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Childhood sexual abuse and posttraumatic stress disorder among pregnant and postpartum women: Review of the literature

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Abstract

Purpose—The aims of this review are i) to summarize and evaluate current knowledge on the association between childhood sexual abuse (CSA) and posttraumatic stress disorder (PTSD) in pregnant and postpartum women, ii) to provide suggestions for future research on this topic, and iii) to highlight some clinical implications.

Methods—Relevant publications were identified through literature searches of four databases (PubMed, CINAHL, PsycINFO, and PsycARTICLES) using keywords such as “child abuse,” “posttraumatic stress,” “pregnancy” and “postpartum”.

Results—Five studies were included in this review. Findings across all studies were consistent with higher prevalence of PTSD diagnosis or symptomatology among women with history of CSA. However, only findings from two studies were statistically significant. One study observed higher overall PTSD scores in women with CSA history compared to women with non-CSA trauma history or no trauma history during pregnancy (mean±SD 1.47 (0.51) vs. 1.33 (0.41) vs. 1.22 (0.29), $p<0.001$), at 2 months postpartum (mean±SD 1.43 (0.49) vs. 1.26 (0.38) vs. 1.19 (0.35), $p<0.001$), and at 6 months postpartum (mean±SD 1.36 (1.43) vs. 1.20 (0.33) vs. 1.14 (0.27), $p<0.001$). Another study observed that the prevalence of PTSD during pregnancy was 4.1 % in women with no history of physical or sexual abuse, 11.4 % in women with adult physical or sexual abuse history, 16.0 % in women with childhood physical or sexual abuse history, and 39.0 % in women exposed to both childhood and adult physical or sexual abuse ($p<0.001$); in a subsequent analysis, the investigators reported that pregnant women with PTSD had over 5-fold odds of having a history of childhood completed rape compared to counterparts without PTSD (OR = 5.3, 95 % CI 3.2, 8.7).

Conclusions—Overall, available evidence suggests positive associations of CSA with clinical PTSD or PTSD symptomatology among pregnant and postpartum women.

Keywords

Childhood trauma; antepartum; pregnancy; postpartum; PTSD

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Conflict of Interest

The authors have no conflict of interest to disclose.

Introduction

Definitions, prevalence and correlates of CSA

Childhood sexual abuse (CSA), generally recognized as developmentally inappropriate sexual activity between a child and another individual who is in a relationship of power, trust, or responsibility to the child, is a serious and highly prevalent adverse early life experience associated with increased risk for short and long-term negative health outcomes (Dinwiddie et al. 2000; Molnar et al. 2001b; Easton et al. 2013; Lindert et al. 2014).

According to a report by the Administration for Children and Families, there were 678,810 unique victims of child abuse and neglect in the United States in 2012; and 9.3% of these children experienced sexual abuse (US Department of Health & Human Services 2013). Recent meta-analytic studies report the range of global prevalence of CSA to be from 0% - 68% (Andrews et al. 2004; Pereda et al. 2009a; Stoltenborgh et al. 2011; Barth et al. 2013). These substantial variations in estimates of CSA prevalence reflect the heterogeneity in study design, socio-cultural contexts, modes of data collection, sample size, study populations, and operational definitions of CSA. On average, 1 in 12 boys and 1 in 5 girls are victims of CSA worldwide (Pereda et al. 2009b; Stoltenborgh et al. 2011).

The three major classifications of CSA are: (a) *non-contact sexual abuse* (e.g., exhibitionism, indecent exposure, sexual harassment or voyeurism); (b) *contact sexual abuse without penetration* (e.g., non-genital fondling, kissing, or genital touching); and (c) *contact sexual abuse with penetration* (e.g., anal, oral, or vaginal intercourse, is considered the most severe) (e.g., in (Negriff et al. 2014)). In addition to type of contact, CSA may also be characterized according to the duration, frequency, age of onset, and relationship of the child to the perpetrator (Andrews et al. 2004). Often, CSA co-exists with one or more other forms of childhood maltreatment (i.e., neglect, physical, emotional, and verbal abuse) (US Department of Health & Human Services 2013).

Available evidence indicate that women and girls are more likely to be victims of sexual abuse compared to their male counterparts (Tolin and Foa 2006; Pereda et al. 2009b; Stoltenborgh et al. 2011). As shown in a large meta-analysis reviewing studies of sex difference in trauma exposure and PTSD published from 1980 to 2005, girls had over 2-fold odds of CSA compared to boys (OR = 2.66, 95% CI = 2.05 - 3.44, $p < 0.001$) (Tolin and Foa 2006). Similarly, women were more likely to be victims of adult sexual abuse (ASA) compared to men (OR = 5.99, 95% CI = 4.42 - 8.93, $p < 0.001$) (Tolin and Foa 2006).

Among women of reproductive age, history of sexual abuse has been linked to adverse pregnancy experiences and outcomes. In a national cohort of 78,660 Norwegian women, those who experienced adult or childhood sexual violence reported more pregnancy-related symptoms like headache, leucorrhea, heartburn, urinary incontinence, pruritus gravidarum, and edema (Lukasse et al. 2012). Studies have also documented associations of history of sexual abuse with smoking or illicit drug use during pregnancy (Gisladdottir et al. 2014), delivery by caesarian section (Nerum et al. 2013), and 2-to 3-fold odds of preterm delivery (Noll et al. 2007; Leeners et al. 2010).

Associations between CSA and adult mental health disorders have been extensively studied. Later-life psychological sequelae of CSA include suicidal behavior (Molnar et al. 2001a;

Easton et al. 2013; Devries et al. 2014), depression (Dinwiddie et al. 2000; Kendler et al. 2000; Lindert et al. 2014), and posttraumatic stress disorder (PTSD) (Silverman et al. 1996; Saunders et al. 1999; Molnar et al. 2001b). Of the various psychopathologies associated with CSA, depression is perhaps the most commonly studied. However, PTSD is also widely documented.

Definitions, prevalence and correlates of PTSD

PTSD was first formally recognized as a distinct psychiatric condition in the Diagnostic and Statistical Manual of Mental Disorders, Third Edition (*DSM-III*), which was published in 1980 (American Psychiatric Association 1980). Since then, there have been a number of revisions to the definition and classification of PTSD. In the most recent update, the Fifth Edition (*DSM-V*) published in 2013, PTSD is re-classified from an anxiety disorder to a trauma-and stressor-related disorder (American Psychiatric Association 2013). PTSD usually presents as a pathological response following *exposure* to a traumatic event. The *DSM-V* considers *exposure* as direct experience, witnessing trauma in person, learning that it occurred to a close family member or a close friend, or first-hand repeated or extreme exposure to details of the traumatic event (American Psychiatric Association 2013). The *DSM-V* also recognizes four unique symptom clusters of PTSD, namely: (a) re-experiencing the event; (b) avoiding reminders of the event; (c) hyper-arousal; (d) negative moods or cognitions (this last symptom cluster was added in the *DSM-V*). Symptoms must be present for all four clusters for >1 month before a diagnosis of PTSD can be made. In addition, the *DSM-V* includes two PTSD subtypes—PTSD in children < 6 years old, and PTSD with dissociation (where one feels detached from one's mind, body and experiences) (American Psychiatric Association 2013).

In the United States, PTSD is common but often underdiagnosed (Switzer et al. 1999; Taubman-Ben-Ari et al. 2001). Lifetime prevalence of PTSD in the general population is between 6 and 8 % (Kessler et al. 1995, 2005; Pietrzak et al. 2011). Prevalence of current PTSD differs within subgroups based on factors such as level of trauma exposure, proximity to the trauma, and length of time since trauma. For example, the prevalence of PTSD was as follows: 10.1 % in Gulf War veterans in the 4 to 5 years after the war (Kang et al. 2003); 29 % (20 % of men and 36 % of women) in 136 survivors in the month after a mass shooting (North et al. 1994); 11.2 % in the New York population compared to the overall US prevalence of 4.3 % in the 1 to 2 months after the September 11 attacks (Schlenger et al. 2002); and in a sample of 1259 nulliparous women: 4.1 % in women with no exposure to physical or sexual abuse, 11.4 % in women exposed to adult physical or sexual abuse, 16.0 % in women exposed to childhood physical or sexual abuse and 39 % in women exposed to both childhood and adult physical or sexual abuse (Seng et al. 2008). While the majority of trauma survivors do not meet the diagnostic criteria for PTSD, many still experience symptoms that may interfere with daily functioning (Pietrzak et al. 2011; McLaughlin et al. 2014). Frequently, PTSD is comorbid with other psychiatric disorders, particularly depression and anxiety (Kessler et al. 1995; Pietrzak et al. 2011). The National Comorbidity Survey found that approximately 59 % of men and 44 % of women with PTSD met the diagnostic criteria for greater than or equal to three psychiatric disorders (Kessler et al. 1995). Although prior research on PTSD largely focused on individuals who have

experienced war and conflict-related trauma (particularly male soldiers), a substantial population of non-combat men and women experience PTSD.

Available evidence indicates that women, as compared with men, have a greater risk of PTSD (Kessler et al. 1995; Breslau et al. 1997; Tolin and Foa 2006; Pietrzak et al. 2011). In a large meta-analysis, girls and women had approximately 2-fold odds of PTSD diagnosis (OR = 1.98, 95% CI = 1.76 – 2.22, $p < 0.001$) compared to their male counterparts. Notably, this excess risk was evident despite the fact that girls and women had lower odds of experiencing traumatic events (OR = 0.77, 95% CI = 0.65 – 0.91, $p = 0.002$) than boys and men (Tolin and Foa 2006). The reasons behind women's increased susceptibility to PTSD are unclear, but investigators have suggested reproductive hormonal fluctuations (Ditlevsen and Elklit 2010), increased susceptibility of women to certain kinds of trauma (e.g. assaultive violence) (Breslau et al. 1999), and methodological issues related to trauma assessment (Tolin and Breslau 2007).

Women are at particularly elevated risk for PTSD during their reproductive years, specifically during pregnancy and postpartum, with PTSD symptoms likely to reach their peak closer to delivery (Onoye et al. 2013). In a sample of 1,581 pregnant women, Seng and colleagues observed higher prevalence of lifetime PTSD (20.2%) and current PTSD (7.9%) (Seng et al. 2009) compared to the 6-month prevalence of 4.6% and lifetime prevalence of 12.3% observed in a nationally representative sample of US women (Resnick et al. 1993). Table I and Fig. I describe the prevalence of current PTSD among pregnant women in some studies from the US and Europe (range 0% - 16%). Maternal antepartum PTSD has been associated with smoking (Lopez et al. 2011) and adverse infant outcomes like preterm birth, shorter gestation (Lipkind et al. 2010; Seng et al. 2011; Yonkers et al. 2014), and low birth weight (Lipkind et al. 2010; Seng et al. 2011).

Available evidence suggests that women with a history of CSA may re-experience flashbacks of their traumatic abuse, as well as increased anxiety and stress during labor and delivery which may prolong childbirth (see review (Leeners et al. 2006)). Furthermore, traumatic delivery experiences are thought to increase risk for postpartum PTSD (Ayers and Pickering 2001; Modarres et al. 2012; O'Donovan et al. 2014). Table II and Fig. II describe the prevalence of current PTSD among postpartum women as observed in some studies. Despite the high prevalence of CSA history among women of reproductive age, and the elevated risk of PTSD in pregnancy and postpartum periods, the association between CSA and PTSD during these periods is not well understood. The objectives of this paper are: i) to provide a brief overview of current knowledge on the association between history of CSA and PTSD in pregnant and postpartum women, ii) to provide suggestions for future research on this topic, and iii) to highlight some clinical implications.

Materials and methods

Search strategy

In order to summarize the literature on the association between history of CSA and PTSD in pregnant and postpartum women, we searched the following online databases: PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), PsycINFO, and

PsychARTICLES using keywords such as “child abuse,” “child sexual abuse,” “early life adversity,” “post-traumatic stress,” “reproductive age,” “pregnancy” and “postpartum” (a detailed description of search terms used to identify relevant publications is provided in Online Resource 1). We also examined the bibliographies of identified papers.

Selection criteria

To be included, studies had to: (1) define CSA as occurring sometime before age 18 years; (2) report quantitative associations between CSA and PTSD symptoms or diagnosis; (3) report specific results relevant to antepartum or postpartum periods (studies examining only labor and delivery experience were excluded); (4) study participants had to be 18 years of age at the assessment of PTSD status; (5) full-length papers (conference abstracts, case studies, gray literature, editorials were excluded); and (6) had to be in the English language. Fig. III summarizes the selection of articles reporting on the relationship between CSA and PTSD in pregnant or postpartum women.

Results

Pregnancy and Postpartum Periods

Our search yielded 5 quantitative studies reporting on the association between history of CSA and PTSD symptoms or diagnosis in pregnant and/or postpartum women (3 from the US, 1 from Canada and 1 from Israel). Where different papers were published on the same cohort, we included the publication(s) with the most up-to-date information. All studies assessed PTSD according to the *DSM-IV*. All studies observed higher prevalence of PTSD diagnosis or symptomatology among women with history of CSA. However, these associations were statistically significant in only two studies. In the sections below, we provide a brief description of each study sample, as well as relevant findings, study strengths and limitations.

Summary of samples and findings

A summary of the studies is given in Table III; the two largest studies were cross-sectional analyses from prospective cohorts in the USA and Israel, respectively. In the first, Seng and colleagues analyzed data from 1,259 pregnant women who were part of the cohort for the Stress, Trauma, Anxiety, and the Childbearing Year (STACY) study. Trauma history was collected using the Life Stressor Checklist with CSA defined as sexual abuse occurring prior to the age of 16 years. Using the National Women's PTSD Module, the authors observed PTSD prevalence of 8.7 % in the entire sample, 4.1 % in women with no history of physical or sexual abuse, 11.4 % in women with adult physical or sexual abuse history, 16.0 % in women with childhood physical or sexual abuse history, and 39.0 % in women exposed to both childhood and adult physical or sexual abuse ($p < 0.001$) (Seng et al. 2008). In a subsequent analysis of 1,581 women from the same cohort, the authors reported that pregnant women with PTSD had over 5-fold odds of having a history of childhood completed rape compared to counterparts without PTSD ($OR = 5.3$, 95% CI 3.2, 8.7) (Seng et al. 2009).

Lev-Wiesel and colleagues analyzed data from a cohort of pregnant Israeli women aged 18 years and older (original cohort; $N = 1,586$). CSA was defined as any acts of sexual abuse occurring prior to age 14 years. The PTSD Symptom Scale was used to measure *DSM-IV* PTSD symptoms during pregnancy (for the 2 weeks preceding data collection) and was also used to assess postpartum childbirth-related PTSD symptoms. In an early analysis of 837 women from the cohort, the authors observed that women with CSA history had significantly higher mean PTSD symptomatology scores compared to women who experienced non-CSA trauma and women who had no trauma history—at 4 to 7 months of pregnancy (mean $\pm$ SD: 1.47 (0.51) vs. 1.33 (0.41) vs. 1.22 (0.29), $p < 0.001$); at 2 months postpartum (mean $\pm$ SD: 1.43 (0.49) vs. 1.26 (0.38) vs. 1.19 (0.35), $p < 0.001$); and at 6 months postpartum (mean $\pm$ SD: 1.36 (1.43) vs. 1.20 (0.33) vs. 1.14 (0.27), $p < 0.001$) (Lev-Wiesel et al. 2009). A subsequent analysis based on 1,003 women from the same cohort, showed significantly higher overall mean PTSD symptoms for women with CSA history compared to women who experienced trauma other than CSA, and women with no trauma history during the second trimester (mean $\pm$ SD: 1.47 (0.50) vs. 1.33 (0.42) vs. 1.26 (0.35), $p < 0.001$), and at approximately 2 months postpartum (mean $\pm$ SD: 1.45 (0.49) vs. 1.29 (0.41) vs. 1.23 (0.39), $p < 0.01$) (Lev-Wiesel and Daphna-Tekoah 2010). As noted by the authors, inferences from these analyses are limited in part due to the high loss-to-follow-up rates observed in this cohort ($>37\%$ loss). Of note, the authors reported that women lost-to-follow-up had higher overall PTSD scores, were younger and more likely to report intrusive thoughts than those who remained in the cohort (Lev-Wiesel and Daphna-Tekoah 2010).

In contrast to the positive associations observed in the studies by Lev-Wiesel et al. (Lev-Wiesel et al. 2009) and Seng et al. (Seng et al. 2008), three other investigative teams (Cohen et al. 2004; Morland et al. 2007; Lang et al. 2010) did not observe statistically significant associations between a history of CSA and PTSD diagnosis or PTSD symptomatology. However, their findings were suggestive of higher PTSD symptomatology scores or prevalence among women exposed to CSA compared to unexposed women. These studies ranged in sample size from 44 to 200, and two of the studies were conducted in the US (Lang et al. 2010; Morland et al. 2007) and one in Canada (Cohen et al. 2004). All were cross-sectional analyses.

Lang et al. studied a sample of 44 women with singleton pregnancies. Participants were 18 years old, at an average of 17.3 weeks gestation (range: 7 to 32 weeks) and recruited through advertisements placed in an obstetric clinic and in local circulars. CSA was assessed using the Childhood Trauma Questionnaire (CTQ) while PTSD was assessed using the PTSD Checklist Civilian Version (PCL-C). The investigators did not observe a statistically significant correlation between CSA scores and PCL-C scores during pregnancy ($r = 0.30$, $p > 0.05$) nor at one-year post-partum ($r = 0.11$, $p > 0.05$) (Lang et al. 2010). The relatively small sample size, and lack of adjustment for possible confounding factors hinders inference from this study.

In order to examine the relationship between current PTSD and maternal health and birth outcomes, Morland et al. recruited 101 pregnant women aged 18 to 35 years who were initiating antenatal care in the first trimester. CSA was defined as sexual assault by age 13 years and traumatic life events were assessed using the Traumatic Life Events Questionnaire

(TLEQ). Severity of PTSD was evaluated using the PCL-C. PTSD was defined as meeting the DSM-IV PTSD diagnostic criteria, while subclinical PTSD was defined as meeting the PTSD criteria but experiencing the symptoms at a “subclinical level of intensity”. The investigators found that the prevalence of history of CSA was: 17.8% in the entire sample, 12.9% in women without PTSD; 17.4% in women with subclinical PTSD; and 37.5% in women with full PTSD ($p = 0.10$) (Morland et al. 2007).

In a cross-sectional study designed to assess the extent to which a difficult birth was associated with PTSD symptoms, as well as socio-demographic factors, adverse life experiences and social support, Cohen and colleagues analyzed data collected from 200 women who were 18 years old, had recently delivered full-term singleton infants and provided PTSD related information at 8 weeks postpartum. CSA was defined as unwanted sexual experience occurring before age 14 years. Prevalence of high posttraumatic stress scores was defined as a response of “yes” to 3 items out of 17 on the Davidson Trauma Scale. The investigators did not observe a statistically significant difference in the prevalence of high posttraumatic stress symptom scores at 8 weeks postpartum among women with a history of CSA (39.3%) and those without CSA history (31.4%; $p = 0.41$). None of the women in the study met criteria for PTSD clinical diagnosis (Cohen et al. 2004).

Limitations of available evidence

The studies included in this review had some common limitations. First, the primary purpose for which the studies were conducted was not to assess the association between CSA and PTSD. Hence, analyses on the CSA-PTSD relationship were preliminary and did not adequately control for confounders. Second, all 5 studies lacked information on maternal pre-pregnancy PTSD status, and thus were unable to distinguish between prevalent versus incident PTSD symptoms. Third, participants were recruited at obstetric centers, thus studies assessing PTSD in the early stages of pregnancy may not be generalizable to all pregnant women, particularly those who may not enroll in prenatal care. Fourth, CSA histories were assessed retrospectively, and so may be subject to misclassification errors. Fifth, the 3 studies (Cohen et al. 2004; Morland et al. 2007; Lang et al. 2010) that did not document statistically significant associations between CSA and PTSD may have had limited statistical power to detect moderate associations. Sixth, the maximum age used as the cutoff for CSA ranged from 13 to 16 years, and consequently may have contributed to the variability in estimated prevalence of CSA (14.2% - 31.0%) observed across studies. Lastly, each study used a different scale to evaluate PTSD, which may have contributed to some heterogeneity in PTSD prevalence across studies.

Proposed biological mechanisms

The most extensively studied pathway in the early life stress (e.g., CSA) and PTSD association is the hypothalamic-pituitary-adrenal (HPA) axis response to stress. Studies of the HPA axis generally show lower baseline plasma and salivary cortisol concentrations (Meewisse et al. 2007; Morris et al. 2012) and elevated corticotropin-releasing hormone (CRH) (Claes 2004) in individuals with PTSD compared to controls. Evidence from studies of hair cortisol concentration (HCC), an emerging integrative biomarker of chronic cortisol

release, are consistent with elevated HCC in PTSD shortly after trauma, which then becomes blunted over time (Steudte et al. 2011; Luo et al. 2012; Steudte et al. 2013). Investigators postulate that alterations to the HPA axis may heighten glucocorticoid receptor responsiveness such that PTSD patients may have an exaggerated response to lower levels of glucocorticoids (Meewisse et al. 2007; Yehuda et al. 2010; Morris et al. 2012; Raabe and Spengler 2013). Conversely, observed independent associations of early life stress with lower levels of cortisol (Weissbecker et al. 2006; Brewer-Smyth and Burgess 2008) suggest that hypocortisolism may be a consequence of early life stress independent of PTSD and an indicator of PTSD risk (Yehuda et al. 2010; Raabe and Spengler 2013). Other investigations of the biological link between early life stress and PTSD have implicated irregularities in inflammatory response and highlighted some novel biochemical and molecular markers that may prove useful for quantifying PTSD risk. Studies have shown shorter lengths of telomeres (the regions of repetitive nucleotide sequences located at the end of chromosomes) with early life stress history (Tyrka et al. 2010; Shalev et al. 2013) and with PTSD (O'Donovan et al. 2011; Ladwig et al. 2013; Zhang et al. 2013); increased global DNA methylation with PTSD (Smith et al. 2011); increased glucocorticoid receptor gene (NR3C1) methylation with CSA history (Perroud et al. 2011); increased pathway activity of NF- κ B (a protein complex that controls expression of genes that code for inflammatory cytokines) in individuals with childhood-abuse related PTSD (Pace et al. 2012); as well as higher C-reactive protein (CRP) and Interleukin-6 (IL-6) levels in individuals with a history of early life stress (Rooks et al. 2012). However, since most studies of biological pathways have been cross-sectional, the chronology of early life stress, PTSD and biological changes remain unclear. A detailed evaluation of plausible biological mechanisms underlying observed CSA-PTSD associations is beyond the scope of this paper; however, readers are referred to other relevant reviews that have provided in-depth discussions on selected biological mechanisms (Brunello et al. 2001; Yehuda et al. 2010; Shalev 2012; Raabe and Spengler 2013).

Discussion

CSA—a serious and highly prevalent adverse early life experience—is associated with a wide range of adverse health outcomes. A substantial literature has documented associations of history of CSA with PTSD among men and non-pregnant women (Silverman et al. 1996; Saunders et al. 1999; Molnar et al. 2001b). Women are more likely to be victims of sexual abuse and to develop PTSD compared to men. Of note, a smaller literature suggests that PTSD and other psychiatric disorders may be particularly elevated among pregnant and postpartum women (Seng et al. 2008; Onoye et al. 2013). Although various epidemiological and qualitative studies have documented abuse-related PTSD symptoms during labor and delivery in women with CSA, little empirical evidence exists on the link between CSA and PTSD in pregnancy and postpartum. There is a need for longitudinal studies on the incidence and progression of PTSD among women with history of CSA.

Of the five studies identified for this review, the two largest studies (Seng et al. 2008; Lev-Wiesel and Daphna-Tekoah 2010) observed positive associations of CSA with PTSD in pregnant and postpartum women. These studies analyzed data for at least 1,000 women. However, they did not adjust for possible confounders. The other three studies did not

document statistically significant CSA-PTSD associations, although as noted earlier, it is likely that the small sample size of these studies (sample size ranging from 44 – 200 participants) resulted in statistically underpowered assessments of the hypothesized associations. Of note, in all three studies, the investigators reported higher rates of PTSD symptoms among women with CSA as compared with controls (see Table III).

PTSD is a psychiatric disorder with substantial burden among women of reproductive age. The high prevalence of exposure to CSA among women may contribute to the considerable vulnerability of pregnant and postpartum women to PTSD. There is a need for better-designed studies examining the relationship between CSA and PTSD in pregnant and postpartum women. Below, we offer some design features for future studies:

1. Longitudinal studies beginning in the pre-pregnancy period would provide much needed information about the incidence and changes in symptoms of PTSD during the pregnancy and postpartum periods, and may point out sensitive periods when women with CSA histories, or other trauma, may be most susceptible to develop PTSD.
2. Studies should distinguish between individuals with clinical PTSD from those who are symptomatic but do not meet the full criteria to improve understanding of factors related to PTSD severity.
3. Combination of quantitative and qualitative methods will enrich the data collected and enable better interpretation of findings.
4. Investigations are needed into factors that may improve resilience to PTSD after exposure to CSA.
5. Investigators may consider recruiting participants from non-medical venues to capture demographics that may not use prenatal clinics at all—or who only use these services much later in pregnancy.
6. Continued interdisciplinary efforts incorporating the fields of epidemiology, psychology, obstetrics, pediatrics, neuroscience, endocrinology, genetics, and epigenetics will help elucidate pathways underlying the CSA-PTSD relationship, and provide better understanding of early life stress, PTSD and their sequelae.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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- Girls and women are at greater risk of being victims of sexual abuse compared to men and boys.
- History of sexual abuse is associated with increased risk of psychiatric disorders and adverse pregnancy outcomes among women of reproductive age.

- Most individuals with PTSD have one or more other psychiatric disorders.
- Girls and women have higher rates of PTSD compared to boys and men.
- Women may be at particularly elevated risk for PTSD during the pregnancy and postpartum periods.
- PTSD during pregnancy has been associated with health risk behaviors and adverse pregnancy outcomes.

Major limitations of current studies:

- Inadequate control of confounding.
- Small sample sizes.
- No information on incidence of PTSD.
- CSA assessed by self-report.

Clinical Implications

The psychological wellbeing of women of reproductive age is of great importance to obstetric and mental healthcare providers. Better understanding of how a history of CSA may increase women's risk of PTSD and other psychopathologies, and affect pregnancy and postpartum outcomes may yield new insights for more comprehensive and effective obstetric care. Given the high prevalence of CSA and PTSD among women of reproductive age; the observed associations of CSA and PTSD with adverse pregnancy experiences and outcomes; and the fact that women may visit their healthcare providers more often during pregnancy than at any other period, antenatal care visits provide opportunities to identify women with CSA-related PTSD. Women with a history of CSA may require increased monitoring and care during the pregnancy and postpartum periods. Early diagnosis and treatment of PTSD and other psychopathologies of pregnant and postpartum women, may lead to better pregnancy outcomes and favorable long-term maternal and offspring health.

Fig. 1.
Prevalence of PTSD during pregnancy as observed in some studies

Fig. II.

Prevalence of PTSD 1 – 2 months postpartum as observed in some studies

Fig. III.

Selection of articles reporting on the relationship between CSA and PTSD in pregnant or postpartum women

Table 1

Prevalence of PTSD during pregnancy as observed in some studies

First author and year	Source population	Study design	PTSD instrument	Assessment period	N	Prevalence
(Ayers and Pickering 2001)	Antenatal clinics in a hospital in London, England (women aged 14 - 42 years old)	Prospective cohort	Minnesota Multiphasic Personality Inventory-2 PTSD Scale ¹ (self-administered)	36 weeks gestation	222	8.1%
(Loveland Cook et al. 2004)	Medicaid eligible women from WIC SNAP sites in 5 counties in rural Missouri and the city of St. Louis, US (23% were < 19 years old)	Prospective cohort	Diagnostic Interview Schedule	Any time during pregnancy	744	7.7%
(Soderquist et al. 2004)	Obstetrics and gynecology department in Linköping and Kalmar, Sweden (15 - 45 years old)	Prospective cohort	Traumatic Event Scale ² (self-administered)	32 weeks gestation	1224	2.3%
(Sutter-Dallay et al. 2004)	Antenatal clinics at the University Hospital of Bordeaux, France (average age ~ 29 years old)	Prospective cohort	MINI-international Neuropsychiatric Interview ²	Third trimester of pregnancy	497	0.0%
(Morland et al. 2007)	Obstetrics/gynecology clinic and private physicians' offices in Oahu, Hawaii, US (18 - 35 years old)	Cross-sectional	PTSD Checklist-Civilian Version ² and Traumatic Life Events Questionnaire (Interview)	First trimester of pregnancy	101	16.0%
(Rogal et al. 2007)	Prenatal clinics, inner-city New Haven, Connecticut (average age ~ 24.5 years old)	Prospective cohort	MINI-international Neuropsychiatric Interview ²	Any time during pregnancy	1100	3.0%
(Mitsuihiro et al. 2009)	Brazilian public hospital (pre-teenagers and teenagers aged 11 - 19 years old; average age ~17 years)	Cross-sectional	Composite International Diagnostic Interview - 2.1 Version ²	12-month prevalence of PTSD	1000	10.0%
(Seng et al. 2009)	Maternity clinics in Midwestern US (women were 18 years old)	Prospective cohort	National Women's Study PTSD Module ³ (Interview)	< 28 weeks gestation	1581	7.9%
(Yonkers et al. 2014)	Obstetrical practices in Connecticut and Western Massachusetts, US (women were 18 years old)	Prospective cohort	Modified PTSD Symptom Scale ⁴ (Interview)	All trimesters of pregnancy	2654	4.9%

• DSM = Diagnostic and Statistical Manual of Mental Disorders; PTSD = Posttraumatic Stress Disorder; US = United States; WIC SNAP = Women, Infants and Children Supplemental Nutrition Assistance Program

¹ Derived from Minnesota Multiphasic Personality Inventory and measures PTSD without reference to a particular traumatic experience (no DSM edition specified).

² Assessed *DSM-IV* diagnostic criteria for PTSD.

³ Assessed *DSM-III-R* diagnostic criteria for PTSD.

⁴ Assessed *DSM-III-R* diagnostic criteria for PTSD but the investigators added one more question to determine *DSM-IV* PTSD.

Table II

Prevalence of full PTSD in the first 1 – 2 months postpartum as observed in some studies

First author and year	Source population	Study design	PTSD instrument	Assessment period	N	Prevalence
(Creedy et al. 2000)	Women who gave birth in teaching hospitals in Queensland, Australia (18 years old)	Prospective Cohort	Post-traumatic Stress Symptoms Scale—Interview [/]	4 – 6 weeks postpartum	499	5.6%
(Wenzel et al. 2005)	Women who delivered infants in Grand Forks, North Dakota US	Cross-sectional	Structured Clinical Interview for DSM-IV Disorders-Non-Patient Version (PTSD Module) [/]	8 weeks postpartum	147	0.0%
(Adevuya et al. 2006)	Women attending 6-week postnatal clinic in Ilesha, Southwest Nigeria	Cross-sectional	MINI-International Neuropsychiatric Interview [/]	6 weeks postpartum	876	5.9%
(Zaers et al. 2008)	Women attending childbirth classes in Trier, Germany	Prospective cohort	PTSD Symptom Scale—Interview [/] (self-administered)	6 weeks postpartum	47	6.0%
(Onoye et al. 2009)	Women seeking prenatal and postnatal care in Honolulu Hawaii	Prospective cohort	PTSD Checklist—Civilian Version (Interview) [/]	4 – 8 weeks postpartum	54	1.9%
(Modarres et al. 2012)	Women visiting healthcare centers for postnatal care, Bushehr, Iran	Cross-sectional	Post-traumatic Symptom Scale—Interview [/]	6 – 8 weeks postpartum	400	20%

• DSM = Diagnostic and Statistical Manual of Mental Disorders; PTSD = Posttraumatic Stress Disorder; US = United States

[/] Assessed DSM-IV diagnostic criteria for PTSD.

Table III

Summary of original studies examining the association of maternal history of CSA with posttraumatic stress during pregnancy, and/or at postpartum

First author (year)	Country	Analysis	Final sample size and description	Recruitment	CSA definition (data collection)	PTSD data collection	Summary of findings
(Cohen et al. 2004)	Canada	Cross-sectional	200 women 18 years old who had recently delivered a full term singleton	Postpartum ward of hospital	Sexual abuse at < 14 years old. (Phone interviews at 8 – 10 weeks postpartum)	Phone interviews using the 17-item Davidson Trauma Scale [/] (at 8 – 10 weeks postpartum)	No significant difference in prevalence of high posttraumatic stress scores within the past week (defined as a response of “yes” to 3 items out of 17 on the Davidson Trauma Scale) among those with history of CSA (39.3%) and those without CSA history (31.4%)
(Morland et al. 2007)	United States	Cross-sectional	101 women, between ages 18 and 35, seeking prenatal care during the first trimester	Obstetrics/gynecology clinic and private physicians' offices	Sexual abuse by age 13. (Face-to-face interview using Traumatic Life Events Questionnaire – various types of trauma)	(30 minute face-to-face interview using the PTSD Checklist-Civilian Version) [/]	No significant difference in prevalence of CSA history among those with PTSD (37.5%), those with subclinical PTSD (17.4%) and those without PTSD (12.9%), $p = 0.10$
(Seng et al. 2008)	United States	Cross-sectional	1259 nulliparous, pregnant women who were 18 years old	Prenatal clinics (initiating care at < 28 weeks gestation)	Sexual abuse at < 16 years old. (Phone interviews using the Life Stressor Checklist)	Phone interviews using National Women's Study PTSD module [/]	Prevalence of PTSD among the women was: 4.1% in women who had never been physically or sexually abused; 11.4% in women who had been physically or sexually abused as adults; 16.0% in women exposed to childhood physical or sexual abuse; and 39.0% in exposed to both childhood and adulthood physical or sexual abuse ($p < 0.001$)
(Lev-Wiesel et al. 2009; Lev-Wiesel and Daphna-Tekoa 2010)	Israel	Cross-sectional	Pregnant women in second trimester (6 months) (n = 837)	Referred by health care practitioner at prenatal care visit	Penetrative and non-penetrative sexual abuse at < 14 years old. (Study interviews using CSA Scale)	Self-report at study interviews using PTSD Symptom Scale [/]	Women exposed to CSA had significantly higher overall PTSD scores (during pregnancy, at 2 months postpartum and 6 months postpartum) compared to women with non-CSA trauma and women with no experience of a potentially traumatizing event
(Lang et al. 2010)	United States	Cross-sectional	44 pregnant women 18 years old (average of 17.3 gestational weeks)	Flyers at obstetric clinics and advertisement in a local circular	Sexual abuse during childhood. (Self-administered Childhood Trauma Questionnaire)	Self-administered PTSD Checklist-Civilian Version (cutoff score of 30) [/]	No significant correlation between scores on the PTSD checklist and CSA as measured by the CTQ, either during pregnancy ($r = 0.30$, $p > 0.05$) or at 1 year post-partum ($r = 0.11$, $p > 0.05$)

• ASA = Adult Sexual Abuse; CSA = Childhood Sexual Abuse; CTQ = Childhood Trauma Questionnaire; DSM = Diagnostic and Statistical Manual of Mental Disorders; OR = Odds Ratio; PTSD = Posttraumatic Stress Disorder

• Morland (2007), Seng (2008; 2009); Lev-Wiesel (2009; 2010), and Lang (2010) were cross-sectional analyses from prospective cohorts.

[/] Assessed DSM-IV PTSD symptoms