



Association of Cyberbullying and Internet Use Disorder

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Abstract

Purpose of Review The purpose of this review is to critically assess the published studies on the relationship between cyberbullying and internet use disorder (IUD), and propose directions for further study.

Recent Findings There were only four prospective studies out of thirty-two reviewed studies conducted since 2004, with only one prospective study conducted during the past 5 years. The field of study has been stagnant during the past 5 years with the vast majority of studies conducted on primary or secondary education and failing to address cyberbullying and IUD in social media and online gaming.

Summary Cyberbullying and IUD have been described since the nineties, yet there are still significant issues with their definition and research. Lately, both these problematic behaviors are sharing the same environments in social media and online gaming. This critical appraisal of published research examined thirty-two published peer-reviewed studies carried out since 2004. Findings indicate a number of significant issues including an overreliance on cross-sectional study design, near-exclusive focus on primary and secondary education students, widespread employment of unstandardized measures for cyberbullying and IUD, and lack of assessment for objective measures of psychological distress. Directions for future research are offered.

Keywords Cyberbullying · Internet use disorder · Internet gaming disorder

Abbreviations

DSM	Diagnostic and Statistical Manual for Mental Disorders
ICD	International Classification of Diseases
IUD	Internet use disorder
PG	Problematic gaming

Introduction

While cyberbullying as a term has a long history with the first studies dating to the nineties [1], it remains to this day a topic of contest regarding its classification and importance. A recent review that was limited to the timeframe between 2015 and 2020 and to adolescent populations found a wide variability in findings, with prevalence rates of cyberbullying preparation ranging from 6.0 to 46.3%, and the rates of cyberbullying victimization ranging from 13.99 to 57.5% [2]. These incompatible findings point to the unresolved difficulties in researching the construct, difficulties stemming from a lack of a commonly agreed upon definition, the nearly complete employment of secondary education student samples in related research and the co-occurrence of traditional bullying.

The term “cyberbullying” itself is not standardized with researchers using a variety of alternate terms including “online bullying/harassment,” “cyber-aggression,” and others, leading to some confusion with actual instances of cyber stalking and cyber harassment [3]. While cyberbullying was viewed as an extension of bullying practices with different means, its definition has also been contested and revisited

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continuously, with a conciliatory proposal put forward by Tokunaga [4] who defined cyberbullying as “any behavior performed through electronic or digital media by individuals or groups that repeatedly communicates hostile or aggressive messages intended to inflict harm or discomfort on others,” emphasizing the intrusion into personal space.

A significant confounder with the perception of cyberbullying is that related research was heavily skewed toward primary and secondary education. In these younger ages cyberbullying more often than not is an extension of non-cyberbullying victimization. However, higher education is not devoid of cyberbullying, as shown in a recent review [5] that highlighted that cyberbullying involves social media and that undergraduate students are afraid to report it. Even among the first reports of this kind, it was established that a significant percentage of victims were cyberbullied for the first time while in college without a link to direct bullying [6]. A comparative study of bullying versus cyberbullying incidence published in 2016 estimated that 20–25% of students reported non-cyberbullying victimization in college and 10–15% reported cyberbullying victimization [7].

Although some high profile cases, that have led to the victim’s suicide, have propelled the term into the mainstream [8], results from prospective studies following students over a long time frame have led prominent researchers to conclude that cyberbullying was a low-prevalence phenomenon that cannot be viewed outside the context of traditional bullying [9] but rather as a subcategory or specific form of bullying [10], with a smaller incidence than the other forms and not as pronounced as was originally considered to be [11]. However, these reports date back to 10 years ago, a timeframe that in the context of our digital era appears very dated. A recent systematic review and meta-analysis [12] found that victims of cyberbullying were three times more likely to present with depressive symptomatology compared to controls and while the presence of traditional bullying moderated this relationship, it did not negate it.

Internet use disorder (IUD) is an umbrella concept that includes all aspects of problematic interaction with internet-related activities, and much as cyberbullying, it has been first described during the nineties [13] and has been mired in controversy ever since [14, 15]. Internet use involves many diverse activities, of which online gaming has received the most scrutiny, with a working definition of online gaming addiction offered in the latest version of the *Diagnosics and Statistical Manual of the American Psychiatric Association, DSM-V* [16]. This inclusion led to several dissenting views and stirred controversy [17], ultimately helping the field progress enough [18] for the World Health Organization to include Gaming Disorder (GD), either offline or online, as a separate disease entity in the latest version of the *International Classification of Diseases, ICD-11* [19]. Other types of specific internet use disorders are identified and proposed

as separate entities, including social media use disorder [20] and online pornography use disorder [21]. Prevalence of IUD in its various forms typically has a wide margin of error with a 2020 review [22] of studies worldwide, reporting a weighted average prevalence rate of 7.02% (95% confidence interval: 6.09–8.08%) and 2.47% (95% confidence interval: 1.46–4.16%) for IUD and GD respectively. These statistics are reportedly on the rise following the COVID-19 pandemic, as shown in a review of related studies [23], ascribed to a slew of factors that include financial hardship, isolation, problematic substance use, and mental health issues such as depression, anxiety, and stress.

IUD and cyberbullying now have two major staging environments in common: using social media and playing games online have become the most frequent choices of adolescents for communication and recreation [24], and this trend has increased during the COVID-19 pandemic to detrimental effect on their well-being [25]. Social media were recognized early on as frequent outlets for cyberbullying [26] while cyberbullying in online gaming communities appears to be an understudied issue. There is a small number of studies that point to the existence of cyberbullying within gaming communities [27–30] and this phenomenon is associated with the toxic culture prevalent in a number of gaming communities [31, 32] that persists despite the efforts from the game creators to reign it in [33]. This review aims to critically assess the published studies on the relationship between cyberbullying and IUD, and propose directions for further study.

Methods

Study Identification and Selection

Results from studies on cyberbullying and IUD published through March of 2022 were searched through the Scopus, ProQuest, and NLM/PubMed databases.

Because both the terms “cyberbullying” and IUD are not conclusively established, other interchangeable terms were added to the main keywords list. Accordingly, we screened studies through the combination of main keywords for both terms:

- (A) Main keywords for IUD: [Internet / online] and [Addiction / Problematic / Dependence / Excessive / abuse / compulsive / addictive / overindulgence / pathological / overuse / problem].
- (B) Main keywords for cyberbullying: cyberbullying / harassment / bullying / aggression / victimization

It is important to note in this point that the choice of keywords for cyberbullying did not necessarily relate to our

understanding of the term but it was appropriate for a number of studies that did not necessarily agree with established terminology.

For the eligibility criteria, we set the following inclusion criteria: (1) studies should include a cross-examination of cyberbullying and IUD and not be limited to parallel reporting of incidence, (2) studies focused on either the cyberbullying perpetration, victimization, or both; (3) studies were journal articles in peer-reviewed publications; (4) studies were published in English, French, or German; (5) studies should have a clearly-defined research population; and (6) studies should describe original research work. Reviews, case studies, and case series were excluded from the search.

A total of 56 papers were identified electronically after duplicates were removed. Twenty-four were removed not adhering to the inclusion and exclusion criteria: one paper was a review, one paper presented a case report, one paper was a case series, eight papers focused on traditional bullying only, and eight papers were examining only IUD and not cyberbullying. The remaining 32 papers were included in the literature review. The procedures were conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines [34]. The PRISMA flow diagram shows the detailed procedure (Fig. 1).

Results

Included Studies

Table 1 presents the main points of the studies that were included in the review. Columns include study design, number of subjects, place, time frame of data collection (where available), age range of subjects, the measures that were employed to assess cyberbullying and IUD, and a brief outline of the findings.

The very few prospective studies provide the most solid evidence. The very first survey of its kind by Yang et al. [38•] did not confirm any relationship between time spent online and cyberbullying. However, this survey was conducted in 2004 and did not include a valid measure of IUD, as it was not formally defined at the time. The survey by Floros et al. [35•] on 2008 found that the impulsivity subscale of the Online Cognitions Scale was a predictor of whether an adolescent victimized others online, although no associations were made with the severity or frequency of victimization. The third survey that was carried out on 2011 offered helpful results on both separate publications of its findings [36••, 41••]: cyberbullying victimization during the first point in time (T1) predicted depressive symptoms and IUD at the second point in time (T2) [36••] while IUD at T1 predicted an increase in the perpetration of cyberbullying and

meeting strangers online at T2. The fourth prospective study that was carried out between 2018 and 2019 by Liu et al. [62••] added that the experience of cyberbullying victimization was positively related to IUD through the mediating variables of mindfulness and depression. Results from the cross-sectional studies confirm that there is a correlation between cyberbullying and IUD that may be mediated by a variety of factors; however, caution is required when treating results from cross-sectional surveys as indicative of causality, regardless of the statistical method that is employed to assess the data. In this instance, there are conflicting reports that are treated as conclusive findings despite the inability to assess directionality: depending on the viewpoint of the authors, IUD was either reported as being associated with cyberbullying [39, 40, 45, 47–49, 51, 52, 54, 55, 60, 61, 62••, 63, 66], moderating cyberbullying [42], mediating cyberbullying [57], predicting cyberbullying victimization [53, 65], or being predicted by cyberbullying [65].

Evaluation of Quality of Evidence So Far

There are several noteworthy findings when reviewing the relevant literature:

- a The vast majority of research is conducted on high-school students, with a handful of studies [43, 45, 48, 49, 56] expanding the scope to young adults, up to 25 years of age. There was a single clinical study of psychiatrically hospitalized adolescents [48]. Sampling high-school students has several advantages: it may be argued that the sample is representative of the population at large, since high school education is obligatory in all the countries where the surveys took place. Computing sample size and the potential responder number is simplified. If the survey is carried out during school time, then participation rates are high. However, the low number of clinical cases of either IUD or cyberbullying present in a population of this kind may lead to an underestimation of the severity of the negative impact. Surveys of this type presume a linear relationship between the studied variables (e.g., moderating variables in the relationship of cyberbullying and IUD). This presumption may not hold in clinical cases of IUD or serious forms of cyberbullying. This issue is amplified by the fact that there was no attempt in any study to quantify the severity of the impact of cyberbullying on the subject's well-being.
- b The point in time of data collection was established for some after personal communication with the corresponding authors and remained unknown for a small number of studies [57, 59, 65]. Publication date may differ from data collection for as long as 7 years [55]. Data on occasion were collected as part of a larger sur-

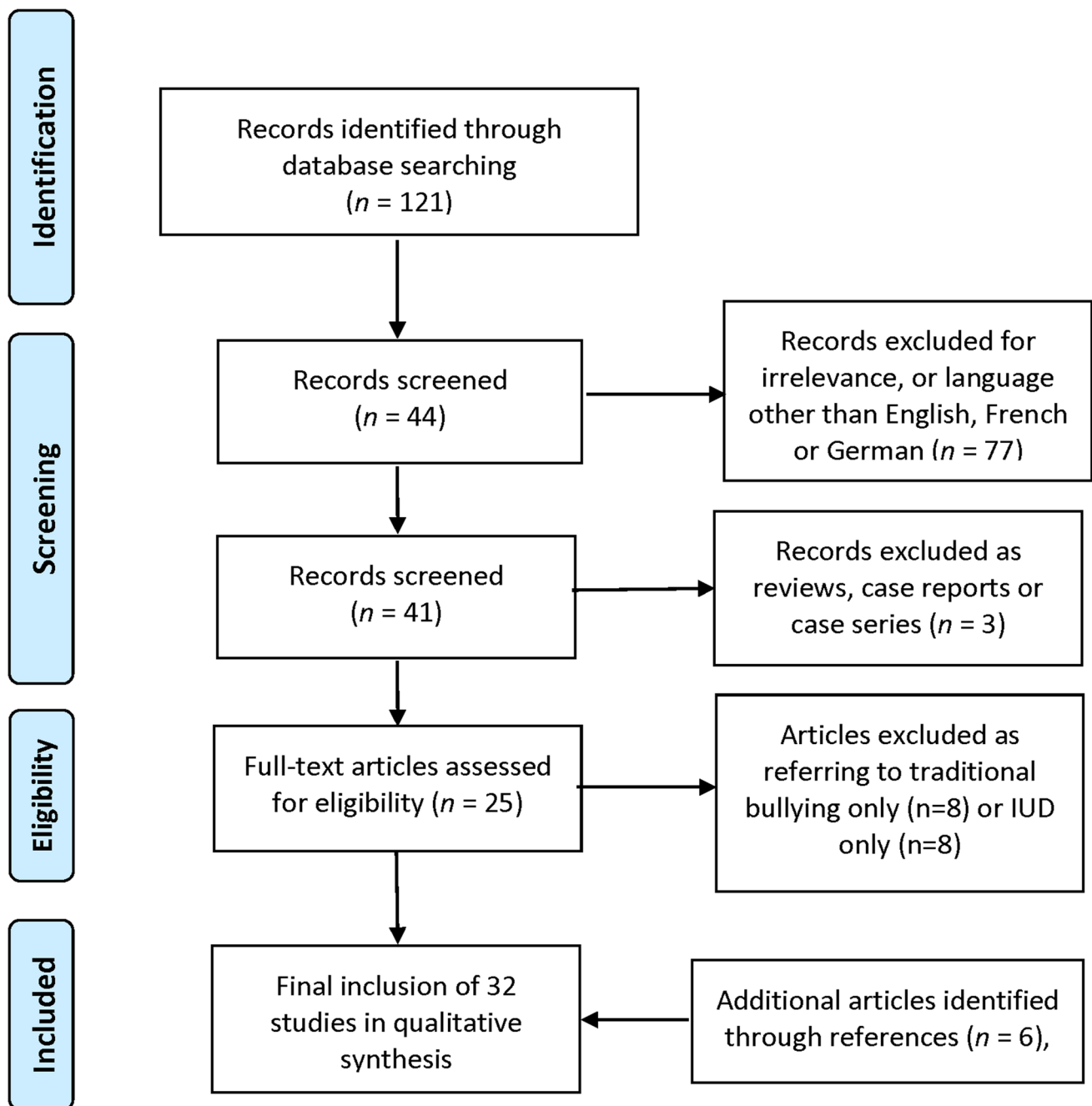


Fig. 1 PRISMA flowchart of study selection

vey with cyberbullying and/or IUD examined with a few items in a larger test battery [40, 54, 57].

- c The majority of studies employed ad hoc measures for cyberbullying, IUD, or both, despite the fact that validated measures for both constructs were available at the time that they were conducted [37, 38•, 39, 40, 42, 44, 46, 48, 52–54, 59, 64]. The specific items that were employed on those ad hoc measures are rarely mentioned. This renders study duplication, data aggregation,

or comparison between studies impossible. Furthermore, cyberbullying was assessed in a large number of studies [35•, 37, 39, 40, 42, 44, 46, 48, 50, 54, 57, 59] with few items that could only relate to prevalence of its existence but not frequency or severity of its perpetration.

- d There were only four prospective surveys while the rest were cross-sectional. The prospective surveys were a survey carried out on 2004 by Yang et al. [38•], a survey carried out on 2008 by Floros et al. [35•], a survey carried

Table 1 Results from studies carried out on cyberbullying correlated with excessive Internet use

Reference	Study design	N	Country	Time frame	Age range	Measures of cyberbullying and IUD	Findings
Floros et al. [35•]	Cohort, two waves, 2 years apart	2017	Greece	First wave 4/2008 (T1) second wave 4/2010 (T2)	Age range 12–19, mean age 15.06, (SD=0.05)	Ad hoc items on cyberbullying victimization and perpetration. Online Cognitions Scale (OCS)	The impulsiveness subscale of OCS was a significant predictor of cyberbullying perpetration
Gómez-Guadix et al. [36••]	Cohort, two waves, six months apart	845	Spain	First wave 4/2011 (T1) second wave 5–6/2012 (T2)	Mean age 15.2, SD = 1.2 at T1	Victimization subscale of the Cyberbullying Questionnaire (CBQ). Generalized Problematic Internet Use Scale 2 (GPIUS2)	Cyberbullying victimization at T1 predicted depressive symptoms and problematic Internet use at T2
Jung et al. [37]	Cross-sectional	4531	South Korea	2011	11–14, 94.2% between 11 and 12	Ad hoc questionnaire on cyberbullying experiences. Internet Addiction Proneness Scale for Youth-Short Form (KS),	Being a victim, perpetrator, and victim-perpetrator significantly increased the likelihood of the presence of problematic internet use (adjusted OR: 2.36, 1.66, and 2.38, respectively)
Yang et al. [38•]	Cohort, two waves, 2 years apart	1173	South Korea	First wave 2004 (T1) second wave 5–6 2006 (T2)	13–14 years at T1	Ad hoc measures of cyberbullying and computer online use time	There was no relationship between computer online use time and cyberbullying
Chang et al. [39]	Cross-sectional	1808	Taiwan	2013	12–14 years	Ad hoc items on cyberbullying victimization/perpetration. Chen Internet Addiction Scale (CIAS),	Adolescent Internet addiction was associated with cyberbullying victimization/perpetration, smoking, consumption of alcohol, and depression
Rasmussen et al. [40]	Cross-sectional	2100	Denmark	2009	Limited to ages 11, 13, and 15	Ad hoc items on perceived problems related to computer gaming and computer use, single items on bullying and being bullied	Children perceiving problems with computer gaming showed higher prevalence of both being bullied and having bullied others. Boys perceiving problems with internet use had the same issues but the relationship was not statistically significant for girls
Gómez-Guadix et al. [41••]	Cohort, two waves, six months apart	888	Spain	First wave 11–12/2011 (T1) second wave 5–6/2012 (T2)	Mean age 15.42, SD = 1.01 at T1	Perpetration subscale of the CBQ. GPIUS2	IUD at T1 predicted an increase in the perpetration of cyberbullying and meeting strangers online at T2

Table 1 (continued)

Reference	Study design	N	Country	Time frame	Age range	Measures of cyberbullying and IUD	Findings
Yu et al. [42]	Cross-sectional	8480	Taiwan	2014	Unspecified, high-school students	Ad hoc selection of five items on cyberbullying and four items on internet addiction picked by previous research	IUD has a significant moderating effect on the relationships among cyberbullying, cyber pornography, and physical and mental health of individuals
Šincek et al. [43]	Cross-sectional	1150	Croatia	Fall 2015	Age range 11–21, mean age 14.77, <i>SD</i> = 2.259	Cyberbullying Inventory (CBI), Problematic Online Gaming (POGQ)	Potentially problematic gamers (those who played games for more than five hours per day) experienced and committed more violence both face-to-face and via the Internet
Tsimtsiou et al. [44]	Cross-sectional	5590	Greece	2013–2014	Age range 12–18, mean age 14.77, (<i>SD</i> = 2.259)	Ad hoc items on cyberbullying victimization and perpetration. Young's Internet addiction test (YIAT)	The odds of IUD increased with online hours, Internet café visits, chatrooms usage, and engagement in cyberbullying. Cyberbullying victims were more likely to be older, female, Facebook and chatrooms users, while perpetrators were more likely to be male, older Internet users and fans of pornographic sites
Machimbarrera et al. [45]	Cross-sectional	3213	Spain	12/2017–4/2018	Age range 11–21, mean age 13.92 (<i>SD</i> = 1.44)	Victimization Scale of the CBQ, GPIUS2	Multiple correlations between IUD, cyberbullying victimization, cyberdating abuse victimization, grooming, and sexting were reported
Zsila et al. [46]	Cross-sectional	6237	Hungary	2015	Age range 15–22, mean age 16.62 (<i>SD</i> = 0.95)	Four ad hoc items on cyberbullying perpetration and victimization. Problematic Internet Use Questionnaire (PIUQ-6)	IUD was related to an increased risk of victimization in both traditional bullying and cyberbullying

Table 1 (continued)

Reference	Study design	N	Country	Time frame	Age range	Measures of cyberbullying and IUD	Findings
Bright et al. [47]	Cross-sectional	3602	Italy	2014–2015	Age range 11–20, mean age 14.64 (<i>SD</i> = 1.7)	Cyberbullying scale from the European Cyberbullying Intervention Project Questionnaire (ECIPQ). Ad hoc scale of five items on problematic Internet use	There is a common pathway to IUD and cyberbullying from reduced parental monitoring and emotional symptoms via increased time spent online
Gansner et al. [48]	Cross-sectional	205	US	2012–2016	Age range 12–20	A single yes/no item on cyberbullying, three items on IUD	IUD severity correlated with being cyberbullied and sexting in psychiatrically hospitalized adolescents
Handono et al. [49]	Cross-sectional	210	Indonesia	2018	Age range 15–24	Ad hoc list of 24 cyberbullying indicators on a five-point Likert scale for frequency. Problematic and Risky Internet Use Screening Scale (PRI-USS)	Time spent online, IUD, and attitude toward cyberbullying, had a positive and high correlation with cyberbullying behavior
Lee et al. [50]	Cross-sectional	1678	South Korea	2016	Mean age 18.6 (<i>SD</i> = 0.5)	Three items on victims, witnesses and bullies of cybersexual harassment and bullying. Short-form Korean Scale for Internet Addiction (K-scale) for adolescents	Cybersexual harassment and cybervictimization along with IUD predicted the levels of stress associated with psychotic-like experiences
Şimşek et al. [51]	Cross-sectional	2422	Turkey	2017	Mean age 16.23 (<i>SD</i> = 1.11)	Cyber Victimization and Cyberbullying Scale. YIAT	Cyber-victimization and cyberbullying were related to Internet usage characteristics and IUD

Table 1 (continued)

Reference	Study design	N	Country	Time frame	Age range	Measures of cyberbullying and IUD	Findings
Zhai et al. [52]	Cross-sectional	2758	China	2012	Mean age 13.53 ($SD = 1.06$)	Ad hoc seven-item questionnaire on adolescent exposure to aggression from peers, Deviant Peer Affiliation Questionnaire. Ten items from YIAT	Peer victimization was positively associated with IUD. Deviant peer affiliation (DPA) partially mediated the link between peer victimization and IUD, and family functioning moderated the association between peer victimization and DPA
Arpaci et al. [53]	Cross-sectional	665	Turkey	2016	Age range 17–19, mean age 17.94 ($SD = 1.12$)	Ad hoc 23-item scale on cyberbullying. YIAT	IUD had a significant direct effect on cyberbullying (effect size 0.39) as well as an intervening effect on the relationship between vertical individualism and cyberbullying
Chao et al. [54]	Cross-sectional	5211	Taiwan	2018	Age range 16–19, mean age 17.31 ($SD = 0.95$)	Ad hoc selection of three items for cyberbullying, ad hoc scale of six items for IUD	Cyberbullying was correlated with IUD, with the correlation moderated by community bond
Lee et al. [55]	Cross-sectional	500	Taiwan	2015–2016	Age range 20–25	School Bullying Experience Questionnaire (C-SBEQ). CIAS, Smartphone Addiction Inventory (SPAI)	Victims had more severe IUD and problematic smartphone use than non-victims. Victims of multi-type bullying had more severe IUD than victims of single-type bullying. Prolonged victimization was significantly associated with IUD and PSU
Li et al. [56]	Cross-sectional, same survey as Lee et al. [55]	500	Taiwan	2015–2016	Age range 20–25	C-SBEQ. CIAS, SPAI	The results previously reported on Lee et al. [55] were mediated by the severity of emotional symptoms
Lin et al. [57]	Cross-sectional	1854	China	Undisclosed	Mean age 15 ($SD = 1.11$)	Cyber victimization was measured using a single question. YIAT	IUD mediated the relationship between cyber-victimization and psychological and physical symptoms

Table 1 (continued)

Reference	Study design	N	Country	Time frame	Age range	Measures of cyberbullying and IUD	Findings
Méndez et al. [58]	Cross-sectional	810	Spain	2019	Age range 12–16, mean age 13.99 (<i>SD</i> =1.32)	Psychometric Properties of School Violence Questionnaire-Revised. Experiences Related to Internet (CERI)	Increased levels of IUD were correlated with higher levels of bullying perpetration of all types, incl. cyberbullying
Wachs et al. [59]	Cross-sectional	1442	Germany, Netherlands, US	Undisclosed	Age range 12–17, mean age 14.17 (<i>SD</i> =1.38)	Ad hoc four-item, cyberbullying victimization scale, ad hoc four-item cyber-harassment scale. Internet-related experiences questionnaire	Cyberbullying victimization and IUD were directly and indirectly associated via alexithymia
Feijóo et al. [60]	Cross-sectional	3188	Spain	2019	Age range 12–17, mean age 14.44 (<i>SD</i> =1.67)	European Cyberbullying Intervention Project Questionnaire (ECIPQ), Escala de Uso Probemático de Internet en adolescentes	Probability of IUD increased incrementally from bullied, to bullies and bully-victims
Li et al. [61]	Cross-sectional	2843	China	2018	Age range 12–17, mean age 13.97 (<i>SD</i> =0.84)	The nine-item Cyberbullying Questionnaire. A short 12-item version of YIAT	Being victimized was associated with IUD and cyberbullying with the association mediated by depression, especially for girls, while the association was also mediated by anxiety in boys
Liu et al. [62••]	Two-wave longitudinal design (T1, T2)	879	China	T1 2018, T2 8 months later	Age range 12–17, mean age 13.51 (<i>SD</i> =1.17)	Revised Cyber Bullying Inventory-Cyberbullying Subscale (RCBPI-CS Adolescents) Problematic Internet Use Scale (APIUS)	The experience of cyberbullying victimization was positively related to IUD through the mediating variables of mindfulness and depression
Machimbarrena et al. [63]	Cross-sectional	25,341	Spain	2019	Age range 10–18, mean age 14.6 (<i>SD</i> =1.68 years)	Cyberbullying Triangulation Questionnaire (CTQ). GPIUS2	Participants who presented severe IUD are the ones who obtained higher scores in cybervictimization and cyberaggression, particularly in the case of cyberbully victims

Table 1 (continued)

Reference	Study design	N	Country	Time frame	Age range	Measures of cyberbullying and IUD	Findings
Samara et al. [64]	Cross-sectional	1613	UK	2016–2017	Age range 10–16	Ad hoc scale with items on cyberbullying and cybervictimization. Ad hoc 15-item scale on IUD	There was a significant positive correlation between IUD and substance abuse, which is mediated by traditional bullying, cyber bullying, and victimization
Tamarit et al. [65]	Cross-sectional	1763	Spain	Undisclosed	Age range 12–16, mean age 14.56 (<i>SD</i> = 1.16)	Thirteen-item Sexting Scale, ten-item Sextor-grooming Scale, thirteen-item Risk of addiction to social media and the internet for adolescents' scale (ERA-RSI)	IUD predicts online sexual victimization, while body self-esteem and sexting mediate the relationship
Yudes et al. [66]	Cross-sectional	2039	Spain	2018	Age range 12–18, mean age 14.57 (<i>SD</i> = 1.58)	ECIPQ, YIAT	Cyberbullying perpetration was positively associated with IUD and negatively with emotional intelligence. Emotional intelligence moderated the relation between IUD and cyberbullying perpetration in boys, especially at lower levels

out on 2011 and reported on two separate publications by Gámez-Guadix et al. [36••, 41••], and a survey carried out on 2018–9 and reported by Liu et al. [62••]. Unfortunately, despite the fact that some of the earliest publications correctly employed a prospective design, research has shifted to exploring associations between alternative psychological constructs with cross-sectional designs. These additional studies have very little new to offer, other than an additional correlation with a different psychological construct (e.g. peer affiliation [52], community bond [54], alexithymia [59], body self-esteem [65]). Furthermore, cross-sectional studies cannot ascertain the consequences of cyberbullying or IUD; this amplifies the issue stemming from the focus on community sampling mentioned above. Despite research data proving that the strongest associations with cyberbullying victimization were stress and suicidal ideation [67], no such parameters were researched.

Discussion

The small number of prospective studies have delivered the most robust findings, as expected. The usefulness of cross-sectional studies is very limited, especially as the phenomenon that they attempt to describe has already been conclusively confirmed and delineated. Unfortunately, as mentioned above, there are no studies that examine the relationship between cyberbullying and IUD in a relevant clinical sample. A single clinical study [48] carried out 10 years ago is misleading in that the population was not receiving help specifically for IUD or cyberbullying. Additionally, it employed a very basic measurement of cyberbullying with a single yes/no item and three items for IUD without delving deeper into any psychological correlates. Thus, we cannot assess the true impact of the relationship between cyberbullying and IUD on the well-being of the victim or any mental health correlates of the perpetrator. This would require a survey of patients seeking help for IUD or for the consequences of cyberbullying victimization on their mental health, or to address tendencies to victimize others.

Directions for further research

Study design stands to benefit from standardization of research instruments in future studies, with no studies so far sharing instruments and seventeen out of thirty-two using ad hoc measures. With the advent of a number of validated scales for cyberbullying and IUD, further usage of ad hoc measures should be discouraged. Cross-sectional studies have reached the limits of their usefulness as has the employment of non-clinical samples. There is a need for shedding more light in the complex interrelationship between cyberbullying, cybervictimization, and IUD, especially in gaming

disorder, and causality cannot be adequately assessed with cross-sectional studies of community samples.

While a case can be made for measuring cyberbullying in a bullying context [10], a similar case should be made for measuring cyberbullying in a context outside the school environment and completely virtual. The overlap of cyberbullying and traditional bullying in a school environment may well be high but cyberbullying is not limited to this type of setting. Underage children and young adults no longer socialize exclusively within their school or their neighborhood. Social media widen the cycle of personal contacts to include total strangers in “real life.” Along with social media use, online gaming is a major pastime for most adolescents. However, there is no research that explored the toxic environment of certain online gaming communities. Ignoring this huge potential for victimization in the younger generation’s favorite pastime activities and demoting cyberbullying to a sub-category of bullying could lead to drastically underestimating its prevalence.

Future studies should include measures of well-being and psychological symptoms in order to quantify the relative impact of cyberbullying and IUD. Additionally, personality correlates should be studied in cyberbullying perpetrators. A prospective study of cyberbullying victims that could identify the factors that turn them to perpetrators themselves would be very helpful in elucidating the underlying psychological mechanisms. Finally, the studies so far have completely neglected mature adults, despite the fact that cyberbullying or IUD are not limited to younger age groups. College students in particular are an under-researched population with increased incidence of both cyberbullying and IUD.

Conclusions

The study of the relationship between cyberbullying and IUD is lacking studies with robust methodology, varied participant samples, and clinical measures of well-being and mental health. Future research should strive to employ samples more representative of the general online user population or focus on specific online activities and communities, employing clinical samples whenever possible.

Author Contribution The authors jointly developed the study concept. The review was designed and carried out by GF and IM. IM wrote the paper, with critical input and assistance with data interpretation from GF. All authors had full access to all study data and take responsibility for the integrity of the data and the accuracy of the data analysis.

Declarations

Ethics Approval Dr Floros was involved in a referenced study [35•].

Human and Animal Rights and Informed Consent All reported studies/experiments with human or animal subjects performed by the authors

have been previously published and complied with all applicable ethical standards (including the Helsinki declaration and its amendments, institutional/national research committee standards, and international/national/institutional guidelines).

Conflict of Interest The authors declare no competing interests.

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