

Research on cyberbullying and suicide: a bibliometric analysis

A. Denche-Zamorano^{1,2} | M. Mendoza-Muñoz^{3,4} |
S. Barrios-Fernández³ | C. Galán-Arroyo^{5,6} | J. C. Adsuar^{1,7} |
J. y Rojo-Ramos⁸

¹Promoting a Healthy Society Research Group (PHeSO), Faculty of Sport Sciences, University of Extremadura, Cáceres, Spain

²Faculty of Education, Psychology and Sport Sciences, Universidad de Huelva, Huelva, Spain

³Occupation, Participation, Sustainability and Quality of Life (Ability Research Group), Nursing and Occupational Therapy College, University of Extremadura, Cáceres, Spain

⁴Departamento de Desporto e Saúde, Escola de Saúde e Desenvolvimento Humano, Universidade de Évora, Évora, Portugal

⁵Sport, Health & Exercise Research Unit (SHERU), Castelo Branco Polytechnic Institute, School of Education/Department Sport and Well-Being, Castelo Branco, Portugal

⁶Physical and Health Literacy and Health-Related Quality of Life (PHYQoL), Faculty of Sport Science, University of Extremadura, Cáceres, Spain

⁷CIPER, Faculty of Human Kinetics, University of Lisbon, Lisbon, Portugal

⁸Physical Activity for Education, Performance and Health, Faculty of Sport Sciences, University of Extremadura, Cáceres, Spain

Correspondence

M. Mendoza-Muñoz, Occupation, Participation, Sustainability and Quality of Life (Ability Research Group), Nursing and Occupational Therapy College, University of Extremadura, 10003 Cáceres, Spain.
Email: mamendezam@unex.es

Abstract

Suicide is a global mental health problem. In recent years, suicidal ideation, suicide attempts and suicides have increased in children and adolescents. In this population, cyberbullying is a public health problem that has grown along the increase in use of devices with internet access. Cybervictimization is related to negative health effects, even including suicidal ideation or suicide in cyberbullied individuals. This study is the first bibliometric analysis on scientific literature related to cyberbullying and suicide based on the traditional laws of bibliometrics. The aim was to generate a global overview of the research related to this object of study. We analysed 242 documents published in journals indexed in the Web of Science, examining the trend followed by annual publications, identifying the prolific (most productive) and prominent (prolific co-authors with one or more papers between most cited papers) co-authors, leading countries and journals, the most cited documents and the most used author keywords. Annual publications followed an exponential growth trend ($R^2 = 89.2\%$), meaning that there is a great interest in the scientific community for this study object. International Journal of Environmental Research and Public Health and Psychiatry Research were the journals with most document published. Baiden, P.

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C. Galán-Arroyo, Sport, Health & Exercise Research Unit (SHERU), Castelo Branco Polytechnic Institute, School of Education/ Department Sport and Well-Being, 6000-266, Castelo Branco, Portugal.
mamengalana@unex.es

(prolific), Kowalski, R. (most cited), Hinjuja, S. and Patchin, J. (prominents) were the most highlighted co-authors, reference authors on the subject. Most scientific output originated in the USA. Five thematic lines were identified among the author keywords. The results of this research show the growing interest of the scientific community in this topic, along with useful information for researchers and publishers, identifying relevant co-authors, journals interested in the topic and emerging lines of research, highlighting self-harm, cyber-victimisation, suicide risks and suicidal behaviours as the most recent thematic lines.

KEYWORDS

bullying, depression, education, scientometrics, social networks

Practitioner point

- The analysed papers on cyberbullying and suicide revealed that annual publications followed an exponential growth trend, which confirms the interest of the scientific community in this topic.
- The International Journal of Environmental Research was the most productive journal; Baiden, (prolific), Kowalski, (most cited), Hinjuja and Patchin, (prominents), the most highlighted co-authors, and the USA led scientific production.
- The most used author keywords were cyberbullying, bullying, adolescents, suicide, suicidal ideation, depression, social media, and mental health.

1 | INTRODUCTION

Alongside road traffic accidents and deaths from interpersonal violence, suicide is among the top three leading causes of death among young people (Cavalcanti et al., 2020; Navarro-Gómez, 2017; Roh et al., 2018; Sedgwick et al., 2019; Wasserman et al., 2021). In 2020, suicides were the second leading cause of death among children and adolescents aged 10–14 in the United States (Ehlman et al., 2022). In Germany, a past survey of children and adolescents aged 10–20 years found that between 6.5% and 9% reported suicide attempts (Becker & Correll, 2020). In another European country, Spain, data on suicides in children and adolescents have worsened since the start of the Covid-19 pandemic, with suicides doubling between 2019 and 2020 in children under 15 years of age (Fundación Salud Mental España, 2015). However, it is from the age of 15 onwards that there is a worrying increase in suicide rates, with suicide rates between the ages of 15 and 19 up to 7.9 times higher than between the ages of 10 and 14 (Roh et al., 2018), coinciding with the transition between primary and secondary education (Williams et al., 2017). On the other hand, in both age groups, as in adults, there is an imbalance in suicide rates by gender, with the male suicide rate being between 1.6 and 3 times higher than the female

suicide rate (Roh et al., 2018; Wasserman et al., 2021) because of all these figures and their consequences on society, suicide is considered a global mental health and public health problem (Wasserman et al., 2021; S. Z. Williams et al., 2022).

Another public health problem among young people and adolescents that has spread in recent years is cyberbullying (Aboujaoude et al., 2015; Nixon, 2014). Cyberbullying, or electronic bullying, is a type of violence (Bottino et al., 2015) committed by one or more individuals on others who cannot easily defend themselves (Menesini & Nocentini, 2009; Smith et al., 2008), to cause harm, through teasing, spreading rumours, threats, repeated sending of aggressive messages, verbal or visual violence, impersonation, account falsification, sexual harassment, or other similar harmful conduct by electronic means, such as computers, tablets or smartphones, on websites, mobile applications, video games, social networks (Bailin et al., 2014; Coyne et al., 2021; Sampasa-Kanyinga & Hamilton, 2015; Sedgwick et al., 2019; Smith et al., 2008; Tozzo et al., 2022; Zhu et al., 2021). Among the risk factors for bullying, personal factors have been distinguished: gender, sexual orientation, race or ethnicity, or health conditions; and situational factors: parent-child relationships or interpersonal relationships, with a higher risk among women, sexual minorities, young people with depression or other pathologies, as well as young people with family problems or without social support (Larrain Mariño et al., 2020; Wright & Wachs, 2022; Zhu et al., 2021). However, protective factors have also been documented: empathy, emotional intelligence, social and family support, and school climate reduce the risk of cyberbullying or the consequences of cyberbullying (Bai et al., 2021; Wright & Wachs, 2022; Zhu et al., 2021). Prevention and intervention in school bullying are elements that can prevent cyberbullying, given that most adolescents who suffer from school bullying also suffer from cyberbullying and being advisable to approach all types of bullying and victimisation experiences holistically and not in isolation (Pichel et al., 2021; Schneider et al., 2012a).

Cybervictimisation in adolescents has been associated with numerous negative effects on the life of the bullied: loss of academic performance, loss of self-esteem, substance use, physical and mental health problems such as psychological distress, depression, anxiety or stress, life dissatisfaction, and even self-harm, suicidal ideation and behaviour, or the completion of suicide (Campbell et al., 2012; Erreygers et al., 2022; Hébert et al., 2016; Hinduja & Patchin, 2010; J. Huang et al., 2021; John et al., 2018; Kowalski et al., 2014; Medrano et al., 2018; Schneider et al., 2012a; Selkie et al., 2016). Suicidal ideation and suicide attempts are higher in secondary school youth who have experienced cyberbullying than in those who have not, suggesting that suicide prevention and intervention are essential within comprehensive school-based bullying response programmes (Hinduja & Patchin, 2010; Schneider et al., 2012a; Van Geel et al., 2014). In cyber-victims, sadness, depressive symptoms, anxiety, dissatisfaction with life, or hostility, the latter especially in young people with attention deficit hyperactivity disorder, could be signs that could indicate to teachers and family members that suicidal ideation or attempts may occur. (Liu et al., 2021; Martínez-Montegudo et al., 2020; Romero et al., 2013).

Several bibliometric studies related to cyberbullying have been found in the scientific literature (Cretu & Morandau, 2022; González-Moreno et al., 2020; Peker & Yalçın, 2022), as well as bibliometric studies related to suicide (Astraud et al., 2021; Cai et al., 2020; Cheng et al., 2021). It demonstrates the high interest of researchers in this type of study. In contrast, no exhaustive bibliometric analysis on cyberbullying and suicide has been found. Therefore, the main objectives of this study were: (1) To analyse the trend followed by annual publications on cyberbullying and suicide; (2) To highlight the journals that concentrated the highest number of publications and citations; (3) To identify the prolific (most productive) and prominent (prolific co-authors with papers between the most cited papers) co-authors; (4) To point out the most cited papers; (5) To find the keywords most used by co-authors. The global objective was to identify research trends in cyberbullying and suicide.

2 | MATERIALS AND METHODS

A bibliometric study was conducted using the Web of Science (Reuters, 2022), as a homogenised database, the database most commonly used by researchers to perform scientific mappings in all types on research areas (Denche-Zamorano et al., 2022; González-Moreno et al., 2020; X. Huang et al., 2022; Navarrete-Cortes et al., 2010;

Shen & Ho, 2020; Valtonen et al., 2022; Vošner et al., 2016). Using a single database favours the homogenisation of bibliometric analyses, by comparing data from documents included in indexed journals and evaluated with the same criteria and quality indicators, for example: the impact factors and quartiles of journals (Aghaei Chadegani et al., 2013; Bakkalbasi et al., 2006; Falagas et al., 2008; Harzing & Alakangas, 2016; Mongeon & Paul-Hus, 2016). Data set to be analysed was obtained by running an advanced search in the WoS search engine, specifically, in the WoS Core Collection, in its editions: Science Citation Index Expanded (SCIE), Emerging Sources Citation Index (ESCI) and Social Science Citation Index (SSCI), were selected, based on search vectors on cyberbullying and suicide (ti = ("cyberbull*") or ti = ("cybervictim*") or ti = ("e-bullying") or ti = ("online bullying") or ti = ("online bullies") or ti = ("electronic bullying") or ti = ("cyber-harassment") or ti = ("online harassment") or ti = ("electronic harassment") or ab = ("cyberbull*") or ab = ("cybervictim*") or ab = ("e-bullying") or ab = ("online bullying") or ab = ("online bullies") or ab = ("electronic bullying") or ab = ("cyber-harassment") or ab = ("online harassment") or ab = ("electronic harassment")) and (ti = ("suicid*") or ab = ("suicid*")), limiting the search to: articles and reviews; no time limitations. This search vector was used because the inclusion criteria established were: (1) Papers published in journals indexed in the WoS Main Collection, in its editions: SCIE, ESCI and SSCI; (2) Papers that contained in the title (using the tag Ti in the search vector) and/or (using the boolean operator OR) abstract (using the tag ab in the search vector) the search terms cited above (cyberbullying related terms AND, boolean operator, terms with root "suicid", using "*" for this reason; 3) Type of papers: Articles and Reviews. In WoS, the ti and ab tags are used to search the titles and abstracts of documents. The search was conducted on 31 October 2022. The documents found were checked for compliance with the selection criteria. No documents had to be excluded.

Once the documents were extracted, a bibliometric analysis was performed in which the following bibliometric laws were reviewed: (1) Exponential growth of science or Price's Law, checking through the degree of exponential adjustment the annual growth of publications (Dobrov et al., 1979; Price, 1976); (2) Concentration of publications in journals or Bradford's Law, distributing the journals in thirds and therefore establishing as the core of journals with the highest concentration those that comprise at least 33% of the total number of: publications; and citations; to highlight the most productive journals and the most cited (Bulick, 1978; Morse & Leimkuhler, 1979; Rodrigues-Santana et al., 2022; Venable et al., 2016); (3) Concentration of publications in authors or Lotka's Law, recognising that in any field of knowledge, most of the articles come from a small proportion of prolific authors, who when identified, can be studied in isolation (Coile, 1977), applying the h-index to these to highlight the most cited authors among the prolific (Hirsch, 2005; Rodrigues-Santana et al., 2022), and among these, the authors with the most papers among the most cited papers were considered to be prominent authors; (4) Concentration of citations in articles or Hirsch's index (h-index), thus considering the "h" articles cited at least "h" times or more (Hirsch, 2005); (5) Concentration of keywords or Zipf's Law, highlighting the most used keywords in the set of articles (Kingsley Zipf, 1932; Valderrama-Zurián et al., 2021).

In addition, the VOSviewer software was used for processing and visualisation of the data set as well as co-occurrence, thus performing a fragmentation analysis with clustered visualisation outputs (Perianes-Rodriguez et al., 2016; Waltman et al., 2010).

3 | RESULTS

3.1 | Annual publications trend

The 242 documents (213 articles and 29 reviews) found were published between 2009 and 2022. Since the publication of the first paper, *Cyberbullying Versus Face-to-Face Bullying A Theoretical and Conceptual Review* (Dooley et al., 2009) in January 2009, there has been continuity in annual publications, with the trend followed by annual publications adjusting by 89.2% (R^2) to an exponential growth rate (Figure 1).

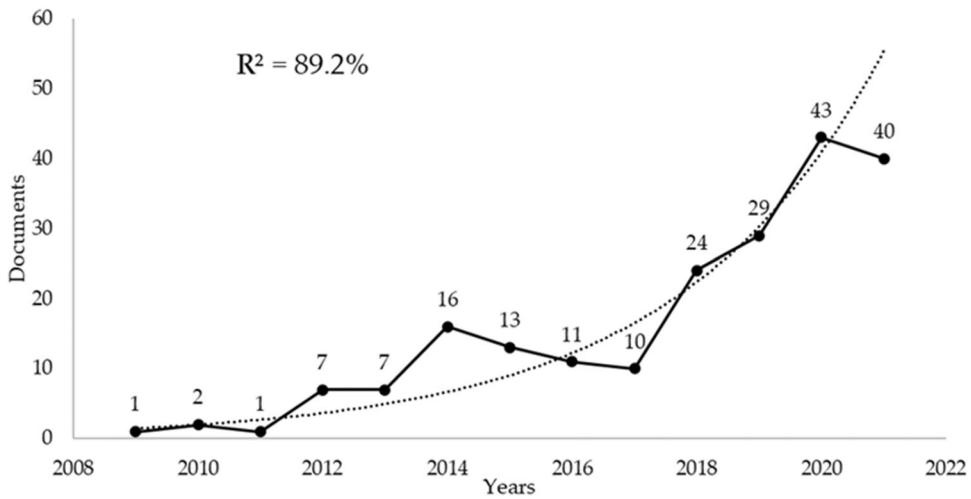


FIGURE 1 Annual publications trend.

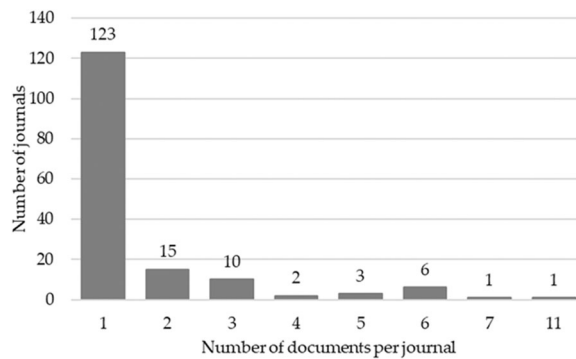


FIGURE 2 Distribution of documents by journal.

3.2 | WoS categories

In WoS, documents were related into 50 thematic categories. Psychiatry (59), Public Environmental Occupational (38), Psychology Multidisciplinary (36), Pediatric (22), Psychology Developmental (19), Social Work (17), Criminology Penology (15), Family Studies (15), Environmental Sciences (11) and Communication (10) were the categories with the most related papers. Among the top ten categories with the most related documents, no category related to education was found: Education and Educational Research (9 documents), Psychology Educational (6 documents), Education Scientific Disciplines (3 documents), Education Special (2 documents).

3.3 | Journals

A total of 158 journals were found publishing on the subject. Figure 2 shows the distribution of articles per journal. According to the number of papers, the Bradford core was composed of 20 journals (89 papers, 36.8%), all of which submitted at least three papers. International Journal of Environmental Research and Public Health (11 documents) was the prolific journal, followed by Psychiatry Research (7 documents), Children and Youth Services Review

TABLE 1 Bradford core journals, according to the number of documents published.

Bradford Zone	Journals	JIF	Q.	Doc.	% Doc	% Acc	% O.A.
CORE	International Journal of Environmental Research and Public Health (MDPI)	n.a. ^a	n.a. ^a	11	4.5%	4.5%	96.1%
	Psychiatry Research (Elsevier)	11.225	Q1	7	2.9%	7.4%	8.3%
	Children and Youth Services Review (Elsevier)	2.519	Q1	6	2.5%	9.9%	8.7%
	Computers in Human Behaviour (Elsevier)	8.957	Q1	6	2.5%	12.4%	11.3%
	Cyberpsychology Behaviour and Social Networking (Mary Ann Liebert)	6.135	Q1	6	2.5%	14.9%	5.5%
	BMC Public Health (BMC)	4.135	Q2	5	2.1%	16.9%	99.6%
	Canadian Journal of Psychiatry-Revue Canadienne de Psychiatrie (SAGE)	5.321	Q2	5	2.1%	19.0%	24.0%
	Frontiers in Psychology (Frontiers Media)	4.232	Q1	5	2.1%	21.1%	99.5%
	Journal of Adolescent Health (Elsevier)	7.898	Q1	4	1.7%	22.7%	12.4%
	Journal of Affective Disorders (Elsevier)	6.533	Q1	4	1.7%	24.4%	10.1%
	Archives of Suicide Research (Taylor & Francis)	2.833	Q2	3	1.2%	25.6%	7.1%
	Current Psychology (Springer)	2.387	Q2	3	1.2%	26.9%	15.7%
	Frontiers in Psychiatry (Frontiers Media)	5.435	Q2	3	1.2%	28.1%	99.5%
	JAMA Paediatrics (Amer Medical Assoc)	26.800	Q1	3	1.2%	29.3%	12.4%
	Journal of School Health (Wiley)	2.460	Q2	3	1.2%	30.6%	7.3%
	Journal of School Nursing (SAGE)	2.361	Q2	3	1.2%	31.8%	7.1%
	Journal of School Violence (Taylor & Francis)	2.835	Q2	3	1.2%	33.1%	1.5%
	Preventive Medicine (Elsevier)	4.637	Q2	3	1.2%	34.3%	16.9%
	Psychosocial Intervention (Official College of Psychologists of Madrid)	4.583	Q1	3	1.2%	35.5%	98.2%
	Russian Journal of Criminology (Baikal State Univ)	n.a	n.a.	3	1.2%	36.8%	98.4%

Abbreviations: Doc, Documents; JIF, Journal Impact Factor; Q, Journal Citation Reports Quartile; % Acc, Accumulated percentage of total number of documents published; % Doc, Percentage of total documents published; % O. A., Percentage of documents in Open Access; n.a., Not applicable.

^aThis journal was removed from the Journal Citation Reports ranking in March 2023.

(6 documents), Computers in Human Behaviour (6 documents) and Cyberpsychology behaviour and social networking (6 documents). Table 1 shows the top 20 most productive journals.

According to the number of accumulated citations, Bradford's core was composed of three journals: Psychological bulletin (Amer Psychological Assoc. 1 document, 1166 citations) Archives of suicide research (Taylor & Francis. 3 documents, 922 citations) and JAMA Paediatrics (Amer Medical Assoc. 3 documents, 685 citations); accumulating 33.2% of the total citations of the analysed documents.

3.4 | Countries/Regions

The United States of America (USA) (106 documents and 5432 citations) was the most productive and most cited country/region of the 61 co-authoring countries. Canada (29 documents and 733 citations) was the second country

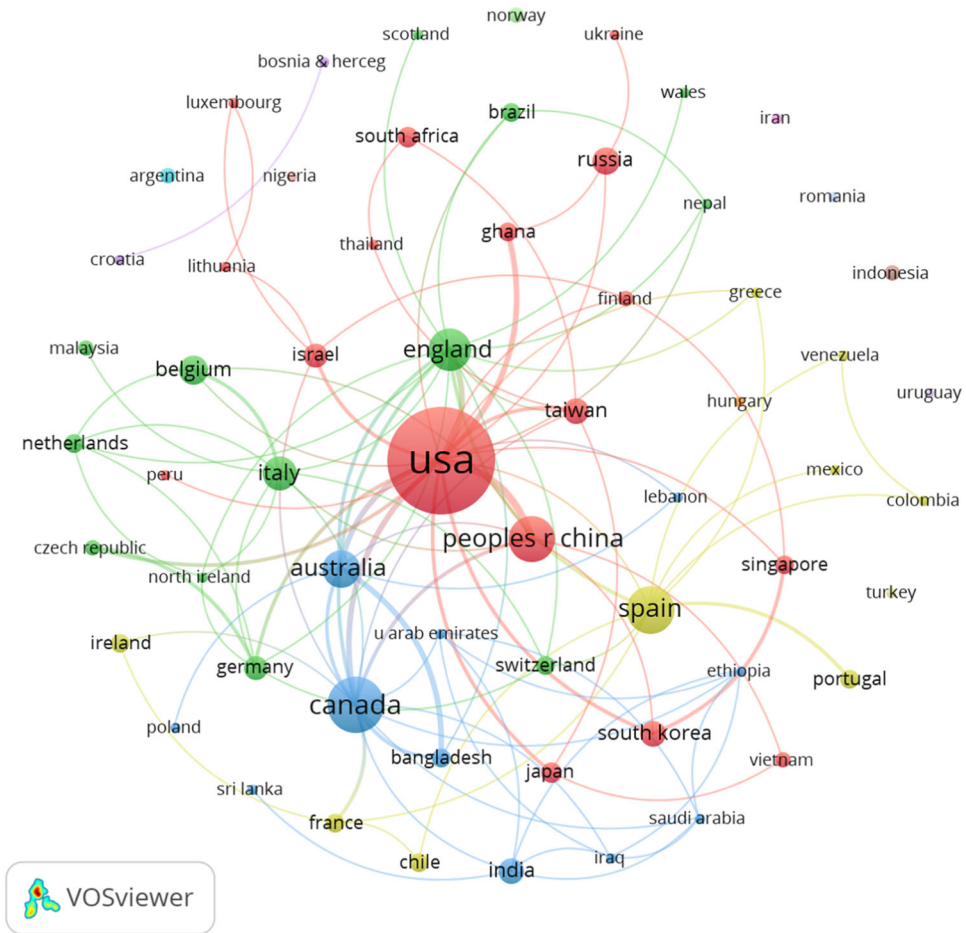


FIGURE 3 Countries/Regions co-authors to the documents on cyberbullying and suicide research.

in terms of documents and third in terms of citations. In production, Spain (20 documents, 344 citations) was the third most productive country, while in the number of citations, Australia (898 citations, 13 documents) ranked second. Four main clusters of collaboration between countries/regions were found. The USA led the cluster with the highest number of collaborating countries/regions (17 and the highest production, together with other countries/regions such as China, South Korea or Taiwan (red cluster). England led the second cluster in a number of countries/regions in collaboration (13), together with countries/regions such as: Italy, Belgium or Germany (Green cluster). Canada led the third cluster with the most countries/regions in collaboration, collaborating with countries/regions such as: Australia, Bangladesh or India (Blue cluster). Spain led the fourth collaboration network (9), together with countries/regions such as Portugal, Chile or France (yellow cluster). Figure 3 shows the collaboration network of the countries/regions (Analysis: Fractionalization; Attraction: 9; Repulsion: -1; Clustering resolution: 0.5; Node size: Documents; Line size variations: Link strength; Colour: Cluster).

3.5 | Prolific and prominent co-authors

P. Baiden (7 papers) was the prolific coauthor of the 867 co-authors of the papers analysed. The majority of co-authors (780 co-authors, 90% of the total) submitted a single paper. The remaining co-authors submitted: 2

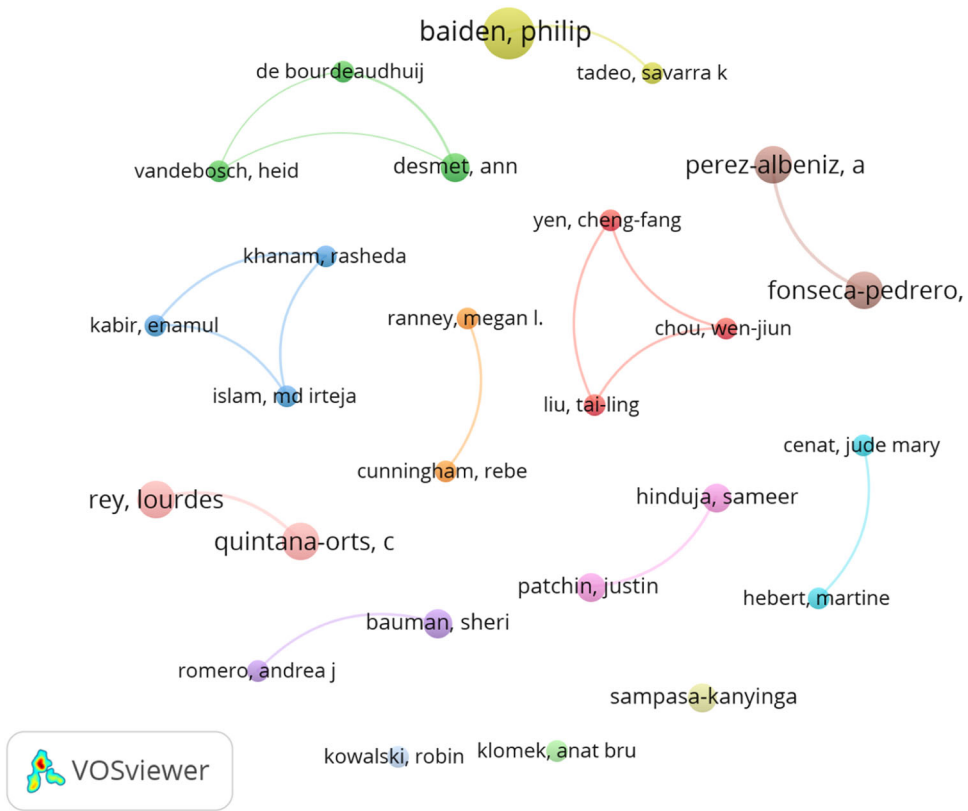


FIGURE 4 Prolific co-authors on cyberbullying and suicide research.

documents (70 co-authors), 3 documents (16 co-authors), 4 documents (5 co-authors), 5 documents (4 co-authors) and 7 documents (1 coauthor). Applying Lotka's law, the 26 co-authors with three or more documents were considered the prolific co-authors. Figure 4 shows the prolific co-authors and the collaboration network formed between them (Analysis: Fractionalization; Attraction: 8; Repulsion: -2; Size node: Documents).

Applying the h-index to the prolific co-authors (3 or more documents), 22 co-authors were found with at least 22 cumulative citations in their papers on cyberbullying and suicide (Table 2). These 22 co-authors had between 37 and 1178 cumulative citations. The coauthor with the most cumulative citations was R. Kowalski (1178 citations). Highly cited authors, such as G. Giumetti (1168 citations, 2 documents), M. Lattanner and A. Schroeder (1166 citations, 1 document), were not among the prolific co-authors, as they did not present the necessary number of documents to be considered among the prolific co-authors. Among the prolific and most cited co-authors, only 16 contributed one or more papers among the most cited papers (Table 2). These 16 co-authors were considered prominent co-authors, standing out: Hinduja, S. and Patchin, J. (3 documents among the most cited documents) and Sampasa-Kanyinga, H. (2 documents); the remaining co-authors submitted a single paper among the most cited papers.

3.6 | Author's keywords

We found 21 keywords with 7 or more occurrences, for 18 keywords with 8 or more occurrences. Applying Zipf's law to the set of keywords, it was estimated that the most used keywords would be the 21 (less than or equal to the square root of 428) with the highest number of occurrences, so the 21 most used keywords were considered as the

TABLE 2 Prolific and most cited co-authors, and prominent co-authors, on cyberbullying and suicide.

Co-authors	Affiliation/Countries-Regions	Doc.	Cit.
Kowalski, R.	University of Texas Arlington/USA	3	1178
Hinduja, S.	Florida Atlantic University/USA	4	1044
Patchin, J.	University of Wisconsin System/USA	4	1044
Bauman, S.	University of Arizona/USA	4	394
Klomek, A.	Reichman Univ/Israel	3	263
Sampasa-Kanyinga, H.	University of Ottawa/Canada	4	174
Quintana-Orts, C.	University of Sevilla/Spain	5	105
Rey, L.	University of Malaga/Spain	5	105
Baiden, P.	University of Texas Arlington/USA	7	99
Cenat, J.	University of Ottawa/Canada	3	96
Hebert, M.	University of Quebec Montreal/Canada	3	96
De Bourdeaudhuij, I.	Ghent University/Belgium	3	82
Desmet, A.	Universite Libre de Bruxelles/Belgium	4	82
Chou, W.	Chang Gung Memorial Hospital/Taiwan	3	75
Liu, T.	Kaohsiung Medical University Hospital/Taiwan	3	75
Yen, C.	Kaohsiung Medical University Hospital/Taiwan	3	75
Cunningham, R.	University of Michigan/USA	3	61
Ranney, M.	Brown University/USA	3	61
Romero, A.	University of Arizona/USA	3	59
Tadeo, S.	Florida State University/USA	3	56
Fonseca-Pedrero, E.	University of La Rioja/Spain	5	37
Perez-Albeniz, A.	University of La Rioja/Spain	5	37

Bold (Prominent co-authors: Prolific co-authors with one, or more, documents among most cited documents).

Abbreviations: Doc., Documents; Cit., Citations.

keywords of greatest interest. The most used concepts were: cyberbullying (121 occurrences), bullying (55), adolescents (55), suicide (49), suicidal ideation (36), depression (29), social media (27) and mental health (27). Figure 5 shows the 21 most used keywords and the thematic clusters they formed, after fractionalization analysis (Attraction: 8; Repulsion: 0; Node side: Occurrences). Five thematic clusters were found, the largest being formed around one of the central terms of this study, cyberbullying, together with concepts such as bullying, adolescents, suicide, depression, mental health, internet or social media (red cluster). A second thematic cluster was related to suicidal ideation, cybervictimization, suicide attempts and adolescence (green cluster). The third thematic group was formed by terms related to the substance use and social homophobia (blue cluster). Finally, two concepts were found respectively forming its own thematic clusters, children (pink cluster) and suicide risk (yellow cluster). Self-harm, cybervictimization, suicidal behaviour and suicide risk were the keywords of most current interest to the co-authors as shown in Figure S1 (Normalisation: Fractionalization analysis; Attraction: 8; Repulsion: 0; Node side: Occurrences; Scores: Average Publication years).

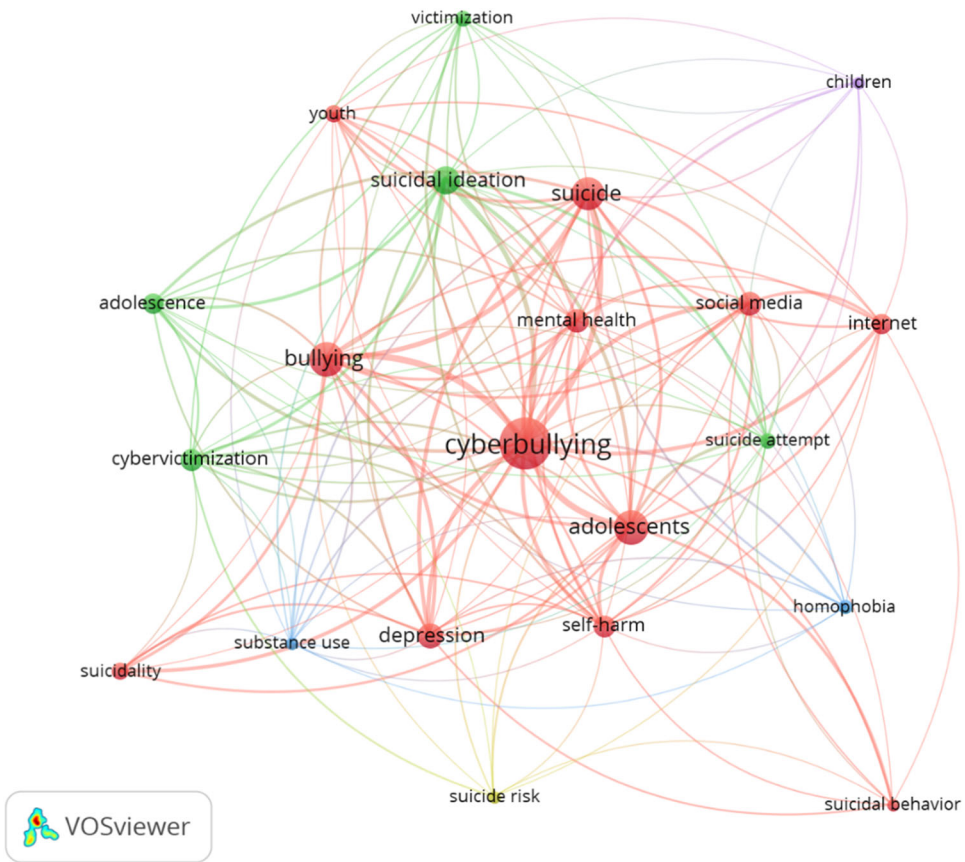


FIGURE 5 Most used author keywords.

3.7 | Most cited papers

Among the documents analysed, applying the h-index, 39 documents stood out with 39 or more citations (Appendix A). The most cited document was *Bullying in the Digital Age: A Critical Review and Meta-Analysis of Cyberbullying Research Among Youth* (Kowalski et al., 2014), published by Kowalski et al. in the issue *Psychological Bulletin* (American Psychological Association). This paper had accumulated 1166 citations at the time of this analysis. The second most cited paper (862 citations), was, *Cyberbullying, and Suicide* (Hinduja & Patchin, 2010), published by Hinduja and Patchin in the issue *Archives of Suicide Research* (Taylor & Francis) While the third most cited (488 citations) was *Cyberbullying, School Bullying, and Psychological Distress: A Regional Census of High School Students* (Schneider et al., 2012b), de Schneider et al., published in the *American Journal of Public Health* (American Public Health Association).

4 | DISCUSSION

This article presents the first bibliometric analysis based on documents published in WoS-indexed journals on cyberbullying and suicide. Among its most notable findings, we found that annual publications on the subject were on an exponential growth trend. In previous bibliometric studies, it had already been shown that research on

cyberbullying was at a time of growing interest, with a large volume of researchers developing this object of study. Cretu y col. (Cretu & Morandau, 2022) and González-Moreno et al. (González-Moreno et al., 2020) found that research on cyberbullying and education was in a phase of accelerated growth, very similar to what has been found in research on cyberbullying and suicide. There has not yet been a saturation of annual publications on cyberbullying, which shows the great interest of the scientific community to further develop this object of study. In these previous bibliometric studies, the documents were especially related to the WoS Categories: Psychology, and Education and Educational Research. This was different in our study, where the subject categories with the most papers were Psychiatry, Public Environmental Occupational and Psychology Multidisciplinary. In fact, although youth or adolescents appear as a keyword in 2 of the 4 author keywords thematic clusters, in our study, education-related categories were not among those with the highest number of documents.

Most research on cyberbullying and suicide is oriented towards thematic areas more related to psychology or psychiatry. This is similar to what has been found in bibliometric studies on suicide-related research, both in the high growth of annual publications and in the leadership of researchers and journals specialised in psychology and/or psychiatry in research on this object of study (Astraud et al., 2021; Grover et al., 2021; Kar et al., 2022; Palod et al., 2022).

In this sense, the low number of publications related to education is in line with the need to develop more research in this field with the object of study: cyberbullying and suicide; something that has already been concluded by other authors, especially in the need to create and implement multidisciplinary school intervention programmes, which not only involve mental health professionals but also parents, teachers and school management staffs (Abrahamyan et al., 2020). Research is needed to help increase adolescents' online safety, increase their self-efficacy in situations of school bullying and cyberbullying, increase empathy and emotional intelligence, improve the classroom climate, train educators and family members to provide support, and implement educational prevention and intervention programmes to reduce the prevalence of cyberbullying and its effects. Moreover, these interventions should be more specific, as gender differences have been detected (Tian et al., 2018), with Jackson et al. (Jackson et al., 2009) suggesting a more focused work on relational aggression in girls, while in boys it would be better to increase affective and cognitive empathy (Topcu & Erdur-Baker, 2010).

Another relevant aspect that emerges from this study is the intimate relationship between cyberbullying and suicide with social networks and the internet. Numerous studies warn of the dangers that the misuse of social media can bring, potentially undermining the freedoms and well-being of the people and communities they serve (Baccarella et al., 2018). Research on the misuse of social media concerning cyberbullying (O'Keeffe et al., 2011), trolling (Buckels et al., 2014), invasions of privacy (Pai & Arnott, 2013) or fake news (Allcott & Gentzkow, 2017) is increasingly common. In this sense, a link between the use of social media and mental health problems has already been shown (Keles et al., 2019), and if we add to this the misuse that could be made of them about bullying, it could become a major public health problem that can lead to mental and behavioural health problems and an increased risk of suicide (Ali & Shahbuddin, 2022; Garrett et al., 2016; Van Geel et al., 2014). Therefore, there is a particular need for public health interventions to provide guidance, especially to adolescents, on the appropriate use of social networks, to prevent cyberbullying and therefore the mental health problems it can cause.

Despite the importance that education has on cyberbullying and suicide, other studies highlight the importance that cyberbullying also has outside this field (Lam et al., 2019). In this line, and relation to one of the clusters defined in this study (homophobia), several studies have shown that sexual orientation can lead to greater victimisation by cyberbullying or be considered a risk factor for suffering these aggressions (Elipe et al., 2018). In addition to being associated with self-harm or suicidal factors (Wright & Wachs, 2022), several studies have also shown negative health outcomes, such as depression and anxiety, or substance use from homophobic cyberbullying (Bishop et al., 2023; Garaigordobil & Larrain, 2020; Wang et al., 2018). Most studies on this population focus on youth or adolescence, however, as highlighted by Jenaro and col. (Jenaro et al., 2018) or Lam et al. (Lam et al., 2019), more studies in adulthood would be interesting, as cyberbullying in adults can be as serious as in young people (Jenaro et al., 2018). Furthermore, Jenaro et al. point out that the importance of studying cyberbullying in the adult

population could be very relevant, as today's children will be tomorrow's adults, and the very high rates of cyberbullying in the adolescent population could therefore increase in the future adult population.

As far as countries are concerned, the USA appears among the results of this study as the country with the highest number of documents (106 documents) on bullying and suicide, very different from the number of documents of the rest of the countries. This may be because the suicide rate per 100,000 inhabitants in this country in 2020 was 13.9%, well above the average suicide rate worldwide (9.26%), being this rate even higher between the years 2109 and 2017. Moreover, this same year, in the USA, suicides were the second leading cause of death among children and adolescents aged 10–14 years and young adults aged 25–34 years (Ehlman et al., 2022). Along these lines, the USA ranks second after Mexico as the country where children and adolescents suffer the highest rate of bullying (6 out of 10). Therefore, the fact that the US leads the list of studies could be translated into a concern for this situation and therefore a search for solutions to it.

4.1 | Future lines and practical applications

The results of this study may have important practical applications, whether schools and communities can use the results of this research to design cyberbullying prevention and mental health promotion programs for children and adolescents by implementing early detection strategies to identify at-risk youth and provide them with appropriate support. As well as, for mental health professionals, educators and counsellors, being able to benefit from information on the most commonly used keywords (such as “self-harm”, “cybervictimization” and “suicide risks”), for training in the detection and management of cyberbullying and suicidal ideation may be more effective based on the data from this study. In addition to for governments and organisations trying to specifically address cyberbullying and its mental health consequences.

Despite the object of study of this research was all articles and article reviews found in WoS on cyberbullying and suicide, as future lines, other studies could focus on necessary future bibliometric analyses focusing on research on cyberbullying and mental health, cyberbullying prevention and intervention programs in education, or other specific areas (political, socio-cultural, family, etc.), using other search terms. Moreover, as already recommended by other authors, educational policies are needed to deal severely with bullying and cyberbullying cases, creating new protocols for early identification and intervention of cases, explore the development and implementation of artificial intelligence algorithms capable of identifying and flagging cyberbullying behaviour on social media platforms, protecting victims, generating positive protective climates for victims, prosecuting aggressors and preventing suicide. Specifically, longitudinal studies tracing the trajectories of cyberbullied youth are crucial in understanding the long-term impact on mental health and suicidal ideation. This encompasses interventions targeted at both prevention (e.g., anti-bullying programs, digital literacy training) and post-intervention support for cyberbullied youth and their families.

4.2 | Limitations

These types of studies have some limitations. Although it is useful to perform prospective reviews of a scientific field, analysing large generic literature volumes: identifying research trends, co-authors or referent institutions, underdeveloped areas or knowledge lacks in a field or study object; it should be complemented by systematic reviews or other studies specific to the findings. Another important limitation was the bias assumed in selecting the data source. Given the incompatibilities that can be found when analysing documents from different databases, especially when comparing the impact and relevance of authors, documents and journals, due to the different coverage of journals, proceedings and books, this research was carried out only with documents indexed in WoS, so this bibliometric study could be complemented by others that use other databases as a reference. Further research focusing on other

databases, grey literature or other bibliographic sources could help to gain an even greater insight into the whole field of study that could not be investigated in our study by focusing on publications published in high-impact, peer-reviewed journals that do not publish papers published by other sources. It could also be considered a limitation to have focused on search terms explicitly linked to cyberbullying. Thus, publications in which bullying could be understood in a broad sense and cyberbullying was considered a subtype of the behaviour were not included. Finally, titles and abstracts were searched to increase the precision of the search. The search could have been broader, including searches on author keywords, but some papers related to the topic could not be escaped.

5 | CONCLUSIONS

This study aimed to assess the trend of annual publications on cyberbullying and suicide. A growing interest of the scientific community in this topic was detected, as 242 papers were found between 2009 and 2022, with Psychiatry (59), Public Environmental Occupational (38), Psychology Multidisciplinary (36), Pediatric (22) and Psychology Developmental (19) being the categories with the most related papers. As for the reference sources, out of a total of 158, only 20 comprise 36.8% of the publications, with the International Journal of Environmental Research and Public Health and Psychiatry Research, being the prolific journals.

The USA was the most productive and most cited country/region of the 61 co-authored countries and Canada was the second country in terms of papers and third in terms of the number of citations.

At the author level, only 26 authors were considered prolific, with 3 or more papers, and of which, considering the H-index only 22 prominent authors were found. Baiden and Kowalski were the prolific and most cited co-authors, respectively.

The authors' keywords formed five thematic lines: cyberbullying and bullying, linked to adolescents, suicide, depression, mental health, internet or social media; suicidal ideation and suicide attempts, linked to cybervictimization, victimisation and adolescence; substance use and homophobia; and finally, children.

This document provides useful information for anyone involved in the approach to cyberbullying and suicide, facilitating the location of relevant authors, collaborative groups, journals interested in the subject, most relevant articles and semantic fields most used by the authors. In this way, this document aims to encourage collaboration between researchers, thus facilitating the access of new researchers to an object of study that needs to be studied in depth. As already recommended by other researchers involved, it is necessary to continue researching on bullying and cyberbullying prevention and intervention programmes at a global and particular level, in addition to implementing more effective educational policies that approach this global problem.

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CONFLICTS OF INTEREST STATEMENT

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.

Datasets are available under reasonable request.

PERMISSION TO REPRODUCE MATERIAL FROM OTHER SOURCES

The authors consent to the use of the material.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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APPENDIX A1: MOST CITED DOCUMENTS ACCORDING TO H-INDEX (THEIR UNIQUE WOS ID)

WOS:000337916400006; WOS:000280264600002; WOS:000298449400030; WOS:000336840200009;
 WOS:000274054200002; WOS:000317638800010; WOS:000277998800003; WOS:000211884000014;
 WOS:000356620100006; WOS:000360984000017; WOS:000213920700013; WOS:000430392000002;
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 WOS:000344701500015; WOS:000357753300015; WOS:000521570700009; WOS:000325234600070;
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 WOS:000428076600001; WOS:000301827300009; WOS:000425672700013; WOS:000507378800011;
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 WOS:000445983700037; WOS:000332729600001; WOS:000466452000008; WOS:000424165900003;
 WOS:000306527100005; WOS:000340003100001; WOS:000460034400007.