketa eta neurri antropometrikoak). Parte-hartze gordina % 53,3koa zen eta baxua gerta daiteke beste unibertsitate ikasleetan eginiko ikerketekin[(71)] erkatuz. Hala ere, portzentaje hau gure ikerketan justifika daitekeen datua dugu, alde batetik, elkarrizketa ordubetekoa zelako (bere aisialdian egin beharrekoa) eta bestetik, neurri antropometriak hartzen zitzaizkielako eta ez zegoelako pizgarri ekonomikorik. Arrazoi hauek kontuan hartuta, proportzioa ona kontsidera daiteke eta beste ikerketa batzuetan[(73)] egindakoaren antzerakoa.

2. taula: Euskal Herriko Unibertsitatearen UPV/EHU populazioa eta ikasle-lagina ezagutza arloa, adina eta sexuaren arabera

										Emakumeak			
Ezagutza arloa	Adina	EHUko populazioa[1] n	%	Lagin teorikoa n	%	Lagin erreala n	%	Parte-hartze tasa (%)	Haztapen koefizientea	EHUko populazioa n	%	Lagin teorikoa n	Lagin erreala n
Zientziak	18	512	26,7	9	25,7	17	24,3	45,7	30,1	1,955	54,3	21	37
	19	521	27,2	10	28,6	12	17,1	54,0	43,4				
	20	433	22,6	8	22,9	14	20,0	48,3	30,9				
	≥21	450	23,5	8	22,9	27	38,6	37,5	16,7				
	Guztira	**1.916**	**7,7**	**35**	**100,0**	**70**	**100,0**	**46,4**[2]					
Ingeniaritza eta Arkitektura	18	1.362	20,4	27	20,6	30	23,1	42,9	45,4	1,817	25,2	33	41
	19	1.234	18,5	24	18,3	21	16,2	36,9	58,8				
	20	1.238	18,5	24	18,3	31	23,8	48,9	39,9				
	≥21	2.842	42,5	56	42,7	48	36,9	50,5	59,2				
	Guztira	**6.676**	**26,2**	**131**	**100,0**	**130**	**100,0**	**44,8**[2]					
Osasun Zientziak	18	765	21,0	15	21,4	31	26,3	43,8	24,7	2,936	76,3	52	92
	19	902	24,8	17	24,3	27	22,9	45,9	33,4				
	20	824	22,7	16	22,9	26	22,0	47,9	31,7				
	≥21	1.145	31,5	22	31,4	34	28,8	16,7	33,7				
	Guztira	**3.636**	**13,7**	**70**	**100,0**	**118**	**100,0**	**38,6**[2]					
Gizarte eta Lege Zientziak	18	1.869	16,1	37	16,8	39	18,8	40,1	47,9	7,264	59,9	126	142
	19	2.334	20,1	46	20,0	51	24,5	54,9	45,8				
	20	2.436	21,0	48	21,8	46	22,1	47,3	53,0				
	≥21	4.985	42,9	89	40,4	72	34,6	55,9	69,2				
	Guztira	**11.624**	**42,1**	**220**	**100,0**	**208**	**100,0**	**49,6**[2]					

Hurrengo orrialdean jarraitzen du.

2. taularen jarraipena.

Ezagutza arloa	Adina	EHUko populazioa[1] n	EHUko populazioa[1] %	Lagin teorikoa n	Lagin teorikoa %	Lagin erreala n	Lagin erreala %	Parte-hartze tasa (%)	Haztapen koefizientea	Emakumeak: EHUko Populazioa N	Emakumeak: EHUko Populazioa %	Emakumeak n	Emakumeak %
Arteak eta Giza Zientziak	18	488	21,1	10	20,8	18	23,4	61,4	27,1	1,638	65,3	34	57
	19	545	23,6	11	22,9	15	19,5	37,4	36,3				
	20	592	25,6	12	25,0	11	14,3	52,7	53,8				
	≥21	689	29,8	15	31,3	33	42,9	58,3	20,9				
	Guztira	**2.314**	**10,4**	**48**	**100,0**	**77**	**100,0**	**52,5**[2]					
	GUZTIRA	**26.166**		**504**		**603**		**46,4**[3]					

[1]Lagina UPV/EHUko 2012/2013ko matrikulazio zerrendatik atera da[(18)]; [2]Batezbesteko parte-hartze tasa ezagutza arlo bakoitzeko; [3]Batezbesteko parte-hartze tasa lagina guztian.

2. irudia: Baztertutako ikasle zenbakia inklusio irizpideak ez betetzearren.

3. taula: Laginaren ezaugarri demografiko eta sozioekonomikoak: Euskal Herriko Unibertsitatearen ikasleak sexuaren arabera (batezbestekoa eta desbideratze estandarra; portzentajeak)

Aldagaiak	Lagin osoa (n=26.165)		Gizonak (n=10.607)		Emakumeak (n=15.558)[5]		*P*[†]
Adina, urteak DE	20,9	2,1	21,1	2,3	20,7	2,0	***
Jaiotza herria							
EAE	83,1		82,6		83,4		
Espainia (EAE izan ezik)	14,5		15,4		13,9		
Europa (Espainia izan ezik)	1,2		1,5		1,1		
Hego Amerika	1,2		0,4		1,7		***
Gurasoen ikasketa maila							
Unibertsitateko ikasketak	46,5		54,9		40,7		
Besteak[1]	53,5		45,1		59,3		***
Aitaren jarduera ekonomikoa							
Lanean	86,9		89,4		85,3		
Jubilatuak edo pentsionistak	7,3		6,4		8,0		
Besteak[2]	5,7		4,2		6,0		***
Amaren jarduera ekonomikoa							
Lanean	74,6		76,9		73,0		
Jubilatuak edo pentsionistak	1,4		0,9		1,8		
Besteak[2]	24,0		22,3		25,2		***

Hurrengo orrialdean jarraitzen du.

3. taularen jarraipena.

Aldagaiak	Lagin osoa (n=26.165)	Gizonak (n=10.607)	Emakumeak (n=15.558)[5]	$P^{\dagger}$
Aitaren lanbidea				
Langile finkoa	68,3	71,7	66,1	
Aldi baterako langilea	2,7	2,5	2,9	
Besteak[3]	28,9	25,8	31,0	***
Amaren lanbide				
Langile finkoa	66,5	67,5	65,7	
Aldi baterako langilea	7,3	5,4	8,5	
Besteak[3]	26,3	27,1	25,7	***
Aitaren kategoria profesionala				
Zerbitzu sektorea	67,1	76,9	75,4	
Lehen sektorea	2,0	1,9	0,2	
Sektore industrial	27,2	17,9	7,2	
Besteak[4]	3,7	3,2	17,2	***
Amaren kategoria profesional				
Zerbitzu sektorea	70,5	60,4	67,2	
Lehen sektorea	0,3	2,0	0,4	
Sektore industrial	10,6	33,6	12,8	
Besteak[4]	18,6	4,1	19,6	***
Metaketa indizea				
> 1	40,9	40,5	41,2	
≤ 1	59,1	59,5	58,8	EE

†Sexu desberdintasunak. *$P < 0{,}05$; **$P < 0{,}01$; ***$P < 0{,}001$.

[1]Bietako inork du unibertsitate ikasketak; [2]Gaixorik egotea 3 hilabete edo gehiago, langabezian, ikasten, ordaintze gabe edo etxeko andrea; [3]Ikasten, ordaintze gabe edo etxeko andrea; [4]Etxeko andrea, langabezian edo erretiratua; [5]Ikerketaren emaitzak haztatu egin dira UPV/EHUk emandako laginaren haztapen koefizienteak erabiliz.

EE, ez esanguratsua.

4. taula: Laginaren ezaugarri demografiko eta sozioekonomikoak: Euskal Herriko Unibertsitatearen ikasleak ezagutza arloaren arabera (batezbestekoa eta desbideratze estandarra; portzentajeak)

Aldagaiak	Osasun Zientziak (n=3.637)		Ez-Osasun Zientziak (n=22.529)[5]		$P^{\dagger}$
Adina, urteak	20,7	2,1	20,9	2,1	
Jaiotza herria					
EAE	71,7		84,9		
Espainia (EAE izan ezik)	26,7		12,5		
Europa (Espainia izan ezik)	-		1,5		
Hego Amerika	1,6		1,1		***
Gurasoen ikasketa maila					
Unibertsitateko ikasketak	48,1		46,2		
Besteak[1]	51,9		53,8		*
Aitaren jarduera ekonomikoa					
Lanean	85,5		87,2		
Jubilatuak edo pentsionistak	9,2		7,0		
Besteak[2]	5,3		5,8		***
Amaren jarduera ekonomikoa					
Lanean	69,5		75,4		
Jubilatuak edo pentsionistak	1,8		1,3		
Besteak[2]	28,6		23,3		***
Aitaren lanbidea					
Langile finkoa	68,3		68,3		
Aldi baterako langilea	3,3		2,6		
Besteak[3]	28,4		29,0		*
Amaren lanbidea	65,5		66,6		
Langile finkoa	7,4		7,2		
Aldi baterako langilea	27,1		26,2		EE
Besteak[3]					
Aitaren kategoria profesionala					
Zerbitzu sektorea	67,2		67,0		
Lehen sektorea	4,4		1,6		
Sektore industrial	26,5		27,4		
Besteak[4]	1,9		4,0		***
Amaren kategoria profesionala					
Zerbitzu sektorea	71,1		70,4		
Lehen sektorea	2,3		-		
Sektore industrial	5,2		11,4		
Besteak	21,4		18,1		***
Metaketa indizea					
> 1	33,8		42,1		
≤ 1	66,2		57,9		***

Hurrengo orrialdean jarraitzen du.

4. taularen jarraipena.

†Sexu desberdintasunak. **P* < 0,05; ***P* < 0,01; ****P* < 0,001.
[1]Bietako inork du unibertsitate ikasketak; [2]Gaixorik egotea 3 hilabete edo gehiago, langabezian, ikasten, ordaintze gabe edo etxeko andrea; [3]Ikasten, ordaintze gabe edo etxeko andrea; [4]Etxeko andrea, langabezian edo erretiratua; [5]Ikerketaren emaitzak haztatu egin dira UPV/EHUk emandako laginaren haztapen koefizienteak erabiliz.
EAE, Euskal Autonomia Erkidegoa; EE, ez esanguratsua.

Partaideen banaketa ezagutza arloaren araberari dagokionez, gure ikerketako datuak eta Balear Uharteetako unibertsitate ikasleenak(25) antzekoak dira, Giza eta Lege Zientziak eta Ingeniaritza eta Arkitektura arloetan izan ezik, beraiekin erkatuta ikasle gutxiago genituen lehengo arloan eta gehiago bigarrenengoan. Nolanahi ere, ikerketa honetan, zorizko lagina geruzatu egin zen UPV/EHUko ezagutza arloen arabera. Gainera, desberdintasun hauek ez dute eraginik ikerketen erkaketan gure ikerlanean ezagutza arloa Osasun Zientzietan eta Ez-Osasun Zientizietan banatu zelako, eta aurretik aipatutako bi arlo hauek kategoria berdinean sartzen dira (Ez-Osasun Zientziak). Gure ikerketan, Osasun Zientzietako ikasleek gutxiago parte hartu zuten; eta hau gerta daiteke ikerlanaren helburua dela eta, eskainitako konpentsazioa delarik eta baita Osasun Zientzietako ikasleak askotan gonbidatuak izaten direlako mota honetako ikerketetara.

Partaideen batezbesteko adinari buruz, Erresuma Batuan(74) eta Grezian(75) egindako ikerketetakoen antzekoa da; baina gure ikerketaren antzeko ezaugarriak dituen Espainiako beste eskualde batzuetan egindako beste ikerketa batekin(19) erkatuta baxuagoa da. Azken emaitza hau izan daiteke 28 urte baino gorako ikasleak baztertu egin zirelako, kontuan hartuta lagin guztiaren % 3,0a bakarrik suposatzen zutela (eta UPV/EHUko populazioaren % 2,5a). Ezagutza arloaren araberako adin desberdintasunak lagina haztatuta dagoelako da, horrela, lagin handietan desbideratze txikiek adierazgarri egiten dituzte desberdintasunak, eta baita analisietan adin dezimala erabili delako ere. Emakumeen parte-hartzeari dagokionez, gure datuak UPV/EHUko populazioaren adierazgarri ziren eta pixkat altuagoak Balear Uharte(71) eta Almeriako(76) unibertsitateko lagin adierazgarrietan egindako ikerketekin konparatuz.

Partaideen hiru laurdenen jaiotza-lekua eta unibertsitatea kokatuta dagoen autonomia berdina zen (EAE), eta berdina gertatzen da Espainiako beste ikerketa batzuetan(77,78). Datu hauek bat datoz urtero CRUEk (*Conferencia de Rectores de las Universidades Españolas*) argitaratzen duen “The Spanish University in numbers” (79) txostenean, eta ikasleen mugikortasun baxua azaldu dezaketen hainbat arrazoi egon daitezke: a)

Espainiako unibertsitateak eskaintza dibertsifikatutako eta ikasleen lurraldeko gertutasuna jarraitzen duen eredua garatu duelako; b) beka gutxi daudelako, mugikortasunarentzat bereziki[79]; c) UPV/EHUk bakarrik eskaintzen duelako graduko irakasgai guztiak euskaraz ikasteko aukera; eta d) azkenik, familia lotura. Bekei dagokionez, garapen maila antzerakoa duten Europako beste herrialde batzuekin konparatuz[79], hemengo beken zenbakia eta kantitatea baxuagoa da. Osasun Zientzietako graduen kasuan, Euskal Herritik kanpoko ikasleen portzentajea altuagoa zen Ez-Osasun Zientzietako ikasleekin konparatuz, eta hau izan daiteke hemengo eskaintza zabalagoa delako gertuko unibertsitate publikoekin konparatzen bada, hala nola, Kantabriakoa, Errioxakoa edo Nafarroakoa.

Datu sozioekonomikoei dagokiolarik, unibertsitate ikasketak zuten ikasleen gurasoen portzentajea Suedian[80] edo Grezian[81] eginiko beste ikerketa batzuekin konparatuta baxuagoa zen. Ostera, kontuan hartu behar da Espainian Hezkuntza Lege Orokorra[82] 1970ean onartu zela eta ezaugarrien artean 6 eta 14 bitarteko umeentzako oinarrizko hezkuntza doakoa zegoen, eta momentu horretatik aurrera unibertsitate ikasleen tasak gradualki gora egin duela. Hala ere, gure datuak Balear Uharteetan[49] egindako ikerketa batenak baino altuagoak dira. Nahiz eta biak Espainiako Autonomia Erkidegoak izan, gaur egun, aipatzekoa da, EAEko unibertsitate tasa Estatuko altuerenetarikoa dela, eta Balearretakoa, baxuenetakoa[83], eta posible da, orain dela 30 urte joera antzekoa izatea. Gurasoen jarduera ekonomikoari dagokionez, gure datuak Santiago de Compostelako (Espainia) Unibertsitate publikoaren[84] antzekoak dira. Azken datu hauek oso interesgarriak izan daitezke, ikertzaile batzuek[85,86] aditzera eman dutelako ekonomi mailak eta amaren ikasketa mailak osasun jarrerak modulatzen dituztelako.

Sendotasun eta ahultasun nagusiak

UPV/EHUko ikasleen gainpisu/obesitatearekin lotutako bizi-ohituren, bereziki dietarekin erlazioa duten arrisku faktoreen ikerketaren eguneratzea sendotasun nagusitzat har daiteke. Ikerlanaren mugaketa nagusienak hurrengoak dira: lehenengoa, diseinu transbertsaleko ikerketa dela eta, honek behatutako erlazioen kausalitatea baloratzea mugatzen du eta ikasleen ohitura dietetikoei, AFri, kirol praktikari eta aisialdiko aktibitateari eta portaera sedentarioei buruzko erantzunek alborapen joera izan dezakete. Elikagaien ahorakina ere gutxiegi edo gehiegi estimatuta egon zitekeen, batez ere talde jakin batzuetan pisua edo sexua[87] dela eta. Nolanahi ere, elikagaien maiztasunari buruzko galdetegi balioztatuak[88], hainbat nutrienteei buruzko informazio fidagarria ematen du.

Bigarrena, datuak aurrez aurreko elkarrizketan jaso ziren, eta hau zehaztugabea da eta alborapen joera izaten du. Baina, galdetegien interpretazioaren aldakortasuna gutxiesteko helburuarekin, galdera guztiak ikerketa taldeak egin zituen eta hainbat buruzpide eman ziren gaizki ulertuak saihesteko. Kontuan hartu behar da, ikerlan epidemiologikoetan, parte-hartzaileen erantzuna gizarte gogoan oinarritzen dela, baina, gaur egun, datu-base gutxi daude guk batu dugun bizi-ohiturei buruzko informazio adina dutenek.

Hirugarrena, neurri antropometriko guztiak pertsona berdinak hartu zituen, horrela, neurketa akatsak asko gutxiesten dira. Laugarrena, nahiz eta aldagaien arteko asoziazio analisietan garrantzitsuak diren hainbat aldagaietara doitu, ezin da baztertu kontuan hartu ez diren beste faktore soziokultural eta ingurumenekoek ahuldu egin ditzaketela ikertutako asoziazioak.

Bosgarrena, ohitura dietetikoei lotutako BEGI kalkulatzeko aukeratutako metodologiari dagokionez, produktuen bizi-zikloen hainbat urrats, produktuak etxean prestatzea bezala, datu faltagatik ez genituela kontuan hartu. Seigarrena eta azkena, emaitzak ikasle-lagin batean oinarrituta daude, beraz, hezkuntza mailak partaideen bizi-ohituretan eragina izan dezake. Horregatik, emaitzak ezin dira hedatu adin berdineko populazio guztietara; eta gomendagarria izango litzateke, ikerketa hau unibertsitatetik at erreplikatzea.

Ondorioak

Laburbilduz, lehenengo aldiz, EHU12/24 ikerketak, protokoloan dauden neurriak erabiliz, unibertsitate ikasle komunitate bateko obesitatearen determinatzaileen hainbat datu azaldu zituen. Ondo aukeratutako neurriak erabiliz, EHU12/24 proiektuak obesitatearen oinarrizko adierazleak (pisua, altuera eta neurri antropometrikoak) bakarrik ez zituen neurtu; gaixotasun honi lotuta dauden jarrera osasuntsu eta ez osasuntsuak ebaluatzeko metodologia garatu zuen, eta baita influentzia psikosoziala eta hauen arteko interakzioak aztertzeko ere. EHU12/24 kohorteak gainpisu/obesitatearen arrisku faktoreak, bereziki dietarekin erlazioa dutenak, analizatzeko baliodun datuak lortu zituen.

Unibertsitatean igarotzen den denbora momentu on bat denez osasuna sustatzeko, eta ikerketa honetan batutako datuek mekanismo kausalari buruz informazio gehiago emango dutenez eta lehen mailako prebentziorako aldakorrak diren faktoreak identifikatzen lagunduko dutenez, autoreek espero dute artikulu honek beste ikertzaile batzuei beste ikasle komunitate batzuetan ikerketa hau erreplikatzeko balio izatea. Horrela datuak erraz eta zehazki konparatzeko aukera egongo da. Alabaina, galdetegian kulturalki sentikorrak diren hainbat gai daude, ohitura dietetikoak bezala, beraz, helburu populazioari egokitu eta baliozkotu beharko da.

Eskerrak

Egileek partaide guztien parte-hartzea eskertzen dute eta baita, proiektu honen testuinguruan Gradu edo Masterreko praktikak egin dituzten ikasle guztien laguntza ere.

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Interes-gatazka

Bat ere ez.

Autoretza

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4. Emaitzak

1. ikerketa

Public Health Nutrition

THE NUTRITION SOCIETY Advancing Nutritional Science

Euskal Autonomia Erkidegoan (Espainia) bizi den populazioaren ahorakin dietetikoa ebaluatzeko egindako elikagaien kontsumo maiztasunari buruzko galdetegi motzaren egokitzapena, baliozkotze eta errepikapena

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Artikulua Prentsan.

Laburpena

Helburua:

Ikerketa honetan elikagaien kontsumo maiztasunari buruzko galdetegi motz (EKMGM) bat egokitu zen eta Euskal Autonomia Erkidegoan (EAE) bizi den populazioaren elikagai taldeen ahorakina ebaluatzeko zuen baliozkotze eta errepikapen gaitasunak analizatu ziren. Gainera, baliozkotasunean eta errepikapenean lotura duten aldagaien (hezkuntza maila, esaterako) eragina aztertu zen.

Diseinua:

Baliozkotzea aztertzeko urtebeteko epean egindako 9 eguneko 24 orduko oroitzapenak (24 OO) erabili ziren erreferentziako metodo bezala. Bi EKMGMeko azpisailkapeneko gradua kuartilen kontingentzia taulak eta 2. EKMGMa eta 9 eguneko-24 OOak erkatzen zituzten Bland-Altman-en grafikoak erabiliz aztertu ziren. Errepikapena aztertzeko EKMGMa birritan bete zen.

Kokapena:

Euskal Autonomia Erkidegoa.

Parte-hartzaileak:

Ikerketan 21 urte baino gorako pertsonek parte hartu zuten (n = 99). Lagina zoriz aukeratu zen eta ikertu beharreko populazioaren adierazgarri izan zen.

Emaitzak:

Baliozkotzean, estatistikoki esanguratsuak ziren korrelazioak behatu ziren elikagai taldeen erdian baino gehiago, korrelazio baxuena (r edo rho) gantzarako (-0,008) izan zen eta altuena beste elikagai batzuentzat (0,963). Bi metodoekin kuartil berdinean edo albokoan sailkatutako batezbesteko partaideen portzentajea % 75,2koa izan zen. Errepikapenaren tartea, korrelazio koefizientearen bidez aztertuta, 0,201etik-0,809ra zihoan, eta partaideen % 82,6a bi EKMGMetan kuartil berdinean edo albokoan zegoen. Lotutako aldagaiek ez zuten eraginik EKMGMen baliozkotze eta errepikapenean.

Ondorioak:

Funtsean, egokitutako EKMGMak ikertutako populazioaren elikagai talde gehienetan errepikapen eta baliozkotze ona aurkezten zuen, eta emaitza hauetan lotutako aldagaiek ez zuten eraginik.

Gako-hitzak:

Elikagaien kontsumo maiztasunari buruzko galdetegia; baliozkotzea; errepikapena; elikagai taldeak; 24 orduko oroitzapenak; ahorakin dietetikoa; Espainia.

Sarrera

Minbizia eta zirkulazio sistemaren gaixotasunak Euskal Autonomia Erkidegoko (EAE)[1] eta Espainiako[2] heriotza-tasaren kausa nagusienak dira; eta datu hauek bat datoz Europako heriotza-tasarekin, Osasun Munduko Erakundeak argitaratutako txostenaren arabera[3]. Bizi-ohiturek, dieta barne, aurretik aipatutako gaixotasun ez kutsakorren tratamendu eta prebentzioan garrantzi handia dute[4-6]. Testuinguru honetan, komunitatean oinarritutako parte-hartze programetan, nutrizio ebaluazioa dieta aldaketen lehenengo pausua da[7]; alabaina, ezaguna da dietak gaixotasunean duen eraginaren ikerketetan, ahorakin dietetikoaren ebaluazioan dagoen zehaztasun faltak ziurgabetasuna eragiten duela[8] eta zalantza hauek faktore dietetikoek gaixotasunetan duten eragina ulertzeko oztopo bihurtu daitezke[9].

Dieta ebaluatzeko metodo batzuek, erregistro dietetikoa edo historia dietetikoa bezala, denbora eta dirua suposatzen dute, eta honek eragiten du metodo hauek ikerketa handietarako ez-aproposak izatea[9]. Horregatik, Elikagaien Kontsumo Maiztasun Galdetegia (EKMG), beste metodo dietetikoen artean, ikerketa epidemiologikoetan ahorakin dietetikoa ebaluatzeko funtsezko tresna izan eta izango da[10,11], erabiltzeko erraza delako, denboraldi luze bateko ahorakin dietetikoa neurtzeko gaitasuna duelako eta kostu gutxikoa delako[12)]. Metodo honetan, aukeratutako elikagai itemak zerrenda baten jartzen dira eta ahorakinen maiztasuna eta anoa apuntatzen da. Elikagai item baten kontsumoa, maiztasuna bere anoaz biderkatzen kalkulatzen da[13].

EKMGak duen elikagai item zenbaki baxuak, beste metodo ireki batzuekin konparatuz, eragiten du datuak jasotzeko, prozesatzeko eta aztertzeko metodo erraz eta merkea izatea[14]. Gainera, EKMGren bertsio motz (EKMGM) bat erabiltzen bada, datuak prozesatzeko denbora murriztu egiten da eta partaideei ez zaie hain astuna egiten[15] dieta ebaluatzeko beste metodo batzuekin erkatuz. Badaude aurretik populazio talde desberdinentzat garatutako eta baliozkotutako EKMGMak[16,17], baina etniak, gizarteak eta kulturak eragina dutenez ohitura dietetikoetan eta EKMGMa kulturari eta etniari gaitzikorra denez, EKMGa populazio bakoitzerako garatu behar da[13,18].

Nahiz eta EKMG batzuk Espainiako populazioaren zenbait helburuetarako baliozkotuta egon, gure ezaguera arte, Euskal Autonomia Erkidegoan (EAE) bizi den populazioarentzat ez dago baliozkotutako EKMGMik. Beraz, populazio honen patroi dietetikoa eta nutrizio hobekuntza ebaluatzen duen EKMGM bat behar da[19]. Ikerketa hau EKMGM bat egokitu eta Euskal Autonomia Erkidegoan bizi den populazioaren elikagai taldeen ahorakina ebaluatzeko zuen gaitasuna baliozkotu eta errepikatzeko egin zen eta lotura duten aldagaiek (hezkuntza maila edo pisu egoera, esaterako) baliozkotasunean eta errepikapenean izan dezaketen influentzia aztertzeko. Ikerketa honetan erabilitako jatorrizko EKMGMa, Espainiako beste eskualde bateko populazio orokorrean baliozkotutako galdetegia izan zen[20].

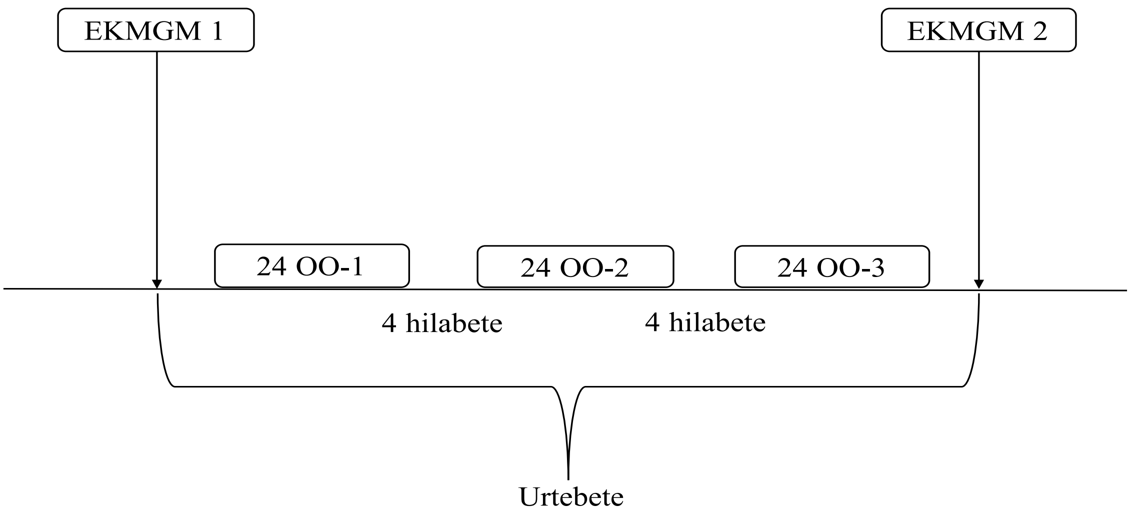
Metodoak

Partaideak eta ikerketaren diseinua

Aztertu beharreko populazioa EAEn (Espainiako Iparraldean) bizi zen helduez osaturiko lagina zen. Laginketaren diseinua polietapikoa eta sexuan eta adinean geruzatuta, Euskal populaziotik zoriz aukeratuta lagin adierazgarria lortzeko helburuarekin egin zen[21]. Laginaren tamaina Cade *et al.*-en[14] irizpideak jarraituz aukeratu zen. Irizpide honen arabera 50 eta 100 bitarteko partaide kopurua nahikoa da EKMGren baliozkotasuna aztertzeko. Populazio osasuntsu bat lortzeko hurrengo inklusio irizpideak ezarri ziren: (1) 18 urte gorako helduak; (2) gutxienez 5 urte eramatea EAEn bizitzen; (3) dieta berezirik behar duten gaixotasunik ez pairatzea; (4) dietan ez egotea; eta (5) beste partaideekin familia harremanik ez izatea.

Partaideak 2013ko otsailetik 2014ko otsailera arte errekrutatu ziren. 135 pertsona gonbidatuak izan ziren ikerketan parte hartzera eta erantzute tasa % 73,3koa izan zen, hau da, 99 pertsonek onartu zuten parte hartzea eta lehenengo EKMGM (1. EKMGM) eta lehenengo txandako hiru 24 orduko oroitzapenak (24 OO) bete zituzten. Ikerketa hasi zuten 99 partaideetatik, 82k bete zituzten 24 OOko 3 txandak, 1. EKMGM eta bigarren EKMGM (2. EKMGM), eta hauek izan ziren azken analisietan sartu zirenak (% 56,1 emakumeak). Beraz, parte-hartze tasa % 60,7koa izan zen. 24 OOen txanda bakoitzak 3 dei telefoniko zituen (egun ez jarraietan), eta dei horietan partaideei eskatzen zitzaien aurreko egunean jandako elikagai eta edari guztiak deskribatzeko eta baita kantitate guztiak ere. 3 eguneko informazioa jaso zen, 2 lan egunak eta bestea asteburukoa edo jai eguna (elkarrizketa bakoitzean egun bateko informazioa jasotzen zen). 24 OOko 3 txandak 4 hilabeteko epearekin bata bestearen artean egin ziren.

Batezbesteko adina 47,3 urtekoa zen (21,0-88,0ko tartea, desbideratze estandarra (DE)17,8) eta batezbesteko gorputz masaren indizea (GMI) 25,2 kg/m^2 (17,0-36,5ko tartea, DE 4,2) eta bi aldagai hauentzako, adina eta GMI, ez ziren desberdintasun esanguratsuak aurkitu sexuaren arabera ($P > 0{,}05$). Ikerketak urtebete iraun zuen. **1. irudian** ikerketaren diseinua azaltzen da. Ikerlanaren hasieran zein bukaeran parte-hartzaileek EKMGM berdina bete zuten (1. EKMGM eta 2., hurrenez hurren), ondo entrenatutako elkarrizketatzaile batek egindako aurrez aurreko elkarrizketan. Nahiz eta galdetegia ebaluatzeko ikerketa aurrez aurreko elkarrizketen bidez egin, ondorengo ikerketetan, galdetegi berdina bakoitzak bete zezan erabili izan da, galdetegia betetzeko aurkibideekin eta zalantzak argitzeko lan taldearen laguntzarekin. Edozein kasutan, bai galdetegia elkarrizketaren bidez egin denean edo bakoitzak bete duenean, dietista batek galdetegi guztiak birpasatu ditu bukatu ondoren.



1. irudia: Baliozkotze ikerketaren fluxua.
24 OO, 24 orduko oroitzapenak; EKMGM, elikagai kontsumo maiztasunari buruzko galdetegi motza.

Elikagaien kontsumo maiztasunari buruzko galdetegi motza (EKMGM)

EKMGM originalarekin erkatu eta gero[20], eta EAEn kontsumitzen diren elikagaien azterketa kuantitatiboa egin eta gero[22], populazio honetan maiz kontsumitzen diren 22 item berri identifikatu genituen. Galdetegi originalak 45 item zituen eta baliozkotutako EKMGMri gehitutako itemak hurrengoak izan ziren: zereal integralak (muesli, zereal integralak…); zuntzdun gailetak; gurina; margarina; azukrea (esnea, jogurta edo kafeari gehitutakoa); eztia; baratxuria eta tipula; elikagai frijituak edo gehitutako olioa duten elikagaiak; ogi integrala; tomate saltsa frijitua; maionesa; pikantea (piperbeltza, paprika, txiliz egindako saltsa pikantea…); gatza; saltxitxak, foie grasa eta patea; hirugiharra; mahaspasa, aranpasa, pikupasa, datilak; kafea edo tea; sagardoa; alkoholdun aperitiboak (bermuta…) (elikagai itemak EKMGMean ordenatuta dauden bezala agertzen dira).

Gainera, galdetegiaren bertsio berrian, esne eta jogurt itemak hurrengo itemetan sailkatu ziren: esne osoa, erdigaingabetua eta gaingabetua; jogurt osoa eta gaingabetua; eta honek 3 itemeko gehikuntza suposatzen zuen, galdetegi originalean elikagai bakoitzeko item bakarra zegoelako. Azkenik, EKMGMak 67 item zituen. Galdetegi originalarekin konparatuz, item berriak zituzten elikagai taldeen banaketa hurrengoa izan zen: *haragi prozesatua* (EKMGM originalak, 2 item vs. baliozkotutako EKMGMak, 4 item), *esnea eta esnekiak* (EKMGM originalak, 5 item vs. baliozkotutako EKMGMak, 8 item), *zerealak* (EKMGM originalak, 3 item vs. baliozkotutako EKMGMak, 5 item), *frutak eta barazkiak* (EKMGM originalak, 7 item vs. baliozkotutako EKMGMak, 9 item), *gozoak eta azukrea* (EKMGM originalak, 10 item vs. baliozkotutako EKMGMak, 13 item), *beste elikagai batzuk* (EKMGM originalak, 2 item vs. baliozkotutako EKMGMak, 5 item), *beste edari alkoholiko batzuk* (EKMGM originalak, item 1 vs. baliozkotutako EKMGMak, 3 item), *gantzak* (EKMGM originalak, 0 item vs. baliozkotutako EKMGMak, 2 item), *kafea edo tea* (EKMGM originalak, 0 item vs. baliozkotutako EKMGMak, item 1), *gehitutako gatza* (EKMGM originalak, 0 item vs. baliozkotutako EKMGMak, item 1) eta *pikantea* (EKMGM originalak, 0 item vs. baliozkotutako EKMGMak, item 1). Beste elikagai taldeen banaketa berdin gelditu zen. Bestalde, EKMGMean ez zeuden elikagaiak jasotzeko, sojako produktuak bezala, adibidez, erantzun irekiko galdera bat zegoen. Galdera honetan, elikagai bat idazten bazen, bere kontsumo maiztasuna ere jasotzen zen.

Elikagai item bakoitzeko, partaideei galdetzen zitzaien ea berariazko item hori kontsumitzen zuten. Kontsumitzen zutela esaten bazuten, elikagai bakoitzeko anoa kontsumo maiztasunari buruz galdetzen zitzaien (astero edo hilabetero)[(23)]. Olio begetalen kontsumoari dagokionez, estimatzeko zailtasuna dela eta, kasu guztietan ikertutako populazioaren kontsumoaren mediana erabili zen, hau da, 29,89 g/egun[(22)]. Honez gain, elikagai frijituei, olioa gehitutako elikagaiei (entsalada, adibidez) eta elikagaiekin erabilitako olioari buruz (oliba, ekilore, arto, soja edo besteak) galdetzen zitzaien; eta datu hauen konbinazioarekin olio bakoitzeko eguneko proportzioa kalkulatu zen.

EKMGMren bidez lortutako elikagai bakoitzeko astero edo hilabeteroko ahorakin maiztasunaren erantzunak egunean kontsumitzen ziren kopuruan bihurtu ziren. Elikagai item bakoitzeko eguneko ahorakina (g/egun) elikagai horren eguneko anoak anoa horren tamainaren (Espainiako anoa estandarra erabiliz) bidez biderkatuz kalkulatu zen[23]. Hainbat elikagai zituzten itemetan, elikagai bakoitzaren ekarpena ohiko kontsumoaren haztapen koefizienteekin[22] kalkulatu zen. Elikagai item guztiak DIAL 2.12[24], dieta ebaluatzeko programan, sartu ziren, ahorakin energetikoa estimatzeko. Elikagai taldeen ahorakinaren emaitzak eguneko kontsumoa 1.000 kcal-tan adierazten dira.

24 orduko oroitzapen metodoa (24 OO)

Innovative Dietary Assessment Methods in Epidemiological Studies and Public Health – Standard Operating Procedure-ren (IDAMES SOP)[25] protokoloa erabili zen anoen tamainan akatsak gutxiesteko 24 OOetan. Protokolo honetan oinarrituta, entrenatutako dietista batek egin zituen 24 OOak eta bukatutako oroitzapen guztiak dietista-ikertzaile arduradunak aztertu zituen zehaztasuna bermatzeko. Protokoloak zehazten zuen bezala, akatsak saihesteko parte-hartzaileek ez zekiten noiz bete behar zituzten 24 OOak. Telefonoz egindako elkarrizketa bakoitzean, behin harremanetan jarrita, prozedurari buruzko azalpen txiki bat ematen zitzaien. Aurreko 24 orduetan jan edo edandako guztiari buruz galdetzen zitzaien, eta ondoren, partaideek xehetasun osoz deskribatu behar zituen aurretik esandako elikagai guztiak, hau da, elikagai mota eta bere ezaugarriak (esne osoa, arrain freskoa, etab.), prestatzeko era, ongailuak (erabilitako olio mota) edo ongarriak.

Aldi berean, dietista elkarrizketatzaileak fitxategi batean datu guztiak jasotzen zituen, eta elkarrizketa bukatzean, dietistak fitxategia bukatu eta birpasatzen zuen. Datu hauek DIAL 2.12 programan[24] sartzen ziren eta partaideek plater konbinatuen osagaiak ez zekizkitenean, hauek bilatu egiten ziren[26,27] eta estandarizatutako errezeta datu-base batean sartzen ziren.

Koaldagaiak

Ikerketaren hasieran ezaugarri soziodemografiko eta ekonomikoen informazioa (sexua, adina, egoera sentimentala eta seme-alabak, jaiotza-lekua, bizilekua, etxean bizi ziren pertsonen zenbakia eta lotarako erabilitako logelen zenbakia, hezkuntza maila, jarduera ekonomikoa eta azken lanpostua) eta bizi-ohituren datuak (alkohol kontsumoa, tabakoa, loaldiaren iraupena eta ariketa fisikoa (AF)) jaso zen 1. EKMGMrekin batera, aurrez aurreko elkarrizketan. Datu hauek Osasun Inkesta Nazionalaren galderekin erregistratu ziren[28].

Etxean bizi ziren pertsonen zenbakia eta lotarako erabiltzen ziren logelen zenbakien datuekin metaketa indizea kalkulatu zen. Indize hau estatus sozialaren erakusle ona kontsideratzen da[29]. Datuen analisia errazteko, hurrengo aldagaiak berriro sailkatu ziren: adina bi kategoriatan sailkatu zen mediana kontuan hartuta (partaide gazteenak < 46 urte eta partaide nagusienak ≥ 46 urte), egoera sentimentala (bikoterik gabe (ezkongai, bananduta edo dibortziatua, alarguna) edo bikotearekin (ezkonduta), jaiotza-lekua (EAEn edo besteak (edozein eskualdean EAEn izan ezik)), jarduera ekonomikoa (lanean, langabezian, erretiratua eta besteak (etxeko andrea edo senide baten arduraduna edo besteak)), eta azken lanpostua (kontratu finkoa (kooperatibako kideak barne), aldi baterako kontratua eta besteak (enpresaburuak edo besteak). Azkenik, GMIren sailkapena, alkohol eta tabako kontsumoa hurrengo eran dikotomizatu egin ziren: ez gainpisu/obesitatea eta gainpisu/obesitatea, ez-edaleak (edaten ez zutenak edo iraganean edaten zutenak baina orain ez) eta edaleak (edaten zutenak) eta ez-erretzaileak eta erretzaileak, hurrenez hurren.

Honez gain, pisu egoerari buruzko datuak jaso ziren: norberak adierazitako pisua eta altuera, pisu ideala eta pisu osasuntsua. Hurrengo galderekin jaso ziren datu hauek: "Zenbat pisatzen duzu?", "Zenbat neurtzen duzu?", "Gustatuko litzaizukeen pisua zein izango litzateke?" eta "Medikuaren esanetan, zein izango litzateke zure pisu osasuntsua?"[30,31]. Gorputz Masaren Indizea (GMI) kalkulatu zen, pisua (kg) / altuera (m^2) formula erabiliz eta Munduko Osasun Erakundeak dituen irizpideak jarraituz sailkatu ziren[32].

GMI kalkulatu eta gero, *gorputz pisuarekiko atsekabea* (GPA= ((pisu ideala – adierazitako pisua)/ adierazitako pisua) x 100)[33] eta *pisu osasuntsuaren pertzepzioa* (POP= (pisu osasuntsua – adierazitako pisua)/adierazitako pisua) x 100) kalkulatu ziren. "Pisuaren desberdintasun portzentajea", pisuen arteko desberdintasuna ≥ % 5ekoa bazen onartu zen. % 5eko ebaki puntu hau aurrez egindako ikerketa batean[34] erabili zen, gutxiago pisatzeko desioa ebaluatzeko pisu ideala eta egungokoaren arteko desberdintasuna neurtuz. Bere erraztasuna eta baliagarritasunagatik[35] aukeratu zen metodo hau.

Gorputzarekiko atsekabea sailkatzeko hiru kategoria sortu ziren: pisu ideala adierazitakoa baino gutxiago (gehiegizko atsekabea: desberdintasun erlatiboa ≤ % -5%); pisu ideala adierazitakoa baino gehiago (gutxiegizko atsekabea: desberdintasun erlatiboa ≥ % 5); eta pisu ideala adierazitakoaren antzekoa (asebetea: % -5 < desberdintasun erlatiboa < % 5). Eta azkenik, POP aldagaiarentzako beste hiru kategoria sortu ziren: pisu osasuntsua adierazitakoa baino gutxiago (desberdintasun erlatiboa ≤ % -5), pisu osasuntsua adierazitakoa baino gehiago (desberdintasun erlatiboa ≥ % 5); eta pisu osasuntsua adierazitakoaren antzekoa (% -5 < desberdintasun erlatiboa < % 5).

Analisi estatistikoa

Datuen analisi estatistikoa SPSS 22.0. bertsioarekin (SPSS Inc., Chicago, IL) eta STATA 13.0 (Stata Corp LP, Texas, USA) egin zen. Emaitzak eguneroko ahorakin eta dentsitate energetikoaren (g/1.000 kcal-tan) batezbestekoa (desbideratze estandarra, DE) eta mediana moduan aurkeztu ziren. Datu kuantitatiboen normaltasun analisia Kolmogorov–Smirnov–Lilliefors probarekin aztertu zen. EKMGM eta 24 OOeko datuek ez zuten distribuzio normala jarraitzen, zerealak, lekaleak eta gantzak bi EKMGMetan izan ezik, beraz, test ez-parametrikoak aplikatu ziren. Zerealak, lekaleak eta gantzak test parametrikoekin aztertu ziren. Spearman-en korrelazio koefizienteak erabili ziren, hiru elikagai talde horietan izan ezik. Hauetan, distribuzio normala jarraitzen zutenez, Pearson-en korrelazio koefizienteak aplikatu ziren.

EKMGMren baliozkotasuna 9 eguneko-24 OOen batezbestekoa EKMGMren datuekin erkatuz aztertu zen. Erkaketa bakoitzaren desberdintasunak 9 eguneko-24 OOen ahorakinaren portzentaje bezala aurkeztu ziren. 9 eguneko-24OOen ahorakinaren portzentaje hauek kalkulatzeko, 9 eguneko-24OOetan kontsumorik ez zuten partaideak ez ziren kontuan hartu, infinitu ematen duelako edozein balore zati huts egiten bada (EKMGMaren balio x 100/0 = ∞). Bi EKMGMen arteko elikagai taldeen ahorakinen desberdintasunak eta EKMGMren eta 9 eguneko-24 OOen batezbestekoa bikotekako t-testak erabiliz ebaluatu ziren (Studen*t* edo Wilcoxon testak). Honez gain, bi metodoen arteko, 9 eguneko-24 OOak eta EKMGM, elikagai taldeen artean Spearman-en edo Pearson-en korrelazioa gordinak eta ajustatutak aplikatu ziren. Galdetegien neurketan pertsona bakoitzeko egon daitekeen akatsa zuzentzeko, sexu eta adin korrelazioak *de-attenuation* faktoreaz biderkatu ziren, $(1+ \gamma/n)^{1/2}$, non γ berariazko eta pertsonen arteko aldakortasunaren ratioa da eta n errepikapenen zenbakia (n=11)[36]. Ratio hau kalkulatzeko faktore bateko ANOVA erabili zen. *De-attenuation* korrelazioen *P* balioak kalkulatu ziren[37].

Adostasun gradua neurtzeko, partaideak kuartiletan banatu ziren bi metodoen elikagai ahorakinetan oinarrituta (2. EKMGM eta 24 OO) eta adostasun eta desadostasun portzentajeak aurkeztu ziren. Bestalde, bi EKMGMen arteko adostasuna ere kalkulatu zen. Aldagai kualitatiboen kasuan, baliozkotasuna eta errepikapena Cohen-en kappa erabiliz aztertu ziren eta aldagai kuantitatiboetan barne-klaseko korrelazioak erabili ziren[38]. Cohen-en kappa-ren ebaki puntuak hurrengoak ziren: > 0,8 bikain, > 0,6 ona edo moderatua, eta > 0,4 onargarria eta klase barneko korrelazioentzat: < 0,40 eskasa, 0,40-0,75 ona edo moderatua eta > 0,75 bikaina[38].

Bi metodoen arteko adostasuna grafikoki aztertzeko energiara ajustatutako Bland-Altman-en[39] grafikoak erabili ziren. Grafika honetan bi metodoen arteko ahorakinaren desberdintasuna (2. EKMGM-9 eguneko-24 OO) versus bi neurrien batezbestekoa (2. EKMGM-9 eguneko-24 OO/2) adierazten da. % 95eko konfiantza-tartearekin ezarritako muga onargarri baxuena eta altuena hurrengo formularekin kalkulatu zen: batezbestekoa ± (1,96 x DE). Bland-Altman-en grafikoetan Fernández-Ballart *et al*.-en artikuluan[40] erabilitako elikagai talde berdinak erabili ziren.

Eta, azkenik, lotutako aldagaiek izan dezaketen eragina baliozkotze eta errepikapenean Chi-square eta Fisher-en testekin aztertu zen. Ikerketa honetan, Bland-Altman-en grafiketan erabilitako elikagai talde berdinen emaitzak azaltzen dira. Aztertutako lotutako aldagaiak hurrengoak izan ziren: egoera sentimentala, seme-alabak, hezkuntza maila, jarduera ekonomikoa, GMI, gorputzarekiko atsekabearen eta pisu osasuntsuaren pertzepzioaren sailkapenak, ariketa fisikoaren maila eta erretzaile estatusa. Analisi hauetan, lotutako aldagaien bi kategoriak bi metodoekin (EKMGMak eta 24 OO) estimatutako elikagai taldeen ahorakinean oinarritutako kuartilekin (berdina/albokoa vs. urrunekoa) gurutzatu ziren. Aldagaien eragina aztertzeko hauek hurrengo eran sailkatu ziren: egoera sentimentala (bikote gabe; bikotearekin), seme-alabak (bai; ez), hezkuntza-maila (lehenengo hezkuntza edo ikasketarik gabe; lehenengo maila baino gorako ikasketak), jarduera ekonomikoa (lanean; besteak), GMI (gutxiegizko pisua/pisu normala; gainpisua/obesitatea), gorputzarekiko atsekabea (ase gabea; asebetea), pisu osasuntsuaren pertzepzioa (ase gabea; asebetea), jarduera fisikoa (bai; ez) eta erretzaileen estatusa (bai; ez). Proba estatistiko guztiak 2 aldekoak izan ziren, eta balio adierazgarri gisa $P < 0{,}05$ zutenak hartu ziren, % 95eko konfiantza-tartearekin.

Emaitzak

Partaideen ezaugarri orokorrak **1. taulan** azaltzen dira. Partaideen batezbesteko adina 47,3koa zen eta gehienek ez zuten bikoterik, seme-alabak zituzten, hiri-eremuan bizi ziren, gutxienez bigarren mailako hezkuntza zuten eta langile aktiboak ziren. Azkenengo aldagaiari dagokionez (jarduera ekonomikoa), gizon langileen kopurua emakumeena baino altuagoa zen; eta gizonezkoen artean behin betiko langile gehiago zeuden; emakumezkoetan, ordea, behin behineko langile gehiago. Bizi-ohiturei dagokionez, partaide gehienek pisu normala zuten, ohiko edaleak ziren, ez-erretzaileak eta ariketa fisikoa egiten zuten bere aisialdian; baina aldagai hauen analisian, sexua kontuan hartuta, gizonek zigarro gehiago erretzen zituzten eta bere ariketa fisikoko maila emakumeena baino altuagoa zen. Bestalde, pisu egoerari buruz, GMI, gorputzarekiko atsekabea eta pisu osasuntsuaren pertzepzioaren sailkapenetan sexu desberdintasunik ez zeuden.

1. taula: Ikertutako laginaren ezaugarriak: Euskal Autonomia Erkidegoko helduak

Aldagaiak Batezbestekoa DE edo %	Lagin osoa (n=82)	Gizonak (n=36)	Emakumeak (n=46)	*P*
Ezaugarri sozio-demografikoak				
Adina (urteak)	47,3 17,8	45,2 16,6	48,9 18,8	0,346
Egoera sentimentala (%)				
Bikote gabe	65,9	61,1	69,6	
Bikotearekin	34,1	38,9	30,4	0,423
Seme-alabak				
Bai (%)	52,4	47,2	56,5	0,403
Seme-alaben kopurua	1,0 1,2	0,8 1,0	1,2 1,4	0,172
Jaiotza-lekua (%)				
EAE	81,3	88,9	75,0	
Besteak[1]	18,8	11,1	25,0	0,113
Bizilekua (%)				
Landa-eremua	23,1	15,2	28,6	
Urbanoa	76,9	84,8	71,4	0,093

Hurrengo orrialdean jarraitzen du.

1. taularen jarraipena.

Aldagaiak Batezbestekoa DE edo %	Lagin osoa (n=82)	Gizonak (n=36)	Emakumea k (n=46)	*P*
Ezaugarri sozio-demografikoak				
Metaketa indizea	1,0 0,4	1,2 0,5	1,0 0,4	0,076
Hezkuntza maila (%)				
Unibertsitate gradua	36,6	27,8	43,5	0,229
Jarduera ekonomikoa (erantzun anizkoitza) (%)				
Lanean	47,6	55,6	41,3	
Langabezian	18,3	22,2	15,2	
Erretiratua	20,7	22,2	19,6	
Bestea2[b]	13,4	-	23,9	**0,018**
Azken lana (%)				
Behin-betiko langilea	45,6	47,2	44,2	
Behin-behineko langilea	35,4	22,2	46,5	
Besteak[3]	19,0	30,6	9,3	**0,019**
Pisu egoera				
GMIren sailkapena				
Gainpisua/ Obesitatea	45,6	55,9	37,8	0,110
Gorputz pisuarekiko atsekabea (%)				
Gehiegizko atsekabea	49,3	40,0	55,8	
Gutxiegizko atsekabea	6,8	10,0	4,7	
Asebetea	43,8	50,0	39,5	0,354
Pisu osasuntsuaren pertzepzioa (%)				
Pisu egoera				
PO adierazitakoa baino gutxiago[4]	48,6	41,4	53,3	
PO adierazitakoa baino gehiago[5]	5,4	6,9	4,4	
PO adierazitakoaren berdina[6]	45,9	51,7	42,2	0,588
Bizi-ohituren faktoreak				
Alkohol kontsumoa (%)				
Ohiko edariak	79,3	83,3	76,1	0,412
Erretzaile estatusa				
Erretzaileak (%)	25,6	33,3	19,6	0,156
Zigarro kopurua	2,9 6,7	4,5 7,8	1,7 5,5	**0,046**

Hurrengo orrialdean jarraitzen du.

1. taularen jarraipena.

Aldagaiak Batezbestekoa DE edo %	Lagin osoa (n=82)	Gizonak (n=36)	Emakumeak (n=46)	*P*
Bizi-ohituren faktoreak				
Loaldia				
Ordu kopurua/ Egun	7,1 1,2	7,1 1,3	7,2 1,2	0,439
Ariketa fisiko nagusia (%)				
Eserita	37,8	25,0	47,8	
Zutik	34,1	30,6	37,0	
Ibiltzen	19,5	27,8	13,0	
Esfortzu fisiko altua	8,5	16,7	2,2	**0,017**
Ariketa fisikoa aisialdian (%)				
Bai	57,3	66,7	50,0	0,130

BB, batezbestekoa; DE, desbideratze estandarra; EAE, Euskal Autonomia Erkidegoa; GMI, gorputz masaren indizea; PO, pisu osasuntsua.
[1]Edozein herrialde Euskal Autonomia Erkidegoa izan ezik; [2]Etxea edo senideak zaindu eta besteak; [3]Ugazaba, jabea edo besteak; [4]Desberdintasun erlatiboa ≤ -5%; [5]Desberdintasun erlatiboa ≥ 5 %; [6]-5 % < desberdintasun erlatiboa < 5 %.
P-balio esanguratsuak letra lodiz idatzita daude.

Baliozkotze analisiak 2. eta 3. tauletan, 1. eta 2. taula Osagarrietan eta 2. irudian azaltzen dira. Gainera, taula hauetatik, 2. eta 1. taula Osagarriek bereziki, EKMGMetik ateratako errepikapenaren datuak dituzte. Elikagai taldeen batezbesteko ahorakina (g/1.000 kcal-tan) (9 eguneko-24 OO, 1. eta 2. EKMGMrekin kalkulatuta) **2. taulan** aurkezten dira. Ahorakin balio altuagoak lortu ziren EKMGMekin (1. eta 2. EKMGMekin) 9 eguneko-24 OOekin baino hurrengo elikagai eta edarientzat (2. taulan agertzen ziren bezala zerrendatzen ziren): arrain urdina, beste elikagai batzuk, light edariak, beste edari alkoholiko batzuk, gantza, saldak eta zopak, gatza eta pikantea (P < 0,05). Batezbestekoen desberdintasun altuena, 9-eguneko 24 OOri dagokionez, haragi guztian eta esnean behatu ziren. Hala ere, ez ziren desberdintasun esanguratsurik aurkitu 1. eta 2. EKMGMen arteko batezbesteko ahorakinetan. Elikagai batzuetan, esnea adibidez, EKMGMeko batezbesteko ahorakina 9-eguneko 24 OOrena baino baxuagoa zen, alabaina, 9-eguneko 24 OOeko portzentajea % 100a baino altuagoa zen, % 230,3koa, eta emaitza desbideratze estandar zabal baten ondorio izan daiteke.

3. taulan EKMGM eta 9 eguneko-24 OOen arteko korrelazio koefiziente gordinak eta ajustatuak aurkezten dira. Korrelazio koefiziente gordinen tartea -0,008tik (gantza) 0,705era (edari alkoholikoak) zihoan. Elikagai guztientzako korrelazio koefizienteen batezbestekoa 0,277 eta 0,304 1. eta 2. EKMGMean izan ziren, hurrenez hurren. Koefiziente ajustatuen tartea -0,011tik (pikantea) eta 0,712ra (ardoa) zihoan. Adin- eta sexu-ajustatutako koefizienteen batezbestekoa 1. EKMGMerako 0,231 izan zen eta 2. EKMGMrako 0,254. *De-attenuated* korrelazioak eta EKMGMetatik eta 9 eguneko-24 OOetatik estimatutako elikagai taldeen ahorakinen klase barneko korrelazioak 1. taula osagarrian azaltzen dira. *De-attenuated* korrelazio koefizienteen batezbestekoa 0,286 (1. EKMGMerako) eta 0,301 (2. EKMGMerako) izan ziren, eta tartea -0,013tik (pikantea) 0,963ra (beste elikagai batzuk) zihoan. Klase barne korrelazioei dagokionez, errepikapen gaitasun ona/moderatua edo bikaina bi EKMGMendako hurrengo elikagai/edarietan behatu zen: esnekiak, frutak, barazkiak, azukredun edariak, edari alkoholikoak (ardoa eta garagardoa bereziki), kafea edo tea (**1. taula osagarrian** agertzen ziren bezala zerrendatzen dira). Gainera, aztertutako elikagai talde guztientzako Bland-Altman-en grafikoek erakusten zuten partaideen % 10ekoa baino gutxiago zegoela adostasun mugetatik kanpo **(2. irudia)**, EKMGMen eta 9 eguneko-24 OOen artean adostasun maila ona zegoela erakutsiz. Analisi hauek ere erakusten zuten elikagai talde guztientzako, barazkientzako izan ezik, desberdintasuna areagotzen zela neurriaren magnitudea handitzen zen heinean.

Bi EKMGMen fidegarritasun estatistikoak **4. taulan** aurkezten dira. Pearson-en korrelazio gordinen tartea 0,201etik (gantza) 0,809ra (edari alkoholikoak), eta adin- eta sexu-ajustatutako koefizienteen tartea 0,219tik (pikantea) 0,823ra (ardoa) zihoazen. Klase barneko korrelazioek errepikapen gaitasun bikaina edo ona aztertutako elikagai gehienenetan erakusten zuten: haragi prozesatuak, arrautzak, arrain zuria, esnea, esnekiak, frutak, barazkiak, gozoak eta azukrea, beste elikagai batzuk, edari ez alkoholikoak, azukredun edariak, light edariak, edari alkoholikoak, ardoa, garagardoa, beste edari alkoholiko batzuk, eta kafea edo tea.

1. eta 2. EKMGMren ahorakinen sailkapena kuartiletan azaltzean, elikagai item guztietan gutxienez partaideen % 72 kuartil berdinean edo albokoan sailkatuta zegoen. Gainerako elikagai taldeentzat, 1. eta 2. EKMGMen arteko adostasun maila gutxienez, % 75,6koa zen (**3. taula osagarria**). Kuartil berdinean edo albokoan zegoen partaideen batezbesteko portzentajea % 82,6koa zen. Cohen-en kappak hurrengo elikagai/edarientzako adostasun ona, moderatua edo onargarria adierazten zuen (Cohen-en kappa balio altuagotik gutxienera ordenatua): azukredun edariak, haragi prozesatuak, light edariak, arrain guztia eta edari alkoholikoak.

2. taula: Elikagai taldeen batezbesteko eguneko ahorakina 1.000 kcal-tan 9 eguneko-24 OOekin eta bi EKMGMekin kalkulatuta

Elikagai ahorakina (g/1.000 kcal-tan)	9 eguneko-24 OO			1. EKMGM					2. EKMGM					
	BB	DE	Med	BB	DE	P^1	Med	9 eguneko-24 OO %	BB	DE	P^2	Med	9 eguneko-24 OO %	P^3
Haragi guztia	97,0	64,0	86,8	60,0	25,1	**<0,001**	60,0	112,3	65,5	47,1	**<0,001**	53,7	112,3	0,636
Haragi zuria	35,3	41,9	20,1	23,6	17,4	0,184	22,2	111,7	25,9	20,0	0,256	19,5	133,9	0,342
Haragi gorria	32,9	30,5	30,3	24,7	16,7	**0,031**	22,5	118,6	26,9	23,4	0,140	20,1	138,0	0,487
Haragi prozesatua	28,8	27,4	21,9	11,7	8,6	**<0,001**	10,6	72,3	12,7	12,2	**<0,001**	10,3	79,7	0,969
Arrautzak	23,1	22,7	17,8	10,4	5,9	**<0,001**	8,9	79,1	11,5	9,1	**<0,001**	9,3	89,9	0,604
Arraina guztira	37,2	38,7	26,8	37,6	25,9	0,369	32,7	154,7	38,8	25,8	0,401	35,5	135,8	0,603
Arrain zuria	19,7	25,4	8,2	18,8	16,2	0,467	15,3	128,1	18,8	15,9	0,409	15,8	90,0	0,885
Arrain urdina	10,2	21,2	0,0	15,0	14,5	**0,002**	10,6	243,3	16,6	14,1	**<0,001**	12,0	267,3	0,237
Itsaskiak	7,3	19,8	0,0	3,7	5,0	0,151	3,0	63,2	3,4	3,6	0,549	2,4	15,7	0,963
Esnea	128,0	95,4	104,0	91,1	83,2	**0,004**	95,8	230,2	95,8	88,7	**0,017**	107,9	252,0	0,551
Esnekiak	55,3	49,6	52,7	67,1	49,8	0,056	62,9	256,2	61,7	48,1	0,135	47,2	258,1	0,388
Zerealak	87,5	49,6	78,2	67,4	23,2	**0,007**	64,7	113,8	65,2	30,9	**0,001**	62,1	105,4	0,555
Frutak	154,7	145,8	114,0	164,1	103,7	0,152	166,7	150,2	184,2	134,6	**0,023**	162,5	186,5	0,324
Barazkiak	108,2	78,5	91,3	101,5	65,2	0,537	90,6	138,9	95,3	57,5	0,225	84,4	130,0	0,507

Hurrengo orrialdean jarraitzen du.

2. taularen jarraipena.

Elikagai ahorakina (g/1.000 kcal-tan)	9 eguneko-24 OO			1. EKMGM					2. EKMGM					
	BB	DE	Med	BB	DE	P^1	Med	9 eguneko-24 OO %	BB	DE	P^2	Med	9 eguneko-24 OO %	P^3
Lekaleak	10,3	12,7	4,4	9,4	5,2	0,807	8,9	122,5	9,3	5,7	0,752	8,3	127,9	0,924
Patatak	42,3	42,6	31,5	30,8	23,3	0,064	27,8	125,7	31,2	24,3	0,106	27,0	108,2	0,758
Gozoak eta azukrea	12,0	11,7	8,6	14,6	12,1	**0,030**	11,2	181,5	15,1	13,8	0,079	12,3	203,0	0,912
Beste elikagai batzuk	0,6	2,8	0,0	5,7	8,2	**<0,001**	3,2	258,4	6,6	11,1	**<0,001**	3,4	186,3	0,585
Edari ez alkoholikoak	93,0	107,9	68,4	65,3	83,2	**0,017**	40,2	181,2	76,7	96,1	0,090	42,2	383,4	0,279
Azukredun edariak	42,9	84,4	0,0	46,4	61,7	0,184	21,3	91,4	49,9	66,4	0,198	25,4	130,5	0,819
Light edariak	6,8	23,8	0,0	19,0	45,2	**0,007**	0,0	220,8	26,8	69,9	**0,004**	0,0	421,6	0,224
Edari alkoholikoak	57,0	95,7	14,4	34,2	54,6	0,059	16,3	115,7	46,5	96,7	0,593	21,1	245,7	0,095
Ardoa	18,2	37,9	0,0	13,8	28,5	0,697	0,0	130,3	16,4	33,8	0,437	2,9	156,2	0,382
Garagardoa	34,1	78,8	0,0	14,3	34,7	**0,008**	0,0	49,3	24,4	89,6	0,188	0,0	92,8	0,073
Beste edari alkoholiko batzuk	5,2	21,8	0,0	6,1	13,4	**0,007**	0,6	190,5	5,8	14,5	**0,015**	0,0	261,6	0,992
Gantza	25,9	14,3	23,3	45,6	5,7	**<0,001**	45,3	233,3	45,1	6,9	**<0,001**	44,9	234,2	0,605

Hurrengo orrialdean jarraitzen du.

2. taularen jarraipena.

Elikagai ahorakina (g/1.000 kcal-tan)	9 eguneko-24 OO			1. EKMGM					2. EKMGM					
	BB	DE	Med	BB	DE	*P*[1]	Med	9 eguneko-24 OO %	BB	DE	*P*[2]	Med	9 eguneko-24 OO %	*P*[3]
Kafea edo tea	39,7	44,8	19,8	38,2	35,6	0,818	32,5	769,1	44,2	47,8	0,402	35,2	750,3	0,164
Saldak eta zopak	3,6	9,9	0,0	19,2	17,0	**<0,001**	15,0	105,2	21,6	19,9	**<0,001**	16,4	122,3	0,311
Gehitutako gatza	1,3	0,8	1,1	1,9	1,1	**<0,001**	1,9	195,6	1,5	0,9	0,185	1,5	153,7	**0,005**
Pikantea	0,0	0,2	0,0	0,1	0,3	**0,002**	0,0	30,8	0,1	0,2	**0,001**	0,0	66,3	0,823

[1]24 OO eta 1. EKMGMen arteko desberdintasunak: [2]24 OO eta 2. EKMGMen arteko desberdintasunak: [3]1. EKMGM eta 2. EKMGMren arteko desberdintasunetarako. 24 OO, 24 orduko oroitzapena; BB, batezbestekoa; DE, desbideratze estandarra; EKMGM, elikagai kontsumo maiztasunari buruzko galdetegi motza.

3. taula: 9 eguneko-24 OOen eta bi EKMGMen bidez dentsitate energetikoaz estimatutako elikagai taldeen korrelazio koefizienteak

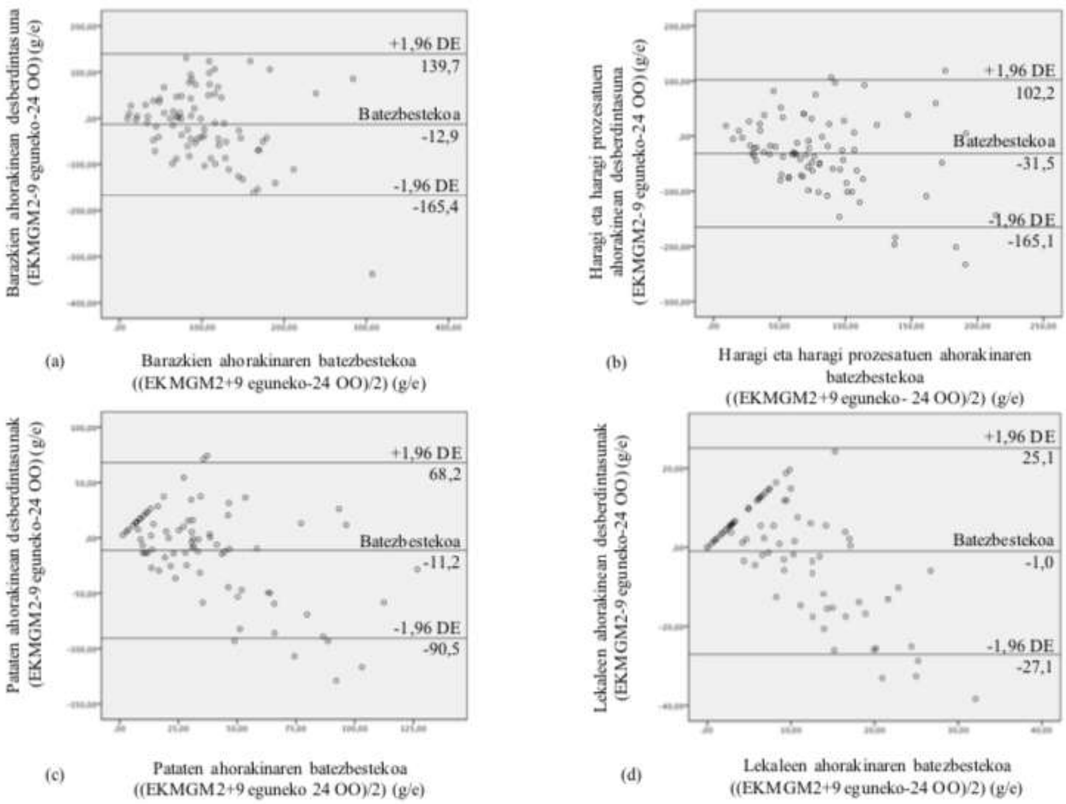
Elikagai taldeak (g/1.000 kcal-tan)	Gordinak 9 eguneko-24 OO				Adin- eta sexu-ajustatuak 9 eguneko-24 OO			
	1. EKMGM	*P*	2. EKMGM	*P*	1. EKMGM	*P*	2. EKMGM	*P*
Haragi guztia	0,016	0,889	0,286	0,009	-0,040	0,727	0,130	0,250
Haragi zuria	0,005	0,962	0,383	<0,001	**-0,003**	0,981	0,203	0,071
Haragi gorria	0,272	0,014	0,379	<0,001	0,249	0,026	0,213	0,058
Haragi prozesatua	0,347	0,001	0,254	0,021	0,216	0,054	0,042	0,714
Arrautzak	0,216	0,052	0,287	0,009	0,169	0,134	0,085	0,451

Hurrengo orrialdean jarraitzen du.

3. taularen jarraipena.

Elikagai taldeak (g/1.000 kcal-tan)	Gordinak				Adin- eta sexu-ajustatuak			
	9 eguneko-24 OO				9 eguneko-24 OO			
	1. EKMGM	*P*	2. EKMGM	*P*	1. EKMGM	*P*	2. EKMGM	*P*
Arraina guztira	-0,020	0,859	0,203	0,067	0,019	0,870	0,185	0,100
Arrain zuria	0,115	0,304	0,154	0,168	0,087	0,441	0,210	0,061
Arrain urdina	-0,157	0,158	0,038	0,733	-0,006	0,961	0,061	0,591
Itsaskiak	0,024	0,832	-0,092	0,412	-0,054	0,637	0,083	0,466
Esnea	0,266	0,016	0,112	0,319	0,346	0,002	0,045	0,694
Esnekiak	0,447	<0,001	0,524	<0,001	0,437	<0,001	0,595	<0,001
Zerealak	0,006	0,960	0,116	0,301	0,007	0,953	0,173	0,125
Frutak	0,520	<0,001	0,496	<0,001	0,416	<0,001	0,382	<0,001
Barazkiak	0,299	0,006	0,366	0,001	0,264	0,018	0,350	0,001
Lekaleak	0,308	0,005	0,164	0,141	0,214	0,056	0,076	0,503
Patatak	0,129	0,249	0,362	0,001	0,076	0,504	0,383	<0,001
Gozoak eta azukrea	0,473	<0,001	0,288	0,009	0,345	0,002	0,189	0,093
Beste elikagai batzuk	0,233	0,035	0,176	0,114	0,172	0,127	0,649	<0,001
Edari ez alkoholikoak	0,311	0,004	0,232	0,036	0,270	0,015	0,179	0,113
Azukredun edariak	0,393	<0,001	0,459	<0,001	0,489	<0,001	0,263	0,018
Light edariak	0,318	0,004	0,258	0,019	0,351	0,001	0,290	0,009
Edari alkoholikoak	**0,632**	<0,001	**0,705**	<0,001	0,489	<0,001	0,609	<0,001
Ardoa	0,610	<0,001	0,578	<0,001	0,551	<0,001	**0,712**	<0,001
Garagardoa	0,599	<0,001	0,647	<0,001	**0,619**	<0,001	0,656	<0,001
Beste edari alkoholiko batzuk	0,332	0,002	0,428	<0,001	0,029	0,799	0,056	0,623
Gantza	0,283	0,010	**-0,008**	0,941	0,204	0,070	0,092	0,419
Kafea edo tea	0,583	<0,001	0,536	<0,001	0,476	<0,001	0,315	0,004
Saldak eta zopak	0,229	0,038	0,210	0,058	0,261	0,019	0,201	0,074
Gehitutako gatza	0,156	0,163	0,265	0,016	0,134	0,237	0,205	0,068
Pikantea	**0,001**	0,993	0,109	0,331	-0,064	0,575	**-0,011**	0,925

Zutabe bakoitzeko korrelazio koefiziente altuena eta baxuena letra lodiz idatzita daude.
P-balio esanguratsuak letra lodiz idatzita daude.
24 OO, 24 orduko oroitzapenak; EKMGM, elikagai kontsumo maiztasunari buruzko galdetegi motza.



2. irudia: Bland-Altman-en irudia 2. EKMGM eta 9 eguneko-24 OOen arteko adostasuna azaltzeko barazkientzako (a), haragia eta haragi prozesatua (b), patatak (c) eta lekaleak (d).

24 OO, 24 orduko oroitzapenak; DE, desbideratze estandarra; EKMGM, elikagai kontsumo maiztasunari buruzko galdetegi motza; g/e, gramo/egun.

4. taula: EKMGM 1 eta 2aren arteko korrelazio koefizienteak eta klase barneko korrelazioak

Elikagai taldeak (g/1.000 kcal-tan)	Gordinak	*P*	Adin- eta sexu- ajustatuak[1]	*P*	KBK	*P*
Haragi guztia	0,406	**<0,001**	0,294	**0,008**	0,277	**0,006**
Haragi zuria	0,372	**0,001**	0,254	**0,023**	0,243	**0,013**
Haragi gorria	0,417	**<0,001**	0,288	**0,010**	0,308	**0,002**
Haragi prozesatua	0,600	**<0,001**	0,401	**<0,001**	0,427	**<0,001**
Arrautzak	0,440	**<0,001**	0,507	**<0,001**	0,466	**<0,001**
Arraina guztira	0,488	**<0,001**	0,416	**<0,001**	0,381	**<0,001**
Arrain zuria	0,433	**<0,001**	0,407	**<0,001**	0,427	**<0,001**
Arrain urdina	0,347	**0,001**	**0,216**	0,055	**0,158**	0,077
Itsaskiak	0,434	**<0,001**	0,284	**0,011**	0,377	**0,017**
Esnea	0,577	**<0,001**	0,455	**<0,001**	0,492	**<0,001**
Esnekiak	0,555	**<0,001**	0,436	**<0,001**	0,468	**<0,001**
Zerealak	0,260[a]	**0,018**	0,286	**0,010**	0,250	**0,011**
Frutak	0,492	**<0,001**	0,244	**0,029**	0,451	**0,004**
Barazkiak	0,500	**<0,001**	0,577	**<0,001**	0,604	**<0,001**
Lekaleak	0,361[a]	**0,001**	0,319	**0,004**	0,359	**<0,001**
Patatak	0,343	**0,002**	0,285	**0,010**	0,297	**0,003**
Gozoak eta azukrea	0,533	**<0,001**	0,530	**<0,001**	0,581	**<0,001**
Beste elikagai batzuk	0,661	**<0,001**	0,408	**<0,001**	0,431	**<0,001**
Edari ez alkoholikoak	0,702	**<0,001**	0,514	**<0,001**	0,585	**<0,001**
Azukredun edariak	0,714	**<0,001**	0,497	**<0,001**	0,625	**<0,001**
Light edariak	0,611	**<0,001**	0,653	**<0,001**	0,738	**<0,001**
Edari alkoholikoak	**0,809**	**<0,001**	0,624	**<0,001**	0,542	**<0,001**
Ardoa	0,755	**<0,001**	**0,823**	**<0,001**	**0,822**	**<0,001**
Garagardoa	0,754	**<0,001**	0,767	**<0,001**	0,527	**<0,001**
Beste edari alkoholiko batzuk	0,745	**<0,001**	0,735	**<0,001**	0,736	**<0,001**
Gantza	**0,201**[1]	0,070	0,228	**0,042**	0,197	**0,037**

Hurrengo orrialdean jarraitzen du.

4. taularen jarraipena.

Elikagai taldeak (g/1.000 kcal-tan)	Gordinak	*P*	Adin- eta sexu- ajustatuak[1]	*P*	KBK	*P*
Gantza	**0,201**[1]	0,070	0,228	**0,042**	0,197	**0,037**
Kafea edo tea	0,626	**<0,001**	0,641	**<0,001**	0,611	**<0,001**
Saldak eta zopak	0,455	**<0,001**	0,312	**0,005**	0,349	**0,001**
Gehitutako gatza	0,293	**0,007**	0,251	**0,025**	0,230	**0,018**
Pikantea	0,390	**<0,001**	0,219	0,051	0,237	**0,016**

[1]Pearson korrelazioa; Zutabe bakoitzeko korrelazio koefiziente altuena eta baxuena letra lodiz idatzita daude.
P-balio esanguratsuak letra lodiz idatzita daude.
KBK, klase barneko korrelazioak.

Bestalde, 2. EKMGMetik eta 9 eguneko-24 OOetatik estimatutako partaideen ahorakinaren batezbesteko % 75,2a kuartil berdinean edo albokoan sailkatu zen (**5. taula**). Cohen-en kappa balioen tartea -0,045etik (gantza) 0,632ra (edari alkoholikoak) zihoan, eta batezbesteko balioa 0,257koa zen; honek adierazten zuen hurrengo produktuetan adostasun ona zegoela (Cohen-en kappa balio altuenetik baxuenera ordenatuta): edari alkoholikoak, garagardoa, kafea edo tea, ardoa, esnekiak, frutak eta azukredun edariak. Lotutako aldagaien influentziari dagokionez (egoera sentimentala, seme-alabak edukitzea edo ez, hezkuntza maila, jarduera ekonomikoa, GMI, gorputzarekiko atsekabea eta pisu osasuntsuaren pertzepzioaren sailkapenak, jarduera fisikoa eta erretzaile estatusa) baliozkotze eta errepikapen analisietan, ez zen erlaziorik aurkitu ($P > 0,05$). Adibidez, barazkientzako emaitzak (1. EKMGM-2. EKMGM eta 2. EKMGM-9 eguneko-24 OO) egoera sentimentalaren arabera izan ziren $\chi^2 = 0,457$; $P > 0,05$ eta $\chi^2 = 1,553$; $P > 0,05$, hurrenez hurren; haragi eta haragi prozesatuentzako emaitzak (1. EKMGM - 2. EKMGM eta 2. EKMGM - 9 eguneko-24 OO) seme-alaba izatearen edo ez arabera izan ziren $\chi^2 = 3,579$; $P > 0,05$ eta $\chi^2 = 0,824$; $P > 0,05$, hurrenez hurren; patatentzako emaitzak (1. EKMGM- 2. EKMGM eta 2. EKMGM-9 eguneko-24 OO) hezkuntza mailaren arabera Fisher-en testaren bidez = 0,526 eta 0,175, hurrenez hurren; eta lekaleentzako emaitzak (1. EKMGM - 2. EKMGM eta 2. EKMGM - 9 eguneko-24 OO) jarduera ekonomikoaren arabera izan ziren $\chi^2 = 1,059$, $P > 0,05$ eta $\chi^2 = 0,010$, $P > 0,05$, hurrenez hurren.

Eztabaida

Ikerketa honetan, EKMGM bat egokitu eta bere baliozkotze eta errepikapen gaitasuna EAEn bizi den populazio batean aztertu zen; gainera, aldagai batzuen (hezkuntza maila edo pisu egoera, adibidez) eragina baliozkotze eta errepikapenean aztertu zen. Gure ezaguera arte, populazio honetan alderdi horiek aztertu dituen ikerketarik ez dago. Laginaren ezaugarri orokorrak, seme-alaben kopuruari, bizilekuari, hezkuntza mailari eta jarduera ekonomikoari dagokionez, Euskal populazioaren antzekoak ziren[41]. Pisu egoerari dagokionez, gure laginaren gainpisu/obesitatearen portzentajea EAEn egindako Osasun Inkestako[42] datuen antzekoa zen, eta bietan, gizonezkoen gainpisu/obesitatearen portzentajea emakumeena baino altuagoa izan zen.

5. taula: Azpi-sailkapena eta *weighted kappa* 2. EKMGMaren eta 9 eguneko-24 OOen artean

Elikagai taldeak	Adostasun portzentajea		
	2. EKMGM-9 eguneko-24 OO		
	Berdina eta albokoa (%)	*Weighted kappa*	*P*
Haragi guztia	69,5	0,194	**0,040**
Haragi zuria	72,0	0,400	**<0,001**
Haragi gorria	73,2	0,304	**0,003**
Haragi prozesatua	70,7	0,204	**0,032**
Arrautzak	78,0	0,264	**0,009**
Arraina guztira	75,6	0,154	0,081
Arrain zuria	65,9	0,121	0,132
Arrain urdina	72,0	-0,043	0,662
Itsaskiak	65,9	-0,098	0,821
Esnea	64,6	0,114	0,150
Esnekiak	81,7	0,433	**<0,001**
Zerealak	70,7	0,184	**0,048**
Frutak	80,5	0,433	**<0,001**
Barazkiak	69,5	0,264	**0,009**
Lekaleak	61,0	0,053	0,314
Patatak	79,3	0,353	**<0,001**
Gozoak eta azukrea	73,2	0,304	**0,003**
Beste elikagai batzuk	78,0	0,130	**0,048**
Edari ez alkoholikoak	69,5	0,204	**0,032**
Azukredun edariak	82,9	0,430	**<0,001**
Light edariak	76,8	0,205	**0,017**
Edari alkoholikoak	86,6	0,632	**<0,001**
Ardoa	87,8	0,466	**<0,001**
Garagardoa	92,7	0,605	**<0,001**
Beste edari alkoholiko batzuk	82,9	0,374	**<0,001**
Gantza	62,2	-0,045	0,657
Kafea edo tea	86,6	0,532	**<0,001**
Saldak eta zopak	79,3	0,199	**0,016**
Gehitutako gatza	73,2	0,234	**0,017**
Pikantea	75,6	0,092	0,132

24 OO, 24 orduko oroitzapenak; EKMGM, elikagai kontsumo maiztasunari buruzko galdetegi motza.
P-balio esanguratsuak letra lodiz idatzita daude.

1. taula osagarria: Bi EKMGMekin eta 9 eguneko-24 OOekin kalkulatutako elikagaien ahorakinen *de-attenuated* korrelazioen eta klase barneko korrelazioen koefizienteak

Elikagai taldeak (g/1.000 kcal-tan)	Adin- eta sexu-ajustatutako korrelazioak eta *de-attenuated* korrelazioak[1]				KBK			
	1. EKMGM	*P*	2. EKMGM	*P*	1. EKMGM	*P*	2. EKMGM	*P*
Haragi guztia	-0,060	0,592	0,196	0,078	0,062	0,388	0,418	**0,008**
Haragi zuria	**-0,003**	0,979	0,236	**0,033**	**0,005**	0,492	0,321	**0,042**
Haragi gorria	0,276	**0,012**	0,236	**0,033**	0,394	**0,013**	0,459	**0,003**
Haragi prozesatua	0,381	**<0,001**	0,074	0,509	0,280	0,071	0,174	0,196
Arrautzak	0,279	**0,011**	0,140	0,210	0,160	0,217	0,148	0,237
Arraina guztira	0,019	0,865	0,186	0,094	0,052	0,406	0,290	0,063
Arrain zuria	0,087	0,437	0,210	0,058	0,186	0,178	0,337	**0,003**
Arrain urdina	-0,007	0,950	0,069	0,538	-0,204	0,797	0,135	0,258
Itsaskiak	-0,060	0,592	0,092	0,411	-0,037	0,565	**0,021**	0,463
Esnea	0,406	**<0,001**	0,053	0,636	0,522	**0,001**	0,124	0,277
Esnekiak	0,460	**<0,001**	0,626	**<0,001**	0,604	**<0,001**	0,747	**<0,001**
Zerealak	0,010	0,929	0,236	**0,033**	0,045	0,418	0,315	**0,045**
Frutak	0,436	**<0,001**	0,401	**<0,001**	0,598	**<0,001**	0,589	**<0,001**
Barazkiak	0,273	**0,013**	0,362	**<0,001**	0,455	**0,003**	0,529	**<0,001**
Lekaleak	0,217	0,050	0,077	0,492	0,307	0,050	0,148	0,237
Patatak	0,088	0,432	0,441	**<0,001**	0,153	0,229	0,484	**0,002**
Gozoak eta azukrea	0,367	**<0,001**	0,201	0,070	0,553	**<0,001**	0,377	**0,017**
Beste elikagai batzuk	0,255	**0,020**	**0,963**	**<0,001**	0,174	0,196	0,459	**0,003**
Edari ez alkoholikoak	0,290	**0,008**	0,192	0,084	0,543	**<0,001**	0,397	**0,012**
Azukredun edariak	0,493	**<0,001**	0,265	**0,016**	0,695	**<0,001**	0,501	**0,001**
Light edariak	0,401	**<0,001**	0,331	**0,002**	0,461	**0,003**	0,306	0,051
Edari alkoholikoak	0,521	**<0,001**	0,649	**<0,001**	0,604	**<0,001**	0,771	**<0,001**
Ardoa	0,560	**<0,001**	0,723	**<0,001**	**0,710**	**<0,001**	**0,838**	**<0,001**

Hurrengo orrialdean jarraitzen du.

1. taula osagarriaren jarraipena.

Elikagai taldeak (g/1.000 kcal-tan)	Adin- eta sexu-ajustatutako korrelazioak eta *de-attenuated* korrelazioak[1]				KBK			
	1. EKMGM	*P*	2. EKMGM	*P*	1. EKMGM	*P*	2. EKMGM	*P*
Garagardoa	0,661	**<0,001**	0,701	**<0,001**	0,658	**<0,001**	0,809	**<0,001**
Beste edari alkoholiko batzuk	0,029	0,796	0,056	0,617	0,028	0,449	0,043	0,421
Gantza	**0,673**	**<0,001**	0,304	**0,005**	0,291	0,062	0,081	0,353
Kafea edo tea	0,485	**<0,001**	0,321	**0,003**	0,633	**<0,001**	0,483	**0,002**
Saldak eta zopak	0,505	**<0,001**	0,389	**<0,001**	0,378	**0,017**	0,288	0,064
Gehitutako gatza	0,188	0,091	0,287	**0,009**	0,189	0,174	0,381	**0,016**
Pikantea	-0,075	0,503	**-0,013**	0,908	-0,044	0,577	0,086	0,343

24 OO, 24 orduko oroitzapenak; EKMGM, elikagai kontsumo maiztasunari buruzko galdetegi motza; KBK,klase barneko korrelazioak.
[1]Pertsonen arteko aldaketak zuzenduta.
Zutabe bakoitzeko korrelazio koefiziente altuena eta baxuena letra lodiz idatzita daude.
P-balio esanguratsuak letra lodiz idatzita daude.

2. taula osagarria: Bi elikagaien kontsumo maiztasunari buruzko galdetegi motzen batezbesteko elikagai taldeen ahorakina

Elikagai taldeak (g)	1. EKMGM BB	1. EKMGM DE	1. EKMGM Mediana	2. EKMGM BB	2. EKMGM DE	2. EKMGM Mediana	*P*
Haragi guztia	135,7	68,6	139,1	125,9	75,3	112,4	0,143
Haragi zuria	51,3	38,7	42,9	48,9	31,5	42,9	0,802
Haragi gorria	56,1	42,1	47,9	50,8	38,6	44,5	0,266
Haragi prozesatua	28,3	24,7	22,5	26,2	22,5	20,5	0,342
Arrautzak	22,1	12,4	23,6	22,3	13,1	23,6	0,814
Arraina guztira	77,3	44,1	72,1	76,4	45,8	69,0	0,849
Arrain zuria	38,3	27,4	42,9	36,8	27,5	32,5	0,741
Arrain urdina	30,8	25,3	21,4	33,0	26,5	21,4	0,183
Itsaskiak	8,3	10,0	7,0	6,7	6,6	4,7	0,301
Esnea	192,4	163,7	250,0	181,2	148,6	250,0	0,153
Esnekiak	149,5	112,1	125,0	118,7	81,8	114,2	**0,017**
Zerealak	145,3	53,8	142,9	127,7	45,7	131,4	**0,003**
Frutak	358,9	242,3	348,3	365,8	248,5	338,5	0,790
Barazkiak	211,9	123,0	200,7	189,4	105,7	178,0	**0,012**
Lekaleak	20,1	9,9	20,0	19,0	11,8	20,0	0,224
Patatak	67,6	48,8	72,9	60,3	40,6	48,6	0,174
Gozoak eta azukrea	37,5	47,9	22,2	30,4	26,7	21,5	0,117
Beste elikagai batzuk	14,4	21,0	6,7	12,7	19,8	6,7	0,213
Edari ez alkoholikoak	158,7	216,8	94,3	149,5	176,1	94,3	0,538
Azukredun edariak	119,1	174,1	47,1	96,6	120,1	47,1	0,101
Light edariak	39,6	91,0	0,0	52,8	129,7	0,0	0,160
Edari alkoholikoak	70,2	99,4	42,6	82,7	132,5	38,6	0,140
Ardoa	27,1	53,9	0,0	30,1	56,1	6,0	0,210
Garagardoa	30,3	63,3	0,0	42,0	119,7	0,0	0,142
Beste edari alkoholiko batzuk	12,8	26,7	1,7	10,7	24,9	0,0	0,351
Gantza	36,5	6,0	34,2	35,8	6,4	32,8	0,196
Kafea edo tea	82,0	79,2	75,0	85,6	80,4	75,0	0,285
Saldak eta zopak	42,9	40,4	28,6	43,7	40,9	28,6	0,866
Gehitutako gatza	4,1	2,0	4,0	2,9	1,5	3,7	**<0,001**
Pikantea	0,3	0,8	0,0	0,3	0,4	0,0	0,902

BB, batezbestekoa; DE, desbideratze estandarra; EKMGM, elikagai kontsumo maiztasunari buruzko galdetegia.

3. taula osagarria: Azpi-sailkapena eta *weighted kappa* EKMGMen artean.

Elikagai taldeak	Adostasun portzentajea 1. EKMGM-2. EKMGM		
	Berdina eta albokoa (%)	*Weighted kappa*	*P*
Haragi guztia	80,5	0,366	**0,001**
Haragi zuria	79,3	0,341	**0,001**
Haragi gorria	78,0	0,051	0,645
Haragi prozesatua	86,6	0,529	**<0,001**
Arrautzak	75,6	0,295	**0,007**
Arraina guztira	80,5	0,438	**<0,001**
Arrain zuria	79,3	0,349	**0,002**
Arrain urdina	76,8	0,292	**0,008**
Itsaskiak	78,0	0,360	**0,001**
Esnea	84,1	0,384	**<0,001**
Esnekiak	80,5	0,379	**0,001**
Zerealak	76,8	0,213	**0,049**
Frutak	80,5	0,103	0,348
Barazkiak	81,7	0,398	**<0,001**
Lekaleak	76,8	0,266	**0,015**
Patatak	76,8	0,162	0,127
Gozoak eta azukrea	78,0	0,202	0,050
Beste elikagai batzuk	85,4	0,146	0,187
Edari ez alkoholikoak	91,5	0,375	**0,001**
Azukredun edariak	89,0	0,643	**<0,001**
Light edariak	86,6	0,477	**<0,001**
Edari alkoholikoak	93,9	0,415	**<0,001**
Ardoa	91,5	0,281	**0,010**
Garagardoa	95,1	0,376	**0,001**
Beste edari alkoholiko batzuk	91,5	0,372	**0,001**
Gantza	72,0	0,149	0,176
Kafea edo tea	89,0	0,388	**<0,001**
Saldak eta zopak	80,5	0,383	**0,001**
Gehitutako gatza	78,0	0,199	0,067
Pikantea	82,9	0,296	**0,007**

EKMGM, elikagai kontsumo maiztasunar buruzko galdetegi motza.
P-balio esanguratsuak letra lodiz idatzita daude.

Emaitzek adierazten dute EKMGM ahorakin dietetikoa baloratzeko metodo nahiko ona dela zenbait elikagai taldeen kasuan 24 OOari dagokionez. Gainera EKMG honen item zenbakia egokia kontsideratu daiteke, beste ikerketa batzuen medianaren antzekoa delako[14]. Nolanahi ere, azpimarratu behar da ez dagoela EKMGentzako zenbaki zehatz bat, galdetegi bakoitzak jaso nahi duen informazioaren arabera diseinatu behar delako[43].

Ikerketa honen diseinua beste baliozkotze eta errepikapen ikerlan batzuetan erabilitakoa da[44,45]. Gure kasuan, EKMGMa ikerketaren hasieran eta bukaeran betetzen zen, eta 24 OOk urtean zehar 4 hilabeteko tartearekin bete ziren, eta prozedura hau bat dator ahorakin dietetiko adierazgarria lortzeko tarte baten (ohikoena urtebete izaten da) egun nahikoen datuak jasotzea beharrezkoa dela dioen teoriarekin[14].

EKMGren baliozkotzeari dagokionez, eta beste autore batzuek bezala, guk ere behatu genuen EKMGMrekin ebaluatutako elikagai taldeen ahorakinak, orokorrean, 9 eguneko-24 OOen batezbestekoarekin estimatutakoak baino altuagoak zirela[44,46,47]. EKMGMrekin ebaluatutako ahorakinak altuagoak izatearen azalpena partaideek plater konbinatuen osagaiak gehiegi estimatzen zutela eta anoa osoak bezala kontsideratzen zituztela izan daiteke nahiz eta gutxiago izan[44]. Bi EKMGMen eta 9 eguneko-24 OOen arteko batezbesteko desberdintasun handienak zituzten elikagaiak (bi EKMGMen alde) light edariak, gantza, saldak eta zopak izan ziren. Edarien (light edariak eta saldak eta zopak) kontsumoa ohikoa ez denez estimazio zehaztasuna gutxiesten da eta horren ondorioz produktu hauen estimazioa gehiegizkoa da[48]. Gantz ahorakinari dagokionez, kasu guztietan ikertutako populazioaren ahorakinaren mediana erabili zen, hau da EAEko populazioarena[22], eta kantitate hau 24 OOekin erregistratutakoa baino altuagoa izan zen. Kontuan hartu behar da, norberaren gantz kantitatea estimatzea zaila dela familia osoko plateren prestakuntzan gehitzen delako edo etxetik at jaten delako[8].

Bi EKMGMen eta 9 eguneko-24 OOen arteko korrelazioak esanguratsuak izan ziren ikertutako elikagai taldeen erdian baino gehiago, eta korrelazio baxuenak gantz eta pikantean eman ziren eta altuenak edari alkoholikoetan eta beste elikagai batzuetan. Pikantearen korrelazio baxua, kantitate txikian kontsumitzen diren elikagaien estimazioa eskasa izaten delako gerta daiteke [48]. Eta gantzari dagokionez, aurretik aipatu den bezala, bi EKMGMetan, kasu guztietan ikertutako populazioaren mediana erabili zen. Zentzu horretan, 9 eguneko-24 OOetan jasotako datuak *intra* eta *inter* aldarrikotasun indibiduala erakusten zuten, horregatik, *de-attenuated* korrelazioen koefizienteak elikagai hauen korrelazio gordinena baino altuagoa izan zen. Gainera, talde batzuetan, batez ere kategoria desberdinetan banatutako elikagaietan, haragian eta arrainean esaterako, korrelazio koefizienteak 0,4 azpitik zeuden, kategoria hauek ezagutzeko eta sailkatzeko dauden zailtasunak islatzen[(49)], nahiz eta gure galdetegian item bakoitzeko adibide batzuk egon. Bestalde, edari alkoholikoen eta beste elikagai batzuen korrelazio altuen arrazoia bi EKMGMetan edari espezifikoen galderak zeudelako izan daiteke[(50)] eta baita produktu horien kontsumoa egoera berezietara lotuta dagoelako, asteburuak bezala, beraz, kantitate zehatza gogoratzea errazagoa da. *De-attenuated* korrelazioei dagokionez, ia kasu guztietan korrelazio ajustatuen antzekoak izan ziren, eta Fernández-Ballart *et al.*-ek[(40)] deskribatzen duten bezala, desberdintasun txiki hau, partaide bakoitzeko egon daitekeen aldarrikotasun baxu samarra partaideen arteko aldarrikotasunarekin konparatzean eta/edo erregistratuko egun kopuruengatik (9 egun) izan daiteke.

Orokorrean, 2. EKMGMren eta 9 eguneko-24 OOen arteko korrelazioak 1. EKMGMren eta 9 eguneko-24 OOen artekoenak baino pixkat altuagoak izan ziren. Gertaera hau beste ikerketa batzuetan ere ematen da eta ikerketak irauten duen urtebete horretan egon daitezkeen aldaketengatik[(45)] edo ikaskuntza efektuagatik[(44)] izan daiteke. Efektu hau dela eta, partaideek bere dietaz gehiago ohartzen dira eta honen ondorioz, 2. EKMGM ezagueraz betetzen dute[(51)].

Bland-Altman-en grafiken emaitzek eta kuartilen sailkapenak 2. EKMGMren eta 9 eguneko-24 OOen arteko adostasuna nahiko ona zela baieztatzen zuten, adostasun mugetatik kanpo zegoen partaideen portzentajea % 10ekoa baino baxuagoa zelako eta kuartil berdinean edo albokoan sailkatutako partaideen elikagai ahorakinaren batezbesteko portzentajea % 75,2koa zelako. Baina haragi eta horien eratorriak adostasun maila txarragoa erakusten zuten ahorakina altuagoa zenean, beste autore batzuek ere fenomeno hau behatu dute eta kontsideratzen dute batezbesteko ahorakinarekiko neurtzearen akats proportzionalaren ondorioa dela[(40)].

Egokitutako EKMGMren errepikapenari dagokionez, gure ikerketan, elikagai talde erdia baino gehiagoren ahorakinak 2. EKMGMean 1.an baino altuagoa zen. Berdina gertatzen zen *Shangai Women's Health Study*-n[(18)] eta *Tehran Lipid and Glucose Study*-n[(52)]. Gertaera hau ezaguera efektuagatik izan daiteke, partaideak, 1. EKMGMa eta 9 eguneko-24 OOk bete eta gero, bere ahorakinaz kontziente ziren; nahiz eta, beste ikertzaile batzuek arrazoi berdina eman kontrako efektua azaltzeko, hau da, 2. EKMGMean 1. baino ahorakin baxuagoa azaltzeko[(44,53)]. Gainera, azpimarratu beharrekoa da, gure kasuan, bi EKMGen artean lagatako tartea urtebetekoa izan zela, beraz, bigarren galdetegian ikusitako desberdintasunak partaideen dietan eta erantzunetan egon daitezkeen aldaketengatik izan daitezke[47].

Gure ikerketan, korrelazio gordinen eta adin- eta sexu- ajustatutako korrelazio koefizienteak errepikapenerako Ogawa *et al.*-en[54] antzekoak ziren eta beste ikertzaile batzuena baino altuagoa[44,55]. Eta EKMGMen arteko esangura mailari dagokionez, koefiziente guztiak esanguratsuak zirela aurkitu genuen, korrelazio gordinetan gantza eta ajustatuetan arrain urdina eta pikantea izan ezik. Emaitza hauek aurretik argitaratutako emaitzen antzekoak ziren[56]. Gainera, kuartilen sailkapenaren emaitzek baieztatzen zuten EKMGMen arteko adostasuna ona zela, eta kuartil berdinean edo albokoan sailkatutako partaideen elikagai ahorakinen batezbestekoa % 82,6koa zen, beste autore batzuek[44,45] aurkitutakoaren antzekoa. Azkenik, badirudi lotutako aldagaiek, hezkuntza maila, seme-alabak edukitzea edo ez, pisu egoera edo bizi-ohiturak, esaterako, ez dutela eraginik EKMGMren baliozkotze eta errepikapenean. Edozein kasutan, lagin handiagoa behar da baliozkotzean eta errepikapenean aldagaien hauen eragina aztertzeko. Nahiz eta EKMGen baliozkotzean eta errepikapenean aldagaiek izan dezaketen eraginaren datak eskasak izan, beste autore batzuek[57] ere ez dute erlaziorik aurkitu hezkuntza maila eta EKMGren errepikapenaren artean eta gure ezaguera arte, ez dago ikerketarik hezkuntza maila eta EKMGren baliozkotzearen artean egon daitekeen erlazioa ikertu duenik.

Sendotasunak eta ahultasunak

Ikerketa honen mugaketa bat, beste populazio batzuetara ezin dela hedatu izan daiteke, beste baliozkotze eta errepikapen ikerketetan gertatzen den bezala[58]. Ikerketaren sendotasuna emaitzak zehazki aurkezten direla izan daiteke eta honek erakusten du elikagai desberdinen erregistroa erronka bat dela. Elikagai itemak ez ziren berriz elkartu, item bakarrak orokorrean taldekakoak baino hobeagoak direlako, antzeko elikagaiak desberdintzea eta taldekatzea galdera zaildu dezakeelako[14]. Honez gain, EKMGM honek faktore dietetikoen eragina gaixotasunetan aztertzen dituzten ikerketetan erabiliko da, beraz oso erabilgarria gerta daiteke berariazko elikagaien kontsumoa estimatzea, edari alkoholikoena esateko (graduazio alkoholiko desberdinarekin eta osagai bio-aktibo desberdinekin), baina baita kantitate txikietan jaten diren elikagaiak ere (pikantea adibidez). Edozein kasutan, ikerketa honetan lortutako emaitzen arabera eta adierazitako datuen eraginkortasuna hobetzeko helburuarekin, EKMGM honen azken bertsioan elikagai anoen kantitateak (gramotan edo mililitrotan)[23] eta bere baliokidea etxeko neurrietan agertzen dira. Eta ikerketa honen sendotasun garrantzitsuenak ikerketaren diseinua eta lotutako aldagaien influentziaren analisia baliozkotze eta errepikapenean izan ziren.

Ondorioak

Laburbilduz, egokitutako EKMGMk errepikapen eta baliozkotze ona du EAEn bizi den populazioan hainbat elikagai taldeen ahorakina neurtzeko, eta emaitza hauetan hezkuntza maila edo pisu egoera bezalako lotutako aldagaiek ez dute eraginik. Hala ere, etorkizuneko ikerketetan, EKMGMean ebaluazio eskasa zuten elikagai taldeen emaitzak arretaz erabili eta interpretatu beharko dira.

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Autoretza

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2. ikerketa

Bizi-ohiturei lotutako gainpisu/obesitatearen arrisku faktoreak unibertsitate ikasleetan: EHU12/24 ikerketaren emaitzak

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Artikulua errebisioan (Int J Obes.)

Laburpena

Aurrekariak/Helburua:

Obesitatearen eragile nagusienak bizi-ohitura ez osasuntsuak dira. Hortaz, ikerketa honen helburua unibertsitate ikasle lagin adierazgarri bateko gainpisua/obesitatearen prebalentzia eta bizi-ohituren arteko interakzioak aztertzea izan zen.

Partaideak eta metodoak:

Ikerketa hau EHU12/24 behaketako kohorte proiektuaren parte da. Proiektu hau gehiegizko gantz-masaren (GnM) prebalentzia eta gainpisua/obesitatea garatzeko arriskuak ebaluatzeko diseinatu zen, estandarizatutako protokolo bat jarraituz. Euskal Herriko Unibertsitateko ikasle lagin adierazgarri batean egin zen. 603 ikasleko kohorte batean, elikadura patroia, dieta kalitatea, ariketa fisikoa (AF), denbora eserita, ohitura toxikoak, loaldiaren iraupena eta antropometriari buruzko informazioa jaso zen.

Emaitzak:

GnM % arabera, gainpisua/obesitatearen prebalentzia % 14,4koa izan zen. Elikadura patroiari lotutako aldagaiak dieta kalitatearekin erlazionatu ziren, eta elikadura ohitura ez osasuntsuak beste osasun portaera desegokiekin erlazionatu ziren. Gizonen artean, AF baxua/moderatua (OR = 3,77; 95 % KT 3,28; 4,33), ez gosaltzea (OR = 3,66; 95 % KT 3,02; 4,44), gosariaren iraupen desegokia (OR = 1,58; 95 % KT 1,39; 1,79), otorduen zenbakia (OR = 1,43; 95 % KT 1,27; 1,61) eta gosaltzea bakarrik/edo egoeraren arabera (OR = 1,37; 95 % KT 1,14; 1;63) gehiegizko GnMrekin erlazionatu ziren. Emakumeen

artean, aldiz, MDS baxua (OR = 2,34; 95 % KT 2,09; 2,62), alkohol kontsumo moderatua/altua (OR = 2,23; 95 % KT 1,90; 2,61), loaldiaren iraupen desegokia (OR = 1,72; 95 % KT 1,56; 1,90), gosaltzea eta bazkaltzea bakarrik/egoeraren arabera (OR = 1,47; 95 % KT 1,29; 1,66; OR = 1,42; 95 % KT 1,27; 1,58 hurrenez hurren) erlazionatu ziren.

Eztabaida:

Gure emaitzek aditzera ematen dute bizi-ohitura ez osasuntsuak batera existitzen direla, elkarri eragiten diotela eta populazio honetan gainpisua/obesitatearen arriskua areagotzen dutela. Gehiegizko adipositatearen arrisku faktoreen sexu desberdintasunak eragina du obesitatearen lehen mailako prebentzioan egiten diren ekintzetan.

Gako-hitzak:

Elikadura patroiak; dieta kalitatea; bizi ohiturak; ariketa fisikoa; alkoholarekiko portaera; erretzeko ohitura; loaldia; unibertsitate ikasleak; Espainia

Sarrera

Obesitatearen prebalentziak gora egiten ari du mundu osoan[1] eta munduko populazioaren heren batek, gutxi gorabehera, gainpisua edo obesitatea du[2]. Obesitatearen areagotze hau seguru aski elikaduran egondako aldaketen, ariketa fisikoaren (AF), faktore sozioekonomikoen, ingurumenekoen eta genetikoen arteko interakzioen ondorio dela[1]. Orokorrean, heldu gazteen proportzio handi batek, unibertsitate ikasleek batez ere, bizi-ohitura ez osasuntsuak jarraitzen dituzte[3,4], eta hau arduratzeko arrazoia da.

Dietari dagokionez, elikadura patroi batzuk, Mediterranear Dieta bezala gainpisua eta obesitate arrisku gutxiagorekin erlazionatu izan dira[5]. Baina, zentzu honetan, *zer jan, non, noiz, nola* eta *norekin*, garrantzitsuak dira, bolumena, kontsumitzen diren elikagai motak eta aniztasunak bakarrik ez dutelako eragina[6]. Dietaren ezaugarri guzti hauek "elikadura patroia" kontzeptuaren barne daude, eta energia ahorakinean garrantzia du, beraz, adipositatea eta gorputz pisuaren erregulazioan ere[7].

Gaur egun arte, dietak, AFk eta portaera sedentarioak arreta handia jaso dute obesitatearen gaur egungo prebalentzia azaltzeko nahian. Hala ere, epidemia honetan parte hartzen duten beste hainbat faktore identifikatu izan dira, loaldiaren iraupena bezala, aldaketa metaboliko eta endokrinoekin lotuta dagoelako[8]. Gainera, orain arte, ikerketa gehienak bizi-ohitura bakar batean edo gutxi batzuetan oinarritu izan dira, nahiz eta, ikerkuntzek aditzera eman duten osasun portaerak askotan elkarrekin bizi direla, elkarri eragiten diotela eta gaixotasunen arriskua areagotzen dutela[9]. Hortaz, obesitateari lotutako bizi-ohituren interakzioak gutxi ulertzen dira.

Beraz, ikerketa honen helburua Espainiako unibertsitate ikasle lagin adierazgarri batean, gainpisua/obesitatearen prebalentzia eta lotutako bizi-ohituren interakzioak (partaideek gomendioetako irizpidea betetzen duten, bereziki) ikertzea izan zen, obesitateari aurre egiteko estrategia hoberenak identifikatzeko. Estrategia hauek bizitzako etapa honek ematen dituen aukerak portaeretan aldaketak eragiteko erabili beharko litzateke. Gainera, unibertsitate ikasleak etorkizuneko elite sozioekonomikoaren proportzio esanguratsua izango dira; beraz, beraien ohiturak eta portaerak jarraitu beharreko ereduak izango dira, eta honek populazio hau ikertzeko interesgarri bihurtzen du.

Partaideak eta metodoak

Ikerketa hau, gehiegizko gantz-masaren (GnM) prebalentzia eta gainpisua/obesitatea garatzeko arrisku faktore nagusienak aztertzen dituen, estandarizatutako protokolo bat jarraituz, Euskal Herriko Unibertsitateko UPV/EHU ikasle-lagin adierazgarri batean egindako EHU12/24 behaketako kohorte ikerketaren parte da(10). EHU12/24 ikerketaren diseinua, lagina eta prozedurak xehetasunez azaldu dira aurretik argitaratutako beste artikulu batean(10).

Ikertutako populazioa

Laburki, ikerketa 2014ko otsailetik 2017ko maiatza artean 18 eta 28 urte bitarteko 603ko ikasle lagin batean egin zen (% 59,5 emakumeak). Honez gain, ikerlan honetan, haztapenak erabili ziren populazioan jasotako datuak adierazgarriagoak egiteko. Ikerketa hau Helsinkiko Adierazpenaren ildoak jarraituz egin zen eta EHUko Gizakiekin lotutako Ikerketetarako Etika Batzordeak proiektuko prozedura guztiak onartu zituen (CEISH/193/2013/ARROYO IZAGA). Parte-hartzaile guztiek idatzizko onespen informatua sinatu zuten.

Gorputz neurriak eta beste ezaugarri batzuk

GnM % larruazalpeko izurren datuekin eta Durnin-ek eta Womersley-ek(11) eta Siri-k(12) proposatutako adin eta sexu berariazko ekuazioarekin kalkulatu zen. Partaideen GnM % Bray *et al.*-en(13) irizpidea jarraituz sailkatu zen. Ondo entrenatutako antropometrista batek ISAK protokola(14) jarraituz egin zituen neurri guztiak. Honez gain, ohiko bizilekua, elikagaien erosketen edo prestakuntzaren arduradunari buruzko informazioa ere jaso zen Bennassar-ek eta St. Jeor-ek garatutako galdetegiekin. Elikagaien erosketen eta prestakuntzaren arduradunaren galderak erantzun anikoitzekoak ziren.

Dieta

Elikadura patroiei buruzko informazioa baliozkotutako galdetegi baten bidez jaso zen(15,16), partaideek deskribatutako otorduen orduak eta otordu motak kontuan hartzen(17). Hurrengo itemak identifikatu ziren: otorduen zenbakia (Ozk) (Ozk-en batezbestekoa, otordu nagusiak/mokaduak egunean zehar), Ozk-en arteko denbora (Ozk-en arteko batezbesteko denbora, otordu nagusiak eta mokaduak), ez gosaltzea (orokorrean ikasleek ez dute gosaltzen), otorduen iraupena (gosarian eta bazkarian/afarian igarotako denbora), beste batzuen presentzia otorduetan (bakarrik jatea vs. beste batzuekin edo egoeraren arabera). Datu guzti hauek aurrez aurreko elkarrizketaren bidez jaso ziren.

Elikadura patroiaren indize bat egin zen atal honetan ikertutako zortzi itemekin eta bakoitzari puntuazio bat (0tik 1era) eman zitzaion. Eredu bezala aurretik beste autore batzuek diseinatutako beste indize batzuk erabili genituen[18,19]. Indize honen aldagai bakoitza aurretik obesitatea jasatearen arriskuarekin erlazionatu izan da egungo gidetan, eskuragarri zeudenean, edo populazio orokorrean eskuragai dagoen ebidentzian. Indize honen egituraketa zehatza **1. taulan** aurkitu daiteke. Elikadura patroiaren puntuazioa 0tik 8ra doa, eta puntuazio altuagoek gomendioekin adostasun altuagoa adierazten dute.

Gainera, dieta elikagaien kontsumoaren maiztasunari buruzko galdetegi motz (EKMGM) batekin ebaluatu zen aurrez aurreko elkarrizketan. EKMGM hau Rodríguez *et al*-en galdetegiaren[20] egokitutako eta baliozkotutako bertsioa izan zen. Energia eta nutrienteen ahorakina kalkulatzeko, kontsumitutako elikagai item guztiak DIAL 2.12, dietak baloratzeko programan sartu ziren. Elikagai talde, energia eta nutrienteen ahorakinen datuetan oinarrituta, elikadura gida dietetikoei atxikidura ebaluatu zen. Helburu honetarako bi dieta kalitatearen indizeak erabili ziren: *Healthy Eating Index* (HEI-2010)[21] eta *MedDietScore* (MDS)[22]. MDS indizeak Mediterranear Dietarekiko (MD) atxikimendu maila neurtzen du eta puntuazio guztia (gehiketa) 0tik 55era doa. Indize hau gaixotasun kardiobaskularreko arrisku faktoreen bio-markagailuei lotuta dago[23].

HEI-2010 0tik 100ra doan dieta kalitate indizea da eta Amerikako Gida Dietetikoetan oinarritzen da. Nahiz eta, HEI-2010 amerikar gidetan oinarrituta egon, Europako populazioetan egindako ikerketa askotan eta baita Europako unibertsitate ikasleetan[24] ere erabili izan da, eta honek emaitzak erkatzen laguntzen digu. Ikerketa honetan HEI-2015aren ordez, HEI-2010 erabili zen hainbat arrazoiengatik. Lehenengoa, HEI-2010 EHUko eta beste unibertsitate ikasle populazioetan[24] erabili izan da eta honek konparaketak egiteko aukera ematen digu. Bigarren arrazoia, HEI-2010ak alkohol kontsumoaren ebaluazioa (kaloria hutseko aldagaiaren arabera) egiten duelako eta HEI-2015k, aldiz, ez. Bi dieta kalitate indize hauek elikadura patroi indizeari gehitu ziren dieta totala indizea kalkulatuz (1. taula). Indize bakoitzeko pisua bakoitzaren aldagai zenbakian oinarritzen zen (HEI-2010 indizeak 12 aldagai zituen eta MDS indizeak, berriz, hamaika).

Bizi-ohiturak (dieta izan ezik)

AFri eta portaera sedentarioari lotutako datuak *International Physical Activity Questionnaire* galdetegiaren bertsio motzarekin jaso ziren[(25)]. Norberak adierazitako loaldiaren iraupena hurrengo galderarekin erregistratu zen: “Unibertsitate gauetan, zenbat ordu egiten duzu lo?”[(26)]. Eta alkohol kontsumoari buruzko informazioa Osasun Inkesta Nazionalaren galderekin jaso zen[(27)]. Gainera, EKMGMk edari alkoholikoei buruzko galdera zehatzak zituen. Alkohol kontsumoaren datuak alkohol gramo eta edari unitate estandarra bezala (EUE) astean eta emaitza hauek Komunitate-elikadurarako Espainiako Elkartearen irizpideekin erkatu ziren[(27)].

Bizi-ohituren indize bat egin zen, atal honetako bost aldagaiekin (1. taula). Obesitateari aurretik ondo lotutako arrisku faktoreei (AF maila eta denbora eserita) indizean puntuazio gehiago eman zitzaien arrisku faktore emergenteei baino[(28,29)]. Erretzeko ohitura ez zen gehitu bizi-ohituren indizeari erretzearen eta obesitatearen arteko erlazioa nahasia delako oraindik[(30,31)]. Puntuazio totalaren tartea 0 tik 3ra zihoan, eta puntuazio altuenak gomendioekin adostasun altua adierazten zuten. Azkenik, bizi-ohitura osasuntsuen indizea dieta totala eta bizi-ohituren indizeekin kalkulatu zen. Azken indize honen puntuazio tartea 0tik 34ra zihoan, eta puntuazio altuek bizi-ohituren gomendioetara atxikidura altua adierazten zuten.

1. taula: Dieta eta bizi-ohituren indizea egiteko irizpideak

Indizea	Aldagaiak[Erreferentziak]	Egituraketa	Puntuazioak (puntuak)
Elikadura patroia (0-8 puntu)	Ozk egun[53]	Egokia (5-7 otordu/egun)	1
		Nahiko egokia (3-4 otordu/egun)	0.5
		Desegokia (< 3 edo > 7 otordu/egun)	0
	Ozk-en arteko denbora[53]	Egokia (120-210 min.)	1
		Nahiko egokia (210-300 min.)	0,5
		Desegokia (< 120 edo > 300 min.)	0

Hurrengo orrialdean jarraitzen du.

1. taularen jarraipena.

Indizea	Aldagaiak[Erreferentziak]	Egituraketa	Puntuazioak (puntuak)
Elikadura patroia (0-8 puntu)	Ez gosaldu[45]	Inoiz (gosaria 5-7 egun/aste)	1
		Batzuetan (gosaria 3-4 egun/aste)	0,5
		Egunero edo ia egunero (gosaria ≤ 2 egun/aste)	0
	Gosaldu bakarrik edo lagunduta[54]	Lagunduta	1
		Egunaren arabera	0,5
		Beti bakarrik	0
	Bazkaldu bakarrik edo lagunduta[54]	Lagunduta	1
		Egunaren arabera	0,5
		Beti bakarrik	0
	Afaldu bakarrik edo lagunduta[54]	Lagunduta	1
		Egunaren arabera	0,5
		Beti bakarrik	0
	Gosariaren iraupena[5,56]	Egokia (≥ 15 min.)	1
		Nahiko egokia (≥ 7 eta < 15 min)	0,5
		Desegokia (< 7 min.)	0
	Bazkaria/afariaren iraupena[56]	Egokia (≥ 30 min.)	1
		Nahiko egokia (≥ 15 eta < 30 min.)	0,5
		Desegokia (< 15 min.)	0
Dieta totala (Elikadura patroia indizea + HEI-2010 + MDS) (0-31 puntu)	HEI-2010, sailkapena[21]	Ona (> 80 puntu)	12
		Hobetzeko beharra (51-80 puntu)	6
		Eskasa (< 51 puntu)	0
	MDS, sailkapena[23]	Atxikidura altua (> 35 puntu)	11
		Atxikidura moderatua (≥18 eta ≤34)	5.5
		Atxikidura baxua (0-18)	0
Bizi-ohiturak (0-3 puntu)	AF maila[25]	Altua	1
		Moderatua	0,5
		Baxua	0
	Eserita igarotzen den denbora[57,58]	Egokia (≤ 3,3 ordu/egun)	1
		Nahiko egokia (> 3,3 eta ≤ 7,5 ordu egun)	0,5
		Desegokia (> 7,5 ordu/egun)	0
	Alkohol kontsumoa[19,27]	Abstemioa	0,5
		Kontsumo moderatua	0,25
		Kontsumo altua	0

Hurrengo orrialdean jarraitzen du.

1. taularen jarraipena.

Indizea	Aldagaiak[Erreferentziak]	Egituraketa	Puntuazioak (puntuak)
Bizi-ohiturak (0-3 puntu)	Gaueko loaldiaren iraupena[19,59]	Egokia (7-8 ordu/egun)	0,5
		Nahiko egokia (6-7 edo 8-10 ordu/egun)	0,25
		Desegokia (<6 edo >10 ordu/egun)	0

[*]4 egun baino gehiago gosaltzen ez zuten ikasleen kasuan, bakarrik edo lagunduta gosaltzen zuten aldagaiaren puntuazioa 0koa zen.
[**]≤ 3,3 ordu eserita/egun ebaki puntu bezala hartu zen, denbora luzeagoak gaixotasun kardiobaskularren arriskua areagotzen duen ikerketetan oinarrituta.
AF, ariketa fisikoa; HEI-2010, *Healthy Eating Index*-2010; MDS, *MedDietScore*; Ozk, otorduen zenbakia.

Analisi estatistikoa

Datuen analisi estatistikoa SPSS 22.0 bertsioarekin egin zen (SPSS Inc., Chicago, IL) eta emaitzak batezbestekoa (desbideratze estandarra, DE) eta maiztasun moduan aurkeztu ziren. Analisi guztiak sexu bakoitzeko egin ziren bizi-ohituretan dituzten desberdintasunak direla eta[(32)]. Ikerketaren emaitzak EHUko 2012/2013ko matrikulazio zerrendatik ateratako haztapen koefizienteekin haztatu egin ziren[(33)]. Datu kuantitatiboen normaltasun analisia Kolmogorov–Smirnov–Lilliefors probarekin aztertu zen. Aldagaien arteko desberdintasunak Kruskal Wallis H testarekin kalkulatu ziren eta Spearman-en korrelazioen koefizienteak kalkulatu ziren elikadura patroia indizea eta dieta kalitateen indizeen artean, eta baita dieta totala indizea eta bizi-ohituren indizearen artean (datuak haztatu zirenez aldagaiek ez dute banaketa normala jarraitzen, hau da, lagina handia zen eta desbideratze txikiek aldagaiak banaketa normala ez jarraitzea egiten zuten). Aldagai kualitatiboak χ^2 testarekin aztertu ziren.

Azkenik, bizi-ohitura osasuntsuen indizearen aldagaien eta gehiegizko GnM izatearen arriskuaren arteko asoziazioak aztertzeko erregresio logistikoak aplikatu ziren, eta hauek adina eta eguneroko energia ahorakinari adostu ziren. % 95eko konfiantza-tarteak kalkulatu ziren eta Wald-en testak erabili ziren odds ratioak (OR) konparatzeko. Bizi-ohitura osasuntsuen aldagai guztiak dikotomizatu egin ziren, kontuan hartzen, batetik, kategoria osasuntsuena, eta bestetik, kategoria moderatua eta ez-osasuntsuena; “denbora eserita” aldagaian izan ezik, aldagai honetan kategoriak hurrengoak ziren: egokia + nahiko egokia vs. desegokia, kategoria osasuntsuaren maiztasuna oso baxua zelako. Proba estatistiko guztiak 2 aldekoak izan ziren, eta balio adierazgarri gisa $P < 0,05$ zutenak hartu ziren.

Emaitzak

GnMren sailkapenari buruzko emaitzei dagokionez, helburu populazioaren % 14,4k gainpisua/obesitatea zuen, eta gehiegizko prebalentzia hau altuagoa izan zen gizonetan (% 16,1) emakumeetan baino (% 13,3) (P < 0,001). Bestalde, gurasoekin bizi ziren ikasleen portzentajea % 53,2koa izan zen. Elikagaien erosketaren eta prestakuntzaren arduradunari dagokiolarik, laginaren erdiak baino gehiagok adierazi zuen gurasoak zirela arduradunak, % 56 elikagaien erosketentzako eta % 53,3 elikagaien prestakuntzarako. Sexu desberdintasunak aurkitu ziren ikertutako azken hiru aldagaietan: gurasoekin bizi zen emakumeen portzentajea gizonena baino altuagoa zen (% 61,5 vs. % 47,5; P < 0,001). Alabaina, emakumeek gizonek baino joera altuagoa zuten bere elikagaiak erostearen eta prestakuntzaren arduraduna izateko (% 36,6 vs. % 34,0 elikagaiak erosteko; eta % 38,3 vs. % 35,8 elikagaiak prestatzeko; P < 0,001 bi aldagaietan).

Ikertutako populazioaren dietaren ezaugarriak sexuaren arabera **2. taulan** deskribatzen dira. Partaideen % 40,3 eta % 50,1 artean eguneroko Ozk, Ozk-en arteko denbora, gosariaren edo/eta otordu nagusien iraupen (bazkaria/afaria) egokia zuen. Sexu desberdintasunak aurkitu ziren ikertutako aldagai guztietan (P < 0,05). Gizonen portzentajea emakumeena baino altuagoa izan zen hurrengo aldagaietan: eguneroko Ozk, Ozk-en arteko denbora eta gosariaren maiztasun egokian (P < 0,05). Emakumeena, bitartean, gosaria eta otordu nagusien iraupenean izan zen (bazkaria/afaria) (P < 0,001).

Honez gain, korrelazio esanguratsua behatu zen elikadura patroiaren indizea eta HEI-2010 indizearen artean (Spearman-en rho, 0,145; P < 0,001 lagin guztian; 0,161; P < 0,001 emakumeetan; eta 0,114; P<0,001 gizonetan), eta elikadura patroiaren indizea eta MDS indizearen artean (Spearman-en rho, 0,096; P < 0,001 lagin guztian; 0,149; P < 0,001 emakumeetan; eta 0,089; P < 0,001 gizonetan). Ildo honetan, elikadura patroiaren batezbesteko puntuazioa altuagoa izan zen MDS eta HEI-2010 indizeetan kategoria altuenetan zeuden partaideetan (**1. taula osagarria**). Gainera, elikadura patroia eta dieta totalaren indizeen batezbesteko puntuazioak altuagoak izan ziren bere gurasoekin bizi ez ziren ikasleetan gurasoekin bizi zirenekin erkatuz (elikadura patroia indizea: "gurasoekin bizi" 5,4(1,1), "beste batzuekin bizi" 5,5(1,4), P < 0,001; dieta totalaren indizea; "gurasoekin bizi" 20,7(4,8), "beste batzuekin bizi" 21,0(4,7), P < 0,001).

2. taula: Laginaren dietaren ezaugarriak: Euskal Herriko Unibertsitateko UPV/EHU ikasleak sexuaren arabera

	Lagin osoa (n=26.165)		Gizonak (n=10.607)		Emakumeak (n=15.558)		*P**
	BB edo %	DE	BB edo %	DE	BB edo %	DE	
Ozk/egun	4,5	0,8	4,5	0,9	4,5	0,8	**0,038**
Ozk egun, %							
Egokia	50,1		50,5		49,8		
Nahiko egokia	48,9		48,3		49,3		
Desegokia	1,0		1,1		0,9		**0,039**
Ozk-en arteko denbora, min.	244,4	66,5	247,0	69,6	242,6	64,3	**<0,001**
Ozk-en arteko denbora, %							
Egokia	41,0		41,4		40,6		
Nahiko egokia	46,6		45,4		47,4		
Desegokia	12,4		13,2		12,0		**0,001**
Ez gosaldu, %							
Inoiz	90,7		91,9		89,9		
Batzuetan	5,2		5,7		4,9		
Egunero edo ia egunero	4,0		2,4		5,1		**<0,001**
Gosaldu bakarrik vs. lagunduta, %							
Lagunduta	22,5		14,3		28,0		
Egunaren arabera	16,4		13,5		18,3		
Beti bakarrik	61,2		72,2		53,7		**<0,001**
Bazkaldu bakarrik vs. lagunduta, %							
Lagunduta	65,5		62,9		67,4		
Egunaren arabera	16,9		13,7		19,1		

Hurrengo orrialdean jarraitzen du.

2. taularen jarraipena.

	Lagin osoa (n=26.165)		Gizonak (n=10.607)		Emakumeak (n=15.558)		*P**
	BB edo %	DE	BB edo %	DE	BB edo %	DE	
Bazkaldu bakarrik vs. lagunduta, %							
Beti bakarrik	17,6		23,5		13,5		**<0,001**
Afaldu bakarrik vs. lagunduta, %							
Lagunduta	76,1		71,9		79,0		
Egunaren arabera	12,0		14,2		10,4		
Beti bakarrik	11,9		13,9		10,5		**<0,001**
Gosariaren iraupena, minutu/egun	12,7	7,6	12,4	7,7	12,9	7,6	**<0,001**
Gosariaren iraupena, sailkapena, %							
Egokia	40,3		38,2		41,9		
Nahiko egokia	39,7		38,4		40,6		
Desegokia	20,0		23,5		17,5		**<0,001**
Bazkaria/afariaren iraupena, minutu/egun	26,9	9,7	25,6	8,7	27,8	10,2	**<0,001**
Bazkaria/afariaren iraupena, sailkapena, %							
Egokia	42,2		35,4		46,9		
Nahiko egokia	55,6		62,0		51,3		
Desegokia	2,2		2,6		1,9		**<0,001**
HEI-2010	74,5	8,0	73,3	7,9	75,3	7,9	**<0,001**
HEI-2010, sailkapena[1], %							
Ona	24,6		19,4		28,2		
Hobetzeko beharra	75,4		80,6		71,8		**<0,001**

Hurrengo orrialdean jarraitzen du.

2. taularen jarraipena.

	Lagin osoa (n=26.165)		Gizonak (n=10.607)		Emakumeak (n=15.558)		*P*[*]
	BB edo %	DE	BB edo %	DE	BB edo %	DE	
MDS	33,5	5,5	32,7	5,2	34,1	5,6	**<0,001**
MDS, sailkapena, %							
Atxikidura altua	43,5		37,1		47,9		
Atxikidura moderatua	56,4		62,7		52,1		
Atxikidura baxua	0,1		0,2		-		**<0,001**
Elikadura patroiaren indizea[2] (0-8 points)	5,5	1,2	5,3	1,2	5,6	1,2	**<0,001**
Dieta totalaren indizea[3] (0-31 points)	20,8	4,7	20,0	4,4	21,4	4,8	**<0,001**

[1]Ez zegoen partaiderik kategoria “eskasan” sailkatua (< 51 puntu); [2]Elikadura patroia indizeak hurrengo aldagaiak zituen: otorduen zenbakia/egun, otorduen arteko iraupena, gosaria hartzen ez zuten partaideak, gosariaren iraupena eta otordu nagusien iraupena; [3]Dieta totalaren indizea: elikadura patroiaren indizea + HEI-2010 sailkapena + MDS sailkapena.

[*]Sexu desberdintasunak. *P* balio esanguratsuak letra lodiz azpimarratuta daude.

BB, batezbestekoa; DE, desbideratze estandarra; HEI-2010, *Healthy Eating Index*; MDS, *MedDietScore*; Ozk, otorduen zenbakia.

Helburu populazioaren bizi-ohituren ezaugarriak (dieta izan ezik) **3. taulan** aurkezten dira. Ikasleek AF moderatua zuten, eserita igarotzen zuten zenbora desegokia zen, alkohol edale moderatuak ziren eta loaldiaren iraupena egokia zen. AF altua eta alkohol kontsumo moderatua zuten gizonen portzentajea emakumeena baino altuagoa zen ($P < 0{,}001$), eta bizi-ohituren indizearen puntuazioa altuagoa izan zen gizonetan emakumeetan baino ($P < 0{,}001$). Emakumeek, ordea, gizonekin konparatuta, loaldiaren iraupen egokiagoa zuten ($P < 0{,}05$). Erretzeko ohitutari dagokionez, laginaren % 81,7 ez erretzailea/erretzaile ohia zen, eta gizon gehiago zeuden kategoria honetan emakumeak baino (% 86,9 vs. % 78,1; $P < 0{,}001$).

Dieta totala eta bizi-ohituren indizeen artean korrelazio positiboak eta esanguratsuak aurkitu ziren lagin guztian (Spearman-en rho = 0,096; $P < 0{,}001$) eta bi sexuetan (gizonak, rho = 0,209; $P < 0{,}001$; eta emakumeak, rho= 0,105; $P < 0{,}001$). Dieta totala eta bizi-ohituren indizeen aldagaien arteko kontingentziako taulen analisiak erakusten dute Ozk-arekiko gomendioa betetzen zuten ikasleek, AF altua ($\chi^2 = 413{,}6$; $P < 0{,}001$) eta denbora gehiago igarotzen zutela eserita ($\chi^2 = 82{,}6$; $P < 0{,}001$), alkohol kontsumo moderatua zutela ($\chi^2 = 301{,}7$; $P < 0{,}001$) eta ez-erretzaileak zirela ($\chi^2 = 263{,}2$; $P < 0{,}001$). Ozk-en arteko denborarekiko eta gosariaren iraupenarekiko gomendioak betetzen zituzten ikasleek AF altua zuten ($\chi^2 = 45{,}0$; $P < 0{,}001$ eta $\chi^2 = 43{,}6$; $P < 0{,}001$, hurrenez hurren) eta loaldiaren iraupen egokia ($\chi^2 = 593{,}5$; $P < 0{,}001$ eta $\chi^2 = 352{,}4$; $P < 0{,}001$, hurrenez hurren).

Lagin guztiaren bizi-ohitura osasuntsuen indizearen batezbestekoari dagokionez 22,4(4,8) puntukoa izan zen eta emakumeetan gizonetan baino altuagoa (22,7(4,9) vs. 21,3(4,5), $P < 0{,}001$). Gainera, gehiegizko GnM ez zuten ikasleek bizi-ohitura osasuntsuen indizean batezbesteko puntuazio altuagoa izan zuten gehiegizko GnM zutenekin konparatuta (22,4(4,7) vs. 21,3(5,0), $P < 0{,}001$). Lagina GnM % arabera sailkatzean, desberdintasunak aurkitu ziren, gehiegizko GnM ez zuten ikasleek Ozk, Ozk-en arteko denbora eta gosariaren iraupen egokiagoa zuten (P<0,001) (**4. taula**).

3. taula: Laginaren bizi-ohituren ezaugarriak (dieta izan ezik): Euskal Herriko Unibertsitateko UPV/EHU ikasleak sexuaren arabera

	Lagin osoa (n=26.165)		Gizonak (n=10.607)		Emakumeak (n=15.558)		P^*
	BB edo %	DE	BB edo %	DE	BB edo %	DE	
AF maila, %							
Altua	24,1		40,7		12,7		
Moderatua	59,9		51,5		65,8		
Baxua	16,0		7,8		21,5		**<0,001**
Denbora eserita, orduak/egun	7,9	2,2	7,8	2,3	7,9	2,2	**0,006**
Denbora eserita, sailkapena, %							
Egokia	0,8		1,2		0,6		
Nahiko egokia	48,0		46,9		48,8		
Desegokia	51,1		51,9		50,6		**<0,001**
Alkohol kontsumoa, sailkapena, %							
Abstemioa	15,3		14,2		16,1		
Moderatua	58,6		72,7		49,0		**<0,001**
Altua	26,0		13,1		34,8		
Gaueko loaldiaren iraupena, orduak/egun	7,7	1,0	7,6	1,0	7,7	1,0	**<0,001**
Gaueko loaldiaren iraupena, sailkapena, %							
Egokia	62,0		61,1		62,6		
Nahiko egokia	33,8		33,5		34,0		
Desegokia	4,2		5,3		3,4		**<0,001**
Bizi-ohituren indizea (0-3 puntu)	1,4	0,5	1,5	0,5	1,3	0,5	**<0,001**

*Sexu desberdintasunak. differences. *P* balio esanguratsuak letra lodiz azpimarratuta daude.
AF, ariketa fisikoa; BB, batezbestekoa;DE, desbideratze estandarra.

4. taula: Laginaren dietaren ezaugarriak gantz masaren sailkapenaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

	Lagin osoa					Gizonak					Emakumeak				
	GnM % normala (n=22.391)		Gehiegizko GnM % (n=3.375)		P^*	GnM % normala (n=8.902)		Gehiegizko GnM % (n=1.705)		P^*	GnM % normala (n=13.489)		Gehiegizko GnM % (n=2.069)		P^*
	BB edo %	DE	BB edo %	DE		BB edo %	DE	BB edo %	DE		BB edo %	DE	BB edo %	DE	
OZk/egun	4,5	0,8	4,2	0,9	**<0,001**	4,6	0,9	4,2	0,8	**<0,001**	4,5	0,8	4,3	0,9	**<0,001**
OZk/egun, %															
Egokia	51,1		44,0			53,1		36,9			49,8		49,7		
Nahiko egokia	48,1		53,7			45,5		63,1			49,9		45,9		
Desegokia	0,7		2,4		**<0,001**	1,4		0,0		**<0,001**	0,3		4,4		**<0,001**
Ozk-en arteko denbora, min.	241,8	64,1	260,0	77,8	**<0,001**	243,5	66,8	265,8	80,3	**<0,001**	240,7	62,2	255,3	75,4	**<0,001**
Ozk-en arteko denbora, %															
Egokia	41,2		39,5			42,0		38,1			40,7		40,5		
Nahiko egokia	47,9		38,7			46,6		39,3			48,8		38,3		
Desegokia	10,9		21,8		**<0,001**	11,4		22,6		**<0,001**	10,6		21,2		**<0,001**
Ez gosaldu, %															
Inoiz	91,8		84,5			94,2		79,8			90,2		88,4		
Batzuetan	4,4		10,3			3,6		16,8			4,9		4,9		
Egunero edo ia egunero	3,8		5,2		**<0,001**	2,2		3,5		**<0,001**	4,9		6,7		**0,003**

Hurrengo orrialdean jarraitzen du.

4. taularen jarraipena.

	Lagin osoa					Gizonak					Emakumeak				
	GnM % normala (n=22.391)		Gehiegizko GnM % (n=3.375)		P^{*}	GnM % normala (n=8.902)		Gehiegizko GnM % (n=1.705)		P^{*}	GnM % normala (n=13.489)		Gehiegizko GnM % (n=2.069)		P^{*}
	BB edo %	DE	BB edo %	DE		BB edo %	DE	BB edo %	DE		BB edo %	DE	BB edo %	DE	
Gosaldu bakarrik vs. lagunduta, %															
Lagunduta	23,5		16,0			14,9		11,0			29,2		20,0		
Egunaren arabera	16,2		17,6			12,7		17,7			18,4		17,5		
Beti bakarrik	60,3		66,4		**<0,001**	72,3		71,3		**<0,001**	52,3		62,5		**<0,001**
Bazkaldu bakarrik vs. lagunduta, %															
Lagunduta	66,6		59,0			62,8		63,2			69,2		55,6		
Egunaren arabera	16,7		18,1			14,4		9,8			18,2		24,9		
Beti bakarrik	16,7		22,9		**<0,001**	22,8		27,1		**<0,001**	12,6		19,5		**<0,001**
Afaldu bakarrik vs. lagunduta, %															
Lagunduta	76,4		74,6			72,7		67,6			78,8		80,4		
Egunaren arabera	12,2		10,7			14,7		11,5			10,5		10,0		
Beti bakarrik	11,4		14,7		**<0,001**	12,6		20,9		**<0,001**	10,7		9,5		0,188
Gosariaren iraupena, min./egun															
	12,6	7,3	13,2	9,3	**<0,001**	12,3	7,1	12,9	10,0	**<0,001**	12,9	7,4	13,4	8,6	0,221
Gosariaren iraupena, sailkapena, %															
Egokia	40,9		37,1			39,8		29,9			41,6		43,4		

Hurrengo orrialdean jarraitzen du.

4. taularen jarraipena.

	Lagin osoa					Gizonak					Emakumeak				
	GnM % normala (n=22.391)		Gehiegizko GnM % (n=3.375)		P^*	GnM % normala (n=8.902)		Gehiegizko GnM % (n=1.705)		P^*	GnM % normala (n=13.489)		Gehiegizko GnM % (n=2.069)		P^*
	BB edo %	DE	BB edo %	DE		BB edo %	DE	BB edo %	DE		BB edo %	DE	BB edo %	DE	
Gosariaren iraupena, sailkapena, %															
Nahiko egokia	40,2		36,5			37,2		44,3			42,2		29,6		
Desegokia	18,9		26,4		**<0,001**	23,0		25,8		**<0,001**	16,1		27,0		**<0,001**
Bazkaria/afariaren iraupena, min./egun	27,1	9,9	25,8	8,1	**<0,001**	25,7	9,1	25,4	6,4	**0,001**	28,0	10,3	26,1	9,2	**<0,001**
Bazkaria/afariaren iraupena, sailkapena, %															
Egokia	42,3		41,7			34,0		42,6			47,8		40,9		
Nahiko egokia	55,5		56,3			62,9		57,4			50,6		55,4		
Desegokia	2,2		2,0		0,609	3,1		-		**<0,001**	1,6		3,7		**<0,001**
HEI-2010	74,5	8,1	74,5	7,6	0,722	73,4	8,2	72,7	6,5	**0,002**	75,2	7,9	76,1	8,0	**<0,001**
HEI-2010 sailkapena[1]															
Ona	24,9		22,8			20,6		12,9			27,7		30,8		
Hobetzeko beharra	75,1		77,2		**0,004**	79,4		87,1		**<0,001**	72,3		69,2		**0,004**
MDS	33,7	5,6	32,8	4,7	**<0,001**	32,9	5,2	31,9	4,9	**<0,001**	34,1	5,7	33,6	4,5	**<0,001**
MDS sailkapena															
Atxikidura altua	45,0		34,8			38,4		30,3			49,4		38,6		

Hurrengo orrialdean jarraitzen du.

4. taularen jarraipena.

	Lagin osoa					Gizonak					Emakumeak				
	GnM % normala (n=22.391)		Gehiegizko GnM % (n=3.375)		P^*	GnM % normala (n=8.902)		Gehiegizko GnM % (n=1.705)		P^*	GnM % normala (n=13.489)		Gehiegizko GnM % (n=2.069)		P^*
	BB edo %	DE	BB edo %	DE		BB edo %	DE	BB edo %	DE		BB edo %	DE	BB edo %	DE	
MDS	33,7	5,6	32,8	4,7	**<0,001**	32,9	5,2	31,9	4,9	**<0,001**	34,1	5,7	33,6	4,5	**<0,001**
MDS sailkapena															
Atxikidura moderatua	54,9		65,2			61,4		69,7			50,6		61,2		
Atxikidura baxua	0,1		-		**<0,001**	0,2		-		**<0,001**	-		-		**<0,001**
Elikadua patroiaren indizea[2] (0-8 puntu)	5,5	1,2	5,1	1,4	**<0,001**	5,3	1,2	5,0	1,3	**<0,001**	5,7	1,2	5,3	1,5	**<0,001**
Dieta totalaren indizea[3] (0-12 puntu)	21,0	4,6	19,9	5,0	**<0,001**	20,2	4,4	18,9	4,1	**<0,001**	21,5	4,7	20,8	5,5	**<0,001**

[1]Ez zegoen partaiderik kategoria “eskasan” sailkatua (< 51 puntu); [2]Elikadura patroia indizeak hurrengo aldagaiak zituen: otorduen zenbakia/egun, otorduen arteko iraupena, gosaria hartzen ez zuten partaideak, gosariaren iraupena eta otordu nagusien iraupena; [3]Dieta totalaren indizea: elikadura patroiaren indizea + HEI-2010 sailkapena + MDS sailkapena.

[*]GnM estatusaren araberako desberdintasunak. *P* balio esanguratsuak letra lodiz azpimarratuta daude.

BB, batezbestekoa; DE, desbideratze estandarra; GnM, gantz-masa; HEI-2010, *Healthy Eating Index*; MDS, *MedDietScore*; Ozk, otorduen zenbakia.

Bestetik, gehiegizko GnM ez zuten ikasleek AF altuagoa, alkohol kontsumo baxuagoa, loaldiaren iraupen egokiagoa eta bizi-ohituren indizearen puntuazio altuagoa zuten gehiegizko GnM zutenekin erkatuta (**5. taula**). GnMren eta sexuaren araberako bizi-ohituren analisiak antzeko emaitzak erakutsi zituen, AF mailan, eserita egotearen denboran eta bizi-ohituren puntuazioan izan ezik emakumeen kasuan ($P < 0{,}05$). Erretzeko ohiturari dagokionez, gehiegizko GnM zuten erretzaileen % (% 17,3) gehiegizko GnM ez zutenena baino altuagoa izan zen (% 12,6) ($P < 0{,}001$); emakume erretzaileetan, ordea, kontrakoa gertatzen zen (% 22,2 GnM % normala vs. % 20,1 gehiegizko GnM %, $P = 0{,}031$).

Bakarrik bizi ziren ikasleen gehiegizko GnM %ren prebalentzia gurasoekin bizi zirenena baino altuagoa zen, nahiz eta desberdintasunak esanguratsuak ez izan (% 14,7 vs. % 14,2; $P = 0{,}275$). Gizonetan, hurrengo aldagaiak erlazionatu ziren gehiegizko GnMrekin (efektuaren tamaina handienetik txikienera): AF maila moderatua/baxua, ez gosaltzea, gosariaren iraupen eta Ozk desegokia, eta bakarrik gosaltzea edo egoeraren arabera (batzuetan bakarrik/batzuetan besteekin) (**6. taula**). Emakumeetan, MDS indizean puntuazio baxua, alkohol kontsumo moderatua/altua, loaldiaren iraupen desegokia, gosaltzea eta bazkaltzea bakarrik edo egoeraren arabera gehiegizko GnMrekin erlazionatu ziren (efektuaren tamaina handienetik txikienera).

Eztabaida

Unibertsitate ikasleen lagin adierazgarri honetan, gainpisua/obesitatearen prebalentzia, GnM % arabera, % 14,4koa izan zen, unibertsitate ikasleetan egindako beste ikerketa batzuena baino baxuagoa[4], baina Euskal Osasun Inkestakoa baino altuagoa[34]. Aipatzekoa da gure ikerketan diagnostiko irizpide bezala GnM % erabili zela gainpisu/obesitate kasuak identifikatzeko, hortaz, ikerketen arteko emaitzak ezin dira zuzenki konparatu. Italiako[35] eta Espainiako unibertsitate ikasleen[36] emaitzekin bat egiten du gizonen prebalentzia emakumeena baino altuagoa izatea ($P < 0{,}001$).

5. taula: Laginaren bizi-ohituren ezaugarriak gantz masaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

	Lagin osoa					Gizonak					Emakumeak				
	GnM % normala (n=22.391)		Gehiegizko GnM % (n=3.375)		P^*	GnM % normala (n=8.902)		Gehiegizko GnM % (n=1.705)		P^*	GnM % normala (n=13.489)		Gehiegizko GnM % (n=2.069)		P^*
	BB edo %	DE	BB edo %	SD		BB edo %	DE	BB edo %	DE		BB edo %	DE	BB edo %	DE	
AF maila, %															
Altua	25,1		17,9			44,9		18,6			12,0		17,2		
Moderatua	58,6		68,2			48,0		69,7			65,6		67,0		
Baxua	16,3		13,9		**<0,001**	7,1		11,7		**<0,001**	22,4		15,8		**<0,001**
Eserita, orduak/egun	7,8	2,2	8,3	2,3	**<0,001**	7,6	2,2	8,6	2,4	**<0,001**	7,9	2,2	7,7	1,0	0,274
Denbora eserita, sailkapena, %															
Egokia	1,0		-			1,4		-			0,7		-		
Nahiko egokia	47,8		49,1			48,3		40,1			47,5		56,8		
Desegokia	51,2		50,9		**<0,001**	50,3		59,9		**<0,001**	51,8		43,2		**<0,001**
Alkohol kontsumoa, sailkapena, %															
Abstemioa	15,5		14,6			13,5		17,8			16,8		12,0		
Moderatua	59,0		56,8			73,9		66,8			49,1		48,5		
Altua	25,6		28,7		**<0,001**	12,6		15,5		**<0,001**	34,1		39,5		**<0,001**
Gaueko loaldiaren iraupena, orduak/egun	7,7	1,0	7,4	1,1	**<0,001**	7,6	1,0	7,3	1,1	**<0,001**	8,0	2,2	7,6	1,0	**<0,001**
Gaueko loaldiaren iraupena, sailkapena, %															
Egokia	63,3		54,2			61,8		57,8			64,4		51,3		
Nahiko egokia	32,5		41,3			33,2		35,3			32,1		46,2		
Desegokia	4,1		4,5		**<0,001**	5,0		6,9		**<0,001**	3,5		2,6		**<0,001**
Bizi-ohituren indizea (0-5 puntu)	1,4	0,5	1,3	0,5	**<0,001**	1,6	0,5	1,4	0,4	**<0,001**	1,3†	0,5	1,3†	0,5	**0,001**

*Gantz masaren araberako desberdintasunak. *P* balio esanguratsuak letra lodiz azpimarratuta daude.
†Desberdintasunak aurkitu ziren gehiegizko GnM % zuten emakumeen artean eta GnM % normala zutenen artean (1,29(0,46); 1,33(0,47)).
AF, ariketa fisikoa BB, batezbestekoa; DE, desbideratze estandarra; GnM, gantz-masa.

6. taula: Gehiegizko GnMrekin erlazionatutako dieta eta bizi-ohiturei lotutako faktoreak: Euskal Herriko Unibertsitateko UPV/EHU ikasleak, EHU12/24 ikerketa

Aldagaiak[1]	1. Eredua			2. Eredua		
	OR	% 95 KT	*P*	OR	% 95 KT	*P*
Gizonak (n=10.607)						
Ozk egun						
Nahiko egokia/Desegokia	2,08	1,86; 2,32	**<0,001**	1,43	1,27; 1,61	**<0,001**
Otordu nagusien arteko denbora						
Nahiko egokia/Desegokia	1,26	1,13; 1,41	**<0,001**			
Ez gosaldu						
Batzuetan/Egunero edo ia egunero	4,92	4,22; 5,74	**<0,001**	3,66	3,02; 4,44	**<0,001**
Gosaldu bakarrik vs. lagunduta						
Bakarrik/Egoeraren arabera	1,36	1,15; 1,61	**<0,001**	1,37	1,14; 1,63	**0,001**
Bazkaldu bakarrik vs. lagunduta						
Bakarrik/Egoeraren arabera	1,01	0,91; 1,13	0,823			
Afaldu bakarrik vs. lagunduta						
Bakarrik/Egoeraren arabera	1,25	1,11; 1,39	**<0,001**			
Gosariaren iraupena						
Nahiko egokia/Desegokia	1,59	1,42; 1,78	**<0,001**	1,58	1,39; 1,79	**<0,001**
Bazkaria/afariaren iraupena						
Nahiko egokia/Desegokia	0,71	0,64; 0,79	**<0,001**	0,60	0,53; 0,68	**<0,001**
HEI-2010						
Hobetzeko beharra	1,81	1,55; 2,10	**<0,001**			
MDS						
Atxikidura baxua	1,54	1,38; 1,73	**<0,001**			
AF maila						
Moderatua/Baxua	4,00	3,50; 4,56	**<0,001**	3,77	3,28; 4,33	**<0,001**
Denbora eserita						
Desegokia	1,44	1,29; 1,60	**<0,001**			

Hurrengo orrialdean jarraitzen du.

6. taularen jarraipena.

Aldagaiak[1]	1. Eredua			2. Eredua		
	OR	% 95 KT	*P*	OR	% 95 KT	*P*
Gizonak (n=10.607)						
Alkohol kontsumoa						
Moderatua/Altua	0,71	0,61; 0,81	**<0,001**	0,51	0,44; 0,60	**<0,001**
Gaueko loaldiaren iraupena						
Nahiko egokia/Desegokia	1,20	1,08; 1,33	**0,001**			
Emakumeak (n=15.558)						
Ozk egun						
Nahiko egokia/Desegokia	1,03	0,94; 1,13	0,534			
Otordu nagusien arteko denbora						
Nahiko egokia/Desegokia	1,06	0,97; 1,17	0,215			
Ez gosaldu						
Batzuetan/Egunero edo ia egunero	1,16	1,00; 1,34	0,052			
Gosaldu bakarrik vs. lagunduta						
Bakarrik/Egoeraren arabera	1,79	1,59; 2,01	**<0,001**	1,47	1,29; 1,66	**<0,001**
Bazkaldu bakarrik vs. lagunduta						
Bakarrik/Egoeraren arabera	1,81	1,65; 1,99	**<0,001**	1,42	1,27; 1,58	**<0,001**
Afaldu bakarrik vs. lagunduta						
Bakarrik/Egoeraren arabera	0,91	0,81; 1,02	0,092			
Gosariaren iraupena						
Nahiko egokia/Desegokia	0,94	0,86; 1,04	0,243			
Bazkaria/afariaren iraupena						
Nahiko egokia/Desegokia	1,33	1,21; 1,46	**<0,001**	1,31	1,18; 1,44	**<0,001**
HEI-2010						
Hobetzeko beharra	0,86	0,78; 0,96	**0,004**	0,52	0,46; 0,59	**<0,001**
MDS						
Atxikidura baxua	1,60	1,45; 1,76	**<0,001**	2,34	2,09; 2,62	**<0,001**

Hurrengo orrialdean jarraitzen du.

6. taularen jarraipena.

Aldagaiak[a]	1. Eredua			2. Eredua		
	OR	% 95 KT	*P*	OR	% 95 KT	*P*
Emakumeak (n=15.558)						
AF maila						
Moderatua/Baxua	0,64	0,57; 0,73	**<0,001**	0,59	0,51; 0,67	**<0,001**
Denbora eserita						
Desegokia	0,72	0,65; 0,79	**<0,001**	0,76	0,69; 0,84	**<0,001**
Alkohol kontsumoa						
Moderatua/Altua	1,45	1,26; 1,67	**<0,001**	2,23	1,90; 2,61	**<0,001**
Gaueko loaldiaren iraupena						
Nahiko egokia/Desegokia	1,71	1,56; 1,88	**<0,001**	1,72	1,56; 1,90	**<0,001**

[1]Aldagai guztiak dikotomizatu egin ziren, kontuan hartzen, batetik, kategoria osasuntsuena (erreferentziako kategoria erregresio analisietan), eta bestetik, kategoria moderatua eta ez-osasuntsuena; "denbora eserita" aldagaian izan ezik, aldagai honetan kategoriak hurrengoak ziren: egokia + nahiko egokia vs. desegokia, kategoria osasuntsuaren maiztasuna oso baxua zelako.
1.Eredua: aldagai bakoitzaren efektua adinera eta eguneko energia ahorakinera adostu zen (kJ/egun); 2. Eredua: *Wald*-en testak erabili ziren adinera eta eguneko energia ahorakinera adostu zen (kJ/egun). *P* balio esanguratsuak letra lodiz azpimarratuta daude.
AF, ariketa fiskoa; HEI, *Healthy Eating Index*; KT, konfiantza tartea; MDS, *MedDietScore*; OR; odds ratio; Ozk, otorduen zenbakia.

1. taula osagarria: Helburu populazioaren dieta kalitatearen indizeak elikadura patroiaren aldagai guztien gomendioen egokitzapenaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak, EHU12/24 ikerketa

Aldagaiak[1]	MDS			HEI-2010		
	BB	DE	*P*	BB	DE	*P*
Eguneroko Ozk						
Egokia	34,1	5,3		75,1	8,2	
Nahiko egokia/desegokia	32,9	5,5	**<0,001**	73,9	7,7	**<0,001**
Otordu nagusien arteko denbora						
Egokia	34,2	5,3		75,1	8,0	
Nahiko egokia/desegokia	33,1	5,5	**<0,001**	74,1	8,0	**<0,001**

Hurrengo orrialdean jarraitzen du.

1. taula osagarriaren jarraipena.

Aldagaiak[1]	MDS			HEI-2010		
	BB	DE	*P*	BB	DE	*P*
Nahiko egokia/desegokia	33,1	5,5	**<0,001**	74,1	8,0	**<0,001**
Ez gosaltzea						
Egokia	33,6	5,5		74,8	7,9	
Nahiko egokia/desegokia	32,6	5,2	**<0,001**	71,3	7,9	**<0,001**
Gosaldu bakarrik vs. lagunduta						
Lagunduta	34,2	5,7		75,4	7,6	
Bakarrik/egoeraren arabera	33,3	5,4	**<0,001**	74,2	8,1	**<0,001**
Bazkaldu bakarrik vs. lagunduta						
Lagunduta	33,6	5,2		74,6	7,6	
Bakarrik/egoeraren arabera	33,4	5,9	**0,043**	74,2	8,7	**<0,001**
Afaldu bakarrik vs. lagunduta						
Lagunduta	33,7	5,4		74,7	7,7	
Bakarrik/egoeraren arabera	32,9	5,7	**<0,001**	73,6	8,9	**<0,001**
Gosariaren iraupena						
Egokia	34,3	5,4		76,3	7,9	
Nahiko egokia/desegokia	33,0	5,5	**<0,001**	73,4	7,9	**<0,001**
Bazkaria/afariaren iraupena						
Egokia	33,4	5,1		74,6	7,8	
Nahiko egokia/desegokia	33,6	5,7	**<0,001**	74,3	8,2	**<0,001**

[1]Aldagai guztiak dikotomizatu egin ziren, kontuan hartzen, batetik, kategoria osasuntsuena eta bestetik, kategoria moderatua eta ez-osasuntsuena.
P balio esanguratsuak letra lodiz azpimarratuta daude.
BB, batezbestekoa; DE, desbideratze estandarra; HEI, *Healthy Eating Index*; MDS, *MedDietScore*; Ozk, otorduen zenbakia.

Elikadura patroiei dagokionez, helburu populazioaren erdia gutxi gorabehera otorduen zenbaki, Ozk-en arteko denbora eta otorduen iraupen egokia zuen. Elikadura patroia eta dieta totalaren indizeen batezbesteko balioak eskala horien batezbestekoa baino altuagoa izan zen (8tik 5,5 eta 31tik 20,8; hurrenez hurren). Espero genuen ez bezala, elikadura patroia eta dieta totalaren indizeetan puntuazio altuagoak lortu zituzten gurasoekin bizi ez ziren ikasleak gurasoekin bizi zirenak baino. Hala ere, beste autore batzuek gurasoekin bizi diren ikasleek, unibertsitate-campusean bizi direnekin konparatuta, elikadura ohitura osasuntsuagoak dituztela behatu dute(37).

Ikerketa batzuek aditzera eman dute elikadura patroiak dieta kalitatearekin erlazionatuta daudela, eta hauen artean, ez gosaltzea eta dieta kalitatearen alderantzizko erlazioa aurkikuntza sendoena da(17). Nahiz eta ikerketa gutxi oinarritu diren elikadura patroien aldagaiek dieta kalitatean duten eraginean, gure aurkikuntzen arabera elikadura patroiaren aldagai guztiak dieta kalitatearekin erlazionatuta zeuden. Emaitza hauek azaltzen duen esplikazio bat izan daiteke elikadura patroi hobeago batek, alde batetik, elikagai ugari eta dieta aniztasun handia duela eta bestetik, elikagai osasuntsuen aukeraketa altuagoa inplikatzen duela, eta horren ondorioz, dieta kalitatea altuagoa da.

Bestalde, UPV/EHUko ikasle emakumeek gizonek baino ohitura dietetiko hobeagoak zituztela ondorioztatu zen, otorduetan denbora gehiago igarotzen zutelako, lagunduta jaten zutelako eta dieta kalitate altuagoa zutelako (HEI-2010 eta MDS indizeen arabera neurtuta, aurretik deskribatu den bezala). Emaitza hauek bat datoz literaturan aurrez aurkitutakoarekin(38) eta emakumeek osasuntsu jaten saiatzen direlakoaren gertaerarekin lotuta egon daiteke(39). Bestetik, laginaren gizonek emakumeek baino elikadura patroi hobeagoa izan zuten, eguneroko Ozk-an, gosariaren maiztasunean eta Ozk-en arteko denboran, zehazki (P < 0,05). Sexu desberdintasunak Ozk-en arteko denboran izan daiteke ezberdintasunak daudelako energia ahorakinaren banaketan egunean zehar, beste autore batzuek(40) aipatu duten bezala.

Bizi-ohiturei (dieta izan ezik) dagokionez, ikertutako populazioaren ezaugarriak hurrengoak izan ziren: AF maila moderatua, denbora larregi eserita, edale moderatuak eta ez-erretzaileak/erretzaile-ohiak eta loaldiaren iraupen egokia. UPV/EHUko ikasle gizonek emakumeek baino bizi-ohitura egokiagoak zituzten AFri, edateko portaerari eta erretzaile estatusari dagokionez. Alabaina, ikasle emakumeek gizonek baino loaldiaren iraupen egokiagoa zuten (P < 0,05). AFan behatutako sexu desberdintasunak beste ikerketa batzuetan behatutakoaren antzekoa zen(37,41). Honez gain, alkohol kontsumoan eta erretzeko ohituran behatutako sexu desberdintasunak ez zetorren bat aurretik argitaratutako emaitzekin[37,42]. Diskrepantzia hauek metodologia arrazoiengatik eta sexuaren araberako kontsumo patroian egondako aldaketengatik izan daiteke [43].

Bestetik, dieta totala eta bizi-ohituren indizeen artean korrelazio positiboak eta esanguratsuak aurkitu ziren, eta aurkikuntza esanguratsuena izan zen Ozk-ena hurrengo aldagaiekin: AF maila altua, denbora larregi eserita, alkohol kontsumo moderatua eta ez-erretzaile izatea; eta Ozk-en arteko denbora eta gosariaren iraupen egokia eta AF maila altua eta loaldiaren iraupen egokiaren artean. Emaitza hauek bat datoz beste autore batzuek aurkitutakoarekin[3,37], hauek aditzera eman dute elikadura ohitura ez-osasuntsuak bizi-ohitura ez-osasuntsuekin erlazionatzen direla (erretzea, alkohol kontsumo altua eta AF maila baxua, adibidez).

Gainera, gehiegizko GnM zuten partaideek bizi-ohitura osasuntsuen indizean puntuazio baxuagoak zituzten gehiegizko GnM ez zuten ikasleekin erkatuta ($P < 0{,}001$). Gehiegizko GnM zuten ikasleek Ozk, Ozk-en arteko denbora eta gosariaren iraupen desegokia, ez zuten gosaltzen, bakarrik jaten zuten, MDS, elikadura patroia eta dieta totalaren indizeetan puntuazio baxuak zituzten ($P < 0{,}01$). Ozk eta gosariaren iraupenari dagokionez, gure aurkikuntzak bat datoz Shang *et al.*-ek aipatutakoarekin[44], aditzera eman zutela maiz eta poliki jatea gainpisua/obesitatearen arriskua murrizten zituztela.

Bestalde, ez gosaltzea eta gainpisua eta obesitatearen arteko erlazioa adina, sexua, kultura eta ekonomia mota guztietan, ondo ezagutzen da[45]. Bakarrik jatea eta gainpisu/obesitateari lotutako arriskuari dagokionez, gure emaitzak bat datoz Lee-ren aurkikuntzekin[46]. Zentzu honetan, gogoratu egin behar da, literaturan ondo deskribatuta dagoela giza harremanen eta dieta kalitatearen arteko erlazioa[6].

Ikerketa batzuek erakutsi dute, orokorrean, gainpisua/obesitatea duten pertsonek bizi-ohitura ez-osasuntsuak jarraitzeko joera dutela (AF gutxi, portaera sedentarioak, asko edatea, erretzea eta loaldia)[4,47]. Emaitza hauek bat datoz gure ikerketako emaitzekin, non gehiegizko GnM zuten ikasleek AF baxua-moderatua, alkohol kontsumo moderatua-altua, larregiko denbora eserita eta loaldiaren iraupen baxua baitzuten GnM % normala zuten ikasleekin konparatuz ($P < 0{,}001$). Edozein kasutan, ikerketa honetan, gehiegizko GnM bizi-ohituren indizearen aldagai desberdinekin erlazionatu zen gizonetan eta emakumeetan. Gizonen artean, AF moderatua/baxua, ez gosaltzea, gosariaren iraupen eta Ozk desegokia eta bakarrik gosaltzea edo egoeraren arabera; eta emakumeen artean, berriz, MDS baxua, alkohol kontsumo moderatua/altua, loaldiaren iraupen desegokia, bakarrik gosaldu eta bazkaldu edo egoeraren arabera gehiegizko GnMrekin erlazionatu ziren. Efektuaren tamaina handienak (ORen magnitudeak) ez gosaltzea eta AF maila aldagaietan gizonetan eta Mediterranear dietarekiko atxikidura aldagaian emakumeetan behatu ziren.

Orokorrean, sexu desberdintasun hauek izan daitezke emakumeentzako gizonentzako baino garrantzitsuagoa delako osasuntsu jatea[48], beraz, ohitura egokiagoak jarraitzen dituzte hurrengo aldagaietan: eguneroko Ozk, gosaltzea, otorduetan denbora igarotzea bezala eta dieta kalitatea, beste autore batzuek azpimarratu duten bezala[38]. Beste bizi-ohiturei dagokionez, AF bezala, seguru aski, kultura eta umetatik garatu daitezkeen ohiturak gizonen AF altuagoarekin lotu daitezke[49].

Espero ez genuen bezala, UPV/EHUko gehiegizko GnM zuten ikasle gizonek bazkari/afariaren iraupen egokia zuten eta abstemioak ziren, eta gehiegizko GnM zuten emakumeetan eserita igarotzen zuten denbora egokia kontsideratzen zen, HEI-2010 indizean puntuazio egokia zuten eta AF maila altua. Emaitza hauek pisua galtzeko jarraitutako portaera osasuntsuekin lotuta egon daitezke (gutxiago edo elikagai desberdinak jatea, edo ariketa egitea pisua galtzeko)[50]. Emakumeetan dieta kalitatearen bi indizeetan emaitza kontraesankorrak aurkitu ziren, eta hau indizearen puntuazioak egitean kontuan hartutako adierazleen ondorio izan daiteke.

Ikerketa honek dituen mugaketak aipatu beharrekoak dira. Lehenengoa, ezin da baztertu komenigarritasun lagin batean egon daitekeen oroitzapenaren alborapena. Parte-hartzearen erabakian hainbat faktoreek izan dezakete eragina, baldintza sozialak, hezkuntza eta osasuna esate baterako, eta hauek arrisku faktoreekin erlazionatuta egon daitezke. Bigarrena, norberak adierazitako portaeren erantzunak gizarte gogoan oinarritzen dira, beraz, emaitzak gutxiestuta edo gehiegi estimatuta egon daitezke. Hala ere, aurretik egindako baliozkotze ikerketek, dietarekin lotuta daudenak adibidez, aditzera ematen dute norberak adierazitako informazioak zehaztasun nahikoa duela epidemiologiako analisietan erabiltzeko[51]. Aipatzekoa da erabilitako galdetegiak aurrez frogatuta edo baliozkotuta zeudela.

Hirugarrena, ikerketa hau aurrez-aurreko elkarrizketak eta antropometriako neurriak zituen proiektu handi baten parte da, beraz, ebaluazio bakoitzaren luzerak erantzunetan eta erantzun-tasan eragina izan lezake. Baina hori saihesteko, elkarrizketak bi egunetan banatu ziren partaideen kontzentrazioa bermatzeko eta parte-hartzea sustatzeko. Azkenik, laugarrena, diseinu transbertsaleko ikerketa dela eta, aukeratutako portaeren arteko kausalitate konklusioak ezin dira atera. Etorkizuneko ikerketetan, ikasle kohorte bat jarraituko dugu denbora batez bere osasun portaeretan unibertsitatearen ingurumenak duen inpaktua aztertzeko.

Ikerketa honen sendotasun nagusiena, beste ikertzaile batzuekin konparatuta[52] gainpisua/obesitatearen diagnostiko irizpide bezala GnM %, GMI ordez, erabili izan dela, faltsu negatiboak eta positiboak saihesteko. Gainera, estandarizatutako protokolo honen bidez unibertsitate ikasleen gainpisua/obesitatearen determinatzaileen datuak jaso dira eta baita beraien arteko interakzioak ere.

Ondorioak

Gure emaitzek aditzera ematen dute hainbat bizi-ohitura ez-osasuntsuak elkarrekin ematen direla, elkarri eragiten diotela eta populazio honetan gainpisua/obesitatearen arriskua areagotzen dutela. Gehiegizko adipositatearen arrisku faktoreen sexu desberdintasunak eragina du obesitatearen lehen mailako prebentzioan egiten diren ekintzetan. Edozein kasutan, ikerketa gehiago behar dira gainpisua/obesitatearen arrisku faktoreen arteko interakzioak aztertzeko.

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3. ikerketa

Unibertsitate ikasleen ohitura dietetikoen ingurumen inpaktua eta osasun dimentsioa: EHU12/24 ikerketaren emaitzak

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Artikulua errebisioan (Public Health Nutr.)

Laburpena

Helburua:

Unibertsitate ikasleen ohitura dietetikoen ingurumen inpaktua eta osasun dimentsioa aztertu eta elkarren artean egon daitezkeen asoziazioak ebaluatu.

Diseinua:

Behaketako kohorte ikerketa honetan, dieta baliozkotutako elikagaien kontsumo maiztasunaren galdetegi motz batekin ebaluatu zen eta dieta kalitatea *Healthy Eating Index* (HEI-2010) eta *MedDietScore* (MDS) indizeekin. Dietaren ingurumen inpaktua literaturatik lortutako berotegi efektuko gasen isurtzearen (BEGI) datuekin kalkulatu zen.

Kokapena:

Euskal Autonomia Erkidegoa.

Partaideak:

Euskal Herriko Unibertsitate publikoko ikasle lagin adierazgarria.

Emaitzak:

Ikasleen dieta karbohidratoetan (energia ingestio guztiaren (EIG) % 38,7koa) eta zuntzean (23.4 g/egun) baxua eta gantzetan altua (EIGren % 39,1) zen. HEI-2010 indizearen batezbesteko puntuazioa 74,5/100 eta MDS indizearena 33,5/55. Dietari lotutako BEGI 4,7 kg eCO_2/egun izan zen. Dietari lotutako BEGI altuak HEI-2010 indizearen puntuazio altuekin eta MDS indizearen puntuazio baxuekin erlazionatu zen. Dieta kalitatearen indizeetan puntuazio altuagoak lortu zituztenak emakumeak ziren nagusiki, adin nagusiagokoak eta gantz-masa portzentaje (GnM %) normala zuten; eta dietari lotutako BEGI datu altuak zituztenak gizonak ziren gehien bat, adin nagusiagokoak, Osasun Zientzietakoak, estatus sozioekonomiko altukoak eta gehiegizko GnM % zuten.

Ondorioak:

Dietaren inguremen inpaktua eta osasun dimentsioaren arteko bateragarritasuna dietaren indizeak egiteko erabilitako irizpideetan datza. Dietaren osasungarritasuna eta ingurumen inpaktua sexua, adina, OZvs. Ez-Osasun Zientziak, estatus sozioekonomikoa eta GnM aldagaiekin lotuta zeuden.

Gako-hitzak

Jasangarritasun nutrizionala; dieta kalitatea; ingurumen inpaktua; berotegi efektuko gasen isurtzea; unibertsitate ikasleak.

Sarrera

Klima aldaketa eta elikagaien segurtasunari buruzko larritasuna areagotzean ari dela eta, dieta osasuntsu eta jasangarriari buruzko interesak gora egin du[1,2]. Elikadura eta Nekazaritza erakundearen arabera, "dieta jasangarriek biodibertsitatea eta ekosistemak babestu eta errespetatzen dituzte, kulturalki onesgarriak, eskuragarriak, ekonomikoki justuak eta nutrizionalki egokiak, ez kaltegarriak eta osasuntsuak dira eta gizakiaren baliabideak optimizatzen dituzte"[3]. Gaur egun arte, autore askok elikagaien kontsumoaren berotegi efektuko gasen isurtzearen (BEGI) inpaktua ebaluatu dute[4-6]. Alabaina, dieta jasangarriaren kontzeptuaren barne ez dago ingurumenaren dimentsioa bakarrik, osasuna, eskuragarritasuna eta onarpen dimentsioak ere barneratzen dira[3]. Dieten jasangarritasuna aztertzea ez da erraza, dimentsio bakoitzeko kalitate handiko adierazleak behar direlako eta baita beraien arteko loturak ere.

Nutrizio jasangarritasunaren dimentsioari dagokionez, nutrizio kalitatearen adierazleen eta/edo osasun aldagaien arabera aztertzen dira[7]. Zentzu honetan, ikerketa batzuek elikagai[8,9] edo nutriente[10,11] gomendioetan oinarritutako dieta jasangarriak edo osasun publikoko ereduak eratu dituzte[12,13]. Beste kasu batzuetan, Mediterranear Dieta (MD) bezalako patroi dietetikoen jarraipenenen osasun eta ingurumen ondorioak aztertu izan dira[14]. Hainbat ikerketek dieta osasuntsuek ingurumen inpaktu txikiagoa dutela adierazi dute, hortaz, kalitate altuko dietak BEGI baxuagoarekin erlazionatu izan dira[15,16]. Alabaina, beste autore batzuek ez dituzte emaitza berdinak aurkitu, dietaren ingurumen inpaktua eta osasun dimentsioa nahitaez bateragarriak ez direla erakutsiz[17-21], eta emaitza hau nutrizioa eta energia dentsitatearen arteko alderantzizko harremanari lotuta egon daiteke[22,23].

Nahiz eta nutrizio kalitate altuko dietak BEGI baxuko elikagaien kontsumo altuaz (100 gramotan adierazita) bereizten diren, azkenean dieta hauek kalitate baxuko dietek baino inpaktu altuagoa dute elikagai kantitate altuagoak dituztelako[7]. Beraz, zalantzarik gabe, dieten ingurumen inpaktua eta nutrizio jasangarritasunaren arteko asoziazioa ikertzen dituzten ikerketa gehiago behar dira. Gainera, unibertsitate heldu gazteek, elikadura patroi eta nutrizio behar desberdinak dituzte heldu populazio orokorrarekin konparatuz[24-27], hortaz, asoziazio hauek komunitate berezi honetan desberdinak izan daitezke.

Gure jakintza arte, unibertsitate ikasleetan jasangarritasunaren bi dimentsio hauek aztertu dituen ikerketarik ez dago. Hortaz, ikerketa honen helburuak UPV/EHUko ikasle lagin adierazgarri baten dietaren ingurumen inpaktua eta nutrizio dimentsioa ebaluatzea eta elkarren artean egon daitezkeen asoziazioak aztertzea izan ziren. Honez gain, dietaren ingurumenaren dimentsio hauekin lotuta egon daitezkeen faktoreak (estatus sozioekonomikoa (ESE) eta faktore demografikoak, Osasun Zientziak (OZ) edo Ez-Osasun Zientziak (EOZ) ikastea eta GnM estatusa) identifikatzen saiatu ginen.

Literaturako datuetan oinarrituta, landutako hipotesiak hurrengoak izan ziren: i) ingurumen nutrizionalaren adierazleak (dieta kalitatearen indizeak) egiteko erabilitako irizpideen arabera, osasun-nutrizionala eta jasangarritasunaren helburuak bateragarriak edo bateraezinak izan daitezke[21]; ii) 20 urte baino gorako partaideen (haragizaleak direla suposatzen da)[28-30], ESE baxuko edo erdikoen[31-33], GnM estatus altukoen[34-36] eta EOZ ikasleen dieta ez da jasangarria izango (bi dimentsioak kontuan hartuta, osasun-nutrizioa eta ingurumen inpaktua).

Dieta jasangarrien osasun onurak, gainpisu eta obesitatearen prebalentzia murriztea[40,41] adibidez, eta gazte helduek ingurumenarekin lotutako gaiekin[42] duten sentsibilitatea dela eta, ikerketa honen emaitzak elikagaietan oinarritutako gida dietetikoak eta parte-hartzeko estrategiak diseinatzeko erabili ahal izango dira. Gida eta estrategia hauek dieta kalitatea hobetzen lagunduko dute eta aldi berean dietek ingurumenean duten inpaktua murriztuko dute eta bizitzako etapa honek ematen dituen aukerak portaeretan aldaketak eragiteko erabili beharko litzateke. Gainera, unibertsitate ikasleak etorkizuneko elite sozioekonomikoaren (SE) proportzio esanguratsua izango dira; beraz, beraien ohiturak eta portaerak jarraitzeko ereduak izango dira[43], eta honek populazio hau ikertzeko interesgarri bihurtzen du.

Materialak eta metodoak

Ikerketa hau, gehiegizko GnMren prebalentzia eta gainpisua/obesitatea garatzeko arrisku faktore nagusienak aztertzen dituen, estandarizatutako protokolo bat jarraituz Euskal Herriko Unibertsitateko UPV/EHU ikasle-lagin adierazgarri batean egindako behaketako kohorte EHU12/24 ikerketaren parte da[44]. EHU12/24 ikerketaren diseinua, lagina eta prozedurak xehetasunez azaldu dira aurretik argitaratutako beste artikulu batean[44]. Ikerketa honetan faktore demografiko eta SEk, datu akademikoak, datu medikoak, gorputz irudiaren ebaluazioa, dietarekin lotutako jarrerak, pisu kontrola eta nutrizio jakintzei buruzko informazioa jaso zen eta eta baita neurri antropometriakoak ere egin ziren[44]. Artikulu honetan, bereziki, dieta osasuntsu eta jasangarri bateri lotutako ohitura dietetiko eta beste faktore batzuen (datu SE, demografiko eta akademikoak (OZ eta EOZ), eta GnM estatusa) emaitzak aurkezten dira.

Ikertutako populazioa

Laburki, ikerketa 2014ko otsailetik 2017ko maiatza artean 18 eta 28 urte bitarteko 603ko ikasle (% 59,5 emakumeak) lagin batean egin zen. 93 ikasle baztertu egin ziren, aldagai garrantzitsuetan datu faltagatik. Honez gain, ikerlan honetan, haztapenak erabili dira populazioan jaso diren datuak adierazgarriagoak egiteko[(45)].

Ahorakin dietetikoaren ebaluazioa

Dieta elikagaien kontsumoaren maiztasunari buruzko galdetegi motz (EKMGM) batekin ebaluatu zen. EKMGM hau Rodríguez *et al.*-en galdetegiaren[(46)] egokitutako eta baliozkotutako bertsioa izan zen. EKMGMaren baliozkotasuna eta errepikatzeko gaitasuna energia, nutriente eta elikagaien ahorakinak neurtzen dituzten bi ikerketa metodoak (EKMGM vs. 24 orduko oroitzapena) konparatuz egin zen (artikulua prentsan). EHU12/24 proiektuko dietaren balorazioaren deskripzio zehatza aurretik argitaratua izan da[(44)]. Energia eta nutrienteen ahorakina kalkulatzeko, kontsumitutako elikagai item guztiak DIAL 2.12[(47)], dietak baloratzeko programan sartu ziren. Aldez aurretik deskribatu zen bezala [(44)], ikasleek bere ahorakin dietetikoa gutxiesten zuten edo ez egiaztatu zen Black-ek[(48)] eguneratutako Goldberg-en[(49)] metodoarekin egin zen eta 1,55 balioa erabili zen ariketa fisikoko maila zehazteko[(50)]. Analisi hauek aditzera ematen dute partaideen % 38ak bere ahorakina gutxiesten zuela eta % 2,1ek gehiegi estimatzen zuela, eta gutxiespen hau gizonetan emakumeetan baino altuagoa izan zen (% 48,3 vs. % 31, hurrenez hurren; $P < 0,001$) eta gehiegizko GnM zuten ikasleetan gehiegizko GnM ez zutenekin konparatuz (% 58 vs. % 34,6, hurrenez hurren; $P < 0,001$).

Makronutrienteak energia-ingestio guztiaren (EIG) portzentaje bezala aurkeztu eta makronutrienteen banaketa tarte onargarriekin (MBTO) erkatu ziren, hau da, gaixotasun kronikoen arrisku baxuarekin lotutako ahorakin tarte eta oinarrizko nutrienteen ahorakin egokiak[(51)] hornitzen dituzten balioekin konparatu ziren. Gantzen kontsumoa Espainiako populazioarentzat erabiltzen diren helburu nutrizionalekin[(51)] aztertu ziren. Energia eta nutrienteen ingestioaren egokitzapena aztertzeaz gain, elikagaietan oinarritutako gida dietetikoen egokitzapena *Healthy Eating Index-2010* (HEI-2010)[52] eta *MedDietScore* (MDS)[53] bitartez baloratu zen.

Lehenengoak, Amerikako Gida Dietetikoetan oinarritzen den dieta kalitatearen indize bat da. Nahiz eta, HEI-2010 amerikar gidetan oinarrituta egon, Europako populazioetan egindako ikerketa askotan eta baita Europako unibertsitate ikasleetan[54,55] ere erabili izan da, eta honek emaitzak erkatzen laguntzen digu. Ikerketa honetan HEI-2015aren ordez HEI-2010 erabili zen hainbat arrazoiengatik. Lehenengoa, HEI-2010 UPV/EHUko eta beste unibertsitate ikasle populazioetan[54,55] erabili izan da eta honek konparaketak egiteko aukera ematen du. Bigarren arrazoia HEI-2010ak alkohol kontsumoaren ebaluazioa (kaloria hutseko aldagaiaren arabera) egiten duelako eta HEI-2015k, bitartean, ez. Ikerketa honetan, elikagai honen ebaluazioak dieta kalitatearen testuinguruan interesa dauka unibertsitate ikasleek alkohol kantitate altuak kontsumitzen dituztelako[56,57], baita bere adineko unibertsitate ikasleak ez diren gazteak baino gehiago ere[58]. HEI-2010 indizeak 12 aldagai ditu, 9 egokitzapenekoak eta 3 moderaziozkoak. HEI-2010 indizearen tarte teorikoa 0tik 100era doa. HEI-2010 puntuatzeko algoritmo metodoarekin kalkulatu genituen indizearen puntu-kopuruak[59]. MDS indizeak DMrekiko atxikimendu maila neurtzen du eta gaixotasun kardiobaskularreko arrisku faktoreen bio-markagailuei lotuta dago[53]. Indize honek 11 osagai ditu eta aldagai bakoitzak banaka puntuatzen zuen. Puntuazio guztia (gehiketa) 0tik 55era doa. Puntuazio altuek DMrekiko atxikimendu altuagoa adierazten dute.

Gainera, dietaren ingurune-inpaktua aztertu zen, literaturatik ateratako dietari lotutako BEGIren datuen (kg eCO_2/kg elikagai, bereziki) arabera kalkulatu zen. Pubmed-en 2000. urtetik 2015. urtera arte publikatutako artikuluen azterketa egin zen eta erabilitako artikuluek BEGIren datuak kg eCO_2/kg bezala adierazi behar zituzten elikagai bakoitzeko. Prozedura guztiak aurretik deskribatuak izan ziren[44]. **1. taulan**, literaturatik ateratako eta ikerketa honetan erabilitako BEGIren datuak laburtzen dira, pertsona bakoitzak elikagaien maiztasunari buruzko galdetegian adierazitako ahorakin dietetikoa kontuan hartuta bere kg eCO_2/pertsona/egun kalkulatzeko[18,60-67]. Laburbilduz, datuak aukeratzerakoan hurbiltasun geografikoa kontuan hartu zen eta zuzenketa faktoreak[60,61] erabili ziren etxerako garraioa edo/eta sastarren BEGI ez zituzten datuetan. Elikagai taldeak sailkatzeko dieten BEGI aztertu dituzten beste ikerketa batzuen irizpide berdinak jarraitu ziren[66], eta talde bakoitzeko elikagaiak Euskal Autonomia Erkidegoan kontsumitzen diren elikagaien azterketa kuantitatiboaren ikerketatik[68] aukeratu ziren.

1. taula: EHU12/24 ikerketan erabilitako elikagai item bakoitzeko berotegi-efektuko gasen isurtzea

Elikagai motak	Elikagai itemak(Erreferentziak)	BEGI (kg eCO_2/kg elikagai)
Frutak	Fruta zitrikoak: laranja[56-58]	1,58
	Beste fruta batzuk: sagarra[56-58]	1,34
	Deshidratatutako frutak: datilak[56,57,59]	1,15
Frutadun edariak	Fruta zuku komertzialak[56-58]	1,26
Barazkiak	Berakatza[56-58]	0,94
	Garniziozko barazkiak: azenarioa[56-58]	1,84
	Indaba berdeak[56-58]	1,94
	Kipula[56-58]	0,94
	Entsalada: letxuga[56-58]	1,99
Fekulazko elikagaik	Ogia[60]	1,47
	Gosariko zerealak[18,56,57]	3,42
	Dilistak[56-58]	0,56
	Pasta[56-58]	0,49
	Patatak[56-58]	0,54
	Arroza[56-58]	1,31
	Gosariko zereal integralak[18,56,57]	3,42
	Ogi integrala[56-58]	1,29
Gazta	Kaloria gutxiko gazta: gazta zuria[56-58]	2,15
	Beste gazta batzuk: gruyère[56-58]	13,53
Esnea eta esnekiak	Esne-gaina[56-58]	3,28
	Esneki-postreak: natillak[56-58]	2,50
	Esne erdigaingabetua[56-58]	1,61
	Esne gaingabetua[56-58]	1,61
	Jogurt gaingabetua[61]	1,33
	Esne osoa[60]	1,00
	Jogurt osoa[56-58]	2,50
Haragi gorriak eta horien eratorriak	Hirugiharra[56,57,62]	9,93
	Urdaiazpikoa[56-58]	7,26
	Bildotsa[56-58]	25,57
	Haragi txikitua[56-58]	20,56
	Saltxitxak[56,57,62]	8,01
Arrautzak eta haragi zuriak	Oilaskoa[56-58]	7,04
	Arrautzak[56-58]	6,06
Arraina eta itsaskiak	Arrain urdina: izokina[56-58]	6,83
	Arrain zuria: legatza[56-58]	4,44
	Itsaskiak: otarrainxka[56-58]	18,03
Gozokiak eta gatzdun mokaduak	Gailetak[61]	2,50
	Krema edo txokolatezko gailetak[61]	2,50
	Krema edo txokolatezko pastelak[56-58]	2,09
	Txokolatea[59]	1,00
	Donutsak[18,56,57]	2,41
	Eztia[56-58]	1,03

Hurrengo orrialdean jarraitzen du.

1. taularen jarraipena.

Elikagai motak	Elikagai itemak(Erreferentziak)	BEGI (kg eCO_2/kg elikagai)
Gozokiak eta gatzdun mokaduak	Azukrea[56-58]	0,96
	Gozokiak: karameluak[61]	2,60
	Gaileta integralak[61]	2,50
	Tomate frijitua[56,57,62]	1,47
	Pikantea: txilea eta piperbeltza[56,57,59]	1,65
	Napolitanak[18,56,57]	2,50
	Pizza[61]	2,50
	Mokaduko paketeak: patata frijituak[56-58]	2,64
	Zopak[56,57,62]	0,36
	Sojadun edariak[61]	0,43
Olioa eta gatzak	Gurina[56-58]	26,60
	Arto olioa[61]	2,29
	Margarina[61]	1,75
	Mahonesa[56,57,63]	2,05
	Oliba olioa[56-58]	2,35
	Ekilore olioa[56-58]	1,24
Alkoholdun edariak	Alkoholdun aperitiboak[56-58]	1,13
	Garagardoa[56-58]	0,46
	Sagardoa[56-58]	1,13
	Edari destilatuak[56-58]	1,13
	Ardoa[56-58]	1,13
	Kafea[56-58]	0,47
	Kaloria gutxiko edariak[61]	1,00
	Azukredun edariak[56-58]	0,47
	Fruitu lehorrak[56-58]	2,93

BEGI, berotegi efektuko gasen isurtzea.

Koaldagaiak

Datu demografikoak (adin dezimala eta sexua barne) eta ESE (gurasoen hezkuntza maila eta metaketa indizean oinarrituta) Osasun Inkesta Nazionalaren(69) galderekin aurrez aurreko elkarrizketa bidez erregistratu ziren. Metaketa indizea etxean bizi diren pertsonak/lotarako erabilitako logelen zenbakiaren ratioa bezala kalkulatu zen(70). Datuen analisia errazteko eta deskribatzeko helburuarekin, SEk birsailkatu ziren: *gurasoen hezkuntza maila* (behintzat bietako batek unibertsitate ikasketak izatea edo ez) eta *metaketa indizea* (puntuazioa 1 baino altuagoa; 1 baino gutxiago edo berdin). Honez gain, ikasleek ikasten ari ziren gradu edo graduondoko informazioa ere erregistratu zen. Graduak Hezkuntza, Kultura eta Kirol Ministerioak(71) proposatutako *ezagutza arloen* arabera sailkatu ziren (Arteak eta Giza Zientziak, Zientziak, Osasun Zientziak, Gizarte eta Lege Zientziak eta Ingeniaritza eta Arkitektura). Ondoren, ezagutza arloa OZ eta EOZ kategoriatan banatu zen. Laginaren % 86,1ek EOZtako ikasleak ziren eta gainerakoak OZtakoak (% 13,9). Laginaren ezaugarri orokorrak, hala nola, adina, gurasoen hezkuntza maila eta metaketa indizea aurretik argitaratuak izan ziren[44].

Honez gain, neurri antropometrikoen barne larruazalpeko izurren neurriak daude (bizipitala, trizipitala, subeskapularra eta suprailiakoa). EHU12/24 proiektuan eginiko neurri antropometrikoen deskribapena argitaratua izan zen[44]. Gantz-masaren portzentajea (GnM %) larruazalpeko izurren datuekin eta Siri-k[72] proposatutako adin eta sexu berariazko ekuazioarekin kalkulatu zen, *Sociedad Española para el Estudio de la Obesidad* (SEEDO)[73] erakundeak gomendatzen duen bezala, eta dentsitatea Durnin eta Womersley formularekin kalkulatu zen[74]. Partaideen GnM % Bray *et al.*-en[75] irizpidea jarraituz sailkatu zen.

Analisi estatistikoa

Datuen analisi estatistikoa SPSS 22.0 bertsioarekin egin zen (SPSS Inc., Chicago, IL) eta emaitzak batezbestekoa (desbideratze tipikoa, DT) eta maiztasun moduan aurkeztu ziren. Ikerketaren emaitzak UPV/EHUko 2012/2013ko matrikulazio zerrendatik ateratako haztapen koefizienteekin haztatu egin ziren[76]. Datu kuantitatiboen normaltasun analisia Kolmogorov–Smirnov–Lilliefors probarekin aztertu zen. Aldagaien arteko desberdintasunak Kruskal Wallis H testarekin kalkulatu ziren (datuak haztatu zirenez aldagaiek ez dute banaketa normala jarraitzen, hau da, lagina handia zen eta desbideratze txikiek aldagaiak banaketa normala ez jarraitzea egiten zuten). Aldagai kualitatiboak χ^2 testarekin aztertu ziren.

Dieta kalitatearen bi indizeen arteko akordio gradua aztertzeko Spearman-en korrelazio koefizienteak (r) eta kappa koefizienteak kalkulatu ziren. Kappa koefizientea akordio neurri bat da: $\kappa=1$ akordio hobeezina da eta $\kappa=0$, bitartean, akordio ahulena. κ koefizientearen analisiak egiteko, dieta kalitatearen datuak bi kategoriatan banatu ziren, HEI-2010 eta MDS indizeen autoreen definizioen arabera. HEI-2010 hurrengo kategoriatan sailkatu zen: hobetzeko beharra (0-80 puntu) eta ona (> 80 puntu) eta MDS hurrengo kategoriatan: MDrekiko atxikidura baxua (0-34 puntu) eta atxikidura altua (> 35 puntu). MDSeko ebaki puntua 34 zen; puntuazio hau baino gutxiagoko puntuazioek gaixotasun kardiobaskularra jasateko arrisku altuago zutela kontuan hartuta ezarri zen, ≥ 1,42 odds erlatiboa izanda[53].

HEI-2010 eta MDS indizeen puntuazio altuen erlazionatutako koaldagaiak erregresio logistikoa erabiliz identifikatu ziren. Eredu hauetan, hurrengo koaldagaiak kontsideratu ziren: adina, ikasten ari ziren ezagutza arloa, ESE (gurasoen hezkuntza mailan eta metaketa indizean oinarrituta) eta GnM estatusa. Aldagai bakoitzeko efektua eguneko energiara (kJ/egun) eta sexura adostu ziren, eta 2. Ereduak dieta osasuntsuagoarekin erlazionatutako faktore guztiak barneratzen zituen. Aldagai esplikatzaile guzti hauek efektu finkoak bezala kontsideratu ziren.

Azkenik, dieta kalitatea (indizearen sailkapena aurretik deskribatu den bezala egin zen) eta ohitura dietetikoei lotutako BEGI aztertzeko, BEGI aldagaia puntuazio baxuan eta altuan sailkatu zen, laginaren mediana kontuan hartuta (BEGI baxuena ≤ 4,4 kg eCO_2/egun; BEGI altuena, > 4,4). Korrelazio bibariatuak eta partzialak dieta kalitatearen bi indize eta BEGIren artean kalkulatu ziren. Korrelazio partzialak eguneko energiara (kJ/egun) eta sexura adostu ziren. Honez gain, erregresio logistikoak egin ziren dieta kalitatearen bi indizeen eta dietari lotutako BEGI eta aurretik aipatutako aldagaien arteko asoziazioak aztertzeko. Proba estatistiko guztiak 2 aldekoak izan ziren, eta balio adierazgarri gisa $P < 0,05$ zutenak hartu ziren, % 95eko konfiantza-tartearekin.

Emaitzak

GnM % arabera, helburu populazioaren % 14,4ak gehiegizko pisua zuen, gizonen % (% 16,1) emakumeena (% 13,3) baino altuagoa izanik (P <0,001). Energia, nutriente eta alkohol ahorakinaren batezbestekoa **2. taulan** deskribatzen da. Partaideen dietaren ezaugarriak hurrengoak izan ziren: karbohidrato eta zuntz (gizonen kasuan, batez ere) ahorakin baxua eta gantzen ahorakin altua, gantz azido aseak eta kolesterolaren kasuan bereziki. Sexu desberdintasunak behatu ziren energia, nutriente (gantz azido aseen kasuan izan ezik) eta alkoholaren ahorakinean. Aldagai guzti hauen emaitzak gizonetan emakumeetan baino altuagoa izan zen ($P < 0,01$), karbohidratoen kasuan izan ezik, non, emakumeen ahorakina altuagoa izan baitzen ($P < 0,001$).

2. taula: Helburu populazioaren energia, nutriente eta alkohol ahorakina: Euskal Herriko Unibertsitateko UPV/EHU ikasleak, EHU12/24 ikerketa (batezbesteko balioak eta desbideratze estandarra)

	Guztira (n=26.165)[1]	Gizonak (n=10.607)	Emakumeak (n=15.558)	P^2	MBTO[51]
	←Batezbestekoa±DE→				
Energia (kJ/e)	8.891,9±2.741,5	9.793,3±2.880,9	8.277,3±2.459,7	***	
Proteinak (% EIG)	15,1±2,7	15,1±3,0	15,0±2,5	**	10-15
Karbohidratoak (% EIG)	38,7±5,6	38,2±5,6	39,1±5,6	***	50-60
Gantzak (% EIG)	39,1±6,6	39,6±6,6	38,7±6,5	***	30-35
Gantz azido aseak (% EIG)	13,1±3,0	13,1±3,0	13,0±3,0	EE	< 7-8
Gantz azido monoaseak (% EIG)	16,8±4,1	17,0±4,1	16,6±4,0	***	20
Gantz azido poliaseak (% EIG)	6,1±2,5	6,2±2,8	5,9±2,3	***	5
Azido linoleikoa (% EIG)	11,8±7,9	13,5±9,5	10,7±6,3	***	3
Azido α-linolenikoa (% EIG)	1,4±0,8	1,6±0,9	1,3±0,7	***	1-2
Kolesterola (mg/e)	314,7±199,8	366,8±241,8	279,3±155,5	***	< 300
Zuntza (g/e)	23,4±9,6	24,1±9,6	23,0±9,6	***	< 22-25 (emakumeak) > 30-35 (gizonak)
Alkohola (g/e)	9,1±9,0	10,2±10,5	8,4±7,7	**<0,001**	

[1]Emaitzak haztatuak izan ziren UPV/EHUko 2012/2013ko matrikulazio zerrendatik ateratako haztapen koefizienteekin; [2]Sexu desberdintasunak.
** $P < 0,01$; *** $P < 0,001$; EE, ez esanguratsua, $P > 0,05$.
DE, desbideratze estandarra; EIG, energia ingestio guztia; MBTO, makronutrienteen banaketa tarte onargarria.

HEI-2010 eta MDS indizeen emaitzak **3. taulan** aurkezten dira. Laginaren HEI-2010 indizearen batezbesteko puntuazio 74,5(8,0) izan zen eta sexu desberdintasunak behatu ziren (gizonen puntuazioa 73,7(7,9) vs. emakumeena 75,3(7,9), P < 0,001). HEI-2010 indizearen aldagai gehienen puntuazioa (frutak, fruta osoak, barazkiak, barazki berdeak eta lekaleak, zereal integralak, esnekiak, itsaskiak eta landareak, zereal finduak eta sodioa) emakumeetan gizonetan baino altuagoa izan zen (P < 0,01). Orokorrean, barazkiak eta zereal integralak puntuazio baxuenak lortu zituzten elikagai taldeak izan ziren.

Bestetik, MDS indizearen batezbesteko puntuazioa 33,5(5,5) 55etik izan zen, sexu desberdintasunekin (gizonen puntuazioa 32,7(5,2) vs. emakumeena 34,1(5,6), P < 0,001). Honez gain, MDS indizearen 11 aldagaietatik, emakumeek gizonek baino puntuazio gehiago lortu zuten 5 aldagaietan (P < 0,001), zereal ez finduak, frutak, barazkiak, haragi gorriak eta horien eratorriak, hegaztiak eta esneki osoak. **4. taulan** kategoria berdinean edo kontrakoan sailkatutako partaideen portzentajeak agertzen dira eta baita bi dieta kalitatearen metodoen (HEI-2010 eta MDS) adostasuna ere. Adostasun gradu ona zegoen HEI-2010 eta MDS metodoen artean (κ=0,332).

Dieta kalitate altuari lotutako faktoreei dagokionez, adin nagusia (> 20,4) eta gehiegizko GnM ez izatea HEI-2010 eta MDS indizeen puntuazio altuekin erlazionatu zen (P < 0,001) (**5. taula**); eta HEI-2010 kasuan, ESE altua (gurasoen hezkuntza mailaren arabera neurtuta) ere dieta kalitate altuarekin lotu zen (P < 0,001). OZtako ezagutza arloa HEI-2010 indizearekin erlazionatu zen, eta MDS kasuan, aldiz, puntuazio baxuarekin lotu zen (P < 0,001). OZtako ikasleek EOZtakoek baino puntuazio altuagoak HEI-2010 indizearen hamabi aldagaietatik zazpitan lortu zituzten: frutak (OZ, 3,6 (1,6) vs. EOZ, 3,5(1,6); P < 0 001), fruta osoak (OZ, 4,1(1,6) vs. EOZ, 4,0(1,6); P < 0, 001), barazkiak (OZ, 1,8(1,0) vs. EOZ, 1,7(1,1); P < 0,001), barazki berdeak eta lekaleak (OZ, 4,8(0,7) vs. EOZ, 4,8(0,8); P < 0,001), esnekiak (OZ, 6,0(2,3) vs. EOZ, 5,3(2,5); P < 0,001), sodioa (OZ, 10,0(0,3) vs. EOZ, 9,9(0,6); P < 0,001) eta kaloria hutsak (OZ, 19,8(0,7) vs. EOZ, 19,7(0,9); P < 0,001). Eta MDS indizearen kasuan, OZtako ikasleek puntuazio altuagoak lortu zituzten hamaika aldagaietatik lautan EOZtakoekin erkatuz: barazkia*k* (OZ, 4,7(0,8) vs. EOZ, 4,6(1,0); P < 0,001), arraina (OZ, 3,0(1,4) vs. EOZ, 2,7(1,4); P < 0,001), haragi gorriak eta horien eratorriak (OZ, 2,5(1,2) vs. EOZ, 2,3(1,4); P < 0,001) eta oliba olioa (OZ, 4,8(0,8) vs. EOZ, 4,7(1,0); P < 0,001).

3. taula: *Healthy Eating Index* eta *MedDietScore* indizeak helburu populazioan: Euskal Herriko Unibertsitateko UPV/EHU ikasleak, EHU12/24 ikerketa (batezbesteko balioak eta desbideratze estandarra)

	Lagin osoa (n=26.165)[1]	Gizonak (n=10.607)	Emakumeak (n=15.558)	P^2
HEI aldagaiak, puntuazioak	⟵Batezbestekoa±DE⟶			
Frutak (0-5)	3,5±1,6	3,3±1,7	3,6±1,6	***
Fruta osoak (0-5)	4,0±1,6	3,8±1,6	4,1±1,5	***
Barazkiak (0-5)	1,8±1,1	1,6±1,0	1,9±1,1	***
Barazki berdeak eta lekaleak (0-5)	4,7±0,8	4,5±1,0	4,8±0,6	***
Zereal integralak (0-10)	2,3±3,2	1,8±2,9	2,6±3,4	***
Esnekiak (0-10)	5,4±2,5	5,3±2,4	5,4±2,6	**
Elikagaietako proteina totala (0-5)	4,3±0,9	4,4±0,8	4,2±1,0	***
Itsaskiak eta landareak (0-5)	3,2±1,3	3,2±1,3	3,3±1,3	***
Gantz azidoak (0-10)	6,8±2,3	6,9±2,2	6,8±2,4	***
Zereal finduak (0-10)	8,9±1,9	8,6±2,1	9,1±1,7	***
Sodioa (0-10)	9,9±0,6	9,9±0,7	10,0±0,4	***
Kaloria hutsak (0-20)	19,7±0,9	19,8±0,6	19,7±1,0	EE
Guztira (0-100)	74,5±8,0	73,3±7,9	75,3±7,9	***
MDS aldagaiak, puntuazioak[3]				
Zereal ez finduak	2,2±2,3	2,0±2,3	2,4±2,3	***
Patatak	2,0±1,4	2,3±1,5	1,8±1,3	***
Frutak	4,5±1,2	4,5±1,2	4,5±1,2	**
Barazkiak	4,6±0,9	4,5±1,0	4,7±0,9	***
Lekaleak	2,2±1,1	2,3±1,1	2,1±1,1	***
Arraina	2,8±1,4	2,9±1,4	2,7±1,5	***
Haragi gorriak eta horien eratorriak	2,3±1,4	1,9±1,3	2,6±1,3	***
Hegaztiak	2,5±1,4	2,4±1,4	2,6±1,4	***
Esneki osoak	1,5±1,9	1,2±1,8	1,7±1,9	***
Oliba olioa	4,7±1,0	4,7±1,1	4,8±0,8	EE
Alkohola	4,2±1,8	4,2±1,8	4,2±1,8	EE
Guztira	33,5±5,5	32,7±5,2	34,1±5,6	***

[1]Emaitzak haztatuak izan ziren EHUko 2012/2013ko matrikulazio zerrendatik ateratako haztapen koefizienteekin; [2]Sexu desberdintasunak; [3]Aldagai Aldagai bakoitzak 5 puntu eman diezazkioke puntuazio totalari eta tarte teorikoa 0-55koa da eta alderantzizko eskala aplikatu zen MDS indizearen 4 aldagaietan (haragi gorriak eta horien eratorriak, hegaztiak, esneki osoak eta alkohola).
** $P < 0,01$; *** $P < 0,001$.
DE, desbideratze estandarra;EE, ez esanguratsua; HEI, *Healthy Eating Index*; MDS, *MedDietScore*.

4. taula: Kuartil berdinean edo kontrakoan sailkatutako partaideen portzentajea eta bi dieta kalitateen metodoen arteko adostasuna (*Healthy Eating Index* eta *MedDietScore*) helburu populazioan: Euskal Herriko Unibertsitateko UPV/EHU ikasleak, EHU12/24 ikerketa (zenbakiak eta portzentajeak)

Lagin osoa (n=26,165)[1]	HEI		r[4]	kappa koefizientea
	Hobetzeko beharra[2] n(%)	Ona[3] n(%)		
MDS				
Atxikidura baxua[e]	13.164(50,3)	1.608(6,1)		
Atxikidura altua[f]	6.563(25,1)	4.830(18,5)		
Guztira	19.727	6.438	0,507(***)	0,332
Gizonak (n=10.607)				
MDS				
Atxikidura baxua[e]	6.089(57,4)	580(5,5)		
Atxikidura altua[f]	2.461(23,2)	1.477(13,9)		
Guztira	8.550	2.057	0,507(***)	0,319
Emakumeak (n=15.558)				
MDS				
Atxikidura baxua[e]	7.074(45,5)	1.028(6,6)		
Atxikidura altua[f]	4.102(26,4)	3.354(21,6)		
Guztira	11.176	4.382	0,494(***)	0,328

[1]Emaitzak haztatuak izan ziren UPV/EHUko 2012/2013ko matrikulazio zerrendatik ateratako haztapen koefizienteekin.
HEI, *Healthy Eating Index*; MDS, *MedDietScore*.

5. taula: Helburu populazioan *Healthy Eating Index* eta *MedDietScore* indizeei lotutako faktoreak: Euskal Herriko Unibertsitateko UPV/EHU ikasleak, EHU12/24 ikerketa

	Healthy Eating Index						*MedDietScore*					
	1. Eredua[1]			2. Eredua[2]			1. Eredua[1]			2. Eredua[2]		
	OR	95 % KT	*P*	OR	95 % KT	*P*	OR	95 % KT	*P*	OR	95 % KT	*P*
Adina (kategorikoa)[3]												
> 20,4	1,11	1,05-1,18	***	1,14	1,07-1,20	***	1,26	1,00-1,33	***	1,28	1,22-1,35	***
Ezagutza arloa												
OZ	1,18	1,09-1,28	***	1,19	1,10-1,29	***	0,78	0,73-0,84	***	0,80	0,74-0,86	***
Gurasoen hezkuntza maila												
Unibertsitate ikasketak	1,06	1,00-1,13	*	1,07	1,01-1,13	*	1,00	0,95-1,05	EE			
Metaketa indizea												
≤ 1,0	0,99	0,93-1,05	EE				0,96	0,92-1,01	EE			
GnM sailkapena												
Ez-gehiegizkoa	1,18	1,09-1,29	***	1,20	1,11-1,31	***	1,50	1,39-1,61	***	1,53	1,42-1,65	***

[1]Aldagai bakoitzeko efektua eguneko energiara (kJ/egun) eta sexura adostu ziren;[2]2. Ereduan 1. Ereduan irtendako aldagai esanguratsuak sartu ziren ($P < 0{,}001$) eta energiara eta sexura adostu zen;[3]Adina mediana kontuan hartuta sailkatu zen.
* $P < 0{,}05$; *** $P < 0{,}001$.
EE, ez esanguratsua; KT, konfiantza tartea; OR, odds ratioa.

6. taulan elikagai taldeko BEGI eta talde bakoitzeko BEGIren ekarpena (%) azaltzen da. BEGIren batezbestekoa pertsoneko eta urteko 1.1719,6(618,1) kg eCO_2: 1.920,6(698,8) kg eCO_2 gizonetan eta 1.582,5(513,2) kg eCO_2 emakumeetan ($P < 0,001$). BEGI guztiari ekarpen altuena suposatzen duen elikagai taldea haragi gorriak eta horien eratorriak (% 28,2) izan zen eta ekarpen baxuena, berriz, edari alkoholikoak (% 1,5). Gizonek emakumeek baino BEGI altuagoa zuten eta BEGI balio altuagoak hurrengo elikagai itemetan ere: gazta, esnea eta esnekiak, fekulazko elikagaiak, haragi gorriak eta horien eratorriak, arrautzak eta haragi zuriak, gozokiak eta gatzdun mokaduak, edari ez alkoholikoak, edari alkoholikoak eta BEGI guztia ($P < 0,001$); frutak eta barazkiak eta olioa eta gantzak, ordea, BEGI altuagoak izan zuten emakumeetan gizonetan baino ($P < 0,001$). Elikagai talde bakoitzeko portzentajea BEGI guztiaren ekarpenari dagokionez, emakumeetan gizonetan baino altuagoa izan zen hurrengo taldeetan: frutak eta barazkiak, gazta, fekuladun elikagaiak, arraina eta itsaskiak, gozokiak eta gatzdun mokaduak eta olioa eta gantzak ($P < 0,001$); gizonek, aldiz, emakumeek baino puntuazio altuago lortu zuten hurrengo itemetan: haragi gorriak eta horien eratorriak, arrautzak eta haragi zuria, ez-edari alkoholikoak eta edari alkoholikoak ($P < 0,05$).

Gainera, korrelazio esanguratsuak identifikatu ziren dietaren BEGI eta HEI-2010 indizearen artean (rho = 0,078, $P < 0,001$) eta dietaren BEGI eta MDS indizea (rho = -0,075, $P < 0,001$); eta baita eguneko energiara (kJ/egun) adosten zirenean (r = 0,294, $P < 0,001$; r = -0,117, $P < 0,001$, hurrenez hurren). Dietari lotutako BEGIri erlazionatutako faktoreak hurrengoak izan ziren; adin nagusiko partaideek, OZtako ikasleek, ESE altukoek, HEI-2010 indizean puntuazio altuek, MDS indizean puntuazio baxuek eta gehiegizko GnMk BEGI altuagoak erakusten zituzten, eredu sinplean eta adostutako ereduan (**7. taula**). Haragi eta horien eratorrien ahorakinari dagokionez (BEGIri ekarpen altuena zuen elikagai taldea), ikasle nagusietan gazteenetan baino altuagoa izan zen (ikasle nagusienak, 138,2(84,6) vs. ikasle gazteenak 126,3(67,0); $P < 0,001$).

6. taula: Helburu populazioaren elikagai kontsumoari lotutako berotegi efektuko gasen isurtzea (BEGI): Euskal Herriko Unibertsitateko UPV/EHU ikasleak, EHU12/24 ikerketa (batezbesteko balioak eta desbideratze estandarra)

Elikagai taldeak	Lagin osoa (n=26.165)[1]		Gizonak (n=10.607)		Emakumeak (n=15.558)		P^2	P^3
	kg eCO_2/ pertsona/egun	BEGI guztiari ekarpena (%)	kg eCO_2/ pertsona/egun	BEGI guztiari ekarpena (%)	kg eCO_2/ pertsona/egun	BEGI guztiari ekarpena (%)		
	← Batezbestekoa±DE →							
Frutak eta barazkiak	0,9±0,6	19,2±12,0	0,9±0,7	16,7±9,9	0,9±0,5	20,9±13,0	***	***
Fekulazko elikagaiak	0,2±0,1	4,8±2,6	0,2±0,1	4,8±2,3	0,2±0,1	4,9±2,9	***	***
Gazta	0,2±0,2	3,3±4,3	0,2±0,2	3,1±3,4	0,2±0,3	3,5±4,8	***	*
Esnea eta esnekiak	0,5±0,4	12,1±7,0	0,6±0,4	12,1±6,4	0,5±0,3	12,2±7,4	***	EE
Haragi gorriak eta horien eratorriak	1,4±1,3	28,2±13,3	1,7±1,1	32,0±12,6	1,2±0,8	25,7±13,2	***	***
Arrautzak eta haragi zuria	0,5±0,5	11,5±5,9	0,6±0,6	11,6±5,8	0,5±0,3	11,5±6,0	***	**
Arraina eta izokina	0,4±0,3	9,6±5,7	0,4±0,3	8,6±4,8	0,4±0,3	10,2±6,1	EE	***
Gozokiak eta gatzdun mokaduak	0,2±0,2	4,9±3,3	0,2±0,2	5,0±3,5	0,2±0,2	4,9±3,2	***	***
Olioa eta gantzak	0,1±0,1	2,2±2,3	0,1±0,1	2,0±1,8	0,2±0,2	2,4±2,6	***	***
Edari ez alkoholdunak	0,1±0,2	2,5±3,1	0,1±0,2	2,6±3,3	0,1±0,1	2,4±3,0	***	***
Alkoholdun edariak	0,1±0,1	1,5±1,7	0,1±0,1	1,6±1,8	0,1±0,1	1,5±1,7	***	**
Guztira	4,7±1,7		5,2±1,9		4,3±1,4		***	

[1]Emaitzak haztatuak izan ziren UPV/EHUko 2012/2013ko matrikulazio zerrendatik ateratako haztapen koefizienteekin; [2]Sexu desberdintasunak BEGI aldagaian kg eCO_2/pertsona/egun adierazita; [3]Sexu desberdintasunak BEGI guztiari ekarpenean.
*$P < 0,05$; ** $P < 0,01$; *** $P < 0,001$.
BEGI, berotegi efektuko gasen isurtzea; DE, desbideratze estandarra; EE, ez esanguratsua.

7. taula: Helburu populazioaren elikagai kontsumoari lotutako berotegi efektuko gasen isurtze altuari lotutako faktoreak: Euskal Herriko Unibertsitateko UPV/EHU ikasleak, EHU12/24 ikerketa

	1. Eredua[1]			2. Eredua[2]		
	OR	95 % KT	*P*	OR	95 % KT	*P*
Adina (kategorikoa)[3]						
< 20,4	0,72	0,68-0,77	***	0,68	0,64-0,72	***
Ezagutza arloa						
Ez-Osasun Zientziak	0,70	0,64-0,76	***	0,76	0,69-0,83	***
Gurasoen hezkuntza maila						
Ez-unibertsitate ikasketak	0,93	0,87-0,99	*	0,90	0,85-0,96	**
Metaketa indizea						
> 1,0	0,65	0,61-0,69	***	0,65	0,60-0,69	***
HEI						
51-80 puntu[4]	0,46	0,43-0,49	***	0,31	0,29-0,34	***
MDS						
0-34 puntu[5]	1,48	1,39-1,58	***	2,13	1,98-2,28	***
Gantz-masa sailkapena						
Gehiegizkoa	2,39	2,19-2,61	***	2,42	2,21-2,64	***

[1]Aldagai bakoitzeko efektua eguneko energiara (kJ/egun) eta sexura adostu ziren;[2]2. Ereduan 1. Ereduan irtendako aldagai esanguratsuak sartu ziren ($P < 0,001$) eta energiara eta sexura adostu zen;[3]Adina mediana kontuan hartuta sailkatu zen; [4]Hobetzeko beharra (51 puntu baino gutxiago zuen partaiderik ez zegoen); [5]Atxikidura baxua.

*$P < 0,05$; ** $P < 0,01$; *** $P < 0,001$.

HEI, *Healthy Eating Index*; KT, konfiantza tartea; MDS, *MedDietScore*; OR, odds ratio.

Eztabaida

Ikerketa honetan, unibertsitate ikasleen ohitura dietetikoen ingurumen inpaktua eta osasun nutrizio dimentsioak aztertu genituen, eta jasangarritasunari lotutako hainbat faktore identifikatu ziren. Ikertutako populazioaren gehiegizko GnM prebalentzia % 14,4koa zen, unibertsitate ikasleetan egindako beste ikerketa batzuetan baino baxuagoa(77,78). Alabaina, gehiegizko GnM prebalentzia altuagoa gizonetan emakumeetan baino erregistratu zen, beste autore batzuek bezala ($P < 0,001$)(77). Osasun ikuspuntutik ohitura dietetikoei dagokionez, ikasleen dietaren ezaugarriak hurrengoak izan ziren: karbohidrato eta zuntzean baxua eta gantzetan altua, gantz azido ase (GAA) eta kolesterolean, bereziki. Ezaugarri hauek Mendebaldeko patroi dietetikoarenak dira eta obesitate arrisku altuagoarekin lotuta izan da(79-81) eta bat dator Europako beste unibertsitate ikasleetan beste ikertzaile batzuek identifikatu dutenarekin(82-85).

HEI-2010 eta MDS indizeekin aztertutako dieta kalitateari dagokionez, emaitzak onargarritzat hartu daitezke, baina hobetu daitezke (100etik 74,5 HEI-2010 indizean eta 55etik 33,5 MDS indizean); beste autore batzuekin konparatuz dieta kalitate indize berdinentzako emaitzak altuagoak izan ziren(54,55,86). Bi indizeetan, emakumeek gizonek baino puntuazio altuagok lortu dituzte ($P < 0,001$), eta honek beste autore batzuen aurkikuntzak baieztatzen ditu(29,54) eta hau gerta daiteke emakumeek osasunari buruzko kontzientzia gehiago dutelako eta gorputz irudiarekiko gizarte presio altuagoak dituztelako(87,88). Unibertsitate ikasle gizonek nutrizioari buruz emakumeek baino gutxiago eztabaidatzen dute eta nutrizioari buruzko sinesmen ahulagoak dituzte(89), beraz, emakumeekin erkatuz patroi dietetiko ez osasuntsuak jarraitzeko sentiberagoak ziren. Edozein kasutan, beste ikertzaile batzuek bezala(90,91), aztertutako bi dieta kalitatearen indizeak moderazioz korrelazionatuak zeuden eta ikertutako populazioan adostasun maila ona zuten, indizeak egiteko eta puntuazioen irizpideen desberdintasunen ondorio izan daiteke.

Ikertutako beste faktore batzuen eta dietaren osasun-nutrizionalaren dimentsioaren arteko asoziazioari dagokionez, bi dieta kalitate indizeetan puntuazio altuagoak lortu zituzten partaideek, ikasle nagusienak eta GnM % normala zutenak ziren. Lehenengo asoziazioa (dieta kalitate altua eta adin nagusia) gure hasierako hipotesia ez zuen egiaztatzen. Beste autore batzuek(29,92,93) kontrako asoziazioak aurkitu zituzten, baina kontuan hartu behar da guk erabilitako adin tartea oso estua izan zela (18 eta 28 urte bitartekoak bi kategoriatan banatuak) beste ikertzaile batzuek erabilitakoekin konparatuz. Espero zen bezala, GnM % normala zuten ikasleen joera dieta osasuntsuagoa izatea izan zen, eta emaitza hau bat dator helduetan egindako beste ikerketa batzuetan aurkitutako asoziazioa dieta kalitatearen indizeen eta obesitatearen artean[34,35].

Ezagutza arloari dagokionez, dieta kalitatearen indizeak egiteko eta puntuazioen irizpideen desberdintasunen ondorio izan daiteke OZtako ikasleek HEI-2010 indizean puntu altuagoa eta MDS indizean puntu baxuagoa lortzea EOZtakoekin konparatuz. Edonola, beste autore batzuek ez dute desberdintasunik aurkitu OZtako eta beste ezagutza arloko ikasleekin konparatuz[94]. Gure aurkikuntzak bat datoz aurreko ikerketekin, hauek asoziazioa erakutsi dute dieta kalitate altua (gure kasuan, HEI-2010 indizearekin neurtuta) eta ESEren artean (gurasoen hezkuntza mailaren arabera neurtuta)[95-96]. Zentzu horretan, beste autore batzuek ESE eta obesitatearen arteko asoziazioan dieta kalitateak bere eragina duela baieztatu dute[96,97].

Ohitura dietetikoak jasangarritasunaren ikuspuntuari dagokionez, dietari lotutako estimatutako BEGIren batezbestekoa 1.719,6 (618,1) kg eCO_2/pertsona/urte zen, hau da, 4,7 kg eCO_2/egun batezbestekoa (emakumeak: 4,3 kg eCO_2/egun; 5,2 kg eCO_2/egun), eta bat dator Europako beste herrialdeetako datuekin, Frantzia bezala (4,1 kg eCO_2/egun)[17], Holanda (emakumeak: 3,7 kg eCO_2/egun; gizonak: 4,8 kg eCO_2/egun)[98], Irlanda (6,5 kg eCO_2/egun)[99], eta Suedia (emakumeak: 4,1 kg eCO_2/egun; gizonak: 5,5 kg eCO_2/egun)[100]. Desadostasun hauek dieta ebaluatzeko metodoen arteko desberdintasunengatik eta partaideen ezaugarriengatik (adina eta ohitura dietetikoak bezala) izan daitezke baina baita erabilitako datuen iturriengatik ere[99]. Edozein kasutan, emakumeen BEGI guztia gizonena baino baxuagoa zen ($P < 0{,}001$), eta bat dator beste ikerketa batzuekin, eta energia ingestio guztiarekin eta *haragi gorrien eta horien eratorriekin* lotuta egon daiteke[99,101]. Haragia betidanik elikagai maskulinotzat hartu da[102], eta gaur egungo jarrerek haragiarekiko haragi-maskulinotasun asoziazio indartsua islatzen dute[103]. Gizonek gehiago jateak, gramo bakoitzeko inpaktu gehiago dituzten elikagaiek, hala nola, haragiak, bere inpaktua areagotzen du emakumeekin konparatuta. Gure emaitzek aditzera ematen dute haragi gorriak eta horien eratorriak dietari lotutako BEGIn gehien laguntzen duen elikagai taldea da (% 28,2), beste autore batzuek behatu duten bezala[104-106]. BEGI altuagoak zituzten elikagai taldeak hurrengoak izan ziren: frutak eta barazkiak (% 19,2) eta esnea eta esnekiak (% 12,1), beste ikerketa batzuek adierazi duten bezala[17]. Beste aldetik, BEGI baxuago zuen elikagai taldea edari alkoholikoen taldea izan zen (gizonak % 1,6 eta emakumeak % 1,5), seguraski, bere kontsumoa baxua delako eta beste autore batzuen emaitzen antzekoak izan ziren (% 5 gizonetan eta % 3 emakumeetan)[98]. Gainera, aipatzekoa da emakumeen fruta eta barazkien eta arrainen eta itsaskien BEGI gizonena baino altuagoa izan zela. Fruta eta barazkiei lotutako BEGIan behatutako sexu desberdintasunak bat datoz Walker *et al.*-en emaitzekin[107]. Beste aldetik, ikerketa honetan energia ahorakina gutxiesteko joera zegoen, gizonetan bereziki, beraz, BEGI neurri berdinean gutxiestuta egon daiteke.

Gure emaitzak kontuan hartuta, dietaren ingurumen inpaktua murrizteko eta osasuna hobetzeko ahaleginak animali jatorriko elikagaien kontsumoa murrizten ardaztu daiteke (kontuan hartzen proteinen energia ingestio guztiaren % 15ekoa izanda) eta fekuladun elikagaien ahorakina handitzen (aldi berean, karbohidratoen portzentajea eta zuntza dietetikoaren kantitatea hobetzeko helburuarekin). Edozein kasutan, gure kulturan animali jatorriko elikagaien kontsumoa oso sustraituta dago; beraz, bere kontsumoa murriztea ez litzateke erraza izango eta ondorio nutrizional kaltegarriak ekarriko lituzke (ahorakin desegokiak dituzten arrisku taldeetan bereziki). Animalien elikagaien ahorakina, haragi gorria bezala, saihesteak edo ahorakin baxuak hainbat mikronutrienteen, Fe, Zn edo B_{12} bitamina bezalakoak, nutrizio desegokiari lagundu diezaiokete[108].

Bi dieta kalitatearen indizeekin bezala, BEGI altuko dietak hurrengo faktoreekin erlazionatu ziren: adina, ezagutza arloa, ESE eta GnM estatusa. Dietari lotutako BEGI eta adinaren arteko asoziazio esanguratsuek aditzera ematen dute ikasle nagusienek (> 20,4 urte) ingurumen inpaktu altuko dietak zituztela gazteenekin konparatuz, eta honek gure hipotesiak baieztatzen du eta maizko haragi kontsumoarekin lotuta egon daiteke. Hala ere, gure hipotesiaren kontra, OZtako ikasleek dietari lotutako BEGI maila altuagoak zituzten. Emaitza hau UPV/EHUk ingurumenarekiko hezkuntzan duen irakaskuntza transbertsalari lotuta egon daiteke, ikasleen zeharkako eta hezkuntza integratzailean datza, beraz, ondorioztatu dezakegu OZtako eta EOZtako ikasleen artean ez daudela desberdintasunik ingurumen hezkuntzari dagokionez.

ESEri dagokionez, ESE altuko ikasleek dietari lotutako BEGI altua zuten, eta hau ez dator bat gure hipotesiarekin. Edozein kasutan, beste autore batzuek nutrizio kalitate altuko dietak kostu ekonomiko altuagoarekin eta ingurumen inpaktu altuarekin lotuta daudela behatu dute[31,109,110], nahiz eta dieta osasuntsuak eta jasangarriak ez direla nahitaez garestiagoak izan behar beste batzuekin konparatuz[11]. Gainera, gure emaitzek obesitatea duten ikasleek ingurumen inpaktu altuko dietak dituztela aditzera ematen dute, faktore demografiko eta ESE eta dieta kalitateari adostu eta gero ere. Emaitza hau bat dator heldu frantsesekin egindako aurreko ikerketa batekin[36]. Dirudienez, patroi dietetiko jasangarriek gainpisua eta obesitatea jasateko arriskua saihesten dute eta ahorakin energetikoa energia beharrekin adosteko egiten diren ahaleginak dieten ingurumen inpaktua murrizteko neurri eraginkorrak dira. Zentzu honetan, Vieux *et al*.-ek erakutsi zuten energia ahorakina bakoitzaren energia beharretara murrizten zirenean dietaren BEGI % 10ean murrizten zela[66].

Azkenik, dieta kalitatearen eta dietari lotutako BEGIren artean egon daitekeen asoziaziori dagokionez, HEI-2010 indizean puntuazio altuenak zituztenek dietari lotutako BEGI altua izateko joera zuten, eta MDS indizean puntuazio baxuenak zituztenak, ordea, BEGI altua zuten. HEI-2010 indizearen emaitzak bat datoz beste ikerketa batzuen emaitzekin[17] eta hauek aditzera ematen dute dieta kalitate altuko dietak ez direla beti BEGI baxuko dietak. Hala ere, BEGI eta HEI-2010 eta MDS indizeen arteko asoziazioetan dauden desberdintasunak indizeak egiteko eta dieta kalitateko indizeen irizpideetan oinarritu daitezke. Izan ere, HEI-2010 indizearen puntuazioaren % 40a dieten BEGI altuenak dituzten elikagai taldeena da (haragi gorriak eta horien eratorriak, frutak eta barazkiak, esnea eta esnekiak, arrautzak eta haragi zuria eta arraina eta itsaskiak). MDS indizearen kasuan, bitartean, gehien kontaminatzen dituzten bost elikagai taldeak % 54ko pisua dute puntuazio guztian, baina, erdiak, hau da, MDS indizearen % 27k alderantzizko puntuazio du. Beraz, haragi gorria eta horien eratorrien, hegaztien eta esneki osoen ahorakina gero eta altuagoa denean, gero eta baxuagoa da bere puntuazioa MDS indizean. Beraz, MDS indizearen % 27a (frutak, barazkiak eta arraina) gehien kontaminatzen dituzten bigarren eta bosgarren elikagai taldeak ziren. Aldi berean, BEGI eta bi dieta kalitate indizeen arteko asoziazioetan dauden desberdintasun hauek neurri batean aurretik aipatutakoarekin azaldu daiteke. Egia da dieta osasuntsuek ez dutela beti BEGI baxua. Elikagaien konbinazio desberdinekin posible da behar dietetikoak betetzen dituen dieta bat kontsumitzea baina baita BEGI altua izatea ere[17,111]. Beste autore batzuek adierazi duten bezala: "dieta kalitatea eta ingurumen jasangarritasuna ez dira nahitaez independenteak, eta dieta kalitatea hobetzea eta ingurumen inpaktu murriztea aldi berean egin behar diren ahaleginak dira"[112].

Gure ikerketak aipatu beharreko hainbat mugaketa ditu. Lehenengoa, ohitura dietetikoei buruzko datuak norberak adierazi zituela, eta onartu egin behar da honek datuak gutxietsi ditzakeela, populazio berezietan, batez ere, pisua eta sexuaren arabera, beste autore batzuek behatu duten bezala[113,114]. Hala ere, EKMGMk hainbat nutrienteei buruzko baliodun informazioa eman dezake[115] eta mugaketarik gabeko beste aukerarik ez dago. Bigarrena, ohitura dietetikoei lotutako BEGIen datuak aztertzeko erabilitako metodologian, produktuen bizi-zikloaren hainbat pauso ez dira kontuan hartu, bazkaria prestatzeko, jatorri geografikoa eta elikagaien urtarokotasunari buruzko datuen faltagatik. Zentzu honetan, kontuan hartu behar da populazio mailan elikagaien bizi-zikloaren pausu guztiak aztertzea oso zaila eta garestia dela. Edozein kasutan, BEGI zehazteko metodologia ona da eta BEGIren kuantifikazioan aurreko ikerketetan erabili izan da[62,66,116]. Hirugarrena, unibertsitate ikasleen dieta jasangarritasunaren eta nutrizioaren ikuspuntuetatik aztertu izan da eta hurrengo ikerketetarako kontuan hartu behar da *Sustainable Diet Index* bezalako indizeak erabiltzea, jasangarritasunaren beste adierazle batzuk aztertzen dituelako, alderdi ekonomikoak eta soziokulturalak bezala[36]. Gainera, elikagaien kontsumoarekin lotutako jasangarritasunaren adierazle bakarra erabili zen eta komenigarria izango litzateke jasangarritasunaren hainbat neurri aztertzea, elikagaien sastarrak edo ureztatzea bezala.

Azkenik, nahasgarriak izan daitezkeen aldagai batzuen kontrol falta eta beste baldintza batzuek elikagaien kontsumoan eragina izan ditzaketela kontuan hartu behar da. Hala ere, ez dugu uste mugaketa hauek akats garrantzitsuetara eramaten dituztenik. Hala ere, arreta jarri behar da datu hauek beste populazio batzuetara estrapolatzen direnean. Aipatutako mugaketa guzti hauek etorkizuneko ikerketaren esparrua zabaltzen dute. Ikerketa honen sendotasuna unibertsitate ikasleen lagin adierazgarri batean erabilitako estandarizatutako neurrien protokoloa da eta ingurumen inpaktuaren eta osasun nutrizio publikoaren dimentsioak konbinatzen dituela.

Ondorioak

Populazio talde honen dieta, osasun eta jasangarritasunaren ikuspuntuetatik, onargarria da baina hobetu daiteke. Dietaren ingurumen inpaktua eta osasun nutrizionalaren arteko bateragarritasuna azken dimentsio hau egiteko eta erabilitako irizpideen menpe dago. Ohitura ditetetikoen osasun nutrizioa eta ingurumen jasangarritasunaren alderdiak hurrengo faktoreekin erlazionatu ziren: sexua, adina, OZtako vs. EOZtako graduak, ESE eta GnM estatusa. Beraz, aztertutako bi dieta kalitate indizeetan puntuazio altuagoak lortu zituzten partaideek emakumeak ziren nagusiki, nagusiagoak eta GnM % normala zuten, eta dietari lotutako BEGI altuagoak zituztenak, gizonak ziren nagusiki, nagusiagoak, OZtakoak, ESE altukoak eta gehiegizko GnM % zuten. Orokorrean, emaitza hauek informazioa eman dezakete etorkizunean UPV/EHUko ikasleetan dieta osasuntsua eta jasangarria sustatzeko parte-hartze estrategiak diseinatzeko.

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Interes-gatazka

Bat ere ez.

Autoretza

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4. ikerketa

4. ikerketa: Emaitza deskribatzaileak eta eztabaida

Emaitza deskribatzaileak eta eztabaida

Tesiaren atal honetan, unibertsitate ikasleetan aztertutako aldagai guztien deskribapenak eta sailkapenak adierazten dira, eta guzti hauek sexua, adina, EA eta GnM estatusaren arabera azaltzen dira.

4.1. Emaitza demografiko eta sozioekonomikoak (SEk)

Ikasleen ezaugarri demografiko eta SEk sexuaren arabera Metodologiako artikuluaren *Emaitza* atalean agertzen dira. **4.1. taulan** ezaugarri hauen datuak adinaren arabera azaltzen dira. Ezaugarri demografiko eta SEei GnM estatusaren arabera dagokionez, gehiegizko GnM zuten ikasleek nagusiagoak eta EAE ziren, lanean zeuden gurasoen portzentajea altuagoa zen eta gizarte estatus baxuagoakoak ziren, gehiegizko GnM ez zuten partaideekin konparatuz (P < 0,001) (**4.2. taula**). Taiwaneko unibertsitate ikasleetan, aurrez egindako ikerketek ere gizarte estatusa eta obesitatearen arteko asoziazioak antzeman dituzte(1).

4.1. taula: Helburu populazioaren ezaugarri demografiko eta SEk adinaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, %	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	P^*
Sexua					
Gizonak	42,8	36,7	34,3	44,9	
Emakumeak	57,2	63,3	65,7	55,1	**<0,001**
Jaiotze herria					
EAE	82,3	81,3	84,2	83,9	
Espainia (EAE izan ezik)	16,3	17,3	13,9	12,4	
Europa (Espainia izan ezik)	0,9	0,7	1,9	1,4	
Hego Amerika	0,5	0,8	-	2,3	**<0,001**
Gurasoen ikasketa maila					
Unibertsitateko ikasketak	56,5	47,6	51,5	38,1	
Besteak[1]	43,5	52,4	48,5	61,9	**<0,001**
Amaren jarduera ekonomikoa					
Lanean	83,8	70,9	74,9	71,9	
3 hilabeteko edo gehiagoko bajan	1,6	1,5	2,3	1,1	
Langabetuak	2,6	8,3	11,1	6,3	
Etxeko andrea	10,5	16,8	9,2	17,7	

Hurrengo orrialdean jarraitzen du.

4.1. taularen jarraipena.

Aldagaiak, %	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	*P**
Amaren jarduera ekonomikoa					
Jubilatuak edo pentsionistak	-	0,6	1,8	2,3	
Besteak[2]	1,5	1,9	0,7	0,8	**<0,001**
Aitaren lanbidea					
Enpresaria langileekin	16,1	10,1	9,9	12,1	
Enpresaria langile gabe	8,0	13,0	21,0	11,7	
Laguntza familiarra	-	-	1,0	0,7	
Behin-betiko langilea	67,4	69,7	62,6	68,4	
Behin-behineko langilea	2,6	3,4	4,2	1,6	
Kooperatibako kidea	1,0	2,3	0,7	0,7	
Besteak[3]	4,9	1,7	0,6	4,7	**<0,001**
Amaren lanbidea					
Enpresaria langileekin	10,1	5,5	4,8	5,0	
Enpresaria langile gabe	7,9	5,6	4,2	4,9	
Laguntza familiarra	1,9	-	-	-	
Behin-betiko langilea	63,6	62,8	70,7	67,1	
Behin-behineko langilea	6,5	7,7	10,5	5,6	
Kooperatibako kidea	0,6	-	-	0,2	
Besteak[3]	9,3	18,4	9,8	17,2	**<0,001**
Aitaren kategoria profesionala					
Zerbitzu sektorea	70,4	62,7	72,5	64,8	
Lehenengo sektorea	3,8	3,1	-	1,4	
Sektore industriala	22,4	31,0	25,0	28,8	
Besteak[4]	3,4	3,1	2,5	4,9	**<0,001**
Amaren kategoria profesionala					
Zerbitzu sektorea	72,3	69,8	76,2	66,9	
Lehenengo sektorea	1,0	7,3	11,4	0,3	
Sektore industriala	12,2	-	-	11,2	
Besteak[4]	14,5	22,9	12,4	21,6	**<0,001**
Metaketa indizea					
> 1	40,6	38,5	37,5	44,3	
≤ 1	59,4	61,5	62,5	55,7	**<0,001**

[1]Bietako inork ez du unibertsitateko ikasketak; [2]ikasten, eszedentzian; [3]ikasten, eszedentzian edo etxeko andreak;[4]etxeko andreak, langabetuak eta jubilatuak.

*Adinaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.

EAE, Euskal Autonomia Erkidegoa.

4.2. taula: Helburu populazioaren ezaugarri demografiko eta SEk GnM estatusaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, batezbestekoa(DE) edo %	Ez gehiegizko GnM (n=22.391)	Gehiegizko GnM (n=3.775)	P^*
Adina, urteak	20,8(2,1)	21,3(2,2)	**<0,001**
Jaiotze herria			
EAE	82,9	84,4	
Espainia (EAE izan ezik)	14,8	12,5	
Europa (Espainia izan ezik)	1,2	1,6	
Hego Amerika	1,1	1,6	**<0,001**
Gurasoen ikasketa maila			
Unibertsitateko ikasketak	46,6	45,7	
Besteak[1]	53,4	54,3	0,320
Aitaren jarduera ekonomikoa			
Lanean	86,6	89,0	
3 hilabeteko edo gehiagoko bajan	0,8	-	
Langabetuak	4,6	4,3	
Jubilatuak edo pentsionistak	7,4	6,7	
Besteak[2]	0,7	-	**<0,001**
Amaren jarduera ekonomikoa			
Lanean	73,9	78,4	
3 hilabeteko edo gehiagoko bajan	1,8	-	
Langabetuak	7,4	5,1	
Etxeko andrea	14,8	11,8	
Jubilatuak edo pentsionistak	-	1,6	
Besteak[2]	0,8	3,1	**<0,001**
Aitaren lanbidea			
Enpresaria langileekin	12,8	7,0	
Enpresaria langile gabe	13,3	12,5	
Laguntza familiarra	0,3	1,5	
Behin-betiko langilea	66,4	72,7	
Behin-behineko langilea	2,4	5,0	
Kooperatibako kidea	1,3	-	
Besteak[3]	3,6	1,3	**<0,001**
Amaren lanbidea			
Enpresaria langileekin	6,4	4,0	
Enpresaria langile gabe	5,8	3,5	
Laguntza familiarra	0,4	-	
Behin-betiko langilea	64,7	75,7	
Behin-behineko langilea	7,5	5,5	
Kooperatibako kidea	0,2	-	
Besteak[3]	15,0	11,3	**<0,001**
Aitaren kategoria profesionala			
Zerbitzu sektorea	66,0	73,7	
Lehenengo sektorea	2,1	0,9	
Sektore industriala	28,0	22,9	
Besteak[4]	3,9	2,5	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.2. taularen jarraipena.

Aldagaiak, batezbestekoa(DE) edo %	Ez gehiegizko GnM (n=22.391)	Gehiegizko GnM (n=3.775)	P^*
Amaren kategoria profesionala			
Zerbitzu sektorea	70,3	71,9	
Lehenengo sektorea	0,2	0,9	
Sektore industriala	10,8	9,4	
Besteak[4]	18,7	17,9	**<0,001**
Metaketa indizea			
> 1	40,7	42,5	
≤ 1	59,3	57,5	**0,029**

[1]Bietako inork ez du unibertsitateko ikasketak; [2]ikasten, eszedentzian; [3]ikasten, eszedentzian edo etxeko andreak; [4]etxeko andreak, langabetuak eta jubilatuak.
[*]Gantz-masa estatusaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra; EAE, Euskal Autonomia Erkidegoa; GnM, gantz-masa.

4.2. Osasun datu objektiboak eta hautemandakoak

Atal honetako emaitzak aurkeztu aurretik, gurasoen gainpisua/obesitatea estimatzeko erabilitako metodoa aipatu beharko litzateke. Gainpisua/obesitatea estimatzeko, *Weight-Cycling Questionnaire*-ko gorputz-irudiak (goiko eta beheko atalak) erabili ziren[(2)]. Metodologia honek, gainpisua/obesitatea sailkatzeko ebaki puntuak ez zituen ezarrita, hortaz, inguruko populazioaren datuak aztertu ziren. EAEko azken Osasun Inkestako 45-64 urte bitarteko gainpisu/obesitatearen prebalentzia datuak, % 65,9 gizonetan eta % 38,2 emakumeetan zehazki, birpasatu zen[(3)]. Datu hauek eta gurasoentzako aukeratutako Brownell-en silueten banaketaren frekuentzia kontuan hartuta*,* Brownell-en goiko edo beheko silueta ≥ 5 zirenak gainpisu/obesitate bezala sailkatu ziren, EAEko emaitzekin hobeto adosten zuen kasua zelako (**4.3. taulako** 3. kasua).

4.3. taula: Euskal Autonomia Erkidegoko Osasun Inkesta eta Brownell-en silueten ebaki puntu desberdinen araberako helduen gainpisu/obesitatearen prebalentzia (ikasle partaideen gurasoen datuak)

Gainpisua/obesitatearen prebalentzia, %	EAEko Osasun Inkesta[1]	1. kasua[2]	2. kasua[3]	**3. kasua[4]**	4. kasua[5]
Gizonak	65,9	32,2	9,0	**65,9**	26,0
Emakumeak	38,2	32,3	4,4	**50,1**	11,5

[1]EAEko Osasun Inkestaren datuak (2018), 45-64 urteko tartea; [2]Brownell-en siluetak ≥ 5 beheko eta goiko siluetetan; [3]Brownell-en siluetak > 5 beheko eta goiko siluetetan; [4]Brownell-en siluetak ≥ 5 beheko edo goiko siluetan; [5]Brownell-en siluetak >5 beheko edo goiko siluetan.
Euskal populazioarekin hobeto adosten zuen kasua letra lodiz azpimarratuta dago.

Ikasle partaideen gurasoen kasuan bezala, Euskal populazioaren gainpisu/obesitatearen prebalentzia eta ikasleek aukeratutako Brownell-en silueten banaketaren frekuentzia kontuan hartu ziren gainpisua/obesitatea sailkatzeko erabiliko ziren silueten ebaki puntuak identifikatzeko (Brownell-en siluetak ≥ 5 beheko eta goiko siluetan, **4.4. taulako** 1. kasua).

4.4. taula: Euskal Autonomia Erkidegoko Osasun Inkesta eta Brownell-en silueten ebaki puntu desberdinen araberako gazte helduen gainpisu/obesitatearen prebalentzia (ikasle partaideen datuak)

Gainpisua/obesitatearen prebalentzia, %	EAEko Osasun Inkesta[1]	**1. kasua[2]**	2. kasua[3]	3. kasua[4]	4. kasua[5]
Lagin osoa	11,6	**5,6**	1,1	27,8	4,0
Gizonak	14,3	**8,1**	2,7	24,8	6,7
Emakumeak	11,6	**4,0**	0,0	29,8	2,2

[1]EAEko Osasun Inkestaren datuak (2018), 15-24 urteko tartea; [2]Brownell-en siluetak ≥ 5 beheko eta goiko siluetetan; [3]Brownell-en siluetak > 5 beheko eta goiko siluetetan; [4]Brownell-en siluetak ≥ 5 beheko edo goiko siluetan; [5]Brownell-en siluetak >5 beheko edo goiko siluetan.
Euskal populazioarekin hobeto adosten zuen kasua letra lodiz azpimarratuta dago.

Gurasoen osasun datu objektibo eta hautemandakoei dagokionez, "obesitateari lotutako gaixotasunak (obesitaterik gabe)" gehien adierazi zuten kategoria izan zen eta ikasleen artean, bitartean, "gaixotasunik gabe" edo "beste gaixotasun batzuk" izan ziren (**4.5. taula**). Norberaren gaixotasunen historiari dagokionez, norberak adierazitako obesitatearen prebalentzia % 0,6koa izan zen eta emaitza hau hainbat ikerketetan aurkitutako pisuaren gutxiespenarekin bat dator(4,5). Gurasoen obesitatearen estatusari dagokionez, lortutako emaitzen arabera EHU12/24 proiektuko ikasleen gurasoen prebalentzia Melillako Kristau eta Musulman ikasleena baino altuagoa izan zen(6). Desberdintasun hauek informazioaren erregistroa era desberdinean egin zelako izan daiteke. Gure kasuan, Brownell-en siluetak erabili ziren gurasoen obesitatea sailkatzeko eta beraien kasuan, partaideek gurasoen obesitatearen pairamena edo ez ziurtatzen zuen osasun-ziurtagiria aurkeztu zuten(6). Hala ere, gure datuak Espainiako Osasun Inkestako eta Europako adin tarte horretakoen antzekoak dira(7,8).

Gainera, ikasleen % 84,7k bere azkenengo urteko osasuna "ona" edo "oso ona" zela kontsideratzen zuen. Datu hauek bat datoz Espainiako beste autonomia erkidegoko unibertsitate ikasleetan behatutako emaitzekin(9). Alabaina, bere osasuna "erregularra", "txarra" edo "oso txarra" adierazten zuten ikasleen portzentajea Alemania, Polonia eta Bulgariako ikasleenak baino pixkat altuagoak ziren[10]. Emaitza hauek Seo *et al.* autoreek[11] erregistratutako datuen antzekoak ziren, bizi kalitatea 55/80 eta estres maila 20,02/40, zehazki. Ikasleak estresatzen dituzten hainbat egoeren artean hurrengoak aurkitzen dira: unibertsitate bizitzari egokitzapena, nota onak mantentzea, presio ekonomikoa, bere denbora maneiatzeko gaitasun falta, etorkizunaren plangintza edo independentzia, eta faktore hauek, unibertsitate ikasleetan osasun arazoak eragin ditzakete[12,13]. Sexu desberdintasunari dagokiolarik, beste ikerlan batzuetan bezala[14,15], ikerketa honetako emakumeek gizonek baino estres maila altuagoa deklaratzen zuten ($P < 0,001$); emakumeek gizonek baino estres maila altuagoa adierazten dutelako[16] eta frustrazioa edo presio akademikoari eta familia eta lagun harremanetan sortutako arazoei aurre egiteko estres maila altuagoa pairatzen dutelako[17,18] izan daiteke.

Adinaren araberako datuei dagokiolarik, beste adinetako ikasleekin konparatuz, ikasle gazteenek bere osasuna "oso ona" bezala deskribatu zuten baina bizi kalitate eta estres maila baxuagoa adierazi zuten ($P < 0,001$) (**4.6. taula**). Nahiz eta datuak alderagarriak ez izan adin tarteak berdinak ez direlako, beste autore batek[15] antzeman zuen ikasle nagusienek autoebaluatutako osasun hobeagoa zutela, gure emaitzen kontrakoa, baina estres mailari dagokionez, adina gora egiten zuen heinean, estres mailak gora egiten zuen[15].

Laginaren osasun datuak EAri buruz aztertzean, OZtako ikasleen joera obesitatea pairatzea (komorbilitateekin edo komorbilitaterik gabe), gurasoek obesitatea izatea, bere osasuna "ona" edo "oso ona" bezala kontsideratzea eta bizi kalitate eta estres maila altuagoa izatea zela behatzen zen EOZtako ikasleekin konparatuta ($P < 0,001$) (**4.7. taula**). Nahiz eta gure osasun datuak EAren arabera erkatzeko ikerketarik ez izan, jakina da gainpisua edo obesitatea pairatzeko probabilitateak areagotzen direla guraso batek edo biek gainpisua edo obesitatea badute[19], baina gure hipotesia zen EOZtako ikasleek obesitatea jasateko joera altuagoa zutela nutrizio eta osasunari buruzko dituzten jakintzak baxuagoak direlako. Badira autoreak aditzera ematen dutela nutrizioari buruzko jakintzek ahorakin dietetikoan eragina izan ditzaketela[20]. Alabaina, beste ikerketa batzuek iradokitzen dute ikasleen nutrizioari buruzko jakintza zuzenak bere kabuz erabilgarriak badira ere, ez direla nahikoak dieta egoki baterako, hori lortzeko ikasleek ohitura dietetiko ez osasuntsuak aldatu beharko dituztelako[21,22].

Azkenik, gehiegizko GnM zuten ikasleek, GnM % normala zuten ikasleekin konparatuz, gaixotasun gehiago zituztela adierazi zuten eta bere osasuna "erregularra", "txarra" edo "oso txarra" zela kontsideratzen zuten eta baita bizi kalitate baxuagoa eta estres maila altuagoa zutela adiera zuten ere ($P < 0{,}001$) (**4.8. taula**). Unibertsitate ikasleetan egindako beste ikerketa batzuetan aditzera eman den bezala, heldu gazteen obesitatea gaixotasun prebalentzia altuagoarekin lotuta dago, arrisku faktore kardiometabolikoekin bereziki[23,24]. Gainera, Espainiako bederatzi autonomia erkidegoetan egindako beste ikerketa baten, obesitatea eta bizi-kalitate mailaren arteko lotura aditzera ematen zuen, GMI baxua zuten ikasleek bizi-kalitate maila altuagoa zutelako[25].

4.5. taula: Helburu populazioaren osasun datu objektiboak eta hautemandakoak sexuaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, batezbestekoa(DE) edo %	Lagin osoa (n=26.165)	Gizonak (n=10.607)	Emakumeak (n=15.558)	*P**
Aitaren gaixotasunak[1]				
Gaixotasunik gabe	17,9	14,4	20,3	
Obesitatea (komorbilitaterik gabe)	9,9	17,1	5,0	
Obesitatea komorbilitateekin	22,0	23,8	20,7	
Obesitateari lotutako gaixotasunak (obesitaterik gabe)	35,5	34,6	36,1	
Beste gaixotasun batzuk	14,7	10,0	17,9	**<0,001**
Aitaren gaixotasunak[1]				
Gaixotasunik gabe	17,9	14,4	20,3	
Obesitatea (komorbilitaterik gabe)	9,9	17,1	5,0	
Obesitatea komorbilitateekin	22,0	23,8	20,7	
Obesitateari lotutako gaixotasunak (obesitaterik gabe)	35,5	34,6	36,1	
Beste gaixotasun batzuk	14,7	10,0	17,9	**<0,001**
Brownell-en siluetak[2] (aita)				
Pisu normala	34,1	26,6	39,1	
Gainpisu/obesitatea	65,9	73,4	60,9	**<0,001**
Amaren gaixotasunak[1]				
Gaixotasunik gabe	15,1	19,2	12,4	
Obesitatea (komorbilitaterik gabe)	19,6	22,3	17,8	

Hurrengo orrialdean jarraitzen du.

4.5. taularen jarraipena.

Aldagaiak, batezbestekoa(DE) edo %	Lagin osoa (n=26.165)	Gizonak (n=10.607)	Emakumeak (n=15.558)	P^*
Amaren gaixotasunak[1]				
Obesitatea komorbilitateekin	12,8	11,5	13,6	
Obesitateari lotutako gaixotasunak (obesitaterik gabe)	23,8	19,3	26,9	
Beste gaixotasun batzuk	28,7	27,8	29,3	**<0,001**
Brownell-en siluetak[2] (ama)				
Pisu normala	49,9	52,1	48,4	
Gainpisu/obesitatea	50,1	47,9	51,6	**<0,001**
Norberaren gaixotasunak[3]				
Gaixotasunik gabe	49,3	55,3	45,2	
Obesitatea (komorbilitaterik gabe)	0,3	0,3	0,2	
Obesitatea komorbilitateekin	0,3	0,7	-	
Obesitateari lotutako gaixotasunak (obesitaterik gabe)	8,0	8,0	8,0	
Beste gaixotasun batzuk	42,1	35,7	46,6	**<0,001**
Brownell-en siluetak[4] (norbera)				
Pisu normala	94,4	91,9	96,0	
Gainpisua/obesitatea	5,6	8,1	4,0	**<0,001**
Azkenengo urtean, zure osasun-egoera...izan da				
Oso ona	24,9	32,1	20,0	
Ona	59,8	55,3	62,9	
Erregularra	13,0	9,9	15,1	
Txarra	1,8	2,1	1,5	
Oso txarra	0,5	0,6	0,5	**<0,001**
Bizi-kalitatea, 0-100	78,7(10,3)	80,1(10,0)	77,7(10,4)	**<0,001**
Estres-maila, 0-100	52,3(25,0)	48,1(24,6)	55,2(24,9)	**<0,001**

[1]Gaixotasun familiarren historioa; [2]Brownell-en siluetak ≥ 5 beheko edo goiko siluetan; [3]norberaren gaixotasunen historioa; [4]Brownell-en siluetak ≥ beheko eta goiko siluetan.
[*]Sexu desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra.

4.6. taula: Helburu populazioaren osasun datu objektiboak eta hautemandakoak adinaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, batezbestekoa(DE) edo %	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	P^*
Aitaren gaixotasunak[1]					
Gaixotasunik gabe	18,2	27,1	17,0	13,3	
Obesitatea (komorbilitaterik gabe)	14,7	9,6	12,7	6,1	

Hurrengo orrialdean jarraitzen du.

4.6. taularen jarraipena.

Aldagaiak, batezbestekoa(DE) edo %	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	P^*
Aitaren gaixotasunak[1]					
Obesitatea komorbilitateekin	21,6	18,1	22,1	24,2	
Obesitateari lotutako gaixotasunak (obesitaterik gabe)	28,9	29,2	30,3	45,2	
Beste gaixotasun batzuk	16,7	16,0	17,9	11,1	**<0,001**
Brownell-en siluetak[2] (aita)					
Pisu normala	32,0	37,2	38,1	31,1	
Gainpisu/obesitatea	68,0	62,8	61,9	68,9	**<0,001**
Amaren gaixotasunak[1]					
Gaixotasunik gabe	15,2	16,0	9,9	17,5	
Obesitatea (komorbilitaterik gabe)	19,5	22,2	27,1	14,2	
Obesitatea komorbilitateekin	12,5	12,9	14,2	12,0	
Obesitateari lotutako gaixotasunak (obesitaterik gabe)	19,8	19,4	24,2	28,1	
Beste gaixotasun batzuk	33,0	29,6	24,7	28,2	**<0,001**
Brownell-en siluetak[2] (ama)					
Pisu normala	47,5	49,3	48,2	52,4	
Gainpisu/obesitatea	52,5	50,7	51,8	47,6	**<0,001**
Norberaren gaixotasunak[3]					
Gaixotasunik gabe	51,0	51,7	45,0	49,5	
Obesitatea (komorbilitaterik gabe)	-	-	1,0	0,7	
Obesitatea komorbilitateekin	-	-	-	0,2	
Norberaren gaixotasunak[3]					
Obesitateari lotutako gaixotasunak (obesitaterik gabe)	6,8	3,2	8,2	11,2	
Beste gaixotasun batzuk	42,1	45,1	45,9	38,5	**<0,001**
Brownell-en siluetak[4] (norbera)					
Pisu normala	94,1	96,0	96,4	92,5	
Gainpisu/obesitatea	5,9	4,0	3,6	7,5	**<0,001**
Azkenengo urtean, zure osasun-egoera...izan da					
Oso ona	29,9	20,4	22,8	26,0	
Ona	54,1	63,9	66,4	56,9	
Erregularra	14,6	13,1	8,1	14,9	
Txarra	0,9	1,7	1,7	2,3	
Oso txarra	0,5	1,1	1,0	-	**<0,001**
Bizi-kalitatea, 0-100	77,5(11,8)	78,6(9,4)	79,0(8,8)	79,1(10,7)	**<0,001**
Estres-maila, 0-100	46,4(23,4)	49,5(24,8)	56,4(24,2)	54,6(25,7)	**<0,001**

[1]Gaixotasun familiarren historioa; [2]Brownell-en siluetak ≥ 5 beheko edo goiko siluetan; [3]norberaren gaixotasunen historioa; [4]Brownell-en siluetak ≥ beheko eta goiko siluetan.
[*]Adinaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.

4.6. taularen jarraipena.
DE, desbideratze estandarra.

4.7. taula: Helburu populazioaren osasun datu objektiboak eta hautemandakoak EAren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, batezbestekoa(DE) edo %	OZ (n=3.637)	EOZ (n=22.529)	P^*
Aitaren gaixotasunak[1]			
Gaixotasunik gabe	15,6	18,3	
Obesitatea (komorbilitaterik gabe)	8,5	10,1	
Obesitatea komorbilitateekin	24,1	21,6	
Obesitateari lotutako gaixotasunak (obesitaterik gabe)	37,3	35,3	
Beste gaixotasun batzuk	14,6	14,7	**<0,001**
Brownell-en siluetak (aita)[2]			
Pisu normala	32,5	34,3	
Gainpisu/obesitatea	67,5	65,7	**0,030**
Amaren gaixotasunak[1]			
Gaixotasunik gabe	6,7	16,5	
Obesitatea (komorbilitaterik gabe)	18,4	19,8	
Obesitatea komorbilitateekin	15,5	12,3	
Obesitateari lotutako gaixotasunak (obesitaterik gabe)	29,7	22,9	
Beste gaixotasun batzuk	29,7	28,5	**<0,001**
Brownell-en siluetak (ama)[2]			
Pisu normala	48,9	50,1	
Gainpisu/obesitatea	51,1	49,9	0,204
Norberaren gaixotasunak[3]			
Gaixotasunik gabe	46,9	49,7	
Obesitatea (komorbilitaterik gabe)	1,9	0,3	
Obesitatea komorbilitateekin	-	-	
Obesitateari lotutako gaixotasunak (obesitaterik gabe)	6,9	8,2	
Beste gaixotasun batzuk	44,3	41,8	**<0,001**
Brownell-en siluetak (norbera)[4]			
Pisu normala	93,1	94,6	
Gainpisu/obesitatea	6,9	5,4	**<0,001**
Azkenengo urtean, zure osasun-egoera...izan da			
Oso ona	25,7	24,7	
Ona	60,4	59,7	
Erregularra	13,0	13,0	
Txarra	0,9	1,9	
Oso txarra	-	0,6	**<0,001**
Bizi-kalitatea, 0-100	79,1(11,1)	78,6(10,2)	**<0,001**
Estres-maila, 0-100	54,1(24,3)	52,0(25,1)	**<0,001**

[1]Gaixotasun familiarren historioa; [2]Brownell-en siluetak ≥ 5 beheko edo goiko siluetan; [3]norberaren gaixotasunen historioa; [4]Brownell-en siluetak ≥ beheko eta goiko siluetan.
*EAren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra: EA, ezagutza arloa; EOZ, Ez-Osasun Zientziak; OZ, Osasun Zientziak.

4.8. taula: Helburu populazioaren osasun datu objektiboak eta hautemandakoak GnM estatusaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, batezbestekoa(DE) edo %	Ez gehiegizko GnM (n=22.391)	Gehiegizko GnM (n=3.775)	P^*
Aitaren gaixotasunak[1]			
Gaixotasunik gabe	23,0	21,7	
Obesitatea (komorbilitaterik gabe)	0,5	2,6	
Obesitatea komorbilitateekin	4,8	4,0	
Obesitateari lotutako gaixotasunak (obesitaterik gabe)	51,7	59,6	
Beste gaixotasun batzuk	20,1	12,0	**<0,001**
Brownell-en siluetak[2] (aita)			
Pisu normala	33,3	38,4	
Gainpisu/obesitatea	66,7	61,6	**<0,001**
Amaren gaixotasunak[1]			
Gaixotasunik gabe	21,9	22,9	
Obesitatea (komorbilitaterik gabe)	1,4	1,4	
Obesitatea komorbilitateekin	1,1	3,3	
Obesitateari lotutako gaixotasunak (obesitaterik gabe)	35,5	33,1	
Beste gaixotasun batzuk	40,1	39,3	**<0,001**
Brownell-en siluetak[2] (ama)			
Pisu normala	50,2	48,2	
Gainpisu/obesitatea	49,8	51,8	**0,025**
Norberaren gaixotasunak[3]			
Gaixotasunik gabe	49,9	46,0	
Obesitatea (komorbilitaterik gabe)	0,2	0,9	
Obesitatea komorbilitateekin	0,1	1,4	
Obesitateari lotutako gaixotasunak (obesitaterik gabe)	7,6	10,5	
Beste gaixotasun batzuk	42,3	41,2	**<0,001**
Brownell-en siluetak[4] (norbera)			
Pisu normala	96,7	80,4	
Gainpisu/obesitatea	3,3	19,6	**<0,001**
Azkenengo urtean, zure osasun-egoera...izan da			
Oso ona	27,5	9,4	
Ona	58,4	68,0	
Erregularra	12,4	16,4	
Txarra	1,1	5,4	
Oso txarra	0,5	0,7	**<0,001**
Bizi-kalitatea, 0-100	79,0(10,0)	76,4(11,4)	**<0,001**
Estres-maila, 0-100	51,6(25,3)	56,7(23,1)	**<0,001**

[1]Gaixotasun familiarren historioa; [2]Brownell-en siluetak ≥ 5 beheko edo goiko siluetan; [3]norberaren gaixotasunen historioa; [4]Brownell-en siluetak ≥ beheko eta goiko siluetan.
[*]Gantz-masa estatusaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra; GnM, gantz-masa.

4.3. Bizi-ohituren emaitzak

4.3.1. Bizilekua eta egoera sentimentala

Gurasoekin bizi zen ikasleen portzentajea % 53,2koa izan zen (**4.9. taula**), Irlandako unibertsitate ikasleen antzekoa[26] eta bi kasuetan, gizon gehiago zeuden etxean bizitzen (hau da, gurasoen etxean) emakumeak baino. Hala ere, datu hauek Grezian egindako beste ikerketa batena baino altuagoak ziren, ikasleen erdia baino gehiago bakarrik edo pisukideekin (ez senideekin) bizi zirelako[27]. Desberdintasun hauek helburu populazioaren hiru laurdenak baino gehiago EAEak zirelako izan daiteke[28], beraz, gehiengoak etxean gelditzea nahiago zuen ikasle egoitzetan edo pisuetan baino, gainera garraio publikoari dagokionez komunikazio onak daude eta familientzako aurrezpen ekonomikoa handia suposatzen du, besteak beste.

EHU12/24 proiektuan, % 71,5ek bere egoera sentimentala ezkongai zela adierazi zuen, eta gizonezkoen portzentajea emakumeena baino altuagoa izan zen (P < 0,001) (4.9. taula) eta datu hauek ez datoz bat Suediako emaitzekin[15] non % 50a ezkongai baitzegoen. Emaitzak adinaren arabera aztertzean, ikasle nagusien joera, gazteekin erkatuz, gurasoekin bizitzea eta bikotea edukitzea izan zen (P < 0,001) (**4.10**). Adin gehiagoko ikasleak gurasoekin bizitzeak espero ez genuen emaitza izan zen. Baina kontuan hartu behar da zeharkako ikerketa bat izanik, ikasle adin tarteen arteko desberdintasuna gurasoen bizilekua eta ikasleen ikasketa zentroaren arteko distantzian egon daitekeela.

OZtako ikasleekin konparatuz, EOZtako ikasle gehiago gurasoekin bizi ziren eta ezkongai zeuden (P < 0,001) (**4.11. taula**). Egoera hau OZtako graduak ikasten dituzten ikasleen artean EAEtik kanpoko ikasleen portzentajea EOZtakoa baino altuagoa delakoan dago eta hau UPV/EHUko OZtako graduen eskaintza gertu dauden unibertsitate publikoena baina zabalagoa delako gerta daiteke Metodologiako artikuluan agerian gelditzen den bezala. Bestalde, gehiegizko GnM zuten ikasleen artean gurasoekin bizi eta ezkongai zegoen partaideen portzentajea altuagoa zen, gehiegizko GnM ez zuten ikasleekin alderatzean (P < 0,001) (**4.12. taula**). Datu hau bat dator gurasoen etxetik kanpo bizi diren ikasleen dieta etxean bizi direnena baino ez osasungarriagoa dela aditzera ematen duten ikertzaileekin, azukre, ardo, alkohola eta janari azkarraren kontsumoa areagotzen dutelako[29] eta asteroko fruta eta barazkien kontsumoa beheratzen dutelako[29,30]. Gertaera honek, familiaren garrantzia azaltzen du ohitura dietetikoen sorkuntzan eta mantentzean[29,30,31].

4.9. taula: Helburu populazioaren bizilekua eta egoera sentimentala sexuaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, %	Lagin osoa (n=26.165)	Gizonak (n=10.607)	Emakumeak (n=15.558)	*P*[*]
Bizilekua				
Gurasoen etxean	53,2	61,5	47,5	
Besteak[1]	46,8	38,5	52,5	**<0,001**
Egoera sentimentala				
Ezkongai	71,5	77	67,4	
Bikotearekin	28,5	22,4	32,6	**<0,001**

[1]Bikotearekin, beste senide batzuekin, ikasle pisuan, ikasle egoitzan edo bakarrik.
[*]Sexu desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.

4.10. Helburu populazioaren bizilekua eta egoera sentimentala adinaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, %	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	*P*[*]
Bizilekua					
Gurasoen etxean	51,6	46,0	41,5	64,3	
Besteak[1]	48,4	54,0	58,5	35,7	**<0,001**
Egoera sentimentala					
Ezkongai	79,1	75,9	73,7	64,2	
Bikotearekin	20,9	24,1	26,3	35,8	**<0,001**

[1]Bikotearekin, beste senide batzuekin, ikasle pisuan, ikasle egoitzan edo bakarrik.
[*]Adinaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.

4.11. taula: Helburu populazioaren bizilekua eta egoera sentimentala EAren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, %	OZ (n=3.637)	EOZ (n=22.529)	*P*[*]
Bizilekua			
Gurasoen etxean	43,4	54,7	
Besteak[1]	56,6	45,3	**<0,001**
Egoera sentimentala			
Ezkongai	58,0	73,7	
Bikotearekin	42,0	26,3	**<0,001**

[1]Bikotearekin, beste senide batzuekin, ikasle pisuan, ikasle egoitzan edo bakarrik.
[*]EAren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
EA, ezagutza arloa; EOZ, Ez-Osasun Zientziak; OZ, Osasun Zientziak.

4.12. taula: Helburu populazioaren bizilekua eta egoera sentimentala GnM estatusaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, %	Ez gehiegizko GnM (n=22.391)	Gehiegizko GnM (n=3.775)	P^*
Bizilekua			
Gurasoen etxean	53,3	52,3	
Besteak[1]	46,7	47,7	0,275
Egoera sentimentala			
Ezkongai	71,3	73,0	
Bikotearekin	28,7	27,0	**0,036**

[1]Bikotearekin, beste senide batzuekin, ikasle pisuan, ikasle egoitzan edo bakarrik.
[*]Gantz-masa estatusaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
GnM, gantz-masa.

4.3.2. Ohitura dietetikoak

4.3.2.1. Energia eta nutrienteen ahorakina

Laginaren energia ahorakinaren batezbestekoa 2.123,8 kcal-koa izan zen, eta gizonetan emakumeetan baino altuagoa (P < 0,001) (**4.13. taula**) eta Espainiako beste unibertsitateetan (Granadako Unibertsitatea, Melillan) egindako ikerketak bat datoz emaitza hauekin[(6)]. Ikerketa honetan, proteina, gantz, gantz azido monoase (GAM), gantz azido poliase (GAP) eta kolesterolaren ahorakina 1.000 kcal-rekiko gizonezkoetan emakumezkoetan baino altuagoa izan zen, eta karbohidrato eta zuntzarena, bitartean, emakumezkoetan altuagoa (P < 0,001) (4.13. taula). Bitamina eta mineralen ahorakinari 1.000 kcal-rekiko dagokionez, emakumeen ahorakina gizonena baino altuagoa izan zen, niazina, B_{12} eta bitamina D kasuetan izan ezik (P < 0,05) (4.13. taula), eta bitamina E, B_6 eta folatoan ahorakina, bai gizonezkoetan bai emakumeetan, beste unibertsitate ikasleetan egindako ikerketena baino altuagoa izan zen[(32)].

Populazio honen kolesterol ahorakinari dagokionez, Espainiako populazioaren bitarteko eta azken nutrizio helburuena baino altuagoa zen[(33)]. Zuntz dietetikoa gomendioen azpitik zegoen, gizon eta emakumeetan (4.13. taula). Komunitate-elikadurarako Espainiako Elkartearen (SENC) gomendioen arabera, zuntzaren ahorakina 1.000 kcal-rekiko 14 gramokoa izan beharko litzateke[(34)]. Zentzu honetan, azpimarragarria da zuntz ahorakin altua eta gaixotasun kronikoen prebentzioaren arteko asoziazioa, hala nola, bigarren diabetes mota edo gaixotasun kardiobaskularrak[(35,36,37)], nahiz eta zuntzaren ahorakinaren beherapena bat dator mendebaldeko elikadura patroiaren ereduarekin[(38)], fruta, barazki eta lekaleen kontsumo baxua dela eta unibertsitate ikasleetan(39). Edozein kasutan, Euskal unibertsitate ikasleen zuntz ahorakina Espainiako, Tunisia eta Amerikako ikasleena baino altuagoa izan zen(38).

Energia eta nutrienteen ahorakina 1.000 kcal-rekiko adina, EA eta GnM estatusaren arabera aztertzean, nutriente gehienetan desberdintasun esanguratsuak behatu ziren (P < 0,05) (**4.14., 4.15. eta 4.16. taulak**). Beste ikerketa batzuetan gertatzen ez den bezala, gure populazioan, energia ahorakina adinarekin beheratzen da(40). Ikasle gazteenetan, gertaera honi lotzen bazaio gantz azido eta GAAen ahorakin altua eta mikronutrienteen ahorakin baxua "*Freshamn 15*" fenomenoa gerta daiteke. Fenomeno honen arabera, ikasleek unibertsitateko lehenengo urtean 15 libra (6,8 kg) gizentzen dituzte(41).

EAren arabera, OZtako ikasleen energia ahorakina EOZtako ikasleena baino altuagoa izan zen (P < 0,001). Eta UPV/EHUko OZtako ikasleek beste unibertsitate batzuetako ikasleek baino energia gehiago kontsumitzen dute(32,39,42), baina Murtziako unibertsitatearen Osasun graduetako ikasleen antzekoa(40). Makronutrienten portzentajeak EAren arabera erkatzean, beste ikerketa batzuetan bezala(39), karbohidratoen portzentajea altuagoa eta gantzena baxuagoa izan zen OZtako ikasleetan, EOZtakoekin konparatuz. GAAen ahorakinari dagokionez, 1.000 kcal-rekiko azalduta, OZako ikasleen kontsumoa Greziako unibertsitate ikasleena baino baxuagoa izan zen, eta gantz azido, GAM eta kolesterolarena beraiena baino altuagoa(32).

Azkenik, gure datuen arabera, orokorrean, GnM % altuagoa zuten ikasleek mikronutrienteen ahorakin altuagoa izan zuten GnM % normala zuten ikasleekin konparatuz (4.16. taula). Emaitza hau ez dator bat gure hipotesiarekin eta beste unibertsitate ikasleetan eta heldu populazioan egindako ikerketekin(43,44).

4.13. taula: Helburu populazioaren energia eta nutrienteen ahorakina 1.000 kcal-rekiko sexuaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, unitateak 1.000 kcal-rekiko, energia izan ezik, batezbestekoa(DE)	Lagin osoa (n=26.165)	Gizonak (n=10.607)	Emakumeak (n=15.558)	P^*
Energia (kcal)	2.123,8(654,8)	2.339,1(688,1)	1.977,0(587,5)	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.13. taularen jarraipena.

Aldagaiak, unitateak 1.000 kcal-rekiko, energia izan ezik, batezbestekoa(DE)	Lagin osoa (n=26.165)	Gizonak (n=10.607)	Emakumeak (n=15.558)	*P**
Proteinak (g)	37,7(6,8)	37,9(7,4)	37,6(6,3)	**0,002**
Karbohidratoak (g)	103,3(15,0)	101,9(14,9)	104,2(14,9)	**<0,001**
Gantzak (g)	43,4(7,3)	44,0(7,4)	43,1(7,2)	**<0,001**
GAA (g)	14,5(3,4)	14,6(3,4)	14,5(3,4)	0,122
GAM (g)	18,6(4,5)	18,9(4,6)	18,5(4,5)	**<0,001**
GAP (g)	6,7(2,8)	6,9(3,1)	6,6(2,5)	**<0,001**
Kolesterola (mg)	145,9(59,1)	154,8(66,4)	139,8(56,6)	**<0,001**
Zuntza (g)	11,4(4,4)	10,5(3,5)	12,0(4,8)	**<0,001**
Tiamina (mg)	0,7(0,3)	0,7(0,2)	0,7(0,3)	**<0,001**
Erriboflabina (mg)	0,9(0,3)	0,9(0,3)	1,0(0,3)	**<0,001**
Niazina (mg)	17,2(3,9)	17,2(4,3)	17,1(3,7)	**<0,001**
B_6 bitamina (mg)	1,1(0,3)	1,0(0,3)	1,1(0,3)	**<0,001**
Azido folikoa (μg)	155,5(56,6)	148,6(53,3)	160,1(58,2)	**<0,001**
B_{12} bitamina (μg)	2,7(0,8)	2,7(0,8)	2,6(0,8)	**<0,001**
Azido askorbikoa (mg)	84,8(47,3)	81,2(51,0)	87,3(44,5)	**<0,001**
A bitamina (μg)	268,3(97,4)	256,3(95,2)	276,5(98,1)	**<0,001**
D bitamina (μg)	1,2(0,8)	1,3(0,8)	1,2(0,7)	**<0,001**
E bitamina (mg)	4,3(2,3)	4,2(2,5)	4,3(2,1)	**<0,001**
K bitamina (μg)	81,6(39,6)	76,4(37,0)	85,2(40,8)	**<0,001**
Ca (mg)	435,1(121,4)	415,2(108,9)	448,6(127,5)	**<0,001**
P (mg)	706,0(137,6)	695,0(140,3)	713,6(135,2)	**<0,001**
Fe (mg)	8,0(2,3)	7,7(2,1)	8,2(2,5)	**<0,001**
Cu (mg)	0,6(0,1)	0,6(0,1)	0,6(0,1)	**<0,001**
I (μg)	46,8(13,2)	46,1(10,4)	47,3(14,8)	**<0,001**
Zn (mg)	5,0(1,3)	4,9(1,4)	5,1(1,2)	**<0,001**
K (mg)	1449,4(282,8)	1401,6(279,0)	1482,1(280,9)	**<0,001**
Se (μg)	48,6(11,7)	48,6(11,3)	48,6(11,9)	0,907
Mg (mg)	151,7(34,2)	144,4(30,0)	156,7(36,0)	**<0,001**
C20_5 (EPA) (g)	0,1(0,1)	0,1(0,1)	0,1(0,1)	**0,047**
C22_6 (DHA) (g)	0,2(0,2)	0,2(0,2)	0,2(0,2)	**0,027**

*Sexu desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra; DHA, azido dokohexanoikoa; EPA, azido eikosapentanoikoa; GAA, gantz azido aseak; GAM, gantz azido monoasegabeak; GAP, gantz azido poliasegabeak.

4.14. taula: Helburu populazioaren energia eta nutrienteen ahorakina 1.000 kcal-rekiko adinaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, unitateak 1.000 kcal-rekiko, energia izan ezik, batezbestekoa(DE)	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	*P*[*]
Energia (kcal)	2.193,6 (676,8)	1.988,7 (559,0)	2.177,3 (807,2)	2.134,0 (585,1)	**<0,001**
Proteinak (g)	37,2(6,8)	38,3(7,2)	37,4(7,0)	37,7(6,3)	**<0,001**
Karbohidratoak (g)	102,9(13,3)	102,1(15,4)	104,6(15,7)	103,3(15,0)	**<0,001**
Gantzak (g)	44,3(7,0)	43,2(7,6)	43,3(7,0)	43,2(7,4)	**<0,001**
GAA (g)	15,1(3,1)	14,1(3,4)	14,8(3,3)	14,3(3,5)	**<0,001**
GAM (g)	18,7(4,5)	18,5(4,1)	18,7(4,6)	18,7(4,7)	0,636
GAP (g)	7,0(2,9)	7,1(3,5)	6,3(2,3)	6,6(2,5)	**<0,001**
Kolesterola (mg)	143,0(52,4)	144,3(54,0)	144,9(73,9)	148,6(55,5)	**<0,001**
Zuntza (g)	10,9(3,8)	11,9(4,9)	10,7(3,9)	11,7(4,6)	**<0,001**
Tiamina (mg)	0,7(0,2)	0,7(0,3)	0,7(0,2)	0,7(0,3)	**<0,001**
Erriboflabina (mg)	0,9(0,3)	1,0(0,3)	0,9(0,3)	0,9(0,3)	**<0,001**
Niazina (mg)	16,8(3,5)	17,8(4,3)	17,2(4,3)	17,1(3,7)	**<0,001**
B_6 bitamina (mg)	1,0(0,3)	1,1(0,3)	1,0(0,3)	1,1(0,3)	**<0,001**
Azido folikoa (μg)	151,4(51,1)	161,9(54,1)	149,4(51,4)	157,3(62,4)	**<0,001**
B_{12} bitamina (μg)	2,7(0,9)	2,7(0,8)	2,6(0,8)	2,7(0,8)	**<0,001**
Azido askorbikoa (mg)	82,2(42,4)	84,4(40,5)	80,6(46,5)	88,7(52,9)	**<0,001**
A bitamina (μg)	262,7(95,0)	282,7 (100,6)	256,7(92,0)	269,5(98,7)	**<0,001**
D bitamina (μg)	1,2(0,6)	1,3(0,8)	1,3(0,8)	1,2(0,8)	**<0,001**
E bitamina (mg)	4,6(2,3)	4,6(2,8)	4,0(2,1)	4,2(2,0)	**<0,001**
K bitamina (μg)	81,5(41,7)	87,6(44,7)	74,0(32,7)	82,6(38,2)	**<0,001**
Ca (mg)	439,6 (113,3)	431,3 (116,1)	433,5 (120,5)	436,0 (128,4)	**<0,001**
P (mg)	695,7 (152,0)	721,0 (137,1)	700,5 (129,8)	706,0 (133,7)	**<0,001**
Fe (mg)	7,8(2,2)	8,1(2,4)	7,8(2,1)	8,2(2,4)	**<0,001**
Cu (mg)	0,6(0,1)	0,6(0,1)	0,6(0,1)	0,6(0,1)	**<0,001**
I (μg)	47,3(20,7)	45,9(11,4)	46,4(10,6)	47,2(10,2)	**<0,001**
Zn (mg)	4,8(1,1)	5,1(1,3)	4,8(1,0)	5,1(1,4)	**<0,001**
K (mg)	1.430,7 (283,4)	1.483,7 (303,1)	1.405,2 (280,4)	1.464,1 (268,5)	**<0,001**
Se (μg)	47,6(11,1)	49,9(13,6)	48,2(12,0)	48,6(10,5)	**<0,001**
Mg (mg)	148,0(34,9)	154,5(37,1)	148,4(31,0)	153,8(33,6)	**<0,001**
C20_5 (EPA) (g)	0,1(0,1)	0,1(0,1)	0,1(0,1)	0,1(0,1)	**<0,001**
C22_6 (DHA) (g)	0,2(0,2)	0,2(0,2)	0,2(0,2)	0,2(0,2)	**<0,001**

[*]Adinaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra; DHA, azido dokohexanoikoa; EPA, azido eikosapentanoikoa; GAA, gantz azido aseak; GAM, gantz azido monoasegabeak; GAP, gantz azido poliasegabeak.

4.15. taula: Helburu populazioaren energia eta nutrienteen ahorakina 1.000 kcal-rekiko EAren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, unitateak 1.000 kcal-rekiko, energia izan ezik, batezbestekoa(DE)	OZ (n=3.637)	EOZ (n=22.529)	*P*[*]
Energia (kcal)	2.140,1(585,8)	2.121,1(665,3)	**<0,001**
Proteinak (g)	38,2(5,7)	37,6(6,9)	**<0,001**
Karbohidratoak (g)	104,9(16,2)	103,0(14,7)	**<0,001**
Gantzak (g)	43,2(7,5)	43,5(7,3)	**0,021**
GAA (g)	14,4(3,4)	14,5(3,4)	**<0,001**
GAM (g)	18,8(4,6)	18,6(4,5)	**0,046**
GAP (g)	6,5(2,4)	6,8(2,9)	**<0,001**
Kolesterola (mg)	145,1(39,9)	145,0(61,6)	**<0,001**
Zuntza (g)	11,2(4,1)	11,4(4,5)	0,083
Tiamina (mg)	0,7(0,2)	0,7(0,3)	**<0,001**
Erriboflabina (mg)	1,0(0,3)	0,9(0,3)	**<0,001**
Niazina (mg)	17,4(3,8)	17,1(4,0)	**<0,001**
B_6 bitamina (mg)	1,1(0,3)	1,1(0,3)	0,155
Azido folikoa (µg)	155,4(48,7)	155,5(57,7)	0,113
B_{12} bitamina (µg)	2,6(0,7)	2,7(0,8)	**<0,001**
Azido askorbikoa (mg)	88,0(42,7)	84,3(48,0)	**<0,001**
A bitamina (µg)	261,2(87,7)	269,5(98,9)	**<0,001**
D bitamina (µg)	1,3(0,9)	1,2(0,7)	**<0,001**
E bitamina (mg)	4,1(1,9)	4,3(2,4)	**<0,001**
K bitamina (µg)	70,2(27,2)	83,5(40,9)	**<0,001**
Ca (mg)	461,4(117,9)	430,8(121,4)	**<0,001**
P (mg)	715,0(105,4)	704,6(142,0)	**<0,001**
Fe (mg)	8,1(2,2)	8,0(2,3)	**0,019**
Cu (mg)	0,6(0,1)	0,6(0,1)	**<0,001**
I (µg)	48,3(10,5)	46,5(13,6)	**<0,001**
Zn (mg)	5,0(1,1)	5,0(1,3)	**<0,001**
K (mg)	1.426,1(250,3)	1.453,2(287,6)	**<0,001**
Se (µg)	50,4(12,2)	48,3(11,6)	**<0,001**
Mg (mg)	152,2(31,0)	151,6(34,7)	**0,025**
C20_5 (EPA) (g)	0,1(0,1)	0,1(0,1)	**0,001**
C22_6 (DHA) (g)	0,3(0,2)	0,2(0,2)	**0,001**

[*]EAren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra; DHA, azido dokohexanoikoa; EA, ezagutza arloa; EOZ, Ez-Osasun Zientziak; EPA, azido eikosapentanoikoa; GAA, gantz azido aseak; GAM, gantz azido monoasegabeak; GAP, gantz azido poliasegabeak; OZ, Osasun Zientziak.

4.16. taula: Helburu populazioaren energia eta nutrienteen ahorakina 1.000 kcal-rekiko GnM estatusaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, unitateak 1.000 kcal-rekiko, energia izan ezik, batezbestekoa(DE)	Ez gehiegizko GnM (n=22.391)	Gehiegizko GnM (n=3.775)	P^*
Energia (kcal)	2.147,3(662,4)	1.984,4(589,0)	**<0,001**
Proteinak (g)	37,4(6,7)	39,1(6,8)	**<0,001**
Karbohidratoak (g)	103,4(15,0)	102,3(14,5)	**<0,001**
Gantzak (g)	43,5(7,2)	43,1(8,0)	**0,004**
GAA (g)	14,6(3,3)	14,1(3,7)	**<0,001**
GAM (g)	18,6(4,5)	18,8(4,9)	0,398
GAP (g)	6,8(2,8)	6,6(2,6)	**0,004**
Kolesterola (mg)	145,2(60,1)	150,0(52,6)	**<0,001**
Zuntza (g)	11,5(4,5)	11,1(3,7)	0,721
Tiamina (mg)	0,7(0,3)	0,6(0,2)	**<0,001**
Erriboflabina (mg)	0,9(0,3)	0,9(0,3)	**<0,001**
Niazina (mg)	17,1(4,0)	17,4(3,9)	**<0,001**
B_6 bitamina (mg)	1,1(0,3)	1,0(0,3)	**0,002**
Azido folikoa (μg)	155,4(57,2)	155,9(52,8)	0,158
B_{12} bitamina (μg)	2,6(0,8)	2,8(0,8)	**<0,001**
Azido askorbikoa (mg)	84,2(47,1)	88,4(48,8)	**<0,001**
A bitamina (μg)	267,2(97,7)	275,1(95,7)	**<0,001**
D bitamina (μg)	1,3(0,8)	1,2(0,8)	**<0,001**
E bitamina (mg)	4,3(2,3)	4,3(2,2)	**<0,001**
K bitamina (μg)	81,1(40,0)	84,9(36,6)	**<0,001**
Ca (mg)	429,7(113,8)	466,9(155,6)	**<0,001**
P (mg)	702,2(135,5)	728,7(147,4)	**<0,001**
Fe (mg)	8,0(2,4)	7,8(2,1)	**<0,001**
Cu (mg)	0,6(0,1)	0,6(0,1)	**<0,001**
I (μg)	46,3(13,2)	49,6(12,7)	**<0,001**
Zn (mg)	5,0(1,3)	5,1(1,3)	**0,001**
K (mg)	1.442,6(279,2)	1.489,9(300,4)	**<0,001**
Se (μg)	48,4(11,5)	49,7(12,4)	**<0,001**
Mg (mg)	151,3(34,6)	153,9(32,0)	**<0,001**
C20_5 (EPA) (g)	0,1(0,1)	0,1(0,2)	**0,001**
C22_6 (DHA) (g)	0,2(0,2)	0,2(0,2)	0,823

*Gantz-masa estatusaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra; DHA, azido dokohexanoikoa; EPA, azido eikosapentanoikoa; GAA, gantz azido aseak; GAM, gantz azido monoasegabeak; GAP, gantz azido poliasegabeak; GnM, gantz-masa.

4.3.2.2. Makronutrienteen banaketa tarte onargarriari (MBTO) egokitzapena

MBTOri dagokionez, nutriente bakar batek ere, ez zuen betetzen tarte onargarri horrekin, proteinen kasuan 18 eta 20 urteko ikasleen taldeetan, OZtan eta gehiegizko GnM ez zuten ikasleetan izan ezik (**4.17., 4.18., 4.19 eta 4.20. taulak**). Aztertutako aldagai guztietan sexua, adina, EA eta GnM estatusaren araberako desberdintasunak behatu ziren (*P* <

0,01), salbuespen batzuekin, gantz azido aseen (GAA) kasuan sexuaren arabera edo GAMen kasuan adinaren arabera, adibidez (4.17., 4.18., 4.19 eta 4.20. taulak). Hainbat ikerketen arabera(40) Espainiako populazioaren, unibertsitate ikasleak barne, dieta ohikoena mendebaldeko dietaren antzekoa da, proteina eta gantzetan, GAA-etan bereziki, aberatsa eta karbohidrato eta zuntzan eskasa. Dieta patroi hau gaixotasun kronikoekin, hala nola gaixotasun kardiobaskularrekin(45) eta minbizi mota batzuekin(46) lotu izan da.

Gure kasuan, helburu populazioak SENC erakundearen(13) proteina gomendioak bakarrik betetzen zituen, karbohidrato eta GAM ahorakinak gomendioen azpitik zeuden eta atal honetan aztertutako gainontzeko nutrienteen ahorakinak gomendioenak baino altuagoak ziren (4.17. taula). UPV/EHUko ikasleek Kroaziako ikasleekin(47) alderatuz gantz azido eta GAM ahorakin altuagoa zuten eta proteina eta GAP baxuagoa. Makronutrienteen banaketa tarte onargarriari egokitzapena adinaren arabera dagokionez, adin kategorien artean ez zegoen desberdintasun handirik (4.18. taula) adin tarte estua zelako baino espero genuen emaitza ikasle gazteagoek dieta patroi okerragoa izatea zen, guraso gabe bizi direlako lehenengo aldiz eta osasunari buruzko erabakien arduradunak direlako(48). Gainera, eskolatik unibertsitaterako trantsizio honetan, gerta daiteke familian ondo ezarritako ohitura dietetikoak eta errutinak galtzea(49).

EAri dagokionez, nahiz eta OZtako eta EOZtako ikasleen arteko makronutrienteen portzentajea desberdina izan ($P < 0,05$) (4.19. taula), MBTOri nahiko antzekoa izan zen. Emaitza hau espero genuenaren kontrakoa da, kontuan hartzen bada nutrizioarekiko jakintzek ikasleen ahorakin dietetikoa hobeto dezaketela(50) eta ikasle hauek arreta gehiago jarriko dutela nutrizioari eta norberaren zainketari(51). Bestalde, UPV/EHUko OZtako ikasleek arlo honetako Espainiako, Danimarkako eta Greziako ikasleekin(22,40,42,52,53) konparatuz proteina eta karbohidrato ahorakin baxuagoa adierazi zuten eta gantz azido eta GAM ahorakin altuagoa.

Azkenik, makronutrienteen ahorakinaren egokitzapena MBTOri antzekoa izan zen GnM estatusaren araberako taldeetan, nahiz eta gehiegizko GnM zuten ikasleek GnM normala zuten ikasleekin erkatuta, proteina ahorakin altuagoa izan eta karbohidrato eta gantz azido baxuagoa. Emaitza hauek ez datoz bat unibertsitate ikasleetan egindako beste ikerketa batzuekin(54) eta makronutrienteetan aberatsak diren elikagai batzuen kontsumoa azpiestimatu daitekeelako, eta baita pisua galtzeko helburuarekin fekuladun eta gantzdun elikagaiak gutxitu egiten dituztelako izan daiteke. Orokorrean, beste ikerlari batzuen esanetan(55,56), gainpisua eta obesitatea duten pertsonek, dieta baloratzeko ikerketetan, bere kontsumoa azpiestimatzen dute.

4.17. taula: Helburu populazioaren makronutrienteen banaketa tarte onargarriari egokitzapena sexuaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, % EIG, batezbestekoa(DE)	Lagin osoa (n=26.165)	Gizonak (n=10.607)	Emakumeak (n=15.558)	*P**	MBTO†, % EIG
Proteinak	15,1(2,7)	15,1(3,0)	15,0(2,5)	**0,002**	10-15
Karbohidratoak	38,7(5,6)	38,2(5,6)	39,1(5,6)	**<0,001**	50-55
Gantzak	39,1(6,6)	39,6(6,6)	38,7(6,5)	**<0,001**	30-35
GAA	13,1(3,0)	13,1(3,0)	13,0(3,0)	0,122	7-8
GAM	16,8(4,1)	17,0(4,1)	16,6(4,0)	**<0,001**	20
GAP	6,1(2,5)	6,2(2,8)	5,9(2,3)	**<0,001**	5

†Serra L & Aranceta J (2011) Objetivos nutricionales para la población española: consenso de la Sociedad Española de Nutrición Comunitaria. *Rev Esp Nutr Com* **17**, 178-199.
* Sexu desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra; EIG, energia-ingestio guztia; GAA, gantz azido ase; GAM, gantz azido monoasegabeak; GAP, gantz azido poliasegabeak; MBTO, makronutrienteen banaketa tarte onargarria.

4.18. taula: Helburu populazioaren makronutrienteen banaketa tarte onargarriari egokitzapena adinaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, % EIG, batezbestekoa(DE)	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	*P**	MBTO†, % EIG
Proteinak	14,9(2,7)	15,3(2,9)	15,0(2,8)	15,1(2,5)	**<0,001**	10-15
Karbohidratoak	38,6(5,0)	38,3(5,8)	39,2(5,9)	38,7(5,6)	**<0,001**	50-55
Gantzak	39,9(6,3)	38,9(6,8)	38,9(6,3)	38,9(6,7)	**<0,001**	30-35
GAA	13,6(2,8)	12,7(3,0)	13,3(3,0)	12,8(3,1)	**<0,001**	7-8
GAM	16,8(4,1)	16,6(3,7)	16,8(4,2)	16,8(4,2)	0,636	20
GAP	6,3(2,6)	6,4(3,1)	5,7(2,1)	6,0(2,3)	**<0,001**	5

†Serra L & Aranceta J (2011) Objetivos nutricionales para la población española: consenso de la Sociedad Española de Nutrición Comunitaria. *Rev Esp Nutr Com* **17**, 178-199.
*Adinaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra; EIG, energia-ingestio guztia; GAA, gantz azido ase; GAM, gantz azido monoasegabeak; GAP, gantz azido poliasegabeak; MBTO, makronutrienteen banaketa tarte onargarria.

4.19. taula: Helburu populazioaren makronutrienteen banaketa tarte onargarriari egokitzapena EAren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, % EIG, batezbestekoa(DE)	OZ (n=3.637)	EOZ (n=22.529)	*P**	MBTO†, % EIG
Proteinak	15,3(2,3)	15,0(2,8)	**<0,001**	10-15
Karbohidratoak	39,3(6,1)	38,6(5,5)	**<0,001**	50-55
Gantzak	38,9(6,7)	39,1(6,5)	**0,021**	30-35
GAA	13,0(3,0)	13,1(3,0)	**<0,001**	7-8
GAM	16,9(4,2)	16,8(4,1)	**0,046**	20
GAP	5,9(2,2)	6,1(2,6)	**<0,001**	5

†Serra L & Aranceta J (2011) Objetivos nutricionales para la población española: consenso de la Sociedad Española de Nutrición Comunitaria. *Rev Esp Nutr Com* **17**, 178-199.
*EAren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra; EA, ezagutza arloa; EIG, energia-ingestio guztia; EOZ, Ez-Osasun Zientziak; GAA, gantz azido ase; GAM, gantz azido monoasegabeak; GAP, gantz azido poliasegabeak; MBTO, makronutrienteen banaketa tarte onargarria; OZ, Osasun Zientziak.

4.20. Helburu populazioaren makronutrienteen banaketa tarte onargarriari egokitzapena GnM estatusaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, % EIG, batezbestekoa(DE)	Ez gehiegizko GnM (n=22.391)	Gehiegizko GnM (n=3.775)	*P**	MBTO†, % EIG
Proteinak	15,0(2,7)	15,6(2,7)	**<0,001**	10-15
Karbohidratoak	38,8(5,6)	38,4(5,4)	**<0,001**	50-55
Gantzak	39,1(6,5)	38,8(7,2)	**0,004**	30-35
GAA	13,1(3,0)	12,7(3,3)	**<0,001**	7-8
GAM	16,7(4,0)	16,9(4,4)	0,398	20
GAP	6,1(2,5)	5,9(2,3)	**0,004**	5

†Serra L & Aranceta J (2011) Objetivos nutricionales para la población española: consenso de la Sociedad Española de Nutrición Comunitaria. *Rev Esp Nutr Com* **17**, 178-199.
*Gantz-masa estatusaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra; EIG, energia-ingestio guztia; GAA, gantz azido ase; GAM, gantz azido monoasegabeak; GAP, gantz azido poliasegabeak; MBTO, makronutrienteen banaketa tarte onargarria.

4.3.2.3. Nutrienteen ahorakina batezbesteko eskakizunei egokitzapena (BEE)

Nutrienteen ahorakina BEE **4.21, 4.22, 4.23 eta 4.24. tauletan** azaltzen da. Batezbesteko eskakizunei baino ahorakin baxuagoa zuten nutriente bakarrak D eta E bitamina izan ziren. A bitamina eta I-ren ahorakinak % 100ko BEE gertu zeuden. D eta E bitaminen emaitzak bat datoz ANIBES ikerketako Espainiako populazioarekin(57,58). Sexu desberdintasunak aurkitu ziren aldagai guztietan tiaminaren kasuan izan ezik ($P < 0,001$) (4.21. taula), eta orokorrean, gizonezkoen BEE portzentajeak emakumeenak baino altuagoak izan ziren. Ikertutako aldagai gehienetan adina, EA eta GnM estatusaren araberako desberdintasunak behatu ziren (P < 0,001) B_{12} eta E bitamina EAreneta I GnM estatusaren araberako kasuetan izan ezik (4.22., 4.23. eta 4.24. taulak). Gure ezaguera arte, literaturan ez daude unibertsitate ikasleetan nutrienteen egokitzapena sexua, adina edo EAren arabera aztertzen dituzten daturik gure emaitzak konparatu ahal izateko. Hala ere, nutrienteen egokitzapena pisu normala eta gehiegizko pisua zuten umeetan egindako ikerketen emaitzen arabera, bi taldeen egokitzapena antzekoa zen[(59)].

4.21. taula: Helburu populazioaren nutrienteen ahorakina batezbesteko eskakizunei egokitzapena sexuaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, % BEE, batezbestekoa(DE)	Lagin osoa (n=26.165)	Gizonak (n=10.607)	Emakumeak (n=15.558)	P^*
Proteinak	191,4(66,5)	185,4(65,1)	195,5(67,1)	**<0,001**
Tiamina	151,5(67,5)	151,4(63,5)	151,5(70,2)	0,897
Erriboflabina	200,8(79,0)	191,6(76,8)	207,1(79,9)	**<0,001**
Niazina	314,8(108,6)	331,6(125,5)	303,4(93,7)	**<0,001**
B_6 bitamina	199,7(76,9)	215,1(84,8)	189,2(69,0)	**<0,001**
Azido folikoa	100,4(43,2)	106,1(46,6)	96,4(40,3)	**<0,001**
B_{12} bitamina	281,4(117,1)	315,5(122,5)	258,2(107,3)	**<0,001**
Azido askorbikoa	266,9(165,0)	246,6(177,8)	280,8(154,2)	**<0,001**
A bitamina	102,2(47,5)	94,3(44,6)	107,6(48,6)	**<0,001**
D bitamina	26,3(18,9)	29,5(22,3)	24,2(15,9)	**<0,001**
E bitamina	75,8(50,0)	82,3(59,2)	71,3(42,1)	**<0,001**
Ca	113,6(43,6)	119,2(42,4)	109,8(44,1)	**<0,001**
P	254,9(83,0)	275,9(86,2)	240,6(77,5)	**<0,001**
Fe	236,5(101,6)	294,8(109,9)	196,9(72,4)	**<0,001**
Cu	181,7(59,8)	194,4(57,6)	173,1(59,7)	**<0,001**
I	103,1(40,4)	111,6(37,9)	97,3(41,0)	**<0,001**
Zn	135,4(50,1)	120,8(43,7)	145,3(51,7)	**<0,001**
Se	226,1(79,5)	249,4(88,9)	210,1(67,9)	**<0,001**
Mg	111,4(35,4)	100,2(29,3)	119,1(37,2)	**<0,001**

*Sexu desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
BEE, batezbesteko eskakizunen ezaugarriak, DE, desbideratze estandarra.

4.22. taula: Helburu populazioaren nutrienteen ahorakina batezbesteko eskakizunei egokitzapena adinaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, % BEE, batez-bestekoa(DE)	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (5.523)	≥ 21 urte (n=10.110)	P^*
Proteinak	197,1(68,2)	182,8(58,6)	196,2(73,3)	190,7(65,2)	**<0,001**
Tiamina	154,9(69,0)	147,8(64,1)	151,3(66,0)	151,9(69,4)	**<0,001**
Erriboflabina	205,8(80,2)	193,8(63,9)	204,5(90,7)	200,2(78,7)	**<0,001**
Niazina	316,3(99,0)	303,2(85,5)	324,5(143,4)	315,1(101,6)	**<0,001**
B_6 bitamina	199,2(72,9)	196,0(66,3)	199,6(91,5)	202,0(75,3)	**<0,001**
Azido folikoa	101,1(39,5)	97,4(35,0)	97,9(42,7)	103,0(48,7)	**<0,001**
B_{12} bitamina	291,8 (118,7)	260,9 (82,1)	285,4 (142,5)	285,3 (115,9)	**<0,001**
Azido askorbikoa	265,2 (152,0)	250,5 (125,9)	259,6 (162,5)	280,8 (188,6)	**<0,001**
A bitamina	102,2(42,9)	101,2(42,8)	101,8(57,0)	102,9(46,3)	**<0,001**
D bitamina	26,1(15,1)	26,1(15,0)	28,0(24,0)	25,7(19,3)	**<0,001**
E bitamina	82,3(49,7)	76,4(57,5)	711,9(49,1)	74,4(45,8)	**<0,001**
Ca	118,9(43,0)	105,1(35,0)	115,0(46,9)	115,0(45,7)	**<0,001**
P	259,7(88,6)	242,8(68,9)	258,3(95,1)	257,3(79,4)	**<0,001**
Fe	238,2(94,8)	221,0(83,0)	233,3(120,0)	246,1(102,1)	**<0,001**
Cu	189,4(63,8)	173,3(62,7)	182,2(63,2)	182,3(53,3)	**<0,001**
I	106,8(50,0)	93,6(26,7)	104,9(44,8)	105,6(37,9)	**<0,001**
Zn	134,2(48,9)	130,9(43,1)	135,7(50,4)	138,2(53,7)	**<0,001**
Se	226,5(71,2)	215,2(63,0)	231,5(101,9)	228,9(77,0)	**<0,001**
Mg	111,9(37,4)	107,0(32,8)	112,5(36,5)	113,0(35,1)	**<0,001**

*Adinaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
BEE, batezbesteko eskakizunen ezaugarriak, DE, desbideratze estandarra.

4.23. taula: Helburu populazioaren nutrienteen ahorakina batezbesteko eskakizunei egokitzapena EAren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, % BEE, batezbestekoa(DE)	OZ (n=3.637)	EOZ (n=22.529)	P^*
Proteinak	206,3(71,7)	189,0(65,3)	**<0,001**
Tiamina	157,9(58,6)	150,4(68,8)	**<0,001**
Erriboflabina	217,8(70,6)	198,1(79,9)	**<0,001**
Niazina	327,2(98,2)	312,8(110,1)	**<0,001**
B_6 bitamina	204,9(75,1)	198,9(77,1)	**<0,001**
Azido folikoa	100,6(33,9)	100,3(44,5)	**<0,001**
B_{12} bitamina	278,3(98,4)	281,9(119,8)	0,124
Azido askorbikoa	286,2(129,7)	263,8(169,8)	**<0,001**
A bitamina	103,2(37,4)	102,0(48,9)	**<0,001**
D bitamina	27,9(19,3)	26,1(18,8)	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.23. taularen jarraipena.

Aldagaiak, % BEE, batezbestekoa(DE)	OZ (n=3.637)	EOZ (n=22.529)	P^*
E bitamina	70,8(35,0)	76,6(52,0)	0,610
Ca	121,4(38,3)	112,4(44,3)	**<0,001**
P	260,8(69,9)	254,0(84,9)	**<0,001**
Fe	226,7(89,7)	238,1(103,3)	**<0,001**
Cu	178,1(54,9)	182,3(60,5)	**0,029**
I	107,3(31,9)	102,5(41,5)	**<0,001**
Zn	146,1(49,1)	133,6(50,0)	**<0,001**
Se	235,8(74,7)	224,5(80,1)	**<0,001**
Mg	118,3(31,3)	110,3(36,0)	**<0,001**

*EAren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
BEE, batezbesteko eskakizunen ezaugarriak, DE, desbideratze estandarra: EA, ezagutza arloa; EOZ, Ez-Osasun Zientziak; OZ, Osasun Zientziak.

4.24. taula: Helburu populazioaren nutrienteen ahorakina batezbesteko eskakizunei egokitzapena GnM estatusaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, % BEE, batezbestekoa(DE)	Ez gehiegizko GnM (n=22.391)	Gehiegizko GnM (n=3.775)	P^*
Proteinak	196,9(67,2)	159,1(51,2)	**<0,001**
Tiamina	154,9(69,8)	131,2(47,2)	**<0,001**
Erriboflabina	203,6(80,2)	184,1(69,0)	**<0,001**
Niazina	318,1(111,5)	295,2(87,0)	**<0,001**
B_6 bitamina	202,6(78,9)	182,6(60,5)	**<0,001**
Azido folikoa	101,7(44,9)	92,6(30,0)	**<0,001**
B_{12} bitamina	283,0(120,2)	271,9(96,5)	**0,033**
Azido askorbikoa	269,0(169,1)	254,3(137,7)	**0,001**
A bitamina	103,2(48,3)	96,4(41,8)	**<0,001**
D bitamina	26,8(19,3)	23,6(16,1)	**<0,001**
E bitamina	76,6(51,0)	71,1(43,5)	**<0,001**
Ca	113,6(42,6)	113,9(49,2)	**<0,001**
P	256,7(84,2)	244,6(74,8)	**<0,001**
Fe	240,0(104,4)	216,1(80,0)	**<0,001**
Cu	184,6(60,3)	164,9(54,0)	**<0,001**
I	103,4(41,2)	101,8(35,3)	0,509
Zn	137,0(50,8)	125,8(44,4)	**<0,001**
Se	227,8(80,3)	215,8(73,6)	**<0,001**
Mg	112,6(35,9)	104,5(31,8)	**<0,001**

*Gantz-masa estatusaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
BEE, batezbesteko eskakizunen ezaugarriak; DE, desbideratze estandarra; GnM, gantz-masa.

4.3.2.4. Dieta kalitatearen indizeak

Ikertutako populazioaren dieta kalitatea aztertzeko helburuarekin, dietaren kalitatea aztertzen dituzten bi indize erabili ziren (HEI-2010 eta MDS) eta bi kasuetan, emaitzak onargarriak izan ziren baina hobetu zitezkeen. HEI-2010 indizearen emaitzak bai lagina osoari dagokionez bai sexuaren arabera **2. ikerketan** aurkezten dira. *HEI-2010* indizearen emaitzetan desberdintasun esanguratsuak behatu ziren indizearen osagai guztietan (P < 0,01) adinaren arabera (**4.25. taula**), EAren arabera (**4.26. taula**) eta GnM estatusaren arabera (**4.27. taula**), zereal integralak, gantz azidoak eta kaloria hutsak izan ezik EAren araberako kasuan eta zereal finduak, kaloria hutsak eta puntuazio totala GnM estatusaren arabera.

Espero zen bezala, ikasle nagusien dieta kalitatea gazteena baino hobeagoa izan zen, eskolatik unibertsitaterako trantsizioaren ondorioz ohitura, dietetikoak barne, aldatu daitezkeelako(49). Gainera, UPV/EHUko OZtako ikasleek EOZkoak baino puntuazio altuagoak lortu zituzten bi indizeetan eta nutrizioarekiko jakintzei eta norberaren arduraren ondorio izan daitezke(50,51). Azkenik, *Third National Health and Nutrition Examination Survey* (NHANES III) ikerketan bezala, ez genuen desberdintasunik aurkitu HEI-2010 indizearen puntuazioan gehiegizko GnM zuten ikasleen eta GnM % normala zuten ikasleen artean. Beste autore batzuek(61-63), ordea, baieztatu dute Amerikar gida dietetikoen atxikidurak GnMn eragin positiboa duela.

4.25. taula: Helburu populazioaren *Healthy Eating Index* adinaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Healthy Eating Index	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	P^*
Aldagaiak (puntuazio-tarteak)	batezbestekoa(DE)				
Frutak (0-5)	3,6(1,6)	3,5(1,5)	3,3(1,7)	3,5(1,7)	**<0,001**
Fruta osoak (0-5)	4,2(1,5)	4,2(1,4)	3,8(1,7)	3,9(1,7)	**<0,001**
Barazkiak (0-5)	1,7(1,1)	1,9(1,1)	1,6(1,0)	1,8(1,1)	**<0,001**
Barazki berdeak eta lekaleak (0-5)	4,7(0,8)	4,8(0,7)	4,6(0,9)	4,7(0,8)	**<0,001**
Zereal integralak (0-10)	2,7(2,7)	2,7(3,7)	2,0(3,1)	2,5(3,3)	**<0,001**
Esnekiak (0-10)	5,7(2,1)	5,3(2,5)	5,5(2,5)	5,2(2,6)	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.25. taularen jarraipena.

Healthy Eating Index	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	*P**
Aldagaiak (puntuazio-tarteak)		batezbestekoa(DE)			
Elikagaietako proteina totala (0-5)	4,2(0,9)	4,3(0,9)	4,3(0,9)	4,3(1,0)	**<0,001**
Itsaskiak eta landareak (0-5)	3,2(1,3)	3,1(1,4)	3,2(1,3)	3,3(1,3)	**<0,001**
Gantz azidoak (0-10)	6,7(2,2)	7,0(2,3)	6,4(2,6)	7,0(2,2)	**<0,001**
Zereal finduak (0-10)	8,8(1,7)	9,0(1,9)	8,8(1,9)	9,0(1,9)	**<0,001**
Sodioa (0-10)	10,0(0,0)	9,9(0,8)	10,0(0,4)	9,9(0,6)	**<0,001**
Kaloria hutsak (0-20)	19,8(0,7)	19,5(1,4)	19,8(0,7)	19,8(0,7)	**<0,001**
Guztira (0-100)	74,0(6,8)	75,3(8,2)	73,4(8,3)	74,8(8,2)	**<0,001**

*Adinaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra.

4.26. taula: Helburu populazioaren *Healthy Eating Index* EAren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Healthy Eating Index	OZ (n=3.637)	EOZ (n=22.529)	*P**
Aldagaiak (puntuazio-tarteak)	batezbestekoa(DE)		
Frutak (0-5)	3,6(1,6)	3,5(1,6)	**<0,001**
Fruta osoak (0-5)	4,1(1,6)	4,0(1,6)	**<0,001**
Barazkiak (0-5)	1,8(1,0)	1,7(1,1)	**<0,001**
Barazki berdeak eta lekaleak (0-5)	4,8(0,7)	4,7(0,8)	**<0,001**
Zereal integralak (0-10)	2,4(3,4)	2,3(3,2)	0,670
Esnekiak (0-10)	6,0(2,3)	5,3(2,5)	**<0,001**
Elikagaietako proteina totala (0-5)	4,3(1,0)	4,3(0,9)	**0,010**
Itsaskiak eta landareak (0-5)	3,1(1,3)	3,2(1,3)	**<0,001**
Gantz azidoak (0-10)	6,9(2,1)	6,8(2,4)	0,496
Zereal finduak (0-10)	8,9(1,8)	8,9(1,9)	**0,007**
Sodioa (0-10)	10,0(0,3)	9,9(0,6)	**0,003**
Kaloria hutsak (0-20)	19,8(0,7)	19,7(0,9)	0,568
Guztira (0-100)	75,7(7,9)	74,3(8,0)	**<0,001**

*EAren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra; EA, ezagutza arloa; EOZ, Ez-Osasun Zientziak; OZ, Osasun Zientziak.

4.27. taula: Helburu populazioaren *Healthy Eating Index* GnM estatusaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Healthy Eating Index	Ez gehiegizko GnM (n=22.391)	Gehiegizko GnM (n=3.775)	*P**
Aldagaiak (puntuazio-tarteak)	batezbestekoa(DE)		
Frutak (0-5)	3,5(1,6)	3,3(1,6)	**<0,001**
Fruta osoak (0-5)	4,0(1,6)	3,9(1,6)	**<0,001**
Barazkiak (0-5)	1,7(1,0)	1,9(1,2)	**<0,001**
Barazki berdeak eta lekaleak (0-5)	4,7(0,8)	4,8(0,7)	**<0,001**
Zereal integralak (0-10)	2,3(3,3)	1,9(2,9)	**<0,001**
Esnekiak (0-10)	5,3(2,4)	5,8(2,8)	**<0,001**
Elikagaietako proteina totala (0-5)	4,2(1,0)	4,4(0,8)	**<0,001**
Itsaskiak eta landareak (0-5)	3,3(1,3)	2,9(1,3)	**<0,001**
Gantz azidoak (0-10)	6,8(2,3)	7,0(2,4)	**<0,001**
Zereal finduak (0-10)	8,9(1,8)	8,8(2,1)	0,300
Sodioa (0-10)	10,0(0,5)	9,9(0,8)	**<0,001**
Kaloria hutsak (0-20)	19,7(0,9)	19,8(0,6)	0,068
Guztira (0-100)	74,5(8,1)	74,5(7,6)	0,722

*Gantz-masa estatusaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra; GnM, gantz-masa.

MDS indizearen puntuazioak bai lagina osorako eta bai sexuaren arabera 2. ikerketan azaltzen dira. Indize hau adinaren arabera aztertzean, aldagai guztietan desberdintasun esanguratsuak behatu ziren ($P < 0,001$) (**4.28. taula**). MDS indizea EAri dagokiolarik, OZtako ikasleek EOZkoek baino puntuazio altuagoak lortu zituzten barazkietan, arrainan, haragi gorrian eta horien eratorrietan, oliba olioan eta puntuazio guztian; EOZtako ikasleek, ordea, frutetan, lekaleetan eta hegaztietan ($P < 0,01$) (**4.29. taula**). UPV/EHUko OZtako ikasleen MDS indizearen batezbesteko puntuazioa Amsterdam eta Thessalonikako ikasleena(53) baino altuagoa izan zen. Edozein kasutan, gure emaitzek eta beste autoreenak ere aditzera ematen dute jakintzak bakarrik ez direla nahikoak pertsonek ohitura dietetikoak barneratzeko(64).

Eta GnM estatusaren araberako kasuan, gehiegizko GnM ez zuten ikasleek gehiegizko GnM zutenek baino puntuazio altuagoak lortu zituzten hurrengo aldagaietan: zereal integralak, patatak, frutak, lekaleak, hegaztiak eta puntuazio guztia ($P < 0,001$) (**4.30**). Puntuazio totalari dagokionez, gure emaitzak bat datoz beste autore batzuen aurkikuntzekin(65), nahiz eta MDrekiko atxikidura tresna desberdinekin neurtu.

4.28. taula: Helburu populazioaren MDS adinaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

MDS	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	P^*
Aldagaiak[1]	batezbestekoa(DE)				
Zereal integralak	2,0(2,2)	2,2(2,4)	2,0(2,3)	2,5(2,3)	**<0,001**
Patatak	2,0(1,3)	2,0(1,6)	2,0(1,4)	2,0(1,4)	**0,036**
Frutak	4,6(1,1)	4,6(1,0)	4,4(1,4)	4,5(1,2)	**<0,001**
Barazkiak	4,5(1,0)	4,7(0,9)	4,5(1,0)	4,6(0,9)	**<0,001**
Lekaleak	2,3(1,2)	2,1(1,0)	2,1(1,1)	2,1(1,1)	**<0,001**
Arraina	2,7(1,4)	2,8(1,4)	2,7(1,5)	2,8(1,4)	**<0,001**
Haragi gorriak eta horien eratorriak	2,3(1,4)	2,4(1,3)	2,3(1,3)	2,3(1,4)	**<0,001**
Hegaztiak	2,7(1,3)	2,5(1,4)	2,6(1,3)	2,4(1,4)	**<0,001**
Esneki osoak	1,4(1,8)	1,5(1,9)	1,5(1,9)	1,5(1,9)	**<0,001**
Oliba olioa	4,6(1,2)	4,7(1,0)	4,9(0,6)	4,8(0,9)	**<0,001**
Alkohola	4,3(1,7)	4,2(1,8)	4,3(1,7)	4,1(1,9)	**<0,001**
Guztira	33,4(5,0)	33,7(5,2)	33,2(5,9)	33,7(5,6)	**<0,001**

[1]Aldagai bakoitzak 5 puntu eman diezazkioke puntuazio totalari eta tarte teorikoa 0-55koa da.
[*]Adinaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra; MDS, *MedDietScore.*

4.29. taula: Helburu populazioaren MDS EAren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

MDS	OZ (n=3.637)	EOZ (n=22.529)	P^*
Aldagaiak[1]	batezbestekoa(DE)		
Zereal integralak	2,2(2,3)	2,2(2,3)	0,704
Patatak	2,0(1,4)	2,0(1,4)	0,687
Frutak	4,5(1,2)	4,5(1,2)	**0,004**
Barazkiak	4,7(0,8)	4,6(1,0)	**<0,001**
Lekaleak	2,0(1,1)	2,2(1,1)	**<0,001**
Arraina	3,0(1,4)	2,7(1,4)	**<0,001**
Haragi gorriak eta horien eratorriak	2,5(1,2)	2,3(1,4)	**<0,001**
Hegaztiak	2,5(1,3)	2,5(1,4)	**0,003**
Esneki osoak	1,4(1,9)	1,5(1,9)	**<0,001**
Oliba olioa	4,8(0,8)	4,7(1,0)	**<0,001**
Alkohola	4,2(1,8)	4,2(1,8)	0,539
Guztira	33,9(5,1)	33,5(5,5)	**0,021**

[1]Aldagai bakoitzak 5 puntu eman diezazkioke puntuazio totalari eta tarte teorikoa 0-55koa da.
[*]EAren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra; EA, ezagutza arloa; EOZ, Ez-Osasun Zientziak; MDS, *MedDietScore*; OZ, Osasun Zientziak.

4.30. Helburu populazioaren *MDS* GnM estatusaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

MDS	Ez gehiegizko GnM (n=22.391)	Gehiegizko GnM (n=3.775)	*P*[*]
Aldagaiak[1]	batezbestekoa(DE)		
Zereal integralak	2,2(2,3)	2,0(2,3)	**<0,001**
Patatak	2,0(1,4)	1,9(1,5)	**<0,001**
Frutak	4,5(1,2)	4,4(1,3)	**<0,001**
Barazkiak	4,6(0,9)	4,6(1,0)	**<0,001**
Lekaleak	2,2(1,1)	2,1(1,1)	**<0,001**
Arraina	2,8(1,4)	2,7(1,4)	0,165
Haragi gorriak eta horien eratorriak	2,3(1,4)	2,3(1,4)	0,497
Hegaztiak	2,6(1,4)	2,3(1,3)	**<0,001**
Esneki osoak	1,5(1,9)	1,4(1,8)	0,250
Oliba olioa	4,7(1,0)	4,7(1,0)	0,324
Alkohola	4,2(1,8)	4,2(1,8)	0,289
Guztira	33,7(5,6)	32,8(4,7)	**<0,001**

[1]Aldagai bakoitzak 5 puntu eman diezazkioke puntuazio totalari eta tarte teorikoa 0-55koa da.
[*]Gantz-masa estatusaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra; MDS, *MedDietScore;*GnM, gantz-masa.

4.3.2.5. Elikadura patroiak

Helburu populazioaren dietaren ezaugarriak eta baita sexuaren eta GnM estatusaren araberako ezaugarriak ere 2. ikerketan azaltzen dira. Ikasle gazteenek eta OZtakoek gehiagotan jaten zuten (P < 0,001) eta otorduei buruzko gomendioak betetzen zituzten (**4.31 eta 4.32. taula**). Uste zenaren kontra, Nafarroako unibertsitate ikasle talde batean egindako ikerketa batek adierazi zuenez, EOZtako ikasleek hobeto egokitzen ziren otordu maiztasunari OZtako ikasleekin konparatuz[(66)]. UPV/EHUko ikasleen bazkari eta afari maiztasuna Alicanteko Unibertsitateko Dietetika eta Erizaintza ikasleena antzekoa izan zen[(52,67)].

Bestalde, 19 urteko ikasleek eta EOZtako ikasleek gehiagotan jaten zuten bakarrik beste adinetako eta OZtako ikasleekin konparatuz (P < 0,001). Eta adina eta EAren araberako analisiek ikasle hauen joera asteburuetan, otordu gehiago eginez eta kanpoan gehiagotan janez, elikadura aldatzea zela adierazi zuten (4.31 eta 4.32. taulak). Azkenik, ikasle nagusi eta OZtako ikasleen artean elikagaien erosketaz eta prestakuntzaz arduratzen ziren portzentajea altuagoa zen beste kategorietako ikasleekin konparatuz.

4.31. taula: Helburu populazioaren elikadura patroiak adinaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, % edo batezbestekoa(DE)	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	P^*
Gosaria, maiztasuna					
7 aldiz/aste	80,2	79,6	78,6	72,8	
5-6 aldiz/aste	11,1	11,4	15,0	16,0	
3-4 aldiz/aste	3,5	2,4	4,0	8,3	
1-2 aldiz/aste	3,4	4,9	1,0	1,3	
Inoiz	1,8	1,7	1,5	1,6	**<0,001**
Hamaiketakoa, maiztasuna					
7 aldiz/aste	14,9	21,4	8,8	19,4	
5-6 aldiz/aste	24,2	23,9	29,8	24,5	
3-4 aldiz/aste	20,0	16,5	20,5	26,2	
1-2 aldiz/aste	19,8	19,7	15,2	14,4	
Inoiz	21,0	18,5	25,7	15,5	**<0,001**
Bazkaria, maiztasuna					
7 aldiz/aste	99,0	97,7	99,0	97,5	
5-6 aldiz/aste	-	2,3	1,0	2,1	
3-4 aldiz/aste	1,0	-	-	0,2	
1-2 aldiz/aste	-	-	-	0,2	
Inoiz	-	-	-	-	**<0,001**
Askaria, maiztasuna					
7 aldiz/aste	27,4	24,9	19,8	26,2	
5-6 aldiz/aste	28,2	26,0	29,0	28,9	
3-4 aldiz/aste	25,9	24,7	20,7	25,5	
1-2 aldiz/aste	8,8	13,2	23,4	8,7	
Inoiz	9,8	11,2	7,2	10,8	**<0,001**
Afaria, maiztasuna					
7 aldiz/aste	95,7	93,8	91,5	95,8	
5-6 aldiz/aste	1,5	4,1	7,9	4,0	
3-4 aldiz/aste	2,8	2,1	0,6	0,2	
1-2 aldiz/aste	-	-	-	-	
Inoiz	-	-	-	-	**<0,001**
Afaldu ostean, maiztasuna					
7 aldiz/aste	1,5	4,5	3,2	3,3	
5-6 aldiz/aste	1,0	0,8	3,0	2,0	
3-4 aldiz/aste	1,1	3,4	5,7	5,4	
1-2 aldiz/aste	19,6	12,8	14,4	16,4	
Inoiz	76,8	78,5	73,7	72,9	**<0,001**
Gauerdian, maiztasuna					
7 aldiz/aste	-	-	-	-	
5-6 aldiz/aste	-	-	-	-	
3-4 aldiz/aste	-	0,8	-	0,2	
1-2 aldiz/aste	3,0	4,3	1,9	4,7	
Inoiz	97,0	94,8	98,1	95,1	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.31. taularen jarraipena.

Aldagaiak, % edo batezbestekoa(DE)	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	P^*
Ozk					
< 3	0,9	0,8	-	1,1	
3-5	93,9	92,9	92,8	89,5	
> 5	5,2	6,3	7,2	9,4	**<0,001**
Ozk-en arteko denbora					
Otordu nagusien artean	401,6(46,9)	390,0(36,8)	394,3(37,5)	399,2(42,9)	**<0,001**
Otorduen artean	245,6(64,4)	238,7(60,4)	247,2(66,4)	258,8(174,1)	**<0,001**
Ozk-en arteko denbora, sailkapena					
240-300 minutu	44,1	37,9	32,6	28,1	
< 240 edo > 300 minutu	55,9	62,1	67,4	71,9	**<0,001**
Ozk-en iraupena (minutuak)					
Gosaria	10,8(5,6)	13,0(7,5)	12,6(6,6)	13,1(7,9)	**<0,001**
Bazkaria eta afaria	24,6(7,7)	26,9(9,4)	27,1(8,7)	27,9(10,1)	**<0,001**
Mokaduak	8,3(4,4)	10,1(8,4)	9,5(5,3)	9,7(5,6)	**<0,001**
Ozk-en lekua (lan egunak)					
Gosaria	(n=4.830)	(n=5.230)	(n=5.439)	(n=9.890)	
Ohiko bizilekua	97,1	95,8	94,8	96,5	
Etxeko janaria unibertsitatean	2,0	1,5	1,0	1,1	
Besteak[1]	0,9	2,6	4,3	2,3	**<0,001**
Hamaiketakoa	(n=2.715)	(n=3.301)	(n=2.935)	(n=6.178)	
Ohiko bizilekua	11,7	8,7	7,4	12,9	
Etxeko janaria unibertsitatean	53,3	48,9	53,4	44,0	
Besteak[1]	35,1	42,4	39,2	43,1	**<0,001**
Bazkaria	(n=4.996)	(n=5.457)	(n=5.470)	(n=10.110)	
Ohiko bizilekua	97,4	89,6	91,7	88,2	
Etxeko janaria unibertsitatean	1,1	8,5	3,5	6,2	
Besteak[1]	-	1,9	4,8	5,6	**<0,001**
Askaria	(n=3.921)	(n=4.149)	(n=4.231)	(n=8.059)	
Ohiko bizilekua	86,5	85,9	76,2	73,4	
Etxeko janaria unibertsitatean	1,5	4,6	4,9	11,5	
Besteak[1]	12,0	9,5	18,9	15,1	**<0,001**
Afaria	(n=4.996)	(n=5.502)	(n=5.470)	(n=10.110)	
Ohiko bizilekua	100,0	100,0	99,4	100,0	
Besteak[1]	-	-	0,6	-	
Afaldu ostean	(n=298)	(n=365)	(n=605)	(n=877)	**<0,001**
Ohiko bizilekua	100,0	100,0	100,0	100,0	
Besteak[1]	-	-	-	-	**-**

Hurrengo orrialdean jarraitzen du.

4.31. taularen jarraipena.

Aldagaiak, % edo batezbestekoa(DE)	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	P^*
Norekin hartzen dituzu hurrengo otorduak?					
Gosaria (n=25.336)					
Bakarrik	60,7	57,2	49,2	67,1	
Konpainian	24,4	22,7	30,8	18,6	
Bakarrik eta konpainian	14,9	20,1	20,0	14,3	**<0,001**
Hamaiketakoa (n=25.336)					
Bakarrik	7,3	6,7	8,2	18,0	
Konpainian	82,1	89,1	82,3	68,0	
Bakarrik eta konpainian	10,6	4,2	9,5	14,0	**<0,001**
Bazkaria (n=25.336)					
Bakarrik	15,0	26,2	11,7	16,5	
Konpainian	-	-	-	-	
Bakarrik eta konpainian	85,0	73,8	88,3	83,5	**<0,001**
Askaria (n=25.336)					
Bakarrik	58,1	40,8	46,9	44,2	
Konpainian	27,1	42,8	31,5	33,4	
Bakarrik eta konpainian	14,8	16,4	21,6	22,4	**<0,001**
Afaria (n=25.336)					
Bakarrik	11,6	11,6	12,4	11,0	
Konpainian	75,2	82,9	75,4	74,1	
Bakarrik eta konpainian	13,1	5,4	12,2	14,9	**<0,001**
Afaldu ostean (n=25.336)					
Bakarrik	27,9	65,0	50,1	67,0	
Konpainian	54,5	22,5	33,9	25,1	
Bakarrik eta konpainian	17,7	12,5	16,1	7,9	**<0,001**
Elikadura aldaketak asteburuan					
Bai	73,1	76,7	80,0	75,0	
Ez	26,9	23,3	20,0	25,0	**<0,001**
Asteburuetako aldaketak					
Otordu gutxiago	10,8	8,1	6,0	9,1	
Otordu gehiago	30,4	12,1	10,2	6,7	
Elikagai gutxiago	10,8	7,5	10,3	7,8	
Elikagai gehiago	30,4	21,0	25,7	23,9	
Etxetik kanpo gehiago jan	21,8	24,0	22,0	23,6	
Etxetik kanpo gutxiago jan	8,3	8,5	8,9	10,7	

Hurrengo orrialdean jarraitzen du.

4.31. taularen jarraipena.

Aldagaiak, % edo batezbestekoa(DE)	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	*P*[*]
Asteburuetako aldaketak					
Beste elikagai batzuk jan	-	3,7	3,8	1,4	
Hobeto jan	5,5	4,7	6,0	5,2	
Okerrago jan	1,0	2,4	1,2	1,7	
Ordutegiak aldatu	7,3	5,5	4,0	7,7	
Denbora gehiago jateko	1,5	2,5	1,9	2,2	**<0,001**
Nork erosten ditu elikagaiak?					
Gurasoek	55,5	42,6	40,6	53,3	
Norberak	13,8	25,0	25,8	19,4	
Gurasoek eta norberak	29,3	30,1	29,3	26,8	
Besteek	1,4	2,3	4,3	0,5	**<0,001**
Nork prestatzen du janaria?					
Gurasoek	52,2	36,3	39,2	49,7	
Norberak	13,2	22,3	25,3	21,5	
Gurasoek eta norberak	31,4	36,6	32,1	28,2	
Besteek	3,3	4,8	3,4	0,6	**<0,001**

[1]Unibertsitateko jantokian edo kafetegian, kalean edo tabernan, lanean edo gimnasioan.
[*]Adinaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra; Ozk, otorduen zenbakia.

4.32. taula: Helburu populazioaren elikadura patroiak EAren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, % edo batezbestekoa(DE)	OZ (n=3.637)	EOZ (n=22.529)	*P*[*]
Gosaria, maiztasuna			
7 aldiz/aste	81,4	76,1	
5-6 aldiz/aste	16,3	13,5	
3-4 aldiz/aste	1,4	5,9	
1-2 aldiz/aste	0,9	2,6	
Inoiz	-	1,9	**<0,001**
Hamaiketakoa, maiztasuna			
7 aldiz/aste	17,0	16,7	
5-6 aldiz/aste	32,4	24,3	
3-4 aldiz/aste	13,3	23,2	
1-2 aldiz/aste	17,0	16,7	
Inoiz	20,3	19,2	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.32. taularen jarraipena.

Aldagaiak, % edo batezbestekoa(DE)	OZ (n=3.637)	EOZ (n=22.529)	*P*[*]
Bazkaria, maiztasuna			
7 aldiz/aste	100,0	97,9	
5-6 aldiz/aste	-	1,7	
3-4 aldiz/aste	-	0,3	
1-2 aldiz/aste	-	0,1	
Inoiz	-	-	**<0,001**
Askaria, maiztasuna			
7 aldiz/aste	30,4	23,9	
5-6 aldiz/aste	30,0	27,9	
3-4 aldiz/aste	23,6	24,5	
1-2 aldiz/aste	9,3	13,3	
Inoiz	6,8	10,4	**<0,001**
Afaria, maiztasuna			
7 aldiz/aste	97,3	94,0	
5-6 aldiz/aste	1,8	4,8	
3-4 aldiz/aste	0,9	1,2	
1-2 aldiz/aste	-	-	
Inoiz	-		**<0,001**
Afaldu ostean, maiztasuna			
7 aldiz/aste	0,9	3,6	
5-6 aldiz/aste	1,8	1,7	
3-4 aldiz/aste	2,7	4,5	
1-2 aldiz/aste	16,2	15,8	
Inoiz	78,4	74,4	**<0,001**
Gauerdian, maiztasuna			
7 aldiz/aste	-	-	
5-6 aldiz/aste	-	-	
3-4 aldiz/aste	-	0,3	
1-2 aldiz/aste	0,7	4,2	
Inoiz	99,3	95,5	**<0,001**
Ozk			
< 3	-	0,9	
3-5	93,9	91,4	
> 5	6,1	7,7	**<0,001**
Ozk-en arteko denbora			
Otordu nagusien artean	403,0(27,6)	395,6(43,4)	**<0,001**
Otorduen artean	232,1(43,2)	252,4(127,5)	**<0,001**
Ozk-en arteko denbora, sailkapena			
240-300 minutu	40,4	33,2	
< 240 edo > 300 minutu	59,6	66,8	**<0,001**
Ozk-en iraupena (minutuak)			
Gosaria	12,0(5,7)	12,6(7,5)	0,148
Bazkaria eta afaria	27,3(8,9)	26,8(9,4)	**<0,001**
Mokaduak	10,7(5,5)	9,3(6,2)	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.32. taularen jarraipena.

Aldagaiak, % edo batezbestekoa(DE)	OZ (n=3.637)	EOZ (n=22.529)	P^*
Ozk-en lekua (lan egunak)			
Gosaria	(n=3.603)	(n=21.785)	
Ohiko bizilekua	96,3	96,1	
Etxeko janaria unibertsitatean	0,9	1,4	
Besteak[1]	2,7	2,5	**0,044**
Hamaiketakoa	(n=2.339)	(n=12.790)	
Ohiko bizilekua	5,8	11,6	
Etxeko janaria unibertsitatean	53,1	47,7	
Besteak[a]	41,1	40,7	**<0,001**
Bazkaria	(n=3.603)	(n=22.430)	
Ohiko bizilekua	91,7	90,9	
Etxeko janaria unibertsitatean	2,8	5,5	
Besteak[1]	5,5	3,6	**<0,001**
Askaria	(n=3.143)	(n=17.217)	
Ohiko bizilekua	88,4	77,4	
Etxeko janaria unibertsitatean	1,1	7,8	
Besteak[a]	10,5	14,8	**<0,001**
Afaria	(n=3.603)	(n=22.476)	
Ohiko bizilekua	99,1	100,0	
Besteak[1]	0,9	-	**<0,001**
Afaldu ostean	(n=253)	(n=1.893)	
Ohiko bizilekua	100,0	100,0	
Besteak[1]	-	-	**-**
Norekin hartzen dituzu hurrengo otorduak?			
Gosaria (n=25.336)			
Bakarrik	46,3	62,2	
Konpainian	36,3	21,0	
Bakarrik eta konpainian	17,4	16,8	**<0,001**
Hamaiketakoa (n=15.132)			
Bakarrik	7,2	12,5	
Konpainian	87,3	76,3	
Bakarrik eta konpainian	5,5	11,3	**<0,001**
Bazkaria (n=26.063)			
Bakarrik	10,8	18,3	
Konpainian	-	-	
Bakarrik eta konpainian	89,2	81,7	**<0,001**
Askaria (n=20.385)			
Bakarrik	59,5	44,4	
Konpainian	19,4	36,3	
Bakarrik eta konpainian	21,1	19,2	**<0,001**
Afaria (n=26.063)			
Bakarrik	10,6	11,7	
Konpainian	80,2	75,8	
Bakarrik eta konpainian	9,2	12,5	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.32. taularen jarraipena.

Aldagaiak, % edo batezbestekoa(DE)	OZ (n=3.637)	EOZ (n=22.529)	P^*
Afaldu ostean (n=2.172)			
Bakarrik	65,1	55,5	
Konpainian	34,9	30,5	
Bakarrik eta konpainian	-	14,0	**<0,001**
Elikadura aldaketak asteburuan			
Bai	76,6	76,0	
Ez	23,4	24,0	0,361
Asteburuetako aldaketak			
Otordu gutxiago	9,0	8,5	
Otordu gehiago	9,9	7,4	
Elikagai gutxiago	2,6	10,0	
Elikagai gehiago	38,2	22,0	
Etxetik kanpo gehiago jan	26,6	22,4	
Etxetik kanpo gutxiago jan	1,3	10,9	
Beste elikagai batzuk jan	2,8	2,9	
Hobeto jan	6,3	5,2	
Okerrago jan	2,2	1,5	
Ordutegiak aldatu	2,8	7,0	
Denbora gehiago jateko	0,5	2,3	**<0,001**
Nork erosten ditu elikagaiak?			
Gurasoek	51,2	48,4	
Norberak	25,5	20,1	
Gurasoek eta norberak	20,8	29,7	
Besteek	2,5	1,8	**<0,001**
Nork prestatzen du janaria?			
Gurasoek	45,7	45,0	
Norberak	30,1	19,4	
Gurasoek eta norberak	22,6	32,8	
Besteek	1,5	2,7	**<0,001**

[1]Unibertsitateko jantokian edo kafetegian, kalean edo tabernan, lanean edo gimnasioan.
[*]EAren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra; EA, ezagutza arloa; EOZ, Ez-Osasun Zientziak; OZ, Osasun Zientziak; Ozk, otorduen zenbakia.

Hautemandako ohitura dietetikoei dagokionez, helburu populazioaren bi herenak bere ohitura dietetikoak eta nutrizio kalitatea “ona” zela kontsideratzen zuen eta ia %50ak bere eguneko kaloria ahorakina “nahikoa” zela deklaratu zuen (**4.33. taula**). Hautemandako ohituta dietetikoei dagokiolarik, emaitzak *NHANES* ikerketako adin talde berdinaren antzekoak dira, nahiz eta partaide guztiak unibertsitate ikasleak ez izan[(68)]. Bere ohitura dietetikoa eta nutrizio kalitatea “ona” zela kontsideratzen zuen emakumeen portzentajea gizonezkoena baino altuagoa izan zen baina eguneko kaloria ahorakina “nahikoa” zela pentsatzen zuen gizonen portzentajea emakumeena baino altuagoa izan zen ($P < 0,001$) (4.33. taula).

Aztertutako aldagai guztietan adin, EA eta GnM estatusaren araberako desberdintasunak zeuden, eta bere nutrizio kalitatea "ona" eta eguneko kaloria ahorakina "nahikoa" zela pentsatzen zuen portzentaje altuenak ikasle gazteenetan, OZtako ikasleetan eta gehiegizko GnM ez zuten ikasleetan aurkitu ziren (P < 0,001) (**4.34., 4.35. eta 4.36. taulak**). Gure jakintza arte, literaturan ez dago daturik gure emaitzak erkatzeko, baina bat datoz espero ziren emaitzekin.

4.33. taula: Helburu populazioaren hautemandako ohitura dietetikoak sexuaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, %	Lagin osoa (n=26.165)	Gizonak (n=10.607)	Emakumeak (n=15.558)	P^*
Elikadura ohiturak				
Txarra	2,7	3,4	2,2	
Erregularra	29,0	26,5	30,8	
Ona	62,4	61,4	63,1	
Oso ona	5,3	8,1	3,4	
ED/EE	0,5	0,6	0,5	**<0,001**
Nutrizio kalitatea				
Txarra	1,6	0,5	2,4	
Erregularra	24,0	21,3	25,9	
Ona	65,1	65,0	65,1	
Oso ona	6,4	10,7	3,5	
ED/EE	2,9	2,6	3,1	**<0,001**
Eguneko kalorien ahorakina				
Pixkat baxua	6,1	7,0	5,5	
Nahikoa	44,7	46,6	43,4	
Pixkat altua	38,9	38,1	39,4	
Oso altua	1,9	2,2	1,7	
ED/EE	8,5	6,1	10,1	**<0,001**

*Sexu desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
ED/EE, ez daki, ez du erantzun.

4.34. taula: Helburu populazioaren hautemandako ohitura dietetikoak adinaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, %	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	P^*
Elikadura ohiturak					
Txarra	0,5	0,8	4,7	3,7	
Erregularra	31,4	31,3	31,7	25,2	
Ona	63,5	59,7	58,2	65,6	

Hurrengo orrialdean jarraitzen du.

4.34. taularen jarraipena.

Aldagaiak, %	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	P^*
Elikadura ohiturak					
Oso ona	4,2	7,3	4,5	5,3	
ED/EE	0,5	0,8	1,0	0,2	**<0,001**
Nutrizio kalitatea					
Txarra	1,4	0,8	2,8	1,6	
Erregularra	22,5	22,5	29,2	22,7	
Ona	68,0	65,0	61,0	65,9	
Oso ona	6,1	8,4	5,5	6,0	
ED/EE	2,0	3,3	1,5	3,8	**<0,001**
Eguneko kalorien ahorakina					
Pixkat baxua	5,8	4,8	7,6	6,1	
Nahikoa	53,2	47,3	39,2	42,0	
Pixkat altua	36,0	38,3	38,8	40,7	
Oso altua	1,4	2,1	1,0	2,5	
ED/EE	3,5	7,5	13,5	8,7	**<0,001**

*Adinaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
ED/EE, ez daki, ez du erantzun.

4.35. taula: Helburu populazioaren hautemandako ohitura dietetikoak EAren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, %	OZ (n=3.637)	EOZ (n=22.529)	P^*
Elikadura ohiturak			
Txarra	2,5	2,7	
Erregularra	24,0	29,8	
Ona	70,3	61,1	
Oso ona	2,5	5,8	
ED/EE	0,7	0,5	**<0,001**
Nutrizio kalitatea			
Txarra	2,5	1,5	
Erregularra	20,3	24,6	
Ona	72,1	63,9	
Oso ona	3,6	6,9	
ED/EE	1,5	3,1	**<0,001**
Eguneko kalorien ahorakina			
Pixkat baxua	5,2	6,2	
Nahikoa	47,4	44,2	
Pixkat altua	38,6	38,9	
Oso altua	2,5	1,8	
ED/EE	6,1	8,8	**<0,001**

*EAren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
EA, ezagutza arloa; ED/EE, ez daki, ez du erantzun; EOZ, Ez-Osasun Zientziak; OZ, Osasun Zientziak.

4.36. taula: Helburu populazioaren hautemandako ohitura dietetikoak GnM estatusaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, %	Ez gehiegizko GnM (n=22.391)	Gehiegizko GnM (n=3.775)	P^*
Elikadura ohiturak			
Txarra	2,4	4,5	
Erregularra	27,5	38,4	
Ona	63,7	54,7	
Oso ona	5,8	2,4	
ED/EE	0,6	-	**<0,001**
Nutrizio kalitatea			
Txarra	1,8	0,9	
Erregularra	22,5	33,0	
Ona	67,2	52,5	
Oso ona	6,6	5,5	
ED/EE	2,0	8,1	**<0,001**
Eguneko kalorien ahorakina			
Pixkat baxua	6,6	3,2	
Nahikoa	48,3	23,5	
Pixkat altua	36,0	55,9	
Oso altua	1,7	3,2	
ED/EE	7,5	14,2	**<0,001**

*GnM estatusaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude. ED/EE, ez daki, ez du erantzun; GnM, gantz-masa.

Orokorrean, azkenengo 5 urteko joera esne osoa eta gozo industrialen ahorakina gutxitzea izan zen eta esne erdigaingabetua, barazki, fruta eta alkoholaren kontsumoa gehiagotzea (**4.37. taula**). Aurkikuntza hauek bat datoz barazki eta esne motari dagokionez Espainiako populazioan egindako ikerketekin[(69,70)], nahiz eta gure galdetegian ez genuen desberdindu esne erdigaingabetua eta gaingabetuaren artean. Bestalde, joera hau antzekoa izan zen datuak sexua, adina, EA eta GnM estatusaren arabera aztertu zirenean eta desberdintasun esanguratsuak behatu ziren elikagai guztietan ($P < 0,001$) (**4.38., 4.39. eta 4.40. taulak**). Literaturan ez zeuden daturik emaitza hauek sexua, adina, EA edo GnM estatusaren arabera erkatzeko, baina ikerketa honetako talde guztietan joera antzekoa izan zen.

4.37. taula: Helburu populazioan azkenengo 5 urtean egondako aldaketak berariazko elikagai taldeetan sexuaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, %	Lagin osoa (n=26.165)	Gizonak (n=10.607)	Emakumeak (n=15.558)	P^*
Esne osoa				
Gutxitu	42,9	39,6	45,5	
Berdina	17,9	23,5	14,1	
Gehiagotu	7,0	9,9	5,0	
Ez du jaten	32,2	27,0	35,8	**<0,001**
Esne erdigaingabetua				
Gutxitu	16,5	14,7	17,6	
Berdina	26,4	27,4	25,3	
Gehiagotu	29,9	26,4	32,3	
Ez du jaten	27,2	31,5	24,3	**<0,001**
Gurina				
Gutxitu	32,8	30,0	34,8	
Berdina	21,1	19,7	22,1	
Gehiagotu	4,1	5,2	3,3	
Ez du jaten	42,0	45,2	39,8	**<0,001**
Margarina				
Gutxitu	17,9	19,4	16,9	
Berdina	15,1	15,3	14,9	
Gehiagotu	4,3	3,7	4,7	
Ez du jaten	62,8	61,6	63,6	**<0,001**
Txahala, txerria, bildotsa				
Gutxitu	28,3	16,3	36,5	
Berdina	58,0	62,3	55,1	
Gehiagotu	11,9	20,9	5,7	
Ez du jaten	1,8	0,5	2,7	**<0,001**
Arraina				
Gutxitu	18,6	18,4	18,7	
Berdina	42,0	45,2	39,7	
Gehiagotu	36,9	34,7	38,3	
Ez du jaten	2,6	1,6	3,3	**<0,001**
Hegaztiak				
Gutxitu	8,0	6,7	8,8	
Berdina	55,5	53,9	56,6	
Gehiagotu	34,9	38,9	32,2	
Ez du jaten	1,7	0,6	2,4	**<0,001**
Barazkiak				
Gutxitu	8,0	6,7	8,8	
Berdina	55,5	53,9	56,6	
Gehiagotu	34,9	38,9	32,2	
Ez du jaten	1,7	0,6	2,4	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.37. taularen jarraipena.

Aldagaiak, %	Lagin osoa (n=26.165)	Gizonak (n=10.607)	Emakumeak (n=15.558)	P^{*}
Frutak				
Gutxitu	20,6	24,9	17,7	
Berdina	34,9	35,3	34,6	
Gehiagotu	42,8	37,2	46,6	
Ez du jaten	1,7	2,6	1,1	**<0,001**
Arrautzak				
Gutxitu	19,1	15,9	21,2	
Berdina	58,6	52,1	63,1	
Gehiagotu	20,4	29,2	14,3	
Ez du jaten	1,9	2,7	1,4	**<0,001**
Zereal integralak				
Gutxitu	12,9	14,0	12,1	
Berdina	19,2	15,3	21,9	
Gehiagotu	27,7	21,1	32,2	
Ez du jaten	40,2	49,5	33,8	**<0,001**
Gozo industrialak				
Gutxitu	52,5	50,8	53,6	
Berdina	27,6	26,9	28,1	
Gehiagotu	8,1	8,3	8,0	
Ez du jaten	11,8	14,0	10,3	**<0,001**
Etxeko gozoak				
Gutxitu	20,7	22,9	19,1	
Berdina	43,9	40,5	46,3	
Gehiagotu	13,4	11,5	14,8	
Ez du jaten	21,9	25,1	19,8	**<0,001**
Alkohola				
Gutxitu	21,9	21,1	22,5	
Berdina	24,0	22,5	25,0	
Gehiagotu	47,8	50,0	46,2	
Ez du jaten	6,3	6,4	6,3	**<0,001**
Azukrea				
Gutxitu	33,5	36,9	31,4	
Berdina	53,2	48,5	56,1	
Gehiagotu	7,8	8,7	7,1	
Ez du jaten	5,6	5,9	5,4	**<0,001**
Gazta				
Gutxitu	17,8	18,6	17,3	
Berdina	49,5	51,3	48,3	
Gehiagotu	22,8	23,6	22,3	
Ez du jaten	9,9	6,5	12,2	**<0,001**
Gatza				
Gutxitu	24,9	26,7	23,7	
Berdina	66,2	64,5	67,3	
Gehiagotu	7,5	8,0	7,2	
Ez du jaten	1,4	0,8	1,7	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.37. taularen jarraipena.

Aldagaiak, %	Lagin osoa (n=26.165)	Gizonak (n=10.607)	Emakumeak (n=15.558)	P^*
Kontserbak latan				
Gutxitu	14,9	14,0	15,5	
Berdina	54,9	54,7	55,0	
Gehiagotu	13,7	17,5	11,1	
Ez du jaten	16,5	13,8	18,4	**<0,001**
Izoztutako elikagaiak				
Gutxitu	17,0	14,6	18,6	
Berdina	49,3	54,9	45,5	
Gehiagotu	22,4	22,5	22,3	
Ez du jaten	11,3	8,0	13,6	**<0,001**
Elikagai freskoak				
Gutxitu	9,4	9,8	9,2	
Berdina	63,8	66,5	62,0	
Gehiagotu	26,3	23,1	28,4	
Ez du jaten	0,5	0,7	0,3	**<0,001**

*Sexu desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.

4.38. taula: Helburu populazioan azkenengo 5 urtean egondako aldaketak berariazko elikagai taldeetan adinaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, %	18urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	P^*
Esne osoa					
Gutxitu	41,5	43,1	46,5	41,4	
Berdina	20,4	15,8	17,9	17,8	
Gehiagotu	6,7	9,7	6,8	5,8	
Ez du jaten	31,4	31,4	28,8	35,0	**<0,001**
Esne erdigaingabetua					
Gutxitu	16,9	11,9	17,1	18,4	
Berdina	26,7	28,7	22,4	27,2	
Gehiagotu	28,8	32,3	36,7	25,4	
Ez du jaten	27,6	27,1	23,9	29,0	**<0,001**
Gurina					
Gutxitu	34,0	35,3	28,5	33,3	
Berdina	24,9	20,7	25,4	17,1	
Gehiagotu	2,9	7,1	1,0	4,7	
Ez du jaten	38,2	36,9	45,1	45,0	**<0,001**
Margarina					
Gutxitu	20,1	22,7	12,3	17,3	
Berdina	19,9	16,4	17,5	10,6	
Gehiagotu	3,3	3,0	2,5	6,4	
Ez du jaten	56,7	57,9	67,7	65,8	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.38. taularen jarraipena.

Aldagaiak, %	18urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	P^*
Txahala, txerria, bildotsa					
Gutxitu	23,2	25,8	30,2	31,2	
Berdina	61,9	59,7	59,8	54,1	
Gehiagotu	13,0	14,5	8,3	11,9	
Ez du jaten	1,9	-	1,7	2,8	**<0,001**
Arraina					
Gutxitu	18,3	19,5	26,0	14,1	
Berdina	47,7	42,6	36,1	42,0	
Gehiagotu	30,7	35,7	36,0	41,1	
Ez du jaten	3,3	2,2	1,9	2,8	**<0,001**
Hegaztiak					
Gutxitu	9,2	9,0	6,0	7,8	
Berdina	63,3	54,3	59,4	50,1	
Gehiagotu	26,5	35,0	34,0	39,5	
Ez du jaten	1,0	1,7	0,6	2,6	**<0,001**
Barazkiak					
Gutxitu	9,0	8,4	9,0	6,5	
Berdina	48,3	51,3	40,8	41,3	
Gehiagotu	41,8	40,3	50,2	51,1	
Ez du jaten	1,0	-	-	1,1	**<0,001**
Frutak					
Gutxitu	19,1	22,4	22,8	19,2	
Berdina	33,2	36,4	33,7	35,5	
Gehiagotu	46,7	40,4	41,8	42,7	
Ez du jaten	1,0	0,8	1,7	2,6	**<0,001**
Arrautzak					
Gutxitu	15,5	20,5	16,4	21,5	
Berdina	60,3	57,5	64,2	55,4	
Gehiagotu	23,3	19,5	16,2	21,6	
Ez du jaten	1,0	2,5	3,2	1,4	**<0,001**
Zereal integralak					
Gutxitu	15,1	12,3	9,8	13,9	
Berdina	16,7	21,5	25,7	15,7	
Gehiagotu	29,6	26,7	25,8	28,3	
Ez du jaten	38,6	39,5	38,6	42,1	**0,005**
Gozo industrialak					
Gutxitu	54,2	54,7	46,7	53,5	
Berdina	27,4	26,3	34,9	24,4	
Gehiagotu	10,5	7,5	6,8	7,9	
Ez du jaten	7,9	11,5	11,5	14,1	**<0,001**
Etxeko gozoak					
Gutxitu	17,8	24,7	16,6	22,1	
Berdina	51,2	46,7	50,5	35,2	
Gehiagotu	8,5	13,7	9,8	17,8	
Ez du jaten	22,5	14,9	23,1	24,8	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.38. taularen jarraipena.

Aldagaiak, %	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	P^*
Alkohola					
Gutxitu	7,3	12,5	20,6	35,0	
Berdina	10,7	24,6	30,6	26,5	
Gehiagotu	75,9	57,2	42,0	31,9	
Ez du jaten	6,1	5,6	6,7	6,6	**<0,001**
Azukrea					
Gutxitu	25,6	31,6	30,2	40,2	
Berdina	59,9	54,1	53,4	49,3	
Gehiagotu	11,1	7,3	8,5	5,9	
Ez du jaten	3,5	7,0	8,0	4,6	**<0,001**
Gazta					
Gutxitu	13,6	16,0	16,6	21,5	
Berdina	53,8	47,5	53,5	46,3	
Gehiagotu	21,2	26,1	23,1	21,6	
Ez du jaten	11,4	10,3	6,8	10,6	**<0,001**
Gatza					
Gutxitu	21,3	26,9	24,8	25,7	
Berdina	68,1	65,0	66,5	65,7	
Gehiagotu	9,7	5,7	8,7	6,8	
Ez du jaten	0,9	2,4	-	1,8	**<0,001**
Kontserbak latan					
Gutxitu	10,8	15,5	10,1	19,2	
Berdina	59,7	57,8	55,6	50,5	
Gehiagotu	14,3	9,3	16,2	14,4	
Ez du jaten	15,2	17,4	18,1	15,9	**<0,001**
Izoztutako elikagaiak					
Gutxitu	14,2	17,3	15,0	19,2	
Berdina	51,3	53,3	45,3	48,4	
Gehiagotu	24,3	24,2	24,7	19,2	
Ez du jaten	10,2	5,1	15,1	13,2	**<0,001**
Elikagai freskoak					
Gutxitu	8,0	17,0	10,1	5,7	
Berdina	71,5	54,1	67,1	63,5	
Gehiagotu	20,5	28,9	22,2	29,9	
Ez du jaten	-	-	0,6	0,9	**<0,001**

*Adin araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.

4.39. taula: Helburu populazioan azkenengo 5 urtean egondako aldaketak berariazko elikagai taldeetan EAren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, %	OZ (n=3.637)	EOZ (n=22.529)	*P*[*]
Esne erdigaingabetua			
Gutxitu	20,9	15,7	
Berdina	27,9	26,2	
Gehiagotu	32,4	29,5	
Ez du jaten	18,9	28,6	**<0,001**
Gurina			
Gutxitu	26,0	34,0	
Berdina	24,2	20,6	
Gehiagotu	6,0	3,7	
Ez du jaten	43,8	41,7	**<0,001**
Margarina			
Gutxitu	14,6	18,4	
Berdina	12,0	15,5	
Gehiagotu	4,3	4,2	
Ez du jaten	69,0	61,8	**<0,001**
Txahala, txerria, bildotsa			
Gutxitu	31,8	27,8	
Berdina	59,6	57,7	
Gehiagotu	8,6	12,4	
Ez du jaten	-	2,1	**<0,001**
Arraina			
Gutxitu	13,6	19,4	
Berdina	36,8	42,8	
Gehiagotu	48,0	35,1	
Ez du jaten	1,6	2,8	**<0,001**
Hegaztiak			
Gutxitu	3,2	8,7	
Berdina	55,1	55,5	
Gehiagotu	40,8	33,9	
Ez du jaten	0,9	1,8	**<0,001**
Barazkiak			
Gutxitu	8,8	7,7	
Berdina	45,8	44,5	
Gehiagotu	44,4	47,2	
Ez du jaten	0,9	0,6	**<0,001**
Frutak			
Gutxitu	17,2	21,2	
Berdina	35,1	34,8	
Gehiagotu	47,2	42,0	
Ez du jaten	-	2,0	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.39. taularen jarraipena.

Aldagaiak, %	OZ (n=3.637)	EOZ (n=22.529)	*P**
Arrautzak			
Gutxitu	15,3	19,7	
Berdina	68,5	57,0	
Gehiagotu	16,2	21,0	
Ez du jaten	-	2,3	**<0,001**
Zereal integralak			
Gutxitu	11,9	13,1	
Berdina	23,2	18,6	
Gehiagotu	27,6	27,7	
Ez du jaten	37,4	40,6	**<0,001**
Gozo industrialak			
Gutxitu	54,0	52,2	
Berdina	26,1	27,8	
Gehiagotu	7,0	8,3	
Ez du jaten	12,9	11,6	**0,001**
Etxeko gozoak			
Gutxitu	16,7	21,3	
Berdina	47,7	43,3	
Gehiagotu	15,3	13,1	
Ez du jaten	20,3	22,2	**<0,001**
Alkohola			
Gutxitu	28,9	20,8	
Berdina	14,4	25,5	
Gehiagotu	51,8	47,1	
Ez du jaten	4,9	6,5	**<0,001**
Azukrea			
Gutxitu	26,8	34,5	
Berdina	62,3	51,7	
Gehiagotu	5,0	8,2	
Ez du jaten	5,9	5,6	**<0,001**
Gazta			
Gutxitu	16,8	18,0	
Berdina	48,1	49,7	
Gehiagotu	23,0	22,8	
Ez du jaten	12,1	9,5	**<0,001**
Gatza			
Gutxitu	28,4	24,4	
Berdina	67,0	66,0	
Gehiagotu	4,5	8,0	
Ez du jaten	-	1,6	**<0,001**
Kontserbak latan			
Gutxitu	10,9	15,5	
Berdina	58,6	54,3	
Gehiagotu	17,4	13,1	
Ez du jaten	13,2	17,1	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.39. taularen jarraipena.

Aldagaiak, %	OZ (n=3.637)	EOZ (n=22.529)	*P*[*]
Izoztutako elikagaiak			
Gutxitu	13,3	17,6	
Berdina	50,0	49,2	
Gehiagotu	27,4	21,6	
Ez du jaten	9,3	11,6	**<0,001**
Elikagai freskoak			
Gutxitu	11,8	9,1	
Berdina	61,2	64,2	
Gehiagotu	26,1	26,3	
Ez du jaten	0,9	0,4	**<0,001**

[*]EAren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
EA, ezagutza arloa; EOZ, Ez-Osasun Zientziak; OZ, Osasun Zientziak

4.40. taula: Helburu populazioan azkenengo 5 urtean egondako aldaketak berariazko elikagai taldeetan GnM estatusaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, %	Ez gehiegizko GnM (n=22.391)	Gehiegizko GnM (n=3.775)	*P*[*]
Esne osoa			
Gutxitu	43,1	41,6	
Berdina	18,4	14,6	
Gehiagotu	7,5	4,3	
Ez du jaten	31,0	39,5	**<0,001**
Esne erdigaingabetua			
Gutxitu	15,4	22,6	
Berdina	26,5	25,8	
Gehiagotu	29,6	31,8	
Ez du jaten	28,5	19,8	**<0,001**
Gurina			
Gutxitu	33,3	30,5	
Berdina	20,7	23,8	
Gehiagotu	3,9	5,0	
Ez du jaten	42,2	40,7	**<0,001**
Margarina			
Gutxitu	17,1	22,8	
Berdina	15,0	15,5	
Gehiagotu	4,1	5,3	
Ez du jaten	63,9	56,4	**<0,001**
Txahala, txerria, bildotsa			
Gutxitu	29,2	23,2	
Berdina	56,4	67,4	
Gehiagotu	12,6	7,6	
Ez du jaten	1,8	1,8	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.40. taularen jarraipena.

Aldagaiak, %	Ez gehiegizko GnM (n=22.391)	Gehiegizko GnM (n=3.775)	P^*
Arraina			
Gutxitu	18,6	18,2	
Berdina	41,8	42,9	
Gehiagotu	37,0	35,8	
Ez du jaten	2,5	3,0	0,120
Hegaztiak			
Gutxitu	8,7	3,8	
Berdina	55,7	54,2	
Gehiagotu	34,0	40,2	
Ez du jaten	1,6	1,8	**<0,001**
Barazkiak			
Gutxitu	8,5	4,1	
Berdina	45,5	39,8	
Gehiagotu	45,3	56,1	
Ez du jaten	0,7	-	**<0,001**
Frutak			
Gutxitu	19,9	24,8	
Berdina	34,6	36,4	
Gehiagotu	43,9	36,0	
Ez du jaten	1,5	2,8	**<0,001**
Arrautzak			
Gutxitu	19,1	18,6	
Berdina	57,9	63,1	
Gehiagotu	21,1	16,0	
Ez du jaten	1,9	2,3	**<0,001**
Zereal integralak			
Gutxitu	12,9	13,3	
Berdina	19,1	20,3	
Gehiagotu	28,6	22,2	
Ez du jaten	39,5	44,2	**<0,001**
Gozo industrialak			
Gutxitu	52,8	50,6	
Berdina	28,3	23,8	
Gehiagotu	7,3	12,7	
Ez du jaten	11,6	12,9	**<0,001**
Etxeko gozoak			
Gutxitu	19,8	26,1	
Berdina	46,2	30,8	
Gehiagotu	12,9	16,4	
Ez du jaten	21,1	26,6	**<0,001**
Alkohola			
Gutxitu	21,4	25,1	
Berdina	24,0	23,9	
Gehiagotu	48,3	44,5	
Ez du jaten	6,3	6,5	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.40. taularen jarraipena.

Aldagaiak, %	Ez gehiegizko GnM (n=22.391)	Gehiegizko GnM (n=3.775)	P^*
Azukrea			
Gutxitu	32,4	39,6	
Berdina	54,8	43,9	
Gehiagotu	7,1	11,8	
Ez du jaten	5,8	4,8	**<0,001**
Gazta			
Gutxitu	17,1	22,1	
Berdina	49,3	51,0	
Gehiagotu	23,5	19,1	
Ez du jaten	10,2	7,1	**<0,001**
Gatza			
Gutxitu	23,2	35,2	
Berdina	67,3	59,2	
Gehiagotu	7,9	5,6	
Ez du jaten	1,6	-	**<0,001**
Kontserbak latan			
Gutxitu	13,9	20,6	
Berdina	54,5	57,0	
Gehiagotu	14,4	9,8	
Ez du jaten	17,1	12,7	**<0,001**
Kontserbak latan			
Gutxitu	13,9	20,6	
Berdina	54,5	57,0	
Gehiagotu	14,4	9,8	
Ez du jaten	17,1	12,7	**<0,001**
Izoztutako elikagaiak			
Gutxitu	16,3	21,1	
Berdina	49,2	50,1	
Gehiagotu	23,5	15,8	
Ez du jaten	11,0	12,9	**<0,001**
Elikagai freskoak			
Gutxitu	9,6	8,3	
Berdina	65,3	55,2	
Gehiagotu	25,1	33,3	
Ez du jaten	-	3,2	**<0,001**

*Gantz-masa estatusaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
GnM, gantz-masa.

4.3.3. Ohitura dietetikoak jasangarritasunaren ikuspuntutik

Dietaren ingurumen inpaktua, literaturako elikagaien BEGI (eCO_2 kg/elikagai kg) erabiliz aztertu zen eta elikagai taldekako BEGIren emaitzak eta bere ekarpena BEGI guztiari (%) sexuaren arabera **3. ikerketan** azaltzen dira. Adina, EA eta GnM estatusaren araberako desberdintasunak behatu ziren elikagai guztien kontsumoari lotutako BEGIan eta BEGI guztiari zuten ekarpenean ($P < 0{,}001$) (**4.41., 4.42. eta 4.43. taulak**), salbuespen batzuekin, fekuladun elikagai eta arrautza eta haragi txurien BEGIren ekarpenean EAren arabera, eta BEGIri lotutako haragi gorri eta horien eratorriak, alkoholik gabeko edariak eta alkoholdun edariak eta haragi gorri eta horien eratorriak eta alkoholdun edarien BEGIren ekarpenean GnM estatusaren arabera (4.41, 4.42. eta 4.43. taulak).

Beste autore batzuen esanetan(71) adinak gora egiten duen neurrian, BEGIk behera egiten du, baina gure adin tartea oso estua da heldu populazioan egindako beste ikerketa batzuekin konparatzeko. Hala ere, beste ikerketa batzuetan bezala(72), haragi gorriak eta horien eratorriak eta gazta eguneko BEGIren % 40aren arduradunak dira eta portzentaje hau berdin mantentzen da adin talde guztietan. Gure hipotesiaren kontra, OZtako ikasleek BEGI altuagoa zuten EOZtako ikasleekin konparatuz. Emaitza hau UPV/EHUko ingurumenarekiko hezkuntzaren ondorio izan daiteke, estrategia honen oinarria transbertsala eta integratzailea delako, beraz, ondorioztatu daiteke EAren arabera, ingurumen hezkuntzarekiko dagokionez ez dagoela desberdintasunik **3. ikerketan** azaltzen den bezala. GnM estatusaren araberako BEGI datuei dagokionez, GnM portzentaje altuagoa zuten ikasleek BEGI altuagoa izatea espero zen GnM portzentaje normala zuten ikasleekin konparatuz, NutriNet-Santé ikerketan(73) bezala, baina gure emaitzek ez dute asoziazio hori frogatzen.

4.41. taula: Helburu populazioaren ohitura dietetikoak jasangarritasunaren ikuspuntutik adinaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Elikagai taldeak, batezbestekoa(DE)	18 urte (n=4.996)		19 urte (n=5.536)		20 urte (n=5.523)		≥21 urte (n=10.110)		P^*	P†
	kg eCO_2/ pertsona/ egun	BEGI guztiari ekarpena (%)	kg eCO_2/ pertsona/ egun	BEGI guztiari ekarpena (%)	kg eCO_2/ pertsona/ egun	BEGI guztiari ekarpena (%)	kg eCO_2/ pertsona/ egun	BEGI guztiari ekarpena (%)		
Frutak eta barazkiak	0,8(0,5)	18,7(10,5)	0,8(0,5)	19,6(11,4)	0,8(0,6)	17,6(11,2)	0,9(0,7)	20,1(13,3)	**<0,001**	**<0,001**
Fekuladun elikagaiak	0,2(0,1)	4,9(2,5)	0,2(0,1)	5,0(2,7)	0,2(0,1)	4,8(2,3)	0,2(0,1)	4,7(2,9)	**<0,001**	**<0,001**
Gazta	0,2(0,2)	3,6(4,9)	0,1(0,2)	3,3(4,0)	0,1(0,2)	2,9(3,4)	0,2(0,3)	3,5(4,5)	**<0,001**	**<0,001**
Esnea eta esnekiak	0,6(0,3)	13,1(6,2)	0,5(0,3)	11,8(7,0)	0,6(0,4)	12,6(6,6)	0,5(0,4)	11,7(7,6)	**<0,001**	**<0,001**
Haragi gorriak eta horien eratorriak	1,4(0,9)	28,3(12,9)	1,3(0,8)	27,8(12,4)	1,5(1,0)	29,3(13,4)	1,4(1,0)	27,0(14,0)	**<0,001**	**<0,001**
Arrautzak eta haragi zuriak	0,5(0,3)	10,6(5,1)	0,5(0,4)	12,3(6,8)	0,5(0,7)	11,2(6,2)	0,7(0,4)	11,7(5,5)	**<0,001**	**<0,001**
Arrainak eta itsaskiak	0,4(0,3)	9,3(5,4)	0,4(0,3)	9,6(5,6)	0,5(0,4)	9,9(6,0)	0,4(0,3)	9,5(5,7)	**<0,001**	**<0,001**
Gozokiak eta gatzdun mokadurako produktuak	0,3(0,2)	5,6(3,3)	0,2(0,2)	4,7(3,5)	0,2(0,2)	5,2(3,5)	0,2(0,1)	4,5(3,1)	**<0,001**	**<0,001**
Olioa eta gantzak	0,1(0,1)	2,2(2,3)	0,1(0,2)	2,2(2,9)	0,1(0,1)	2,3(2,2)	0,1(0,1)	2,2(2,0)	**<0,001**	**<0,001**
Alkoholik gabeko edariak	0,1(0,1)	2,4(2,5)	0,1(0,1)	2,3(2,6)	0,1(0,2)	2,5(3,3)	0,1(0,2)	2,6(3,5)	**<0,001**	**<0,001**
Alkoholdun edariak	0,1(0,1)	1,2(1,4)	0,1(0,1)	1,5(1,8)	0,1(0,1)	1,6(1,5)	0,1(0,1)	1,7(1,9)	**<0,001**	**<0,001**
Guztira	4,6(1,5)		4,4(1,3)		4,7(2,0)		4,8(1,7)		**<0,001**	

*Adin araberako desberdintasunak berotegi efektuko gasen isurtzean eCO2kg/pertsona/egun adierazita. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
†Adin araberako desberdintasunak; elikagai talde bakoitzak duen ekarpena berotegi efektuko gasen isurtzearekiko. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
BEGI, berotegi efektuko gasen isurtzea; DE, desbideratze estandarra.

4.42. taula: Helburu populazioaren ohitura dietetikoak jasangarritasunaren ikuspuntutik EAren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Elikagai taldeak, batezbestekoa(DE)	OZ (n=3.637)		EOZ (n=22.529)		P^{*}	$P†$
	kg eCO_2/ pertsona/ egun	BEGI guztiari ekarpena (%)	kg eCO_2/ pertsona/ egun	BEGI guztiari ekarpena (%)		
Frutak eta barazkiak	0,9(0,5)	19,5(10,4)	0,9(0,6)	19,1(12,3)	**<0,001**	**<0,001**
Fekuladun elikagaiak	0,2(0,1)	4,9(2,5)	0,2(0,1)	4,8(2,7)	**<0,001**	0,190
Gazta	0,2(0,2)	3,6(4,1)	0,2(0,2)	3,3(4,3)	**<0,001**	**<0,001**
Esnea eta esnekiak	0,6(0,3)	13,4(6,3)	0,5(0,4)	11,9(7,1)	**<0,001**	**<0,001**
Haragi gorriak eta horien eratorriak	1,3(0,8)	26,7(12,2)	1,4(1,0)	28,5(13,5)	**<0,001**	**<0,001**
Arrautzak eta haragi zuriak	0,5(0,2)	11,3(5,2)	0,5(0,5)	11,6(6,0)	**<0,001**	0,618
Arrainak eta itsaskiak	0,5(0,3)	10,0(5,3)	0,4(0,3)	9,5(5,7)	**<0,001**	**<0,001**
Gozokiak eta gatzdun mokadurako produktuak	0,2(0,1)	4,3(2,8)	0,2(0,2)	5,0(3,4)	**<0,001**	**<0,001**
Olioa eta gantzak	0,1(0,1)	2,3(2,2)	0,1(0,1)	2,2(2,3)	**<0,001**	**0,011**
Alkoholik gabeko edariak	0,1(0,2)	3,0(3,8)	0,1(0,1)	2,4(3,0)	**<0,001**	**<0,001**
Alkoholdun edariak	0,0(0,1)	1,0(1,2)	0,1(0,1)	1,6(1,8)	**<0,001**	**<0,001**
Guztira	4,7(1,3)		4,7(1,7)		**<0,001**	

*EAren araberako desberdintasunak berotegi efektuko gasen isurtzean eCO2kg/pertsona/egun adierazita. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
†EAren araberako desberdintasunak; elikagai talde bakoitzak duen ekarpena berotegi efektuko gasen isurtzearekiko. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
BEGI, berotegi efektuko gasen isurtzea; DE, desbideratze estandarra; EA, ezagutza arloa; EOZ, Ez-Osasun Zientziak; OZ, Osasun Zientziak.

4.43. taula: Helburu populazioaren ohitura dietetikoak jasangarritasunaren ikuspuntutik GnM estatusaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Elikagai taldeak, batezbestekoa(DE)	Ez gehiegizko GnM (n=22.391)		Gehiegizko GnM (n=3.775)		*P*[*]	*P*†
	kg eCO_2/ pertsona/egun	BEGI guztiari ekarpena (%)	kg eCO_2/ pertsona/egun	BEGI guztiari ekarpena (%)		
Frutak eta barazkiak	0,9(0,6)	19,4(12,3)	0,8(0,5)	18,1(10,1)	**<0,001**	**<0,001**
Fekuladun elikagaiak	0,2(0,1)	4,9(2,7)	0,2(0,1)	4,3(2,3)	**<0,001**	**<0,001**
Gazta	0,1(0,2)	3,2(3,9)	0,2(0,4)	4,2(6,0)	**<0,001**	**<0,001**
Esnea eta esnekiak	0,5(0,3)	12,0(6,8)	0,6(0,4)	13,2(8,1)	**0,044**	**<0,001**
Haragi gorriak eta horien eratorriak	1,4(1,0)	28,2(13,3)	1,3(0,8)	28,4(13,4)	0,640	0,729
Arrautzak eta haragi zuriak	0,5(0,5)	11,4(6,0)	0,5(0,2)	12,1(5,1)	**<0,001**	**<0,001**
Arrainak eta itsaskiak	0,4(0,3)	9,7(5,7)	0,4(0,3)	9,1(5,7)	**<0,001**	**<0,001**
Gozokiak eta gatzdun mokadurako produktuak	0,2(0,2)	5,0(3,4)	0,2(0,1)	4,2(2,6)	**<0,001**	**<0,001**
Olioa eta gantzak	0,1(0,1)	2,3(2,4)	0,1(0,1)	2,0(1,5)	**<0,001**	**0,009**
Alkoholik gabeko edariak	0,1(0,1)	2,5(3,0)	0,1(0,2)	2,6(3,5)	0,231	**0,018**
Alkoholdun edariak	0,1(0,1)	1,5(1,7)	0,1(0,1)	1,7(2,1)	0,421	0,628
Guztira	4,7(1,7)		4,5(1,3)		0,851	

[*]Gantz-masa estatusaren araberako desberdintasunak berotegi efektuko gasen isurtzean eCO2kg/pertsona/egun adierazita. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
†Gantz-masa estatusaren araberako desberdintasunak; elikagai talde bakoitzak duen ekarpena berotegi efektuko gasen isurtzearekiko. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
BEGI, berotegi efektuko gasen isurtzea; DE, desbideratze estandarra; GnM, gantz-masa.

4.3.4. Elikagaiak aukeratzeko ingurumen arrazoiak

236ko ikasle azpilagin batean (% 44,3 emakumeak), ikasleen elikagaiak aukeratzeko ingurumen arrazoiak aztertu ziren Sautron *et al*.-ek[74] garatutako galdetegiaren bertsio motzarekin, Telleria-Aramburu *et al*.-en[28] artikuluan deskribatzen den bezala. Azpimarratu beharko litzateke, gizonezkoen % 42,4k inoiz ez edo noizbehinka egiten zituela janarien erosketak (**4.44. taula**). Emaitza hauek bat datoz Espainiako beste unibertsitate batean[39] aurkitutakoarekin.

Berariazko elikagai taldeei dagokiolarik, ikasleek gehiagotan erosten zituzten frutak, barazkiak, esnea eta esnekiak; haragia eta arraina baino. Gertaera hau lotuta egon daiteke gazte helduetan elikagaiak erosteko portaeran influentzia duten faktoreetan, hala nola, komenigarritasuna (haragia eta arraina kontsumitzeko prestatu egin behar dira), prezioa eta osasuna[75,76]. Sexu desberdintasunak behatu ziren fruta eta barazkien erosketetan, hau da, emakumeen joera frutak eta barazkiak askotan edo batzuetan erostea zen eta gizonena, berriz, inoiz edo noizbehinka (P < 0,01) (4.44. taula). Emaitza hau beste ikerketa batzuetan[77] ere behatu zen eta badirudi osasuna emakumeentzako faktore garrantzitsua dela elikagaien aukeraketak egiteko.

4.44. taula: Helburu populazioaren elikagaien erosketen arduraduna sexuaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

	Bai, askotan	Bai, batzuetan	Ez, inoiz ez edo noizbehinka	P^{**}
Janari erosketak, zeuk egiten dituzu?				
Lagin osoa (n=237)	28,7	35,0	36,3	0,308
Gizonak (n=132)	24,2	33,3	42,4	**0,038**
Emakumeak (n=105)	34,3	37,1	28,6	0,549
P^*			0,068	
Haragia (haragi gorria, hegaztiak, urdaitegia), zeuk erosten duzu?				
Lagin osoa (n=237)	18,6	39,7	41,8	**<0,001**
Gizonak (n=132)	17,4	36,4	46,2	**<0,001**
Emakumeak (n=105)	20,0	43,8	36,2	**0,009**
P^*			0,296	
Arraina, zuk erosten duzu?				
Lagin osoa (n=237)	13,1	26,6	60,3	**<0,001**
Gizonak (n=132)	9,8	24,2	65,9	**<0,001**
Emakumeak (n=105)	17,1	29,5	53,3	**<0,001**
P^*			0,104	

Hurrengo orrialdean jarraitzen du.

4.44. taularen jarraipena.

	Bai, askotan	Bai, batzuetan	Ez, inoiz ez edo noizbehinka	P^{**}
Frutak eta barazkiak, zuk erosten dituzu?				
Lagin osoa (n=237)	30,8	45,1	24,1	**<0,001**
Gizonak (n=132)	24,2	43,9	31,8	**0,020**
Emakumeak (n=105)	39,0	46,7	14,3	**<0,001**
P*			**0,003**	
Esnea eta esnekiak, zuk erosten dituzu?				
Lagin osoa (n=237)	29,1	47,7	23,2	**<0,001**
Gizonak (n=132)	22,7	51,5	25,8	**<0,001**
Emakumeak (n=105)	37,1	42,9	20,0	**0,012**
P*			0,052	

*Sexu desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
**Frekuentzien banaketan desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.

Elikagaiak aukeratzerako orduan ingurumen arrazoiei dagokionez, “etika eta ingurumenaren” kasuan, populazioaren gehiengoa ados edo desados zegoen alderdi hauekin, bilgarrien kantitatearen kasuan izan ezik, non laginaren bi heren baino gehiago ados edo erabat ados baitzegoen (**4.45. taula**). Desadostasun gradu altuena faktorearen hurrengo itemetan azaldu zen: “gastu energetiko” (% 62,9 desados edo oso desados zegoen) eta “garraioan sortutako poluzioa” (% 66,7 desados edo oso desados zegoen). Faktore honetan, sexu desberdintasunak behatu ziren “ekoizpenean sortutako poluzioan”, gizon gehiago zeuden oso desados emakumeekin konparatuz (P < 0,05). Laginaren tamaina dela eta, adina, EA eta GnM estatusaren araberako emaitzak ez dira aztertu.

Partaide gehienak ados edo oso ados zeuden “ekoizpen lokala eta betikoaren” faktorearekin. Adostasun gradu altuena faktorearen hurrengo itemetan azaldu zen: “sasoiko produktuak” (% 79,8 ados zegoen neurri altuagoan edo baxuagoan) eta “ekoizpen lekuarekiko hurbiltasuna” (% 74,6 ados zegoen neurri altuagoan edo baxuagoan). “Fruta eta barazkien ekoizpen lekuarekiko hurbiltasunari” dagokion itemean gizon gehiago zeuden desados emakumeak baino (P <0,05). Emaitza hau Allès *et al*.-en[78] aurkikuntzen kontra doa, hauen esanetan, emakumeek gizonek baino ingurumen kontzientzia handiagoa dutelako. “Ingurumen mugaketa” faktorean, partaideen gehiengoa oso desados edo desados zegoen item hauekin, eta desadostasun maila handiagoa edo baxuagoa hurrengo itemetan azaldu zuten “ingurumen arrazoiengatik fruta eta barazkiak erosten saihestea” (% 91,6) eta “ingurumen arrazoiengatik arraina erosten saihestea” (% 88,2).

Sexu desberdintasunak bakarrik behatu ziren "ingurumen arrazoiengatik haragia erosten saihestea" itemean eta ados edo oso ados zegoen portzentajea altuagoa izan zen emakumeetan gizonetan baino ($P < 0,05$). Heldu populazioan egindako beste ikerketa batzuetan[79], haragi kontsumoa murrizteko arrazoi bakarra ingurumen inpaktua izan zen. Bestalde, "kutsagarrien gabeziaren" kasuan, % 40a baino gehiago erabat desados zegoen elikagaietan egon daitezkeen "kimikoei esposizioarekin". Zehazki, partaideen % 73,4 ados edo oso ados zegoen item honekin. Azken faktore hau Frantziako heldu populazio batean egindako ikerketa bateko[80] arrazoi nagusienetariko bat bezala identifikatu zen elikagaiak erosteko.

4.45. taula: Helburu populazioaren elikagaiak aukeratzeko ingurumen arrazoiak sexuaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, %	Erabat desados	Desados	Ados	Erabat ados	P^{**}
Etika eta ingurumena					
Ingurumen inpaktua (H)					
Lagin osoa (n=237)	21,5	32,1	38,0	8,4	**<0,001**
Gizonak (n=132)	24,2	28,0	38,6	9,1	**<0,001**
Emakumeak (n=105)	18,1	37,1	37,1	7,6	**<0,001**
P*				0,436	
Ingurumen inpaktua (A)					
Lagin osoa (n=237)	22,4	28,7	39,7	9,3	**<0,001**
Gizonak (n=132)	25,8	28,0	38,6	7,6	**<0,001**
Emakumeak (n=105)	18,1	29,5	41,0	11,4	**<0,001**
P*				0,458	
Ingurumen inpaktua (FB)					
Lagin osoa (n=237)	16,9	32,5	38,4	12,2	**<0,001**
Gizonak (n=132)	19,7	28,0	42,4	9,8	**<0,001**
Emakumeak (n=105)	13,3	38,1	33,3	15,2	**<0,001**
P*				0,118	
Ingurumen inpaktua (E)					
Lagin osoa (n=237)	24,1	33,8	35,4	6,8	**<0,001**
Gizonak (n=132)	22,7	34,1	37,1	6,1	**<0,001**
Emakumeak (n=105)	25,7	33,3	33,3	7,6	**<0,001**
P*				0,879	
Ekoizpenean sortutako poluzioa (O)					
Lagin osoa (n=237)	29,5	35,9	27,8	6,8	**<0,001**
Gizonak (n=132)	35,6	28,0	28,0	8,3	**<0,001**
Emakumeak (n=105)	21,9	45,7	27,6	4,8	**<0,001**
P*				**0,019**	

Hurrengo orrialdean jarraitzen du.

4.45. taularen jarraipena.

Aldagaiak, %	Erabat desados	Desados	Ados	Erabat ados	P^{**}
Etika eta ingurumena					
Ekoizpenean sortutako hondakinak (O)					
Lagin osoa (n=237)	21,1	40,1	27,0	11,8	**<0,001**
Gizonak (n=132)	22,0	39,4	25,8	12,9	**<0,001**
Emakumeak (n=105)	20,0	41,0	28,6	10,5	**<0,001**
*P**				0,896	
Bere inpaktua planetako baliabideetan (O)					
Lagin osoa (n=237)	16,5	27,4	38,8	17,3	**<0,001**
Gizonak (n=132)	18,9	31,1	31,8	18,2	**0,032**
Emakumeak (n=105)	13,3	22,9	47,6	16,2	**<0,001**
*P**				0,092	
Garraioan sortutako poluzioa (O)					
Lagin osoa (n=237)	28,3	38,4	22,8	10,5	**<0,001**
Gizonak (n=132)	30,3	40,2	20,5	9,1	**<0,001**
Emakumeak (n=105)	25,7	36,2	25,7	12,4	**0,007**
*P**				0,576	
Gastu energetikoa (O)					
Lagin osoa (n=237)	20,7	48,5	23,6	7,2	**<0,001**
Gizonak (n=132)	18,9	47,7	25,0	8,3	**<0,001**
Emakumeak (n=105)	22,9	49,5	21,9	5,7	**<0,001**
*P**				0,191	
Bilgarrien kantitatea (O)					
Lagin osoa (n=237)	13,1	18,1	32,1	36,7	**<0,001**
Gizonak (n=132)	12,9	22,0	34,1	31,1	**<0,001**
Emakumeak (n=105)	13,3	13,3	29,5	43,8	**<0,001**
*P**				0,146	
Ekoizpen lokala eta betikoa					
Ekoizpen lekuarekiko hurbiltasuna (O)					
Lagin osoa (n=237)	9,7	22,8	40,5	27,0	**<0,001**
Gizonak (n=132)	12,1	19,7	37,9	30,3	**<0,001**
Emakumeak (n=105)	6,7	26,7	43,8	22,9	**<0,001**
*P**				0,062	
Ekoizpen lekuarekiko hurbiltasuna (FB)					
Lagin osoa (n=237)	9,3	16,0	40,9	33,8	**<0,001**
Gizonak (n=132)	12,1	12,1	36,4	39,4	**<0,001**
Emakumeak (n=105)	5,7	21,0	46,7	26,7	**<0,001**
*P**				**0,021**	
Artisau-produktuak (O)					
Lagin osoa (n=237)	8,0	19,0	48,9	24,1	**<0,001**
Gizonak (n=132)	8,3	26,5	47,7	23,5	**<0,001**
Emakumeak (n=105)	7,6	17,1	50,5	24,8	**<0,001**
*P**				0,918	

Hurrengo orrialdean jarraitzen du.

4.45. taularen jarraipena.

Aldagaiak, %	Erabat desados	Desados	Ados	Erabat ados	P^{**}
Ekoizpen lokala eta betikoa					
Sasoiko produktuak (O)					
Lagin osoa (n=237)	7,6	12,7	38,4	41,4	**<0,001**
Gizonak (n=132)	8,3	15,2	38,6	37,9	**<0,001**
Emakumeak (n=105)	6,7	9,5	38,1	45,7	**<0,001**
*P**				0,466	
Ekoizpenaren jatorria (H)					
Lagin osoa (n=237)	11,8	21,5	35,0	31,6	**<0,001**
Gizonak (n=132)	14,4	15,9	38,6	31,1	**<0,001**
Emakumeak (n=105)	8,6	28,6	30,5	32,4	**0,001**
*P**				0,066	
Ingurumen mugaketak					
Ingurumen arrazoiengatik erostea saihestea (H)					
Lagin osoa (n=237)	62,4	21,5	10,5	5,5	**<0,001**
Gizonak (n=132)	59,1	27,3	10,6	3,0	**<0,001**
Emakumeak (n=105)	66,7	14,3	10,5	8,6	**<0,001**
*P**				**0,039**	
Ingurumen arrazoiengatik erostea saihestea (A)					
Lagin osoa (n=237)	67,9	20,3	6,3	5,5	**<0,001**
Gizonak (n=132)	65,9	22,7	7,6	3,8	**<0,001**
Emakumeak (n=105)	70,1	17,5	4,8	7,6	**<0,001**
*P**				0,337	
Ingurumen arrazoiengatik erostea saihestea (FB)					
Lagin osoa (n=237)	73,0	18,6	4,6	3,8	**<0,001**
Gizonak (n=132)	68,9	19,7	7,6	3,8	**<0,001**
Emakumeak (n=105)	78,1	17,1	1,0	3,8	**<0,001**
*P**				0,079	
Ingurumen arrazoiengatik erostea saihestea (E)					
Lagin osoa (n=237)	64,1	20,7	9,7	5,5	**<0,001**
Gizonak (n=132)	60,6	24,2	12,1	3,0	**<0,001**
Emakumeak (n=105)	68,6	16,2	6,7	8,5	**<0,001**
*P**				0,058	
Kutsagarrien gabezia					
Kimikoei esposizioa (O)					
Lagin osoa (n=237)	9,3	17,3	29,5	43,9	**<0,001**
Gizonak (n=132)	10,6	20,5	22,7	46,2	**<0,001**
Emakumeak (n=105)	7,6	13,3	38,1	41,0	**<0,001**
*P**				0,146	
Kimikoei esposizioa (A)					
Lagin osoa (n=237)	9,3	18,1	29,5	43,0	**<0,001**
Gizonak (n=132)	12,1	20,5	25,0	42,4	**<0,001**
Emakumeak (n=105)	5,7	15,2	35,2	43,8	**<0,001**
*P**				0,135	

*Sexu desberdintasunak.
**Frekuentzien banaketan desberdintasunak.
A: arraina aukeratzeko ingurumen arrazoien itemak; E: esnekiak aukeratzeko ingurumen arrazoien itemak; O: elikagaiak orokorrean aukeratzeko ingurumen arrazoien itemak; FB: frutak eta barazkiak aukeratzeko ingurumen arrazoien itemak; H: haragia aukeratzeko ingurumen arrazoien itemak.

4.3.5. Loaldia, portaera sedentarioa (PS), ariketa fisikoa (AF) eta kirola (K)

Helburu populazioaren bizi-ohiturei lotutako loaldia, PS eta AFren ezaugarriak eta baita sexuaren eta GnM estatusaren araberako ezaugarriak 2. ikerketan aurkezten dira. Ikasleen erdia baino gehiago, bai gizonak bai emakumeak, K egiten zuela adierazi zuen, batez ere banakako K eta ez zuen lehiaketetan parte hartzen (**4.46. taula**). Gizonek, gazteenek, OZtako ikasleek eta GnM portzentaje altua ez zutenek AF maila altuagoan eta K gehiago egiten zuten (**4.47., 4.48. eta 4.49. taulak**), EOZtako ikasleek izan ezik, hauek nahiz eta K gutxiago egin, AF maila altua egiten zuten (4.49. taula). Azken aurkikuntza hau ez dator bat beste ikertzaile batzuek aurkitutakoarekin[81]. Populazioaren heren batek kontsideratzen zuen bere adinekoak bezain aktiboak zirela eta ariketa ez egiteko emandako arrazoi nagusienak “denbora falta”, “bolondres falta” eta “ordutegia” izan ziren (4.48. taula). Balear Uharteetako ikasleek arrazoi berdinak eman zituzten ariketa eza justifikatzeko[82].

Bestalde, ikasle gazteenen joera loaldiaren gomendioak betetzea izan zen (4.47 taula), ez beste ikerketa batzuetan bezala[83], eta desadostasun hauen oinarriak graduen araberako ordutegi desberdinetan egon daitezke. Azkenik, Euskal ikasleek Koreako ikasleek beste ordu pasatzen dituzte eserita[84], eta ikasle nagusienek PS aldagaian portzentaje altuagoa aurkezten zuten, esfortzu akademikoa zorrotzagoaren ondorio. Bestetik, OZtako ikasleek OZtakoek baino ordu gehiago pasatzen dituzte eserita eta lotuta egon daiteke OZtako ikasleek AF gutxiago egiten duten gertaerarekin beste unibertsitate ikasle batzuetan gertatzen den bezala[85].

4.46. taula: Helburu populazioaren kirol praktika sexuaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, batezbestekoa(DE) edo %	Lagin osoa (n=26.165)	Gizonak (n=10.607)	Emakumeak (n=15.558)	P^*
Kirola				
Bai	60,9	74,0	51,9	
Ez	39,1	26,0	48,1	**<0,001**
Kirol mota				
Banaka	61,3	61,3	68,0	
Taldeka	29,7	29,7	24,8	
Banaka eta taldeka	9,0	9,0	7,2	**<0,001**
Lehiaketa				
Bai	37,3	51,6	23,4	
Ez	62,7	48,4	76,6	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.46. taularen jarraipena.

Aldagaiak, batezbestekoa(DE) edo %	Lagin osoa (n=26.165)	Gizonak (n=10.607)	Emakumeak (n=15.558)	*P*[*]
AF ez egitearen arrazoiak				
Konpainia falta	0,2	0,4	-	
Dirua	1,8	1,9	1,7	
Ordutegia	21,9	22,6	21,4	
Interes falta	0,2	0,4	-	
Lekua	3,8	6,4	2,1	
Osasuna	5,1	5,6	4,8	
Denbora falta	44,4	43,1	45,2	
Borondate falta	22,1	18,8	24,2	
ED	0,7	0,7	0,6	**<0,001**
Zure adinekoekin konparatuz...zara				
Askoz aktiboagoa	3,0	2,2	3,6	
Aktiboagoa	26,4	19,2	31,4	
Bezain aktiboa	34,1	30,5	36,6	
Gutxiago	28,1	33,2	24,5	
Askoz gutxiago	7,0	13,5	2,6	
ED	1,4	1,4	1,4	**<0,001**

[*]Sexu desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
AF, ariketa fisikoa; DE, desbideratze estandarra; ED, ez daki.

4.47. taula: Helburu populazioaren ariketa fisikoa adinaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, batezbestekoa(DE) edo %	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	*P*[*]
Loaldia					
7-9 ordu	85,2	85,9	79,6	72,6	
< 7 eta > 9 ordu	14,8	14,1	20,4	27,4	**<0,001**
AF aisialdian					
Maila baxua/moderatua	72,3	78,6	79,6	74,3	
Maila altua	27,7	21,4	20,4	25,7	**<0,001**
Kirola					
Bai	64,2	54,7	63,9	61,0	
Ez	35,8	45,3	36,1	39,0	**<0,001**
Kirol mota					
Banaka	66,0	67,2	59,4	57,0	
Taldeka	30,2	28,9	29,4	30,0	
Banaka eta taldeka	3,8	3,9	11,2	13,0	**<0,001**
Lehiaketa					
Bai	44,3	31,8	35,2	37,4	
Ez	55,7	68,2	64,8	62,6	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.47. taularen jarraipena.

Aldagaiak, batezbestekoa(DE) edo %	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	*P*[*]
AF ez egitearen arrazoiak					
Konpainia falta	-	0,8	-	-	
Dirua	2,2	0,4	4,0	1,2	
Ordutegia	19,6	19,1	25,6	22,7	
Interes falta	-	-	-	0,4	
Lekua	5,4	2,7	3,4	3,9	
Osasuna	5,9	6,1	1,8	6,1	
Denbora falta	47,4	43,0	44,4	44,6	
Borondate falta	19,1	26,8	19,8	20,7	
ED	0,4	1,2	1,1	0,3	**<0,001**
Zure adinekoekin konparatuz...zara					
Askoz aktiboagoa	5,0	6,3	6,8	8,5	
Aktiboagoa	30,3	26,9	29,2	27,0	
Bezain aktiboa	35,5	34,4	32,4	34,2	
Gutxiago	26,4	27,4	29,4	24,3	
Askoz gutxiago	1,0	4,4	1,0	4,4	
ED	1,9	0,6	1,3	1,6	**<0,001**
Eserita, ordu/egun	7,6(2,3)	7,7(1,8)	7,9(2,2)	8,0(2,4)	**<0,001**

[*]Adinaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
AF, ariketa fisikoa; DE, desbideratze estandarra; ED, ez daki.

4.48. taula: Helburu populazioaren ariketa fisikoa EAren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, batezbestekoa(DE) edo %	OZ (n=3.637)	EOZ (n=22.529)	*P*[*]
Loaldia			
7-9 ordu	79,5	79,2	
< 7 eta > 9 ordu	20,5	20,8	0,702
AF aisialdian			
Maila baxua/moderatua	84,5	74,6	
Maila altua	15,5	25,4	**<0,001**
Kirola			
Bai	63,4	60,5	
Ez	36,6	39,5	**0,001**
Kirol mota			
Banaka	73,4	59,2	
Taldeka	18,3	31,7	
Banaka eta taldeka	8,3	9,1	**<0,001**
Lehiaketa			
Bai	18,4	40,3	
Ez	81,6	59,7	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.48. taularen jarraipena.

Aldagaiak, batezbestekoa(DE) edo %	OZ (n=3.637)	EOZ (n=22.529)	P^*
AF ez egitearen arrazoiak			
Konpainia falta	-	0,2	
Dirua	1,1	2,0	
Ordutegia	25,3	21,5	
Interes falta	-	0,2	
Lekua	3,3	3,9	
Osasuna	2,4	5,7	
Denbora falta	46,5	44,7	
Borondate falta	20,5	21,9	
ED	1,0	-	**<0,001**
Zure adinekoekin konparatuz...zara			
Askoz aktiboagoa	6,9	7,0	
Aktiboagoa	20,6	29,3	
Bezain aktiboa	39,2	33,3	
Gutxiago	27,4	26,3	
Askoz gutxiago	2,3	3,1	
ED	3,7	1,0	**<0,001**
Eserita, ordu/egun	8,3(2,2)	7,8(2,2)	**<0,001**

*EAren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
AF, ariketa fisikoa; DE, desbideratze estandarra; ED, ez daki; EA, ezagutza arloa; EOZ, Ez-Osasun Zientziak; OZ, Osasun Zientziak.

4.49. taula: Helburu populazioaren kirol praktika GnM estatusaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, batezbestekoa(DE) edo %	Ez gehiegizko GnM (n=22.391)	Gehiegizko GnM (n=3.775)	P^*
Kirola			
Bai	61,7	56,0	
Ez	38,3	44,0	**<0,001**
Kirol mota			
Banaka	62,4	53,7	
Taldeka	29,5	31,1	
Banaka eta taldeka	8,1	15,3	**<0,001**
Lehiaketa			
Bai	38,0	32,2	
Ez	62,0	67,8	**<0,001**
AF ez egitearen arrazoiak			
Konpainia falta	0,2	0,6	
Dirua	0,9	-	
Ordutegia	22,0	24,1	
Interes falta	0,2	-	
Lekua	3,2	7,3	

Hurrengo orrialdean jarraitzen du.

4.49. taularen jarraipena.

Aldagaiak, batezbestekoa(DE) edo %	Ez gehiegizko GnM (n=22.391)	Gehiegizko GnM (n=3.775)	*P* [*]
AF ez egitearen arrazoiak			
Osasuna	5,3	4,7	
Denbora falta	47,0	37,2	
Borondate falta	21,0	26,2	
ED	0,2	-	**<0,001**
Zure adinekoekin konparatuz...zara			
Askoz aktiboagoa	7,8	2,3	
Aktiboagoa	29,1	21,6	
Bezain aktiboa	34,9	29,6	
Gutxiago	24,0	40,9	
Askoz gutxiago	2,9	3,8	
ED	1,3	1,7	**<0,001**

[*]Gantz-masa estatusaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
AF, ariketa fisikoa; DE, desbideratze estandarra; ED, ez daki; GnM, gantz-masa.

4.3.6. Ohitura toxikoak

Helburu populazioaren alkohol kontsumoa, eta baita sexua eta GnM estatusaren arabera ere, **2. ikerketan** azaltzen dira. Ohitura toxikoei buruzko gainontzeko datuak sexua, adina, EA eta GnM estatusaren arabera **4.50., 4.51., 4.52. eta 4.53. tauletan** azaltzen dira. Laginaren hiru laurdenak ez-erretzaileak edo erretzaile ohiak ziren. Gure laginaren erretzaile kopurua Europako beste herrialdeetako, hala nola Serbia[86], Grezia[87] eta Italia[88], ikasleena baino baxuagoa izan zen baina Irlandan[26] eta Erresuma Batuan[89] egindako ikerketakoen antzekoak. Adinari dagokionez, beste ikerketa baten bezala[90], erretzaileen prebalentziak gora egiten zuen, adinak gora egiten zuen heinean.

EAren araberako datuei dagokionez, beste ikerketa batzuetan bezala[32], erretzen ez zuten OZtako ikasleen portzentajea altua zen (% 93,5), seguraski, ohitura toxiko honen ondorio kaltegarriaz kontziente zirelako. Nolanahi ere, beste ikertzaile batzuek[81,86] OZtako ikasleen artean UPV/EHUko ikasleena baino portzentaje altuagoa adierazi zuten. Gainera, erretzaileen portzentajea gehiegizko GnM zuten ikasleen artean GnM portzentaje normala zutena baino altuagoa zen, beste unibertsitate ikasle populazioetan behatu den bezala[93]. Baina tabakoa eta obesitatearen arteko asoziazioa konplexua da eta oraindik ez dago ondo ulertuta[94] eta argitaratutako emaitzak kontraesankorrak dira. Ikerketa batzuek ez dute asoziazio esanguratsurik aurkitu erretzaile eta GMI artean[95], beste batzuek, ordea, aditzera ematen dute tabakoa lotuta dagoela GMI baxuagoarekin[94] eta erretzeari uzteak areagotutako GMIrekin[95]. Beste ikerketa batzuetan ez bezala[96], gure emaitzek ez zuten baieztatzen gehiegizko GnM zuten erretzaileek zigarro gehiago erretzen zituztela GnM portzentaje normala zuten erretzaileekin konparatuta.

Adinaren araberako alkohol kontsumoari dagokiolarik, 19 urteko ikasleek beste adinetako ikasleek baino gehiago edaten zuten, beste ikerketa batzuetan behatu den bezala[97]. Gazte helduek bere alkohol kontsumoa justifikatzeko hainbat arrazoi ematen dituzte, lotsa edo bere parekoengatik onartuak izateko[98], baina kontuan hartu behar da adin gazteetan edateak alkoholarekiko portaera arriskutsuak ekarri ditzakeela hurrengo urteetan[99]. Beste ikerketa batzuetan bezala, desberdintasunak behatu ziren ezagutza arlo desberdinetako ikasleen artean (4.52. taula), EOZtako ikasleen artean arriskuko edale gehiago identifikatuz[26].

4.50. taula: Helburu populazioaren ohitura toxikoak sexuaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, %	Lagin osoa (n=26.165)	Gizonak (n=10.607)	Emakumeak (n=15.558)	*P**
Tabakoa				
Erretzaileak	18,3	13,1	21,9	
Ez-erretzaileak/erretzaile ohiak	81,7	86,9	78,1	**<0,001**
Erretzaileen sailkapena				
< 10 zigarro	91,4	96,5	89,4	
10-20 zigarro	6,4	3,5	7,4	
> 20 zigarro	2,3	-	3,2	**<0,001**

*Sexu desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.

4.51. taula: Helburu populazioaren ohitura toxikoak adinaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, %	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	*P**
Tabakoa					
Erretzaileak	14,5	15,7	18,6	21,5	
Ez-erretzaileak/erretzaile ohiak	85,5	84,3	81,4	78,5	**<0,001**
Erretzaileen sailkapena					
< 10 zigarro	100,0	89,4	85,5	91,3	
10-20 zigarro	-	5,3	14,5	5,5	
> 20 zigarro	-	5,3	-	3,2	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.51. taularen jarraipena.

Aldagaiak, %	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	*P*[*]
Alkohol kontsumoa					
Baxua/moderatua	78,6	69,7	73,6	74,3	
Altua	21,4	30,3	26,4	25,7	**<0,001**

[*]Adinaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.

4.52. taula: Helburu populazioaren ohitura toxikoak EAren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, %	OZ (n=3.637)	EOZ (n=22.529)	*P*[*]
Tabakoa			
Erretzaileak	6,5	20,3	
Ez-erretzaileak/erretzaile ohiak	93,5	79,7	**<0,001**
Erretzaileen sailkapena			
< 10 zigarro	90,3	91,5	
10-20 zigarro	9,7	5,9	
> 20 zigarro	-	2,6	**<0,001**
Alkohol kontsumoa			
Baxua/moderatua	79,9	73,0	
Altua	20,1	27,0	**<0,001**

[*] EAren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
EA, ezagutza arloa; EOZ, Ez-Osasun Zientziak; OZ, Osasun Zientziak.

4.53. taula: Helburu populazioaren ohitura toxikoak GnM estatusaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, %	Ez gehiegizko GnM (n=22.391)	Gehiegizko GnM (n=3.775)	*P*[*]
Tabakoa			
Erretzaileak	18,3	18,8	
Ez-erretzaileak/erretzaile ohiak	81,7	81,2	0,397
Erretzaileen sailkapena			
< 10 zigarro	90,2	97,0	
10-20 zigarro	7,1	3,0	
> 20 zigarro	2,8	-	**<0,001**

[*]Gantz-masa estatusaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
GnM, gantz-masa.

4.4. Gorputz irudiaren ebaluazioa eta atsekabea

Gorputz irudiaren ebaluazioari dagokionez, gizonen *t-score*-ak egungo gorputz neurrian (EGN), gorputz neurri idealean (GNI) eta zentzuzko gorputz neurrian (ZGN) emakumeenak baino altuagoak izan ziren (**4.54. taula**). Berdina gertatu zen ikasle gazteenekin, EOZtako ikasleekin eta gehiegizko GnM zuten ikasleekin beste kategorietako ikasleekin konparatuz (**4.55., 4.56. eta 4.57. taulak**). GIA emakumeetan, ikasle gazteenetan eta EOZtako ikasleetan beste kategorietako ikasleena baino altuagoa zen (P <0,001). Obesitatea duten populazioaren GIAri dagokionez, gure emaitzak bat datoz aurreko onarpenekin[(100)]. GIAren norabidea GnM estatusaren arabera desberdinak izan ziren, gehiegizko atsekabea gehiegizko GnM zutenen artean behatu zen eta gutxiegizko atsekabea gehiegizko GnM ez zutenen artean (P < 0,001). Gutxiegizko atsekabe hau lotuta dago gihar masa handiagoa izateko desioarekin, batez ere, gizonetan eta ikasle gazteenetan[(101)].

4.54. taula: Helburu populazioaren gorputz irudiaren ebaluazioa sexuaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, *t-score*, batezbestekoa(DE)	Lagin osoa (n=26.165)	Gizonak (n=10.607)	Emakumeak (n=15.558)	P^*
EGN	51,9(9,2)	55,0(8,8)	49,8(9,0)	**<0,001**
GNI	58,7(14,2)	60,7(15,1)	57,4(13,3)	**<0,001**
ZGN	56,0(12,8)	60,7(13,5)	52,8(11,2)	**<0,001**
EGN-GNI	-6,9(6,6)	-5,7(7,7)	-7,6(5,6)	**<0,001**
EGN-ZGN	-4,1(9,5)	-5,7(10,2)	-3,1(8,9)	**<0,001**

*Sexu desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra; EGN, egungo gorputz neurria; GNI, gorputz neurri ideala; ZGN, zentzuzko gorputz neurria.

4.55. taula: Helburu populazioaren gorputz irudiaren ebaluazioa adinaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, *t-score*, batezbestekoa(DE)	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	P^*
EGN	52,5(9,4)	52,3(9,0)	50,5(9,1)	52,0(9,3)	**<0,001**
GNI	54,4(10,1)	53,9(12,4)	51,4(10,1)	53,7(12,6)	**<0,001**
ZGN	56,5(12,8)	56,5(11,8)	55,3(13,5)	55,5(12,9)	**<0,001**
EGN-GNI	-1,9(10,1)	-1,6(11,6)	-0,9(9,8)	-1,6(11,6)	**0,023**
EGN-ZGN	-3,9(10,0)	-4,3(7,9)	-4,8(8,7)	-3,8(10,5)	0,067

*Adinaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra; EGN, egungo gorputz neurria; GNI, gorputz neurri ideala; ZGN, zentzuzko gorputz neurria.

4.56. taula: Helburu populazioaren gorputz irudiaren ebaluazioa EAren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, *t-score*, batezbestekoa(DE)	OZ (n=3.637)	EOZ (n=22.529)	*P**
EGN	50,3(9,1)	52,1(9,3)	**<0,001**
GNI	50,8(10,1)	53,8(11,8)	**<0,001**
ZGN	53,0(11,2)	56,5(13,0)	**<0,001**
EGN-GNI	-0,5(8,9)	-1,7(11,3)	**<0,001**
EGN-ZGN	-2,7(7,6)	-4,4(9,8)	**<0,001**

*EAren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra; EA, ezagutza arloa; EGN, egungo gorputz neurria; EOZ, Ez-Osasun Zientziak; GNI, gorputz neurri ideala; OZ, Osasun Zientziak; ZGN, zentzuzko gorputz neurria.

4.57. taula: Helburu populazioaren gorputz irudiaren ebaluazioa GnM estatusaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, *t-score*, batezbestekoa(DE)	Ez gehiegizko GnM (n=22.391)	Gehiegizko GnM (n=3.775)	*P**
EGN	51,3(8,8)	55,4(10,8)	**<0,001**
GNI	53,4(11,8)	53,3(11,0)	**0,009**
ZGN	55,2(12,5)	60,6(13,7)	**<0,001**
EGN-GNI	-2,1(10,7)	2,0(11,8)	**<0,001**
EGN-ZGN	-3,9(8,9)	-5,3(12,5)	**<0,001**

*Gantz-masa estatusaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra; EGN, egungo gorputz neurria; GNI, gorputz neurri ideala; GnM, gantz-masa; ZGN, zentzuzko gorputz neurria.

Helburu populazioaren GIAri buruzko informazioa sexua, adina, EA eta GnM estatusaren arabera **4.58., 4.59., 4.60. eta 4.61. tauletan** agertzen da. Portzentaje altuenak GIA neurri idealarekin (GNI) aldagaian “gehiegizko” kategorian eta gorputz irudiaren atsekabea zentzuzko neurriarekin (ZGN) aldagaian “gustura” kategorian eman ziren (4.58 taula). Aldagai bietan desberdintasunak behatu ziren, emakumeek, 19 urteko ikasleek, OZtakoek eta gehiegizko GnM zutenek neurri idealarekin gehiegizko atsekabe altuagoa sentitzen zuten gizonekin, beste adinetako ikasleekin, EOZtakoekin eta gehiegizko GnM ez zutenekin erkatuz (*P* <0,001). Emakumeen GIA neurri idealarekin dagokionez, beste autore batzuek aurretik aditzera eman dute asoziazio hau(102-105) eta emaitza hauek lotuta egon daitezke edertasunaren estereotipoarekin. Mendebaldeko herrialdeetan, argaltasuna gorputz irudi idealaren eredu denez, herrialde hauetako emakume gazteak argalak izateko presio mentala eta soziala jasaten dute(106), gizon gazteek, berriz, gorputz astunak nahiago dituzte gizonezkoena dela kontsideratzen baitute(107).

Gehiegizko GnMri dagokionez, aditzera eman da adipositatea eta GIA ondo lotuta daudela(108). Azkenik, gizonak, 20 urteko ikasleak, OZtakoak eta gehiegizko GnM ez zutenak, ZGNri dagokiolarik, beste kategorietako ikasleak baino gustorago sentitzen ziren ($P < 0,001$) (4.58., 4.59., 4.60. eta 4.61. taulak). Kasu guztietan, ZGNrekin gustura sentitzen ziren portzentajea GNIrekin baino altuagoa zen eta emaitza hauek GNI mantentzeko aukera edo ezintasunari buruzko kontzientziarekin lotuta egon daiteke(109,110). Kontuan hartzen bada gorputz atsekabearen pertzepzioa eta GIA obesitatea errazteko portaerekin lotuta daudela(111), ezinbestekoa gertatzen da prebentzio eta parte-hartze estrategiak garatzea.

4.58. taula: Helburu populazioaren gorputz irudiaren atsekabea sexuaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

GIA	Lagin osoa (n=26.165)	Gizonak (n=10.607)	Emakumeak (n=15.558)	*P*[*]
GIA GNIrekin, %		EGN-GNI		
GIA gehiegiz[1]	48,0	33,2	58,1	
GIA gutxiegiz[2]	18,3	27,3	12,1	
Gustura[3]	33,7	39,4	29,7	**<0,001**
GIA ZGNrekin, %		EGN-ZGN		
GIA gehiegiz[4]	17,8	15,8	19,2	
GIA gutxiegiz[5]	21,7	24,6	19,8	
Gustura[6]	60,4	59,6	61,0	**<0,001**

[1]EGN-GNI > 0; [2]EGN-GNI < 0; [3]EGN-GNI = 0; [4]EGN-ZGN > 0; [5]EGN-ZGN < 0; [6]EGN-ZGN = 0.
[*]Sexu desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
EGN, egungo gorputz neurria; GIA, gorputz irudiaren atsekabea; GNI, gorputz neurri ideala; ZGN, zentzuzko gorputz neurria.

4.59. taula: Helburu populazioaren gorputz irudiaren atsekabea adinaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

GIA	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	*P*[*]
GIA GNIrekin, %		EGN-GNI			
GIA gehiegiz[1]	46,4	52,7	44,9	48,0	
GIA gutxiegiz[2]	22,9	16,3	14,6	19,1	
Gustura[3]	30,6	31,1	40,5	32,8	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.59. taularen jarraipena.

GIA	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	*P*[*]
GIA ZGNrekin, %		EGN-ZGN			
GIA gehiegiz[4]	18,4	16,8	12,7	20,9	
GIA gutxiegiz[5]	23,5	20,2	22,6	21,1	
Gustura[6]	58,1	63,0	64,7	57,9	**<0,001**

[1]EGN-GNI > 0; [2]EGN-GNI < 0; [3]EGN-GNI = 0; [4]EGN-ZGN > 0; [5]EGN-ZGN < 0; [6]EGN-ZGN = 0.
[*]Adin araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
EGN, egungo gorputz neurria; GIA, gorputz irudiaren atsekabea; GNI, gorputz neurri ideala; ZGN, zentzuzko gorputz neurria.

4.60. taula: Helburu populazioaren gorputz irudiaren atsekabea EAren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

GIA	OZ (n=3.637)	EOZ (n=22.529)	*P*[*]
GIA GNIrekin, %	EGN-GNI		
GIA gehiegiz[1]	51,9	47,4	
GIA gutxiegiz[2]	15,2	18,8	
Gustura[3]	32,9	33,8	**<0,001**
GIA ZGNrekin, %	EGN-ZGN		
GIA gehiegiz[4]	18,6	17,7	
GIA gutxiegiz[5]	15,7	22,7	
Gustura[6]	65,7	59,6	**<0,001**

[1]EGN-GNI > 0; [2]EGN-GNI < 0; [3]EGN-GNI = 0; [4]EGN-ZGN > 0; [5]EGN-ZGN < 0; [6]EGN-ZGN = 0.
[*]EAren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
EA, ezagutza arloa; EGN, egungo gorputz neurria; EOZ, Ez-Osasun Zientziak; GIA, gorputz irudiaren atsekabea; GNI, gorputz neurri ideala; OZ, Osasun Zientziak; ZGN, zentzuzko gorputz neurria.

4.61. taula: Helburu populazioaren gorputz irudiaren atsekabea GnM estatusaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

GIA	Ez gehiegizko GnM (n=22.391)	Gehiegizko GnM (n=3.775)	*P*[*]
GIA GNIrekin, %	EGN-GNI		
GIA gehiegiz[1]	42,2	82,6	
GIA gutxiegiz[2]	20,6	4,6	
Gustura[3]	37,2	12,8	**<0,001**
GIA ZGNrekin, %	EGN-ZGN		
GIA gehiegiz[4]	14,9	35,6	
GIA gutxiegiz[5]	22,4	17,4	
Gustura[6]	62,7	47,0	**<0,001**

[1]EGN-GNI > 0; [2]EGN-GNI < 0; [3]EGN-GNI = 0; [4]EGN-ZGN > 0; [5]EGN-ZGN < 0; [6]EGN-ZGN = 0.
[*]Gantz-masa estatusaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
EGN, egungo gorputz neurria; GIA, gorputz irudiaren atsekabea; GNI, gorputz neurri ideala; GnM, gantz-masa; ZGN, zentzuzko gorputz neurria.

Helburu populazioaren gorputzeko goiko eta beheko atalen pertzepzioa **4.62. taulan** azaltzen da. Gorputzaren atal desberdineneko (goiko eta beheko) atsekabeari dagokionez, gizonak deserosoago zeuden bere gorputzeko goiko atalarekin, eta emakumeak, ordea, beheko atalarekin (P < 0,001) (**4.63. taula**). Beste autore batzuen aurkikuntzak bezala[112,113], emaitza hauek adierazi dezakete gizonak larritutagoak daudela gorputzeko goiko atala handitzeko desioarekin (giharra eta indarra bereziki), eta emakumeak, berriz, beheko atala argaltzeko (aldaka eta izter estuagoak) desioarekin. Gorputz irudiaren ebaluazioa gorputzaren atal bakoitzeko adinaren arabera aztertzean, 20 urteko ikasleak beste adinekoak baino gustorago zeudela bere gorputzeko goiko atalarekin eta gazteenak (18 urtekoak), berriz, beheko atalarekin (P < 0,001) behatu zen (**4.65. taula**).

EAri dagokionez, OZtako ikasleak beste arloko ikasleak baino gustorago zeuden gorputzeko goiko atalarekin eta EOZtakoak, ostera, gorputzeko beheko atalarekin (P < 0,001) (**4.67. taula**). Eta GnM estatusaren arabera, gehiegizko GnM zuten ikasleek GnM normala zuten ikasleek baino gehiegizko atsekabe altuagoa sentitzen zuten gorputzeko goiko eta beheko atalekin (P < 0,001) (**4.69. taula**). Azken emaitza hauek bat datoz beste autore batzuen emaitzekin, aditzera ematen dutelako gorputzaren atsekabea ohikoa dela obesitatea pairatzen duten pertsonetan pisu normala duten pertsonekin konparatuta, bai, populazio orokorrean[100], bai unibertsitate ikasleetan[108].

4.62. taula: Helburu populazioaren gorputz irudiaren ebaluazioa gorputzaren atal bakoitzeko sexuaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Silueta bakoitzeko partaideen portzentajea, %	Lagin osoa (n=26.165)	Gizonak (n=10.607)	Emakumeak (n=15.558)	P^*
EGI (gorputzaren goiko atala)				
1	7,4	1,4	11,6	
2	14,2	17,6	11,8	
3	33,8	32,8	34,4	
4	34,2	30,5	36,7	
5	9,3	14,9	5,5	
6	1,2	2,8	-	
7	-	-	-	
8	-	-	-	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.62. taularen jarraipena.

Silueta bakoitzeko partaideen portzentajea, %	Lagin osoa (n=26.165)	Gizonak (n=10.607)	Emakumeak (n=15.558)	*P*[*]
EGI (gorputzaren beheko atala)				
1	2,5	1,5	3,1	
2	14,0	11,4	15,8	
3	20,0	31,8	11,9	
4	40,6	40,2	40,9	
5	19,0	8,5	26,1	
6	3,5	5,4	2,2	
7	0,5	1,2	-	
8	-	-	-	**<0,001**
GII (gorputzaren goiko atala)				
1	4,3	0,4	7,0	
2	18,2	9,7	24,0	
3	36,9	20,3	48,3	
4	40,0	68,7	20,4	
5	0,6	1,0	0,3	
6	-	-	-	
7	-	-	-	
8	-	-	-	**<0,001**
GII (gorputzaren beheko atala)				
1	1,8	0,6	2,6	
2	18,4	4,7	27,7	
3	33,3	20,9	41,8	
4	42,8	65,4	27,4	
5	2,9	6,5	0,4	
6	0,7	1,8	-	
7	0,1	0,2	-	
8	-	-	-	**<0,001**
AiGI (gorputzaren goiko atala)				
1	0,5	0,3	0,6	
2	5,3	1,8	7,8	
3	13,0	11,4	14,1	
4	16,4	14,4	17,7	
5	41,1	42,7	39,9	
6	23,3	28,9	19,6	
7	0,4	0,5	0,3	
8	-	-	-	**<0,001**
AiGI (gorputzaren beheko atala)				
1	3,3	1,4	4,6	
2	9,8	7,4	11,4	
3	19,6	18,0	20,7	
4	34,0	30,5	36,3	
5	22,1	26,9	18,9	
6	9,9	13,8	7,3	
7	1,3	2,0	0,8	
8	-	-	-	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.62. taularen jarraipena.

Silueta bakoitzeko partaideen portzentajea, %	Lagin osoa (n=26.165)	Gizonak (n=10.607)	Emakumeak (n=15.558)	P^*
AmGI (gorputzaren goiko atala)				
1	3,0	1,8	3,8	
2	6,1	5,1	6,7	
3	16,5	20,6	13,7	
4	34,0	34,2	33,8	
5	32,7	32,3	32,9	
6	7,3	6,0	8,2	
7	0,5	-	0,8	
8	-	-	-	**<0,001**
AmGI (gorputzaren beheko atala)				
1	2,5	1,1	3,4	
2	10,4	6,8	12,8	
3	16,1	18,6	14,4	
4	29,1	30,2	28,3	
5	33,9	35,7	32,7	
6	7,5	6,9	7,8	
7	0,6	0,7	0,5	
8	-	-	-	**<0,001**
GIE (gorputzaren goiko atala)				
1	0,6	0,3	0,8	
2	15,9	8,7	20,8	
3	39,8	51,8	31,7	
4	42,3	37,9	45,3	
5	1,4	1,3	1,5	
6	-	-	-	
7	-	-	-	
8	-	-	-	**<0,001**
GIE (gorputzaren beheko atala)				
1	0,6	0,3	0,8	
2	10,4	8,2	11,8	
3	41,9	50,3	36,2	
4	44,1	38,0	48,2	
5	2,7	2,9	2,5	
6	0,4	0,3	0,4	
7	-	-	-	
8	-	-	-	**<0,001**

*Sexu desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
AiGI, aitaren gorputz irudia; AmGI, amaren gorputz irudia; EGI, egungo gorputz irudia; GIE, gorputz irudi erakargarria; GII, gorputz irudi ideala.

4.63. taula: Helburu populazioaren gorputz irudiaren atsekabea gorputzaren atal bakoitzeko sexuaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

GIArekiko sailkapena, %	Lagin osoa (n=26.165)	Gizonak (n=10.607)	Emakumeak (n=15.558)	P^*
Goiko atala		EGI – GII		
Gehiegizko atsekabea[1]	9,6	8,3	10,5	
Gutxiegizko atsekabea[2]	8,8	10,9	7,4	
Asebetea[3]	81,6	80,8	82,1	**<0,001**
Beheko atala		EGI – GII		
Gehiegizko atsekabea[1]	16,1	6,3	22,8	
Gutxiegizko atsekabea[2]	5,5	8,9	3,1	
Asebetea[3]	78,4	84,7	74,1	**<0,001**

[1]EGI-GII > 1; [2]EGI-GII < -1; [3]-1 ≥ EGI-GII ≤ 1.
[*]Sexu desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
EGI, egungo gorputz irudia; GIA, gorputz irudiaren atsekabea; GII, gorputz irudi ideala.

4.64. taula: Helburu populazioaren gorputz irudiaren ebaluazioa gorputzaren atal bakoitzeko adinaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Silueta bakoitzeko partaideen portzentajea, %	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	P^*
EGI (gorputzaren goiko atala)					
1	5,5	8,3	7,5	7,8	
2	20,0	14,2	17,5	9,5	
3	33,6	32,8	36,6	32,9	
4	31,8	38,0	31,6	34,6	
5	8,2	5,6	6,0	13,7	
6	1,0	1,1	0,7	1,5	
7	-	-	-	-	
8	-	-	-	-	**<0,001**
EGI (gorputzaren beheko atala)					
1	-	1,2	2,8	4,2	
2	12,8	14,2	13,0	15,1	
3	21,6	19,9	19,1	19,7	
4	43,4	39,1	46,0	37,0	
5	17,3	20,9	16,4	20,2	
6	4,9	3,6	2,7	3,2	
7	-	1,1	-	0,7	
8	-	-	-	-	**<0,001**
GII (gorputzaren goiko atala)					
1	5,4	3,5	1,7	5,7	
2	16,3	16,8	20,1	18,8	
3	32,8	39,4	40,9	35,4	
4	45,5	40,3	36,4	39,0	
5	-	-	1,0	1,0	

Hurrengo orrialdean jarraitzen du.

4.64. taularen jarraipena.

Silueta bakoitzeko partaideen portzentajea, %	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	P^*
GII (gorputzaren goiko atala)					
6	-	-	-	-	
7	-	-	-	-	
8	-	-	-	-	**<0,001**
GII (gorputzaren beheko atala)					
1	1,5	2,0	2,1	1,6	
2	14,5	18,2	19,6	19,8	
3	31,8	34,5	38,4	30,6	
4	47,0	42,5	36,7	44,3	
5	3,7	2,7	3,2	2,4	
6	1,0	-	-	1,4	
7	0,5	-	-	-	
8	-	-	-	-	**<0,001**
AiGI (gorputzaren goiko atala)					
1	-	-	0,6	0,9	
2	4,5	7,3	4,8	5,0	
3	12,9	15,5	10,7	13,0	
4	16,5	16,4	22,5	12,9	
5	42,5	42,7	40,5	39,7	
6	23,1	18,2	20,1	28,1	
7	0,5	-	0,7	0,4	
8	-	-	-	-	**<0,001**
AiGI (gorputzaren beheko atala)					
1	2,6	3,5	3,6	3,4	
2	9,1	10,0	8,1	11,0	
3	18,0	19,2	17,8	21,5	
4	31,9	37,7	34,8	32,4	
5	26,1	23,8	23,0	18,7	
6	10,9	5,8	9,2	12,2	
7	1,5	-	3,4	0,7	
8	-	-	-	-	**<0,001**
AmGI (gorputzaren goiko atala)					
1	4,5	2,0	2,1	3,2	
2	4,4	8,7	5,3	5,8	
3	17,3	14,1	12,9	19,4	
4	38,2	33,7	33,4	32,4	
5	31,2	35,0	40,8	27,7	
6	4,4	5,0	4,6	11,5	
7	-	1,4	1,0	-	
8	-	-	-	-	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.64. taularen jarraipena.

Silueta bakoitzeko partaideen portzentajea, %	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	*P**
AmGI (gorputzaren beheko atala)					
1	3,0	3,7	1,5	2,1	
2	12,8	11,0	9,9	9,1	
3	12,7	8,9	20,1	19,6	
4	22,6	32,0	21,8	34,7	
5	42,3	37,5	42,7	23,0	
6	6,6	6,1	3,5	10,8	
7	-	0,8	0,6	0,7	
8	-	-	-	-	**<0,001**
GIE (gorputzaren goiko atala)					
1	1,5	1,5	-	-	
2	11,4	14,0	23,0	15,3	
3	45,9	47,4	31,6	37,2	
4	39,8	36,0	44,5	45,7	
5	1,5	1,1	1,0	1,8	
6	-	-	-	-	
7	-	-	-	-	
8	-	-	-	-	**<0,001**
GIE (gorputzaren beheko atala)					
1	1,0	1,4	0,6	-	
2	7,6	7,2	17,3	9,7	
3	51,4	50,9	33,7	36,8	
4	35,1	39,0	45,9	50,3	
5	4,3	1,4	2,1	2,9	
6	0,6	-	0,6	0,3	
7	-	-	-	-	
8	-	-	-	-	**<0,001**

*Adinaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
AiGI, aitaren gorputz irudia; AmGI, amaren gorputz irudia; EGI, egungo gorputz irudia; GIE, gorputz irudi erakargarria; GII, gorputz irudi ideala.

4.65. taula: Helburu populazioaren gorputz irudiaren atsekabea gorputzaren atal bakoitzeko adinaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

GIArekiko sailkapena, %	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	*P**
Goiko atala			EGI – GII		
Gehiegizko atsekabea[1]	6,3	9,8	5,9	13,2	
Gutxiegizko atsekabea[2]	9,4	12,6	8,4	6,6	
Asebetea[3]	84,3	77,6	85,7	80,2	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.65. taularen jarraipena.

GIArekiko sailkapena, %	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	P^*
Beheko atala			EGI – GII		
Gehiegizko atsekabea[1]	13,7	17,3	16,4	16,6	
Gutxiegizko atsekabea[2]	4,4	5,9	2,7	7,2	
Asebetea[3]	81,9	76,8	80,9	76,1	**<0,001**

[1]EGI-GII > 1; [2]EGI-GII < -1; [3]-1 ≥ EGI-GII ≤ 1.
*Adin araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
EGI, egungo gorputz irudia; GIA, gorputz irudiaren atsekabea; GII, gorputz irudi ideala.

4.66. taula: Helburu populazioaren gorputz irudiaren ebaluazioa gorputzaren atal bakoitzeko EAren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Silueta bakoitzeko partaideen portzentajea, %	OZ (n=3.637)	EOZ (n=22.529)	P^*
EGI (gorputzaren goiko atala)			
1	5,9	7,7	
2	15,4	14,0	
3	33,1	33,9	
4	35,4	34,0	
5	10,3	9,1	
6	-	1,3	
7	-	-	
8	-	-	**<0,001**
EGI (gorputzaren beheko atala)			
1	2,7	2,4	
2	12,4	14,3	
3	12,7	21,1	
4	46,9	39,6	
5	20,5	18,7	
6	4,8	3,3	
7	-	0,6	
8	-	-	**<0,001**
GII (gorputzaren goiko atala)			
1	6,0	4,1	
2	20,8	17,8	
3	38,5	36,7	
4	33,8	41,0	
5	0,9	0,5	
6	-	-	
7	-	-	
8	-	-	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.66. taularen jarraipena.

Silueta bakoitzeko partaideen portzentajea, %	OZ (n=3.637)	EOZ (n=22.529)	P^*
GII (gorputzaren beheko atala)			
1	4,5	1,3	
2	23,1	17,6	
3	38,1	32,5	
4	31,8	44,6	
5	1,8	3,0	
6	0,7	0,8	
7	-	-	
8	-	-	**<0,001**
AiGI (gorputzaren goiko atala)			
1	-	0,5	
2	2,5	5,8	
3	16,5	12,5	
4	14,4	16,7	
5	48,6	39,8	
6	17,4	24,3	
7	0,7	0,3	
8	-	-	**<0,001**
AiGI (gorputzaren beheko atala)			
1	2,5	3,5	
2	8,7	10,0	
3	22,1	19,2	
4	33,3	34,1	
5	22,6	22,0	
6	10,2	9,9	
7	0,7	1,4	
8	-	-	**<0,001**
AmGI (gorputzaren goiko atala)			
1	4,1	2,8	
2	4,0	6,4	
3	17,1	16,4	
4	33,1	34,1	
5	31,7	32,8	
6	9,1	7,0	
7	0,9	0,4	
8	-	-	**<0,001**
AmGI (gorputzaren beheko atala)			
1	4,1	2,2	
2	9,9	10,5	
3	12,1	16,7	
4	30,6	28,8	
5	36,2	33,5	
6	6,2	7,7	
7	0,9	0,5	
8	-	-	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.66. taularen jarraipena

Silueta bakoitzeko partaideen portzentajea, %	OZ (n=3.637)	EOZ (n=22.529)	P^*
GIE (gorputzaren goiko atala)			
1	0,7	0,6	
2	20,2	15,2	
3	37,0	40,3	
4	40,6	42,6	
5	1,6	1,4	
6	-	-	
7	-	-	
8	-	-	**<0,001**
GIE (gorputzaren beheko atala)			
1	0,9	0,6	
2	12,0	10,1	
3	39,2	42,3	
4	43,6	44,2	
5	2,5	2,7	
6	1,8	0,1	
7	-	-	
8	-	-	**<0,001**

*EAren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
AiGI, aitaren gorputz irudia; AmGI, amaren gorputz irudia; EA, ezagutza arloa; EGI, egungo gorputz irudia; EOZ, Ez-Osasun Zientziak; GIE, gorputz irudi erakargarria; GII, gorputz irudi ideala; OZ, Osasun Zientziak.

4.67. taula: Helburu populazioaren gorputz irudiaren atsekabea gorputzaren atal bakoitzeko EAren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

GIArekiko sailkapena, %	OZ (n=3.637)	EOZ (n=22.529)	P^*
Goiko atala	EGI – GII		
Gehiegizko atsekabea[1]	5,9	10,2	
Gutxiegizko atsekabea[2]	6,6	9,1	
Asebetea[3]	87,5	80,6	**<0,001**
Beheko atala	EGI – GII		
Gehiegizko atsekabea[1]	20,6	15,4	
Gutxiegizko atsekabea[2]	1,4	6,1	
Asebetea[3]	78,0	78,5	**<0,001**

[1]EGI-GII > 1; [2]EGI-GII < -1; [3]-1 ≥ EGI-GII ≤ 1.
*EAren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
EA, ezagutza arloa; EGI, egungo gorputz irudia; EOZ, Ez-Osasun Zientziak; GIA, gorputz irudiaren atsekabea; GII, gorputz irudi ideala; OZ, Osasun Zientziak.

4.68. taula: Helburu populazioaren gorputz irudiaren ebaluazioa gorputzaren atal bakoitzeko GnM estatusaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Silueta bakoitzeko partaideen portzentajea, %	Ez gehiegizko GnM (n=22.391)	Gehiegizko GnM (n=3.775)	*P**
EGI (gorputzaren goiko atala)			
1	8,7	-	
2	16,2	2,4	
3	37,5	11,6	
4	30,7	54,5	
5	6,9	23,5	
6	-	8,0	
7	-	-	
8	-	-	**<0,001**
EGI (gorputzaren beheko atala)			
1	2,9	-	
2	15,6	4,6	
3	21,9	8,2	
4	41,7	33,8	
5	15,5	39,6	
6	2,3	10,4	
7	-	3,4	
8	-	-	**<0,001**
GII (gorputzaren goiko atala)			
1	4,9	0,9	
2	18,3	17,8	
3	36,1	41,8	
4	40,4	37,7	
5	0,5	1,8	
6	-	-	
7	-	-	
8	-	-	**<0,001**
GII (gorputzaren beheko atala)			
1	1,8	1,6	
2	19,7	11,0	
3	33,7	31,2	
4	41,3	51,8	
5	2,8	3,1	
6	0,6	1,3	
7	0,1	-	
8	-	-	**<0,001**
AiGI (gorputzaren goiko atala)			
1	0,2	1,9	
2	5,6	4,0	
3	12,5	16,2	
4	15,7	20,2	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.68. taularen jarraipena.

Silueta bakoitzeko partaideen portzentajea, %	Ez gehiegizko GnM (n=22.391)	Gehiegizko GnM (n=3.775)	P^*
AiGI (gorputzaren goiko atala)			
5	42,4	33,2	
6	23,5	22,4	
7	0,1	2,2	
8	-	-	**<0,001**
AiGI (gorputzaren beheko atala)			
1	2,9	6,0	
2	9,6	11,1	
3	19,8	18,4	
4	34,4	31,4	
5	22,0	22,8	
6	10,5	6,7	
7	0,9	3,7	
8	-	-	**<0,001**
AmGI (gorputzaren goiko atala)			
1	3,0	2,7	
2	6,6	2,9	
3	15,9	20,4	
4	34,9	28,8	
5	32,3	34,9	
6	6,8	10,4	
7	0,6	-	
8	-	-	**<0,001**
AmGI (gorputzaren beheko atala)			
1	2,9	-	
2	10,4	10,4	
3	15,6	18,8	
4	29,5	26,6	
5	34,6	29,9	
6	6,6	12,4	
7	0,3	1,8	
8	-	-	**<0,001**
GIE (gorputzaren goiko atala)			
1	0,7	-	
2	16,6	11,7	
3	40,2	37,3	
4	41,5	47,0	
5	1,0	4,0	
6	-	-	
7	-	-	
8	-	-	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.68. taularen jarraipena.

Silueta bakoitzeko partaideen portzentajea, %	Ez gehiegizko GnM (n=22.391)	Gehiegizko GnM (n=3.775)	P*
GIE (gorputzaren beheko atala)			
1	0,7	-	
2	11,3	4,9	
3	43,1	34,6	
4	42,2	55,2	
5	2,2	5,3	
6	0,4	-	
7	-	-	
8	-	-	**<0,001**

*Gantz-masa estatusaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
AiGI, aitaren gorputz irudia; AmGI, amaren gorputz irudia; EGI, egungo gorputz irudia; GIE, gorputz irudi erakargarria; GII, gorputz irudi ideala; GnM, gantz-masa.

4.69. taula: Helburu populazioaren gorputz irudiaren atsekabea gorputzaren atal bakoitzeko GnM estatusaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

GIArekiko sailkapena, %	Ez gehiegizko GnM (n=22.391)	Gehiegizko GnM (n=3.775)	P*
Goiko atala		EGI – GII	
Gehiegizko atsekabea[1]	6,7	13,6	
Gutxiegizko atsekabea[2]	10,1	5,9	
Asebetea[3]	83,2	80,5	**<0,001**
Beheko atala		EGI – GII	
Gehiegizko atsekabea[1]	27,0	31,4	
Gutxiegizko atsekabea[2]	1,2	2,8	
Asebetea[3]	71,8	65,9	**<0,001**

[1]EGI-GII > 1; [2]EGI-GII < -1; [3]-1 ≥ EGI-GII ≤ 1.
*Gantz-masa estatusaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
EGI, egungo gorputz irudia; GIA, gorputz irudiaren atsekabea; GII, gorputz irudi ideala; GnM, gantz-masa.

4.5. Elikadurarekiko jarrerak (EJ)

Helburu populazioaren nutrizioarekiko jarrerak **4.70. taulan** erakusten dira. Sexu desberdintasunak behatu ziren lau faktoreetan, emakumeen puntuazioa gizonena baino altuagoa izan zen “borondate eza eta ez osasungarria” eta “kontzientzia osasuntsua” aldagaietan, gizonek bitartean emakumeek baino puntu gehiago lortu zituzten “elikagaien araketa” eta “haragia gogoko izatea” aldagaietan (P < 0,05) (4.70). Beste ikerketa batzuetan bezala(114), haragiarekiko zaletasuna sexuarekin lotuta dago eta gizonezkoek nahiago dute elikagai mota hau. Hau gerta daiteke gizonek haragia jatea maskulinoa kontsideratzen dutelako eta horregatik elikagai honen kantitate gehiago jaten dute[115].

Ikasleen nutrizioarekiko jarrerak adinaren arabera **4.71. taulan** agertzen dira eta desberdintasun esanguratsuak zeuden lau faktoreetan, ikasle nagusien puntuazioak gazteenak baino altuagoak izan ziren faktore guztietan “kontzientzia osasuntsua” aldagaian izan ezik ($P < 0{,}001$). “Haragia gogoko izatea” faktorearen kasuan lotuta egon daiteke ikasle nagusienek haragi gehiago jaten dutela suposatzen delako[116-118]. “Kontzientzia osasuntsuari” dagokionez, ikasle nagusienek, beste adinetako ikasleekin erkatuz, faktore honetan puntuazio altuagoa lortu zuten. Kontuan izan behar da faktore hori gehienetan aldatzeko borondatea adierazten duela elikagaien aukera arautzen duten osasunari buruzko kezkak baino[119]. Nutrizioarekiko jarrerei EAren arabera dagokionez, EOZtako ikasleek OZtakoek baino puntu gehiago lortu zituzten faktore guztietan “elikagaien araketan” izan ezik ($P < 0{,}05$) (**4.72. taula**) eta hau ez dator bat gure hipotesiarekin kontuan hartzen bada OZetako ikasleek informazio gehiago dutela osasunari buruz eta hortaz, jarrera osasuntsuagoak dituztela suposatzen delako[32].

Bestetik, GnM estatusaren araberako desberdintasunak lau faktoreetan behatu ziren eta gehiegizko GnM zuten ikasleen puntuazioak GnM normala zutenak baino altuagoak ziren “borondate eza eta ez osasuntsua” eta “elikagaien araketa” aldagaietan, beste bi faktoreetan (“haragia gogoko izatea” eta “kontzientzia osasuntsua”), bitartean, gehiegizko GnM ez zutenek puntu gehiago lortu zituzten ($P < 0{,}01$) (**4.73. taula**), espero zen bezala. Ez da harritzekoa gehiegizko GnM zutenek “borondate eza eta ez osasungarria” faktorean puntuazio altuagoa izatea gehiegizko GnM ez zutenekin konparatuz eta baita sexu, adina eta EAren arabera ere, faktore honek komenigarritasun, umorea, afektua eta norberaren eraginkortasunari buruzko itemak konbinatzen ditu[119]. Elikagaiak aukeratzeko hiru arrazoi hauek elikagai ez-osasuntsuak kontsumitzeko aukerarekin positiboki asoziatuta zeuden[120-122].

4.70. Helburu populazioaren nutrizioarekiko jarrerak sexuaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak (puntuazio-tarteak)	Lagin osoa (n=26.165)	Gizonak (n=10.607)	Emakumeak (n=15558)	P^*
1. faktorea[1] (0-40 puntu)	16,3(6,0)	15,7(6,3)	16,7(5,7)	**<0,001**
2. faktorea[2] (0-20 puntu)	12,8(5,2)	13,2(5,0)	12,5(5,3)	**<0,001**
3. faktorea[3] (0-16 puntu)	6,6(2,5)	7,3(2,6)	6,1(2,3)	**<0,001**
4. faktorea[4] (0-20 puntu)	15,1(2,2)	15,0(2,2)	15,1(2,2)	**0,046**

[1]Borondate eza eta ez osasungarria; [2]Elikagaien araketa; [3]Haragia gogoko izatea; [4]Kontzientzia osasuntsua.
*Sexu desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra.

4.71. taula: Helburu populazioaren nutrizioarekiko jarrerak adinaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak (puntuazio-tarteak)	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	P^*
1. faktorea[1] (0-40 puntu)	16,2(5,8)	15,1(5,7)	16,7(5,6)	16,8(6,3)	**<0,001**
2. faktorea[2] (0-20 puntu)	12,1(4,8)	12,4(5,5)	12,4(5,3)	13,5(5,1)	**<0,001**
3. faktorea[3] (0-16 puntu)	6,7(2,6)	5,0(2,3)	6,7(2,4)	6,9(2,4)	**<0,001**
4. faktorea[4] (0-20 puntu)	15,2(2,0)	15,0(2,4)	15,2(2,2)	15,1(2,2)	**<0,001**

[1]Borondate eza eta ez osasungarria; [2]Elikagaien araketa; [3]Haragia gogoko izatea; [4]Kontzientzia osasuntsua.
*Adinaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra.

4.72. taula: Helburu populazioaren nutrizioarekiko jarrerak EAren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak (puntuazio-tarteak)	OZ (n=3.637)	EOZ (n=22.529)	P^*
1. faktorea[1] (0-40 puntu)	15,5(5,7)	16,4(6,0)	**<0,001**
2. faktorea[2] (0-20 puntu)	13,0(4,9)	12,8(5,3)	**0,041**
3. faktorea[3] (0-16 puntu)	6,1(2,4)	6,7(2,5)	**<0,001**
4. faktorea[4] (0-20 puntu)	14,8(2,4)	15,1(2,2)	**<0,001**

[1]Borondate eza eta ez osasungarria; [2]Elikagaien araketa; [3]Haragia gogoko izatea; [4]Kontzientzia osasuntsua.
*EAren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra; EA, ezagutza arloa; EOZ, Ez-Osasun Zientziak; OZ, Osasun Zientziak.

4.73. taula: Helburu populazioaren nutrizioarekiko jarrerak GnM estatusaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak (puntuazio-tarteak)	Ez gehiegizko GnM (n=22.391)	Gehiegizko GnM (n=3.775)	P^*
1. faktorea[1] (0-40 puntu)	16,0(5,9)	18,0(6,1)	**<0,001**
2. faktorea[2] (0-20 puntu)	12,6(5,2)	13,8(5,2)	**<0,001**
3. faktorea[3] (0-16 puntu)	6,6(2,5)	6,5(2,5)	**0,001**
4. faktorea[4] (0-20 puntu)	15,1(2,3)	14,8(2,0)	**<0,001**

[1]Borondate eza eta ez osasungarria; [2]Elikagaien araketa; [3]Haragia gogoko izatea; [4]Kontzientzia osasuntsua.
[*]Gantz-masa estatusaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra; GnM, gantz-masa.

4.6. Pisuaren ezaugarriak eta kontrola

Norberak adierazitako pisuari dagokionez, helburu populazioaren ia % 90a bere pisua mantendu zuen azkenengo 4 hilabetetan eta ia % 70a azkenengo urtean. Baina orain dela 3 eta 5 urteko pisuekin konparatuz, pisua mantendu zuen ikasleen portzentajea % 30 eta % 43 arte beheratu zen, hurrenez hurren, (P < 0,001) (**4.74. taula**). Azkenengo 3 eta 5 urteetan gertatzen den pisu hartze hori hainbat kasutan nerabezarotik heldutasunerako trantsizioari lotuta dago. Ikasle nagusi eta gehiegizko GnM zutenen joera azkenengo 4 hilabetetan eta azken urtean pisua hartzea izan zen, beste kategorietako partaideekin konparatuz (**4.75.** eta **4.76. taulak**). Hartutako pisuari dagokionez, kantitate gehiago behatu ziren gizonezkoetan, EOZtako ikasleetan eta gehiegizko GnM zutenetan beste kategorietako ikasleekin erkatuz (4.75, 4.76. eta **4.77.** taulak). Beste autore batzuek bezala[(123,124)] unibertsitateko 3-4 urteko aldi horretan, gizonek emakumeek baino pisu gehiago hartu zuten. Pisu hartze honen emaitzak EAren arabera OZtako ikasleek osasuna sustatzeko ohiturei buruz daukaten kontzientziari lotuta egon daiteke[(32)].

4.74. taula: Helburu populazioaren **pisu ezaugarriak sexuaren arabera**: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, batezbestekoa(DE) edo %	Lagin osoa (n=26.165)	Gizonak (n=10.607)	Emakumeak (n=15.558)	P*
Orain dela 4 hilabeteko pisuarekin konparatuta				
Pisua mantendu du[1]	86,4	85,8	86,9	
Pisua hartu du[2]	9,4	8,5	10,1	
Pisua galdu du[3]	4,2	5,7	3,0	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.74. taularen jarraipena.

Aldagaiak, batezbestekoa(DE) edo %	Lagin osoa (n=26.165)	Gizonak (n=10.607)	Emakumeak (n=15.558)	*P**
Pisua galdu dutenen artean				
Galdutako pisua, kg	5,6(2,9)	6,6(3,3)	4,1(1,1)	**<0,001**
Pisua hartu dutenen artean				
Hartutako pisua, kg	4,8(1,9)	5,7(1,7)	4,2(1,8)	**<0,001**
Orain dela urtebeteko pisuarekin konparatuta				
Pisua mantendu du[1]	68,6	64,2	71,8	
Pisua hartu du[2]	21,4	25,7	18,2	
Pisua galdu du[3]	10,0	10,1	10,0	**<0,001**
Pisua galdu dutenen artean				
Galdutako pisua, kg	6,1(2,7)	7,0(2,9)	5,4(2,3)	**<0,001**
Pisua hartu dutenen artean				
Hartutako pisua, kg	5,6(2,7)	5,9(2,5)	5,2(2,9)	**<0,001**
Orain dela 3 urteko pisuarekin konparatuta				
Pisua mantendu du[1]	42,6	34,4	48,4	
Pisua hartu du[2]	45,4	57,3	37,0	
Pisua galdu du[3]	12,0	8,2	14,6	**<0,001**
Pisua galdu dutenen artean				
Galdutako pisua, kg	8,4(7,3)	12,7(10,8)	6,7(4,3)	**<0,001**
Pisua hartu dutenen artean				
Hartutako pisua, kg	6,9(3,9)	8,1(4,6)	5,8(2,3)	**<0,001**
Orain dela 5 urteko pisuarekin konparatuta				
Pisua mantendu du[1]	31,4	23,5	36,9	
Pisua hartu du[2]	56,1	67,5	48,1	
Pisua galdu du[3]	12,6	9,1	15,0	**<0,001**
Pisua galdu dutenen artean				
Galdutako pisua, kg	7,9(6,0)	10,4(8,3)	6,8(4,3)	**<0,001**
Pisua hartu dutenen artean				
Hartutako pisua, kg	8,8(5,7)	11,2(6,6)	6,4(3,0)	**<0,001**

[1]Pisua (4 hilabete; urtebete; 3 urte; 5 urte) – Egungo pisua < % 5 edo < % -5 (orain dela 4 hilabete; urtebete; 3 urte; 5 urteko pisuarekin konparatuz); [2]Pisua (4 hilabete; urtebete; 3 urte; 5 urte) – Egungo pisua ≥ %5 (orain dela 4 hilabete; urtebete; 3 urte; 5 urteko pisuarekin konparatuz); [3]Pisua (4 hilabete; urtebete; 3 urte; 5 urte) – Egungo pisua ≥ %-5 (orain dela 4 hilabete; urtebete; 3 urte; 5 urteko pisuarekin konparatuz).
[*]Sexu desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra.

4.75. taula: Helburu populazioaren pisu ezaugarriak adinaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, batezbestekoa(DE) edo %	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	*P**
Orain dela 4 hilabeteko pisuarekin konparatuta					
Pisua mantendu du[1]	85,1	76,7	87,3	91,5	
Pisua hartu du[2]	11,8	15,1	10,3	4,8	
Pisua galdu du[3]	3,1	8,2	2,4	3,7	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.75.taularen jarraipena.

Aldagaiak, batezbestekoa(DE) edo %	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	P^*
Orain dela 4 hilabeteko pisuarekin konparatuta					
Pisua mantendu du[1]	85,1	76,7	87,3	91,5	
Pisua hartu du[2]	11,8	15,1	10,3	4,8	
Pisua galdu du[3]	3,1	8,2	2,4	3,7	**<0,001**
Pisua galdu dutenen artean					
Galdutako pisua, kg	-4,7(0,8)	-4,3(1,3)	-5,1(0,8)	-7,7(3,9)	**<0,001**
Pisua hartu dutenen artean					
Hartutako pisua, kg	4,7(2,0)	5,0(1,3)	4,5(1,8)	5,1(2,5)	**<0,001**
Orain dela urtebeteko pisuarekin konparatuta					
Pisua mantendu du[1]	59,6	67,2	71,8	72,0	
Pisua hartu du[2]	31,2	22,4	19,2	17,2	
Pisua galdu du[3]	9,2	10,4	9,0	10,8	**<0,001**
Pisua galdu dutenen artean					
Galdutako pisua, kg	5,0(1,6)	6,9(2,8)	5,4(3,2)	6,4(2,6)	**<0,001**
Pisua hartu dutenen artean					
Hartutako pisua, kg	6,0(3,2)	5,3(2,5)	5,7(1,9)	5,4(2,8)	**<0,001**
Orain dela 3 urteko pisuarekin konparatuta					
Pisua mantendu du[1]	28,7	38,0	50,8	47,2	
Pisua hartu du[2]	62,7	51,7	39,4	37,3	
Pisua galdu du[3]	8,7	10,3	9,8	15,5	**<0,001**
Pisua galdu dutenen artean					
Galdutako pisua, kg	7,0(3,0)	8,5(4,9)	4,7(1,8)	9,9(9,2)	**<0,001**
Pisua hartu dutenen artean					
Hartutako pisua, kg	8,4(5,8)	6,2(2,8)	7,1(3,5)	6,2(2,3)	**<0,001**
Orain dela 5 urteko pisuarekin konparatuta					
Pisua mantendu du[1]	13,6	29,5	36,7	36,9	
Pisua hartu du[2]	78,5	63,3	58,2	42,1	
Pisua galdu du[3]	7,9	7,2	5,2	21,0	**<0,001**
Pisua galdu dutenen artean					
Galdutako pisua, kg	6,5(3,0)	9,5(5,0)	4,9(1,7)	8,2(6,6)	**<0,001**
Pisua hartu dutenen artean					
Hartutako pisua, kg	11,7(8,5)	8,0(4,2)	8,1(4,5)	7,7(3,7)	**<0,001**

[1]Pisua (4 hilabete; urtebete; 3 urte; 5 urte) – Egungo pisua < % 5 edo < % -5 (orain dela 4 hilabete; urtebete; 3 urte; 5 urteko pisuarekin konparatuz); [2]Pisua (4 hilabete; urtebete; 3 urte; 5 urte) – Egungo pisua ≥ % 5 (orain dela 4 hilabete; urtebete; 3 urte; 5 urteko pisuarekin konparatuz); [3]Pisua (4 hilabete; urtebete; 3 urte; 5 urte) – Egungo pisua ≥ % -5 (orain dela 4 hilabete; urtebete; 3 urte; 5 urteko pisuarekin konparatuz).
[*]Adinaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra.

4.76. taula: Helburu populazioaren pisu ezaugarriak EAren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, batezbestekoa(DE) edo %	OZ (n=3.637)	EOZ (n=22.529)	*P*[*]
Orain dela 4 hilabeteko pisuarekin konparatuta			
Pisua mantendu du[1]	85,0	86,6	
Pisua hartu du[2]	11,2	9,2	
Pisua galdu du[3]	3,8	4,3	**<0,001**
Pisua galdu dutenen artean			
Galdutako pisua, kg	3,6(0,4)	5,9(3,0)	**<0,001**
Pisua hartu dutenen artean			
Hartutako pisua, kg	4,4(1,3)	4,9(2,0)	**<0,001**
Orain dela urtebeteko pisuarekin konparatuta			
Pisua mantendu du[1]	75,4	67,4	
Pisua hartu du[2]	17,5	22,0	
Pisua galdu du[3]	7,1	10,6	**<0,001**
Pisua galdu dutenen artean,			
Galdutako pisua, kg	5,9(1,6)	6,1(2,8)	0,105
Pisua hartu dutenen artean			
Hartutako pisua, kg	5,2(2,3)	5,6(2,8)	**<0,001**
Orain dela 3 urteko pisuarekin konparatuta			
Pisua mantendu du[1]	45,9	42,0	
Pisua hartu du[2]	36,6	47,1	
Pisua galdu du[3]	17,5	10,9	**<0,001**
Pisua galdu dutenen artean			
Galdutako pisua, kg	5,5(2,9)	9,3(8,0)	**<0,001**
Pisua hartu dutenen artean			
Hartutako pisua, kg	6,0(2,8)	7,0(4,0)	**<0,001**
Orain dela 5 urteko pisuarekin konparatuta			
Pisua mantendu du[1]	39,5	29,8	
Pisua hartu du[2]	51,2	57,0	
Pisua galdu du[3]	9,3	13,2	**<0,001**
Pisua galdu dutenen artean			
Galdutako pisua, kg	7,0(3,8)	8,0(6,2)	0,166
Pisua hartu dutenen artean			
Hartutako pisua, kg	7,0(3,4)	9,1(5,9)	**<0,001**

[1]Pisua (4 hilabete; urtebete; 3 urte; 5 urte) – Egungo pisua < % 5 edo < % -5 (orain dela 4 hilabete; urtebete; 3 urte; 5 urteko pisuarekin konparatuz); [2]Pisua (4 hilabete; urtebete; 3 urte; 5 urte) – Egungo pisua ≥ % 5 (orain dela 4 hilabete; urtebete; 3 urte; 5 urteko pisuarekin konparatuz); [3]Pisua (4 hilabete; urtebete; 3 urte; 5 urte) – Egungo pisua ≥ % -5 (orain dela 4 hilabete; urtebete; 3 urte; 5 urteko pisuarekin konparatuz).
[*]EAren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra; EA, ezagutza arloa; EOZ, Ez-Osasun Zientziak; OZ, Osasun Zientziak.

4.77. taula: Helburu populazioaren pisu ezaugarriak GnM estatusaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, batezbestekoa(DE) edo %	Ez gehiegizko GnM (n=22.391)	Gehiegizko GnM (n=3.775)	P^*
Orain dela 4 hilabeteko pisuarekin konparatuta			
Pisua mantendu du[1]	86,6	84,9	
Pisua hartu du[2]	9,0	11,7	
Pisua galdu du[3]	4,3	3,5	**<0,001**
Pisua galdu dutenen artean			
Galdutako pisua, kg	5,6(3,1)	5,6(0,5)	**<0,001**
Pisua hartu dutenen artean			
Hartutako pisua, kg	4,6(1,6)	6,0(2,5)	**<0,001**
Orain dela urtebeteko pisuarekin konparatuta			
Pisua mantendu du[1]	71,0	52,0	
Pisua hartu du[2]	18,5	40,7	
Pisua galdu du[3]	10,4	7,3	**<0,001**
Pisua galdu dutenen artean			
Galdutako pisua, kg	6,2(2,8)	5,2(1,3)	**<0,001**
Pisua hartu dutenen artean			
Hartutako pisua, kg	5,2(2,3)	6,7(3,6)	**<0,001**
Orain dela 3 urteko pisuarekin konparatuta			
Pisua mantendu du[1]	45,1	26,6	
Pisua hartu du[2]	41,8	68,9	
Pisua galdu du[3]	13,1	4,5	**<0,001**
Pisua galdu dutenen artean			
Galdutako pisua, kg	8,6(7,5)	4,4(0,2)	**<0,001**
Pisua hartu dutenen artean			
Hartutako pisua, kg	6,7(3,9)	7,9(3,6)	**<0,001**
Orain dela 5 urteko pisuarekin konparatuta			
Pisua mantendu du[1]	33,4	17,4	
Pisua hartu du[2]	52,5	80,0	
Pisua galdu du[3]	14,0	2,6	**<0,001**
Pisua galdu dutenen artean			
Galdutako pisua, kg	8,0(6,1)	5,4(1,2)	**0,006**
Pisua hartu dutenen artean			
Hartutako pisua, kg	8,5(5,5)	10,0(6,1)	**<0,001**

[1]Pisua (4 hilabete; urtebete; 3 urte; 5 urte) – Egungo pisua < % 5 edo < % -5 (orain dela 4 hilabete; urtebete; 3 urte; 5 urteko pisuarekin konparatuz); [2]Pisua (4 hilabete; urtebete; 3 urte; 5 urte) – Egungo pisua ≥ % 5 (orain dela 4 hilabete; urtebete; 3 urte; 5 urteko pisuarekin konparatuz); [3]Pisua (4 hilabete; urtebete; 3 urte; 5 urte) – Egungo pisua ≥ % -5 (orain dela 4 hilabete; urtebete; 3 urte; 5 urteko pisuarekin konparatuz).
*Gantz-masa estatusaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra; GnM, gantz-masa.

Helburu populazioaren pisuaren pertzepzioa eta pisuarekiko portaeren informazioa **4.78., 4.79., 4.80. eta 4.81. tauletan** azaltzen da eta baita datu hauek sexua, adina, EA eta GnM estatusaren arabera ere. Ikasleen % 28,6 bere pisua gehiegizkoa zela kontsideratzen zuten, eta pertzepzio hau altuagoa zen emakumeetan, ikasle nagusienetan, OZtakoetan eta gehiegizko GnM zuten ikasleetan beste kategorietako ikasleekin konparatuz. Gure kasuan, bere egungo pisua astuna zela kontsideratzen zuen portzentajea Koreako helduena baino baxuagoa izan zen(125), nahiz eta bi kasuetan pisu astunaren pertzepzioa altuagoa izan emakumeetan gizonetan baino. Sexu desberdintasun hauek gorputz idealari buruzko arauak sexuen arabera desberdinak direlako eman ahal dira(125). Norberak adierazitako GMIren informazioa sexua, adina, EA eta GnM estatusaren araberako informazioa 4.1.8. atalean deskribatzen da.

Partaideen erdia baino gehiagok bere “pisua ondo”, “pisuan batzuetan pentsatzen zutela” eta “pisua garrantzitsua” zela azaldu zuten eta baita “gainpisua zuten emakumeen estigmatizazioa gizonena baino altuagoa” dela eta “gure gizarteak gainpisua duten pertsonak diskriminatzen dituela” ere pentsatzen zuten. Aldagai guztietan, gainpisuaren diskriminazioan izan ezik, sexu desberdintasunak behatu ziren (P < 0,001) (4.78. taula). Emaitza hauek aditzera ematen duten gorputza eta itxura fisikoa emakumeentzako gizonentzako baino garrantzitsuago dela eta hau bat dator aurretik egindako beste ikerketa batzuekin(126,127). Pisatzearen lekua eta maiztasuna gehiengoarentzako etxea eta hilean behin izan zen eta sexua, adina, EA eta GnM estatusaren araberako desberdintasunak behatu ziren (P < 0,001) (4.78., 4.79., 4.80. eta 4.81. taulak).

Partaideen gehiengoarentzat, pisua mantentzea eta galtzea ez zen “ez zaila ez erraza” eta pisua hartzea “erraza/oso erraza”, eta nahi zutena jaten zutela kontsideratzen zuten. Sexua, adina, A eta GnM estatusaren araberako desberdintasunak behatu ziren aldagai guztietan (P < 0,001). Gehiegizko GnM zuten ikasleei dagokionez, heren bat baino gehiagori “pisua mantentzea zaila” egiten zitzaion eta bi heren baino gehiagori “pisua hartzea nahiko erraza” eta “pisua galtzea zaila edo oso zaila” egiten zitzaien (4.78, 4.79., 4.80. eta 4.81 taulak). Pisua galtzeko zailtasuna gehiegizko GnM zuten ikasleen artean, gainpisua edo obesitatea zuten Arabiako emakume unibertsitate ikasleetan ere behatu zen(128). Pisua galtzea eta mantentzea gaur egun ere erronka bat da giza biologia, portaera eta ingurugiroaren arteko interakzioa delako(129).

Laginaren % 60a baino gehiagok bere pisua galtzeko ezer ez zuela egiten adierazi zuen. Pisua aldatzeko zerbait egiten ari zirenen artean, AF eta dieta aukera nagusienak izan ziren Errumania(130) eta Libanoko(131) ikasleetan edo Koreako helduetan(125) egindako ikerketetan. Sexua, adina, EA eta GnM estatusaren araberako desberdintasunak (P < 0,001) (4.78, 4.79., 4.80. eta 4.81 taulak). Unibertsitate ikasle eta heldu populazioan egindako beste ikerketa batzuetan(132,133) bezala, estrategia ez osasuntsuak (otordu batzuk ez egitea, botaka edo pilulak hartzea) ez ziren ohikoak helburu populazioan (laginaren % 10,3a). Populazioaren % 9,9a dietan zegoen, eta portzentaje hau Italian egindako beste ikerketa baten(134) antzekoa eta Errumaniako unibertsitate ikasleetan egindakoaren baino baxuagoa(130). Dietan zeuden partaideen artean, gehienek bere kabuz egiten zuten dieta eta pisua galtzea zen arrazoi nagusiena. Sexu desberdintasunak behatu ziren dietaren arrazoi nagusian, gizonek giharra handitzea eta emakumeak pisua galtzea nahi zutelako (P < 0,001) (4.79. taula) eta emaitza hau edertasunaren gizarte estereotipoaren ondorio izan daiteke; argaltasuna emakumearen gorputz irudi ideala(106) delako eta gorputz gihartsuak gizonena(107).

Dieta portaerari buruzko emaitzei dagokiolarik, adina, EA eta GnM estatusaren arabera, ikasle nagusien, EOZtakoen eta gehiegizko GnM zutenen joera dietan egotea zen beste kategorietako partaideekin erkatuz (P < 0,001) (4.79., 4.80. eta 4.81. taulak). GnM estatusaren kasuan, gehiegizko GnM zutenen artean dietan zegoen partaideen portzentajea gehiegizko GnM ez zuten ikasleena baino altuagoa zen eta hau, gainpisua/obesitatea zuten ikasleek bere gorputza astuna/oso astuna zela kontsideratzen zutelako izan daiteke, baina baita bere GIIrekin gehiegizko atsekabea zutelako eta bere goiko eta beheko gorputz atalekin ere. Eta GIA, beste unibertsitate ikasleetan egindako ikerketetan(135,136) agerian gelditu den bezala pisua galtzeko portaeretan eragina izan dezake.

4.78. taula: Helburu populazioaren pisu kontrolaren ezaugarriak sexuaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, batezbestekoa(DE) edo %	Lagin osoa (n=26.165)	Gizonak (n=10.607)	Emakumeak (n=15.558)	P^*
Pisuaren pertzepzioa				
Gustatuko litzaizukeen pisua, kg	61,8(13,4)	72,3(11,9)	55,1(9,4)	**<0,001**
Pisu osasuntsua, kg	63,2(11,0)	72,8(7,5)	56,4(7,5)	**<0,001**
Egungo pisuaren pertzepzioa				
Argala/argalegia	15,2	20,9	12,3	
Ondo	55,1	51,3	57,7	
Gizena/gizenegia	28,6	27,9	29,1	
ED/EE	1,1	-	1,9	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.78. taularen jarraipena.

Aldagaiak, batezbestekoa(DE) edo %	Lagin osoa (n=26.165)	Gizonak (n=10.607)	Emakumeak (n=15.558)	*P* *
Zenbateko maiztasunarekin pentsatzen dute bere pisuan				
Inoiz	9,9	13,0	7,8	
Batzuetan	49,6	48,4	50,4	
Sarri	32,2	30,9	33,0	
Beti	8,3	7,7	8,7	**<0,001**
Pisuaren garrantzia				
Ez da oso garrantzitsua	15,0	17,5	13,3	
Pixkat garrantzitsua	59,0	59,4	60,2	
Garrantzitsua	23,8	21,6	25,3	
Oso garrantzitsua	1,3	1,6	1,2	**<0,001**
Pisua				
Pisatzeko lekua				
Etxean	66,7	68,4	65,6	
Osasunaren profesionala	25,4	17,1	30,9	
Norberak estimatuta	1,7	1,6	1,7	
Kirolarekin lotutako lekua	5,5	12,3	1,0	
Besteak[1]	0,7	0,6	0,8	**<0,001**
Pisatzeko maiztasuna				
Egunean behin	3,9	5,0	3,2	
Astean behin	22,5	26,2	20,0	
Hilean behin	39,1	40,7	38,0	
Urtean behin edo gutxiago	34,0	28,1	38,1	
ED/EE	0,4	-	0,7	**<0,001**
Pisua mantentzea/galtzea				
Pisua ez badute zaintzen, ...pisatuko zuten				
Gutxiago	10,5	13,4	7,0	
Berdina	18,6	21,1	16,9	
Gehiago	69,4	63,6	73,4	
ED/EE	2,4	2,0	2,7	**<0,001**
Pisua mantentzea...da				
Erraza/oso erraza	27,7	41,4	18,4	
Ez zaila ez erraza	49,8	42,1	55,0	
Zaila/oso zaila	20,5	15,6	23,9	
ED/EE	2,0	0,9	2,7	**<0,001**
Pisua hartzea...da				
Erraza/oso erraza	43,9	38,2	47,7	
Ez zaila ez erraza	28,3	17,7	35,6	
Zaila/oso zaila	25,4	41,3	14,5	
ED/EE	2,5	2,8	2,3	**<0,001**
Pisua galtzea...da				
Erraza/oso erraza	21,5	25,5	18,7	
Ez zaila ez erraza	35,2	34,8	35,6	
Zaila/oso zaila	40,1	34,8	43,7	
ED/EE	3,2	4,9	2,0	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.78. taularen jarraipena.

Aldagaiak, batezbestekoa(DE) edo %	Lagin osoa (n=26.165)	Gizonak (n=10.607)	Emakumeak (n=15.558)	*P*[*]
Nahi baino gehiago/gutxiago jan				
Gutxiago/askoz gutxiago	35,1	23,6	42,9	
Nahi beste	57,2	63,7	52,7	
Gehiago/askoz gehiago	7,3	11,7	4,4	
ED/EE	0,4	1,1	-	**<0,001**
Pisua kontrolatzeko estrategiak				
Pisua mantentzeko	11,6	10,1	12,6	
Pisua galtzeko	16,3	15,2	17,1	
Pisua hartzeko	8,2	17,8	1,7	
Ezer	63,7	56,7	68,5	
ED/EE	0,4	0,2	0,1	**<0,001**
Estrategia mota				
Ariketa fisiko gehiago	53,9	60,9	46,9	
Dietan egon	41,1	35,3	46,9	
Otorduak ez egin	0,6	-	1,1	
Botaka eta/edo pilulak	0,6	-	1,3	
ED/EE	3,8	3,8	3,8	**<0,001**
Dieta egin				
Bai	9,9	9,8	9,9	
Ez	90,1	90,2	90,1	0,700
Dieta mota				
Bere kabuz	67,6	60,4	72,4	
Sanitario baten kontseilua	19,3	18,3	20,1	
Kirol entrenamendua	2,7	6,7	-	
Besteak[2]	10,4	14,6	7,5	**<0,001**
Dieta egitearen arrazoi nagusia				
Pisua galdu	40,3	26,1	48,4	
Pisua mantentzeko	10,7	19,3	5,7	
Osasuntsuago bizitzeko	14,4	2,1	21,4	
Gaixotasun batengatik	13,2	3,9	18,6	
Giharrak handitzeko	12,7	32,2	1,5	
Kirolagatik	8,7	16,3	4,3	**<0,001**
Pisuarekiko gizarte jarrerak				
Gainpisuaren estigmatizazioa emakumeak vs. gizonak				
Bai	45,3	39,7	49,1	
Ez	50,6	56,3	46,7	
ED/EE	4,1	4,0	4,2	**<0,001**
Gainpisua duten pertsonen gizarte diskriminazioa				
Bai	92,3	92,6	92,1	
Ez	4,5	4,4	4,6	
ED/EE	3,1	3,0	3,2	0,321

[1]Naturistan, ikerkuntza batean eta zentro komertzialean; [2]Besteak, elikagai batzuk ez ditu ondo toleratzen senide bat dietan dago.
[*]Sexu desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra; ED/EE, ez daki, ez du erantzun.

4.79. taula: Helburu populazioaren pisu kontrolaren ezaugarriak adinaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, batezbestekoa(DE) edo %	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	P^*
Pisuaren pertzepzioa					
Gustatuko litzaizukeen pisua, kg	63,3(14,7)	63,4(11,0)	61,2(14,6)	63,3(10,8)	**<0,001**
Pisu osasuntsua, kg	64,4(11,3)	63,8(10,4)	63,7(11,5)	63,7(10,1)	**<0,001**
Egungo pisuaren pertzepzioa					
Argala/argalegia	16,2	10,5	11,9	20,1	
Ondo	58,7	59,2	65,3	45,5	
Gizena/gizenegia	22,9	29,6	22,9	34,0	
ED/EE	2,3	0,7	-	1,4	**<0,001**
Zenbateko maiztasunarekin pentsatzen dute bere pisuan					
Inoiz	10,2	5,4	9,8	12,4	
Batzuetan	53,2	54,7	46,6	46,7	
Sarri	27,8	33,9	34,4	32,1	
Beti	8,8	6,0	9,3	8,7	**<0,001**
Pisuaren garrantzia					
Ez da oso garrantzitsua	19,2	8,4	15,3	16,3	
Pixkat garrantzitsua	56,4	65,6	59,0	58,9	
Garrantzitsua	24,4	25,2	25,0	22,1	
Oso garrantzitsua	-	0,8	0,7	2,6	**<0,001**
Pisua					
Pisatzeko lekua					
Etxean	64,8	75,8	57,5	67,9	
Osasunaren profesionala	31,4	20,7	33,6	22,6	
Norberak estimatuta	0,9	0,9	1,0	2,8	
Kirolarekin lotutako lekua	2,0	0,6	8,1	7,7	
Besteak[1]	1,5	2,0	-	-	**<0,001**
Pisatzeko maiztasuna					
Egunean behin	5,1	2,3	2,4	5,0	
Astean behin	17,4	19,9	23,1	26,2	
Hilean behin	42,1	43,5	40,1	34,7	
Urtean behin edo gutxiago	35,3	33,5	34,3	33,5	
ED/EE	-	0,8	-	0,7	**<0,001**
Pisua mantentzea/galtzea					
Pisua ez badute zaintzen, ...pisatuko zuten					
Gutxiago	8,9	12,3	9,3	8,5	
Berdina	22,6	11,3	18,6	20,6	
Gehiago	64,0	75,0	70,6	68,5	
ED/EE	4,4	1,4	1,5	2,4	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.79. taularen jarraipena.

Aldagaiak, batezbestekoa(DE) edo %	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	P^*
Pisua mantentzea...da					
Erraza/oso erraza	30,3	22,4	22,7	32,1	
Ez zaila ez erraza	49,6	53,2	55,4	44,9	
Zaila/oso zaila	20,1	19,0	20,3	21,7	
ED/EE	-	5,4	1,5	1,4	**<0,001**
Pisua hartzea...da					
Erraza/oso erraza	39,1	46,1	44,3	44,8	
Ez zaila ez erraza	30,1	36,3	29,0	22,7	
Zaila/oso zaila	29,8	16,3	23,3	29,1	
ED/EE	1,0	1,4	3,4	3,4	**<0,001**
Pisua galtzea...da					
Erraza/oso erraza	24,6	15,5	21,6	23,1	
Ez zaila ez erraza	36,4	41,3	34,4	31,8	
Zaila/oso zaila	36,6	41,1	38,8	42,0	
ED/EE	2,4	-	5,1	3,1	**<0,001**
Nahi baino gehiago/gutxiago jan					
Gutxiago/askoz gutxiago	37,1	35,8	34,2	34,2	
Nahi beste	53,4	57,5	60,5	57,0	
Gehiago/askoz gehiago	9,5	6,8	5,4	7,6	
ED/EE	-	-	-	1,1	**<0,001**
Pisua kontrolatzeko estrategiak					
Pisua mantentzeko	8,9	9,3	14,4	12,6	
Pisua galtzeko	13,8	18,1	15,1	17,3	
Pisua hartzeko	8,5	9,4	6,0	8,7	
Ezer	68,8	63,3	64,5	61,0	
ED/EE	-	-	-	0,4	**<0,001**
Estrategia mota					
Ariketa fisiko gehiago	60,4	55,9	81,2	51,6	
Dietan egon	36,3	38,8	14,6	42,6	
Otorduak ez egin	-	-	-	1,4	
Botaka eta/edo pilulak	-	-	-	1,6	
ED/EE	3,3	5,3	4,3	2,8	**<0,001**
Dieta egin					
Bai	3,4	11,5	7,8	13,3	
Ez	96,6	88,5	92,2	86,7	**<0,001**
Dieta mota					
Bere kabuz	100,0	69,3	34,8	73,3	
Sanitario baten kontseilua	-	23,5	43,8	11,8	
Kirol entrenamendua	-	-	-	9,7	
Besteak[2]	-	7,2	21,4	5,2	**<0,001**
Dieta egitearen arrazoi nagusia					
Pisua galdu	50,8	38,4	28,2	44,9	
Pisua mantentzeko	16,7	9,3	37,1	27,3	
Osasuntsuago bizitzeko	-	6,8	21,3	9,0	

Hurrengo orrialdean jarraitzen du.

4.79. taularen jarraipena.

Aldagaiak, batezbestekoa(DE) edo %	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	*P* [*]
Dieta egitearen arrazoi nagusia					
Gaixotasun batengatik	-	17,7	-	-	
Giharrak handitzeko	32,5	18,5	13,5	5,6	
Kirolagatik	-	9,3	-	13,2	**<0,001**
Pisuarekiko gizarte jarrerak					
Gainpisuaren estigmatizazioa emakumeak vs. gizonak					
Bai	43,3	44,2	49,3	44,7	
Ez	53,5	49,3	47,2	51,7	
ED/EE	3,2	6,5	3,5	3,7	**<0,001**
Gainpisua duten pertsonen gizarte diskriminazioa					
Bai	91,1	93,0	92,2	92,6	
Ez	4,8	3,2	6,1	4,3	
ED/EE	4,0	3,7	1,7	3,1	**<0,001**

[1]Besteak, elikagai batzuk ez ditu ondo toleratzen, senide batek hasi duelako; [2]Naturistan, ikerkuntza batean eta zentro komertzialean.
[*]Adinaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra; ED/EE, ez daki, ez du erantzun.

4.80. taula: Helburu populazioaren pisu kontrolaren ezaugarriak EAren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, batezbestekoa(DE) edo %	OZ (n=3.637)	EOZ (n=22.529)	*P* [*]
Pisuaren pertzepzioa			
Gustatuko litzaizukeen pisua, kg	60,0(10,4)	62,3(13,8)	**<0,001**
Pisu osasuntsua, kg	60,4(9,2)	63,7(11,2)	**<0,001**
Egungo pisuaren pertzepzioa			
Argala/argalegia	12,2	15,7	
Ondo	60,0	54,3	
Gizena/gizenegia	27,1	28,8	
ED/EE	-	1,2	**<0,001**
Zenbateko maiztasunarekin pentsatzen dute bere pisuan			
Inoiz	6,9	10,4	
Batzuetan	40,9	51,0	
Sarri	42,3	30,5	
Beti	10,0	8,0	**<0,001**
Pisuaren garrantzia			
Ez da oso garrantzitsua	10,5	15,7	
Pixkat garrantzitsua	57,0	60,3	
Garrantzitsua	32,5	22,4	
Oso garrantzitsua	-	1,6	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.80. taularen jarraipena.

Aldagaiak, batezbestekoa(DE) edo %	OZ (n=3.637)	EOZ (n=22.529)	P^*
Zenbateko maiztasunarekin pentsatzen dute bere pisuan			
Pisua			
Pisatzeko lekua			
Etxean	51,5	69,2	
Osasunaren profesionala	45,8	22,1	
Norberak estimatuta	-	1,9	
Kirolarekin lotutako lekua	2,8	3,8	
Pisatzeko lekua			
Besteak[1]	-	0,8	**<0,001**
Pisatzeko maiztasuna			
Egunean behin	0,7	4,4	
Astean behin	23,7	22,3	
Hilean behin	50,3	37,3	
Urtean behin edo gutxiago	25,3	35,4	
ED/EE	-	0,5	**<0,001**
Pisua mantentzea/galtzea			
Pisua ez badute zaintzen, ...pisatuko zuten			
Gutxiago	8,4	9,7	
Berdina	16,3	19,0	
Gehiago	74,7	68,6	
ED/EE	0,7	2,7	**<0,001**
Pisua mantentzea...da			
Erraza/oso erraza	15,9	29,6	
Ez zaila ez erraza	58,4	48,4	
Zaila/oso zaila	23,9	20,9	
ED/EE	1,8	2,0	**<0,001**
Pisua hartzea...da			
Erraza/oso erraza	49,4	43,0	
Ez zaila ez erraza	33,6	27,5	
Zaila/oso zaila	12,1	27,5	
ED/EE	5,0	2,1	**<0,001**
Pisua galtzea...da			
Erraza/oso erraza	26,4	20,7	
Ez zaila ez erraza	31,3	35,9	
Zaila/oso zaila	41,7	39,9	
ED/EE	0,7	3,6	**<0,001**
Nahi baino gehiago/gutxiago jan			
Gutxiago/askoz gutxiago	48,4	33,0	
Nahi beste	46,4	58,9	
Gehiago/askoz gehiago	4,3	7,8	
ED/EE	0,9	0,4	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.80. taularen jarraipena.

Aldagaiak, batezbestekoa(DE) edo %	OZ (n=3.637)	EOZ (n=22.529)	*P*[*]
Pisua kontrolatzeko estrategiak			
Pisua mantentzeko	13,5	11,3	
Pisua galtzeko	12,7	16,9	
Pisua hartzeko	4,0	8,9	
Ezer	69,7	62,8	
ED/EE	-	0,2	**<0,001**
Estrategia mota			
Ariketa fisiko gehiago	54,1	57,6	
Dietan egon	41,1	38,0	
Otorduak ez egin	0,6	-	
Estrategia mota			
Botaka eta/edo pilulak	0,7	-	
ED/EE	3,4	4,4	**<0,001**
Dieta egin			
Bai	6,0	10,5	
Ez	94,0	89,5	**<0,001**
Dieta mota			
Bere kabuz	53,7	68,9	
Sanitario baten kontseilua	46,3	16,8	
Kirol entrenamendua	-	2,9	
Besteak[2]	-	11,4	**<0,001**
Dieta egitearen arrazoi nagusia			
Pisua galdu	17,4	42,5	
Pisua mantentzeko	12,8	10,5	
Osasuntsuago bizitzeko	-	15,8	
Gaixotasun batengatik	52,3	9,4	
Giharrak handitzeko	17,5	12,2	
Kirolagatik	-	9,6	**<0,001**
Pisuarekiko gizarte jarrerak			
Gainpisuaren estigmatizazioa emakumeak vs. gizonak			
Bai	52,0	44,2	
Ez	45,6	51,4	
ED/EE	2,5	4,4	**<0,001**
Gainpisua duten pertsonen gizarte diskriminazioa			
Bai	90,0	92,7	
Ez	9,1	3,8	
ED/EE	0,9	3,5	**<0,001**

[1]Besteak, elikagai batzuk ez ditu ondo toleratzen, senide batek hasi duelako; [2]Naturistan, ikerkuntza batean eta zentro komertzialean.
[*]EAren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra; EA, ezagutza arloa; ED/EE, ez daki, ez du erantzun; EOZ, Ez-Osasun Zientziak; OZ, Osasun Zientziak.

4.81. taula: Helburu populazioaren pisu kontrola GnM estatusaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, batezbestekoa(DE) edo %	Ez gehiegizko GnM (n=22.391)	Gehiegizko GnM (n=3.775)	P^*
Pisuaren pertzepzioa			
Gustatuko litzaizukeen pisua, kg	62,1(10,9)	67,2(9,9)	**<0,001**
Pisu osasuntsua, kg	62,6(11,1)	67,0(9,6)	**<0,001**
Egungo pisuaren pertzepzioa			
Argala/argalegia	16,7	-	
Ondo	59,9	26,7	
Gizena/gizenegia	21,2	69,2	
ED/EE	1,1	4,1	**<0,001**
Zenbateko maiztasunarekin pentsatzen dute bere pisuan			
Inoiz	10,8	4,9	
Batzuetan	48,8	54,8	
Sarri	33,1	26,5	
Beti	7,4	13,8	**<0,001**
Pisuaren garrantzia			
Ez da oso garrantzitsua	15,6	11,4	
Pixkat garrantzitsua	60,0	59,1	
Garrantzitsua	23,2	27,7	
Oso garrantzitsua	1,3	1,8	**<0,001**
Pisua			
Pisatzeko lekua			
Etxean	66,2	70,0	
Osasunaren profesionala	25,1	26,8	
Norberak estimatuta	1,6	2,0	
Kirolarekin lotutako lekua	6,2	1,1	
Besteak[1]	0,8	-	**<0,001**
Pisatzeko maiztasuna			
Egunean behin	3,8	4,4	
Astean behin	21,6	28,0	
Hilean behin	39,6	36,4	
Urtean behin edo gutxiago	34,5	31,3	
ED/EE	0,5	-	**<0,001**
Pisua mantentzea/galtzea			
Pisua ez badute zaintzen, ...pisatuko zuten			
Gutxiago	10,1	6,4	
Berdina	19,8	11,2	
Gehiago	67,6	80,0	
ED/EE	2,4	2,3	**<0,001**
Pisua mantentzea...da			
Erraza/oso erraza	28,6	22,2	
Ez zaila ez erraza	52,8	31,7	
Zaila/oso zaila	16,6	44,0	
ED/EE	2,0	2,0	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.81. taularen jarraipena.

Aldagaiak, batezbestekoa(DE) edo %	Ez gehiegizko GnM (n=22.391)	Gehiegizko GnM (n=3.775)	P^*
Pisua hartzea...da			
Erraza/oso erraza	39,0	72,6	
Ez zaila ez erraza	30,1	17,6	
Zaila/oso zaila	28,3	8,1	
ED/EE	2,6	1,7	**<0,001**
Pisua galtzea...da			
Erraza/oso erraza	23,1	11,6	
Ez zaila ez erraza	38,8	14,1	
Zaila/oso zaila	34,7	72,2	
ED/EE	3,4	2,0	**<0,001**
Nahi baino gehiago/gutxiago jan			
Gutxiago/askoz gutxiago	30,8	60,1	
Nahi beste	61,3	32,8	
Gehiago/askoz gehiago	7,4	7,1	
ED/EE	0,5	-	**<0,001**
Pisua kontrolatzeko estrategiak			
Pisua mantentzeko	12,2	8,0	
Pisua galtzeko	12,5	39,2	
Pisua hartzeko	9,2	2,0	
Ezer	66,0	50,2	
ED/EE	0,1	0,6	**<0,001**
Estrategia mota			
Ariketa fisiko gehiago	53,8	56,6	
Dietan egon	40,5	41,2	
Otorduak ez egin	0,7	-	
Botaka eta/edo pilulak	0,2	2,2	
ED/EE	4,8	-	**<0,001**
Dieta egin			
Bai	9,7	11,1	
Ez	90,3	88,9	**<0,01**
Dieta mota			
Bere kabuz	64,5	83,4	
Sanitario baten kontseilua	19,9	16,6	
Kirol entrenamendua	3,2	-	
Besteak[2]	12,4	-	**<0,001**
Dieta egitearen arrazoi nagusia			
Pisua galdu	29,8	83,4	
Pisua mantentzeko	10,2	12,6	
Osasuntsuago bizitzeko	17,9	-	
Gaixotasun batengatik	15,5	4,0	
Giharrak handitzeko	15,8	-	
Kirolagatik	10,8	-	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.81. taularen jarraipena.

Aldagaiak, batezbestekoa(DE) edo %	Ez gehiegizko GnM (n=22.391)	Gehiegizko GnM (n=3.775)	P^*
Pisuarekiko gizarte jarrerak			
Gainpisuaren estigmatizazioa emakumeak vs. gizonak			
Bai	45,4	44,4	
Ez	51,7	44,0	
ED/EE	2,9	11,6	**<0,001**
Gainpisua duten pertsonen gizarte diskriminazioa			
Bai	92,1	93,6	
Ez	4,4	5,0	
ED/EE	3,4	1,4	**<0,001**

[1]Besteak, elikagai batzuk ez ditu ondo toleratzen, senide batek hasi duelako; [2]Naturistan, ikerkuntza batean eta zentro komertzialean.
[*]Gantz-masa estatusaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra; ED/EE, ez daki, ez du erantzun; GnM, gantz-masa.

4.7. Nutrizioari buruzko jakintzak

Ikasleen erdia baino gehiagok kontsideratzen zuen bere nutrizioari buruzko jakintzak "onak" zirela, gehien bat, gizonen, ikasle gazteen, OZtakoen eta gehiegizko GnM zuten ikasleen kasuan, beste kategorietako ikasleekin erkatuta (P < 0,001). Hala ere, ikasle gazteen eta gehiegizko GnM zutenen erantzun zuzenen portzentajea ez zen izan beste kategoriakoak bezain altuak. Erabilitako nutrizioari buruzko jakintzen galdetegian, erantzun zuzenen portzentajea gizonetan emakumeetan baino altuagoa izan zen (P < 0,001) (**4.82. taula**). Emaitza hau espero genuenaren kontrakoa da eta baita beste ikertzaile batzuk[20,51,137] aurkitutakoaren kontrakoa ere, emakumeek interes gehiago izaten dutelako dieta, nutrizioa eta gorputz pisuarekin lotutako gaiekin, unibertsitatean dauden bitartean batez ere[132,138]. Azpimarratzekoa da ikerketa honetan emakumeek galdera gehiago utzi zituztela erantzun gabe (P < 0,001).

Adinaren araberako emaitzei dagokionez, ikasle nagusienek beste adinetako ikasleek baino galdera gehiago erantzun zituzten zuzen (P < 0,001) (**4.83. taula**). Emaitza hauek beste autore batzuenekin bat datoz[20]. Eta espero zen bezala, OZtako ikasleek EOZtakoek baino portzentaje altuagoak lortu zituzten erantzun zuzenetan (P < 0,001) (**4.84. taula**), Bottcher *et al*.-ek egindako ikerketan bezala[139]. Azkenik, GnM estatusaren araberako erantzun okerrei dagokionez, GnM normala zuten ikasleek gehiegizko GnM zuten ikasleek baino puntuazio altuagoa lortu zuten (P < 0,001) (**4.85. taula**) eta atal honetako nutrizio kontseiluekiko interes gutxiago izatearen ondorio izan daiteke[140]. Aurretik egindako ikerketek[141] ez dute bermatu nutrizio jakintzei eta gainpisua/obesitatearen arteko asoziazio esanguratsurik. Emaitza hauek aditzera ematen dute ikertutako populazioan dieta eta nutrizioari buruzko jakintzak hobetzeko hezkuntza ez dela aldagai garrantzitsua pisua galtzeko prozesuan.

4.82. taula: Helburu populazioaren nutrizio jakintzen ezaugarriak sexuaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Erantzun zuzen, oker eta erantzunik gabeko galderen portzentajea, batezbestekoa(DE)	Lagin osoa (n=26.165)	Gizonak (n=10.607)	Emakumeak (n=15.558)	*P**
Zuzenak	61,5(14,8)	63,2(13,4)	60,3(15,5)	**<0,001**
Okerrak	15,6(9,2)	15,7(9,1)	15,5(9,3)	0,426
Ez daki/Ez du erantzun	23,0(15,8)	21,1(15,0)	24,2(16,2)	**<0,001**

*Sexu desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra.

4.83. taula: Helburu populazioaren nutrizio jakintzen ezaugarriak adinaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Erantzun zuzen, oker eta erantzunik gabeko galderen portzentajea, batezbestekoa(DE)	18 urte (n=4.996)	19 urte (n=5.536)	20 urte (5.523)	≥ 21 urte (10.110)	*P**
Zuzenak	60,9(13,2)	58,7(15,1)	60,5(14,8)	63,7(14,9)	**<0,001**
Okerrak	17,3(9,3)	16,3(9,5)	15,2(9,1)	14,5(9,0)	**<0,001**
Ez daki/Ez du erantzun	21,7(13,6)	25,0(16,2)	24,3(16,2)	21,8(16,1)	**<0,001**

*Adinaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra.

4.84. taula: Helburu populazioaren nutrizio jakintzen ezaugarriak EAren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Erantzun zuzen, oker eta erantzunik gabeko galderen portzentajea, batezbestekoa(DE)	OZ (n=3.637)	EOZ (n=22.529)	*P**
Zuzenak	69,9(14,0)	60,1(14,4)	**<0,001**
Okerrak	13,2(7,5)	16,0(9,4)	**<0,001**
Ez daki/Ez du erantzun	16,9(12,8)	23,9(16,0)	**<0,001**

*EAren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra; EA, ezagutza arloa; EOZ, Ez-Osasun Zientziak; OZ, Osasun Zientziak.

4.85. taula: Helburu populazioaren nutrizio jakintzen ezaugarriak GnM estatusaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Erantzun zuzen, oker eta erantzunik gabeko galderen portzentajea, batezbestekoa(DE)	Ez gehiegizko GnM (n=22.391)	Gehiegizko GnM (n=3.775)	*P**
Zuzenak	61,5(14,7)	61,3(15,1)	0,396
Okerrak	15,7(9,3)	15,1(8,9)	**0,005**
Ez daki/Ez du erantzun	22,9(15,8)	23,5(15,8)	**0,029**

*Gantz-masa estatusaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra; GnM, gantz-masa.

4.8. Antropometria eta indize deribatuak

Helburu populazioaren antropometriako neurrien informazioa **4.86. taulan** azaltzen da. Partaideen batezbesteko GMI 22,3 kg/m^2-koa zen, Espainiako beste autonomia erkidego baten[142] eta Iraneko[143] unibertsitate ikasleen antzekoa. Ikasleen ia hiru laurdenak neurrizko pisua zuen GMI sailkapenaren arabera eta gainpisu/obesitatearen portzentajea, GMI eta GnM % arabera eta gizonetan emakumeetan baino altuagoa zen (P < 0,001). GMIren araberako gainpisu/obesitatearen prebalentzia % 15,2koa izan zen, Europan egindako beste ikerketa batzuena baino baxuagoa[89,143,145,146].

Bestalde, GnM %ren batezbestekoa (% 14,4 laginan, % 16,1 gizonetan eta % 13,3 emakumeetan, P < 0,001) Espainiako beste eskualde batzuetako unibertsitate ikasleena[6,146] baino baxuagoa izan zen baina Danimarka eta Greziako ikasleena baino altuagoa[53]. Gizonetan behatzen den obesitate prebalentzia altuagoaren oinarria barneratutako ohitura ez-osasuntsuetan datza, hala nola, gida dietetikoei atxikidura baxua[117,147,1148] eta dieta patroi okerra **2. ikerketan** agerian gelditzen den bezala eta baita emakumeek argal egoteko presio handiagoa jasaten dutelako ere[149].

Adinaren araberako emaitzek erakusten dute ikasle nagusiagoen GMI gazteena baino altuagoa dela, nahiz eta neurrizko pisuan egon (P < 0,001) eta baita GMI eta GnM %ren araberako obesitate prebalentzia altuagoak dituztela ere beste adinetako ikasleekin konparatzean (P < 0,001) (**4.87. taula**). GMI eta GnM % igoera adinak gora egiten duen heinean Europako eta Ameriketako beste unibertsitate ikasle batzuetan[150,151] ere behatu da eta bi arrazoi antzeman dira gertaera hau frogatzeko. Lehenengoa, unibertsitateko azken urtean ikasleek bere denboraren maneiua oztopatzen duten hainbat jarduera dituztela eta honek energia balantzearekin lotutako portaeretan eragina izan dezake eta hau gainpisua eta obesitatearekin lotuta dago(150). Bigarrena, ikasle nagusienak gazteenak baino independenteagoak dira eta euren buruaren arduradunagoak(150).

EAren araberako emaitzei dagokionez, zirkunferentzia neurri guztiak EOZtako ikasleetan OZtakoetan baino altuagoak izan ziren baina gehiegizko GnM zuten ikasleen portzentaje altuagoa OZtako ikasleetan eman zen (P < 0,001) (**4.88. taula**). Datu honek ez du bermatzen gure hasierako hipotesia, baina seguraski OZtako ikasleek aurkezten duten energia ahorakin altuagoa, AF baxuagoa, nutrizioarekiko jarreretan puntuazio baxuagoa eta pisua galtzeko oztopo gehiago eta nahi dutena jatearen ondorio izan daiteke.

Gehiegizko GnM zuten ikasleen artean, % 39,7 neurrizko pisua bezala sailkatu ziren GMI arabera eta norberak adierazitako GMI arabera % 51, eta gehiegizko GnM ez zutenen artean, ordea, % 7 gainpisua/obesitate bezala sailkatu ziren neurtutako edo norberak adierazitako GMIren arabera (**4.89. taula**). Emaitza hauek Espainiako unibertsitate ikasleetan egindako ikerketaren antzekoak dira(152), eta agerian lagatzen dute GMI gorputzeko GnM estimatzeko tresna ahula dela. Ildo honetan, gainpisua/obesitatea pairatzen zuten ikasleak identifikatzeko erabilitako 3 metodoen konparaketak (neurtutako eta norberak adierazitako GMI eta Brownell-en siluetak) GnM %rekin erkatuta, erreferentziako metodoa, agerian laga zuen espezifikotasun maila ona baina sentsibilitate baxua, batez ere GMIren kasuan eta honek eragiten du faltsu negatibo portzentaje altua (**4.90**). Emaitza hauek bat datoz Okorodudu-ren emaitzekin(153) eta GMIk muskuluari edo gantzari lotutako pisua eta GnMren banaketa ezin duelako desberdindu gertatzen da(154). Hala ere, obesitateari buruzko epidemiologia ikerketetan GMI erabilpena oso hedatuta dago oso erraza eta errepikatzeko gaitasuna duelako(156).

GAI gehiegizko GnM zuten ikasleetan bakarrik kalkulatu zen, obesitate zentrala definitzeko helburuarekin. Batezbesteko GAI 0,89(0,1) (gizonak 0,92(0,0); emakumeak 0,87(0,1), hurrenez hurren), eta GAIren arabera arriskuko kategorian sailkatutako partaideen portzentajea % 28,2koa izan zen, eta emakumeetan gizonetan baino altuagoa izan zen (% 50,7 vs. % 1, P <0,001, hurrenez hurren). GAIn arrisku bezala sailkatutakoen emakumeen portzentajea Eslovakiako unibertsitate ikasleena antzekoa izan zen(157); gizonetan, ordea, Eslovakiako ikasleen % altuagoa izan zen gure partaideekin konparatuz, eta erabilitako ebaki puntu desberdinen ondorio izan daiteke. GAI gaixotasun kardiobaskularrak aurreikusteko GMI baino tresna hobeagoa izan daiteke(158). Azkenik, ikerketa honetan, gehiegizko GnM zuten partaideen menarkiaren adina gehiegizko GnM ez zuten ikasleena baino baxuagoa izan zen, beste ikerketa batzuetan bezala(159), eta honek baieztatzen du obesitatea pubertasun goiztiarraren arduraduna izan daitekeela.

4.86. taula: Helburu populazioaren antropometriako neurriak sexuaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, batezbestekoa(DE) edo %	Lagin osoa (n=26.165)	Gizonak (n=10.607)	Emakumeak (n=15.558)	P^*
Pisua, kg	64,1(11,5)	72,7(9,7)	58,2(8,5)	**<0,001**
Altuera, zm	169,0(8,9)	176,7(6,9)	163,7(5,7)	**<0,001**
Altuera, m	1,69(0,1)	1,8(0,1)	1,6(0,1)	**<0,001**
Garaiera ileoespinala, zm	98,6(6,7)	103,5(5,5)	95,3(5,3)	**<0,001**
Altuera eserita, zm	84,3(4,9)	87,4(4,6)	82,2(3,9)	**<0,001**
GMI, kg/m^2	22,3(2,9)	23,3(2,7)	21,7(2,8)	**<0,001**
GMIren sailkapena, %				
Neurriz azpiko pisua	6,5	3,8	8,4	
Neurrizko pisua	78,3	72,4	82,4	
Gehiegizko pisua/Obesitatea	15,2	23,9	9,2	**<0,001**
Adierazitako GMI, kg/m^2	22,2(2,7)	23,2(2,6)	21,5(2,6)	**<0,001**
Adierazitako GMI sailkapena, %				
Neurrizko pisua	87,3	79,1	93,0	
Gehiegizko pisua/Obesitatea	12,7	20,9	7,0	**<0,001**
GnM, %	22,9(6,4)	16,8(4,1)	27,1(3,7)	**<0,001**
GnMren sailkapena, %				
Neurrizko gantza	85,6	83,9	86,7	
Gehiegizko gantza	14,4	16,1	13,3	**<0,001**
GnMI, kg/m^2	5,2(1,8)	4,0(1,4)	5,9(1,6)	**<0,001**
Zirkunferentziak, zm				
Eskumuturra	15,6(1,2)	16,6(0,9)	14,9(0,8)	**<0,001**
Beso erlaxatua	28,2(3,5)	30,5(3,0)	26,7(2,9)	**<0,001**
Besoaren flexio gorena	29,4(3,8)	32,4(3,0)	27,3(2,7)	**<0,001**
Izterra	53,4(4,7)	54,1(4,7)	52,9(4,7)	**<0,001**
Zangosagarra	36,3(2,7)	37,4(2,5)	35,5(2,6)	**<0,001**
Goiko gerria	73,7(8,1)	79,8(6,3)	69,4(6,3)	**<0,001**
Beheko gerria	81,4(8,3)	83,9(7,9)	79,7(8,1)	**<0,001**
Aldaka	97,0(6,3)	96,7(6,2)	97,2(6,4)	**<0,001**
Gantzaren banaketa, mm				
Besoa	25,2(8,6)	19,9(7,6)	28,7(7,2)	**<0,001**
Gorputz-enborra	42,8(14,3)	42,1(15,9)	43,2(13,1)	**<0,001**
Hanka	35,2(11,4)	27,6(9,8)	40,4(9,4)	**<0,001**
GnGM, %	77,1(6,4)	83,2(4,1)	72,9(3,7)	**<0,001**
GnGMI, kg/m^2	17,2(2,3)	19,3(1,7)	15,7(1,4)	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.86. taularen jarraipena.

Aldagaiak, batezbestekoa(DE) edo %	Lagin osoa (n=26.165)	Gizonak (n=10.607)	Emakumeak (n=15.558)	*P**
Diametroak, zm				
Biakromiala	36,6(4,0)	39,8(3,3)	34,4(2,7)	**<0,001**
Bikrestala	24,0(4,1)	24,9(3,7)	23,3(4,3)	**<0,001**
Ukondoa	6,2(0,7)	6,8(0,5)	5,8(0,5)	**<0,001**
Belauna	8,9(0,8)	9,3(0,7)	8,7(0,7)	**<0,001**
Menarkiaren adina			12,6 (1,4)	

*Sexu desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra; GMI, gorputz masaren indizea; GnM, gantz-masa; GnMI, gantz masaren indizea; GnGMI, gantz gabeko masa indizea

4.87. taula: Helburu populazioaren antropometriako neurriak adinaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, batezbestekoa(DE) edo %	18 urte (n=4.995)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	*P**
Pisua, kg	63,1(10,1)	63,6(10,7)	63,4(12,4)	65,2(12,0)	**<0,001**
Altuera, zm	169,0(8,7)	169,0(8,8)	168,3(9,9)	169,3(8,5)	**<0,001**
Altuera, m	1,7(0,1)	1,7(0,1)	1,7(0,1)	1,7(0,1)	**<0,001**
Garaiera ileoespinala, zm	98,3(6,7)	98,2(6,7)	98,6(7,3)	99,0(6,2)	**<0,001**
Altuera eserita zm	84,0(4,3)	84,1(5,6)	84,4(5,2)	84,6(5,6)	**<0,001**
GMI, kg/m^2	22,0(2,6)	22,2(2,6)	22,2(2,9)	22,6(3,1)	**<0,001**
GMIren sailkapena, %					
Neurriz azpiko pisua	5,2	7,7	6,2	6,2	
Neurrizko pisua	83,5	79,9	77,3	75,5	
Gehiegizko pisua/Obesitatea	11,4	12,5	16,5	17,8	**<0,001**
Adierazitako GMI, kg/m^2	21,8(2,6)	22,1(2,4)	22,0(2,8)	22,4(2,9)	**<0,001**
Adierazitako GMIren sailkapena, %					
Neurrizko pisua	90,0	90,2	87,0	84,5	
Gehiegizko pisua/Obesitatea	10,0	9,8	13,0	15,5	**<0,001**
GnM, %	22,1(6,1)	23,2(6,2)	23,4(6,8)	22,8(6,3)	**<0,001**
GnMren sailkapena, %					
Neurrizko gantza	90,5	87,0	87,6	81,2	
Gehiegizko gantza	9,5	13,0	12,4	18,8	**<0,001**
GnMI, kg/m^2	4,9(1,6)	5,2(1,7)	5,3(1,9)	5,2(1,8)	**<0,001**
Zirkunferentziak, zm					
Eskumuturra	15,6(1,1)	15,5(1,1)	15,5(1,2)	15,6(1,2)	**<0,001**
Beso erlaxatua	27,8(2,8)	28,1(3,2)	28,0(3,6)	28,6(3,8)	**<0,001**
Besoaren flexio gorena	29,1(3,2)	29,1(3,4)	29,0(3,8)	29,8(4,2)	**<0,001**

Hurrengo orrialdean jarraitzen du.

Aldagaiak, batezbestekoa(DE) edo %	18 urte (n=4.995)	19 urte (n=5.536)	20 urte (n=5.523)	≥ 21 urte (n=10.110)	P^*
Zirkunferentziak, zm					
Izterra	53,2(3,8)	53,2(4,3)	53,4(5,1)	53,6(5,1)	**<0,001**
Zangosagarra	36,2(2,4)	36,2(2,7)	36,1(2,9)	36,4(2,8)	**<0,001**
Goiko gerria	72,7(7,2)	73,0(7,2)	72,7(7,7)	75,0(9,0)	**<0,001**
Beheko gerria	79,8(7,7)	80,9(7,2)	80,2(8,3)	83,0(8,7)	**<0,001**
Aldaka	96,2(5,8)	96,7(5,6)	96,8(6,7)	97,7(6,6)	**<0,001**
Gantzaren banaketa, mm					
Besoa	24,7(8,2)	25,5(8,0)	25,1(8,9)	25,2(8,8)	0,129
Gorputz-enborra	40,3(12,3)	43,1(14,0)	42,1(14,1)	44,2(15,2)	**<0,001**
Hanka	33,8(10,6)	36,1(11,7)	36,1(11,5)	34,9(11,5)	**<0,001**
GnGM, %	77,9(6,1)	76,8(6,2)	76,6(6,8)	77,2(6,3)	**<0,001**
GnGMI, kg/m^2	17,1(2,1)	17,0(2,1)	17,0(2,4)	17,4(2,4)	**<0,001**
Diametroak, zm					
Biakromiala	36,1(3,7)	36,0(4,2)	36,6(4,0)	37,1(3,9)	**<0,001**
Bikrestala	23,9(3,9)	24,0(4,6)	24,0(3,9)	24,0(4,1)	0,491
Ukondoa	6,1(0,6)	6,2(0,7)	6,2(0,7)	6,3(0,7)	**<0,001**
Belauna	8,8(0,7)	8,9(0,8)	8,9(0,8)	9,0(0,7)	**<0,001**
Menarkiaren adina	12,5(1,9)	12,6(1,4)	12,6(1,2)	12,6(1,3)	**<0,001**

*Adinaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
DE, desbideratze estandarra; GMI, gorputz masaren indizea; GnM, gantz-masa; GnMI, gantz masaren indizea; GnGMI, gantz gabeko masa indizea.

4.88. taula: Helburu populazioaren antropometriako neurriak EAren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, batezbestekoa(DE) edo %	OZ (n=3.637)	EOZ (n=22.529)	P^*
Pisua, kg	61,3(10,5)	64,5(11,6)	**<0,001**
Altuera, zm	167,5(8,3)	169,2(9,0)	**<0,001**
Altuera, m	1,7(0,1)	1,7(0,1)	**<0,001**
Garaiera ileoespinala, zm	97,4(7,0)	98,8(6,6)	**<0,001**
Altuera eserita, zm	83,1(4,3)	84,5(5,0)	**<0,001**
GMI, kg/m^2	21,7(2,5)	22,4(2,9)	**<0,001**
GMIren sailkapena, %			
Neurriz azpiko pisua	7,6	6,4	
Neurrizko pisua	78,9	78,2	
Gehiegizko pisua/Obesitatea	13,5	15,4	**0,001**
Adierazitako GMI, kg/m^2	21,5(2,4)	22,3(2,8)	**<0,001**
Adierazitako GMIren sailkapena, %			
Neurrizko pisua	91,2	86,6	
Gehiegizko pisua/Obesitatea	8,8	13,4	**<0,001**
GnM, %	24,6(5,4)	22,6(6,5)	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.88. taularen jarraipena.

Aldagaiak, batezbestekoa(DE) edo %	OZ (n=3.637)	EOZ (n=22.529)	P^*
GnMren sailkapena, %			
Neurrizko gantza	85,7	85,6	
Gehiegizko gantza	14,3	14,4	0,889
GnMI, kg/m^2	5,4(1,4)	5,1(1,8)	**<0,001**
Zirkunferentziak, zm			
Eskumuturra	15,3(1,0)	15,6(1,2)	**<0,001**
Beso erlaxatua	27,2(3,4)	28,4(3,5)	**<0,001**
Besoaren flexio gorena	28,2(3,6)	29,6(3,8)	**<0,001**
Izterra	53,3(5,4)	53,4(4,6)	0,195
Zangosagarra	36,1(2,5)	36,3(2,8)	**<0,001**
Goiko gerria	71,2(7,5)	74,1(8,1)	**<0,001**
Beheko gerria	80,7(7,8)	81,5(8,3)	**<0,001**
Aldaka	96,4(6,6)	97,1(6,3)	**<0,001**
Gantzaren banaketa, mm			
Besoa	26,3(8,0)	25,0(8,6)	**<0,001**
Gorputz-enborra	42,1(11,6)	42,9(14,7)	0,856
Hanka	39,0(10,5)	34,6(11,5)	**<0,001**
GnGM, %	75,4(5,4)	77,4(6,5)	**<0,001**
GnGMI, kg/m^2	16,4(2,1)	17,3(2,3)	**<0,001**
Diametroak, zm			
Biakromiala	35,5(3,7)	36,8(4,0)	**<0,001**
Bikrestala	25,4(3,4)	23,8(4,2)	**<0,001**
Ukondoa	6,1(0,6)	6,3(0,7)	**<0,001**
Belauna	8,9(0,8)	8,9(0,8)	0,362
Menarkiaren adina	12,7(1,2)	12,6(1,4)	**<0,001**

DE, desbideratze estandarra; GMI, gorputz masaren indizea; GnM, gantz-masa; GnMI, gantz masaren indizea; GnGMI, gantz gabeko masa indizea.
*EAren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.
EA, ezagutza arloa; EOZ, Ez-Osasun Zientziak; OZ, Osasun Zientziak

4.89. taula: Helburu populazioaren antropometriako neurriak GnM estatusaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, batezbestekoa(DE) edo %	Ez gehiegizko GnM (n=22.391)	Gehiegizko GnM (n=3.775)	P^*
Pisua, kg	62,3(10,4)	74,5(12,3)	**<0,001**
Altuera, zm	169,1(9,1)	168,2(7,8)	**0,002**
Altuera, m	1,7(0,1)	1,7(0,1)	**0,002**
Garaiera ileoespinala, zm	98,5(6,8)	99,3(6,2)	**<0,001**
Altuera eserita zm	84,3(5,0)	84,6(4,5)	**<0,001**
GMI, kg/m^2	21,7(2,2)	26,2(3,2)	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.89. taularen jarraipena.

Aldagaiak, batezbestekoa(DE) edo %	Ez gehiegizko GnM (n=22.391)	Gehiegizko GnM (n=3.775)	*P*[*]
GMIren sailkapena, %			
Neurriz azpiko pisua	7,6	-	
Neurrizko pisua	84,8	39,7	
Gehiegizko pisua/Obesitatea	7,5	60,3	**<0,001**
Adierazitako GMI, kg/m^2	21,6(2,2)	25,6(2,9)	**<0,001**
Adierazitako GMIren sailkapena, %			
Neurrizko pisua	93,0	51,0	
Gehiegizko pisua/Obesitatea	7,0	49,0	**<0,001**
GnM, %	21,9(6,0)	28,8(5,2)	**<0,001**
GnMI, kg/m^2	4,7(1,4)	7,6(1,9)	**<0,001**
Zirkunferentziak, zm			
Eskumuturra	15,5(1,1)	16,1(1,1)	**<0,001**
Beso erlaxatua	27,6(3,2)	31,8(2,9)	**<0,001**
Besoaren flexio gorena	28,8(3,6)	32,5(3,0)	**<0,001**
Izterra	52,6(4,3)	58,0(4,8)	**<0,001**
Zangosagarra	35,9(2,5)	38,5(3,1)	**<0,001**
Goiko gerria	72,1(6,8)	82,8(9,1)	**<0,001**
Beheko gerria	79,5(6,4)	92,7(8,8)	**<0,001**
Aldaka	95,9(5,4)	103,8(6,9)	**<0,001**
Gantzaren banaketa, mm			
Besoa	23,2(7,0)	36,8(7,3)	**<0,001**
Gorputz-enborra	38,6(9,7)	67,5(11,9)	**<0,001**
Hanka	33,1(9,9)	47,9(11,5)	**<0,001**
GnGM, %	78,1(6,0)	71,2(5,2)	**<0,001**
GnGMI, kg/m^2	16,9(2,2)	18,6(2,3)	**<0,001**
Diametroak, zm			
Biakromiala	36,4(3,9)	37,6(4,3)	**<0,001**
Bikrestala	23,6(4,0)	26,0(4,1)	**<0,001**
Ukondoa	6,2(0,7)	6,4(0,6)	**<0,001**
Belauna	8,8(0,7)	9,5(0,8)	**<0,001**
Menarkiaren adina	12,6(1,4)	12,5(1,4)	**<0,001**

DE, desbideratze estandarra; GMI, gorputz masaren indizea; GnM, gantz-masa; GnMI, gantz masaren indizea; GnGMI, gantz gabeko masa indizea.
[*]Gantz-masa estatusaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.

4.90. Gehiegizko pisua/obesitatea definitzeko erabilitako metodoen emaitzek konparaketa

%	GnM % (*gold standard method*)		
	GMI	Norberak adierazitako GMI	Brownellen siluetak
Sentsibilitatea	60,3	49,0	19,6
Espezifikotasuna	92,5	93,0	96,7
Iragarpen balio positiboa	67,6	64,0	60,6
Iragarpen balio negatiboa	89,9	87,5	82,3

GMI, gorputz masaren indizea; GnM %, gantz-masa portzentajea..

4.9. Pisuaren pertzepzioa eta atsekabea

Helburu populazioaren % 80a baino gehiagorentzat bere pisua eta GMIren pertzepzioa "normala" zen, eta portzentaje hau unibertsitate ikasleetan egindako beste ikerketa batena[163] baino altuagoa izan zen. Laginaren % 45,5ek baino gehiago bere pisu osasuntsuaren pertzepzio egokia zuen (hau da, bere pisu osasuntsua berak adierazitakoa, neurtutakoa eta idealaren antzekoa zen) eta % 50,9 baino gehiago asebete zegoen bere pisuarekin eta/edo irudiarekin; eta pisu osasuntsuaren pertzepzio egokiagoa emakumeetan eman zen gizonetan baino (**4.91. taula**). Gure emaitzek bermatzen dute emakumeek gizonek baino kontzientzia gehiago dutela bere pisuarekiko[164,165].

POPren kasuan (3) (POP (3)), honek kalkulatzen du pisu idealaren pertzepzioa pisu osasuntsuarekiko eta GIAn aplikatutako irizpide berdina erabili zen, hau da, $\leq$ -5 % emaitzak aditzera ematen du pisu ideala osasuntsuago baino baxuagoa dela eta $\geq$ 5% emaitzak pisu ideala osasuntsuagoa baino altuagoa. Aldagai honetan ateratako datuek erakusten dute pisu osasuntsua baino gutxiago pisatzeko desioa zuten emakumeen portzentajea gizonena baino altuagoa zela, eta honek aditzera ematen du emakume gazte hauek kontzientzia gehiago dutela edertasunarekiko osasuntsuarekiko baino. Joera hau beste autore batzuek ere[166] behatu dute eta hainbat faktoreen influentzia dela eta gerta daiteke, hala nola gizarte prozesuak, iragarkien eta publizitatearen rola, modaren industriaren joerak, besteak beste. Pisu osasuntsua baino gehiago pisatzeko desioa gizonetan emakumeetan baino altuagoa izan zen eta gihar masa handitzeko desioarekin lotuta egongo da eta emakumeetan aipatutako faktore berdinek bere eragina izango dute gizonetan ere. Alde batetik, publizitateak gizonen irudi maskulinoa sustatzen du[167]. Bestetik, Mendebaldeko kulturetan boterea eta indarra maskulinotasunarekin lotuta dago[168].

Adinari dagokionez, ikasle nagusienek, gazteenekin erkatuta, bere pisua eta GMI gutxiesteko joera zuten eta bere pisuarekin eta irudiarekin atsekabe handiagoa erakusten zuten (P < 0,001) (**4.94. taula**). EAren araberari dagokionez, OZtako ikasleek, EOZtakoek, baino pertzepzio egokiagoa zuten bere pisu osasuntsuarekiko, bere pisuarekin asebeteago zeuden eta bere gorputz irudiarekin atsekabe altuagoa erakusten zuten (P < 0,05) (**4.93. taula**).

Azkenik, gehiegizko GnM zuten ikasleek, gehiegizko GnM ez zuten ikasleekin konparatuta, bere pisua eta GMI gutxiesten zuten eta pisuarekin eta gorputz irudiarekin asegabeago zeuden (P < 0,001) (**4.94. taula**). Zentzu honetan, norberak adierazitako pisuaren gutxiespena(169) eta gorputz irudiarekin asegabetasuna gainpisua eta obesitatea pairatzen duten pertsonetan askotan behatu izan da(170). Kontuan hartu behar da norberaren pisua ezagutzeak obesitatearen norabidean eta baita pisu kontrolaren portaeretan ere garrantzia du(171,172), hortaz, gure emaitzek azpimarratzen dute unibertsitate ikasleen GnM, pisuaren estatusa eta gorputzarekiko asebetetzea hobetzeko portaera osasuntsuen kontzientzia handitu behar dela.

4.91. taula: Helburu populazioaren pisu pertzepzioaren ezaugarriak sexuaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, %	Lagin osoa[1]	Gizonak[1]	Emakumeak[1]	P^*
GPP	(n=25.477)	(n=10.405)	(n=15.072)	
Gutxiegi estimatu[2]	3,8	3,9	3,7	
Gehiegi estimatu[3]	5,6	6,1	5,3	
Normala[4]	90,6	90,0	91,0	**0,017**
GMIP	(n=24.510)	(n=10.125)	(n=14.385)	
Gutxiegi estimatu[5]	9,5	6,9	11,3	
Gehiegi estimatu[6]	5,9	6,7	5,4	
Normala[7]	84,6	86,4	83,3	**<0,001**
GPA	(n=23.125)	(n=9.117)	(n=14.008)	
Gutxiegiz[8]	13,8	20,1	9,6	
Gehiegiz[9]	35,4	23,8	42,9	
Gustura[10]	50,9	56,1	47,5	**<0,001**
POP (1)	(n=23.187)	(n=9.712)	(n=13.475)	
Gutxiegi estimatu[11]	19,7	28,5	13,4	
Gehiegi estimatu[12]	31,8	25,1	36,6	
Normala[13]	48,5	46,4	50,0	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.91. taularen jarraipena.

Aldagaiak, %	Lagin osoa[1]	Gizonak[1]	Emakumeak[1]	P^*
POP (2)	(n=23.615)	(n=9.914)	(n=13.701)	
Gutxiegi estimatu[14]	24,1	31,1	19,1	
Gehiegi estimatu[15]	30,3	25,3	33,9	
Normala[16]	45,5	43,6	47,0	**<0,001**
POP (3)	(21.822)	(n=8.813)	(n=13.008)	
Gutxiegi estimatu[17]	15,9	13,6	17,5	
Gehiegi estimatu[18]	9,1	12,9	6,5	
Normala[19]	75,0	73,5	76,0	**<0,001**
GIA	(n=26.129)	(n=10.607)	(n=15.522)	
Asegabea[20]	37,6	31,4	41,8	
Asebetea[21]	62,4	68,6	58,2	**<0,001**

[1]Laginaren tamainan dauden desberdintasunen arrazoiak erantzunak derrigorrezkoak ez zirelako da; [2]GPP, ((norberak adierazitako pisua - neurtutako pisua)/ neurtutako pisua)x100: ≤ -5%; [3]GPP, ((norberak adierazitako pisua - neurtutako pisua)/neurtutako pisua)x100: ≥ 5%; [4]GPP, ((norberak adierazitako pisua - neurtutako pisua / neurtutako pisua)x100: -5% < desberdintasun erlatiboa < 5%; [5]GMIP, ((norberak adierazitako GMI - neurtutako GMI)/ neurtutako GMI)x100: ≤ -5%; [6]GMIP, ((norberak adierazitako GMI - neurtutako GMI)/ neurtutako GMI)x100: ≥ 5%; [7]GMIP, ((norberak adierazitako GMI - neurtutako GMI)/ neurtutako GMI)x100: -5% < desberdintasun erlatiboa < 5%; [8]GPA, ((pisu ideala - norberak adierazitako pisua)/ norberak adierazitako pisua)x100: ≥ 5%; [9]GPA, ((pisu ideala - norberak adierazitako pisua / norberak adierazitako pisua)x100: ≤ -5%; [10]GPA, ((pisu ideala - norberak adierazitako pisua)/ norberak adierazitako pisua)x100: -5% < desberdintasun erlatiboa < 5%; [11]POP (1), ((pisu osasuntsua - norberak adierazitako pisua)/ norberak adierazitako pisua)x100: ≥ 5%; [12]POP (1), ((pisu osasuntsua - norberak adierazitako pisua)/ norberak adierazitako pisua)x100: ≤ -5%; [13]POP (1), ((pisu osasuntsua - norberak adierazitako pisua)/ norberak adierazitako pisua)x100: -5% < desberdintasun erlatiboa < 5%). [14]POP (2), ((pisu osasuntsu - neurtutako pisua)/ neurtutako pisua)x100: ≥ 5%; [15]POP (2), ((pisu osasuntsua - neurtutako pisua)/ neurtutako pisua)x100: ≤ -5%; [16]POP (2), ((pisu osasuntsua - neurtutako pisua)/ neurtutako pisua)x100: -5% < desberdintasun erlatiboa < 5%); [17]POP (3), ((pisu ideala - pisu osasuntsua)/pisu osasuntsua)x100: ≥ 5%; [18]POP (3), ((pisu ideala - pisu osasuntsua)/pisu osasuntsua)x100: ≤ -5%; [19]POP (3), ((pisu ideala - pisu osasuntsua)/pisu osasuntsua)x100: -5% < desberdintasun erlatiboa < 5%); [20]Likert eskala≤ 4; [21]Likert eskala>4.

*Sexu desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.

GPP, gorputz pisuaren pertzepzioa; GMIP, gorputz masaren indizearen pertzepzioa; GPA, gorputz pisuarekiko atsekabea; POP, pisu osasuntsuaren pertzepzioa; GIA, gorputz irudiaren atsekabea.

4.92. taula: Helburu populazioaren pisu pertzepzioaren ezaugarriak adinaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, %	18 urte[1]	19 urte[1]	20 urte[1]	≥ 21 urte[1]	P^*
GPP	(n=4.752)	(n=5.490)	(n=5.417)	(n=9.819)	
Gutxiegi estimatu[2]	5,9	3,9	3,7	2,8	
Gehiegi estimatu[3]	7,9	8,6	4,3	3,6	
Normala[4]	86,2	87,5	92,0	93,6	**<0,001**
GMIP	(n=4.511)	(n=5.301)	(n=5.142)	(n=9,557)	
Gutxiegi estimatu[5]	7,0	9,3	10,6	10,1	
Gehiegi estimatu[6]	6,1	11,6	2,8	4,4	
Normala[7]	86,8	79,1	86,6	85,5	**<0,001**
GPA	(n=4.267)	(n=4.900)	(n=5.199)	(n=8.759)	
Gutxiegiz[8]	15,4	13,2	13,1	13,7	
Gehiegiz[9]	32,5	41,3	32,7	35,0	
Gustura[10]	52,1	45,5	54,2	51,3	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.92. taularen jarraipena.

Aldagaiak, %	18 urte[1]	19 urte[1]	20 urte[1]	≥ 21 urte[1]	*P*[*]
POP (1)	(n=4.377)	(n=4.883)	(n=5.071)	(n=8.855)	
Gutxiegi estimatu[11]	25,4	17,9	16,4	19,9	
Gehiegi estimatu[12]	26,6	40,7	26,1	32,7	
Normala[13]	48,0	41,5	57,4	47,4	**<0,001**
POP (2)	(n=4.573)	(n=4.883)	(n=5.178)	(n=8.981)	
Gutxiegi estimatu[14]	27,6	21,7	18,4	26,9	
Gehiegi estimatu[15]	28,0	36,2	26,6	30,5	
Normala[16]	44,4	42,1	55,0	42,6	**<0,001**
POP (3)	(n=4.154)	(n=4.571)	(n=4.938)	(n=8.159)	
Gutxiegi estimatu[17]	15,2	12,6	16,1	18,1	
Gehiegi estimatu[18]	7,5	9,8	7,8	10,3	
Normala[19]	77,3	77,6	76,1	71,6	**<0,001**
GIA	(n=4.996)	(n=5.499)	(n=5.523)	(n=10.110)	
Asegabea[20]	34,6	36,9	33,6	41,5	
Asebetea[21]	65,4	63,1	66,4	58,5	**<0,001**

[1]Laginaren tamainan dauden desberdintasunen arrazoiak erantzunak derrigorrezkoak ez zirelako da; [2]GPP, ((norberak adierazitako pisua - neurtutako pisua)/ neurtutako pisua)x100: ≤ -5%; [3]GPP, ((norberak adierazitako pisua - neurtutako pisua)/neurtutako pisua)x100: ≥ 5%; [4]GPP, ((norberak adierazitako pisua - neurtutako pisua / neurtutako pisua)x100: -5% < desberdintasun erlatiboa < 5%; [5]GMIP, ((norberak adierazitako GMI - neurtutako GMI)/ neurtutako GMI)x100: ≤ -5%; [6]GMIP, ((norberak adierazitako GMI - neurtutako GMI)/ neurtutako GMI)x100: ≥ 5%; [7]GMIP, ((norberak adierazitako GMI - neurtutako GMI)/ neurtutako GMI)x100: -5% < desberdintasun erlatiboa < 5%; [8]GPA, ((pisu ideala - norberak adierazitako pisua)/ norberak adierazitako pisua)x100: ≥ 5%; [9]GPA, ((pisu ideala - norberak adierazitako pisua / norberak adierazitako pisua)x100: ≤ -5%; [10]GPA, ((pisu ideala - norberak adierazitako pisua)/ norberak adierazitako pisua)x100: -5% < desberdintasun erlatiboa < 5%; [11]POP (1), ((pisu osasuntsua - norberak adierazitako pisua)/ norberak adierazitako pisua)x100: ≥ 5%; [12]POP (1), ((pisu osasuntsua - norberak adierazitako pisua)/ norberak adierazitako pisua)x100: ≤ -5%; [13]POP (1), ((pisu osasuntsua - norberak adierazitako pisua)/ norberak adierazitako pisua)x100: -5% < desberdintasun erlatiboa < 5%). [14]POP (2), ((pisu osasuntsu - neurtutako pisua)/ neurtutako pisua)x100: ≥ 5%; [15]POP (2), ((pisu osasuntsua - neurtutako pisua)/ neurtutako pisua)x100: ≤ -5%; [16]POP (2), ((pisu osasuntsua - neurtutako pisua)/ neurtutako pisua)x100: -5% < desberdintasun erlatiboa < 5%); [17]POP (3), ((pisu ideala - pisu osasuntsua)/pisu osasuntsua)x100: ≥ 5%; [18]POP (3), ((pisu ideala - pisu osasuntsua)/pisu osasuntsua)x100: ≤ -5%; [19]POP (3), ((pisu ideala - pisu osasuntsua)/pisu osasuntsua)x100: -5% < desberdintasun erlatiboa < 5%); [20]Likert eskala≤ 4; [21]Likert eskala>4.

[*]Adinaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.

GPP, gorputz pisuaren pertzepzioa; GMIP, gorputz masaren indizearen pertzepzioa; GPA, gorputz pisuarekiko atsekabea; POP, pisu osasuntsuaren pertzepzioa; GIA, gorputz irudiaren atsekabea.

4.93. taula: Helburu populazioaren pisu pertzepzioaren ezaugarriak EAren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, %	OZ[1]	EOZ[1]	*P*[*]
GPP	(n=3.569)	(n=21.908)	
Gutxiegi estimatu[2]	3,2	3,9	
Gehiegi estimatu[3]	7,2	5,4	
Normala[4]	89,6	90,7	**<0,001**

Hurrengo orrialdean jarraitzen du.

4.93. taularen jarraipena.

Aldagaiak, %	OZ[1]	EOZ[1]	*P*[*]
GMIP	(n=3.411)	(n=21.099)	
Gutxiegi estimatu[5]	7,7	9,7	
Gehiegi estimatu[6]	2,7	6,5	
Normala[7]	89,6	83,8	**<0,001**
GPA	(n=3.246)	(n=19.879)	
Gutxiegiz[8]	10,3	14,3	
Gehiegiz[9]	32,2	35,9	
Gustura[10]	57,5	49,8	**<0,001**
POP (1)	(n=3.354)	(n=19.833)	
Gutxiegi estimatu[11]	15,7	20,4	
Gehiegi estimatu[12]	33,5	31,5	
Normala[13]	50,8	48,1	**<0,001**
POP (2)	(n=3.421)	(n=20.194)	
Gutxiegi estimatu[14]	19,1	25,0	
Gehiegi estimatu[15]	29,7	30,4	
Normala[16]	51,3	44,6	**<0,001**
POP (3)	(n=3.165)	(n=18.656)	
Gutxiegi estimatu[17]	13,0	16,4	
Gehiegi estimatu[18]	8,9	9,2	
Normala[19]	78,1	74,4	**<0,001**
GIA	(n=3.637)	(22.492)	
Asegabea[20]	39,4	37,3	
Asebetea[21]	60,6	62,7	**0,014**

[1]Laginaren tamainan dauden desberdintasunen arrazoiak erantzunak derrigorrezkoak ez zirelako da; [2]GPP, ((norberak adierazitako pisua - neurtutako pisua)/ neurtutako pisua)x100: ≤ -5%; [3]GPP, ((norberak adierazitako pisua - neurtutako pisua)/neurtutako pisua)x100: ≥ 5%; [4]GPP, ((norberak adierazitako pisua - neurtutako pisua / neurtutako pisua)x100: -5% < desberdintasun erlatiboa < 5%; [5]GMIP, ((norberak adierazitako GMI - neurtutako GMI)/ neurtutako GMI)x100: ≤ -5%; [6]GMIP, ((norberak adierazitako GMI - neurtutako GMI)/ neurtutako GMI)x100: ≥ 5%; [7]GMIP, ((norberak adierazitako GMI - neurtutako GMI)/ neurtutako GMI)x100: -5% < desberdintasun erlatiboa < 5%; [8]GPA, ((pisu ideala - norberak adierazitako pisua)/ norberak adierazitako pisua)x100: ≥ 5%; [9]GPA, ((pisu ideala - norberak adierazitako pisua / norberak adierazitako pisua)x100: ≤ -5%; [10]GPA, ((pisu ideala - norberak adierazitako pisua)/ norberak adierazitako pisua)x100: -5% < desberdintasun erlatiboa < 5%; [11]POP (1), ((pisu osasuntsua - norberak adierazitako pisua)/ norberak adierazitako pisua)x100: ≥ 5%; [12]POP (1), ((pisu osasuntsua - norberak adierazitako pisua)/ norberak adierazitako pisua)x100: ≤ -5%; [13]POP (1), ((pisu osasuntsua - norberak adierazitako pisua)/ norberak adierazitako pisua)x100: -5% < desberdintasun erlatiboa < 5%). [14]POP (2), ((pisu osasuntsu - neurtutako pisua)/ neurtutako pisua)x100: ≥ 5%; [15]POP (2), ((pisu osasuntsua - neurtutako pisua)/ neurtutako pisua)x100: ≤ -5%; [16]POP (2), ((pisu osasuntsua - neurtutako pisua)/ neurtutako pisua)x100: -5% < desberdintasun erlatiboa < 5%); [17]POP (3), ((pisu ideala - pisu osasuntsua)/pisu osasuntsua)x100: ≥ 5%; [18]POP (3), ((pisu ideala - pisu osasuntsua)/pisu osasuntsua)x100: ≤ -5%; [19]POP (3), ((pisu ideala - pisu osasuntsua)/pisu osasuntsua)x100: -5% < desberdintasun erlatiboa < 5%); [20]Likert eskala≤ 4; [21]Likert eskala>4.

[*]EAren desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.

EA, ezagutza arloa; EOZ, Ez-Osasun Zientziak; GPP, gorputz pisuaren pertzepzioa; GMIP, gorputz masaren indizearen pertzepzioa; GPA, gorputz pisuarekiko atsekabea; OZ, Osasun Zientziak; POP, pisu osasuntsuaren pertzepzioa; GIA, gorputz irudiaren atsekabea.

4.94. taula: Helburu populazioaren pisu pertzepzioaren ezaugarriak GnM estatusaren arabera: Euskal Herriko Unibertsitateko UPV/EHU ikasleak

Aldagaiak, %	Ez gehiegizko GnM[1]	Gehiegizko GnM[1]	*P*[**]
GPP	(n=22.017)	(n=3.461)	
Gutxiegi estimatu[2]	3,1	8,6	
Gehiegi estimatu[3]	6,2	1,7	
Normala[4]	90,7	89,7	**<0,001**
GMIP	(n=21.152)	(n=3.358)	
Gutxiegi estimatu[5]	8,5	15,8	
Gehiegi estimatu[6]	6,4	3,1	
Normala[7]	85,1	81,1	**<0,001**
GPA	(n=19.814)	(n=3.311)	
Gutxiegiz[8]	28,9	73,9	
Gehiegiz[9]	15,6	2,7	
Gustura[10]	55,5	23,4	**<0,001**
POP (1)	(n=20.073)	(3.114)	
Gutxiegi estimatu[11]	22,0	5,2	
Gehiegi estimatu[12]	25,1	75,0	
Normala[13]	52,9	19,8	**<0,001**
POP (2)	(n=20.304)	(n=3.311)	
Gutxiegi estimatu[14]	27,5	3,6	
Gehiegi estimatu[15]	22,6	77,9	
Normala[16]	49,9	18,6	**<0,001**
POP (3)	(n=18.660)	(n=3.161)	
Gutxiegi estimatu[17]	17,5	6,9	
Gehiegi estimatu[18]	9,2	8,9	
Normala[19]	73,4	84,3	**<0,001**
GIA	(n=22.354)	(n=3.775)	
Asegabea[20]	32,7	66,1	
Asebetea[21]	67,3	33,9	**<0,001**

[1]Laginaren tamainan dauden desberdintasunen arrazoiak erantzunak derrigorrezkoak ez zirelako da; [2]GPP, ((norberak adierazitako pisua - neurtutako pisua)/ neurtutako pisua)x100: ≤ -5%; [3]GPP, ((norberak adierazitako pisua - neurtutako pisua)/neurtutako pisua)x100: ≥ 5%; [4]GPP, ((norberak adierazitako pisua - neurtutako pisua / neurtutako pisua)x100: -5% < desberdintasun erlatiboa < 5%; [5]GMIP, ((norberak adierazitako GMI - neurtutako GMI)/ neurtutako GMI)x100: ≤ -5%; [6]GMIP, ((norberak adierazitako GMI - neurtutako GMI)/ neurtutako GMI)x100: ≥ 5%; [7]GMIP, ((norberak adierazitako GMI - neurtutako GMI)/ neurtutako GMI)x100: -5% < desberdintasun erlatiboa < 5%; [8]GPA, ((pisu ideala - norberak adierazitako pisua)/ norberak adierazitako pisua)x100: ≥ 5%; [9]GPA, ((pisu ideala - norberak adierazitako pisua / norberak adierazitako pisua)x100: ≤ -5%; [10]GPA, ((pisu ideala - norberak adierazitako pisua)/ norberak adierazitako pisua)x100: -5% < desberdintasun erlatiboa < 5%; [11]POP (1), ((pisu osasuntsua - norberak adierazitako pisua)/ norberak adierazitako pisua)x100: ≥ 5%; [12]POP (1), ((pisu osasuntsua - norberak adierazitako pisua)/ norberak adierazitako pisua)x100: ≤ -5%; [13]POP (1), ((pisu osasuntsua - norberak adierazitako pisua)/ norberak adierazitako pisua)x100: -5% < desberdintasun erlatiboa < 5%). [14]POP (2), ((pisu osasuntsu - neurtutako pisua)/ neurtutako pisua)x100: ≥ 5%; [15]POP (2), ((pisu osasuntsua - neurtutako pisua)/ neurtutako pisua)x100: ≤ -5%; [16]POP (2), ((pisu osasuntsua - neurtutako pisua)/ neurtutako pisua)x100: -5% < desberdintasun erlatiboa < 5%); [17]POP (3), ((pisu ideala - pisu osasuntsua)/pisu osasuntsua)x100: ≥ 5%; [18]POP (3), ((pisu ideala - pisu osasuntsua)/pisu osasuntsua)x100: ≤ -5%; [19]POP (3), ((pisu ideala - pisu osasuntsua)/pisu osasuntsua)x100: -5% < desberdintasun erlatiboa < 5%); [20]Likert eskala≤ 4; [21]Likert eskala>4.

[*]GnM estatusaren araberako desberdintasunak. Emaitza esanguratsuak letra lodiz azpimarratuta daude.

4.94. taularen jarraipena.

GPP, gorputz pisuaren pertzepzioa; GMIP, gorputz masaren indizearen pertzepzioa; GnM, gantz-masa; GPA, gorputz pisuarekiko atsekabea; POP, pisu osasuntsuaren pertzepzioa; GIA, gorputz irudiaren atsekabea.

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5. Eztabaida

Gainpisua/obesitatearen bizi-ohiturekin lotutako arrisku faktoreak, dietarekin erlazionaturikoak bereziki, bere eragin psikosozialak eta faktore hauen arteko interakzioa, Euskal Herriko Unibertsitateko UPV/EHU ikasleetan ikertzea izan zen tesi honen helburu nagusia. Helburu hau lortzeko, EHU12/24 behaketako kohorte ikerketa egin zen eta estandarizatutako protokolo baten bidez neurri antropometrikoak, determinatzaileak diren jarrerak, AF eta dieta (osasuna eta ingurumenaren ikuspuntuetatik) bezala, eta zeharkako jarrerak, faktore sozio/psikologikoak esaterako erregistratu ziren. Aurrez aurreko elkarrizketak egin ziren hurrengo informazioa jasotzeko: faktore demografiko eta SEk, familia eta norberaren gaixotasun aurrekariak, datu akademikoak, bizi-ohiturak, gorputz irudi eta pisuaren ebaluazioa, gantz eta kolesterol gutxiko dieta jarraitzearekin erlazionatutako jarrerak eta gorputz pisua kontrolatzeko portaerak.

Partaideak, ezaugarri demografikoak eta SEk eta EA

Tesi hau testuinguruan jartzeko, partaideen proportzioa, eta EHU12/24 ikerketako ezaugarri demografikoak eta SEk aipatu behar dira. Ikerketan parte-hartzera gonbidatuak izan ziren 1.300 ikasleetatik, 696k baiezkoa eman zuten. Hala ere, 93 ikasleek inklusio irizpideak ez zituzten bete edo ez zuten ikerketa osoa osatu, beraz, baztertuak izan ziren eta erabilitako lagina 603 ikaslekoa izan zen, hau da, parte-hartzea % 53,5ekoa izan zen, beste unibertsitate ikasleetan egindako ikerketen antzekoa[1]. Nahiz eta unibertsitate ikasleekin egindako beste ikerketa batzuetako parte-hartzea altuagoa izan[2], kontuan hartu behar da aurrez aurreko elkarrizketa hau egin ahal izateko ikasleen aisialdiko ordubete behar zela eta ez zitzaiela pizgarri ekonomikorik eskaini. Ikerlan honetan, haztapenak[3] erabili ziren populazioan jaso ziren datuak adierazgarriagoak egiteko, 2012-2013ko urte akademikoko ikasleen zerrendatik[4] ateratako haztapen koefiziente bat esleituz parte-hartzaile bakoitzari.

EHU12/24 ikerketaren aukeraketa zorizkoa eta EAn geruzatuta izan zen, ondoren, ezagutza arlo hauek OZ eta EOZ kategoriatan sailkatu ziren. Arlo bakoitzeko partaideen datuak Espainiako beste unibertsitate batean egindako ikerketa baten antzekoak dira[5]. Partaideen adinari dagokionez, Europako ikasleekin egindako ikerketen antzekoa izan zen[6,7] baina Espainiako unibertsitate desberdinetan egindako ikerlan batena baino baxuagoa[8]. Azken emaitza hau, 28 urte baino gorako ikasleak baztertu egin zirelako izan daiteke, kontuan hartuta lagin guztiaren % 3,0a bakarrik suposatzen zutela.

Laginaren ezaugarri demografikoekin jarraituz, emakumeen parte-hartzea Espainiako, Balear Uharteak[2] edo Almeriako[9] unibertsitateetakoak baino altuagoa izan zen, baina baita UPV/EHUko populazioaren adierazgarria ere. Jaiotza-lekuaren kasuan, Espainiako unibertsitateetan gertatzen den bezala[10,11], ikasleen gehiengoa Unibertsitatea kokatuta dagoen autonomia erkidego berdinetik zetorren eta hemengo ikasleen mugikortasun baxua azaltzen duten arrazoiak hurrengoak dira: Espainiako unibertsitateak eskaintza dibertsifikatutako eta ikasleen lurraldeko gertutasuna jarraitzen duen eredua garatu duela[12], mugikortasun beka gutxi daudela, UPV/EHUk graduak euskaraz ikasteko aukera eskaintzen duela eta familia lotura.

Azkenik, helburu populazioaren datu SEei dagokionez, gurasoen hezkuntza maila eta bere jarduera ekonomikoaren arabera neurtuta, unibertsitate ikasketak zituzten gurasoen portzentajea Europako herrialde desberdinetakoak baino baxuagoak ziren, hala nola, Suedia[13] edo Grezia[14] baina honen desberdintasunaren arrazoia Espainian Hezkuntza Lege Orokorra 1970. urte arte ez zela onartu datza[15]. Hortaz, Espainiako unibertsitate ikasleen ratioa gradualki igotzen joan da. Gainera, Euskal gurasoen jarduera ekonomikoa Galiziako unibertsitate ikasleen gurasoen antzekoa izan zen[16]. Laburbilduz, EHU12/24 kohorteak baliodun datuak ematen ditu obesitatearen konplexutasuna eta gaixotasunaren determinatzaileen interakzioak analizatzeko unibertsitate ikasleetan.

EKMGMaren egokitzapena, baliozkotze eta errepikapena

EKMGM bat erabili zen helburu populazioaren ahorakin dietetikoa ebaluatzeko. Gure ezaguera arte, EAEn bizi den populazioarentzat ez dago baliozkotutako EKMGMik. Beraz, ikasleen dieta ebaluatu baino lehen, Espainiako beste eskualde bateko populazio orokorrean garatutako EKMGM bat egokitu zen[17]. Egokitutako galdetegiaren baliozkotze eta errepikapen gaitasuna EAEn bizi den heldu populazio batean aztertu zen. EKMGM berriaren baliozkotzea eta errepikapena EAEn bizi zen populazioan ebaluatu zen eta ez bakarrik unibertsitate ikasleetan, aurrerantzean populazio heldu honen patroi dietetikoak eta nutrizio hobekuntzak ebaluatzeko ikerketetan erabiltzeko helburuarekin. Edozein kasutan, galdetegiaren baliozkotzean eta errepikapenean lotutako aldagaiek izan dezaketen eragina zehaztu zen, hala nola, hezkuntza maila edo pisu estatusa, EHU12/24 kohortearen ahorakin dietetikoa ebaluatzeko erabilgarritasuna baieztatzeko.

Egokitutako galdetegiaren baliozkotze eta errepikapen analisietan, EAEko 82 partaideko lagin adierazgarriak parte hartu zuen, denak 21 urte baino helduagoak. EKMGM originalari dagokionez, honek 45 item zituen, baina guk populazio honetan kontsumitzen diren 22 item berri identifikatu eta gehitu genituen, beraz, egokitutako galdetegiak 67 item zituen. Zenbaki hau optimoa dirudi eta beste ikerketa batzuetan erabilitako zenbakien antzekoa da(18). 82 partaideek 1. EKMGM bete zuten ikerketaren hasieran, 24 OOko 3 txandak 4 hilabeteko epearekin eta 2. EKMGM ikerketaren bukaeran, urtebeteko epean. Ikerketaren diseinua beste ikerketa batzuetan erabilitakoaren berdina izan da(19,20). Bestalde, EKMGMren baliozkotzea eta errepikatzeko gaitasuna elikagaien ahorakinak konparatuz neurtu ziren, EKMGM eta 24 OO ahorakinen arteko korrelazioekin eta hasierako eta bukaerako EKMGMekin.

Ikerketaren partaideen ezaugarri orokorrei dagokionez, laginaren ia erdiak umeak zituen eta lanean jarraitzen zuen, gehienak EAEko hiri-eremuetan bizi ziren eta gutxienez bigarren hezkuntzako ikasketak zituzten. Ezaugarri hauek Euskal populazio orokorraren antzekoak ziren(21). Gainera, neurri antropometrikoei dagokionez, ikerketan behatu zitekeen bezala, laginaren erdia gutxi gorabehera gainpisua/obesitate zuen, eta emakumeek gizonek baino pisu osasuntsuago zutela ematen zuen. Datu hauek Euskal Osasun Inkestan lortutako emaitzen antzekoak ziren(22).

EKMGMren baliozkotzeari dagokionez, galdetegi honen bitartez jasotako elikagai taldeen ahorakinak, orokorrean 24 OO batezbestekoarena baino altuagoa izan zen, beste ikerketa batzuetan behatu den bezala(19,23,24). Bi metodoen artean ahorakinak estimatzerako orduan dauden desberdintasunak plater konbinatuen osagaiek gehiegi estimatzen zuten ondorio izan daiteke eta baita anoa osoa bezala kontsideratzen zela elikagai bakoitza ere(19). Bi metodoen arteko korrelazioei dagokionez, ikertutako elikagai erdien baino gehiagorenak esanguratsuak izan ziren eta korrelazio baxuenak gantz eta elikagai pikanteetan behatu ziren elikagai txikien estimazioaren zehaztasun baxuagatik(25). Gainera, kategoria desberdinetan sailkatutako elikagai taldeetan, haragia edo arraina bezala, korrelazioak baxuak izan ziren partaideek zailtasunak zituztelako elikagai bakoitza bere kategorian identifikatu eta sailkatzeko(26). Gainera edari alkoholikoentzako korrelazio altuak lortu ziren eta edari hauen kontsumoa asteburuko momentu zehatzetara lotuta dagoenez bere gogorapena errazagoa dela ematen du(27).

Orokorrean, 2. EKMGMaren eta 9 eguneko-24 OOen arteko korrelazioak 1. EKMGMaren eta 9 eguneko-24 OOen artekoenak baino pixka bat altuagoak izan ziren, beste autore batzuek behatu duten bezala(19,20). Badira autoreek aditzera ematen dutela desberdintasun hauek ikerketaren zehar gertatzen diren dietaren aldaketen ondorio direla(20) beste batzuek, bitartean, ikaskuntza efektuagatik dela esaten dute(19), hau da, partaideek 2. galdetegia betetzeko kontzientzia gehiago hartu dutela ikerketak iraun duen urte horretan(28). 2. EKMGM eta 9 eguneko-24 OO arteko adostasuna grafikoki ebaluatzeko, *Bland-Altman*-en analisiak egin ziren eta hauek adostasun maila nahiko ona zegoela baieztatzen zuten. Gainera, kuartil berdinean edo albokoan sailkatutako partaideen elikagai ahorakinaren batezbesteko portzentajea % 75,2koa izan zen. Baina haragi eta horien eratorriak adostasun maila txarragoa erakusten zuten ahorakina altuagoa zenean, beste autore batzuek ere fenomeno hau behatu dute eta kontsideratzen dute batezbesteko ahorakinarekiko neurtzearen akats proportzionalaren ondorioa dela(29).

EKMGMren errepikapenari dagokionez, hainbat elikagai taldeen ahorakina 2. EKMGMean 1.an baino altuagoak izan ziren, beste ikerketa batzuetan behatu den bezala(30,31). Ahorakinean ematen den aldaketa honen arrazoia ikaskuntza efektuaren ondorio izan daiteke, alabaina, beste autore batzuek arrazoi berdina erabiltzen dute 2. EKMGMean 1. arekin konparatuz behatzen dituzten ahorakin baxuagoak azaltzeko(19,32). Gure kasuan, urtebete ondoren, gerta zitekeena da partaideek bere dieta aldatu izana zen eta horren ondorioz, bere erantzunak ere bai(23). Egokitutako EKMGMren errepikapena aztertzeko, korrelazio gordinak eta adin- eta sexu-ajustatuko korrelazioak erabili ziren; eta lortutako koefizienteak beste autore batzuena baino altuagoak izan ziren(19,33). Honez gain, koefiziente guztiak esanguratsuak izan ziren, korrelazio gordinetan gantza eta ajustatuetan arrain urdina eta pikantea izan ezik, eta beste ikerketa batzuetan antzeko emaitzak lortu zituzten(34). Aipatzekoa da bi EKMGMen arteko adostasun maila ona izan zela beste autore batzuek aurkitutakoa bezala(19,20).

Bestalde, EKMGMren baliozkotzean eta errepikapenean lotutako aldagaiek, hezkuntza maila, umeak edukitzea, pisu estatusa edo bizi-ohiturak bezala, izan dezaketen eragina ikertzean, ez zen eraginik aurkitu. Eta gure ezaguera arte, nahiz eta EKMGen baliozkotzean eta errepikapenean aldagaiek izan dezaketen eraginaren datak eskasak izan, beste autore batzuek(35) ere ez dute erlaziorik aurkitu hezkuntza maila eta EKMGaren errepikapenaren artean. Orokorrean, egokitutako EKMGMk errepikapen eta baliozkotze ona aurkezten du EAEn bizi den populazioan hainbat elikagai taldeen ahorakina neurtzeko, eta emaitza hauetan hezkuntza edo pisu egoera bezalako lotutako aldagaiek ez dute eraginik. Emaitza hauek gure hipotesia baieztatzen dute (tesiaren hipotesi 0), hau da, egokitutako EKMGMk EAEko populazioaren ahorakina ebaluatzeko baliozkotze eta errepikapen ona duela eta lotutako aldagaiek (hezkuntza maila edo pisu estatusa, hala nola) ez dutela eraginik. Hala ere, etorkizuneko ikerketetan, EKMGMean ebaluazio eskasa zuten elikagai taldeen emaitzak arretaz erabili eta interpretatu beharko dira.

EHU12/24 kohorteko dieta

EKMGMren baliozkotze eta errepikapena aztertu ondoren, egokitutako galdetegi hau partaide guztiei eman zitzaien bere ohitura dietetikoak jasotzeko. EKMGM energia eta nutrienteen ahorakina estimatzeko erabili zen, eta informazio hau elikadura patroiekin batera, dieta hainbat ikuspuntuetatik aztertzeko aukera eman zigun: (1) norberak adierazitako ahorakin dietetikoaren gutxiespena; (2) nutrienteen ahorakinaren egokitzapena; (3) dieta kalitatea; (4) elikadura patroiak; eta (5) dietaren ingurumen inpaktua.

Lehenengo, Goldberg-ek proposatuko[36] eta Black-ek[37] eguneratutako metodoarekin norberak adierazitako datuak gutxiesten edo gehiegi estimatzen zuten partaideak identifikatu ziren. Lortutako emaitzek aditzera ematen dute unibertsitate ikasleen % 38ak bere ahorakin dietetikoa gutxiesten zuela, eta gizonek eta gehiegizko GnM zuten ikasleek emakumeek eta GnM % normala zuten ikasleek baino gehiago gutxiesten zutela ere bai (P < 0,001). Portzentaje hauek helduetan egindako beste ikerketa batzuetan lortutako emaitzenak baino altuagoak ziren[38-40]. Eta Lutomski *et al*.-ek[41] behatu zuten bezala, gizonek emakumeek baino gehiago gutxiesten zuten bere energia ahorakina, nahiz eta emaitza hau horrelako ikerketetan ez ohikoa izan[39-42].

Bestalde, obesitatea eta energia gutxiestea lotuta zeuden beste ikerketa batzuetan aditzera eman den bezala[38,42]. Bere ahorakina gehiegi estimatzen zuten ikasleen kasuan, portzentajea baxua izan zen (% 2,1) eta heldu populazioetakoa baino baxuagoa[39]. Nahiz eta energia ahorakina gutxiesten edo gehiegi estimatzen zuten partaideak identifikatu, bere esklusioak, beste autore batzuek aditzera eman duten bezala, ezagutzen ez den alborapena gehitzen du, partaide hauen bizi-ohiturak, egoera nutrizionala eta gaixotasun kronikoen arriskua ondo estimatzen dutenengandik bereizten direlako[43]. Nutrienteen ahorakinean desberdintzen diren arren, gaizki estimatzen duten ikasleen esklusioak ez dauka inplikaziorik nutrienteen ahorakinaren ebaluazioan(42). Hortaz, autore batzuen arabera(42,43) partaide hauek ez dira laginetik baztertu behar, guk egin genuen bezala.

Bigarrena, unibertsitate ikasleen dieta Mendebaldeko elikadura patroiaren antzekoa da. Patroi dietetiko honen ezaugarriak hurrengoak dira: proteinetan, gantzetan eta GAAetan altua eta karbohidrato eta zuntz dietetikoan baxuan, Espainiako populazioaren dietaren antzekoa(44); eta gaixotasun kronikoen areagotutako arriskuarekin erlazionatu izan da, gaixotasun kardiobaskularrak(45) edo minbizi zehatzak(46), adibidez. Guk espero genuen ez bezala, makronutrienteen ahorakina MBTOrekiko ez zen hobeagoa izan OZtako ikasleetan EOZtako ikasleekin konparatuz. Emaitza honek iradokitzen du jakintzak ez direla nahikoak ohitura dietetikoak finkatzeko(47,48). Kontuan hartu behar da elikagaien aukeraketan, jakintzaz aparte, beste hainbat faktoreek ere bere eragina dutela, erabilgarritasuna, komenigarritasuna edo osasuna, adibidez(49,50). Mikronutrienteen egokitzapenari dagokionez, BEEren bitartez ebaluatua izan zela, bitamina eta mineral guztien ahorakina egokia izan zen, D eta E bitaminen kasuan izan ezik, eta hau bat dator Espainiako populazioan egindako ANIBES ikerketarekin(51,52).

Hirugarrena, dieta kalitatearen indizeen arabera, HEI-2010 eta MDS, ikasleen dieta nahiz eta onargarria izan hobetu zitekeen, baina beste unibertsitate ikasleetakoa baino hobeagoa zen(53-55). Beste autore batzuek behatu duten bezala(2,53), dieta kalitatean sexu desberdintasunak aurkitu ziren, eta emakumeen puntuazioa gizonena baino altuagoa izan zen. Alde hauen arrazoiak emakumeek argal egoteko duten gizarte presioan egon daitezke(56,57) eta baita gizonek patroi dietetiko ez osasuntsuak jarraitzeko duten ahultasunean nutrizioari buruz duten jakintza eskasek eragina dutela ere(58). Dieta kalitatearen indizeak adina eta Earen araberari dagokionez, ikasle nagusienek eta OZtakoek beste kategorietako ikasleekin erkatuz puntuazio altuagoak lortu zituzten. Adinaren kasuan, eskolatik unibertsitatera pasatzearen ondorio izan daiteke, aldaketa honek errutinan eta ohitura dietetikoetan eragina duelako(59). Eta EAri dagokionez, osasunari buruzko kontzientziak ohitura dietetikoetan eragina izan ditzake baina ez da nahikoa(47,48). Emaitza hauek UPV/EHUko ikasle populazioaren dieta aldagai demografiko eta EArekin lotura duelaren hipotesia (tesiaren 1. hipotesia) sustatzen dute eta baita ikasleak gomendio dietetikoetatik urrun daudelaren hipotesia (tesiaren 2. hipotesia) neurri batean baieztatzen dute ere.

Laugarrena, elikadura patroiei dagokionez, Euskal ikasleen erdiak gutxi gorabehera eguneroko Ozk, Ozk-en arteko denbora eta otorduen iraupen egokia zuen. Gainera, elikadura patroiari lotutako aldagai guztiak dieta kalitatearekin erlazionatuta zeudela aurkitu genuen, beste autore batzuek bezala [59]. Emaitza hauek azaltzen duen esplikazio bat izan daiteke elikadura patroi hobeago batek, alde batetik, elikagai ugari eta dieta aniztasun handia duela eta bestetik, elikagai osasuntsuen aukeraketa altuagoa inplikatzen duela, eta horren ondorioz, dieta kalitatea altuagoa da. Elikadura patroia sexuaren arabera aztertzean, emakumeek gizonek baino ohitura dietetiko hobeagoak zituztela ondorioztatu zen, otorduetan denbora gehiago igarotzen zutelako, lagunduta jaten zutelako eta dieta kalitate altuagoa zutelako (HEI-2010 eta MDS indizeen arabera neurtuta, aurretik deskribatu den bezala). Emaitza hauek bat datoz literaturan aurrez aurkitutakoarekin[60-62] eta emakumeek osasuntsu jaten saiatzen direlako gertaerarekin lotuta egon daiteke[63]. Uste zenaren kontra, laginaren gizonek emakumeek baino elikadura patroi hobeagoa izan zuten, eguneroko Ozk-an, gosariaren maiztasunean eta Ozk-en arteko denboran, zehazki. Azken sexu desberdintasun honen arrazoia izan daiteke ezberdintasunak daudelako energia ahorakinaren banaketan egunean zehar, beste autore batzuek aipatu duten bezala.

Bestalde, ikasle gazteenek eguneroko Ozk-en gomendioa betetzeko joera zutela behatu zen. Hala ere, ikasle nagusienek bazkaria eta afaria lagunduta jateko joera zuten. EAren araberako elikadura patroiaren kasuan, OZtako ikasleek eguneroko Ozk egokiagoa zuten eta normalean lagunduta jaten zuten, EOZtako ikasleekin erkatuz. Espero ez zen bezala, Nafarroako unibertsitate ikasleetan egindako ikerketa batean EOZ ikasleek OZkoek baino eguneroko Ozk egokiagoa zuten [65]. Emaitza hauek 1. hipotesia “UPV/EHUko unibertsitate ikasleen bizi-ohiturak, dieta barne, aldagai demografiko (adina eta sexua) eta ikasten ari diren graduko EArekin lotuta daudela” eta 2. hipotesia “UPV/EHUko ikasle populazioa elikadura gomendio eta bizi-ohitura osasuntsuetatik urrun dago” baieztatzen dituzte.

Azkenik, bosgarrena, ohitura dietetikoak jasangarritasunaren ikuspuntutik aztertu zirenean, dietari lotutako BEGIren batezbestekoa 1.719,6 (618,1) kg eCO_2/pertsona/urtean izan zen, hau da, 4,7 kg eCO_2/egunean (emakumeak 4,3 kg eCO_2 eta gizonak 5,2 kg eCO_2), datu hauek Europako beste herrialde batzuen antzekoak dira[66-69]. BEGI guztia gizonetan emakumeetan baino altuagoa izan zen (P < 0,001), beste ikerketa batzuetan behatu den bezala, eta honek iradokitzen du, BEGI altua maskulinotzat[70] hartu den haragi gorrien eta horien eratorrien kontsumo altuarekin lotuta dagoela [66,71]. Ildo honetan, UPV/EHUko ikasleen nutrizioarekiko jarrerek aditzera ematen dute haragiarekiko zaletasuna sexu maskulinoarekin lotuta dagoela. Elikagai talde bakoitzaren ekarpena BEGI guztiari aztertzean, datu hau, beste autore batzuek behatu dutenaren antzekoa izan zen[68,69,72-74], haragi gorrien eta horien eratorrien ekarpena altuena izan zen, fruta eta barazkiaz eta esnea eta esnekiaz jarraitua eta edari alkoholikoena baxuena, seguru aski, bere kontsumoa eskasa zelako.

Dieta kalitatea eta dietari lotutako BEGIren arteko asoziaziori dagokionez, HEI-2010 indizean puntuazio altuenak zituzten ikasleek BEGI altua zutela behatu zen, eta aldi berean, MDS indizean puntu gutxi lortu zituzten ikasleek BEGI altua zuten. Emaitzen desberdintasun hauek indizeak egiteko eta puntuatzeko irizpideetan egon daitezke. HEI-2010 indizearen puntuazioaren % 40a gehien kontaminatzen duten elikagaiena da (haragi gorriak eta horien eratorriak, frutak eta barazkiak, esnea eta esnekiak, arrautzak eta haragi zuria eta arraina eta itsaskiak). MDS indizearen kasuan, bitartean, BEGI altuenak dituzten elikagai taldeetatik, hiruk, haragi gorriak eta horien eratorriak, hegaztiak eta esneki osoak alderantzizko puntuazioa dute, hau da, bere ahorakina gero eta altuagoa denean, gero eta baxuagoa da bere puntuazioa MDS indizean. Baina, gertaera honetaz aparte, aipatzekoa da dieta osasuntsuak ez direla beti dieta jasangarriak, beste ikerketa batzuetan aditzera eman den bezala[69,75]. Hortaz, gure emaitzek dieta osasuntsuak ingurumen inpaktu baxuagoa duelaren hipotesia (tesiaren 3. hipotesia) ez dute egiaztatzen.

BEGI altuko dietei lotutako faktoreei dagokionez, adina, EA, ESE eta GnM estatusa identifikatu ziren. Beraz, ikasle nagusienek, OZtako ikasleek, ESE altukoek eta gehiegizko GnM zutenek BEGI altuko dietak zituzten. Emaitza hauek bat datoz gure hasierako hipotesiarekin (tesiaren 3. hipotesia) EAren kasuan izan ezik, eta emaitza kontraesankor hau UPV/EHUk ingurumenarekiko hezkuntzan duen irakaskuntza transbertsala eta integratzailearen ondorio izan daiteke. Adinaren kasuan, asoziazio hau ikasle nagusiek haragia maiz jaten dutelako izan daiteke. ESEren kasuan, beste autore batzuek aditzera eman duten bezala, kalitate dietetiko altuko dietak kostu ekonomiko altuagoarekin eta ingurumen inpaktu handiagorekin lotuta daude[76-78], nahiz eta dieta osasuntsuak eta jasangarriak beste dieta batzuk baino garestiagoak ez izan beti[79]. Azkenik, GnMri dagokionez, aditzera eman da, energia ahorakina norberaren energia beharretara adosten denean BEGIn murrizketak lortzen direla[71].

Laburbilduz, nutrizioaren ikuspuntutik, UPV/EHUko ikasleen dietak proteina, gantz eta GAA ahorakin altuak ditu eta karbohidrato eta zuntz dietetiko ahorakin baxuak, beraz, Mendebaldeko patroi dietetikoa jarraitzen duela esan daiteke. Gainera, dietari lotutako jasangarritasunaren dimentsioetatik, bik, osasun-nutrizioak eta ingurumen jasangarritasunak, eta baita elikadura patroiak ere onargarriak baina hobetu daitezkeela behatu da. Gainera, dietaren ingurumen inpaktua eta osasun-nutrizionalaren dimentsioen arteko bateragarritasuna neurri batean dieta kalitatearen indizeak egiteko erabiltzen diren adierazleen menpe dago. Eta dietari lotutako bi jasangarritasun dimentsio hauek sexua, adina, osasuna, OZ vs. EOZ, ESE eta GnMrekin lotuta zeuden. Aurkikuntza hauek elikagaietan oinarritutako gida dietetikoak eta parte-hartze estrategiak diseinatzeko erabili daitezke. Gida eta estrategia hauek dieta kalitatea hobetzen lagunduko dute eta aldi berean, ingurumen inpaktua murriztuko dute, eta bizitzako etapa honek ematen dituen aukerak aprobetxatu daitezke ikasleen portaeretan aldaketak eragiteko.

EHU12/24 kohortearen bizi-ohiturak (dieta izan ezik)

Bizi-ohiturei (dieta izan ezik) dagokionez, helburu populazioak AF maila moderatua zuen, eserita denbora gehiegi igarotzen zuen, edale moderatua eta ez-erretzaile/erretzaile oiha zen eta lotan denbora egokia pasatzen zuen. Gizonek emakumeek baino baino bizi-ohitura egokiagoak zituzten, AFri, edateari eta erretzeari dagokionez, bereziki. AFn dauden sexu desberdintasunak aldez aurretik beste ikerketa batzuetan behatu izan da[2,80]. Orokorrean, laginaren erdiak, bai gizonek eta bai emakumeek, K egiten zuten, banakakoa gehien bat eta ez zuten egiten lehiaketa mailan. Alkohol kontsumoan eta erretzeko ohituran behatutako sexu desberdintasunak aurreko ikerketetan aurkitutakoaren kontrakoa da[2,81-82], eta metodologia eta sexuaren araberako kontsumo patroian egondako aldaketengatik izan daiteke[84-86].

Honez gain, ikasle gazteenek AF altuagoa eta K gehiago egiten zuten eta loaldiaren gomendioak hobeto betetzen zituzten ikasle nagusiekin konparatuz. Halaber, beste ikerketa batzuetan[87], ikasle gazteenek beste adinetako ikasle batzuek baino lo gutxiago egiten dutela behatu izan da, eta desberdintasun hau graduaren araberako ordutegien desberdintasunetan egon daitezke. Azkenik, ohitura toxikoei EAren arabera dagokionez, OZtako ikasleek ohitura toxiko gutxiago, tabakoa eta alkohola, zituzten, EOZtakoekin erkatuz, seguru aski, kontziente direlako ohitura hauek bere osasunean dituzten ondorioez. Atal honetako emaitzek tesiaren 1. eta 2. hipotesiak baieztatzen dituzte, hau da, “UPV/EHUko unibertsitate ikasleen bizi-ohiturak, dieta barne, aldagai demografiko (adina eta sexua) eta ikasten ari diren graduko EArekin lotuta daude” eta “UPV/EHUko ikasle populazioa elikadura gomendio eta bizi-ohitura osasuntsuetatik urrun dago”.

EHU12/24 kohorteko gainpisua/obesitatearen prebalentzia eta bizi-ohiturei lotutako arrisku faktoreak

Helburu populazioaren gainpisu/obesitatearen prebalentzia % 14,4koa zen, unibertsitate ikasleetan egindako beste ikerketa batzuena(88,89) eta adin berdinerako Espainiako Osasun Inkestako(90) emaitzena baino baxuagoa. Halaber, gure emaitza, Euskal Osasun Inkestako 15-24 urte bitarteko gazteena baino altuagoa izan zen(22). Azken emaitza honek UPV/EHUko ikasleen gainpisu/obesitate prebalentzia adin honetako populazio orokorrarena baino altuago delaren 4. hipotesia baieztatzen du, behintzat, Euskal populazioarekin erkatzen denean. Baina desberdintasun hauek diagnostikoan erabilitako irizpide desberdinen ondorio izan daitezke. Izan ere, tesi honetan, prebalentzia hau estimatzeko metodo desberdinak erabili ziren: silueten eskala (gorputz irudia ebaluatzeko), neurtutako eta norberak adierazitako GMI eta GnM %.

Neurtutako eta adierazitako GMI GnM %rekin erkatuta, agerian lagatzen zuen GMIk espezifikotasun maila ona baina sentsibilitate baxua zuela, faltsu negatibo portzentaje altua eraginez. Beste autore batzuek antzeko aurkikuntzak izan dituzte(91) eta GMIk muskuluari edo gantzari lotutako pisua eta GnMren banaketa ezin duelako desberdindu gertatzen da(92). Nahiz eta, ikerketa epidemiologikoetan GMIren erabilera oso hedatuta egon(93), bere erraztasuna eta errepikapen gaitasunagatik(94), aipatzekoa da EHU12/24 kohortean egindako ahalegina, partaide guztiei antropometriako neurriak hartzeko, zehaztasuna bermatzeko eta obesitatea zuten ikasleak GnM %ren arabera sailkatzeko, eta ez GMI arabera.

Italiako(89) eta Espainiako unibertsitate ikasleetan(2,95,96) jasotako datuak bezala, guk ere gehiegizko GnM prebalentzia altuagoa behatu genuen gizonetan emakumeetan baino ($P < 0,001$). Gizonen prebalentzia altuagoa azaldu dezaketen bizi-ohiturei dagokionez, kohorte honetako emakumeek dieta kalitate, HEI-2010 eta MDS indizeekin neurtuta, eta elikadura patroi hobeagoak zituztela ondorioztatu dezakegu aurreko ikerketetan behatu den bezala(2,96). Badaude, aurretik aipatutako eta obesitatea izateko arrisku altuagoarekin lotutako beste bizi-ohitura batzuk, dieta eta AFz aparte, PS bezala(97-100) eta kasu honetan, gizonek emakumeek baino denbora gehiago pasatzen zuten eserita Espainiako unibertsitate ikasleetan egindako beste ikerketa baten bezala(101). Emakumeen taldeari dagokionez, beste ikerketa batzuek(102-104) agerian laga duten bezala obesitatea eta pubertaro goiztiarraren arteko asoziazioa ikerketa honetan ere baieztatu izan da.

GnM estatusaren araberako adin eta ezaugarri SEei dagokionez, gehiegizko GnM zuten ikasleak nagusiagoak ziren eta gizarte estatus baxuagoa zuten gehiegizko GnM ez zuten ikasleekin konparatuz ($P < 0,001$). Emaitza hauek gainpisua/obesitatea aldagai demografiko eta SEekin lotuta dagoela baieztatzen dute (tesiaren 5. hipotesia). Obesitatearen prebalentziak gora egiten duela adinak gora egiten duen heinean, Japoniako unibertsitate ikasleetan egindako ikerketa baten ere aurkitu zen[(105)]. Emaitza hau ikasleek unibertsitateko azkenengo urtean duten lanaren eta garatutako independentziaren eta norberaren arduraren ondorio izan daiteke. Baina, datu hauez gain, aipatu behar da ikasle nagusiek gazteek baino arrisku faktore gehiago dituztela obesitatea pairatzeko, hala nola, erretzaile tasa altuagoa, edale gehiago, denbora gehiago igarotzen dutela eserita eta lo gomendioei egokitzapen txarragoa dutela, unibertsitate ikasleetan egindako beste ikerketa baten ikusi den bezala[(106)]. ESEri dagokionez, Taiwaneko unibertsitate ikasleetan aurretik egindako ikerketa baten ere agerian utzi zen gizarte estatusa eta obesitatearen arteko asoziazioa[(107)].

Alabaina, guk espero ez genuen bezala (tesiaren 5.a hipotesia), OZtako ikasleek gainpisu/obesitate prebalentzia altuagoa aurkezten zuten EOZtako ikasleekin konparatuta. Nahiz eta OZtako ikasleek osasunari lotutako arrisku faktoreei buruzko kontzientzia gehiago izan[(108)], jakintza hauek osasun portaeretan bihurtzea estres maila altuago batekin lotuta egon daiteke gure ikerketan behatu den bezala eta beste autore batzuek azaldu duten bezala[(109-111)]. Gainera, beste ikerketa batzuetan agerian utzi den bezala, OZtako ikasleek bere graduan ikasitako jakintzak ez dituzte bereganatzen[(112)] eta osasunari lotutako arrisku portaeretan ez daude desberdintasun esanguratsurik OZtako eta EOZtako ikasleen artean. Tesi honetan, OZtako ikasleek energia ahorakin altuagoa zuten eta AF gutxiago egiten zuten EOZtako ikasleekin erkatuz, eta honek gainpisu/obesitatea izateko arriskua areagotzen du. Honez gain, OZtako ikasleek obesitate historia pertsonala eta familiarra izateko aukera gehiago zituzten EOZtako ikasleekin erkatuz eta jakina da gainpisua edo obesitatea pairatzeko probabilitateak areagotzen direla guraso batek edo biek gaixotasuna badute[(113)].

Bestalde, gehiegizko GnM zuten ikasleek GnM normala zuten ikasleekin alderatuta, gaixotasun gehiago, osasunari buruzko pertzepzioa okerragoa, bizi-kalitate baxuagoa eta estres maila altuago zutela adierazi zuten. Datu hauek, aldi berean, gorputz pisua eta irudiaren pertzepzio eta gogobetetzearekin eta pisu kontrolari buruzko portaerekin lotuta egon daitezke. Influentzia soziokulturalez, familiako kideez, adinaz edo sexuaz gain, gorputz tamaina[114] gutxiestera eraman ditzaketen beste elementu psikologikoak[115] egon daitezke. Tesi honetan, gehiegizko GnM zuten ikasleek bere pisuarekiko eta irudiarekiko atsekabe maila altuagoa azaltzen zuten eta baita bere pisu estatusa identifikatzeko zailtasunak ere, honek gainpisua/obesitatea PP, GPA eta GIA desegokiarekin lotuta dagoelaren hipotesia (tesiaren 5.b hipotesia) baieztatzen du. Literatura zientifikoan, adipositatea atsekabearen adierazle bezala identifikatu izan da[116], baina aditzera eman da ere, GIA etorkizuneko gainpisua/obesitatea eta elikadura asalduren adierazle izan daitekeela[117].

Gainpisua/obesitatearen onarpenean, beste autore batzuek behatu dute obesitatea duten emakumeek bere burua obesitatearekin identifikatzen badutela pisua galtzen saiatzen direla. Baina, bere burua pisu normala edo gainpisuarekin identifikatzen bazuten pisua hartzen zuten[118,119], eta honek aditzera ematen du gainpisua/obesitatea duten pertsonek bere pisua gaizki estimatzen badute oztopoak izango dituztela jarrera eta portaera osasuntsuak bereganatzeko[120,121], beharbada pisua galtzeko motibazioa galdu dutelako[122]. Bestalde, pisuaren pertzepzio egokia pisua hartzeko probabilitate gutxiagorekin lotuta dago. Norberaren gainpisua edo obesitatearen pertzepzio goiztiarra gizon eta emakumeetan pisua galtzeko faktore arrakastatsua bezala, azaldu izan da aurretik egindako ikerketetan[123].

Tesiaren 6.a hipotesiaren arabera, elikadura patroi desegokiak eta dieta kalitate eskasa UPV/EHUko ikasleek gainpisu/obesitatea izatearen arriskuarekin lotuta daude. Gizonen kasuan, bereziki, Ozk eta gosariaren iraupen desegokia, bakarrik jatea eta egoeraren arabera bakarrik edo lagunduta eta ez gosaltzea gehiegizko GnM izatearen arrisku faktore bezala identifikatu ziren. Emakumeen kasuan, bitartean, gosaria eta bazkaria bakarrik edo egoeraren arabera bakarrik edo lagunduta, bazkari/afariaren iraupen desegokia eta MDS indizean puntuazio baxua gehiegizko GnMrekin erlazionatu ziren. Elikadura patroian behatutako sexu desberdintasunen oinarria emakumeek osasuntsu jateari ematen dioten garrantzian egon daiteke[124]. Beraz, ohikoa da, emakumeek gizonek baino ohitura dietetiko egokiagoak jarraitzea, eguneroko Ozk, gosaltzea, otorduetan denbora igarotzea bezala eta baita dieta kalitate hobeagoa izatea ere, beste autore batzuek azpimarratu duten bezala[125-127].

Gehiegizko GnM ez zuten ikasleek puntuazio altuagoak zituzten HEI-2010 eta MDS dieta kalitatearen indizeetan eta erlazio hau beste populazio batzuetan ere behatu izan da[128,129]. Makronutrienteen MBTOri dagokionez GnM estatusaren arabera, gehiegizko GnM zuten ikasleen proteinen ahorakina GnM normala zuten ikasleena baino altuagoa izan zen, eta karbohidratoena eta gantzena baxuagoa. Beste ikerketa batzuetan[130], kontrako emaitzak lortu ziren, baina espero ez genuen emaitza hau karbohidratoetan eta gantzetan altuak diren elikagaien gutxiespenaren ondorio izan daiteke edo pisua galtzeko elikagai hauen murrizketaren ondorio. Gainera, *Goldberg*-en metodoarekin baieztatu genuen bezala eta beste ikerketa batzuek aipatu duten bezala, gehiegizko GnM zuten pertsonek energia eta elikagai ahorakina gutxiesteko joera altuagoa dute[131,132].

Bestalde, ikasleen erantzunak nutrizioarekiko jarrerei dagokionez, espero zen bezala (tesiaren 5.c hipotesia), “borondate eza eta ez osasungarria” faktorea (komenigarritasuna, umorea eta afektua eta norberaren eraginkortasunari buruzko itemak konbinatzen dituen faktorea), eta “elikagaien araketa” faktorea UPV/EHU ikasleetan gainpisua/obesitatearekin lotuta zeuden. Hala ere, tesiaren 5.d hipotesiarekin desadostasuna egon zen, GnMko bi taldeetan nutrizioari buruzko jakintzak antzekoak izan zirelako. Ildo honetan, aurreko ikerketek ez dute bermatzen nutrizioari buruzko jakintzak eta gainpisua/obesitatearen arteko asoziazioa[133], eta honek aditzera ematen du ikertutako populazioan dieta eta nutrizioari buruzko jakintzak hobetzeko hezkuntza ez dela aldagai garrantzitsua pisua galtzeko prozesuan.

EHU12/24 kohorteko beste bizi-ohiturei dagokiolarik, gehiegizko GnM zuten ikasleen artean, guraso gabe bizi ziren eta bikotea ez zuten partaideen portzentajea altuagoa izan zen. Gurasoen etxetik at bizi diren ikasleen gehiegizko GnM azukre, ardo, alkohol eta janari azkarraren ahorakin altuagoarekin lotuta egon daiteke[134] eta fruta eta barazkien ahorakin baxuagoarekin[134,135], eta honek unibertsitate denboraldian ohitura dietetikoen mantentzean gurasoen garrantzia islatu dezake[134-136]. Gainera, AF baxua-moderatua, eserita denbora gehiegi pasatzea, lotan denbora gutxiago igarotzea, alkohol kontsumo moderatu-altua eta erretzea ohikoagoa zen gainpisua/obesitatea zuten ikasleen artean GnM % normala zuten ikasleekin erkatuz. Emaitza hauek bat datoz beste ikerketa batzuek esandakoarekin, hau da, orokorrean, gainpisua/obesitatea duten pertsonek bizi-ohitura osasuntsuak jarraitzeko joera dute (AF gutxi, PS, edatea, erretzea eta loaldiko denbora) [137-140]. Aipatzekoa da gizonen artean AF maila baxua/moderatua, eta emakumeen artean, alkohol kontsumo moderatua-altua eta loaldiaren iraupen desegokia gehiegizko GnM izatearen arriskuarekin lotuta zeudela. Datu hauek, 6.b hipotesia baieztatzen dute, hau da, bizi-ohitura ez osasuntsuen arteko asoziazioak, gelditasuna eta PS, eta alkohol kontsumo bezalakoak, gainpisua/obesitatea sufritzeko arriskua areagotzen duela.

Laburbiltzeko, UPV/EHU ikasleen gainpisu/obesitatearen prebalentzia, diagnostiko irizpide bezala GnM % erabiliz, adin tarte berdineko populazio orokorrarena baino altuagoa izan zen. Gehiegizko GnM aldagai demografiko eta SEekin erlazionatuta zegoen, eta gizonek, ikasle nagusienek eta ESE baxukoek gainpisua/obesitatea izateko arrisku gehiago zuten. Gehiegizko GnM gaixotasun gehiagorekin, norberak adierazitako osasun, bizi-kalitate eta estres-maila txarragoarekin erlazionatu zen; eta emaitza hauek gorputzaren pertzepzio okerragoarekin lotuta egon zitekeen eta baita GPA eta GIAkin ere; eta, ondorioz, pisua galtzeko portaera ez-osasuntsuen adopzioarekin lotuta egon zitekeen. Lortutako emaitzen arabera, elikadura patroi desegokia, dieta kalitate eskasa eta bizi-ohitura ez-osasuntsuak, AF, PS eta ohitura toxikoak barne, populazio honetan gainpisu/obesitatearekin lotuta zeudela ondorioztatu dezakegu.

Sendotasunak eta ahultasunak

Euskal Herriko Unibertsitateko ikasleen gainpisu/obesitatearekin lotutako bizi-ohituren, bereziki dietarekin zerikusia duten arrisku faktoreen ikerketaren eguneratzea tesi honen sendotasun nagusitzat har daiteke. Hala ere, aipatzekoak diren hainbat ahultasun baditu ere. Lehenengoa, diseinu transbertsaleko ikerketa dela eta, honek behatutako asoziazioen kausalitatea baloratzea mugatzen du. Bigarrena, ohitura dietetikoei, AF/Kri, aisialdiko aktibitateei eta portaera sedentarioei buruzko datuak norberak adierazten zituen eta hauek alborapen joera izan dezakete. Dietaren kasuan, datu hauek ikasleek eman zituzten eta ahorakina gutxiegi edo gehiegi estimatuta egon zitekeen, batez ere talde jakin batzuetan, pisua edo sexua(141) dela eta. Hori egiaztatzeko, Goldberg-ek garatutako(36) eta Black-ek eguneratutako(37) metodoa erabili zen eta AF maila bezala 1,55 erabili zen(142). Bestalde, nahiz eta EKMGMk hainbat mugaketa izan, hainbat nutrienteei buruzko informazio fidagarria ematen du(143) eta kontuan hartu behar da oraindik ez dagoela mugaketarik gabeko aukerarik. Gainera, egokitutako EKMGMk EAEn bizi den populazioaren elikagai talde gehienen ahorakina neurtzeko baliozkotze eta errepikapen gaitasun ona adierazi zuen.

Hirugarrena, dietari lotutako BEGI aztertzeko metodologian, produktuen bizi-zikloaren hainbat urrats ez ziren neurtu elikagaiak prestatzeko erari buruzko informazio faltagatik, eta baita jatorri geografiko eta urtarokotasunari buruzko informazio eskasagatik. Kontuan hartu behar da elikagaien bizi-zikloaren urrats guztiak aztertzea oso zaila eta garestia dela. Alabaina, BEGI kalkulatzeko metodologia, aurretik beste ikerketa batzuetan BEGI kuantifikatzeko erabili izan den aukera da(144-146). Laugarrena, datu guztiak aurrez aurreko elkarrizketen bidez jaso ziren eta hau zehaztugabea eta alborapen joera izan dezake. Baina, galdetegien interpretazioaren joera murrizteko, galdera guztiak ikerketa taldeak egiten zituen eta hainbat buruzpide eman ziren gaizki ulertuak saihesteko. Hala ere, ikerketa epidemiologikoetan parte-hartzaileen erantzuna gizarte gogoan oinarritzen bada ere, gaur egun, datu-base gutxi daude guk batu dugun bizi-ohiturei buruzko informazio adina dutenek. Bosgarrena, neurri antropometriko guztiak pertsona berdinak egin zituen neurketa akatsak gutxiesteko helburuarekin.

Seigarrena, nahiz eta aldagaien arteko asoziazioa aztertzeko analisiak, garrantzitsuak ziren aldagaietara adostu, ezin da alde batera utzi kontuan hartu ez ziren beste faktore soziokultural eta ingurumenekoek ahuldu egin ditzaketela asoziazio hauek. Azkenik, zazpigarrena, aurkikuntza guzti hauek unibertsitate ikasle lagin batean oinarrituta daude, beraz, emaitza hauek ezin dira hedatu populazio gaztera, hezkuntza mailak partaideen bizi-ohituretan eragina izan dezakeelako. Horregatik, gomendagarria izango litzateke ikerketa hau unibertsitatetik at erreplikatzea.

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6. Ondorioak

Tesi honetan lortutako emaitzen arabera, hurrengoa ondorioztatu daiteke:

1. Egokitutako EKMGMk errepikapen eta baliozkotze ona du EAEn bizi den populazioren hainbat elikagai taldeen ahorakina neurtzeko, eta hezkuntza maila edo pisu egoera bezalako lotutako aldagaiek ez dute eraginik errepikapenean eta baliozkotzean.

2. EHU12/24 kohorteko ohitura dietetikoak aldagai demografikoekin eta ikasten ari ziren graduaren EArekin erlazionatuta zeuden. Emakumeek eta OZtako ikasleek beste kategorietako ikasleekin konparatuta (gizonak eta EOZtako ikasleak) dieta kalitatea eta elikadura patroia egokiagoak zituzten. Gainera, emakumeek, ikasle gazteenek, EOZtako ikasleek eta ESE baxua zutenek ingurumenean inpaktu baxua zuten dieta jarraitzeko joera zuten.

3. Bizi-ohiturak (dieta izan ezik) ere aldagai demografikoekin eta EArekin erlazionatu ziren, EHU12/24 kohortean. Gizonek, bereziki, AF altua zuten eta alkohol eta tabako kontsumo baxua. Halaber, OZtako ikasleek ere alkohol eta tabako kontsumo baxua adierazi zuten. Gainera, ikasle gazteenak ez-erretzaileak ziren eta alkohol kontsumoaren eta loaldiaren iraupenaren gomendioa betetzeko joera zuten.

4. EHU12/24 kohortearen dieta proteinetan, gantzetan eta GAAetan altua eta karbohidratoetan eta zuntz dietetikoan baxua izateagatik bereizten zen. Elikadura patroia eta dietari lotutako jasangarritasunaren bi dimentsioetatik, osasun-nutrizioa eta ingurumen jasangarritasuna, onargarriak ziren. Gainera, populazio honen bizi-ohituren (dieta izan ezik) ezaugarriak hurrengoak ziren: AF moderatua, denbora larregi eserita igarotzea, edale moderatuak izatea eta loaldiaren iraupen egokia izatea.

5. EHU12/24 kohortean, ingurumen inpaktua eta osasun-nutrizionalaren dimentsioen arteko bateragarritasuna dieta kalitatearen indizeak egiteko erabiltzen diren adierazleen menpe dago. Gainera dietari lotutako bi jasangarritasunaren dimentsioak sexua, adina, OZ vs. EOZekin erlazionatu ziren. Emakumeek, bereziki, kalitate altuko

eta ingurumen inpaktu baxuko dietak jarraitzeko joera zuten; eta ikasle gazteenek eta EOZkoek ingurumen inpaktu baxuko dietak.

6. EHU12/24 kohortean, gainpisua/obesitatearen prebalentzia, GnM % diagnostiko irizpide bezala erabilita, % 14,4koa izan zen, eta adin berdinerako populazio orokorrarena baino altuagoa. Alabaina, desberdintasun hauek diagnostikoan erabilitako irizpide desberdinen ondorio izan daiteke.

7. Ikertutako populazioan, gizonek, ikasle nagusienek, ESE baxukoek eta OZ ikasleek gainpisua/obesitatea pairatzeko arrisku gehiago zuten. Gainera, gainpisua/obesitatea zuten ikasleek bere pisuarekiko eta irudiarekiko atsekabe maila altua azaltzen zuten eta baita pisu estatusa identifikatzeko zailtasunak ere. Honez gain, nutrizioarekiko jarrerak, borondate eza eta ez osasungarria eta elikagaien araketa faktoreak gainpisua/obesitatearekin erlazionatu ziren. Hala ere, nutrizioari buruzko jakintzak antzekoak izan ziren GnM estatusaren araberako bi taldeetan, eta honek aditzera ematen du ikertutako populazioan, dieta eta nutrizioa hobetzeko hezkuntza ez dela aldagai oso garrantzitsua pisua galtzeko.

8. Populazio honetan, elikadura patroi desegokiak, dieta kalitate eskasa eta bizi-ohitura ez-osasuntsuak (AF, PS eta ohitura toxikoak) gainpisua/obesitatea pairatzeko arriskua areagotzen zuten. Bizi-ohitura ez-osasuntsuetariko batzuk batera ematen dira eta elkarri eragiten diote, gainpisua/obesitatearen areagotutako arriskua modulatzen. Gizonen artean, ez gosaltzeak eta AFren mailak gainpisua/obesitatearen arriskuan efektu handienak zituzten aldagaiak izan ziren, eta emakumeen artean, MDrekiko atxikidura.