Is trauma research neglecting neurodiverse populations? A systematic review and meta-analysis of the prevalence ACEs in adults with autistic traits

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Abstract

Purpose – *The prevalence of exposure to adversity is elevated in autistic populations, compared to neurotypical peers. Despite this, the frequency and nature of early adverse experiences are not well understood in autistic adults, with several underlying methodological limitations in the available literature. The purpose of this study is to systematically synthesise and analyse the prevalence of childhood adversity in this marginalised population, in accordance with the adverse childhood experiences (ACEs) framework.*

Design/methodology/approach – *Peer-reviewed empirical research articles were systematically searched for from electronic databases and screened against established inclusion criteria. Pooled prevalence rates for individual ACE types were calculated.*

Findings – *Four papers were included (*N = 732*), all of which used a predominantly or exclusively female sample. Only sexual abuse was reported in all papers, with a pooled prevalence rate of 38%. Physical abuse and emotional abuse were less frequently explored, with two papers reporting on these ACEs, though obtained comparable and higher pooled prevalence rates (39% and 49%, respectively). Pooled prevalence rates could be calculated for neither neglect nor ''household'' ACEs because of insufficient data. The limited state of the evidence, in conjunction with high levels of heterogeneity and poor sample representativeness found, positions the ACEs of autistic adults as a critical research priority.*

Originality/value – *To the best of the authors' knowledge, this study is the first to systematically synthesise the prevalence of early childhood adversities, as conceptualised in accordance with the ACEs framework, in adults with autistic traits.*

Keywords Trauma, Meta-analysis, Systematic review, Autism spectrum disorder, Adverse childhood experiences (ACEs)

Paper type Literature review

Introduction

Adverse childhood experiences (ACEs) are a framework of events relating to child maltreatment and household dysfunction that occur in the first 18 years of life and cause significant harm or distress (Felitti *et al.*, 1998; Finkelhor *et al.*, 2015). ACEs are found to be considerably impactful, both in terms of their effects on psychological and physical health and the associated financial impacts (Hughes *et al.*, 2021); thus, their prevention and management are positioned as a global public health priority. Of particular importance is the development of policies and strategies that centre those with increased risk for and impact of ACEs, which demands an understanding of risk factors for exposure.

Exposure to early adversity is relatively commonplace in general population samples, with pooled prevalence rates of 42.2% and 54.4% for single ACE exposure reported in European and North American populations (Bellis *et al.*, 2019). Nevertheless, intersectional discrepancies in prevalence rates exist. For example, research has noted significant differences in total ACE scores dependent on multiple characteristics including gender, ethnicity and sexual orientation (Giano *et al.*, 2023). One additional characteristic that has been neglected within the trauma research field and warrants greater visibility and attention is neurodiversity.

Autism spectrum disorder (ASD) describes a heterogeneous range of neurodiverse presentations characterised by differences in social interaction, communication and behaviour (World Health Organization, 2019). ASD is positioned under the neurodevelopmental disorder umbrella within diagnostic systems. Despite not being formulated as a trauma response, high rates of early trauma exposure and symptomology are reported by autistic people (Rumball *et al.*, 2020). ASD is also highly comorbid with other disorders linked to increased risk for trauma exposure, such as ADHD (Boodoo *et al.*, 2022). Thus, traumatic exposure is positioned as a key target for prevention and intervention in this population.

When compared to general population samples, autistic people are noted to be at significantly higher risk of experiencing childhood adversity, and polyvictimisation is common in this marginalised group (Hellström, 2019). Research has noted a 50% increase in risk for experiencing between one to three early traumas and a 99% increase in risk for experiencing four or more early traumas in autistic children, compared to neurotypical peers (Berg *et al.*, 2016). The types of early adversity more commonly reported in ASD populations span a range of experiences, including child maltreatment, bullying and crime victimisation (Pfeffer, 2016). Additional adversities unique to the autistic experience have also been identified, such as sensory trauma and various forms of social marginalisation (Kerns *et al.*, 2022). Given the elevated risk for adverse experiences in autistic people, including exposure to multiple ACEs, there is a need for comprehensive insight into the frequency and nature of the range of adverse experiences that pervade the early lives of this population. Such insight is critical for informing effective preventative and management approaches that target the most pervasive and impactful adverse experiences of this population.

Despite an increased visibility of autistic people within trauma research in recent years, current understandings of early adversity in this population are hindered by a number of key methodological limitations. Primarily, much of the available evidence has stemmed from research using child and adolescent samples and non-standardised measures of early adversity, in the absence of any common framework (Trundle *et al.*, 2022). Differences in the conceptualisation of childhood trauma within this field of research presents several challenges for the meaningful comparison of trauma exposure rates in ASD and wider populations. Studies have assessed exposure to early adversity over differential time periods (e.g. within the first 16 and first 18 years of life), and divergence in the types of trauma events assessed is evident. Additionally, the inclusion of child and adolescent populations who are still within the early development period and, thus, still bear the capacity to experience further early trauma, within research samples risks underestimating the true prevalence of childhood adversity.

The ACEs framework and corresponding questionnaire (Felitti *et al.*, 1998; Finkelhor *et al.*, 2015) were developed as a measure of adverse events occurring in the first 18 years of life and allow for standardisation in the definition of and measurement period for childhood adversity. Thus, examination of the prevalence rates of ACEs in adult samples is warranted for a more accurate understanding of the true nature and frequency of ACEs that can be compared with and examined against rates of early adversity reported in other populations, including other marginalised groups.

Besides an understanding of *frequency*, insight into the *different types or classes* of ACEs experienced by autistic people is also of importance. Previous research in neurotypical populations has indicated differential effects of ACEs on developmental (Herzog *et al.*, 2020), psychological (Wang *et al.*, 2019) and physical health trajectories (Campbell *et al.*, 2016) and, thus, may indicate differential priorities for prevention and management strategies. Whether the differential impacts of ACE types are mirrored in neurodiverse populations, including autistic people, is not yet known. However, examination of the classes of ACEs explored in research with autistic people would aid in informing assessment, prevention and intervention strategies that address the prominent adverse experiences of this population, as well as identifying priorities for further investigation in research.

Aim

This review sought to systematically synthesise and analyse current evidence on the prevalence of different ACE types in autistic adults.

Method

This systematic review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page *et al.*, 2021). Before the review was conducted, the research protocol was registered on the Prospective Register of Systematic Reviews (registration number: CRD42022353281).

Search strategy

The databases Scopus, PubMed, PsycArticles, Ovid (EMBASE, Medline) and CINAHL Ultimate were searched between 13th and 16th January 2023 by XX and XX [blinded for peer review]. Additionally, reviews of a similar nature to the current study and papers retained after full-text screening were manually searched for additional relevant articles. Table 1 reports on the search terms used, which were identified through scoping searches and use of the OVID database thesaurus and agreed by all authors. Searches were appropriately formatted for each database and included synonyms, acronyms and

Table 1 Search strategy	
Topic	*Terms*
Prevalence	(Epidemiolog* OR Prevalence OR Prevalence) AND
ACEs	("Maltreatment" OR "Child* Maltreatment" OR "Adversity" OR "Adverse Childhood Experience*" OR "Child* Adversit*" OR "Abuse" OR "Emotional Abuse" OR "Sex* Abuse" OR "Physical Abuse" OR "Child* Abuse*" OR "Trauma" OR "Trauma* Exposure" OR "Psych* Trauma" OR "Trauma* Experience*" OR "Child* Trauma*" OR Neglect* OR "Child* Neglect*" OR Victim* OR "ACEs") OR (("parent*" OR "household*" OR "famil*") AND ("incarc*" OR "imprison*" OR "substance" OR "mental* ill*" OR "domestic" OR "intimate partner violence" OR "IPV")) AND
Autism	(Autis* OR Asperg* OR "developmental disorder*" OR "DD" OR "PDD" OR "ASD" OR "ASC")
Notes: PubMed does not permit truncation (*) between two words or with words containing less than four characters. Such instances of truncation were, therefore, omitted from searches on PubMed (Supplementary Table 1) **Source:** authors own work	

unconventional spellings. The alternative search terms used in PubMed, which uses different formatting criteria, are provided in Supplementary Table 1.

Definition of childhood adversity

This review focused on studies assessing the prevalence of any of the ten forms of early adversity as proposed by Finkelhor *et al.* (2015), which extends on the original ACE framework proposed by Felitti *et al.* (1998). Specifically, we included articles that assessed at least one form of early childhood abuse or neglect (emotional abuse, physical abuse, sexual abuse, emotional neglect and physical neglect) or at least one form of household dysfunction (exposure to intimate partner violence [IPV] within the household, parental substance abuse, parental mental illness, parental separation or divorce and parental incarceration).

Inclusion and exclusion criteria

Article inclusion was contingent upon the following criteria: The article:

- reported on the prevalence rates of one or more ACE types;

- used standardised measures to assess ACEs within the first 18 years of life;

- was a peer-reviewed, empirical research study;

- sampled adults (18+) or reported prevalence rates for child/adolescent and adult participants separately;

- sampled participants with an evidenced or self-reported diagnosis of ASD or participants who met the clinical threshold for autism based on validated assessments of traits (e.g. the PROTECT Autism Spectrum Traits questionnaire, which has been shown to have good predictive validity for ASD [Stewart *et al.*, 2021]);

- was available in English;

- was accessible in full-text version; and

- used a quantitative or mixed methods design.

Whilst inclusion criteria was initially restricted to include articles which reported on ACEs only in individuals with a clinically validated diagnosis of ASD, the decision was made to broaden this, in line with other systematic reviews of this population (Trundle *et al.*, 2022), because of a lack of eligible studies.

Excluded studies were those that did not meet the full list of criteria mentioned above or used the same data set as another included study. Additionally, studies published before 1980 were excluded from the search, given that the notion of childhood adversity was first postulated at this time (Rutter, 1980). Conversely, no restrictions were applied to country of study origin or setting type. Grey literature was not included within the review because of the absence of any peer review process typical of this literature type as well as inconsistencies in its indexing (Adams *et al.*, 2017).

Study selection and data extraction

The screening and data extraction process for this systematic review was carried out using the Covidence Systematic Review software (Veritas Health Innovation, 2019). Once database searches were conducted, eligible studies were independently screened by authors XX and XX [blinded for peer review]. Initially, title and abstract screening was carried out, and papers were assessed for their eligibility against the exclusion criteria listed above. Full-text copies of articles that passed title and abstract screening were then

retrieved and screened. The reference lists of studies that passed full-text screening and the reference list of a systematic review on a similar topic (Trundle *et al.*, 2022) were also searched, and additional relevant studies were extracted. In the case of any discrepancies in the assessment of studies, these were referred to authors XX and XX for review, to reach consensus. Once the final list of eligible studies had been obtained, data extraction began and was completed independently by XX and XX [blinded for peer review]. A data extraction template was formulated by the team and consisted of the following parameters:

- author;
- country of study;
- sample size;
- study design;
- key demographics;
- assessment measures; and
- prevalence of each reported ACE.

Once data was extracted by independent authors, it was once again searched for discrepancies and agreement was found by XX [blinded for peer review]. Extracted data is presented in Table 2.

Quality assessment

The final papers included in the study were quality assessed using the AXIS tool which is a critical appraisal tool used to assess research papers and judge the reliability of the study outlined in the paper (Downes *et al.*, 2016). This scale can be used with cross-sectional studies. The AXIS tool comprises of 20 quality questions under the following headings:

- Introduction;
- Methods;
- Results;
- Discussion; and
- Other (conflicts of interest and ethical approval).

The AXIS tool was applied independently by XX and XX [blinded for peer review]. Items were scored by providing a yes or no answer to each question and a final overall quality judgement question reflected whether the reviewer viewed the study to be good, fair or bad quality. XX [blinded for peer review] provided consensus on any resulting disagreements.

Data analysis

Data analysis was conducted in SPSS version 28 (IBM Corporation, 2020). Pooled prevalence rates were calculated for ACEs reported in two or more papers. To overcome the limitations associated with conventional two-step methods for meta-analyses (Lin and Xu, 2020), a generalised linear mixed model was used to calculate pooled prevalence rates. A forest plot was generated for each ACE on which meta-analyses was conducted.

Heterogeneity between studies was explored by calculating Cochran's Q and I^2 values. An I^2 value greater than 75% was indicative of high heterogeneity (Higgins and Thompson, 2002). However, given the potential for significant bias of I^2 values in meta-analyses with few studies, confidence intervals for this statistic are also reported, in line with

Table 2 Study characteristics

Author	Country of study	Sample size and type	Study design	Recruitment method	Key demographics	Assessment measures	Prevalence (%)					
							PA	EA	SA	PN	EN	IPV
Cazalis et al. (2022)	France	225 women – self-reported ASD diagnostic group and trait-based non-diagnostic group (mixed)	Cross-sectional	Adverts sent out by local autism organisations	Gender: 99.6% female; Age: 18–60 years (mean not specified)	Sexual Experiences Survey Short Form Victimization questionnaire (SES-SFV); Ritvo Autism and Asperger Diagnostic Scale (RAADS)			68.9%			
Roberts et al. (2015)	US	213 female nurses - trait-based non-diagnostic sample	Cross-sectional	Specific recruitment strategy not specified	Gender: 100% female; Age: not specified	Childhood Trauma Questionnaire (CTQ); Social Responsiveness Scale (SRS)			40.1%			
Stewart et al. (2022)	UK	251 older adults – trait-based non-diagnostic sample	Cross-sectional	Specific recruitment strategy not specified	Gender: 65.7% female; Age: 50–81 years (M = 63.04, SD = 6.77)	Childhood Trauma Screener (CTS-5); PROTECT Autism Spectrum Traits Questionnaire	25.5%	40.2%	14.7%	12.0%	66.1%	
Weiss and Fardella (2018)	Canada	45 adults – self-reported ASD diagnosis	Cross-sectional	Adverts distributed by autism organisations, programs, online communities, higher education academic support services, and word-of-mouth	Gender: 57.5% female; Age: 18–53 years (M = 30.00, SD = 1.48)	Juvenile Victimization Questionnaire-Adult Retrospective Questionnaire (JVQ-AR); Autism Diagnostic Observation Scale-2nd Edition (ADOS-2)	57.8%	62.2%	55.6%			17.8%

Notes: PA = Physical Abuse; EA = Emotional Abuse; SA = Sexual Abuse; PN = Physical Neglect; EN = Emotional Neglect; IPV = Intimate Partner Violence; and ASD = Autism Spectrum Disorder

Source: authors own work

recommendations (von Hippel, 2015). Because of the small number of eligible studies included in the review, it was not possible to perform subgroup analyses or sensitivity analysis to identify sources of heterogeneity in prevalence rates.

Funnel plots were created and assessed as an indicator of publication bias and Egger's test was conducted for ACE types with a sufficient number of studies (≥3) (Higgins and Altman, 2008).

Results

Systematic literature search

In all, 14,517 articles were identified in the initial search, 2,891 of which were duplicates. After title and abstract screening, 41 of the 11,626 references were retained. A secondary search was conducted manually and resulted in two further articles being added. Finally, 39 papers were excluded at full-text stage, leaving 4 articles suitable for review (Figure 1).

Characteristics of included studies. The four studies included in the review were carried out between 2015 and 2022. Sample sizes ranged from 45 to 251, with a median sample size of 219 participants. The research was performed in four different Western, high-income

Figure 1 PRISMA flow diagram

Source: Authors' own work
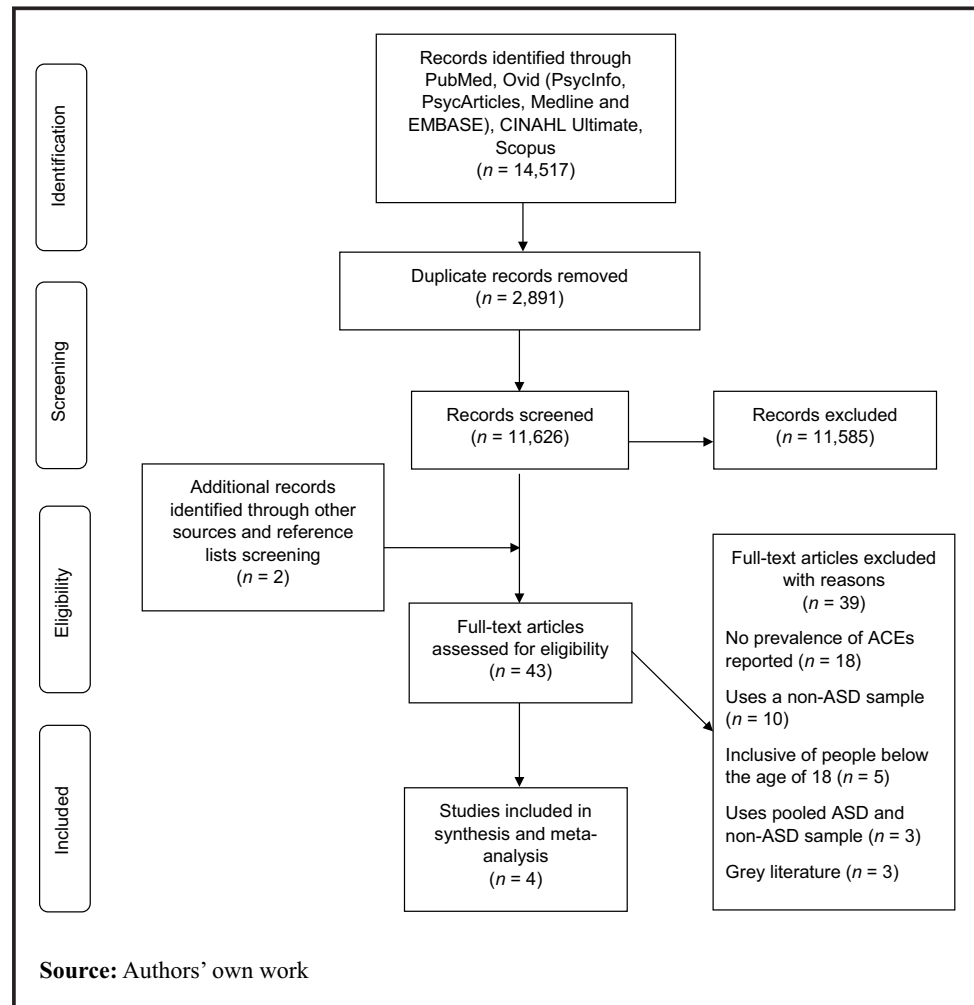
countries as classified by the World Bank (2022), namely, France, Canada, the USA and the UK. Two of the included articles (50%) used a female-majority sample. Of the two other articles, one investigated an exclusively female sample, and the other study recruited on the basis of sex, rather than gender; of these participants, all bar one identified as female. Because of the lack of studies providing comprehensive information on the ethnicity of participants, it was not possible to summarise trends on this demographic characteristic.

Two studies used a non-diagnostic sample in which probable ASD was established based on scores on a validated assessment measure. One study used a sample of people who self-reported an ASD diagnosis which was confirmed based on scores on a validated assessment. The remaining study used a mixed sample, comprising both diagnostic and non-diagnostic groups.

Quality appraisal. Three (75%) of the included studies received a rating of "fair" quality, and one was rated as "good" on the AXIS tool. The performance of each article on the AXIS tool is illustrated in Supplementary Table 2.

Prevalence of adverse childhood experience types

The number of studies reporting on each ACE type is illustrated in Table 3. The prevalence of each of the five child maltreatment ACEs was reported in at least one paper, with articles most frequently exploring sexual abuse. Of the five household ACEs, only exposure to IPV was explored, with the remaining four household adversities being excluded in research.

Pooled prevalence estimates are reported for sexual, emotional and physical abuse in Table 3, as there were multiple papers reporting on these specific ACEs in the review. Of these three ACEs, the highest pooled prevalence rates were found for emotional abuse, at almost 50%. However, pooled prevalence rates were also high for sexual and physical abuse, approaching 40% for both ACEs. High levels of heterogeneity were apparent between studies, with an $I^2>70\%$ for all three ACEs. Forest plots are provided in Supplementary Figure 1.

Pooled prevalence estimates could not be calculated for emotional or physical neglect or IPV, because of the lack of eligible studies reporting on these ACE types. However, examination of the prevalence rates reported in the singular available studies (Table 2) indicated childhood emotional neglect to be prevalent in autistic adults, with two-thirds of the sample reporting this ACE.

Publication bias

Examination of funnel plots for the three ACEs included in the meta-analysis showed asymmetry in the plot for sexual abuse (Supplementary Figure 2), indicating possible publication bias in the four included studies reporting on this ACE. Nevertheless, in line with

Table 3 Prevalence, heterogeneity and publication bias values					
ACE type	*No. of studies (%)*	*Pooled prevalence estimate (%)*	*95% CI*	*I^2 [95% CI]*	*Cochran's Q*
Child maltreatment ACEs					
Sexual abuse	4 (100)	38	22.2–56.2%	95.7% [91.8–97.7%]	82.8 [$p < 0.001$]
Emotional abuse	2 (50)	49	34.1–64.3%	86.1% [44.6–96.5%]	7.45 [$p < 0.01$]
Physical abuse	2 (50)	39	19.8–63.1%	94.2% [81.6–98.1%]	17.35 [$p < 0.001$]
Emotional neglect	1 (25)	–	–	–	–
Physical neglect	1 (25)	–	–	–	–
Household ACEs					
Intimate partner violence	1 (25)	–	–	–	–
Note: CI = Confidence Interval **Source:** authors own work					

guidance, the limited number of studies (<10) included in the analysis precludes the ability to make inferences about publication bias from these plots (Higgins et al., 2019).

Additionally, it was not possible to statistically examine the impact of differences in sample type (diagnostic vs non-diagnostic) because of the small number of studies. However, higher prevalence rates for physical and emotional abuse in the study using a diagnostic sample, compared to the study used a non-diagnostic trait-based sample, were observed. Similar trends were also apparent for sexual abuse, with the lower prevalence figures reported in the two studies using non-diagnostic trait-based sample.

Discussion

The current study sought to systematically review and analyse the prevalence of different ACE types in autistic adult populations. Whilst previous attempts to synthesise and analyse the prevalence of early adverse experiences in autistic people have been made (Dike et al., 2022; Trundle et al., 2022), this study is the first to do so in accordance with the ACEs framework and exclusive of child and adolescent samples. The review illustrated the limited state of existing literature, in regards to quantity and quality. However, the findings tentatively highlight the elevated risk for ACEs in autistic people, specifically females.

Primarily, through systematic review of the literature, the significant scarcity of research into the early adverse experiences, as defined by the ACEs framework, of autistic people became apparent. Only four eligible studies were yielded, two of which used samples of individuals without a clinically validated diagnosis, instead relying on assessments of autistic trait severity. As such, prevalence rates reported in this review should be interpreted with caution. In the absence of any empirical evidence, it cannot be assumed that the early experiences of individuals with an ASD diagnosis and of individuals who demonstrate autistic traits are equivocal. Preliminary examination of differences in prevalence rates reported for ACE types between the studies indicated higher figures in studies using diagnostic samples, though the limited number of included articles limited further statistical comparison.

Furthermore, whilst more than 40 papers were included for full-text review, half of ineligible studies (50%) were screened out as they did not report on the prevalence of ACEs. Other traumatic experiences investigated included being a victim of disability hate crime (Richardson et al., 2016) and death of a close relative (Kildahl et al., 2020). Whilst it is irrefutable that these are relevant challenges experienced by the ASD population, the lack of research exploring types of adversity known to be highly impactful is problematic. Additionally, the limited use of standardised frameworks to operationalise and assess childhood adversity within research impairs our ability to make valid comparisons about risk for early adversity between autistic people and other populations.

Of further concern was the lack of studies using samples that are representative of the ASD population, across different intersections. Of the four studies included in the review, males were significantly underrepresented in the samples. Given that ASD populations are male-dominated (Fombonne, 2009), this finding indicates a minimisation and failure to explore male experiences of trauma. The trend for female-dominated samples echoes the patterns seen in the wider trauma literature base, more widely, with the experiences of males remaining largely overlooked outside of veteran and, to a lesser extent, detained populations (Affleck et al., 2018). Given that gendered differences in the prevalence and impact of ACEs have been well documented across a range of cultures and population types (Leban and Delacruz, 2023), assumptions about the experiences of other gendered groups cannot be drawn. Resultantly, the trauma experiences and needs of autistic people who do not identify as female are likely to remain undetected and, thus, unaddressed by clinical services. This is a particular omission given that transgender and gender diverse adults are more likely to have an autism diagnosis and have been found to score higher on self-report measures of autistic traits (Warrier et al., 2020).

Furthermore, all four studies were conducted in western, high-income countries and did not provide comprehensive insight into the ethnic identities existing within their samples. Resultantly, the representativeness of the results across the ASD population, globally, is doubtful. Evidence has documented disparities in the prevalence, patterns and burden of ACEs across different ethnic, cultural and socioeconomic groups (Goldstein *et al.*, 2020). As such, research that addresses the experiences of all intersections existing within the ASD population is needed to ensure the development of prevention and management strategies that are sensitive to differences in risk and impact.

Significant disparity in the types of ACEs examined in research was also noted. At present, no research in ASD populations have explored all ten ACEs within a single study. As a result, examination of the differential prevalence of ACE types in the ASD population is reliant on the comparison of figures reported between studies. Consequently, whether patterns in the prevalence of ACE types are shared across the ASD population or diverge based on factors such as study setting and demographic characteristics (e.g. sex, ethnicity and socioeconomic status) is not known.

Of the ACEs that were explored, direct adverse experiences were most frequently investigated, specifically experiences of abuse. Of the three abuse types, sexual abuse was most commonly assessed, and the only ACE captured in all four studies. Whilst the findings of the current review are tentative, the individual and pooled prevalence rates reported in this review and included studies indicate that autistic people, primarily females, are more likely to experience childhood sexual abuse, when compared to the general population rates for adults in western, high-income countries (e.g. the UK: 6.3%, Bellis *et al.*, 2014; the USA: 10.14%, Pérez-Fuentes *et al.*, 2013). Similar trends were also found for physical and emotional abuse, with both Stewart *et al.* (2022) and Weiss and Fardella (2018) reporting prevalence rates that exceed those reported in general population samples in the UK (physical abuse: 7.6% and emotional abuse: 9.3%, Office for National Statistics, 2020) and Canada (physical abuse: 24%, Statistics Canada, 2022; emotional abuse: 9%, Public Health Agency of Canada, 2010).

Reasons for the apparent increased risk for childhood abuse in this population are likely to be complex, though may in part reflect societal and systemic shortcomings in identifying and responding to adversity outside of neurotypical populations. For example, difficulties in communication, which are experienced by some autistic children, have been linked with an increased risk for abuse and neglect (Sylvestre *et al.*, 2016) and may impair the verbalisation of adverse experiences in this population. Additionally, perhaps by virtue of their increased risk for abuse in the home, autistic children and adolescents are more likely to enter the care system and be subject to out-of-home placements (Cidav *et al.*, 2018), in which they may face further maltreatment and trauma (Mitchell, 2018; Salazar *et al.*, 2013).

Outside of experiences of childhood abuse, other forms of child maltreatment appear substantially overlooked. Specifically, experiences of physical and emotional neglect were examined in only one study. Exposure to neglect is shown to be particularly pernicious in its influences on a child's development across cognitive, emotional, social and health-related domains (Avdibegović and Brkić, 2020), as well as their outcomes in later life (Cohen *et al.*, 2017). Experiences of neglect may, therefore, be particularly detrimental for autistic people, with the potential to contribute to and exacerbate existing developmental challenges for this population. Whilst the lack of empirical evidence limits the ability to draw any substantive conclusions regarding the true prevalence and impact of neglect, such experiences, specifically those of an emotional nature, were found to be pervasive by Stewart *et al.* (2022). Resultantly, addressing this knowledge gap in future research is critical to ensuring that impactful sources of adversity are addressed in clinical practice and importantly, where possible, prevented.

Of further concern was the overlooking of household dysfunction within the literature. One study examined experiences of IPV, and the remaining four household ACEs were not

represented in any of the included articles. This is a notable omission, given that high co-occurrence between and within childhood maltreatment and household ACE categories has been documented (Broekhof *et al.*, 2022), with experiences of abuse and neglect often occurring in the context of a dysfunctional household environment. The failure to capture experiences of household dysfunction within the literature reflects a particularly significant gap in our understanding of the adverse experiences of autistic people, given that previous studies have indicated relationships between household dysfunction and ASD. For example, high levels of psychopathology, including depressive, anxiety, personality and substance use disorders, have been reported in parents of children with ASD (Schnabel *et al.*, 2020), which exceed those reported in parents of children without ASD (Riahi and Sakineh, 2012). Furthermore, parental incarceration has been associated with a 73% increase in the relative risk for developmental disorder and a 58% increase in relative risk for multiple developmental disorders, inclusive of autism (Jackson *et al.*, 2021). An understanding of the prevalence of experienced neglect and household dysfunction ACEs in autistic people is key to gaining a more complete insight into the adverse experiences of autistic individuals, as well as their prevention and, thus, the protection of this population.

Clinical and research implications

The limited state of the evidence, both in respect to quantity and quality, hinders the ability to draw substantiative implications for clinical practice and policy. Nevertheless, a number of tentative clinical implications are proposed.

Primarily, and in line with the wider trauma literature base, the under-representation of male and gender diverse/gender minority autistic people in trauma research indicates that the experiences of such groups are likely neither well understood nor addressed in clinical services. Such an oversight in current understandings risks failing to reach and respond to the trauma needs of groups already marginalised within society. Where support is provided, interventions put in place to address trauma needs may not be those that address the most pertinent sources of adversity or afford the most advantageous outcomes. The integration of trauma screening within autism assessment and referral processes would offer much premise in ensuring the adverse experiences and associated clinical needs of this holistic population are heard and integrated within treatment plans.

Furthermore, there is need for research that addresses the blinds identified within the literature. Specifically, studies that examine all ACEs and do so in wider, more representative populations are of central importance. Findings from research with other marginalised populations have shown household ACEs to be highly prevalent. For example, a study of deaf male inpatients found that household ACEs were reported at a rate equal to direct maltreatment ACEs (Webb *et al.*, 2023), with individual prevalence rates between 38.5% and 76.9% reported for household ACE types. As such, failure to attend to indirect experiences of adversity, as well as direct experiences, inhibits the development and delivery of prevention strategies, assessment measures and intervention approaches that address the pertinent early experiences and subsequent needs of this population.

Additionally, research must also go beyond the ACEs framework when exploring early adversity in ASD populations. The ACEs framework was used in this review for the purpose of summarising prevalence rates for adverse events defined and assessed in a standardised manner. Nevertheless, the limitations of this framework as a measure of early adversity in ASD populations ought to be acknowledged. Autistic people face a range of unique stressors and adversities (Kerns *et al.*, 2022), which are not captured under this neurotypical-orientated framework, including institutional experiences of adversity. As such, the current review cannot, it does not even seek to, provide comprehensive insight into the global experiences of adversity faced by this marginalised group.

Finally, research is necessary to delineate the relationship between ASD and trauma symptoms. Besides the high comorbidity noted between the two, overlap in symptomology and diagnostic overshadowing is also seen, with behavioural features of autism often mirroring trauma-related symptoms and vice versa (Dell'Osso *et al.*, 2015; Haruvi-Lamdan *et al.*, 2020). For example, hyperarousal, as a core feature of PTSD, may be perceived as hyperactivity resulting from sensory over-stimulation. Resultantly, trauma manifestations may be incorrectly attributed to an individual's autism, inhibiting access to interventions that address the pertinent clinical needs of this population.

Limitations

The findings reported here should be interpreted in consideration of a number of important caveats. Primarily, the small number of eligible studies included in this review strongly limit the ability to draw any conclusive insights into the true prevalence of ACEs in autistic adult populations. Given that the included studies used samples of varying demographic profiles and assessed ACEs using different measures, a high risk of publication bias is likely.

The inclusion of articles using non-diagnostic samples must also be acknowledged. Because of the lack of available studies using samples of adults with a clinically validated diagnosis of ASD, studies using a trait-based approach and clinical cut-offs on assessment measures to classifying participants into ASD and non-ASD groups were included in this review. This is a notable limitation given the inherent overlap in ASD and trauma symptomology (Dell'Osso *et al.*, 2015; Haruvi-Lamdan *et al.*, 2020), as well as evidence questioning the specificity and ability of some self-report measures to discriminate between ASD and other clinical presentations (Fusar-Poli *et al.*, 2020). In the absence of any comprehensive assessment process, it cannot be determined whether participants used in such studies were in fact presenting with ASD.

Finally, studies included in this review were exclusively conducted in high-income Western countries and in female-dominant samples. In consideration of the small and bias nature of samples used in the included studies, pooled prevalence rates reported here are thus unlikely to be representative, cross-culturally.

Conclusion

Based on the available evidence, experiences of childhood abuse appear pervasive in the lives of females diagnosed with or displaying traits of ASD. Nevertheless, no definite conclusions can be drawn regarding which ACEs are most prevalent. This review positions the early adverse experiences of people with ASD as a significant priority for further research, for the purpose of developing a more accurate and representative insight into the true nature and frequency of early adversity in this population. Furthermore, in consideration of the adverse familial context in which experiences of abuse primarily occur, it is vital that indirect experiences of adversity occurring within the household be recognised and reflected within research agendas and, potentially, clinical practice.

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Supplementary material

The supplementary material for this article can be found online.

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