Global estimates of violence against children with disabilities: an updated systematic review and meta-analysis

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Summary

Background Previous meta-analysis evidence shows that children (aged 0–18 years) with disabilities experience high amounts of violence. During the past decade, there has been a substantial increase in the volume of available data, and we therefore aimed to update the evidence and provide a current global estimate of violence against children with disabilities.

Methods For this systematic review and meta-analysis, we searched 18 English-language international databases for observational studies published in English or Chinese between Aug 17, 2010, and Sept 16, 2020, and three Chinese databases for studies published from database inception to Sept 16, 2020. We used search terms structured around the concepts of disability, child, and violence—defining violence as physical, emotional, or sexual violence, or neglect, and considering disability as physical, mental, intellectual, and sensory impairments, and chronic diseases. We also searched 11 grey-literature repositories and hand searched the reference lists of included records for observational studies. We double screened records for studies that measured violence against children with disabilities. We excluded studies that included only people who had experienced violence or that did not provide separate estimates for children if adults were also included. Two authors independently extracted data and appraised study quality. We pooled estimates using three-level, mixed-effects meta-analyses, and did subgroup analyses. This study was prospectively registered with PROSPERO, CRD42020204859.

Findings We found and screened 26 204 records, of which we excluded 25 844. We assessed 386 full text articles and finally included 98 studies (with 16 831 324 children) in our analysis. Our results showed that the overall prevalence of violence against children with disabilities was 31·7% (95% CI 27·1–36·8; I^2=99·15%; 16 807 154 children, 92 studies) and the overall odds ratio of children with versus without disabilities experiencing violence was 2·08 (1·81–2·38; I^2=91·5%; 16 811 074 children, 60 studies). Sensitivity analyses suggested a high degree of certainty for these estimates, although there was a high degree of heterogeneity across most estimates. There was some risk of publication bias, although the included studies were, on average, of medium quality. The estimates of violence differed by the type of violence, disability, and perpetrator. Children in economically disadvantaged contexts were especially vulnerable to experiencing violence.

Interpretation This review shows that children with disabilities experience a high burden of all forms of violence, despite advances in awareness and policy in the past 10 years. Our results indicate a need for increased partnerships across disciplines and sectors to protect children with disabilities from violence. Additional well designed research is also needed, especially in under-represented and economically disadvantaged populations.

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Introduction

The UN Convention on the Rights of Persons with Disabilities[1] and the WHO International Classification of Functioning, Disability and Health[2] define disability as physical, mental, intellectual, and sensory impairments, and chronic diseases that lead to a compromised relationship between individuals and their environment and produce multiple barriers in full participation within society. Although there is an absence of global data on how many children have disabilities, the most comprehensive and up-to-date estimates indicate that 291·2 million children worldwide have epilepsy, intellectual disability, vision impairment, or hearing loss, representing 11·2% of the total child and adolescent population globally.[3] Of these children, 94·5% live in low-income and middle-income countries (LMICs),[3] in which multiple risks (eg, poverty, inadequate access to services, and malnutrition) converge.[4,5]

Violence against children is an urgent health and development issue that can take a several forms, including physical, sexual, or emotional violence, or neglect.[6] Violence can be perpetrated by caregivers, authority figures (eg, teachers or other service providers), or other adults, and can involve bullying by peers in-person or online, or be enacted by intimate partners during adolescence.[7] Violence has a range of acute and long-lasting negative consequences, such as increased mortality, cognitive impairment, and physical and mental

Research in context

Evidence before this study

A systematic review and meta-analysis published in 2012 provided a baseline for the prevalence of violence against children with disabilities and calculated the odds ratios (ORs) in comparison with non-disabled children. That review searched 12 English-language, international electronic databases for observational studies published between Jan 1, 1990, and Aug 17, 2010, and which had a response rate greater than 50%. The review included 17 studies in the meta-analyses, all done in high-income countries, and showed that globally, 26·7% (95% CI 13·8–42·1) of children with disabilities had experienced violence, with an OR of 3·68 (2·56–5·29) compared with non-disabled children. There was substantial heterogeneity in the findings, and the included studies were of moderate methodological quality. Multiple new studies have been published since the 2012 review, pointing to the need for an update of the evidence.

Added value of this study

This global systematic review and meta-analysis involved an extensive search of 18 English-language, international and three Chinese databases, as well as the grey literature, thereby expanding upon the literature covered in the 2012 review. Chinese sources not included in that review provided 11% of the 98 included studies in this review. We also included 23 studies from low-income and middle-income countries, which increased the geographical applicability of the evidence to contexts beyond high-income countries. The large number of included studies allowed us to expand on past analyses and to investigate the association of different types of disability with multiple forms of violence and perpetrator, including peer bullying. However, the additional studies from low-income and middle-income countries have several limitations, having been done in only seven countries, without any geographical representation of southeast and central Asia, Russia, or many parts of eastern Europe. In addition, no included studies involved participants from lower-middle-income countries. We used three-level meta-analyses to improve the accuracy of previous estimates and to enable analysis of multiple estimates from each study. Our results showed that overall, around one-third of children with disabilities survived violence (prevalence 31·7% [95% CI 27·1–36·8]) and that these children were more than two times as likely to have experienced violence than their non-disabled peers (OR 2·08 [1·81–2·38]) and experienced higher rates of both traditional bullying and cyberbullying.

Implications of all the available evidence

This study suggests that large numbers of children with disabilities continue to experience violence. There is an urgent need for robust research from low-income and middle-income countries and economically disadvantaged settings. Further evidence is also needed on sexual violence and neglect and on children with physical limitations, sensory impairments, and chronic diseases.

health problems. Violence also creates substantial economic costs for society, associated with the treatment of injuries and with ongoing behaviours that are risks to health.[8–11] Furthermore, child survivors are increasingly likely to become perpetrators of violence themselves as adults, leading to the intergenerational transmission of violence.[12] A 2016 study showed that approximately 1 billion children worldwide, aged 2–17 years, were exposed to violence in the past 12 months,[13] and estimates suggest that 93% of the disability-adjusted life-years lost because of interpersonal violence against children occur in LMICs.[5]

The collective evidence suggests that children with disabilities are more likely to experience violence than their non-disabled peers. A 2012 systematic review of data up to 2010,[14] found that 26·7% of children with disabilities experienced violence and that their probability of experiencing violence was 3·68 times higher than for their non-disabled peers. Children with disabilities face unique vulnerabilities and can be the target of violence because of societal stigma or their inability to verbalise, identify, or defend themselves from abuse. Parents might also act out in frustration or anger at children who have high care needs or behavioural challenges.[15–17]

All children have a right to be protected from violence. A reduction in violence against children with disabilities would help to promote social equity and improve health and wellbeing among a group that is marginalised within society.[18] Up-to-date evidence is essential to understanding the extent of this issue. Since the 2012 review,[14] the number of relevant studies has increased substantially. In this review, we aimed to update the global estimates for violence against children with disabilities to inform decision making. Research[19,20] has highlighted the importance of including non-English literature in evidence synthesis; as such, our update expands upon past research to include three Chinese-language regional databases and provides a more comprehensive picture of violence against the world's children.

Methods

Search strategy and selection criteria

For this systematic review and meta-analysis, we searched for observational studies (longitudinal, cross-sectional, and case-control), published in English or Chinese, in 18 English-language, international databases (eg, Medline, Embase, and PyschINFO) between Aug 17, 2010, and Sept 16, 2020, and in three Chinese regional databases (eg, China National Knowledge Infrastructure) for studies published from database inception to Sept 16, 2020 (appendix 1 p 1). We combined free-text and medical subject headings search terms structured around the

See Online for appendix 1

concepts of disability, children, and violence. For the list of search terms and databases used, see appendix 1 (pp 1–6). We also searched 11 grey-literature repositories (appendix 1 pp 1–2) and hand-searched the reference lists of included articles.

We included studies published in English or Chinese that measured violence against children aged 0–18 years with disabilities. Violence was defined in line with standardised global guidance[6] as physical, emotional, or sexual violence, or neglect. We included maltreatment of children perpetrated by caregivers, authority figures, or other adults; in-person or online bullying by peers; and intimate partner violence perpetrated by children or adults, against children younger than 18 years.[7] Studies were included if they specified the type of violence and the measurement tool used.

No restrictions were imposed on the types of disability included, which encompassed any impairment, disorder, or limitation, as defined by the UN Convention on the Rights of Persons with Disabilities[1] and the WHO International Classification of Functioning, Disability and Health.[2] We included studies about physical limitations, mental disorders, cognitive and learning disabilities, sensory impairments, and other chronic diseases, and studies that reported multiple types of disability and produced estimates for single or combined disability types. Only studies that clearly stated the disability type, or category, or both, were included in this review.

We included studies that reported prevalence, measures of association, or the raw data that enabled us to calculate these estimates. Measures of association had to compare violence against children with disabilities versus violence against those without, rather than comparing between children with disabilities grouped by disability type. Prevalence estimates were based on the number of children with disabilities who experienced violence, divided by the total number of children with disabilities in the sample. Studies were excluded if samples were drawn solely from survivors of violence or included both children and adults without providing separate estimates for children.

We used an incremental approach[21] that built on the search strategy of the 2012 review.[14] After applying the inclusion criteria to our search results, we combined the retrieved articles with studies included in the 2012 review.[14] We used EndNote X9 and Rayyan to remove duplications before screening the search results. Two authors (ZF and CZ) who are bilingual in English and Chinese, each independently screened the search results and subsequently retrieved full texts. Disagreements about inclusion were resolved by discussion with a third author (ML) and we calculated Cohen's k coefficients to measure reviewer agreement.

Data analysis

Data extraction was done using a standardised extraction sheet. Two bilingual authors (ZF and ML) each extracted data from 50% of the included studies and then exchanged data sheets to check each other's entries for accuracy. The data extracted included basic study information (author, year, data source, country or region, and country income level); study method (design, setting, sampling strategy, sample size, response rate, missing data, covariates, respondent type, violence type, measurement tool, timeframe, and perpetrator); child characteristics (gender, age, disability, and comorbidities); and outcome data (estimate, CI, and SE). All estimates were extracted, irrespective of statistical significance.

We applied criteria used in the 2012 review[14] for quality appraisal (appendix 1 p 7). The quality assessment scored items related to study design, sampling strategy, measurement, statistical analyses, missing data, description of participants, and confounder adjustment. The criteria were in line with the Joanna Briggs Institute critical appraisal checklist for prevalence studies and the Joanna Briggs Institute checklists for cross-sectional, cohort, and case control studies.[22,23] Each criterion was scored to indicate the absence or presence of a study quality (ie, 0=absent *vs* 1=present). Two authors (ZF and ML) appraised the studies, with discrepancies resolved in discussion with a third author (CZ).

We extracted prevalence and odds ratio estimates. In studies without ORs, crude ORs were calculated from the raw data. We applied three-level, mixed-effects models to pool multiple estimates from each study. By accounting for correlational dependencies and between-study and within-study variance, such models reduce the risk of rejecting a true null hypothesis, avoid second-order sampling biases, and increase the amount of information that can be used from each study.[24] We used restricted maximum likelihood estimators[25] to summarise effects for prevalence and ORs separately. Knapp–Hartung[26] modifications were incorporated to further reduce type I errors. We log-transformed all estimates before synthesis and converted them back in the final reporting. Variance around estimates was calculated using 95% CIs. Heterogeneity of studies was evaluated in forest plots and quantified using I^2 statistics.

Subgroup analyses were done to investigate differences in prevalence or in OR by types of violence (physical, emotional, or sexual violence, or neglect), disability (cognitive or learning disability, mental disorder, physical or mobility impairment, sensory impairment, or chronic disease), and perpetrator (adult, peer, or intimate partner). We also explored the difference between traditional bullying (in-person physical, verbal, or relational acts, such as hitting and kicking; insults and threats; or social exclusion)[27] and cyberbullying (ie, remote intimidation via electronic device),[28] as categorised by the US Centers for Disease Control and Prevention.[29] We did additional univariate meta-regression analysis to investigate the effect of various covariates on pooled estimates of violence. The covariates were disability type; World Bank country

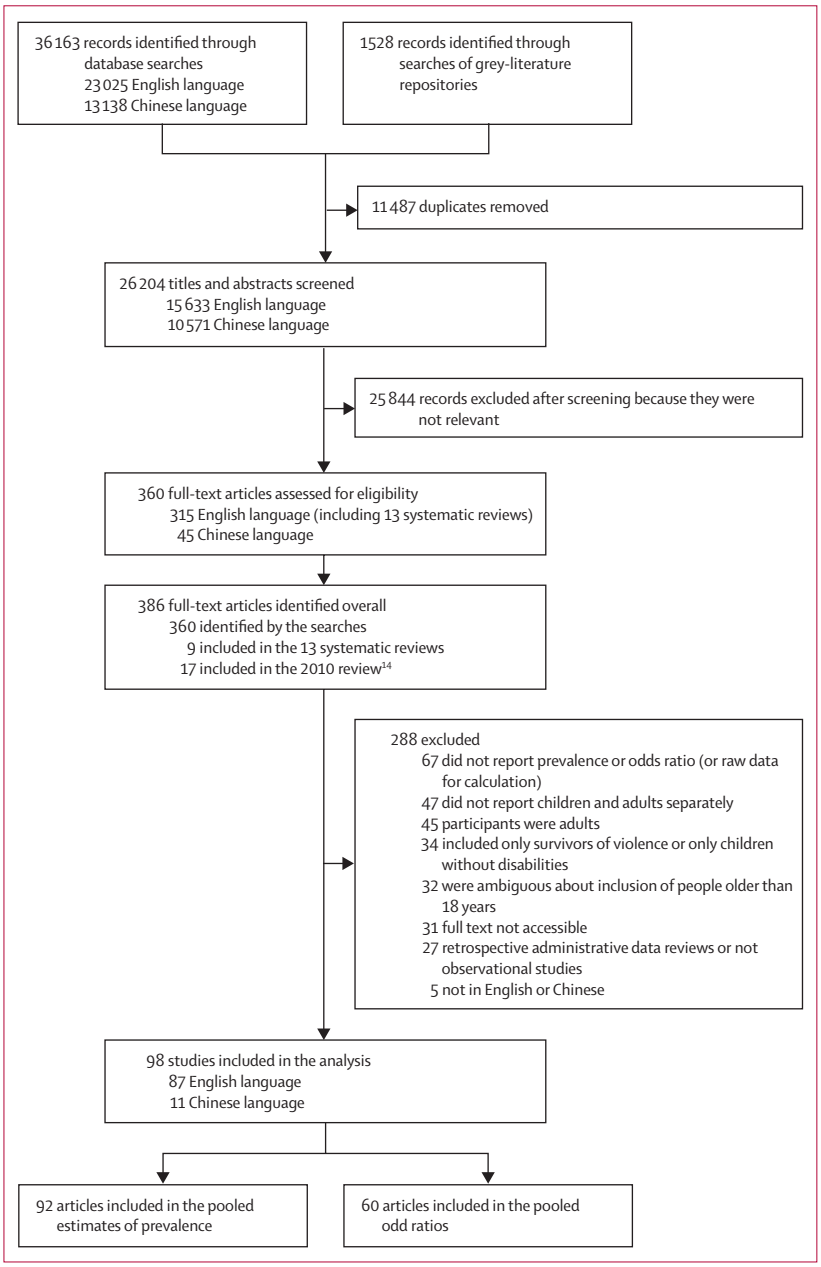

Figure: **Study selection**

income-level classification; WHO world region classification; sample size (≥100 *vs* <100); respondent type (child report *vs* caregiver report); validated tool; response rate (≥50% *vs* <50%); and quality scores (prevalence ≥4 *vs* <4 and OR ≥5 *vs* <5). We assumed a shared between-study variance, given the small number of estimates in each univariate meta-regression. Covariates with significant p values were subsequently included in a multivariate model.[30] Sensitivity analyses were done by removing studies with low quality scores and small sample sizes (ie, <100). Publication bias was assessed by examining funnel plot asymmetry and quantified using Egger's test.[31] All data analyses were done in R (version 4.0.3).

We adhered to the Cochrane guidelines[21] in doing this systematic review and meta-analysis and to PRISMA[32] for reporting the results. This study was prospectively registered in PROSPERO (CRD42020204859). This review adhered to the registered PROSPERO protocol, except for the use of three-level, mixed-effects meta-analyses; this decision was driven by the data structure of the identified studies, which included multiple estimates per outcome.

Role of the funding source

There was no funding source for this study.

Results

The search returned 36 163 records, resulting in 26 204 records after removing 11 487 duplicates. We reviewed 386 full texts, including 13 systematic reviews and nine additional articles identified within these reviews, and including 17 articles from the 2012 review.[14] We excluded eight articles from the 2012 review[14] because they involved adult participants and did not provide separate estimates for children aged 0–18 years. No evidence from the grey-literature search met the inclusion criteria. 98 studies (87 in English and 11 in Chinese; 16 831 324 children) were eligible for analysis (figure).

There were 81 cross-sectional and 17 longitudinal studies done during the period 1990–2020. 38 (39%) of 98 studies used representative sampling and 48 (49%) had a response rate higher than 50%. Sample sizes varied, ranging from 25 to 16 641 020. 44 (45%) of 98 studies were done in school settings, 31 (32%) in service agencies, 18 (18%) in communities, and the remaining five (5%) did not report the study setting. Most studies relied on child report (63 [64%] of 98) or caregiver report (27 [28%]), and four (4%) had a combination of child and caregiver report and four (4%) relied on service provider or professional report. Cognitive or learning disabilities were examined in 55 (56%) of 98 studies, mental disorders in 17 (17%) studies, physical limitations in ten (10%) studies, sensory impairments in seven (7%) studies, and chronic diseases in six (6%) studies. 25 (26%) studies reported on children with multiple types of disabilities. All except for two studies involved both boys and girls. 35 (36%) studies were done in the Americas (32 in the USA); 34 (35%) in Europe; 25 (26%) in the Western Pacific (16 in China and seven in Australia); and four (4%) in Africa or the Eastern Mediterranean (Uganda, Iran, and Lebanon). Most studies (75 [77%]) were done in high-income countries (HICs) and the remaining studies were done in upper-middle-income (21 [21%]) and low-income (2 [2%]) countries.

The studies were medium quality on average (appendix 1 pp 8–10). Reviewer agreement on quality scores was high (prevalence: weighted k 0·93 [95% CI 0·87–0·98], percentage 91·3%; OR weighted k 0·94

[95% CI 0·89–0·98], percentage 88·5%). Panels 1 and 2 summarise the types of violence and disability included in the studies.

The table summarises the pooled prevalence of violence against children with disabilities, which was assessed in 92 (94%) of the 98 studies (16 807 154 children). The overall prevalence for any type of violence was 31·7% (95% CI 27·1–36·8; I^2=99·15%). Sensitivity analyses produced similar results. The overall prevalence was 28·9% (23·2–35·3; I^2=99·51%; 56 studies) after removing studies with small sample sizes and 27·7% (22·3–33·9; I^2=99·27%; 45 studies) after removing low-quality studies. The funnel plot was asymmetrical (appendix 1 p 17), with a significant Egger's test (b=–1·91; p<0·0001), indicating a high risk of publication bias. The prevalence of experiencing violence was higher among children with mental disorders (34·4% [26·9–42·8]) or cognitive or learning disability (33·0% [27·1–39·4]) and lower among children with sensory impairments (27·4% [15·1–44·6]), physical or mobility limitations (25·6% [15·4–39·5]), or chronic diseases (20·5% [10·0–37·3]).

Prevalence differed by the type of violence. The prevalence of violence for children with disabilities was 31·7% (95% CI 20·8–45·1) for physical violence, 36·2% (26·6–47·0) for emotional violence, 11·3% (7·4–16·9) for sexual violence, and 19·4% (8·6–38·1) for neglect. The most common perpetrator was a peer through peer bullying (37·7% [31·7–44·1]), with traditional bullying (37·4% [24·6–52·2]) more prominent than cyberbullying (23·4% [14·0–36·5]). Other perpetrators included adults committing child maltreatment (26·5% [18·5–36·5]) and intimate partners (14·4% [0·4–86·9]). Children with emotional disorders and cognitive impairments were victimised more often than those with other forms of disability, across all types of violence and perpetrator, except for sexual violence and peer bullying. Children with sensory impairments (14·4% [95% CI 2·0–58·6]) and physical limitations (13·8% [2·2–53·7]) had a higher prevalence of sexual violence than children who were cognitively impaired, and children with sensory issues also experienced higher amounts of peer bullying (43·2% [21·6–67·8]). Heterogeneity was generally high, ranging from 86·16% to 99·72%, with one exception (I^2=0·00%) that might have been caused by a small sample size.

The meta-regressions showed that children with mental disorders experienced more child maltreatment (b=1·26 [95% CI 0·05–2·46]; appendix 1 p 18). Children with disabilities living in low-income countries had a substantially higher prevalence of violence than those in HICs (b=2·13 [0·37–3·88]; appendix 1 p 18). Children in Africa (b=2·47 [95% CI 0·72–4·22]), the Eastern Mediterranean (b=1·56 [0·03–3·10]), and the Western Pacific (b=0·93 [0·37–1·50]) experienced violence more frequently than children in Europe (b=–1·25 [–1·62 to –0·88]). After controlling for the country's income level, the higher prevalence of violence in the Eastern Mediterranean and Africa no longer existed (which might also have been affected by the small number of studies in those regions), whereas the Americas showed a significantly higher prevalence (b=0·52 [95% CI 0·01–1·03]). The meta-regression results suggest that no methodological factor substantially affected prevalence estimates.

Crude ORs were calculated for 39 (40%) of 98 studies and included in the analyses and overall, 60 (61%) of 98 articles (16 811 074 children) were included in the pooled ORs. The overall OR for any type of violence was 2·08 (95% CI 1·81–2·38; I^2=91·5%) for children with disabilities compared with non-disabled children (table). The OR remained roughly consistent after removing studies with small sample sizes (2·02 [1·71–2·39]; I^2=94·38%; 42 studies) and high risk of bias (1·97 [1·65–2·34]; I^2=89·8%; 30 studies). The funnel plot was asymmetric (appendix 1 p 20), and the Egger's test (b=1·34, p<0·0001) indicated potential publication bias. However, more studies were missing from areas of higher statistical significance than from areas of lower statistical significance, suggesting other causes of asymmetry.[33] The OR was higher among children with mental disorders (2·39 [1·63–3·52]) and cognitive or learning disabilities (2·35 [1·90–2·91]) than for children with physical limitations (1·93 [1·19–3·15]), sensory impairments (1·85 [1·06–3·21]), or chronic diseases (1·20 [1·07–1·34]).

Children with disabilities had increased likelihood of all forms of violence, whether physical (OR 2·16 [95% CI 1·53–3·06]), emotional (2·19 [1·67–2·87]), or sexual (2·19 [1·62–2·94]) violence, and of neglect (2·32 [0·92–5·85]),

***Panel 1*: Definitions of the types of violence and neglect included in the studies**

Physical violence
Hitting with or without tools, parental corporeal punishment, physical bullying, physical abuse, overt victimisation, discipline-related violence, or physical dating-related violence.

Emotional violence
Psychological abuse (eg, scolding), threatening or interference, witnessing intimate-partner violence, relational peer bullying, teasing, witnessing cyberbullying, social bullying, verbal bullying, online harassment, ostracism, being purposefully excluded from activities, being cursed (sworn) at, being insulted, being shouted at, or being humiliated.

Sexual violence
Sexual victimisation, online unwanted sexual solicitation, contact sexual victimisation, or non-contact sexual victimisation.

Neglect
Physical, emotional, educational, safety, or medical neglect

***Panel 2*: Types of disability diagnoses or conditions used in the studies**

Cognitive and learning disabilities
Diagnosed or subthreshold attention deficit and hyperactivity disorder (ADHD), autism spectrum disorder, intellectual disability, learning disability, severe traumatic brain injury, and borderline intellectual functioning.

Mental disorders
Any mental health problem, any internalising (emotional) and externalising (behavioural) disorder, behavioural disorders, oppositional defiant disorder, bipolar disorder, and generalised anxiety disorder.

Physical limitations
Any restriction in body movement, any mobility impairment, any physical disability, cerebral palsy, muscular dystrophy, coordination disorder, polio, spina bifida, Erb's palsy, and tic disorders.

Chronic diseases
Cystic fibrosis, chronic pain, and persistent rash or wheeze (asthma).

Sensory impairments
Visual impairment, hearing loss, deafness, and hard of hearing.

Types of multiple-disability category used by the included studies
- Developmental disabilities and concomitant psychiatric disorders
- Learning difficulties, social emotional behavioural difficulties, and developmental disabilities
- Impaired hearing, vision, motion function, dyslexia, ADHD, asthma, allergy, diabetes, epilepsy, and intestinal disease
- Impaired movement, dyslexia, vision or hearing impairment, or any other impairment that makes things difficult either in or outside of school
- Intellectual disability, cerebral palsy or orthopaedic deformity, seizure, and vision or hearing disability
- Receiving special education services
- ADHD, oppositional defiant disorder, conduct disorder, post-traumatic stress disorder, anxiety, depression, learning disorders, and intellectual disability
- Sight, hearing, mobility, or speech impairment, and epilepsy
- Emotional, behavioural, psychotic, and developmental disorder
- Any psychiatric disorder
- Mood disorders, anxiety disorders, eating disorders, hyperkinetic, conduct and tics disorders, and other disorders
- Limitations in hearing, vision, cognitive, ambulatory, self-care, and independent living
- Sensory, physical, and learning disability
- Cognitive disability, mental disorder, psychiatric problems, and chronic diseases
- ADHD, oppositional defiant disorder, autism, eating disorder, anxiety disorder, and depression
- Speech and language impairment
- Physical disabilities, long-term health problems, emotional problems, and learning disability
- Long-term illness, disability, or a medical condition which restricts participation in schooling
- Visual impairment, hearing impairment, speech defect, diabetes, mental illness, epilepsy, stomach pain, asthma, allergic rhinitis, eczema, physical dysfunction, overweight, and ADHD
- Physical disability and sensory impairment

compared with their non-disabled peers (table). ORs for children with disabilities were also higher for child maltreatment (1·95 [95% CI 1·53–2·50]), intimate partner violence (4·05 [1·22–13·4]), and peer bullying (1·85 [1·55–2·22]), including traditional bullying (1·71 [1·19–2·47]) and cyberbullying (1·19 [1·05–1·33]). Where pooled estimates were available, the odds ratios were highest among children with cognitive impairments and mental disorders, although peer bullying was again an exception and was more likely to be experienced by children with physical or mobility limitations (1·98 [95% CI 0·58–6·75]) than by those with mental disorders (1·76 [0·95–3·27]). There was high heterogeneity among studies, although this was lower for sexual violence and child maltreatment, and for children with sensory impairments and chronic diseases than for other subgroups.

See Online for appendix 2

Further meta-regressions showed that adults commonly perpetrated violence against children with cognitive disabilities (b=0·54 [95% CI 0·04–1·03]) and mental disorders (0·76 [0·14–1·38]; appendix 1 p 21). Children with cognitive disabilities were the most likely to experience emotional violence (b=0·72 [95% CI 0·19–1·25]). Children with disabilities living in upper-middle-income countries (b=0·45 [95% CI 0·12–0·79]) appeared to be more likely to experience violence than those in HICs. Study design had no significant effect on the pooled OR of any violence.

Appendix 2 shows forest plots for the included studies and the references are shown in appendix 1 (pp 23–29).

Discussion

The number of studies on violence against children with disabilities has increased substantially during the past decade. This review provides the most up-to-date synthesis of evidence to inform solutions to this urgent health and development issue. Our findings indicate that, in general, about one-third of children with disabilities are survivors of violence, and children with disabilities are more than twice as likely as their non-disabled peers to experience violence. Children with disabilities experienced higher amounts of all forms of violence across diagnosis types. Sensitivity analyses suggest a high degree of certainty in

the findings, but caution should still be exercised, given that sampling was not comprehensive across all regions and types of violence and disabilities.

Compared with the 2012 review[14] of violence against children with disabilities up to 2010 (prevalence 26·7% [95% CI 13·8–42·1]; OR 3·68 [2·56–5·29]), we identified a 5% higher prevalence (31·7% [27·1–36·8]) but a lower OR (2·08 [1·81–2·38]), which is possibly because we included a broader spectrum of violence types (eg, peer bullying and intimate partner violence; panel 1), a wider range of disabilities (eg, children with chronic diseases and special educational needs; panel 2), and a larger number of studies, including from LMICs. However, it should be noted that the OR in this study still indicates that violence against children with disabilities is a severe global issue that warrants action. In sensitivity analyses, the overall prevalence estimates after removal of small sample sizes (28·9%) and low-quality studies (27·7%) were similar to the prevalence estimate from the 2012 review.[14] However, we applied three-level, mixed-effects

	Prevalence estimates				Odds ratio estimates			
	Pooled estimate (95% CI)	Number of studies	Number of estimates	I^2	Odds ratio (95% CI)	Number of studies	Number of estimates	I^2
Any disability								
Any violence	0·317 (0·271–0·368)	92	361	99·15%	2·08 (1·81–2·38)	60	249	91·50%
Physical violence	0·317 (0·208–0·451)	33	50	98·62%	2·16 (1·53–3·06)	21	34	90·15%
Emotional violence	0·362 (0·266–0·470)	34	87	98·86%	2·19 (1·67–2·87)	26	62	91·14%
Sexual violence	0·113 (0·074–0·169)	21	39	94·98%	2·19 (1·62–2·94)	11	28	67·62%
Neglect	0·194 (0·086–0·381)	13	18	97·51%	2·32 (0·92–5·85)	8	9	88·00%
Peer bullying	0·377 (0·317–0·441)	54	169	97·96%	1·85 (1·55–2·22)	34	118	86·39%
Traditional bullying	0·374 (0·246–0·522)	16	36	97·97%	1·71 (1·19–2·47)	10	27	82·70%
Cyberbullying	0·234 (0·140–0·365)	9	20	94·91%	1·19 (1·05–1·33)	7	19	0·99%
Child maltreatment	0·265 (0·185–0·365)	29	118	98·39%	1·95 (1·53–2·50)	19	72	82·76%
Intimate partner violence	0·144 (0·004–0·869)	3	3	97·63%	4·05 (1·22–13·4)	3	3	40·17%
Multiple types of disability*								
Any violence	0·283 (0·172–0·430)	21	85	99·72%	1·72 (1·43–2·07)	17	51	89·67%
Physical violence	0·28 (0·083–0·627)	9	17	99·48%	1·46 (1·03–2·06)	8	13	86·53%
Emotional violence	0·31 (0·139–0·554)	10	26	99·54%	1·41 (1·21–1·64)	8	11	28·73%
Sexual violence	0·083 (0·039–0·170)	7	11	94·13%	1·63 (1·10–2·41)	3	5	25·01%
Neglect	0·063 (0·009–0·338)	3	4	94·99%	†	1	1	†
Peer bullying	0·465 (0·230–0·716)	10	27	99·67%	1·79 (1·46–2·19)	10	16	76·63%
Child maltreatment	0·164 (0·082–0·302)	9	39	98·90%	1·35 (1·04–1·75)	6	17	75·83%
Intimate partner violence	0·080 (0·000–1·000)	2	2	94·36%	3·38 (0·67–17·10)	2	2	0·00%
Cognitive or learning disability								
Any violence	0·330 (0·271–0·394)	51	193	97·93%	2·35 (1·90–2·91)	32	121	84·82%
Physical violence	0·353 (0·196–0·550)	17	24	97·89%	3·1 (1·62–5·93)	10	15	87·15%
Emotional violence	0·415 (0·279–0·566)	17	46	98·06%	3·32 (2·07–5·33)	13	35	92·12%
Sexual violence	0·087 (0·055–0·134)	10	16	86·80%	2·37 (1·48–3·79)	6	13	45·25%
Neglect	0·244 (0·086–0·525)	9	13	97·16%	2 (0·52–7·62)	6	7	89·75%
Peer bullying	0·368 (0·300–0·441)	33	100	97·08%	2·07 (1·54–2·78)	20	62	87·28%
Child maltreatment	0·308 (0·189–0·462)	16	59	98·09%	2·45 (1·58–3·80)	9	35	83·64%
Mental disorder								
Any violence	0·344 (0·269–0·428)	14	29	93·13%	2·39 (1·63–3·52)	14	30	89·30%
Physical violence	0·441 (0·073–0·888)	2	3	91·03%	2·25 (0·12–41·28)	3	4	87·50%
Emotional violence	0·456 (0·296–0·624)	5	7	95·30%	3·53 (1·71–7·26)	5	7	88·56%
Sexual violence	0·184 (0·026–0·653)	4	4	93·82%	2·12 (0·00–39756934·17)	2	2	88·80%
Neglect	..	..	..	..	†	1	1	†
Peer bullying	0·387 (0·275–0·514)	8	12	92·52%	1·76 (0·95–3·27)	8	16	93·57%
Child maltreatment	0·361 (0·177–0·597)	5	7	95·22%	2·27 (1·63–3·16)	4	6	17·72%
Intimate partner violence	†	1	1	..	†	1	1	..

(Table continues on next page)

	Prevalence estimates				Odds ratio estimates			
	Pooled estimate (95% CI)	Number of studies	Number of estimates	I^2	Odds ratio (95% CI)	Number of studies	Number of estimates	I^2
(Continued from previous page)								
Physical or mobility limitation								
Any violence	0·256 (0·154–0·395)	10	17	94·51%	1·93 (1·19–3·15)	6	23	86·32%
Physical violence	†	1	1	†	..	..	..	..
Emotional violence	..	..	..	..	†	1	1	†
Sexual violence	0·138 (0·022–0·537)	3	4	97·02%	1·64 (1·41–1·92)	2	7	0·00%
Peer bullying	0·335 (0·186–0·526)	6	9	90·39%	1·98 (0·58–6·75)	3	5	91·21%
Child maltreatment	0·143 (0·053–0·335)	4	5	86·16%	1·53 (1·30–1·79)	4	11	0·00%
Sensory impairment								
Any violence	0·274 (0·151–0·446)	7	23	95·88%	1·85 (1·06–3·21)	3	5	37·24%
Physical violence	0·297 (0·011–0·940)	3	3	97·81%	..	..	..	..
Emotional violence	0·251 (0–0·998)	2	3	98·57%	..	..	..	..
Sexual violence	0·144 (0·020–0·586)	3	4	90·43%	†	1	1	†
Neglect	..	..	..	..	..	..	..	..
Peer bullying	0·432 (0·216–0·678)	3	9	86·15%	†	1	2	†
Child maltreatment	0·197 (0·074–0·431)	3	7	93·08%	†	1	2	†
Chronic disease								
Any violence	0·205 (0·100–0·373)	6	14	96·00%	1·20 (1·07–1·34)	6	19	3·49%
Physical violence	0·097 (0·001–0·903)	2	2	0·00%	1·15 (0–617·3)	2	2	0·00%
Emotional violence	0·224 (0·066–0·540)	3	5	93·60%	1·22 (0·94–1·59)	3	8	29·89%
Peer bullying	0·246 (0·101–0·487)	4	12	96·89%	1·19 (1·07–1·32)	4	17	0·00%
Child maltreatment	†	1	1	†	†	1	1	†

No studies or data were found for: intimate partner violence in children with a cognitive or learning disability, a physical or mobility limitation, a sensory impairment, or a chronic disease; neglect in children with a physical or mobility limitation or a sensory impairment, or a chronic disease; or sexual violence in children with a chronic disease. We did not pool estimates for traditional and cyberbullying by disability types because of the small number of studies. *Studies that provided a combined estimate based on a sample of children who had more than one of five types of disability: cognitive or learning disability, mental disorder, physical limitation, sensory impairment, and chronic disease. †Pooled estimate not possible for a single study.

Table: **Synthesised effect estimates of the prevalence and odds ratios of violence against children with disabilities by types of disability and violence**

models, which fitted the data structure of new studies added to this review, but are not the same as the two-level models used in the previous review.[14]

Our results are consistent with previous research that shows that children with cognitive or mental health concerns tend to experience higher amounts of most forms of violence than children with other disabilities.[34] Sexual violence was experienced by more children with physical limitations and sensory impairments than by children with cognitive disabilities. Children with sensory problems also had the highest prevalence of being peer bullied. However, these results should be interpreted with caution because of the small number of studies.

Emotional violence was the most commonly reported type of violence, and neglect had the largest OR. The prominence of emotional violence might be a result of the broad definition used across the studies. However, some evidence[35] indicates that expansive definitions of violence do not lead to larger effect estimates, which would indicate that high amounts of emotional violence against children with disabilities truly exist. Children with disabilities have complex needs, which can burden caregivers and lead to instances of neglect,[36] and this can be further exacerbated if poverty strains the ability of caregivers to provide for their children.[17]

Nearly 40% of children with disabilities were bullied by peers and had higher odds of being bullied than non-disabled children (OR 1·85). Our findings were generally in line with a previous global review[37] on the bullying of children with chronic physical or sensory disabilities (OR 1·65). Subgroup analyses showed that traditional bullying and cyberbullying were both of substantial concern. Although our estimates for intimate partner violence were inconclusive, owing to the low number of studies, the exceptionally high OR of 4·05 (95% CI 1·22–13·4) highlights the need to prioritise this type of violence in further research.

The effect of disability on violence varies across cultures and contexts. Our results were consistent with existing evidence[38,39] indicating that, in general, children in LMICs have a heightened risk of violence. This risk might result from inadequate access to prevention and support services in such settings.[40] There is much less public social protection expenditure and legal protection for children in LMICs compared with in HICs, despite LMICs having a larger percentage of children within

their total populations.[41,42] The type of violence also varied by region. For example, the Western Pacific and Americas tended to have an increased prevalence of violence. Regional differences might result from harmful norms that stigmatise people with disabilities and lead to greater social tolerance of violence. These findings are speculative, as the review only included studies from two low-income countries and three African and Eastern Mediterranean countries.

This systematic review has several strengths. We used an extensive search across 21 electronic databases and 11 grey-literature repositories. Our results were supplemented by hand searching reference lists of all included studies. Chinese-language studies constituted 11% of the included literature, indicating the importance of seeking evidence in regional databases and using local languages. The 2012 review[14] called for increased evidence from outside the USA and Europe, and 23% of the studies included in our analysis were done in LMICs. Furthermore, over half of the included studies provided estimates for bullying, a pervasive problem among young people that has profound negative health consequences,[43] which provided a unique opportunity to understand the extent of this issue for children with disabilities. Our data synthesis included all eligible estimates to avoid sampling bias and used three-level models to account for correlation of estimates within each study.

Our study also had a number of limitations. Despite the increased number of studies in LMICs, those studies were still limited to seven countries. Furthermore, there were no studies from lower-middle-income countries (in which globally, the largest number of people reside and face a severe shortage of resources) or southeast or central Asia, Russia, or parts of eastern Europe. Most studies adopted a cross-sectional design, indicating the possibility of reverse causation. Having a disability might cause one to experience violence, but violence can also cause some disabilities. There was substantial unexplained heterogeneity, and the meta-regression showed that different contexts, methodological features, and types of disability could have influenced the estimates. Differences in child characteristics (eg, gender and age) might also have contributed to the variation, but we were unable to assess their effect because of the mixture of boys and girls and the wide age range in most studies. Inconsistent definitions and measures of violence and disability undermined our ability to compare studies, which was exacerbated by two-fifths of studies using unvalidated instruments to measure violence, and one-fifth including disabilities that were not clinically screened.

Only 61% of the studies that produced ORs compared children with disabilities with their non-disabled peers, and the remaining studies did not report having ruled out disabilities other than the one of interest in the comparison group. Only 30% of studies controlled for confounding factors and 40% used representative samples, reducing our ability to establish whether the high amounts of violence were because of disability or other factors. In addition, there was a low number of studies measuring violence perpetrated by intimate partners and authority figures. Children with chronic diseases, sensory impairments, and mobility limitations were also under-represented. The studies included relied on child-reports and caregiver-reports, which can be subject to recall bias and social-desirability bias and can be influenced by cognitive limitations. Finally, our search was done in September, 2020, and relevant studies have been published subsequently that are not included in this review. Overall, the subsequent studies are consistent with the findings of the current review. For example, one study published in 2021[44] showed a higher risk of peer victimisation in Chilean children with disabilities than in non-disabled children. This issue illustrates the importance of regularly updating reviews in rapidly growing knowledge areas. Our search was also limited to studies published in English and Chinese, which omitted those published in other commonly spoken and locally-specific languages.[19,45]

This review suggests that children with disabilities remain a vulnerable population who have a high risk of experiencing violence. We call for active engagement and partnerships between policy makers, practitioners, and researchers to improve the prevention and identification of violence. Consistent with the mapping review done by Winters and colleagues,[46] our study highlights the scarcity of studies from LMICs, in which there might be a convergence of contextual factors that increases violence against children with disabilities. LMICs have multiple conflicting priorities in terms of health and social spending. Nevertheless, further investment and improved legal frameworks should be established to prevent violence against children with disabilities. LMICs have much to gain from taking such action, given the large percentage of children with disabilities within their populations and substantial disability-adjusted life-years lost to violence.[3,5] It is crucial that evidence-based solutions (eg, the INSPIRE strategies[47]) are prioritised and that national funding is provided to target the poorest groups, who are likely to have the fewest resources through which to access care. In-service training about the specific vulnerabilities of children with disabilities should be offered to service providers. Service provision should be holistic, and multidisciplinary teams that can address the complex medical, psychological, and socioeconomic needs of children with disabilities and their families could be particularly effective. Evidence-based parenting programmes have been useful in protecting children from violence in the home environment and can be scaled up or adapted to LMIC contexts.[20,45] The high prevalence of bullying underscores the importance of targeting school and online settings to prevent violence and facilitate social participation.

Future research should use robust study designs that include a sufficient number of respondents, aim to be

representative, use validated violence scales, include clinical assessments of disability and severity, and assess violence at multiple timepoints and in different types of respondents, to facilitate understanding of the causal relationships between violence and disability. The breadth of research should be increased in LMICs, to involve a larger number of children with physical limitations, sensory impairments, and chronic diseases, to examine sexual violence, and to investigate violence perpetrated by service providers and intimate partners. Additionally, we call for a synthesis of the effectiveness of existing interventions to further inform policy and practice.

Contributors

ZF, JB, JML, and ICT conceptualised the study. ZF and ICT built and did the searches. ZF and CZ did the screening, with discrepancies resolved in discussion with ML. ZF and ML extracted the data and appraised study quality, with discrepancies resolved in discussion with CZ. ZF did the statistical analysis, and ICT checked the code. ZF wrote the manuscript, and ICT revised the first draft. All authors had access to the data reported in the study. ZF, JML, and JB verified the data. All authors contributed to the review of the article and approved the final version.

Declaration of interests

We declare no competing interests.

Data sharing

The data included in this study and the analytic code will be made available on Article publication to researchers on request (email: fangzuyi@bnu.edu.cn).

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