



Joint association of bullying and cyberbullying in health-related quality of life in a sample of adolescents

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Abstract

Purpose Health-related quality of life (HRQoL) has been analyzed in relation to multiple psychosocial and health problems. However, only a few studies have analyzed the impact of bullying and cyberbullying on HRQoL. The main purpose of this study was to analyze the level of severity of bullying and cyberbullying on HRQoL. The effects of different roles, especially the conjunctions of victim–cybervictim and bully–victim/cyberbully–cybervictim on HRQoL, were explored.

Methods An analytical and cross-sectional study was conducted in a region of northern Spain. Random and representative sampling was employed. The participants included 12, 285 adolescents between 11 and 18 years of age, with a mean age of 14.69 ± 1.73 . The Spanish version of the KIDSCREEN-27, the Spanish version of the European bullying intervention project questionnaire (EBIPQ), and the cyberbullying triangulation questionnaire (CTQ) were employed.

Results The prevalence of bullying victimization, cybervictimization, bullying perpetration, and cyberbullying perpetration was 12%, 8.1%, 10.4%, and 7%, respectively. Significant and negative correlations between all the dimensions of the EBIPQ and the CTQ with the KIDSCREEN-27 were found. Victimization and cybervictimization had more impact than bullying perpetration and cyberbullying perpetration, especially on psychological well-being and school environment. The mixed roles of the victim–cybervictim and victim–cybervictim/bully–cyberbully obtained lower scores than the remaining roles in all the dimensions of KIDSCREEN-27.

Conclusions Those in mixed roles related to victimization and cybervictimization obtained the lowest scores in all HRQoL dimensions. The results enhance an understanding of the severity of the problem of bullying and cyberbullying and their impact on HRQoL.

Keywords Health-related quality of life · Bullying · Cyberbullying · Child · Adolescence

Introduction

Health-related quality of life (HRQoL) is a complex construct for which there is no single accepted definition [1]. However, there is clear consensus not to define it as the absence of a disease or disorder, but rather from a more holistic point of view, that integrates the physical, psychological, emotional, and social aspects of an individual.

Furthermore, well-being must be perceived by individuals themselves, as well as by those around them [2, 3].

HRQoL has increasingly been addressed in relation to problems associated with violent behavior, and the affliction associated with bullying and cyberbullying that various role players, such as the victim, aggressor, bully/victim, and observer, suffer. In particular, violence toward minors has been associated with a reduction in the quality of life when they have suffered physical and psychological abuse, psychological maltreatment, neglect, and/or witnessed intimate partner violence [4–6]. This is especially important during adolescence as it is a period marked by significant changes [7, 8].

The most common forms of school violence are bullying and cyberbullying. Both problems are carried out intentionally, maintained over time, and occur in situations of power asymmetry [9]. Cyberbullying is usually anonymous,

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timeless, and omnipresent. Furthermore, it is conducted through information and communication technologies [10]. A meta-analysis of 80 studies on 12- to 18-year-olds revealed that the average prevalence rate of bullying perpetration and bullying victimization was 35% and 36%, respectively [11]. It is estimated that the average prevalence rate of cybervictimization is 15%, and that of cyberperpetration is 16% [11]. These statistics concur with the results of more recent reviews [12, 13]. Studies conducted in Spain have revealed a similar prevalence of cyberbullying [12, 13].

There is considerable evidence of a decline in the psychological well-being of individuals and especially victims when they are subjected to bullying [14, 15]. Bullying victims suffer diminished physical and mental health and poorer peer social support than those who are not victims of bullying [15]. Furthermore, bullying victimization has been associated with lower HRQoL scores in almost all aspects of daily functioning [15]. Bullying victims are twice as likely to experience low HRQoL compared with those who are not victims, even after adjusting for the perception of health, gender, and age [16]. Being a victim of bullying during one's final school years (16–18 years) leads to greater impairment of HRQoL than in the early stages of schooling [16]. The importance of peer groups in this phase of adolescence [17] and their tendency not to seek help and support in comparison to younger adolescents may contribute to this greater impairment [18]. Furthermore, gender differences begin to emerge during this stage. In comparison to boys, girls have shown a decrease in the physical and psychological aspects of HRQoL [19]. However, regardless of gender and age, the impairment of HRQoL, when suffering from school bullying, is widespread in multiple geographical contexts: Europe [15], Chile [20], Mexico [21], and Turkey [22].

Although studies have shown a reduction in HRQoL when there is evidence of school bullying, there is a paucity of research on cyberbullying and HRQoL. However, at least one study has revealed that cybervictims have lower scores in physical well-being, psychological well-being, self-perception, autonomy, parent relationships and home life, peer social support compared with the scores of cyberbystanders, uninvolved individuals, and even cyberaggressors [23].

Furthermore, there does not appear to be any studies that have jointly evaluated bullying and cyberbullying to determine their joint influence on HRQoL, thus revealing a gap in the literature. This is noteworthy because there is evidence of a strong relationship between the two problems [22]. Moreover, the psychological influence of being a victim–cybervictim is greater than being only a victim or cybervictim [18]. There is a definite overlap between bullying victims and aggressors [24] in the context of cyberbullying [25, 26]. This joint role of aggressor and victim presents problems attributed to victimization (internalizing problems) and those that have been considered more typical

of aggressors (externalizing problems) besides suffering the high degree of rejection from their peers [27, 28]. Therefore, investigating bullying and cyberbullying in relation to HRQoL is imperative, especially in mixed forms, such as victim–bully/cybervictim–cyberbully.

Accordingly, the main objective of this study was (i) to analyze differences in HRQoL in accordance with the level of severity associated with bullying and cyberbullying. In addition, (ii) HRQoL was explored in relation to different bullying and cyberbullying participation categories, especially mixed forms, such as victim–cybervictim, victim–aggressor, and cybervictim–cyberaggressor. Lastly, (iii) we also established the prevalence of bullying and cyberbullying in the sample and made comparisons based on the severity of the problem, gender, age, and type of school, namely, public or private. We formulated the following hypotheses: First, the greater the severity of bullying and cyberbullying, the lower HRQoL would be [15, 21, 23]; second, adolescents who were victims–cybervictims would present lower HRQoL, similar to that of other psychosocial problems, than those who only identified as victims or cybervictims [27, 28]. In accordance with the studies mentioned in the introduction, the authors also considered that adolescents who presented joint roles of victim–cybervictim/bully–cyberbully (i.e., who participated in all four possible roles) would obtain the lowest scores in HRQoL; and third, the levels of bullying and cyberbullying would be similar to those found in other studies [12, 13, 29].

Method

Design and participants

A descriptive and cross-sectional study [30] was carried out in an autonomous community in northern Spain. According to official data, the population under study was made up of 42,100 schoolchildren distributed in 156 centers, with an error margin of less than 0.1% (99% Confidence Interval [CI]). It was calculated that the representative sample should include at least 11,927 students. According to the basic skills diagnostic practice test performed in the 2009–2014 period, the mean economic, social, and cultural status (ESCS) of the 59 schools was similar to the mean ESCS for the totality of secondary education centers in their region. Twenty of the participating schools ranked in the higher tertile of ESCS; 20 were in middle position, and 19 were in the lower tertile.

Instruments

Students were requested to respond with reference to the time elapsed since the beginning of the school term (approximately 5 months). The participants provided

information about demographic variables such as sex, school, and age. For the analysis of the variables under study, the following instruments were used.

For the evaluation of HRQoL, the Spanish version of the KIDSCREEN-27 [31] for children and adolescents aged 8 to 18 years was used. This version measures 5 dimensions through 27 items: Physical well-being (e.g., “Have you felt well and fit?”), Psychological well-being (e.g., “Have you felt sad?”), Autonomy and Parent Relation (e.g., “Have your parents had enough time for you?”), Social Support & Peers (e.g., “Have you and your friends helped others?”), and School environment (e.g., “Have you done well at school?”). The development of the KIDSCREEN was based on the probabilistic partial credit model (PCM), which belongs to the family of Rasch models. PCM attempts to explain the actual behavior of the responders in the testing situation by the estimated person parameter and the location of the item-answers-category-thresholds. The PCM assumes all items of a scale to be the indicators of a single unidimensional latent trait [31]. For the KIDSCREEN-27, the mean scores varied around 50 (SD = 10) due to *T*-value standardization. There are normative data for the Spanish infantile–juvenile population. The reliability for this sample was .86 for the Cronbach’s ordinal alpha, .95 for the ordinal alpha, and .92 for the omega coefficient.

Spanish version of the European Bullying Intervention Project Questionnaire (EBIPQ; [32]). This instrument contains 14 items, 7 related to Victimization (e.g., “I have been excluded or ignored by other people), and 7 related to Bullying perpetration (e.g., “I have excluded or ignored someone”). For both dimensions, the items refer to actions such as hitting, insulting, threatening, stealing, saying rude words, excluding, spreading rumors, etc. The questionnaire takes into account aspects of physical, verbal, social, and psychological bullying. It is rated on a 5-point Likert scale (0 = *never*, 4 = *always*). The score ranges from 0 to 28 for each dimension. For the study sample, it presents Cronbach’s alphas of .83 and .82, ordinal alphas of .87 and .87, and omega coefficients of .87 and .87, for Victimization and Bullying perpetration, respectively.

Cyberbullying Triangulation Questionnaire-CTQ—[25, 33]. This consists of 10 items for the dimension of Cybervictimization (e.g., “sending me threatening or insulting messages”) and 15 items for Cyberbullying perpetration (e.g., “making embarrassing jokes, rumors, gossip, or comments about a classmate on the Internet”). It also contains a dimension of Cyberbystanding that was not included in the study. Responses are rated on a 3-point Likert scale (0 = *never*, 2 = *very often*). The Cybervictimization dimension score ranges between 0 and 20 and that of Cyberbullying perpetration between 0 and 30. The study sample had a Cronbach’s alpha of .88 and .83, an ordinal alpha of .87 and .88, and an

omega coefficient of .88 and .89, for Cybervictimization and Cyberbullying perpetration, respectively.

Procedure

The application of the questionnaires to the students of the different classrooms was supervised by the tutor, with the advice of the Guidance Department and the school Direction. A rigorous procedure was established for collecting data through the online Survey Monkey® platform, using the computer labs of each school. The average response time for the questionnaire battery was approximately 15 min.

Ethical considerations

Collaboration was voluntary, anonymous, and disinterested. The study was carried out with the authorization of the participants, the schools, and the political–educational institution of the autonomous community. Through the official communication channels with the families, the schools sent a passive consent form that informed the parents or guardians about the purpose of the study and its characteristics, its promoters, and their right not to participate. Those parents/guardians who did not wish to allow participation returned the signed consent. Less than 1% of the sample refused to allow their children to participate. The project was approved by the Ethics Committee of the Principality of Asturias (Ref. 59/17), and the Juvenile Prosecutor’s Office was informed. There were no exclusion criteria, except for refusal to participate by the legal guardians or by the students themselves.

Data analysis

Statistical analyses were carried out using the Statistical Package for the Social Sciences (SPSS) [34] program, the R software [35], and the Psych package [36]. Firstly, to determine the internal consistency of the instruments used, Cronbach’s alphas [37], ordinal alphas [38], and omega coefficients [39] were estimated. Then, the assumptions of normality (Shapiro-Wilks) and variance homogeneity for the group comparisons were verified (Levene’s test).

For the standardization of bullying and cyberbullying, a combination of statistical and criteria norms was followed. The statistical norms were (i) *No problem* (a score one standard deviation equal to or below the mean); (ii) *Moderate problems* (scores between one and two standard deviations from the mean); and (iii) *Severe problems* (scores equal to or above two standard deviations from the mean). In the specific case of bullying, criterially, a single behavior that was *always* reported was also considered a severe problem, in accordance with the definition of Olweus [9].

To obtain the roles of victim/cybervictim, bully/cyberbully, and victim–bully/cybervictim–cyberbully, the scores

of each participant were dichotomized (*no problem* = score below or equal to 1 standard deviation from the mean; and *problem* = above 1 standard deviation from the mean). The possible combinations yielded 16 participation categories, although only the 9 categories that represented at least 1% of the sample were used in the analyses: *no problem* (has not been a victim or an aggressor of bullying or cyberbullying); *pure victim* (has only been a victim of bullying); *pure bully* (has only been an aggressor of bullying); *victim-bully* (has been a victim and an aggressor of bullying); *victim-cyber-victim* (has been a victim of bullying and cyberbullying); *pure cybervictim* (has only been a victim of cyberbullying); *pure cyberbully* (has only been an aggressor of cyberbullying); *bully-cyberbully* (has been an aggressor of bullying and cyberbullying); *victim-cybervictim/bully-cyberbully* (presents conjointly all the previous roles). Each participant was only included in only one participation category.

Additionally, the following analyses were carried out: (1) analysis of frequencies and measurements of central tendency and dispersion of the variables; (2) χ^2 analysis for the contrast of proportions and analysis of adjusted standardized residuals; (3) Student's *t* for independent samples and single sample Student's *t*; (4) Cohen's *d* and eta squared as effect size measures; (5) bivariate Pearson correlations; (6) analysis of variance with post hoc Games-Howell comparisons. Due to the great number of comparisons, and in order to limit Type I error, only values equal to or less than $p = .001$ were considered statistically significant. In addition, it is indicated whether the scores obtained by our sample were below the 25th percentile when compared to the Spanish reference sample [31]. When this occurs, it is because participants present a lower score than the 75% of a normal

standardization sample, which could be interpreted as an indicator of low quality of life.

Results

The sample was made up of 12,285 participants of whom 49.1% were boys ($n = 6032$) and 50.3% were girls ($n = 6181$), and 0.6% did not answer this question ($n = 72$). The mean age and standard deviation were 14.69 ± 1.73 , with a range of 11–18 years. Of the sample, 29.4% ($n = 3606$) were between 11 and 13 years old, 36.8% ($n = 4516$) were between 14 and 15 years old, 33.9% ($n = 4160$) were between 16 and 18 years old, and 3 participants did not respond. Fifty-nine schools took part in the sample collection. In particular, 16 schools were private schools ($n = 3381$; 27.25%) and 43 were public schools ($n = 8904$; 72.5%).

The prevalence of victimization, cybervictimization, bullying perpetration, and cyberbullying perpetration was 12%, 8.1%, 10.4%, and 7%, respectively, whereas a higher percentage of boys were bullies and cyberbullies, a significantly higher percentage of girls were cybervictims (see Table 1). Severe problems ranged between 3% for cyberbullying perpetration and 6.6% for bullying victimization.

A series of *t* tests revealed significant differences in several variables related to gender. Boys scored significantly higher than girls did in bullying perpetration, cyberbullying perpetration, physical well-being, psychological well-being, autonomy, and parent relations. Girls scored significantly higher in cyberbullying victimization, social support & peers, and school environment. The largest differences emerged in bullying perpetration, physical well-being, and

Table 1 Prevalence of each of the risks as a function of the severity of the problem for the total sample and by sex

Construct	Severity of problem	Total <i>f</i> (%) $n = 12,285$	Boys <i>f</i> (%) $n = 6032$	Girls <i>f</i> (%) $n = 6181$	χ^2 (<i>p</i>)
Bullying victimization	No problem	10,805 (88)	5333 (88.4)	5407 (87.5)	4.39 (.111)
	Moderate	666 (5.4)	302 (5)**	362 (5.9)*	
	Severe	814 (6.6)	397 (6.6)	412 (6.7)	
Bullying perpetration	No problem	10,755 (87.6)	5069 (84)**	5623 (91)*	139.79 (.001)
	Moderate	1009 (8.2)	613 (10.2)*	388 (6.3)**	
	Severe	521 (4.2)	350 (5.8)*	170 (2.8)**	
Cybervictimization	No problem	11,294 (91.9)	5615 (93.1)*	5615 (90.8)**	30.43 (.001)
	Moderate	658 (5.4)	254 (4.2)**	399 (6.5)*	
	Severe	333 (2.7)	163 (2.7)	167 (2.7)	
Cyberbullying perpetration	No problem	11,424 (93)	5570 (92.3)**	5784 (93.6)*	29.35 (.001)
	Moderate	495 (4)	231 (3.8)	262 (4.2)	
	Severe	366 (3)	231 (3.8)*	135 (2.2)**	

*Adjusted standardized residuals > 1.96

**Adjusted standardized residuals < -1.96

psychological well-being, which were higher for boys than for girls. These results, as well as the correlations between bullying, cyberbullying, and the HRQoL dimensions, are displayed in Table 2.

In relation to the type of school contract, namely, private or public school, a series of *t* tests revealed no significant differences. With respect to age groups (11–13, 14–15, and 16–18), although the effect size was small, statistically significant differences were found for all the dimensions. The lowest scores were in the 11–13-year group (see Table 3). Correlations between age and the three variables under study also yielded significant results: Bullying aggression ($r = .082, p < .001$), cyberbullying victimization ($r = .044, p < .001$), and cyberbullying aggression ($r = .109, p < .001$).

An analysis of the severity levels of problems, which were classified as no problems, moderate problems, and severe problems, victimization, bullying, cybervictimization, and cyberbullying perpetration, as well as their impact on HRQoL, revealed that the participants who did not present problems had significantly higher scores than those who reported severe problems in all the dimensions of the KIDSCREEN-27 (see Table 4). Victimization and cybervictimization had a greater impact on HRQoL than bullying and cyberbullying perpetration did. The dimension most affected by school violence problems was psychological well-being, followed by the school environment. Furthermore, when comparing cybervictimization (severe problems) to cybervictimization (no problems), the largest statistical difference was found in the dimension of psychological well-being. A comparison of the averages obtained in the Spanish standardization sample of the KIDSCREEN-27 with the severe problems category revealed significant differences in all the dimensions. The effect size between the Spanish standardization sample and those with severe problems of cybervictimization and severe problems of bullying victimization in the psychological well-being dimension were noted. In this dimension, the scores of these participants were below the 25th percentile.

With regard to the bullying and cyberbullying participation category and its influence on HRQoL, the participants who did not present problems were, in all cases, within the range of the reference population, with mean scores varying around 50 (SD = 10). The differences in all the KIDSCREEN-27 dimensions between those who did not present problems and those who were pure cybervictims, victims–cybervictims, or who participated in all four roles concurrently are presented in Table 5. There were no significant differences in any dimension between pure bullies and pure cyberbullies. However, there were differences between victims–cybervictims and pure victims in all the dimensions; those who had a mixed role had lower HRQoL. The same tendency was observed between victims–cybervictims and pure cybervictims. The participants who reported problems

Table 2 Total correlations between the risks of the study and the five KIDSCREEN-27 dimensions and means and standard deviations for the entire sample ($N = 12,285$) and for boys ($n = 6032$) and girls ($n = 6181$)

	1.	2.	3.	4.	5.	6.	7.	8.	9.	M ± SD		<i>t</i> (<i>p</i>)	<i>d</i>
										Boys	Girls		
1. Bullying victimization	–									3.56 ± 3.7	3.59 ± 3.6	– 1.03 (.304)	0.02
2. Bullying perpetration	.485	–								2.19 ± 2.8	1.87 ± 2.4	12.67 (< .001)	0.22
3. Cybervictimization	.513	.381	–							0.69 ± 1.6	0.73 ± 1.6	– 3.28 (< .001)	0.06
4. Cyberbullying perpetration	.309	.598	.542	–						0.97 ± 2.3	0.88 ± 2.0	4.60 (< .001)	0.08
5. Physical well-being	–.143	–.051	–.128	–.065	–					49.13 ± 12.0	46.23 ± 11.2	27.52 (< .001)	0.50
6. Psychological well-being	–.326	–.162	–.248	–.138	.473	–				48.53 ± 10.1	47.09 ± 10.0	16.07 (< .001)	0.32
7. Autonomy and parent relation	–.245	–.138	–.193	–.119	.391	.527	–			52.83 ± 10.9	51.93 ± 10.7	9.36 (< .001)	0.17
8. Social support and peers	–.231	–.107	–.196	–.092	.346	.488	.459	–		54.1 ± 10.35	54.56 ± 10.1	– 4.94 (< .001)	0.09
9. School environment	–.277	–.242	–.217	–.186	.375	.501	.483	.410	–	49.72 ± 10.3	49.37 ± 10.7	– 3.75 (< .001)	0.07

All correlations are significant at $p < .001$. *M* arithmetic mean, *SD* standard deviation, *d* = Cohen's *d*

Table 3 Differences as a function age group (11–13, 14–15, 16–18 years) in the dimensions of bullying and cyberbullying ($n = 12,282$)

	11–13 years ^a $n = 3606$		14–15 years ^b $n = 4516$		16–18 years ^c $n = 4160$		<i>F</i>	<i>p</i>	χ^2	Post hoc (Bonferroni)
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
Bullying Victimization	3.35	3.40	3.75	3.72	3.5	3.84	12.63	.001	.002	a < b; c < b
Bullying perpetration	1.78	2.22	2.37	2.85	2.34	3.19	53.38	.001	.009	a < b; a < c
Cybervictimization	0.56	1.31	0.76	1.58	0.70	1.75	16.26	.001	.003	a < b; c < b
Cyberbullying perpetration	0.63	1.63	1.03	2.11	1.21	2.81	31.47	.001	.011	a < b; b < c; a < c

M arithmetic mean, *SD* standard deviation, *F* Fisher’s *F*, *p* significance

Table 4 Differences in the KIDSCREEN-27 dimensions as a function of the severity of the problem in bullying and cyberbullying ($n = 12,230$)

Psychosocial problem	Severity level	Phy-Wb <i>M</i> ± <i>SD</i>	Psy-Wb <i>M</i> ± <i>SD</i>	A&Pr <i>M</i> ± <i>SD</i>	SS&P <i>M</i> ± <i>SD</i>	SE <i>M</i> ± <i>SD</i>
Bullying victimization	No problem ¹	49.58 ± 11.80	49.39 ± 9.85	53.52 ± 10.63	54.72 ± 9.92	50.47 ± 10.06
	Moderate problems ²	45.65 ± 11.29	43.44 ± 9.34	47.91 ± 10.29	50.18 ± 10.51	45.49 ± 9.28
	Severe problems ³	46.03 ± 14.03	41.23 ± 10.29†	47.76 ± 12.61	49.02 ± 13.29	43.28 ± 11.41
	<i>F</i> (<i>p</i> <)	<i>F</i> = 63.35***,	<i>F</i> = 348.13***,	<i>F</i> = 79.55***,	<i>F</i> = 169.18***,	<i>F</i> = 251.81***,
	Post hoc (Games-Howell)	1 > 2; 1 > 3	1 > 2; 1 > 3; 2 > 3	1 > 2; 1 > 3	1 > 2; 1 > 3	1 > 2; 1 > 3; 2 > 3
<i>t</i> (<i>d</i>)	6.60*** (0.23)	21.23*** (0.93)	6.22*** (0.28)	6.50*** (0.28)	12.40*** (0.55)	
Bullying perpetration	No problem ¹	49.26 ± 11.82	48.96 ± 10.11	52.28 ± 10.77	54.38 ± 10.12	50.45 ± 10.0
	Moderate problems ²	48.57 ± 12.17	45.93 ± 9.09	49.85 ± 10.58	52.48 ± 10.51	45.39 ± 10.09
	Severe problems ³	47.59 ± 14.67	44.58 ± 10.81	49.27 ± 12.72	51.19 ± 13.5	43.07 ± 12.51
	<i>F</i> Post hoc (Games-Howell)	<i>F</i> = 6.04	<i>F</i> = 82.81***,	<i>F</i> = 73.96***,	<i>F</i> = 37.19***,	<i>F</i> = 231.43***,
			1 > 2; 1 > 3	1 > 2; 1 > 3	1 > 2; 1 > 3	1 > 2; 1 > 3; 2 > 3
<i>t</i> (<i>d</i>)	3.22 (0.11)	13.15*** (0.58)	3.47*** (0.15)	2.76*** (0.12)	11.71*** (0.52)	
Cybervictimization	No problems ¹	49.53 ± 11.89	49.17 ± 9.96	53.39 ± 10.79	54.58 ± 10.06	50.29 ± 10.17
	Moderate problems ²	45.18 ± 11.49	42.63 ± 9.14	46.96 ± 9.68	50.04 ± 10.49	44.29 ± 8.90
	Severe problems ³	43.51 ± 13.4	38.63 ± 8.67†	45.24 ± 11.22	45.48 ± 13.54†	41.03 ± 11.14†
	<i>F</i> Post hoc (Games-Howell)	<i>F</i> = 78.84***,	<i>F</i> = 302.30***,	<i>F</i> = 192.60***,	<i>F</i> = 183.77***,	<i>F</i> = 232.83***,
		1 > 2; 1 > 3	1 > 2; 1 > 3; 2 > 3	1 > 2; 1 > 3	1 > 2; 1 > 3; 2 > 3	1 > 2; 1 > 3; 2 > 3
<i>t</i> (<i>d</i>)	12.36*** (0.43)	31.79*** (1.39)	12.08*** (0.53)	12.44*** (0.55)	17.29*** (0.76)	
Cyberbullying perpetration	No problems ¹	49.30 ± 11.93	48.79 ± 10.11	53.13 ± 10.82	54.24 ± 10.14	50.13 ± 10.13
	Moderate problems ²	47.83 ± 11.62	45.77 ± 9.32	49.31 ± 10.54	53.81 ± 10.56	45.57 ± 9.06
	Severe problems ³	45.92 ± 13.83	44.01 ± 10.32	48.42 ± 12.51	49.95 ± 14.62	42.48 ± 13.34†
	<i>F</i> Post hoc (Games-Howell)	<i>F</i> = 17.08***, 1 > 3	<i>F</i> = 58.14***,	<i>F</i> = 59.02***,	<i>F</i> = 30.72***, 1 > 3	<i>F</i> = 141.13***,
			1 > 2; 1 > 3	1 > 2; 1 > 3		1 > 2; 1 > 3; 2 > 3
<i>t</i> (<i>d</i>)	6.92*** (0.24)	15.01*** (0.65)	5.08*** (0.22)	4.45*** (0.19)	12.02*** (0.53)	

Phy-Wb physical well-being, *Psy-Wb* psychological well-being, *A&Pr* autonomy & parents relations, *SS&P* social support & peers, *SE* school environment, *M* arithmetic mean, *SD* standard deviation

****p* < .001. All post hoc comparisons are significant at *p* < .001. *T* test between those with severe problems and the Spanish standardization sample of the KIDSCREEN-27 ($n = 531$), *Phy-Wb* ($M = 49.21$; $SD = 10.08$); *Psy-Wb* ($M = 50.78$; $SD = 10.12$); *A&Pr* ($M = 51.21$; $SD = 9.42$); *SS&P* ($M = 52.76$; $SD = 9.22$); *SE* ($M = 49.48$; $SD = 9.78$). † denotes that this score is under the 25th percentile for the standardization sample

Table 5 Differences in the KIDSCREEN-27 dimensions as a function of the bullying–cyberbullying participation category ($n = 11,776$)

Bullying–cyberbullying participation category <i>n</i> (%)	Phy-Wb		Psy-Wb		A&Pr		SS&P		SE	
	M	SD	M	SD	M	SD	M	SD	M	SD
No problem ¹ <i>n</i> = 9216	49.79	± 11.7	49.89	± 9.83	54.05	± 10.53	55.04	± 9.74	51.25	± 9.82
Pure victim ² <i>n</i> = 585	46.68	± 12.58	43.42	± 10.30 ^a	49.18	± 11.99	49.74	± 11.78	45.91	± 10.17
Pure bully ³ <i>n</i> = 637	50.50	± 12.63	48.02	± 9.28	52.10	± 10.89	53.41	± 10.48	46.52	± 10.35
Victim–bully ⁴ <i>n</i> = 276	47.29	± 13.01	44.20	± 9.55	49.08	± 11.05	52.91	± 10.81	45.29	± 10.74
Pure cybervictim ⁵ <i>n</i> = 267	45.39	± 11.79	43.09	± 8.70 ^a	48.06	± 9.22	49.82	± 9.62	45.94	± 8.69
Victim–cybervictim ⁶ <i>n</i> = 257	42.99	± 11.14	38.71	± 9.39 ^a	45.15	± 11.06	46.61	± 11.74 ^a	42.97	± 9.07
Pure cyberbully ⁷ <i>n</i> = 242	48.00	± 11.54	47.47	± 9.30	51.83	± 10.89	55.65	± 9.99	47.53	± 9.72
Bully–cyberbully ⁸ <i>n</i> = 176	48.28	± 12.27	46.97	± 9.85	49.63	± 11.15	53.21	± 12.66	44.39	± 11.82
Victim–Cybervictim/bully–Cyberbully ⁹ <i>n</i> = 120 (1%)	43.61	± 13.72	39.54	± 8.22 ^a	46.74	± 13.57	45.40	± 15.62 ^a	41.00	± 12.80 ^a
<i>F</i> ($p <$)	$F = 15.09, p < .001$		$F = 67.48, p < .001$		$F = 42.21, p < .001$		$F = 37.06, p < .001$		$F = 66.77, p < .001$	
Post hoc (Games-Howell)	1 > 2; 1 > 5; 1 > 6; 1 > 9; 2 < 3; 2 > 6; 3 > 5; 3 > 6; 3 > 9		1 > 2; 1 > 3; 1 > 4; 1 > 5; 1 > 6; 1 > 9; 2 < 3; 2 > 6; 2 < 7; 2 > 9; 3 > 4; 3 > 5; 3 > 6; 3 > 9; 4 > 6; 4 > 9; 5 > 6; 5 < 7; 5 > 9; 6 < 7; 6 < 8; 7 > 9; 8 > 9		1 > 2; 1 > 3; 1 > 4; 1 > 5; 1 > 6; 1 > 8; 1 > 9; 2 < 3; 2 > 6; 3 > 4; 3 > 5; 3 > 6; 3 > 9; 5 < 7; 6 < 7; 6 < 8; 7 > 9; 8 > 9		1 > 2; 1 > 5; 1 > 6; 1 > 9; 2 < 3; 2 < 7; 2 > 9; 3 > 5; 3 > 6; 3 > 9; 4 > 6; 4 > 9; 5 < 7; 5 < 8; 6 < 8; 7 > 9; 8 > 9		1 > 2; 1 > 3; 1 > 4; 1 > 5; 1 > 6; 1 > 7; 1 > 8; 1 > 9; 3 > 6; 3 > 9; 7 > 9;	

Each participant can be only assigned to a unique Bullying–Cyberbullying participation category; *Phy-Wb* = Physical well-being; *Psy-Wb* = Psychological well-being; *A&Pr* = autonomy & parents relations, *SS&P* = social support & peers, *SE* = school environment, *M* = arithmetic mean, *SD* = standard deviation. All post hoc comparisons are significant at $p < .001$

^aDenotes that this score is under the 25th percentile for the standardization sample

of victimization–cybervictimization conjointly or presented the four joint roles consistently obtained lower scores in all the dimensions, especially when they were compared with those who did not present problems, pure bullies, and pure cyberbullies.

The comparison of means between the categories presented and the Spanish reference sample is displayed in Table 6. We highlighted the effect sizes of the victim–cybervictim/bully–cyberbully role in all the dimensions, particularly in psychological well-being and school environment. The pure victims, pure cybervictims, and victim–cybervictims also differed significantly in their scores from the standardization sample, with great variability in the effect sizes. In addition, the scores of the roles of pure victims, pure cybervictims, victim–cybervictims, and victim–cybervictim/bully–cyberbully were below the 25th percentile, indicating a significant reduction in HRQoL.

Discussion

The present study contributes to our knowledge of how problems of school bullying affect adolescents' perceived HRQoL. Furthermore, in the study, differences in HRQoL were analyzed in relation to the level of severity of bullying and cyberbullying. In addition, their impact on HRQoL in relation to the different bullying roles, especially hybrid forms such as victim–cybervictim and the conjoint role of victim–bully/cybervictim–cyberbully, were compared.

In general, the results concur with those of all the studies that have revealed lower HRQoL when bullying occurs [15, 16, 21, 22, 40]. Similarly, in relation to cyberbullying, the results are in accordance with those of González–Cabrera et al. [23]. Significant differences between cybervictims

and cyberbullies in two of the dimensions of the KIDSCREEN-27, namely, psychological well-being and social support & peers, were revealed. However, a novel view was provided in this study by jointly addressing the role of victim–cybervictim. This mixed form had lower HRQoL than that associated with being a pure victim or a pure cybervictim. Therefore, the hypothesis that victims–cybervictims had a greater impact on HRQoL than that of either a victim or cybervictim was confirmed. Similarly, in relation to bullying and cyberbullying, the participants who were victims–bullies conjointly (playing all four roles) presented the greatest impact on all the KIDSCREEN-27 dimensions. This evidence concurs with studies that have revealed that the hybrid form of victim–bully presents lower psychological well-being, psychological adjustment, and greater psychosocial risks [24, 41–44]. In the present study, the joint category that groups the four profiles may present both the problems attributed to victimization–cybervictimization (internalizing problems) and those associated with aggressors–cyberaggressors (externalizing problems). Although this result was revealed in the context of victim–bully [27, 28], it seems even more logical for it to occur and with greater impact when cyberbullying is also introduced. Previous studies have jointly linked bullying and cyberbullying, and have shown more harmful effects in constructs such as emotional impact [43], internalizing and externalizing problems [44], and suicide [45].

The analysis of the differences in HRQoL as a function of the level of severity associated with victimization, bullying perpetration, cybervictimization, and cyberbullying perpetration is a singular contribution. We chose to classify three levels of severity, namely, no problems, moderate problems, and severe problems, in accordance with other studies [46]. The combination of statistical and

Table 6 Differences in the KIDSCREEN-27 dimensions as a function of the bullying–cyberbullying participation category ($n = 11,776$) and in the original typification sample

Bullying–cyberbullying participation category	Phy-Wb $t(d)$	Psy-Wb $t(d)$	A&Pr $t(d)$	SS&P $t(d)$	SE $t(d)$
Pure victim	4.56*** (0.22)	12.11*** (0.72)	3.12*** (0.19)	4.78*** (0.28)	5.98*** (0.36)
Pure bully	–2.20 (0.11)	4.89*** (0.29)	–1.48 (0.09)	–1.12 (0.07)	5.01*** (0.29)
Victim–bully	2.56 (0.36)	8.97*** (0.66)	2.87 (0.21)	–0.21 (0.02)	5.59*** (0.41)
Pure cybervictim	4.78*** (0.35)	10.64*** (0.79)	4.49*** (0.33)	4.20*** (0.31)	5.02*** (0.35)
Victim–cybervictim	7.84*** (0.60)	16.13*** (1.22)	7.99*** (0.61)	8.05*** (0.60)	8.98*** (0.68)
Pure cyberbully	1.48 (0.11)	4.34*** (0.35)	–0.81 (0.06)	–3.95*** (0.30)	2.58*** (0.20)
Bully–cyberbully	1.00 (0.08)	4.37*** (0.38)	1.83 (0.16)	–0.51 (0.04)	5.68*** (0.49)
Victim–cybervictim/bully–cyberbully	5.12*** (0.52)	11.36*** (1.14)	4.29*** (0.44)	6.85*** (0.69)	8.08*** (0.81)

Phy-Wb physical well-being, Psy-Wb psychological well-being, A&Pr autonomy & parents relations, SS&P social support & peers, SE school environment; T test between the participation category and the Spanish standardization sample of the KIDSCREEN-27

*** $p < .001$. $d =$ Cohen's d

criteria aspects is a restrictive criterion, in particular, for the severe forms of each construct. We revealed that when problems were severe, a significantly lower score in HRQoL was evident in all the dimensions of KIDSCREEN-27 in comparison with those who did not report problems and with the original standardization sample of Spanish adolescents. In addition, there were also significant differences in all the dimensions between those who had no problems and those who had moderate victimization and cybervictimization problems. While bullying and cyberbullying perpetration also resulted in lower HRQoL, it was less than that of victimization and cybervictimization. Furthermore, the psychological well-being and school environment dimensions revealed a greater impact. Although the data are related to that obtained in a previous study that addressed cyberbullying and HRQoL, the data cannot really be compared because no similar studies have been conducted. As noted in other studies, the most severe problems of cyberbullying that are maintained over time are associated with longer-lasting and permanent psychological, physical, and social problems, which can predict the occurrence of mental health problems [47–50]. The severity of the problems in this study also implied a significant reduction in HRQoL as a result of the perniciousness of the situation for adolescents at a significant time in their biopsychosocial development.

In relation to the secondary objectives, we analyzed the prevalence of victimization and perpetration in traditional bullying and cyberbullying. When including moderate and severe problems, the prevalence of victimization and bullying was 12% and 12.4%, respectively. These values are within the range reported by other studies [11, 29]. The prevalence of cybervictimization (8.1%) and cyberbullying perpetration (7%) concur with current studies [13, 29]. Furthermore, previous studies that employed the same evaluation instrument (cyberbullying triangulation questionnaire) found convergent data [25, 46, 51].

In relation to gender, our results concur with those that found a higher percentage of girls involved in cybervictimization [51–53] and those that revealed boys obtained higher scores in bullying and cyberbullying perpetration [53, 54]. This difference could be explained by boys' higher tendency to externalize their behaviors and act out [55] in conjunction with the fact that girls tend to be more empathic and thus, they are less likely to hurt others or to perpetrate violence [56]. With respect to age differences, we found that, in general, 11–13-year-olds obtained lower scores followed by 14–15-year-olds. This suggests that involvement in these problems increases with age. These findings are consistent with those obtained in other studies of cyberbullying [46, 51, 57]. Finally, no differences were found as a function of the type of school in contrast to the results of previous Spanish studies [58].

The study presents several strengths. A broad and representative sample of a region of Spain was employed. Only a few studies have used such a large sample, and thus, the results of this region could possibly be transferred to other regions of Spain. Because questionnaires of European projects, such as KIDSCREEN [31] and the EBIPQ [32], were employed, the results are more comparable even though one should always be cautious when generalizing. In this sense, it is noteworthy that we compared the results obtained in our sample with those of the sample of the original standardization of the KIDSCREEN questionnaire.

However, the study also has limitations. First, the results are based on self-reports, and thus, response bias may have occurred (especially due to social desirability bias). It is recommended that additional measures, such as sociograms and/or parent/teacher/peer reports, be employed in future studies. Second, the present study was a cross-sectional study, and therefore, causal relationships between the study dimensions could not be established. Thus, it is recommended that future studies utilize longitudinal designs. Third, only the dimensions of traditional and cyberbullying victimization and perpetration were used. However, it may be of interest to triangulate these constructs, adding the role of bystander/cyberbystander [25]. Fourth, a multilevel analysis could have been performed by taking into account the possible variability between classes and schools. However, the latter was not possible because the data were not collected in individual classes but by the school as a whole because the study was planned in conjunction with the educational authorities. Finally, no data related to health information, family, and/or parental characteristics, which could have been confounding factors for some of the findings, were collected. Thus, it is recommended that future research consider these factors. It may also be advisable for future initiatives to include other constructs such as sexting, grooming, cyberdating, and/or problematic internet use and their relationship with HRQoL.

The study has several practical implications for professionals in the educational and clinical fields. When bullying is suspected, HRQoL screening can help to demonstrate these problems, especially in the school environment dimension of the KIDSCREEN-27 and/or a school's adaptation dimension (bullying) in KIDSCREEN-52. A lower HRQoL in adolescence without a medical cause may be associated with psychosocial problems such as those explored in this study; it should be noted that one of the most prevalent risks of the internet is cyberbullying [46]. In addition, existing and effective prevention strategies and programs for bullying or cyberbullying [59–62] could include HRQoL as an additional measure to establish the effectiveness of intervention measures. Adequate intervention may reduce the problems of bullying and cyberbullying, thus improving HRQoL, especially psychological well-being, peer social support,

and school environment. It is also interesting to consider the joint importance of victims-aggressors as a subgroup that requires special attention in intervention programs and the importance of variables such as forgiveness in interrupting the cycle of violence [62]. In cases where HRQoL is diminished because of severe bullying/cyberbullying, a psycho-educational evaluation of the student should be conducted to establish possible psychological needs, and established harassment protocols should be implemented. Furthermore, communication with the family should be initiated to restore the student's psychological well-being.

To conclude, this study provides empirical evidence about the significant deterioration of HRQoL of adolescents who are involved in bullying and/or cyberbullying, and in particular, those who are victims–cybervictims or who present all four roles simultaneously.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed consent The study obtained the approval of legal guardians through a procedure with passive consent.

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