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RESEARCH ARTICLE

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Epidemiology of peer cybervictimization and its relationship with health-related quality of life in adolescents: A prospective study

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Abstract

Introduction: Research focused on the association between peer cybervictimization and declining health-related quality of life (HRQoL) is scarce. Currently, few longitudinal studies find an association between these phenomena, and none focus on cybervictimization profiles. The main objectives are: (1) to analyze the point and period prevalence, and incidence of cybervictimization profiles (uninvolved, new, ceased, intermittent, and stable cybervictims); (2) to study the relationship between cybervictimization and HRQoL over time; (3) to determine the longitudinal impact on the HRQoL of each type of profile.

Methods: A prospective study was conducted in three waves over 13 months. A total of 1142 adolescents aged 11–18 years participated in all the waves (630 girls, 55.2%).

Results: The prevalence of victimization for the three waves was 21.6% (Wave 1; W1), 23.5% (W2), and 19.6% (W3), respectively. The period prevalence was 41.3%, and the accumulated incidence was 25.1%. It was found that 24% of the participants were new victims, 5.9% were intermittent victims, and 6% were stable victims. Being a cybervictim at W1 poses a relative risk of 1.73 [1.29–2.32], that is, a twofold increased risk of presenting a low HRQoL 13 months later compared to those who are not cybervictims.

Conclusion: One in four adolescents became a new cybervictim during the 13 months of the study. The adolescents who presented poorer HRQoL were the stable cybervictims.

KEYWORDS

adolescents, cyberbullying, health-related quality of life, longitudinal, prevalence, profiles

1 | INTRODUCTION

Peer cyberbullying and cybervictimization are topics that arouse great interest because of their implications for adolescents' physical, psychological, and social well-being (Aboujaoude et al., 2015). Although the two terms have sometimes been used interchangeably, there is a clear distinction in their definitions (Chun et al., 2020). Thus, peer cyberbullying refers to any malicious behavior carried out by one or more people repetitively through information and communication technologies in which there is an imbalance of power between the cyberaggressor (or cyberaggressors) and the cybervictim (Tokunaga, 2010). However, the term peer cybervictimization does not denote this power imbalance among those involved (Nocentini et al., 2010) and is better suited to the reality assessed in most studies (Chun et al., 2020).

Meta-analytical studies report that the average prevalence of peer cybervictimization is high, affecting 16% of the adolescent population (Modecki et al., 2014), although the prevalence usually varies between 20% and 40% (Aboujaoude et al., 2015). Other more current reviews indicate a greater range of variability: between 1.6% and 56.9% (Brochado et al., 2017), 1.9% and 84% (Camerini et al., 2020), and 14% and 57.5% (Zhu et al., 2021). All these data suggest that cybervictimization is a prevalent phenomenon at a global level. In the Spanish context, the prevalence of cybervictimization also shows very disparate data. For example, in Spain, we find studies on the prevalence of cybervictimization that report ranges of cybervictims between 2.9%, (Navarro et al., 2015) and 38% (Gámez-Guadix et al., 2015). Among these prevalence ranges, two representative studies carried out by Save the Children (Calmaestra et al., 2016) and UNICEF (Andrade et al., 2021) report disparate prevalences of cybervictimization in Spanish adolescents: 6.9% and 22.5%, respectively. The variability in all these data may be a consequence of various factors: different definitions of the construct, the plurality of assessment instruments, and the use of different cut-off points, among others (Berne et al., 2013; Chun et al., 2020).

As for the differences according to sex, contrasting results are also found in the literature. Thus, while some research points to girls being more likely than boys to experience cybervictimization (Aboujaoude et al., 2015; Sun & Fan, 2018), other studies report a higher prevalence of cybervictimization in boys (Machimbarrena & Garaigordobil, 2018; Wong et al., 2018). In contrast, other studies found no significant sex differences (DePaolis & Williford, 2015).

Longitudinal studies have focused on examining the stability of cybervictimization over time, in addition to testing different predictors and mediators of cybervictimization. Specifically, Bayraktar and Wright (2021) found that cybervictimization increased by 6% after 1 year of study, whereas other investigations maintain that cybervictimization remains stable (Camacho et al., 2021; Gámez-Guadix et al., 2015). Although there is ample evidence of the role of prior cybervictimization as a predictor of future cybervictimization (Barlett, 2015; Camerini et al., 2020; González-Cabrera et al., 2018), very few studies focus on the different trajectories of peer cybervictimization. In general, these trajectories have been used in other psychosocial problems related to violence, such as traditional victimization. In this sense, concerning peer victimization, in a study with three waves, González-Cabrera et al. (2021) found the following percentages: 26% of new victims, 6.3% of ceased victims, 8% of intermittent victims, and 8% of stable victims.

In general, longitudinal studies also allow us to determine whether peer cybervictimization remains stable, decreases or increases over time and they also report the prevalence at a specific time (i.e., the prevalence data for each wave) (Caruana et al., 2015). Although it is common to find prevalences such as those previously indicated in reviews of longitudinal studies about cybervictimization (Camerini et al., 2020), to date, none provide period prevalence (i.e., the number of cases in a certain period of time, usually 12 months) or the incidence of peer cybervictimization (i.e., new cases in a population in a given time period). In epidemiology, these measures allow us to determine and report the development of a problem or pathology at a specific time and they are also useful for realities such as victimization in any of its manifestations (Hernández-Aguado & Lumbreras, 2018).

On another hand, numerous studies warn that being subject to cybervictimization causes serious consequences at the physical, psychological, and social levels of young people (Aboujaoude et al., 2015). Specifically, the literature shows consensus about the relationship between peer cybervictimization and internalizing (Camerini et al., 2020) and externalizing problems (Fisher et al., 2016). Similarly, peer cybervictimization is also related to more holistic and general variables such as psychological well-being, life satisfaction (Larrañaga et al., 2018) or quality of life (QoL) (Kadiroğlu et al., 2018).

QoL is defined by the World Health Organization as an individual's perception of their position in life within the contexts of the culture and value systems in which they live regarding their goals, expectations, standards, and concerns (Saxena et al., 1997). From this more global construct is derived a more specific term, called health-related quality of life (HRQoL). HRQoL is a multidimensional construct that refers to aspects of health that are reflected in the individual's daily functioning on a physical, psychological, social, and emotional level (Ravens-Sieberer et al., 2008; Wallander & Koot, 2016) and how they are seen by others.

Although HRQoL is a construct widely studied in children and adolescents as an outcome health measure of clinical population (Wallander & Koot, 2016), its study in psychosocial problems related to violence has received less attention. Currently, there is evidence of the relationship between traditional bullying and a decrease in HRQoL (González-Cabrera et al., 2020; Hidalgo-Rasmussen et al., 2018), and the impact on HRQoL has also been shown in online partner abuse (Ortega-Barón et al., 2022), peer abuse (Jernbro et al., 2015), or when psychosocial risks accumulate (González-Cabrera et al., 2021). Concerning cybervictimization, there are few studies, although González-Cabrera et al. (2018) pointed out how cybervictimization was related to decreases in physical and psychological well-being, autonomy and the relationship with parents, peer support, and the environment in the school. Recently, McLoughlin et al. (2021) also reported the relationship between cybervictimization and poorer HRQoL over time.

Currently, there are no known studies that jointly analyze the trajectory of cybervictimization profiles and their impact on HRQoL. Nor is there evidence regarding the epidemiological approaches to cybervictimization that provide indicators such as the period prevalence or the incidence of this psychosocial problem. Therefore, the objectives of the present prospective study were as follows: (a) to analyze the point prevalence, period prevalence, and incidence of cybervictimization in a sample of Spanish adolescents; (b) to analyze the prevalence of cybervictimization profiles (uninvolved, new victims, ceased victims,

intermittent victims, and stable victims); (c) to analyze the relationship between cybervictimization and HRQoL over time; and (d) to determine the longitudinal impact of each type of cybervictimization profile on HRQoL. These analyses will take into account possible sex differences.

This study proposes the following hypotheses in a sample of Spanish adolescents. Regarding the first objective, (H1) the point prevalence will be between 6.9% and 22.5% (Calmaestra et al., 2016). As there are no data for period prevalence and incidence, the following research question arises: What are the period prevalence and incidence of peer cybervictimization? As for the second objective, it is hypothesized (H2) that the nonvictims (or uninvolved) will be the largest group, followed by new victims and stable victims, and the smallest groups will be the ceased victims and the intermittent victims, as is the case of other related problems (Berger-Silva, 2010; González-Cabrera et al., 2021; Ortega-Barón et al., 2022). Concerning the third objective, it is hypothesized (H3) that being a cybervictim at Wave 1 (W1) or 2 (W2) will increase the risk of presenting a worse HRQoL at W3, as has been shown in other studies on violence (González-Cabrera et al., 2021; Ortega-Barón et al., 2022). Regarding the last objective, in general, it is expected (H4) that those involved in cybervictimization will present lower scores in HRQoL, with stable victims obtaining the lowest scores (González-Cabrera et al., 2021; Ortega-Barón et al., 2022).

2 | METHOD

2.1 | Design and participants

A prospective study was conducted with three waves over 13 months (December 2017 to February 2019). The first two waves were carried out in the same academic year with a delay of 6 months between W1 and W2. The third wave (W3) was performed in the following academic year (approximately 7 months after W2). In the initial sample, 2152 students participated in this study. The students were enrolled in 14 schools in seven Spanish regions (Aragon, Castilla la Mancha, Castilla y León, Community of Madrid, Valencian Community, Basque Country, and Principality of Asturias). The final sample of this longitudinal study, was composed of a total of 1142 participants (55.2% girls) who completed the three waves (participation rate: 53.1%)—see Table 1. Nonprobabilistic incidental sampling was used.

2.2 | Instruments

For the assessment process, we asked the participants some sociodemographic questions: sex, age, grade, and study center. The reduced version of the Cyberbullying Triangulation Questionnaire (CTQ; González-Cabrera et al., 2019) was used for the cybervictimization dimension, based on the works of Calvete et al. (2010) and Gámez-Guadix et al. (2015). This questionnaire is composed of 9 items. Each item is rated on a 5-point Likert scale ranging from 0 (*never*) to 4 (*almost every week*). The total score ranges between 0 and 36. The CTQ has adequate indicators of reliability and internal validity, and for the sample of the present study, Cronbach's alphas of .74 (W1), .83 (W2), and .85 (W3) were obtained.

TABLE 1 Characteristics of the participants at the three waves ($n = 1108$[a])

Wave	W1 (f/%)	W2 (f/%)	W3 (f/%)
Grade			
1st Grade SCE	282 (25.5)	282 (25.5)	11 (1.0)
2nd Grade SCE	366 (33.3)	366 (33.3)	277 (25.0)
3rd Grade SCE	330 (28.9)	330 (28.9)	370 (33.3)
4th Grade SCE	72 (6.3)	72 (6.3)	330 (30.0)
1st Grade high school	58 (5.1)	58 (5.1)	63 (5.6)
2nd Grade high school	–	–	57 (5.1)
Age			
M (*SD*)	13.6 (1.2)	13.9 (1.2)	14.7 (1.3)

Note: % = percentage.

Abbreviations: f, frequency, M, mean; SCE, secondary compulsory education; *SD*, standard deviation.

[a]There were 33 participants who did not respond to the variable "grade."

For the assessment of HRQoL, the Spanish version of the KIDSCREEN-10 (Ravens-Sieberer & Kidscreen Group Europe, 2016) for children and adolescents aged 8–18 years was used. This version consists of 10 items and is a general assessment of HRQoL. It includes items of physical and psychological well-being, social support, and relationship with parents, among others. Each item is rated on a 5-point Likert scale ranging from 1 (*not at all/never*) to 5 (*a lot/always*). The mean scores varied around 50 ($SD = 10$) due to *t*-value standardization for the Spanish population (Ravens-Sieberer & Kidscreen Group Europe, 2016). It has appropriate levels of reliability and internal validity, and population values for the Spanish sample. In the present study, Cronbach's alpha coefficient was .80 (W1), .82 (W2), and .82 (W3).

2.3 | Assessment criteria

To dichotomize the cybervictimization variable (cybervictim vs. noncybervictim), participants who scored 2 ("often") or higher on any of the items of the CTQ's cybervictimization dimension were considered "cybervictims." This criterion is commonly used in this instrument and allows comparability between studies (González-Cabrera et al., 2020). Cybervictims were classified based on when they reported problems: new victims (those who reported being cybervictims only at W1 or W2, or W3); intermittent cybervictims (those who were victims at W2 and W3, but not at W1; or at W1 and W3, but not at W2); ceased cybervictims (those who were victims at W1 and W2 but not at W3), stable cybervictims (victims at all the three waves). Health-related quality of life was considered to be low when a participant reported a score below one standard deviation of the sample mean for each wave. In most circumstances, the threshold of discrimination for changes in HRQoL appears to be approximately half of a standard deviation (Norman et al., 2003). At W1, a value of ≤38.6 was considered low (46.7 ± 8.1, arithmetic mean and standard deviation, respectively); at W2, a value of ≤38.8 (47.3 ± 8.5); and at W3, a value of ≤37.9 (46.5 ± 8.6). The values considered appropriate HRQoL were those higher than the aforementioned values at each wave.

2.4 | Procedure

The questionnaires were applied in an online format using Qualtrics©. Participants responded in the computer classes of their schools or in their classrooms when using devices such as computers, and occasionally tablets or mobiles. In either case, they were supervised by a teacher in charge. The time required to complete the instruments ranged between 5 and 10 min. Participants generated a code using an algorithm by answering a series of questions that allowed the researchers to link their answers across times. The adolescents' participation was voluntary, confidential (participants identity was protected) and they did not receive any reward or compensation for completing the questionnaire. All the participating centers approved participation in the study. An informed consent procedure was established for legal guardians. The Committee on Research Ethics of Universidad Internacional de la Rioja (Ref. 231/17) endorsed the investigation.

2.5 | Statistical analysis

The Statistical Package for the Social Sciences (SPSS v23) program was used for: (1) analysis of frequencies, arithmetic means, and standard deviations; (2) analysis of point and period prevalence, and incidence; (3) Chi-square analysis and analysis of the adjusted standardized residuals; (4) McNemar's test to examine whether prevalence rates changed between waves; (5) analysis of variance for repeated measures with correction of the degrees of freedom adjusted with Greenhouse-Geisser and post hoc comparisons of Bonferroni; (6) *t*-tests for independent samples (Cohen's *d* was calculated to determine the effect size); (7) Pearson bivariate correlations; and (8) variance of analysis with post hoc Games-Howell comparisons. The EPIDAT 3.1 Program was used to calculate prevalence ratios (PR) and relative risks (RR). The period prevalence is obtained from the total number of cases involved in peer cybervictimization at any of the waves. The cumulative incidence is the new cases that occur as of W1. Due to the large number of comparisons, and to reduce Type I error, only $p \leq .001$ were considered statistically significant.

3 | RESULTS

3.1 | Point and period prevalence, incidence, and stability of peer cybervictimization

Table 2 shows the prevalence of peer cybervictimization profiles as a function of the three waves for the total score and sex. Overall, significant differences were found in the profiles as a function of sex. In particular, we found a higher than expected proportion of uninvolved participants, ceased victims and stable victims among girls. The point prevalence were 21.5% (7.2%

TABLE 2 Prevalences of cybervictimization profiles for the three study waves

Cybervictim as a function of all three waves W1-W2-W3	Total (f/%)	Boys (f/%)	Girls (f/%)	χ^2(df) (*p*)
NV-NV-NV (Uninvolved)	670 (58.7)	315 (27.6)[a]	355 (31.1)[b]	20.409 (7) ($p = .005$)
V-NV-NV (New victims)	84 (7.4)	28 (2.5)	56 (4.9)	
NV-V-NV (New victims)	102 (8.9)	48 (4.2)	54 (4.7)	
NV-NV-V (New victims)	88 (7.7)	39 (3.4)	49 (4.3)	
V-V-NV (Ceased victims)	62 (5.4)	18 (1.6)[b]	44 (3.9)[a]	
V-NV-V (Intermittent victims)	32 (2.8)	16 (1.4)	16 (1.4)	
NV-V-V (Intermittent victims)	35 (3.1)	12 (1.1)	23 (2.0)	
V-V-V (Stable victims)	69 (6.0)	20 (1.8)[b]	49 (4.3)[a]	

Note: f = frequency, % = percentage; χ^2 = Chi-Square, *p* = significance; V = victim; NV = nonvictim.

[a]Adjusted standardized residuals >1.96.

[b]Adjusted standardized residuals <1.96.

TABLE 3 Prevalence of peer cybervictimization behaviors as a function of wave and sex

	Total (*N* = 1142)			Boys (*N* = 496)			Girls (*N* = 646)		
	W1 (*n* = 1142) (f/%)	W2 (*n* = 1142) (f/%)	W3 (*n* = 1142) (f/%)	W1 (*n* = 496) (f/%)	W2 (*n* = 496) (f/%)	W3 (*n* = 496) (f/%)	W1 (*n* = 646) (f/%)	W2 (*n* = 646) (f/%)	W3 (*n* = 646) (f/%)
Item 1	135 (11.8)*	125 (10.9)	124 (10.9)*	46 (3.9)[a]	48 (4.2)	40 (3.8)[a]	89 (7.9)[b]	77 (6.7)	81 (7.1)[b]
Item 2	61 (5.3)	96 (8.4)**	75 (6.6)	20 (1.8)	27 (2.4)[a]	28 (2.7)	41 (3.6)	69 (6.0)[b]	42 (3.9)
Item 3	96 (8.4)	123 (10.8)	109 (9.5)	35 (3.1)	44 (3.9)	37 (3.7)	61 (5.3)	79 (6.9)	66 (5.9)
Item 4	13 (1.1)	32 (2.8)	16 (1.4)	4 (0.4)	14 (1.2)	7 (0.8)	9 (0.8)	18 (1.6)	7 (0.6)
Item 5	12 (1.1)	36 (3.2)	18 (1.6)	4 (0.4)	16 (1.4)	9 (1.0)	8 (0.7)	20 (1.8)	6 (0.6)
Item 6	6 (0.5)	15 (1.3)	14 (1.2)	1 (0.1)	9 (0.8)	5 (0.6)	5 (0.4)	6 (0.1)	7 (0.6)
Item 7	50 (4.4)*	69 (6.0)	56 (4.9)	13 (1.1)[a]	24 (2.1)	16 (1.6)	37 (3.2)[b]	45 (3.9)	37 (3.3)
Item 8	72 (6.3)*	71 (6.2)	48 (4.2)*	21 (1.8)[a]	24 (2.0)	12 (1.2)	51 (4.6)[b]	47 (4.2)	32 (3.0)
Item 9	2 (0.2)	14 (1.2)	14 (1.2)	1 (0.1)	8 (0.7)	6 (0.7)	1 (0.1)	6 (0.5)	6 (0.5)

Note: Item 1 = sending me threatening or insulting messages; Item 2 = uploading or sending humiliating pictures of me; Item 3 = writing or spreading jokes, rumors, gossip, or comments that make a fool of me; Item 4 = getting my password to access social networks (nicks, codes, etc.) and sending messages on my behalf that could make me look bad to others or cause problems with my acquaintances; Item 5 = video recording or taking pictures with a mobile phone while a group laughs and forces me to do something humiliating or ridiculous and hanging it on the internet; Item 6 = video recording or taking pictures with a mobile phone while someone hits me or hurts me to send or post on the internet; Item 7 = spreading secrets, information or compromising images about me on the internet; Item 8 = intentionally separating me from a group on a social network (chats, friends' lists, thematic forums, etc.); Item 9 = videotaping or taking pictures of me showing some kind of sexual behavior to hang or send. Significant at ***$p < .001$; **$p < .010$; *$p < .05$.

[a]Adjusted standardized residuals <1.96.

[b]Adjusted standardized residuals >1.96.

boys, 14.3% girls) at W1; 23.4% (8.6% boys, 14.7% girls) at W2; and 19.6% (7.1% boys, 11.9% girls) at W3. There were nonsignificant changes in the prevalence of peer cybervictimization between W1 and W2 (McNemar test = 1.58, $p = .209$), nor between W1 and W3 (McNemar test = 1.79, $p = .180$). There was a trend difference between W2 and W3 (McNemar test = 6.51, $p = .011$). Likewise, for the 13 months of the study, the period prevalence was 41.3%, and the cumulative incidence was 25.1%.

3.2 | Prevalence of peer cybervictimization behaviors based on the wave and sex

Table 3 shows the prevalence of peer cybervictimization for each of the behaviors depending on the wave and sex. Statistically significant differences across time were found in one of the nine items for the total sample: Item 4, related to identity theft (GG-ε = 7.453; $p = .001$; $\eta^2 = 0.006$). The mean of the reported cybervictimization behavior in this item was significantly higher at W2 when compared to W1 ($p < .001$), and showed a trend difference with W3 ($p = .004$). The differences found in

Item 2 (related to sending humiliating messages) (GG-ε = 5.173; $p = .006$; $\eta^2 = 0.005$) and Item 5 (associated with obtaining humiliating images or videos) (GG-ε = 6.286; $p = .002$; $\eta^2 = 0.005$) at the different waves could also be considered as significant trend differences. Specifically, these two items showed significantly higher scores at W2 than at W1 ($p = .001$ and $p < .001$, respectively).

In general, as can be seen in Table 3, the wave with the highest scores in reported cybervictimization behaviors was W2, and the wave with the lowest prevalence was W1 (except for Items 1—related to sending messages—and 8—intentionally expelling a peer from a group—, in which the prevalence was lower at W3). Concerning the mean of the cybervictimization dimension, there was a statistically significant difference between the three waves (GG-ε = 7.434; $p = .001$; $\eta^2 = 0.007$). Specifically, the mean cybervictimization dimension was significantly higher at W2 than at W1 ($p < .001$).

In terms of sex differences, significant differences were found in item 1 (waves 1 and 3), item 2 (wave 2), item 7 (wave 1) and item 8 (Waves 1 and 3) between boys and girls. In all cases, more girls than expected were found to report these behaviors.

3.3 | Stability of HRQoL

The prevalence of participants with low HRQoL (below one standard deviation) was 15.7% at W1 (girls 10.3%, boys 5.4%), 15.7% at W2 (girls 10.4%, boys 5.3%), and 14.4% at W3 (girls 10.2%, boys 4.2%). When comparing the mean HRQoL scores, statistically significant differences were found in all three waves (GG-ε = 7.600; $p = .001$; $\eta^2 = 0.007$). The HRQoL score was significantly higher at W2 than at W1 ($p = .002$), and at W2 than at W3 ($p < .001$), but differences between W1 and W2 were nonsignificant ($p = .420$).

Likewise, the mean HRQoL score between boys and girls was compared at each wave. Statistically significant differences were found between boys and girls at W1 ($t = 4.807$; $p < .001$; $d = 0.028$), at W2 ($t = 4.502$; $p < .001$.; $d = 0.026$), and at W3 ($t = 7.157$; $p < .001$; $d = 0.045$), with girls obtaining a lower mean HRQoL score in all waves.

3.4 | Association between cybervictimization and HRQoL over time

Peer cybervictimization scores positively correlated with each other in all three waves, while associations with HRQoL were negative in all waves (see Table 4).

Complementing the above, the PR between being a cybervictim at W1 and presenting an HRQoL below one standard deviation was PR = 2.00 [1.44–2.32]. This indicates that a cybervictim at W1 simultaneously has twice the prevalence of low HQroL. At W2, it was RP = 1.54 [1.21–1.96], and at W3, it was PR = 2.08 [1.62–2.67].

The RR between being a cybervictim at W1 and presenting a low HRQoL at W3 was 1.73 [1.29–2.32], which means that a cybervictim at W1 has 1.73 times more risk of presenting a low HRQoL 13 months later (W3) compared to those who were not cybervictims. The RR between being a cybervictim at W2 and having low HRQoL at W3 was 1.83 [1.37–2.44].

3.5 | Differences in HRQoL based on the cybervictimization profile and the wave

Last, Table 5 presents the comparisons between the total HRQoL scores at each wave, depending on the different peer cybervictimization profiles. Statistically significant differences were found in the total HRQoL scores based on the different

TABLE 4 Association between peer cybervictimization and HRQoL and wave ($n = 1142$)

	1.	2.	3.	4.	5.	6.	7.
1. Peer cybervictimization W1	—	0.319***	0.196***	−0.256***	−0.228***	−0.180***	0.200***
2. Peer cybervictimization W2	0.539***	—	0.110*	−0.126**	−0.083	−0.106*	0.055
3. Peer cybervictimization W3	0.341***	0.425***	—	0.005	−0.114*	−0.104*	0.019
4. HRQoL W1	−0.293***	−0.274***	−0.259***	—	0.555***	0.515***	−0.164***
5. HRQoL W2	−0.287***	−0.289**	−0.264***	0.653***	—	0.515***	−0.204***
6. HRQoL W3	−0.174***	−0.220**	−0.274***	0.522***	0.554***	—	−0.168***
7. Age	−0.075	0.061	−0.045	0.–300***	−0.289***	−0.194***	—

Note: Correlations for boys are shown above the diagonal and for girls below the diagonal. Significant at ***$p < .001$, **$p < .010$, *$p < .05$.
Abbreviation: HRQoL, health-related quality of life.

TABLE 5 Differences in the KIDSCREEN-10 as a function of cybervictim profile and wave ($n = 1142$)

Type of cybervictimization	KD-10 W1 *M* (*SD*)	KD-10 W2 *M* (*SD*)	KD-10 W3 *M* (*SD*)
Uninvolved[a] ($n = 642$)	48.29 (7.92)	48.94 (8.56)	48.12 (8.40)
New victims[b] ($n = 268$)	45.76 (8.24)	46.23 (8.52)	45.13 (8.64)
Ceased victims[c] ($n = 62$)	43.87 (8.63)	44.59 (8.74)	45.99 (9.80)
Intermittent victims[d] ($n = 67$)	42.52 (5.84)	44.22 (5.93)	42.38 (7.54)
Stable victims[e] ($n = 69$)	41.16 (5.27)	41.74 (5.69)	40.36 (4.75)
F ($p <$) η^2 Post hoc (G-H)	$F_{(9,\ 1107)} = 15.157$; $p < .001$; $\eta^2 = 0.111$; a > b, d, e; b > e	$F_{(9,\ 1137)} = 12.661$; $p < .001$; $\eta^2 = 0.094$; a > b, d, e; b > e	$F_{(9,1137)} = 16.513$; $p < .001$; $\eta^2 = 0.119$; a > b, d, e; b > e; c > e

Note: KD-10 (KIDSCREEN-10); *M* = arithmetic mean; *SD* = standard deviation; *p* = significance; *F* = Fisher's *F*; η^2 = eta squared; post hoc: Games-Howell post hoc test.

cybervictimization profiles at the three waves ($p < .001$) and sex ($p < .50$). However a nonsignificant interaction between profile and sex was found (W1, $F_{(1,\ 1007)} = 0.995$, $p = 409$; W2, $F_{(1,\ 1007)} = 0.601$, $p = 662$; W3, $F_{(1,\ 1007)} = 1.697$, $p = 148$). In general, it can be seen that stable victims had a significantly lower HRQoL score than uninvolvedand new victims at all three waves. Additionally, it was found that nonvictims had a significantly higher HRQoL score ($p < .001$) as compared to all the types of victims (except for ceased victims).

4 | DISCUSSION

This prospective three-wave study provides empirical evidence of the relationship between peer cybervictimization and its impact on HRQoL over time, which had not been documented in previous studies. Furthermore, this study also presents an unique approach to peer cybervictimization through an epidemiological perspective.

Concerning the first objective, to analyze the point prevalence, period prevalence, and cumulative incidence, it should be noted that the reported prevalence data are higher than those indicated by Modecki et al. (2014), although they are in the range of many other studies (Brochado et al., 2017; Zhu et al., 2021). In addition, the prevalence is similar to that reported in other recent studies with Spanish samples, which used cut-off points similar to those of the present study, such as Andrade et al. (2021). According to the present results, the first hypothesis of this study (H1) is confirmed, as the point prevalence is between 6.9% and 22.5%. This finding can be explained, at least in part, by the exponential increase in Internet consumption among the adolescent population (Eurostat, 2019), as well as by insufficient family supervision of Internet and social media use (Díaz-López et al., 2020). On the other hand, it should be noted that there is no evidence of cyber-victimization among peers in relation to period prevalence or cumulative incidence. Moreover longitudinal studies often just provide a comparison of different point prevalences at each wave (Camerini et al., 2020). Therefore, these data cannot be compared with other epidemiological studies on this problem, but with research on traditional peer violence with a similar research approach.

In this sense, both the reported period prevalence of 41.3% in the 13 months and the cumulative incidence of 23.5% are in line with those found by González-Cabrera et al. (2021) on peer victimization. This may also indicate that point prevalence studies underestimate the number of total victims of cyberbullying. In this sense, it should be borne in mind that the two problems are closely related in adolescence (Antoniadou et al., 2016; Chan & Wong, 2019; Waasdorp & Bradshaw, 2015) and which could also overlap.

Prevalence data, before the COVID-19 pandemic, should be analyzed with caution. Whether there has been an increase in the prevalence of cyberbullying is currently under discussion, as there are studies that support this relationship (Kee et al., 2022) and others that suggest that there has not been a significant increase (Mendes et al., 2022). In any case, adolescents were indeed more exposed to the use of the Internet and social networks and thus to greater online risks (World Childhood Foundation, 2020).

Although no hypotheses were raised for prevalence in terms of sex, as there is no consensus in the literature, the results of this study indicate a higher prevalence of peer cybervictimization among girls, as seen in the higher prevalence of ceased

victims and stable victims. This result is consistent with the findings of the meta-analysis carried out by Sun and Fan (2018). However, other studies found a higher prevalence of peer cybervictimization among boys (Machimbarrena & Garaigordobil, 2018; Wong et al., 2018) while others found no differences by sex (DePaolis & Williford, 2015). A possible explanation for the results of the present study is that, in general, boys have higher levels of aggressiveness than girls, and therefore, girls would be victimized to a greater extent, both by boys and girls (Navarro et al., 2015; Sorrentino et al., 2019). It could also be because girls use social media significantly more than boys (Booker et al., 2018), and previous studies found correlations between social media use and engaging in risky behaviors related to violence (Vannucci et al., 2020). Another possible explanation is the lower parental restriction and supervision of Spanish parents over boys (Andrade et al., 2021).

Concerning the second objective, to analyze peer cybervictimization profiles, the data reported in this study point to nonvictims as the group with the highest prevalence, followed by new, stable, intermittent, and ceased victims. Therefore, the hypothesis formulated for the second objective (H2) is confirmed. These results are in line with those found in previous studies, both on peer victimization, as well as other related problems (Berger-Silva, 2010; González-Cabrera et al., 2021; Ortega-Barón et al., 2022). In any case, the high number of people involved in cybervictimization problems shows the need for primary or secondary prevention of these issues (Calvete et al., 2021), and the joint prevention of multiple Internet risks is also relevant (Ortega-Barón et al., 2021). It should be noted that up to a 6% of the sample was a stable victim through the 13 months of the study.

Concerning the third objective, to study the relationship between peer cybervictimization and HRQoL over time, an association was found between peer cybervictimization and deterioration of HRQoL at all three waves, in line with previous longitudinal studies of two and four waves (González-Cabrera et al., 2018; McLoughlin et al., 2021). Additionally, being a cybervictim at W1 and W2 poses more risk of presenting low QoL at W3 compared to those who are not cybervictims. Therefore, the hypothesis proposed regarding the third objective (H3) is confirmed. This is consistent with evidence from other studies (González-Cabrera et al., 2021; Ortega-Barón et al., 2022). A possible explanation could be that peer cybervictimization is associated with self-esteem issues, and a decline in psychological well-being and life satisfaction (Brewer & Kerslake, 2015; Larrañaga et al., 2018).

Regarding objective four, to determine the impact on HRQoL of each type of peer cybervictimization profile, it should be noted that, in line with the findings of González-Cabrera et al. (2021), the uninvolved profile presents a significantly higher score in HRQoL. At the same time, stable victims are those with the worst HRQoL, compared to the rest of the profiles. Therefore, the hypothesis proposed for the fourth objective (H4) is confirmed. This could be explained because, as it has been found in previous studies, stable victims tend to present higher levels of stress, depressive symptoms, generalized anxiety problems, and suicidal ideation (Iranzo et al., 2019) than the rest of the cybervictimization profiles (Geoffroy et al., 2018; Hellfeldt et al., 2018). In addition, it was found that, in ceased victims, HRQoL increases slightly after the cessation of peer cybervictimization, but it does not match that of those who have never been cybervictimized. These results are consistent with those found in longitudinal studies on other manifestations of violence (González-Cabrera et al., 2021; Ortega-Barón et al., 2022). A possible explanation could be that being victimized involves a loss of psychological well-being, regardless of the trajectory of the aggression (Hellfeldt et al., 2018). In addition, past victimization experiences may lead to the development of maladaptive schemas related to the way victims feel about themselves and how they perceive relationships with others (Hankin et al., 2016). This, in turn, can play an important role in maintaining cybervictimization over time, as occurs in the context of bullying (Calvete et al., 2018).

The study has potential practical implications for education and health professionals. First, the findings of the study demonstrates that although cyberbullying victimization has an immediate effect on quality of life, those who report sustained cyberbullying victimization are the ones with the lowest scores on quality of life. This highlights the importance of tackling this problem as soon as possible to prevent the presence of cybervictimization. Moreover, from the evidence derived from this study, one can see the need to design and carry out literacy and digital responsibility programs to prevent peer cybervictimization. In this sense, it seems especially appropriate to implement such programs as a preventive measure, specifically in the primary education stage because, in general, at this age, children still have significant restrictions on access to and use of the Internet. Secondly, HRQoL is established as a globalizing construct that should be the object of a comprehensive analysis. Through its evaluation, evidence can be extracted about the existence of psychosocial problems in the adolescent population. In addition, knowing the impact of each cybervictimization profile on HRQoL could provide a greater degree of precision when designing and implementing interventions in schools that focus especially on improving the key dimensions of HRQoL associated with these problems (emotional well-being, relationship with parents and peers, and school environment). Third, HRQoL could be considered an additional measure in intervention programs for peer cybervictimization, to verify their effectiveness. Finally, analyzing the prevalence and incidence of a problem such as cyberbullying aids to increase the understanding of the problem, as point prevalence has limitations and may be underestimating how many cybervictims there may be. In the future, longitudinal studies could collect and compare these data to find out the number of new cases in a unit of time and the total number of those involved during the study waves (this is a more complete understanding of the reality of a problem such as cyberbullying and other Internet risks).

This study presents some limitations: (1) the measuring instruments employed are self-reporting and there may be a social desirability bias. This could be improved in future studies with the use of complementary measures from other sources (tutors, teachers, and peers) to obtain a more complete triangulated view. (2) As for the representativeness of the sample, although it is large and includes participants from different regions of the country within longitudinal study, extrapolation of the results to the population should be done with caution as the sample is not representative of Spanish adolescents. (3) Despite, no data related to the level of education of the families nor the socio-economic status of the families were collected, the income areas of the 14 participating schools were identified. Three of them were located in high-income areas (above the national average), eight in middle-income areas and three below the national average. As a projection of this study, we encourage replicating the present research in samples from other regions of Spain and in other countries attending to ther socio-economic status.

Finally, by way of synthesis, it should be noted that 4 out of 10 adolescents were involved in the dynamics of peer cybervictimization and 1 out of 4 became a new victim over the 13 months lenght of the study. In addition, peer cybervictimization and deterioration of HRQoL were associated, both transversely and longitudinally. Finally, we note that stable cybervictims reported the worst HRQoL.

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CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

The datasets of the current study are not publicly available due to confidentiality agreement with participants schools but are available from the corresponding author on reasonable request.

ETHICS STATEMENT

This study was approved by the ethics committee of the Asturias Principality (Ref. 231/17).

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