The Prevalence and Risk Factors of Autistic Experiences of Interpersonal Violence: A Systematic Review and Meta-Analysis

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Research Article

Keywords: Autism spectrum disorder, violence, victimisation, gender, intersectionality, prevalence, risk factors, systematic review, meta-analysis, multiple minority theory

Posted Date: November 23rd, 2022

DOI: https://doi.org/10.21203/rs.3.rs-2286120/v1

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Abstract

Background: Interpersonal violence is a widespread yet understudied issue in autism spectrum disorder (henceforth, ‘autism’). While the multiple minority stress model suggests gender marginalised groups (e.g., females, transgender, non-binary) are at greater risk, research investigating this model among autistic populations is limited. The current review and meta-analysis examined the prevalence and risk factors associated with interpersonal violence among autistic individuals of varying gender identities.

Methods: A systematic database search identified 42 studies examining: (1) a combination of physical, sexual, or psychological violence; (2) physical violence; (3) sexual violence; (4) psychological violence; (5) traditional bullying; (6) cyberbullying; and (7) homicide among autistic people across all age groups and support needs levels, compared by gender. A random-effects meta-analysis with pooled data from 13 eligible studies was undertaken, comprising 4,498 participants (males $n = 3,472$; females $n = 1,026$) aged between 2 to 56 years.

Results: Analyses indicated overall violence prevalence is increased among females compared to males, $d = 0.44$, $p < .001$; 95% CI [0.24, 0.65], across all ages and support needs levels. The largest effect was for childhood maltreatment and negative social events during adulthood, $d = 1.07$, $p < .05$, [0.20, 1.93]. Narrative synthesis of 37 studies indicated autistic people were significantly more likely to be victimised by carers and peers compared to non-autistic people. Key risk factors included belonging to a gender or racial minority, having co-occurring mental health issues, and coming from a low-income household.

Limitations: The generalisability of findings was limited by the shortage of literature about autistic experiences of violence not involving bullying, participants with high needs, and participants outside of the binary gender. This may also contribute to the high level of heterogeneity ($I^2 = 87\%$) found.

Conclusions: The results of this review and meta-analysis indicate that interpersonal violence is a pressing issue among autistic people, who appear to face concerningly high rates of victimisation and poly-victimisation across the life course, particularly among multiply marginalised people (i.e., gender, race, mental health, economic). This underscores the importance of exploring violence from an intersectional perspective, across individual and societal contexts, providing support for multiple minority theory.

Lay Summary

Interpersonal violence is commonly experienced by autistic people, with gender influencing the amount and type of violence experienced. We wanted to better understand violence prevalence and what increases its likelihood. We found high rates of victimisation and repeat victimisation among autistic, compared to non-autistic peers, with females being more likely to be victimised than males. Being further marginalised (gender, race, economic, and mental illness) increased risk, emphasising the need to examine these issues across personal and social contexts, different age groups, and by applying intersectionality.
The Prevalence and Risk Factors of Autistic Experiences of Interpersonal Violence: A Systematic Review and Meta-Analysis

Interpersonal violence is a pervasive public health and human rights issue of critical importance\(^1,2\), and a leading cause of mortality among young people in many regions around the world\(^2,3\). Emerging evidence suggests interpersonal violence is highly prevalent in autism spectrum disorder (henceforth, ‘autism’)\(^4\), indicating autistic people are significantly more likely to be victimised compared to the general population\(^5–10\). This risk is further increased among autistic gender marginalised groups, who share the twin discriminators of gender and disability, rendering this population particularly vulnerable\(^11,12\). Given the complex nature of autism, disability, gender, and violence, interventions designed to address this crisis should be informed by an improved understanding of factors, both individual and societal, that increase the prevalence and risk of interpersonal violence among autistic populations.

Background

Autistic Experiences Of Interpersonal Violence

Issues surrounding violence are particularly relevant for autistic people, who experience the intersectional effects of autism characteristics (particularly social functioning challenges\(^13\)) and social attitudinal barriers\(^14\), serving to increase this population’s vulnerability towards varying forms of violence\(^11,15\). This approach acknowledges that disability is relative, and reflects the disadvantage that occurs when natural occurring variations in ability are a poor fit with hegemonic social standards\(^16–18\). In this sense, autistic experiences of violence contribute to disability itself. For example, emotional regulation challenges\(^19\) and cognitive and behavioural rigidity\(^20\) often observed in autism can lead to impulsive emotional outbursts, aggression, or meltdowns\(^21,22\). Such behaviours may increase risk of violence, particularly within disparate-power relationships, due to the tendency for these outbursts to be perceived as deliberate or to reflect defiance\(^23\). Furthermore, socio-communication impairments, such as reduced social inference ability\(^24\) or difficulty with receptive and expressive speech\(^25\), may present barriers to disclosing violence and accessing appropriate treatments or justice\(^15,26\), potentially increasing susceptibility to multiple violations by repeat offenders\(^27\). Importantly, being autistic not only increases one’s vulnerability towards a specific violent event, but may also increase chronicity and constancy of violent events\(^6,27\) within the broader context of additional, ongoing, stress-inducing interpersonal challenges\(^28\).

Research suggests a relationship between gender and vulnerability to violence, specifically the type of violence experienced among disabled populations (see Namatovu et al.\(^31\)). This highlights the intersectionality between gender and disability within the context of violence. For example, recent survey data of more than 18,000 disabled people in Denmark aged 16 to 65 years old found physically disabled men were more likely to experience physical violence and threats while mentally and physically disabled women were more likely to report sexual violence and discrimination, relative to their male and female
counterparts\textsuperscript{11}. Another survey of 350 developmentally disabled adults in the United States found, when compared to men, women were almost three times more likely to report sexual abuse and identify their intimate partner as their abuser\textsuperscript{15}. These gender patterns are echoed in autism research. A systematic review of 27 publications examining sexuality among autistic people with low needs suggest an increased risk of sexual victimisation and abuse among females, relative to males and non-autistic individuals\textsuperscript{32}. Notably, when compared to non-autistic females, autistic females have been found to have heightened vulnerability to a range of adverse interpersonal encounters, encompassing various forms of physical, sexual, and psychological violence\textsuperscript{6,24,33}. These findings indicate the importance of examining the role of gender in relation to prevalence and risk of autistic experiences of violence, necessitating the need for a systematic and meta-analytic integration of findings in this area.

**Biopsychosocial, Life Course, And Social-ecological Frameworks**

To better frame the complexity of risk associated with autistic experiences of violence, we propose the use of two theoretical frameworks, a biopsychosocial\textsuperscript{34} and social-ecological framework\textsuperscript{35}. These frameworks are commonly used to understand the myriad of factors, both internal and external to an individual, that influence risk of interpersonal violence. For example, in addition to the nuanced relationship between disability, gender, and violence discussed above, unique challenges associated with being autistic (e.g., difficulty with social inference ability and forming relationships) may exacerbate this populations’ vulnerability to potential abuse\textsuperscript{5,36,37}. This can be observed by the intersectional effects of individual and social factors that influence autistic experiences of interpersonal violence, necessitating the need to apply various frameworks to better understand this phenomenon. At an individual-level, a biopsychosocial framework may be used to gain insight into the biological, psychological, and social risk factors of violence for autistic people. A social-ecological framework then enables an understanding of how broader factors beyond individual-level factors (i.e., relationship, community, societal) may interact to influence risk of violence exposure within autism. Finally, such factors may be framed within a life course model\textsuperscript{38}, which describes how developmental processes influence risk at different life stages, for example, in early childhood versus adolescence.

**Individual Factors**

The biopsychosocial model\textsuperscript{34} predicts that health concerns result from a disturbance between biological processes, psychological constructs, and environmental factors. This is particularly true if victimisation is framed in relation to exposure to risk\textsuperscript{39}, such that risk of violence is a function of specific characteristics of the victim, the presence of a motivated offender, and the absence of a capable guardian\textsuperscript{40}. In line with these considerations, differences in neuroanatomical function and structure in autistic populations (for review, see Ecker et al.\textsuperscript{41}) contribute to psychosocial processes that increase the risk of victimisation in autism. For example, autistic individuals are more likely to have difficulty identifying and expressing emotions\textsuperscript{42} and display reduced social inference skills\textsuperscript{24} which limit their ability to identify and negotiate
high-risk situations\textsuperscript{36}. Low self-esteem\textsuperscript{43} and lack of sexual knowledge\textsuperscript{5} often evident in autism, can also increase acquiescence to increase the likelihood of victimisation.

Importantly, autism-related challenges may also intersect with gender to further increase violence risk among autistic gender marginalised groups. Increasing evidence suggests autistic individuals are more likely to identify as \textit{gender non-conforming}\textsuperscript{44–46}, potentially increasing the likelihood of experiencing hostile stressors (e.g., violence), because they are a minority within a minority. According to the minority stress model\textsuperscript{47}, individuals with a minority identity experience additional daily stressors and difficulty compared to individuals in the mainstream population. These stressors are amplified by \textit{multiple minority identities}, such as being autistic and belonging to a gender minority (e.g., female, non-binary)\textsuperscript{48}. In support of this model, gender marginalised groups have been found to be at heightened risk for victimisation in the general population\textsuperscript{49, 50}. Although evidence in autistic samples is scarce, there is limited preliminary evidence of multiple marginalised groups increasing risk of unwanted sexual experience in autistic gay women\textsuperscript{51}, and violence in autistic non-cisgender males\textsuperscript{32, 37}.

**Social Factors**

The biopsychosocial challenges experienced by autistic people manifest within the broader social context of discrimination and disadvantage\textsuperscript{12, 15}, and can be framed within a social-ecological model\textsuperscript{35}. At an individual-level, autistic people may be presented with fewer opportunities for formal sexual health or sexuality education\textsuperscript{5, 52}, often leading to an increased likelihood of being sexually abused or exploited\textsuperscript{5, 53}. At a relationship-level, violence can occur within disparate power relationships or dependent relationships, leading to difficulties in reporting or escaping violence if the perpetrator is a carer or partner\textsuperscript{54}. Community-level challenges arise from a general lack of training among police on how to interact with autistic people, which can lead to communication challenges and negative experiences if autistic victims do report a crime\textsuperscript{55–57}. Broader societal structural barriers include a lack of political attention and public awareness regarding victimisation among disabled people, and a lack of access to appropriate violence support services\textsuperscript{12, 26, 31, 58}. Finally, existing laws, policies, and practices routinely deny or inhibit the legal capacity of disabled people, whilst creating barriers to justice\textsuperscript{26}.

As an initial step towards understanding the heightened vulnerability of autistic people towards victimisation, we conducted the first systematic review and meta-analysis of autistic experiences of interpersonal violence that incorporates contextual and comprehensive frameworks to examine both prevalence and risk. To date, previous systematic findings have focused solely on the prevalence of victimisation in autism\textsuperscript{4}, and the nature of adverse sexual experiences (e.g., regretted sexual encounters, consenting to an unwanted sexual event, and unwanted sex or sexual advances) among autistic males and females\textsuperscript{32}. Such findings highlight the heightened vulnerability of autistic populations towards violence experiences and underline the need for a review that applies intersectionality to examine autistic experiences of violence across multiple contexts among all age groups and levels of autism support.
needs. Specifically, this review aimed to examine interpersonal violence among autistic individuals of varying gender identities through a minority-stress lens, in relation to what types of violence are more prevalent, and the biopsychosocial and socio-ecological risk factors associated with these experiences.

Method

Protocols and Registration

The current systematic review was registered with the International Prospective Registry of Systematic Review in July 2021, under registration number CRD42021252481. Our search strategy was part of a larger systematic review examining autistic experiences of interpersonal violence. This systematic review adheres to PRISMA guidelines.59

Study Eligibility Criteria

We conducted a comprehensive synthesis of all available literature on autistic experiences of interpersonal violence. All studies of varying methodologies and designs were included if their findings mentioned participants being exposed (i.e., subject or witness to) to interpersonal violence, defined as any act resulting in physical, sexual, or psychological violence that occurs between individuals.60 This was for comparative groups of autistic people of varying gender identities, of any age, and any level of support needs, including participants diagnosed with or without co-occurring intellectual disability (ID; i.e., an average Intelligence Quotient [IQ] of less than 70). Studies were included that measured interpersonal violence using reliable and validated instruments. Studies were also included if they measured interpersonal violence using alternative measures, such as study-specific, novel questionnaires, structured and semi-structured interviews, and parent report measures. Reviews, opinion pieces, theses, animal studies, editorials, commentaries, case studies, conference abstracts, and studies written in a language other than English were excluded. Studies were also excluded if data on interpersonal violence were not differentiated by the participants gender, or if they included participants with other disabilities (e.g., Attention-Deficit Hyperactivity Disorder [ADHD]) and results pertaining to autistic participants were not clearly differentiated.

Information Sources

Studies were identified by a systematic database search of MEDLINE Complete, Excerpta Medica Database (EMBASE), SocINDEX, Cumulative Index of Nursing and Allied Health Literature (CINAHL), PsycINFO, and Web of Science. Reference lists of included studies were also reviewed to identify any further relevant studies. No restrictions were placed on publication date. The search syntax that was used included synonyms for the following terms: (a) autism; (b) interpersonal violence; and (c) participant gender. The first reviewer conducted the initial database search in June 2021. The full electronic search
strategy of the reported databases is listed in Table 1, while study selection and data extraction are provided in Additional File 1: Expanded Methods.
<table>
<thead>
<tr>
<th>Outcome</th>
<th>Descriptor</th>
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<tbody>
<tr>
<td>Search for autism</td>
<td>1. “Autism Spectrum Disorder*”</td>
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<tr>
<td></td>
<td>2. “Pervasive Developmental Disorder?Not Otherwise Specified”</td>
</tr>
<tr>
<td></td>
<td>3. Autis*</td>
</tr>
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<td></td>
<td>4. ASD</td>
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<td>5. ASC</td>
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<td>6. PDD?NOS</td>
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<td></td>
<td>7. Asperger*</td>
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<td>8. OR 1–7</td>
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<tr>
<td>Search for interpersonal violence</td>
<td>9. Violen*</td>
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<td></td>
<td>10. Abus*</td>
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<td></td>
<td>11. Assault*</td>
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<td>12. ((Negative OR Adverse) N5 (Experience* OR Encounter*))</td>
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<td>13. Victim*</td>
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<td>14. Stalk*</td>
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<td>15. Rape*</td>
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<td>18. Trauma*</td>
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Summary Measures And Statistical Analysis

To examine the overall prevalence of interpersonal violence among autistic males and females, subgroup analyses were conducted on each interpersonal violence variable that was examined by more than two studies of comparable designs. As meta-analyses relying upon a small number of studies have low power to detect heterogeneity, a random effects meta-analysis was utilised in all analyses.\(^{59}\)

The effect sizes of all relevant variables extracted from the included studies were converted to standardised mean group difference (Cohen's \(d[95\% \text{ CI}]\)\(^{62}\)). For studies that did not report an effect size, we computed effect sizes from available data. The inverse variance statistical method with a 95% confidence interval was computed using Review Manager, Version 5.4.1\(^{63}\). Heterogeneity was determined through interpretation of the Cochrane's \(Q\) and \(I^2\) statistics. For variables where meta-analysis was not possible, a narrative synthesis of all relevant variables in included studies is provided. Key risk factors associated with autistic experiences of interpersonal violence are reported via a narrative synthesis of the results of all included studies. Participant’s socio-demographic characteristics included in the studies (e.g., gender, sexual identity, racial-ethnic identity, age) are reported in Table 2.

Results
Study Selection

The initial database search yielded a total of 8,356 studies. Following the removal of 2,996 duplicates, 166 articles were identified for full-text screening and 42 articles were retained for inclusion (see Fig. 1).

Study Characteristics: Methods and Participants

All studies retained for quantitative synthesis ($n = 13$) were published between 2005 and 2021, observational in nature, and utilised cross-sectional designs. Overall, these articles included findings from 4,498 participants (males, $n = 3,472$; females, $n = 1,026$; transgender, $n = 0$; nonbinary, $n = 0$) with high support needs (i.e., with co-occurring ID) or low support needs (i.e., without co-occurring ID), and participants for whom autism needs level was not reported. Autistic participants included children, adolescents, and adults, with ages ranging from 2 to 56 years. Among the 13 studies included for meta-analysis, four analysed self-report data, five analysed caregiver reports, one analysed peer report data, one examined data screened from child protection service (CPS) records, and two examined both caregiver- and self-report data.

All participants in studies included for quantitative synthesis had either obtained a formal diagnosis of autism or had reported a suspected autism diagnosis. For methods of diagnosis outlined by the studies, see Table 2.

Study Characteristics: Exposures and Outcomes

Meta-analysis was conducted examining the prevalence of interpersonal violence among autistic males and females. Subgroup analyses were conducted on each form of violence that was examined by two or more studies retained for quantitative synthesis. Among these studies, five forms of violence were identified, including: (1) a combination of physical, sexual, or psychological violence; (2) physical violence; (3) sexual violence; (4) traditional bullying; and (5) cyberbullying. Exploratory subgroup analyses were conducted in relation to age and level of autism support needs. Studies examining age were grouped into those analysing: (1) children; (2) adolescents; (3) children and adolescents; and (4) adults. Among subgroup analyses exploring level of support needs, there were two groups: (1) participants both with high needs and low needs, or participants with support needs not specified (N/S); and (2) participants with low needs.

Synthesis Of Results

The subgroup analyses examining various forms of interpersonal violence among autistic males and females found significant gender differences for all five types of violence. Significant gender differences in the prevalence of violence were also found in the exploratory subgroup analyses examining age and autism needs.

Gender Differences in Violence Prevalence
Overall, interpersonal violence was significantly higher among autistic females than autistic males, $d = 0.44$, $p < .001$; CI $[0.24, 0.65]$, across all five subgroup analyses, with a moderate effect size (see Forest Plot in Fig. 2a). The strongest effect was observed in relation to a combination of physical, sexual, or psychological violence with a large effect size, $d = 1.07$, $p < .05$, $[0.20, 1.93]$. This was followed by a large effect for sexual violence, $d = 0.83$, $p < .001$, $[0.60, 1.06]$, followed by an approaching moderate effect for cyberbullying, $d = 0.49$, $p < .01$, $[0.14, 0.84]$, and weak effects for traditional bullying, $d = 0.14$, $p < .01$, $[0.04, 0.25]$, and physical violence, $d = 0.14$, $p > .05$, $[0.01, 0.28]$. This pattern held in follow-up analyses of studies examining gender differences in violence prevalence across the lifetime and within the past year for all violence types, except physical violence (see Fig. 2b).

**Gender Differences in Violence Prevalence by Age and Autism Support Needs**

Exploratory subgroup analyses examining gender differences in violence prevalence by age (see Fig. 2c) found autistic females to be significantly more likely than autistic males to experience violence across all age groups: childhood, $d = 0.61$, $p < .05$, $[0.03, 1.20]$, childhood and adolescence, $d = 0.19$, $p < .01$, $[0.07, 0.31]$, adolescence, $d = 0.15$, $p < .05$, $[0.01, 0.29]$, and adulthood, $d = 0.93$, $p < .001$ $[0.27, 1.60]$. Autistic females were also significantly more likely to be victimised than autistic males among children and adults throughout the lifetime and among children and adolescents within the past year (see Fig. 2d). This pattern held regardless of level of autism support needs (see Fig. 2e), with autistic females significantly more likely than autistic males to be victimised among those with low needs, $d = 0.47$, $p < .01$, $[0.15, 0.79]$, and those with high or low needs, $d = 0.37$, $p < .01$, $[0.12, 0.63]$. Further analyses found this also held across the lifetime; however, no significant gender differences were found among those with low needs within the past year, $d = 0.16$, $p > .05$, $[-0.05, 0.38]$ (see Fig. 2f).

**Homogeneity Analysis**

When assessing homogeneity (using $\chi^2$), a significant ($p < .001$) and high level of heterogeneity ($I^2 = 94\%$; cf. Higgins et al.\textsuperscript{65}) was found for the combined physical, sexual, or psychological violence subgroup analysis. While this may be explained by the small number of studies included and high variation between them in this subgroup analysis\textsuperscript{59}, it was not the only analysis with a small number of studies. The heterogeneity of results likely arose from variability in outcome measurements\textsuperscript{66}. These involved a combination of physical, sexual, or psychological violence. Because stringent methods were undertaken to ensure these studies were representative of current published findings in this area, and as findings follow a consistent trend and direction, we suggest the results be included, yet interpreted cautiously. The remaining four meta-analyses contained low levels of heterogeneity, ranging from 0–36%. The results of each meta-analyses including pooled mean effect size estimates $d$ 95% CI, and results pertaining to heterogeneity are presented in Figs. 2a to 2f.

**Risk Factors of Violence**
Risk factors of violence were examined via qualitative synthesis of 37 studies. These studies used quantitative \((n = 33)\), qualitative \((n = 3)\), and mixed methods designs \((n = 1)\), and included findings from 13,158 autistic participants, 261,849 non-autistic participants, and 99 medical professionals. Of these studies, data were obtained via the news media \((n = 1)\), CPS records \((n = 1)\), text-mining of police reports \((n = 1)\), self-report \((n = 10)\), caregiver-report \((n = 13)\), caregiver- and self-report \((n = 6)\), peer-report \((n = 2)\), semi-structured interviews \((n = 2)\), and a qualitative survey \((n = 1)\). A summary of the key risk factors of violence in autism identified by this review is provided below. For a detailed summary of risk factors of each form of violence see Additional File 1: Expanded Results.

**Individual Factors.** There were several individual-level risk factors of note. First, being autistic was associated with a significantly increased risk of experiencing childhood maltreatment\(^{67,68}\), domestic violence\(^{69}\), adverse social encounters\(^6\), and sexual victimisation\(^5,70\), compared to non-autistic controls. Autism-related challenges found to increase risk involved emotional dysregulation and behavioural rigidity (i.e., frequent meltdowns, rigid-rule keeping, self-injury\(^{71}\), resistance to change\(^{72}\)), and social impairments (i.e., social vulnerability\(^{73,74}\), reduced risk awareness\(^{75,76}\), relationship issues\(^{74,77-80}\)). Co-occurrence of mental health conditions with autism also increased risk, including internalising symptoms (e.g., anxiety, depression, withdrawn\(^{73,80-82}\)), externalising behaviours (e.g., co-occurring ADHD\(^{82,83}\), oppositional defiant disorder [ODD] symptoms\(^{84-86}\)), and having two or more co-occurring mental health conditions\(^79\). Finally, belonging to a gender (i.e., transgender, non-binary, female)\(^{37,53,70,76}\) or racial marginalised group\(^{72,79}\) significantly increased risk of violence.

**Social Factors.** Social-level factors identified by this review highlight the role of carer and peer relationships in autistic experiences of violence. In particular, autistic people were significantly more likely to be victimised by both caregivers\(^{69}\) and peers\(^{80,87}\) compared to non-autistic people. Risk factors for caregiver violence included caregiver reports of being overwhelmed by stress, reacting to the child’s behaviour, perceiving the child as difficult to manage or restricting their life, and not wanting an autistic child\(^{88}\). Risk factors of peer victimisation included attending a public school\(^{79,83}\), having a lack of school support\(^{79}\), and coming from a low-income household\(^{72,82}\).

**Risk Of Bias Across Studies: Publication Bias**

High levels of heterogeneity were observed in the meta-analyses investigating gender differences in interpersonal violence prevalence in autism by various types of violence, \(I^2 = 87\%\), \(p < .001\), and by age and autism severity, \(I^2 = 82\%\), \(p < .001\). This heterogeneity was further explored through inspection of funnel plots, each of which were asymmetrical, indicating susceptibility to publication bias (see Figs. 3a, 3b, 3c). As rigorous efforts were undertaken to include all relevant studies, this is likely attributable to the limited number of studies on this topic. Given these levels of heterogeneity, caution should be exercised when interpreting the results of this meta-analysis.
Discussion

This systematic review and meta-analysis summarised the prevalence and risk factors of autistic experiences of interpersonal violence, compared by gender. Overall, significant gender differences were found in violence prevalence, with findings identifying the enhanced vulnerability of gender marginalised groups (i.e., transgender, non-binary, female), compared to males. Key risk factors of violence were identified by applying biopsychosocial and socio-ecological level frameworks and involving the intersectional effects of autism-related characteristics and gender. This was examined within the broader societal context of discrimination and disadvantage. Our findings highlight interpersonal violence as a critical issue within autism, emphasising the importance of examining such issues through an intersectional lens, and lending support for the appropriateness of applying multiple minority theory in this area.

Prevalence Of Interpersonal Violence

As shown in Table 2, findings suggest a high prevalence of lifetime violence within autism. This included multiple forms of victimisation (88.3%), physical violence (13–64.3%), sexual violence (8–78%), psychological violence (12–82%), child abuse (30.8–50.4%), and traditional bullying (40.4–80%). Among autistic children who experienced any form of violence, 92% had been victimised more than once in the past year\textsuperscript{89}, suggesting autistic populations are vulnerable to concerningly high rates of repeated victimisation. These findings are similar to those outlined in a recent meta-analysis examining the prevalence of various forms of lifetime victimisation in autism\textsuperscript{4}. Our review identified individuals at greater risk of violence had co-occurring mental health issues, belonged to a racial minority, or came from lower income households. Collectively, our findings confirm interpersonal violence to be a highly prevalent issue for the autistic community, indicating a high likelihood of victimisation and poly-victimisation across the lifetime, particularly among marginalised individuals, regardless of gender.

Gender

Our analysis found significant gender differences in the prevalence of violence, whereby females face increased risk, across all forms of violence than do males. As seen in Fig. 2a, the strongest association was observed for combined forms of abuse (including childhood maltreatment and negative social events in adulthood), followed by sexual violence, cyberbullying, traditional bullying, and physical violence. These findings conflict with those found in both general\textsuperscript{90,91} and disabled populations\textsuperscript{11,15} showing the female gender bias holds only in specific forms of violence (i.e., sexual victimisation and cybervictimisation). A further point of interest is the failure of others to find gender differences in rates of overall abuse among non-autistic controls\textsuperscript{6,67}, and developmentally disabled people\textsuperscript{15}. Our findings suggest that there may be something special about autism, rather than disability, that place females at higher risk of violence. That is, the intersectional effects of belonging to an autistic identity and female gender heightens risk of experiencing violence, relative to other disabled, and non-disabled populations.
Limited included studies measured gender outside of binary labels; however, the few findings that were available indicate particular vulnerability among these groups. Autistic transgender, non-binary, and genderqueer participants were significantly more likely to experience sexual violence than autistic cis-gender males\textsuperscript{37}, and reported severe gendered harassment, exclusion, and threats\textsuperscript{92}. These findings reflect those found among disabled\textsuperscript{93, 94} and general population research\textsuperscript{50, 95, 96} indicating the heightened vulnerability of gender minorities across various forms of violence. Our findings are preliminary, but concerning, and warrant further investigation into the nature and risk of violence among autistic gender marginalised groups.

**Exploratory Analyses: Age and Level of Autism Support Needs**

Our exploratory analyses on gender differences in violence prevalence by age provide context as to how different developmental periods influence risk of violence among autistic males and females. Females were significantly more vulnerable to violence than males across all age groups, regardless of whether the victimisation was reported to have occurred across the lifetime or within the past year. As shown in Fig. 2d, the large effect size in adulthood indicates autistic women are significantly more likely to have cumulative lifetime experiences of violence compared to autistic men. However, a moderate effect observed during childhood suggests this to be a critical period of increased violence risk among females, in particular. It is unclear why this difference attenuated during adolescence and within the past year, given the greater severity of co-occurring mental health issues\textsuperscript{97} and increased socio-communicative functioning challenges exhibited by females than males during this period\textsuperscript{98, 99}, which, according to our findings, act as additional risk factors for victimisation. Future research would benefit from examining the influence of gender on lifetime violence experiences, particularly during the formative years and the transitionary period to adolescence.

Exploratory analyses regarding gender differences in violence prevalence by level of autism support needs were also informative. Females were found to be significantly more at risk of violence than males among those with both high or low support needs (see Fig. 2e), with a large effect found for lifetime victimisation (see Fig. 2f). Although initial, these findings highlight the necessity of applying a lens of intersectionality to examine disability characteristics and gender in relation to their influence on violence experiences across the life course. The lack of studies separating the prevalence and risk factors of violence in autistic participants with high and low needs, highlight the lack of awareness within the research community of the need to explore potentially confounding factors, reflecting intersectionality, that influence risk. Autistic people with ID face reduced risk awareness\textsuperscript{75} and difficulty adequately verbalising such experiences\textsuperscript{100}, placing them at high risk of violence; this needs to be empirically validated and subsequently addressed.

**Risk Factors Of Interpersonal Violence**
While existing literature largely attributes victimisation to environmental factors\textsuperscript{101,102}, the findings of this review propose increased violence risk occurs due to an interaction between biopsychosocial factors, contributing to challenges unique to the autistic experience. Risk was found to occur across multiple levels and appears to involve an interaction between genetic predisposition\textsuperscript{103}, autism-related characteristics, and associated challenges (e.g., difficulties with interpersonal functioning and mental health), occurring within the context of immediate and broader social disadvantage. For this population, such risk increases not only the likelihood of violence experiences, but also their frequency, type, and severity, whereby the nature of which varies across the life course. These findings suggest neither biological, nor social factors alone can explain the enhanced vulnerability towards violence within autism, and underscore the importance of adopting a biopsychosocial perspective, socio-ecological framework, and life course perspective to understand the complexity of such experiences.

**Individual Risk: Biopsychosocial Factors**

**Autism-related factors.** Specific autism profiles may be particularly vulnerable to violence. First, we suggest that risk was related to the level of conformity with societal standards or normative, \textit{able-bodied}, behaviour which increased risk of targeting\textsuperscript{77,104}; these include young age\textsuperscript{73,105}, a greater amount of autistic traits\textsuperscript{68,79,88,106}, low-support, relative to higher-support needs\textsuperscript{79,82,105}, verbal versus no verbal communication ability\textsuperscript{83}, and rigid behaviours, including rigid-rule keeping\textsuperscript{71} and resistance to change\textsuperscript{72}. Second, victimisation was linked to social functioning, and is consistent with risk factors identified in general population victimisation literature; for example, social isolation, intra-individual characteristics (e.g., mental health issues), and health-related factors (e.g., functional impairment)\textsuperscript{46,107}. Specific challenges identified in our review relate to socio-communicative functioning (i.e., difficulty forming and maintaining quality social relationships\textsuperscript{73,74,77–80}, impairment in social communication\textsuperscript{72,86}) and reduced risk awareness, demonstrated by a lack of sexual knowledge\textsuperscript{5} and diminished likelihood of telling a caregiver or authority about abuse\textsuperscript{75}. This suggests that autistic people may be vulnerable due to a lack of or poor-quality social relationships which may buffer against the risk and effects of violence\textsuperscript{108,109}, and a reduced ability to discriminate safe from unsafe situations\textsuperscript{36}. Importantly, autism-related factors may not only increase vulnerability towards violence, but they may also constitute barriers in disclosing abuse experiences and accessing adequate support, treatment, or justice.

**Psychological Factors.** Co-occurring psychological factors were also found to increase risk. Consistent with findings from the general population\textsuperscript{110,111}, co-occurring mental health and behavioural challenges were risk factors\textsuperscript{72,79}, which included both \textit{internalising} and \textit{externalising} symptom presentations. Specific internalising symptoms were insecurity, anxiety, depression, and being withdrawn\textsuperscript{73,80–82,106}, which may contribute to perceptions of being an easy target\textsuperscript{73,112}. Externalising risk factors were co-occurring ADHD\textsuperscript{82,83}, frequent meltdowns\textsuperscript{71}, and ODD symptoms\textsuperscript{84–86}. It may be that these behavioural difficulties increase risk of carer frustration and violence, or that impairments in cognitive, emotional, and behavioural regulation that characterise ADHD and ODD symptomology\textsuperscript{113} increase the likelihood of
repeated violence through a cycle of victimisation and retaliation\textsuperscript{82,114,115}. Consequently, the high proportion of internalising symptoms\textsuperscript{116–118} and externalising behaviours\textsuperscript{119,120} found to co-occur within autism, underlines the necessity of targeted treatment and support in such areas.

Together, these findings shed preliminary light on the intersectional effects of autism characteristics, autism impacts, and gender in the construction of sexual violence. For example, females were reported to be more motivated to have intimate partners which, combined with a diminished understanding of how these relationships are formed, reduced awareness of what constitutes abuse, and low assertiveness, increased risk\textsuperscript{76}. In contrast, males were more likely to have difficulty forming intimate relationships and lacked intimate partners\textsuperscript{76}. We suggest that the gender difference in victimisation risk arises from gender roles where greater expectations are placed on females to be interdependent, passive, and compliant\textsuperscript{121,122}, and to display a greater desire to perform idealised standards of gender-normative behaviour\textsuperscript{123}. Given females greater desire for, or capacity to perform, social relationships than autistic males\textsuperscript{124,125}, and perceived social pressure to be sociable, autistic females likely have higher exposure to risk situations than do autistic males. When the situation demands exceed limited social inference skills often observed within autism\textsuperscript{24}, females experience greater incidence of violence.

**Social Risk: Socio-Ecological Factors**

Biopsychosocial factors were also found to occur within the context of broader socio-ecological issues, adding additional complexity to victimisation risk within autism. Several contexts were identified that heighten risk; these include relationships with carers and peers, and communal factors involving schooling.

**Carers.** Police reports of domestic violence determined autistic people were more likely to be victimised by a carer (e.g., parent, guardian, paid carer), relative to intimate partners, as observed in non-autistic cases\textsuperscript{69}. Most concerning were homicide incidents involving autistic children occurring within the context of dependent relationships\textsuperscript{126,127}. Risk of such vulnerability was identified as a carer’s inability to cope with overwhelming stress, reacting to the child’s behaviour, the carer’s perception that the autistic child was a burden, restricting the carer’s life, and carer reports of not wanting an autistic child\textsuperscript{127}. Such findings warrant urgent attention addressing factors associated with carer stress (e.g., level of autism support needs, carer mental health, finances, coping strategies\textsuperscript{69,128}). They also highlight the importance of interventions aimed at providing families and caregivers adequate mental health and financial support, to assist in promoting resilience and reducing risk and escalation of domestic violence within autism\textsuperscript{69,126,127}.

**Peers.** Regarding peer victimisation, increased risk was associated with social vulnerability (e.g., a lack of or poor-quality social relationships\textsuperscript{73,74}) and relationship issues (e.g., conflict, difficulty forming and maintaining friends\textsuperscript{74,77–80}). These findings reflect previous works which suggest social marginalisation
within autism contributes to risk of bullying (for a review, see Schroeder et al.\textsuperscript{129}), underscoring the necessity of supports or services aimed at facilitating quality peer-relationships.

**School.** Risk of peer victimisation was also found to be enhanced by broader community and societal factors. Consistent with findings from the general population\textsuperscript{130,131}, coming from a low-income household\textsuperscript{72,82}, attending a public or general population school\textsuperscript{79,82,83}, or a lack of school support\textsuperscript{74} were found to increase risk of bullying. These findings highlight the importance of implementing support and prevention strategies across multiple contexts. For example, social skills programs, such as PEERS for autistic adolescents\textsuperscript{132}, have been shown to be effective at teaching strategies, at an individual- and relational-level, which improve social relationships and assist with managing peer rejection and conflict\textsuperscript{133–135}. However, previous recommendations also point to the need for additional strategies aimed at targeting the school environment\textsuperscript{129}. This approach may be favoured by autistic people given critiques that social skills program curricula promote normative rules for social interaction, and may reinforce the inhibition of authentic interaction and increase stigma associated with autism\textsuperscript{136}. Evidence suggests school-based bullying intervention programs aimed at facilitating an anti-bullying environment via teacher training intended to assist in better identification and management of bullying\textsuperscript{137–139} may be a more inclusive, effective, and comprehensive approach.

**Strengths And Limitations**

This review aimed to integrate all current qualitative and quantitative literature on interpersonal violence within autism, providing a vital understanding of the prevalence and risk factors of autistic experiences of violence in relation to gender, and incorporating all age groups and levels of functioning. By employing a model that examines the complex relationship between disability, gender, and violence, and the interaction between individual and social factors throughout differing developmental periods, this review provides a comprehensive examination of existing research on violence in autism. In addition to such strengths, the current study was not without its limitations. While there is an abundance of research on bullying within autism, a major limitation of this review is the shortage of empirical literature on other forms of interpersonal violence (i.e., overall, physical, sexual, psychological, homicide). This limited the number of studies included in each subgroup analysis and prevented the examination of gender differences in the prevalence of homicide and psychological violence. Additionally, high levels of heterogeneity observed in our meta-analysis (see Figs. 2a, 2c, & 2e) can be accounted for by variability in outcome measurements for physical, sexual, or psychological violence, but suggest findings be interpreted with caution. Further, the limited number of studies in this review that included participants of certain age groups (i.e., children or adults), levels of functioning (i.e., high support needs), and varying gender identities (e.g., nonbinary, transgender) indicates study findings may not be generalisable to the broader autism population.

Sampling bias is difficult to overcome. It is possible victimised participants were more likely to participate studies included in this review, while cases obtained from news media reports may be more likely to be
reported if deemed *newsworthy*; as such, the influence of selection bias on study findings cannot be ruled out. An additional limitation may extend to methods of data collection and measurements used in several studies. Data that relied on the reporting practices of police, were obtained from the news media, or retrospective chart review may contain inaccuracies in reporting, and should be interpreted with caution. Finally, the retrospective nature of violence measures used by some studies may have led to recall bias, while studies that utilised caregiver-report may be subject to underestimating or underreporting the prevalence of abuse, particularly in the household. Consequently, study findings should be interpreted considering such limitations.

**Implications And Future Directions**

The evidence provided in this review offers vital insight into the heightened prevalence and risk of autistic experiences of interpersonal violence, particularly in relation to violence occurring within carer and peer relationships and among further marginalised people (i.e., gender, race, economic, mental health). Despite these concerns, violence experiences have been largely neglected by autism research, not least regarding intersectionality. However, our findings highlight the relevance of considering the complex interaction between autism-related challenges and additional factors (e.g., gender, race, level of autistic traits) through an intersectional lens when examining violence in autism. Doing so will provide a more thorough understanding of key factors influencing such experiences and will assist in identifying those most affected.

This review also identified key areas for future research. In particular, the findings of this review suggest carer stress may play a pivotal role in abuse cases\(^{69,126,127}\), suggesting future research on domestic violence within autism would be beneficial to inform intervention and prevention and support strategies and services. Further, given the high rates of lifetime victimisation and poly-victimisation identified by this review, there is a need for further research to examine the experience and impact of violence across the autistic life course. Finally, our finding that gender significantly influences the prevalence and type of violence experienced, and preliminary investigations which suggest race\(^{72,80}\) and sexual orientation also contributes to such experience\(^{51,92}\), warrants further examination of violence experiences among autistic gender, racial, and sexual marginalised groups. A particular area of concern is the increased social desire, reduced social inference skills, and sub-assertiveness observed in autistic females\(^{76}\), who may be particularly vulnerable to coercion and abuse from an intimate partner\(^{32,36,140}\). Given the lack of available literature on intimate partner violence in autism, urgent research in this area is warranted.

**Conclusion**

Review of the literature confirms interpersonal violence to be a crucial issue among the autistic community, who appear to face concerningly high rates of multiple forms of victimisation (88.3%) and poly-victimisation (92%) across the life course, particularly among further marginalised populations. The current review characterises autistic experiences of violence to assist in the implementation of prevention
or support interventions or services and emphasises key areas of concern that warrant urgent attention by future research. Specifically, further research examining varying forms violence in autism across the life course, particularly in relation to the influence of intersectionality, would aid in our understanding of the nature and impact of such experiences on autistic health, functioning, and quality of life.

Declarations

Ethical Approval

Not applicable.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

All authors contributed to the written work presented in this paper. KC conceived the idea for this study, conducted all systematic searches, meta-analytic procedures, and drafted the manuscript. KR reviewed studies identified in the systematic database search. DH, EW, MH, and MS provided expertise, critically evaluated this review, and contributed to the drafting of this manuscript. MS and MH were involved in the conceptual design of the study, and MS additionally contributed to all analyses and the interpretation of data. All authors assisted with and approved the final manuscript.

Funding

There was no source of funding for this research.

Availability of data and materials

Data and material can be available where appropriate.

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Table

Table 2 is available in the Supplementary Files section

Figures
Figure 1

PRISMA 2020 Flowchart for Study Inclusion, Adapted from Page et al.64
Figure 2
See image above for figure legend.

Figure 3
See image above for figure legend.
Supplementary Files

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