Disentangling the Associations Between Attention Deficit Hyperactivity Disorder and Child Sexual Abuse: A Systematic Review

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Abstract

Background: An association between child sexual abuse (CSA) and attention deficit hyperactivity disorder (ADHD) has been documented. However, the temporal relationship between these problems and the roles of trauma-related symptoms or other forms of maltreatment remain unclear. This review aims to synthesize available research on CSA and ADHD, assess the methodological quality of the available research, and recommend future areas of inquiry. **Methods:** Studies were searched in five databases including Medline and PsycINFO. Following a title and abstract screening, 151 full texts were reviewed and 28 were included. Inclusion criteria were sexual abuse occurred before 18 years old, published quantitative studies documenting at least a bivariate association between CSA and ADHD, and published in the past 5 years for dissertations/theses, in French or English. The methodological quality of studies was systematically assessed. **Results:** Most studies identified a significant association between CSA and ADHD; most studies conceptualized CSA as a precursor of ADHD, but only one study had a longitudinal design. The quality of the studies varied greatly with main limitations being the lack of (i) longitudinal designs, (ii) rigorous multimethod/ multiinformant assessments of CSA and ADHD, and (iii) control for two major confounders: trauma-related symptoms and other forms of child maltreatment. **Discussion:** Given the lack of longitudinal studies, the directionality of the association remains unclear. The confounding role of other maltreatment forms and trauma-related symptoms also remains mostly unaddressed. Rigorous studies are needed to untangle the association between CSA and ADHD.

Keywords

child sexual abuse, attention deficit hyperactivity disorder, systematic review

Child sexual abuse (CSA) is a major public health concern that can have a long-lasting impact throughout the life span. It is estimated that approximately 20% of girls and 8% of boys will experience CSA before the age of 18 years (Stoltenborgh et al., 2011). CSA has been found to be associated with a myriad of mental health problems that can persist through adulthood, including dissociation (Hillberg et al., 2011), depression (Hillberg et al., 2011), and symptoms of post-traumatic stress disorder (PTSD) and anxiety (Chen et al., 2010; Hillberg et al., 2011). An adverse childhood experience such as CSA is likely to disrupt the mastery of core developmental tasks (Irigagay et al., 2013), such as the ability to regulate emotions and to form secure attachments. (Doyle & Cicchetti, 2017). CSA has also been empirically associated with internalizing and externalizing behavior problems in childhood (Berliner, 2011; Langevin et al., 2015) and with difficulties in the school environment (e.g., peer victimization, lower grades, need for special education; Daignault & Hébert, 2009; Hébert et al., 2016; Perfect et al., 2016). CSA, as well as other types of childhood maltreatment, has been associated with attention

deficit hyperactivity disorder (ADHD; Fuller-Thomson & Lewis, 2015; González et al., 2019; Sanderud et al., 2016). Although ADHD has been linked to CSA in previous studies, the direction of this association and its relationship to other mental health problems is unclear. Interestingly, this temporality issue with ADHD and CSA only applies to few other consequences/risk factors that have been associated with CSA (e.g., chronic conditions; Assink et al., 2019).

ADHD is a heritable neurodevelopmental disorder with prevalence rates ranging from 2% to 7.1% depending on

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meta-analytic rates (Sayal et al., 2018; Willcutt, 2012). ADHD typically has a childhood onset (less than 12 years old) and is characterized by inattention and/or hyperactivity–impulsivity (American Psychiatric Association, 2013). The associated patterns of behaviors can cause performance-related issues in educational, social, and professional environments that can persist into adulthood (Harpin et al., 2016). For example, Ebejer and colleagues (2012) found ADHD symptoms in adults to be associated with poorer health, lower educational attainment, and higher rates of unemployment. In addition, a Danish study found individuals with ADHD to have higher annual health care costs and to be more likely to receive social services in adulthood (Jennum et al., 2020). In this review, the terms ADHD and ADHD symptoms will be used. ADHD refers to the diagnosis, whereas ADHD symptoms refer to the presence of symptoms that do not necessarily reach the clinical levels of the disorder. ADHD and ADHD symptoms, like CSA, can have dramatic consequences on individual's adaptation and should be the focus of prevention and intervention efforts aiming to reduce the burden on affected individuals and, more largely, society.

As previously mentioned, CSA has been associated with ADHD in both men and women, but the direction of this association remains unclear. Indeed, some scholars have studied how ADHD can be a risk factor for later sexual victimization, while others have looked at the impact of CSA on the development of ADHD symptoms (Ebejer et al., 2012; Fuller-Thomson & Lewis, 2015; Fuller-Thomson et al., 2016). A few mechanisms have been suggested to explain CSA as a risk factor for ADHD (Fuller-Thompson & Lewis, 2015): (1) Stress induced by the exposure to CSA may cause changes in the individual's brain functioning (e.g., deficits in default mode network connectivity involved in the activation of the medial temporal, prefrontal cortices, and the limbic areas integrated in the posterior cingulate) that could result in ADHD (Anda et al., 2006; Dvir et al., 2014) and (2) learned experiences of threat, such as CSA, could affect the neural development and lead to changes in brain structures that are consistent with ADHD (McLaughlin et al., 2014). Conversely, it has also been demonstrated that ADHD can be a risk factor for CSA (Gotby et al., 2018). Experts speculate that children with ADHD (among other neurodevelopmental disorders) may be perceived as different, and it may be easier for motivated, potential offenders to dehumanize their victims and thus to transgress boundaries (Gotby et al., 2018; Rudman & Mescher, 2012). It is also worthy to mention that several ADHD symptoms overlap with core symptoms of PTSD, raising concerns about potential misdiagnosis of ADHD in traumatized individuals (Spencer et al., 2016).

Despite burgeoning interest in the topic and the multiplication of studies looking at the interrelations between CSA and ADHD in the past decades, to date, no systematic review synthesizing the evidence is available. Given the current state of research on this topic and the mixed perspectives on the direction of the association between ADHD and CSA, integrating the available research will help in identifying future directions of inquiry and help both clinicians and researchers have a better understanding of the mechanisms underlying the ADHD–CSA association. In this context, the current systematic review aims to (1) synthesize available research on the associations between CSA and ADHD, its temporality and its relationship to trauma-related symptoms, (2) assess the methodological quality of available research, and (3) recommend directions for future research and practice.

Method

Article Search and Selection

Subject headings (when available) and key words were searched from the following databases in this order: (1) MEDLINE Ovid (1946–January 8, 2020), (2) PsycINFO Ovid (1806–January 8, 2020), (3) ERIC EBSCOhost (Education Resources Information Center; 1966–January 8, 2020), (4) Scopus (searched January 8, 2020), and (5) ProQuest Dissertations and Theses Global (searched January 8, 2020). The initial search was built in Medline (see Appendix). It was peer-reviewed by Dr. Tracie Afifi, Professor at the University of Manitoba, who has expertise in research on child maltreatment and mental health.

Inclusion and Exclusion Criteria

Given our specific interest in CSA, to be included in the review, sexual abuse had to have occurred before 18 years of age. Other inclusion criteria included published quantitative studies, dissertations and theses, and conference proceedings, as well as book chapters if they reported original findings. Studies published in English and French were included. There were no inclusion or exclusion criteria pertaining to the demographic background of participants nor where the study was conducted or published. Other review papers were not included. All articles published up to the time of article search/extraction (January 8, 2020) were included, except for theses and dissertations (only the past 5 years).

The search resulted in 2,825 articles. After removal of duplicates, 2,353 articles remained, which were imported into Rayyan (Ouzzani et al., 2016) to facilitate the screening process. Following a review of titles and abstracts, 2,202 articles were excluded, resulting in 151 articles deemed eligible for full-text assessment. Following full-text assessment, a further 123 articles were excluded, leaving a final sample of 28 articles for this review. See Figure 1 for a Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow diagram.

Data Extraction and Analysis

To address interrater reliability, the first 60 titles and abstracts were reviewed by the first three authors, after which the second and third authors continued screening, met to discuss discrepancies with each other, as well as consulted with the first author in cases of uncertainty. The same process was conducted for reading the 151 full-text articles; all were read and agreed upon by the second and third author, while consulting the first author. Throughout the process of full-text screening, the last author was also consulted for her expertise in externalizing
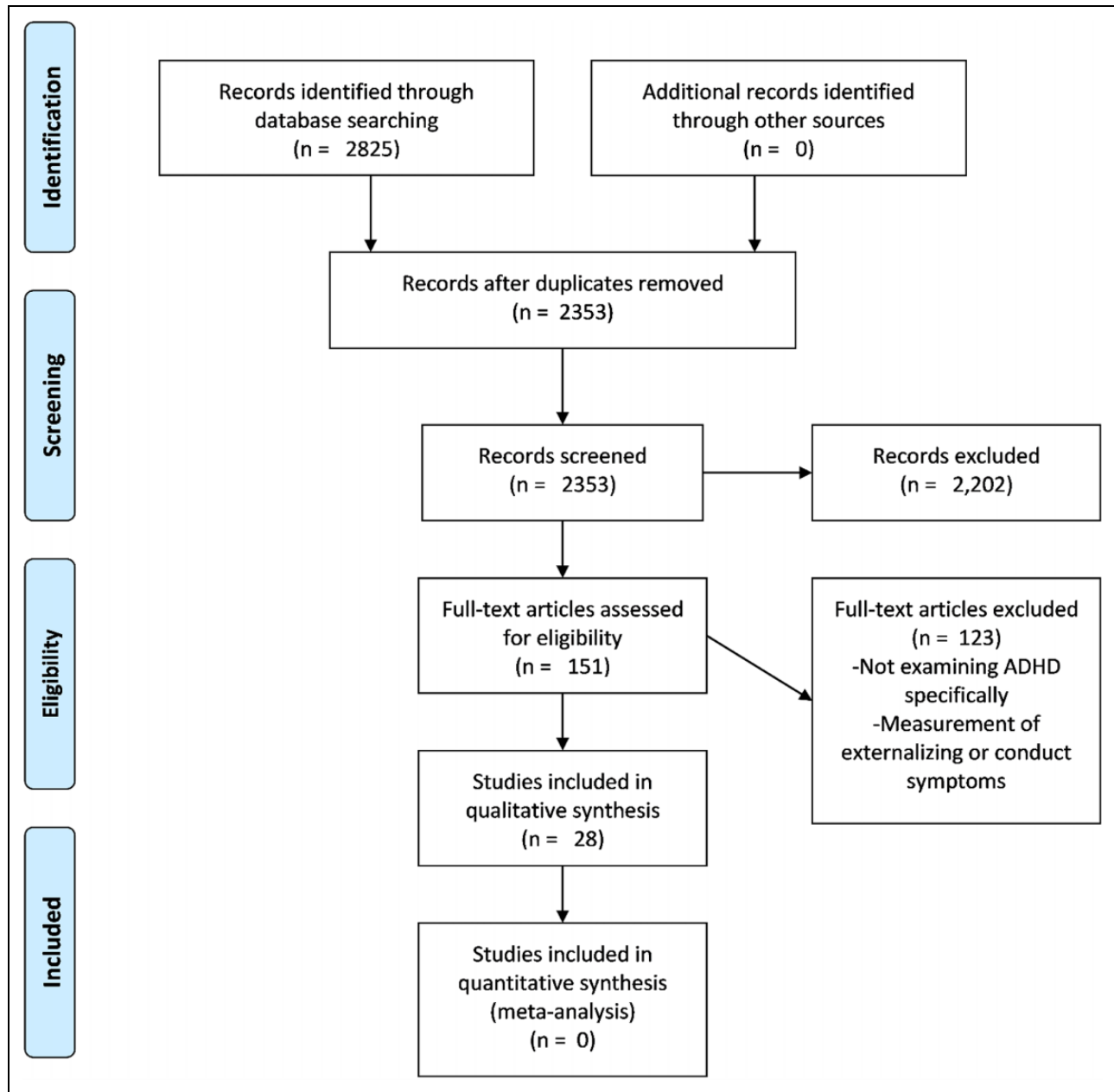
Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses 2009 flow diagram.

behaviors. After reading the 151 full-text articles, 123 were excluded due to ADHD not being clearly measured. For instance, many studies examined behavioral or externalizing problems more generally or measured the association between conduct problems and sexual abuse.

The 28 remaining articles were assessed for quality using the Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies, published by the National Heart, Lung and Blood Institute (https://www.nhlbi.nih.gov/health-topics/study-quality-assessment-tools). This is a 14-item tool that requires readers to assess papers primarily on methods and requires a final rating of "good", "fair", or "poor." The final 28 articles were evenly divided among the first three authors

and last author, who appraised and summarized the articles in pairs. A summary template was created, so that each author extracted the same information from their articles including study aims, study design, sample, setting and procedures, measures, principal relevant results, and limitations. The authors met to discuss and resolve discrepancies in appraisal items and the final quality ratings.

Results

The presentation of the findings is subdivided based on the theoretically or empirically postulated direction of the effects between CSA and ADHD. As such, papers conceptualizing

CSA as a risk factor for ADHD are presented first, subdivided based on the use of an adult (mean age of 18 years or older) or child sample. Next, papers conceptualizing ADHD as a risk factor for CSA are presented with the same subdivision based on sample type. Finally, papers that did not seem to postulate a specific direction between CSA and ADHD, and therefore that appeared to conceptualize these as comorbid problems, are summarized. Further, presentation of the findings is separated based on the use of bivariate versus more complex analytic approaches accounting for potential confounders in the relation between ADHD and CSA. See Table 1 for details about the included studies.

CSA as a Predictor of ADHD—Adult Samples (n = 7)

Two studies conceptualizing CSA as a risk factor for ADHD and using adult samples only provided bivariate associations. In their study of male inmates ($n = 799$), Matsumoto and Imamura (2007) found that ADHD symptoms were higher for sexually abused than nonabused men. According to Sanderud et al. (2016; $n = 2,980$, community sample), young adults with a history of CSA were 2.07 times more likely to report ADHD than nonabused adults.

Five of the seven studies with adult samples conceptualizing CSA as a predictor of ADHD included potentially confounding factors in their analyses; all but one identified significant associations between CSA and ADHD. Using a representative sample of Canadian adults ($n = 23,395$, population-based sample), Afifi et al. (2014) showed that CSA victims were 1.7 times more at risk of reporting suffering from attention deficit disorder (inattentive subtype of ADHD) than nonvictims after controlling for sociodemographic factors, other types of child abuse, and any diagnosed mental disorders, including PTSD. Using the same sample, Fuller-Thomson and Lewis (2015; $n = 10,496$ men, 12,877 women; population-based sample) found that both men and women were around 2.5 times more likely to have attention deficit disorder (renamed ADHD by the authors) if they reported a history of CSA, after controlling for age, parental domestic abuse, and physical abuse. After accounting for conduct problems and various childhood factors (e.g., socioeconomic status, parental conflicts and rules, family structure), CSA significantly predicted ADHD symptoms in another study (Ebejer et al., 2012; $n = 3,795$, community sample). Women with borderline personality disorder and ADHD had higher scores of CSA than women without borderline personality and ADHD, while women only reporting ADHD did not differ in terms of CSA scores from women without ADHD and borderline personality (Ferrer et al., 2017; $n = 204$, clinical sample). In this study, combined ADHD and borderline personality was significantly and uniquely predicted by childhood emotional abuse, physical abuse, and sexual abuse. Finally, the only study including confounding variables that did not show a significant association between CSA and ADHD in their adult sample is Boyd et al. (2019; $n = 7,214$, community sample). In this longitudinal study, CSA did not predict self-reported attention problems at 21 years old in bivariate

analyses and multiple regressions controlling for several sociodemographic factors, birthweight, maternal depression, and other child maltreatment types.

CSA as a Predictor of ADHD—Child Samples (n = 9)

Three studies conceptualizing CSA as a predictor of ADHD with child samples documented bivariate associations. Comparing hyperactivity scores in their sample of sexually abused children ($n = 112$, clinical sample) to the sample used to create the norms of the measure used, Gomes-Schwartz et al. (1985) identified a positive association with CSA. In comparison to the Turkish norms, another study found higher scores of attention problems (hyperactivity not measured) in sexually abused children over a 3-year period (Ozbaran et al., 2009; $n = 20$, clinical sample). In contrast to the findings in these clinical samples, González et al. (2019) found no associations between CSA and ADHD in their Latino community sample ($n = 2,480$).

Of the nine studies conceptualizing CSA as a predictor of ADHD using a child sample, six considered potential confounding factors; all but one found significant associations. In their longitudinal study, Boyd et al. (2019) found that after accounting for several sociodemographic factors and other maltreatment types, CSA was associated with more attention problems (hyperactivity not measured) at 14 years old as documented using parent reports, but not youth reports. Walrath et al. (2003; $n = 759$ children with CSA; 2,722 children with no CSA; clinical sample), after accounting for demographics (gender, age, and race) and life challenges (psychiatric hospitalization, physical abuse, runaway attempts, suicide attempts, drug/alcohol use, sexual abuse, and sibling in foster care), also had different results depending on the respondent for ADHD symptoms. Based on clinicians' ratings of primary diagnosis, children with a history of sexual abuse had lower rates of ADHD than nonabused children. However, the relation was reversed when using caregivers' reports of attention problems using the Child Behavior Checklist, and no difference was found when using children's ratings. Sonnby et al. (2011) found that boys and girls ($n = 4,910$, community sample) were more likely to have symptoms of ADHD if they were sexually abused, even after accounting for familial and sociodemographic factors, although this association was stronger among girls. Two studies examined the impact of CSA characteristics. One of them showed that while controlling for dissociation, intrafamilial abuse was associated with greater attention problems (hyperactivity not measured) than extrafamilial abuse (Kaplow et al., 2008; $n = 127$, clinical sample). The other showed that when gender, age at onset of the CSA, severity, frequency, duration, perpetrator type, and physical abuse history were considered, children with higher frequencies of CSA had more attention problems (hyperactivity not measured; Ruggiero et al., 2000; $n = 80$ children with CSA, community sample). Finally, the one study that did not identify CSA as a significant predictor of ADHD symptoms was Ford et al. (2009; $n = 397$, residential treatment sample). In their analyses,

Table 1. Review Results Organized by Child and Adult Samples.

Reference	Study Aims	Sample	Study Setting and Design	Measures	Main Findings
Child/adolescent samples					
Boyd et al. (2019)	Examining how maltreatment influences attention problems	7,214 Mother and child dyads with information on child maltreatment	Australia Prospective longitudinal, birth cohort study	– ADHD: CBCL completed by caregivers; the YSR reported by children at 14 years; the YASR completed by participants at 21 years – CSA: official CPS records	14 years of age YSR: in bivariate analyses, but not in multiple regressions, sexual abuse associated with more attention problems: F test = 5.221, $p = .022$ YSR: unstandardized $B = .484$, $SE = 0.266$, $\beta = .026$, $t = 1.82$, $p = .069$ 14 years of age CBCL: in bivariate analyses and multiple regressions, sexual abuse associated with more attention problems: F test = 6.755, $p = .009$ CBCL: unstandardized $B = .896$, $SE = 0.316$, $\beta = .039$, $t = 2.838$, $p = .005$ Confounding factors included for YSR and CBCL at 14 years of age: notification for physical, emotional abuse, or neglect; gender; indigenous Australian; relationship status; family income prior to birth; maternal education; chronic maternal depression; and birthweight 21 years of age YASR: sexual abuse not associated with attention problems in bivariate and multiple regressions: F test = 0.199, $p = .655$ Unstandardized $B = .229$, $SE = 0.255$, $\beta = .015$, $t = 0.897$, $p = .370$ Confounding factors included at 21 years of age YASR: same as in previous regression + youth income and relationships

Table 1. (continued)

Reference	Study Aims	Sample	Study Setting and Design	Measures	Main Findings
Ford et al. (2000)	Investigate history of maltreatment in child psychiatry outpatients with ADHD	165 Children (mean age = 12, SD = 3.4; 57% female, 43% male) Study groups: for sexual abuse, 11% in ADHD only group, 18% in ODD only, 31% in ADHD/ODD group, and 0% adjustment disorder group	United States Retrospective case control	– ADHD: Multimodal Treatment Study of Children with ADHD – CSA: structured clinical interview with parent and child	Bivariate analysis: study groups differed significantly in sexual abuse $\chi^2(3, N = 165) = 15.0, p < .001$ Sexual abuse was greatest for the group with both ADHD and ODD
Ford et al. (2009)	Identify subgroups of children with psychiatric disorders in terms of maltreatment history	397 Psychiatric residents (mean age = 13.4 ± 2.6; 81% male) 126 had sexual abuse history	United States Cross-sectional, chart review study	– Attention: Devereux Scales of Mental Disorders – Impulsivity and hyperactivity: Conners' Teacher Questionnaire – CSA: medical records	Sexual abuse was not a significant predictor of attention problems: ($B = .30, SE = 1.30, \beta = .01, t = 0.23, p = .82$) and did not predict Conners' Teacher scores, $B = .84, SE = 1.06, \beta = .05, t = 0.79, p = .43$. Confounding factors included: female gender, non-White ethnicity, psychotic disorder, internalizing and externalizing disorder, developmental disorder, substance use disorder, complex trauma, parental impairment, nonfamily placement, placed before age 5, multiple placements, and physical abuse
Gokten et al. (2016)	To examine the risk of children diagnosed with ADHD to experience abuse or neglect	104 Children diagnosed with ADHD; 104 healthy control children were compared Children between 6 and 12 years old	Turkey Cross-sectional, case-controlled	– ADHD: the Turkish Schedule for Affective Disorders and Schizophrenia for School Age Children—Present and Lifetime (Kiddie Schedule for Affective Disorders and Schizophrenia; K-SADS-PL-T) – CSA: The Abuse Assessment Questionnaire in Children and Adolescents	Bivariate analysis: no statistically significant difference between children with and without ADHD in terms of sexual abuse ($p = .149$)

Table 1. (continued)

Reference	Study Aims	Sample	Study Setting and Design	Measures	Main Findings
Gomes-Schwartz et al. (1985)	Evaluate children's emotional responses following sexual abuse	112 Children ranging in age from 4 to 18	United States Cross-sectional	– ADHD: Louisville Behavior Checklist—Sexual abuse: evaluated by staff at the Family Crisis Program for Sexually Abused Children	Bivariate analysis (t tests): Among 7- to 13-year-olds, the mean score of hyperactivity was significantly higher than that of the general population as reported in the norm sample of the Louisville Behavior Checklist (M = 58.62, SD = 14.16, p < .05)
González et al. (2019)	Examine associations between maltreatment and ADHD and estimate associations between repetitive maltreatment and ADHD	2,480 Latino male and female children aged 5–13 years	United States Cross-sectional and longitudinal	– ADHD: DISC-IV (parent-report) – CSA: the sexual victimization measure from Finkelhor and Dziuba-Leatherman (child self-report)	Logistic regression: no significant association between sexual abuse and ADHD (OR = 1.44, p = .59) Confounding factors included: wave (time), study site (New York, Puerto Rico), age, gender (except for stratified analyses), household education and income band, any parental psychopathology, and having taken ADHD medication (time-varying)
Gul & Gurkan (2018)	Investigate child and parent factors contributing to maltreatment in children with ADHD	Children with ADHD (n = 100) and a comparison group without ADHD (N = 100) Children were between 6 and 11 years old (M = 8.4 years, SD = 0.88 years); 73% male	Turkey Case-control	– ADHD: K-SADS-PL; CRS (parent report) – CSA: Abuse and Neglect Assessment Questionnaire for Children developed by Irmak (2008; child self-report); two questions on sexual abuse	Bivariate analysis: no significant differences in sexual abuse between ADHD and control groups
Hébert et al. (2006)	Conduct a cluster analysis to identify profiles of children who had been sexually abused	123 Children (110 girls and 13 boys) 7 and 13 years old (M = 9.22, SD = 1.53)	Canada Cluster analysis, case-control study	– ADHD: CBCL – CSA: adaptation (Parent & Hébert, 1995) of the History of Victimization Form	Cluster analysis: results revealed four clusters of sexually abused children. Three of the four clusters of sexually abused children had higher scores of attention problem than non-abused children (p < .05)
Jaisoorya et al. (2016)	Study the prevalence of self-reported ADHD	7,150 Final sample; 3,631 (50.8%) were boys and 3,519 (49.2%) were girls with a mean age of 15.3 years (range = 12–19 years)	India Cross-sectional	– ADHD: The BAARS-IV–Childhood Symptoms self-report – CSA: four questions modified from the Child Abuse Screening Tool–Children's Version	Logistic regression: students with ADHD combined type compared with the non-ADHD group had higher odds of reporting contact sexual abuse (OR = 3.63 [2.56, 5.15])

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Table I. (continued)

Reference	Study Aims	Sample	Study Setting and Design	Measures	Main Findings
Kaplow et al. (2008)	Investigate attention problems in children who have experienced sexual abuse and the roles of gender, trauma, and disclosure	129 Girls and 27 boys (mean age = 10.7 years)	United States Longtudinal	– Demographic information and abuse were extracted from written reports completed at a Time 1 forensic interview – CSA: abuse characteristics were coded for severity scale (0 = exposure to 3 = oral, anal, or vaginal intercourse) and intra versus extrafamilial abuse – Parent report of attention problems using CBCL	Bivariate analysis: significantly higher mean attention score among children abused by someone within the family compared to those abused by someone outside of the family Path analysis revealed that intrafamilial abuse significantly predicted greater attention problems (β = .23) Confounding factors included: dissociation and time to follow-up from T1 to T2
McLeer et al. (1994)	Comparing the prevalence of psychiatric disorders among sexually abused and non-abused children	26 Sexually abused children (mean age = 9) referred to sexual abuse clinic for psychiatric evaluation 23 Nonsexually abused children (mean age = 10.4) recruited from an outpatient department	United States Cross-sectional	– ADHD: Psychiatric disorders assessed using K-SADS-E – CSA: sexually abused children were referred from rape and sexual crisis centers and from private practitioners	Bivariate analysis: ADHD was the most prevalent psychiatric disorder diagnosed in children who had been sexually abused, though the difference between sexually abused and nonsexually abused children was not statistically significant
Ohlsson et al. (2018)	To examine whether ADHD symptoms predict self-reported CSA at age 18	4,500 Children participated: 1,902 males, 2,598 females 18 males and 256 females reported sexual victimization	Sweden Prospective longitudinal, population-based - Child and Adolescent Twin Study	– ADHD (parent report; 9 or 12 years old): Autism–Tics, AD/HD and other Comorbidities inventory (A-TAC). – CSA (children report at age 18): two questions	Logistic regression: females with clinical ADHD had higher risk of experiencing sexual abuse (OR = 2.02, p < .05); same pattern for males, but not statistically significant Confounding factor included: overall neurodevelopmental disorder symptoms (autism spectrum and ADHD)
Ozbaran et al. (2009)	Evaluating the effects of sexual abuse on children	20 Parents and children followed for 2 years 9 Girls and 11 boys between the ages of 5 and 16 (M = 9.4)	Turkey Longitudinal	– ADHD: psychiatric evaluations according to DSM-IV; evaluation form for details of sexual abuse; demographic form – CBCL completed by mothers – CSA (2-year follow-up): evaluation form; interview with specialist of the child abuse team	Bivariate analysis: in comparison to Turkish norms, the sexually abused group of children had significantly higher attention problems both in the first year (p < .001) and third year assessment (p < .01)

Table 1. (continued)

Reference	Study Aims	Sample	Study Setting and Design	Measures	Main Findings
Ruggiero et al. (2000)	Examine predictors of psychopathology in sexually abused children	Primarily African-American sample (84%) 65 Females and 15 males (mean age = 9.4 years)	United States Cross-sectional study part of a larger longitudinal study	– ADHD: CBCL – CSA: separate structured interviews for children and parents (frequency of abuse, victim–perpetrator relationship, disclosure of sexual abuse)	Descriptive analysis: higher scores in attention problems were associated with a higher frequency of sexual abuse (also included: gender, age at onset, severity, duration, and perpetrator type) Confounding factor included: physical abuse history
Sonnby et al. (2011)	Examine the prevalence of ADHD and depression in individuals with experiences of sexual abuse	All secondary school students (15–16 and 17–18 years old) $n = 4,910$ (2,473 boys and 2,437 girls)	Sweden Survey—Survey of Adolescent Life	– ADHD: Swedish translation of the short form of the World Health Organization ADHD self-report scale – CSA: assessed with three self-report questions	Logistic regression: ADHD boys, $OR = 1.938$, CI [1.184, 3.171] ADHD girls, $OR = 2.577$, CI [1.732, 3.835] Confounding factors included: separated parents, parental unemployment, type of housing, and non-Scandinavian ethnicity
Walrath et al. (2003)	Investigate behavior and functioning in children (aged 5–17.5 years) with histories of sexual abuse	759 Children with a history of sexual abuse; 2,722 children without sexual abuse history	United States Cross-sectional	– ADHD: behavior CBCL; diagnoses: made by clinical personnel according to DSM-IV – CSA: child or caregiver provided information in response to a dichotomous question (yes/no)	Logistic regression: child sexual abuse was associated with lower rates of ADHD compared to children with no history of sexual abuse (17.4% vs. 26.7%; $OR = 0.58$, $SE = .06$, $p < .01$ For child ratings on CBCL, there was no significant difference between those with and without sexual abuse histories in terms of attention problems ($OR = 1.19$, $SE = .18$). For caregiver ratings, there was a significant difference in attention problems for children with and without sexual abuse histories ($OR = 1.22$, $SE = 10$, $p < .05$) Confounding factors included: demographic (gender, age, and race); life challenges (psychiatric hospitalization, physical abuse, runaway attempts, suicide attempts, drug/alcohol use, and sibling in foster care)

Table 1. (continued)

Reference	Study Aims	Sample	Study Setting and Design	Measures	Main Findings
Adult samples					
Affifi et al. (2014)	Using a nationally representative sample, examine the relation between child abuse and mental health	Canadians aged 18 or older (n = 23,395)	Canada Cross-sectional	– ADHD: World Health Organization version of the Composite International Diagnostic Interview – CSA: 2012 Canadian Community Health Survey; self-reported; occurring before the age of 16	Logistic regression: CSA-ADD – OR1 (95% CI) = 2.9 [2.1, 4.0] CSA-ADD – OR2 (95% CI) = 1.7 [1.2, 2.4] OR1 confounding factors included: adjusted for age, sex, visible minority status, Canadian born status, education, income, marital status, and province OR2 Confounding factors included: adjusted for sociodemographic variables listed above, other types of child abuse and any diagnosed mental disorders
Ebejer et al. (2012)	Identifying the prevalence of ADHD and exposure to childhood risk factors	1,369 Men and 2,426 women, recruited through the National Health and Medical Research Council Twin Registry	Australia Twin study, cross-sectional	– ADHD: The semistructured assessment for the Genetics of Alcoholism (include 34 items on ADHD diagnosis) – CSA: coded as a 0 or 1. Unclear how many questions assessed sexual abuse	Logistic regression: sexual abuse during childhood significantly predicted inattentive and hyperactivity-impulsive symptoms ($p > .001$ and $p > .01$, respectively) Confounding factors included: conduct problems included in the regression as a covariate. Other confounding factors included childhood SES, family structure, conflicts with parents, parental arguing, parental tension, parental drinking, and parental rules

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Table 1. (continued)

Reference	Study Aims	Sample	Study Setting and Design	Measures	Main Findings
Ferrer et al. (2017)	Compare maltreatment history among adults with ADHD, BPD, and comorbid ADHD with borderline	204 Patients with BPD clinical features 170 (83.3%) women (mean age = 31.17, SD = 9.61; clinical population)	Spain Cross-sectional	– ADHD: The Wender Utah Rating Scale (WURS) – CSA: CTQ-SF	Bivariate analysis: women with BPD and ADHD have higher scores of CSA than women without BPD and without ADHD: $t(98) = 2.29$, $p = .02$ No significant differences between women with ADHD only and women without BPD and without ADHD ($p > .05$) Logistic regression: emotional abuse ($\beta = .18$), physical abuse ($\beta = -.22$), and sexual abuse ($\beta = .15$) predicted combined BPD-ADHD diagnosis Confounding factor included: gender
Fuller-Thomson and Lewis (2015; same sample as Afifi et al., 2014)	Examine retrospectively reported abuse	10,496 Men and 12,877 women from the Canadian Community Health Survey-Mental Health	Canada Cross-sectional	– ADHD: self-reported to having a condition that has been diagnosed by a health professional – CSA: two questions on sexual abuse before the age of 16	Logistic regression: sexual abuse was significantly related to higher odds of having ADHD (men $OR = 2.57$, $p < .001$; women $OR = 2.55$, $p < .001$) Confounding factors included age and gender; logistic regression analysis adjusted for parental domestic abuse and physical abuse
Fuller-Thomson et al. (2016; same sample as Afifi et al., 2014)	Develop a profile of women with self-reported ADHD in comparison to those without ADHD	Women between the ages of 20 and 39 drawn from the 2012 Canadian Community Health Survey—Mental Health 107 Women self-reported diagnosis of ADHD; 3,801 not diagnose with ADHD	Canada Cross-sectional	– ADHD: self-reported to "do you have attention deficit disorder?" – CSA: two questions on sexual abuse before the age of 16	Descriptive analysis; prevalence of CSA: no ADHD: 10.9% $p < .001$ ADHD: 35.8%, $p < .001$ This difference was significant
Jaisoorya et al. (2019)	Document prevalence of retrospectively recalled symptoms of ADHD	5,145 College students, 1,750 (34.8%) were men and 3,395 (65.2%) were women (mean age = 19.4) -143 Participants with ADHD (67 male, 76 female); 5,002 non-ADHD participants (1,716 male; 3,286 female)	India Cross-sectional	– ADHD: Barkley Adult ADHD Rating Scale-IV (students rated their ADHD symptoms between 5 and 12 years) – CSA: lifetime exposure to sexual abuse was assessed using four questions from the Child Abuse Screening Tool Children's Version 24	Logistic regression: participants with clinically significant ADHD symptoms had higher odds of contact ($OR = 3.10$) and non-contact sexual abuse ($OR = 3.29$) Confounding factors included: sex and residence

(continued)

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Table 1. (continued)

Reference	Study Aims	Sample	Study Setting and Design	Measures	Main Findings
Matsumoto & Imamura (2007)	Examine associations between ADHD and dissociation in inmates	799 Male inmates (mean age = 23.7 years); 94 participants reported CSA	Japan Cross-sectional	– ADHD: Japanese version of the WURS—self-reported, retrospective account of ADHD symptoms – CSA: yes/no question	Bivariate analysis: ADHD symptoms were significantly higher in participants who reported CSA than those who did not ($p < .001$)
Ouyang et al. (2008)	Examine the associations between ADHD during childhood and child maltreatment	14,322 Youths interviewed twice During Wave 3, participants ranged in age from 18 to 28 years (mean age = 21.8 years)	United States Longitudinal, population-based—National Longitudinal Study of Adolescent Health	– ADHD (Wave 3): 18 retrospective questions – CSA (Wave 3): computer-assisted self-interview completed at T2 –	Logistic regression: ADHD (all types together): $OR = 2.31$, $p < .001$) Inattentive type: $OR = 2.61$, $p < .001$ Combined type: $OR = 2.90$, $p < .001$ All three ADHD categories were associated with contact sexual abuse Confounding factors included: race, sex, age cohort, family structure, whether the mother was a teenager when the child was born, whether the biological father was ever jailed, parent education level, and family size adjusted poverty status
Rucklidge et al. (2006)	Investigate the prevalence of child abuse in individuals who were identified with ADHD in adulthood, and the impact of ADHD and abuse on psychosocial functioning	-Only participants who believed they had problems with attention when they were children not diagnosed with ADHD until adulthood -114 Participants: 17 men and 40 women with ADHD; 40 men and 17 women without ADHD	Canada Cross-sectional	– ADHD: The Conners' Adult ADHD Rating Scale–Self-Report: Short Version – CSA: Childhood Trauma Questionnaire	Bivariate analysis: -23.1% of women with ADHD and 12.5% of men with ADHD reported experiencing moderate to severe sexual abuse -Females who experienced sexual abuse had higher ADHD scores compared to the three other groups (female controls, male controls, and males with ADHD) Confounding variables included: SES
Sanderud et al. (2016)	Investigate the relationship between child maltreatment and ADHD in adulthood	Sample of 4,718 young adults (24 years of age). Interviews conducted with 2,980 participants	Denmark Cross-sectional, national study	– ADHD: Adult ADHD Self-Report Scale – CSA: Structured interviews of 20 questions covering child maltreatment	Logistic regression: sexual abuse predicted probable ADHD ($OR = 2.07$, $p < .05$)

Table 1. (continued)

Reference	Study Aims	Sample	Study Setting and Design	Measures	Main Findings
White & Buehler (2012)	Examine the association between ADHD symptoms experienced before age 12 and sexual victimization during adolescence	Subsample of 374 participants (mean age = 18.9 years, SD = 2.90) who did not experience sexual abuse before age 13; 43 participants had experienced child sexual abuse	United States Cross-sectional	– ADHD (before 12): DuPaul et al. (1998) modification of Barkley and Murphy's (1998) rating scale – CSA: modified version of the Koss et al.'s (1987) Sexual Experiences Survey	Mediation analyses: ADHD symptoms were associated with greater sexual victimization experiences (Sobel t = 2.67, p = .007) and were linked to sexual victimization through risky sexual behaviors Moderators included: SES, primary caregiver employment status, race, and family structure. Association between ADHD and sexual victimization was stronger for Black women
White et al. (2014; same sample as White & Buehler, 2012)	To investigate the mediating effects of risky behaviors in the association between child ADHD and adolescent sexual victimization	417 Women recruited through university psychology classes (mean age = 18.90 years, SD = 2.90)	United States Cross-sectional	– ADHD: The DuPaul et al. (1998) modification of Barkley and Murphy's (1998) rating scale – CSA: female adolescent sexual victimization: the Kosson et al. (1997) revision of the Sexual Experiences Survey	There was a significant direct association between childhood ADHD symptoms and adolescent sexual victimization ($\beta = .15$) Risky sexual behavior explained the association between ADHD symptoms and adolescent sexual victimization Moderation analysis showed consensual sexual activity and staying out all night interacted with ADHD to increase risky behavior and sexual risk-taking Confounding factors included: early onset of alcohol or marijuana use, consensual sexual activity, and staying out all night interacted with childhood ADHD symptoms to increase general risky behavior and sexual risk-taking

Note. OR = odds ratio; ADHD = attention deficit hyperactivity disorder; CSA = child sexual abuse; CTQ-SF: Conflict Tactics Scale-Short Form; ODD = oppositional defiant disorder; CBCL = Child Behavior Checklist; YSR = Youth Self Report; YASR = Young Adult Self Report; K-SADS-PL-T = Kiddie Schedule for Affective Disorders and Schizophrenia; DISC-IV = Diagnostic Interview Schedule for Children IV; CRS = Conners' Rating Scales; BAARS-IV = The Barkley Adult ADHD Rating Scale–IV; BPD = borderline personality disorder; DSM-IV = *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*; SES = socioeconomic status.

they controlled for several potential confounding factors including gender, ethnicity, other mental disorders (psychotic, internalizing and externalizing, developmental, and substance use), complex traumatic experiences, parental impairment, placement history, and physical abuse.

ADHD as a Predictor of CSA—Adult Samples (n = 4)

All studies using an adult sample and conceptualizing ADHD as a risk factor for CSA accounted for potential confounding factors, and all uncovered significant associations. Adjusting only for gender and place of residence, Jaisoorya et al. (2019) found that the risk of contact and noncontact sexual abuse in college students ($n = 5,145$, community sample) with clinically significant ADHD symptoms was three-fold as compared to non-ADHD students. While controlling for several sociodemographic and family factors, Ouyang et al. (2008) found that ADHD inattentive and combined types were associated with an increased risk of contact sexual abuse ($n = 14,322$, population-based sample). Finally, two studies using the same sample of young women recruited through university psychology classes ($n = 417$, community sample; White & Buelher, 2012; White et al., 2014) found that after accounting for sociodemographic variables, ADHD symptoms were associated with greater sexual victimization experiences during adolescence and that this association was mediated by risky sexual behaviors.

ADHD as a Predictor of CSA—Child Samples (n = 4)

Conducting only bivariate analyses, Gul and Gurkan (2018) found no differences in CSA rates between the ADHD ($n = 100$) and control group ($n = 100$) in their Turkish clinical sample. Gokten et al. (2016) also found no difference in rates of CSA between children with ($n = 104$) and without ADHD ($n = 104$; clinical sample). Conversely, Jaisoorya et al. (2016; $n = 7,150$, community sample) found that teenagers with ADHD combined type (inattention and hyperactivity) had higher odds (odds ratio [OR] = 3.63) of contact sexual abuse than non-ADHD teenagers.

One study using a child sample and conceptualizing ADHD as a predictor of CSA included potential confounding factors in their analyses. Ohlsson et al. (2018; $n = 4,500$, population-based) found that girls with clinical ADHD had two times the risk of being sexually abused when compared to non-ADHD girls. A similar pattern was found with boys, but it was nonsignificant. Ohlsson et al. (2018) only controlled for overall neurodevelopmental disorder symptoms as potential confounding factors in these analyses.

CSA and ADHD as Comorbid Problems—Adult Samples (n = 2)

No study conceptualizing CSA and ADHD as comorbid problems, without clear directionality, and using an adult sample included potential confounders in their analyses. Fuller-

Thomson et al. (2016) found a significant difference in prevalence rates of CSA among adult women with ($n = 107$) and without ADHD ($n = 3,801$, subsample from the population-based sample used by Afifi et al., 2014). Rucklidge et al. (2006) reported a positive association between ADHD scores and CSA among women ($n = 114$, community sample).

CSA and ADHD as Comorbid Problems—Child Samples (n = 3)

Among the three studies documenting the association between CSA and ADHD without clear hypothesized directionality and using child samples, none included covariates. Ford et al. (2000; $n = 165$, clinical sample) found positive associations between ADHD and sexual abuse, with the highest rate being among children with both ADHD and oppositional defiant disorder. In their cluster analysis study, Hébert et al. (2006) found that three of the four clusters of sexually abused children ($n = 123$, clinical sample) had higher scores of inattention (hyperactivity not measured) than the comparison group of nonabused children ($n = 123$, community sample). Finally, McLeer et al. (1994) failed to identify a significant association between ADHD diagnosis and sexual abuse in their small clinical sample ($n = 26$ sexually abused children, 23 nonsexually abused children).

Methodological Quality of Reviewed Papers

The methodological quality of the 28 studies included in this review varied greatly. Of all of the articles, seven were rated highly (Afifi et al., 2014; Boyd et al., 2019; González et al., 2019; Ruggiero et al., 2000; Sonnby et al., 2011; White & Buehler, 2012; White et al., 2014), nine fairly (Ebejer et al., 2012; Ferrer et al., 2017; Fuller-Thomson & Lewis., 2015; Fuller-Thomson et al., 2016; Jaisoorya et al., 2016; Kaplow et al., 2008; Ohlsson et al., 2018; Ozbaran et al., 2009; Sanderud et al., 2016), nine poorly (Ford et al., 2000; Fuller-Thomson et al., 2016; Gomes-Schwartz et al., 1985; Gul & Gurkan, 2018; Hébert et al., 2006; Jaisoorya et al., 2019; Matsumoto & Imamura, 2007; McLeer et al., 1994; Rucklidge et al., 2006; Walrath et al., 2003), two fell between fair and poor (Ford et al., 2009; Ouyang et al., 2008), and one between fair and good (Gokten et al., 2016). The main limitations related to the design, the sample, the measures, and the statistical analyses. Almost all studies had cross-sectional designs ($n = 27$), and only one study was prospective longitudinal (Boyd et al., 2019), the most robust design for determining an association between CSA and ADHD. In addition, the outcome assessors were often unblinded to the CSA status of the participants ($n = 23$) which could have biased their assessment of ADHD symptoms. Of the 28 studies, only two presented a justification for their sample size in the form of a power analysis. Of the 26 studies that did not, eight had large samples which did not raise concerns over statistical power considerations, leaving a subsample of 18 studies that might have been underpowered. On the other hand, most studies ($n = 23$)

recruited participants from the same or similar populations (including the same time period) with predetermined inclusion and exclusion criteria that were consistently applied to all participants.

Regarding the measures, in over half ($n =$ 17) of the studies, the CSA measure were considered valid and reliable while 10 were not. Additionally, for one study, due to unclear information about the measures, it was not possible to determine whether the CSA measure used was valid. For 23 of the studies, the ADHD measure was considered valid and reliable, with only five studies that did not reach such standards. Moreover, for the assessment of CSA, 23 studies used questionnaires and parent-report and/or child self-report measures whereas five studies used more robust methods of assessment such as chart reviews or corroborated cases by child protective services. For the assessment of ADHD, 26 studies used questionnaires and parent-report, teacher-report, and/or child self-report measures whereas two studies used more robust measures, such as diagnosis by a clinician.

In terms of the analyses performed to examine the associations between ADHD and CSA, confounding variables of other maltreatment types and sociodemographic/other variables (e.g., sex, age, family structure, and income) were adjusted statistically for their impact on the relationship in only eight studies. In 17 studies, either sociodemographic/other variables or other maltreatment types were controlled for, and in most of these cases, it was the sociodemographic factors that were included. Only one study controlled for the presence of PTSD (Afifi et al., 2014); one study controlled for dissociation symptoms (Kaplow et al., 2008). Three studies only conducted bivariate analysis to document the association between CSA and ADHD.

Discussion

This systematic review synthesized and critically assessed the methodological quality of available research on the association between CSA and ADHD. Over the past 35 years, 12 studies documented these associations using an adult sample, 15 using a child or adolescent sample, and one had a longitudinal design encompassing both adolescence and early adulthood (Boyd et al., 2019). Most studies (82%) uncovered significant associations between CSA and ADHD or ADHD symptoms and, surprisingly, this proportion did not differ much depending on the number of confounding factors included in the main analyses. A little over half of the studies reviewed (57%) included at least one potentially confounding factor in their examination of the associations between CSA and ADHD, but only 21% of included studies controlled for other maltreatment types, despite the well-documented high rates of co-occurrence between different forms of child maltreatment and family adversity (e.g., Turner et al., 2010). The most frequent confounding factors incorporated were sociodemographic factors and family characteristics such as family size, parental conflicts, and parental psychopathology. Comorbid psychiatric disorders were also controlled for in 17.8% ($n = 5$) of included

studies, and only two studies (7.1%) controlled for PTSD or trauma-related symptoms (i.e., dissociation), consequently limiting greatly our ability to disentangle the associations between CSA, ADHD, and trauma symptoms. More than half of the included studies were based on samples from the United States or Canada (see Table 1 study setting for the list of countries). Associations would need to be explored further in more diverse samples and samples from other countries which might have varying rates of ADHD and CSA. Indeed, cross-cultural studies have inconsistent findings, some showing similar rates of ADHD across cultures (Bauermeister et al., 2010; Polanczyk et al., 2014), and others showing overrepresentation of some ethnic groups (e.g., African American, Hispanic American) in children diagnosed with ADHD (Flowers & McDougle, 2010; Gomez-Benito et al., 2019). CSA is also known to have highly varying rates globally (Stoltenborgh et al., 2011).

Furthermore, we were unable to clarify the directionality of the association between CSA and ADHD. A little over half of studies conceptualized CSA as a risk factor for ADHD (53%), while 29% conceptualized ADHD as a risk factor for future CSA, and a minority of studies (18%) did not make clear assumptions regarding the temporal association between these variables. While there seems to be a tendency to consider CSA a risk factor for the development of ADHD symptoms, only one study had an appropriate design—prospective longitudinal—to ascertain such directionality (Boyd et al., 2019). According to Boyd et al.'s (2019) findings, CSA only predicts ADHD symptoms in adolescence when parental reports are used.

Recently, Craig et al. (2020) published a systematic review on child maltreatment and ADHD and reported only five longitudinal studies, showing that early maltreatment is a risk factor for developing ADHD symptoms later on. However, the authors note that these findings are not consistent. Whereas some studies reported maltreatment predicting attention problems (Thompson & Tabone, 2010), the associations were not as clear in other studies. For example, Stern et al. (2018) found ADHD and maltreatment associations concurrently across development. Relevant to the topic of this review, dissociative symptoms are common following sexual abuse (Trickett et al., 2011) and can make differential diagnosis difficult, especially in children, since periods of dissociation may cause children to appear dazed, inattentive, and unfocused in the classroom (Ford & Courtois, 2013). On the other hand, Lugo-Candelas et al. (2020) highlight that the reverse relationship of ADHD predicting adverse experiences has been understudied. Based on a longitudinal population-based study, they found that children with ADHD at Wave 1, specifically the inattentive, were more likely to experience adverse childhood experiences later on. Based on a sample of adults with childhood histories of ADHD ($n = 97$) and a comparison group of adults with no ADHD history ($n = 121$), Wymbs and Gidycz (2020) also reported that those with ADHD histories were more likely to experience sexual assault, assessed at or after the age of 14. Although these findings contribute to the literature on ADHD as a risk factor for abuse, this was a cross-sectional study and sexual abuse before the age of 14 was not analyzed.

While some included studies were rated strongly, there are several other limitations that were uncovered through the systematic assessment of the methodological quality of the available research, and these limitations compromise even further our ability to untangle the associations between CSA and ADHD based on the current evidence base. Hence, only a quarter of included studies was rated as high quality regarding the pursued objectives of the current review. Highly ranked studies had strengths such as large and representative samples and validated measures of CSA and ADHD (e.g., structured interviews, multiinformant measurement, validated questionnaires), in addition to using appropriate statistical analysis controlling for major confounders (e.g., other traumatic events, trauma symptoms). One third of included studies were rated as fair or good-to-fair, meaning that they had some important limitations regarding their sample (e.g., small, unrepresentative), recruitment procedures (e.g., convenience sampling), measures (e.g., unvalidated, self-report only), or statistical procedures (e.g., few confounding factors included). Finally, 40% of included studies were considered poor or poor-to-fair quality, highlighting major limitations such as the use of small, unrepresentative samples, unclear methods limiting reproducibility, unvalidated measures of ADHD and CSA, and poor control for confounding factors such as sociodemographic factors, other maltreatment types, and mental health symptoms.

In addition to these general ratings, it is worth mentioning that even though a gold standard assessment of ADHD usually requires a structured battery of neuropsychological tests, parent and teacher reports, and in-depth clinical interviews to avoid misdiagnoses (Wolraich et al., 2011), almost all studies included in this review based their assessment of one or two informants using questionnaires. Thus, risks of confusion between actual ADHD symptoms and symptoms related to other psychopathologies (e.g., anxiety, mood; Mao & Findling, 2014) or typical reactions to psychosocial stressors or traumatic experiences (Szymanski et al., 2011), especially in the context of the study of CSA (Mii et al., 2020), are extremely high. Findings from Walrath et al. (2003) seem to confirm this risk of misdiagnosis when using self- or parent-report measures of ADHD instead of official diagnoses from clinicians. Indeed, they found that nonsexually abused children, when compared to abused children, were at higher risk of having ADHD as a primary diagnosis given by a clinician, while parent reports indicated higher attention problems in sexually abused children. This could be explained by the fact that clinicians are better able to discriminate between trauma and ADHD symptoms than parents, but also by the fact that questionnaires, such as the Child Behavior Checklist, do not offer enough sensitivity and contextualization to allow determining the cause behind the observed behavior, increasing the risk of mislabeling symptoms (e.g., labeling dissociation symptoms as attention deficit). However, an alternative explanation might be that clinicians misinterpret ADHD symptoms as trauma symptoms when assessing sexually abused children. Finally, the measurement of CSA was also problematic in several studies. Indeed, given problems with the sole use of retrospective recall or single question assessments (e.g., memory, underreporting), but also the limitations of relying only on official child protection records (e.g., major underreporting), a multimethod assessment is desirable (Baldwin et al., 2019); none of the studies used such an approach.

In light of these major limitations, several recommendations may be made. First, there is a pressing need for prospective longitudinal studies documenting the associations over time of CSA and ADHD. Only such studies could clarify the temporal relationship between CSA and ADHD and might even show that transactional processes are at play between these two variables. For example, ADHD could increase the risk of being sexually abused, and in turn, CSA could increase already existing ADHD symptoms; or CSA could lead to ADHD symptoms that in turn increase someone's risk of later sexual revictimization. Second, there needs to be rigorous assessment of both CSA and ADHD in participants, including differential diagnosis using neuropsychological tests for ADHD, and the integration of both self- and parent reports of CSA using validated questionnaires or interviews, and official child protection services data which would necessitate the use of clinical samples. Complementary to fine-grained analyses of clinical samples, there is a need for large and representative samples to minimize selection bias and ensure appropriate statistical power, and for cross-cultural studies or studies with diverse samples. Finally, studies should assess and control major confounding factors such as other forms of child maltreatment and family adversity, sociodemographic and cultural factors, and comorbid psychopathologies, especially trauma-related symptoms (e.g., PTSD, dissociation). The consideration of the potential impact of CSA characteristics, and even of the characteristics of the other maltreatment experiences where applicable, could also be appropriate given findings from Kaplow et al. (2008) and Ruggiero et al. (2000).

Our review itself is not without limitations. Despite our efforts to ensure every relevant study would be included (e.g., including every major database related to the topic, having our search strategy peer-reviewed), there is always a risk of missing some due to the selection of databases, the search strategy used, or mistakes during the screening process. Also, we did not include gray literature and unpublished dissertations older than 5 years. Further, we were not able to combine the studies using a meta-analysis due to the heterogeneity of included papers in terms of measures, samples, and designs. Therefore, we are not able to test for impactful moderators or to determine the strength of the association between CSA and ADHD.

Implications and Conclusion

In line with research on this topic, clinicians have also reported on the associations between CSA and ADHD (Burke Harris, 2018). Our rigorous systematic review revealed 28 studies. Of those, 16 were rated as at least fair using the Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies; only one was longitudinal in nature and was highly rated in

Table 2. Implications for Research, Practice, and Policy.

Implications for research

- This review provides a thorough synthesis of the available research on associations between child sexual abuse (CSA) and attention deficit hyperactivity disorder (ADHD)
- To better understand the directionality, prospective longitudinal studies are needed with validated measures, including thorough assessments of CSA and ADHD
- Multivariate analyses should include an examination of confounding factors

Implications for practice

- The paucity of studies with strong methodological rigor makes it difficult to make definitive conclusions and clinical recommendations
- Practitioners should be aware of the comorbidities between CSA and ADHD; the results point to the importance of differential diagnosis and to avoid mistaking trauma symptoms for attention or behavioral problems

Implications for policy

- With increased awareness of the associations between CSA and ADHD that can be obtained from future longitudinal studies, suggestions may be made regarding policy to implement programs with the aim of reducing this comorbidity

terms of quality; only two controlled for trauma-related symptoms, one of which was highly rated and one of which was fair. Although most studies pointed to a general link between CSA and ADHD, clearly, high quality, controlled, longitudinal evidence is sparse at best. Implications are summarized in Table 2.

Given the paucity of research in this area, it is difficult to make specific clinical recommendations. Nevertheless, clinicians working with victims of CSA or individuals with ADHD symptoms should be aware of possible comorbidities. Although research has not been able to address directionality of these different problems, or disentangle the effect of trauma symptomatology, that does not mean that individual clinicians cannot address these issues with clients on a case-by-case basis. One method that could be used is rigorous testing for ADHD using neuropsychological batteries and in-depth interviews to establish the time line between these problems and identify other trauma symptoms, schizophrenia, or psychotic disorders (Burke Harris, 2018). If CSA occurred before ADHD symptoms appeared, it might be relevant to undergo a detailed differential diagnosis process to ensure that trauma-related symptoms are not mislabeled as ADHD, so appropriate treatment can be offered (Craig et al., 2020). In cases of real comorbidity between CSA and ADHD, it could be appropriate to formulate a treatment plan, in collaboration with the affected individual, that could address both of these issues concurrently or in sequence based on collaborative priority rating among interested parties (e.g., the practitioner, the parent, and the child; the practitioner and the individual). Clinical guidelines for treating ADHD and PTSD are available; however, guidelines are lacking when it comes to treating the comorbidity of these problems (Barnett et al., 2018).

Finally, given the adverse and persisting effects that both CSA and ADHD can have on children and adults, this area of research requires further development. Longitudinal studies with diverse samples using validated and multimethod measures of both CSA and ADHD would be particularly beneficial to advancing the state of knowledge.

Appendix

Ovid MEDLINE(R) ALL <1946 to January 8, 2020 >	
#	Search Statement
1	exp Attention Deficit Disorder with Hyperactivity/
2	exp "Attention Deficit and Disruptive Behavior Disorders"/
3	exp Central Nervous System Stimulants/
4	exp Child Behavior Disorders/
5	adhd.mp.
6	"attention deficit disorder with hyperactivity".mp.
7	"attention deficit hyperactivity disorder".mp.
8	"attention-deficit hyperactivity disorder".mp.
9	"attention deficit disorder".mp.
10	(attention adj3 deficit).mp.
11	addh.mp.
12	(ad hd or ad?? hd).mp.
13	"Attention Deficit and Disruptive Behavior Disorders".mp.
14	**1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13**
15	exp Rape/
16	exp Incest/
17	exp Sex Offenses/
18	exp Pedophilia/
19	exp Sex/
20	exp Violence/
21	19 and 20
22	exp Crime Victims/
23	19 and 22
24	exp Child Abuse, Sexual/
25	(sex$ adj3 abuse$).mp.
26	incest$.mp.
27	(sex$ adj3 child$).mp.
28	(sex$ adj3 offens$).mp.
29	molest$.mp.
30	rape$.mp.
31	(sex$ adj3 crim$).mp.
32	(sex$ adj3 abuse$).mp.
33	(sex$ adj3 assault$).mp.
34	(sex$ adj3 offen$).mp.
35	(sex$ adj3 exploit$).mp.
36	(sex$ adj3 victim$).mp.
37	(sex$ adj3 coerc$).mp.
38	(sex$ adj3 maltreat$).mp.
39	(groom$ adj3 sex$).mp.
40	(Sex$ adj3 violen$).mp.
41	(sex$ adj3 trauma).mp.
42	**15 or 16 or 17 or 18 or 21 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41**
43	**14 and 42**

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