

Associations between prenatal substance exposure, prenatal violence victimization, unintended pregnancy, and trauma exposure in childhood in a clinical setting

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ABSTRACT

Given the importance of early prevention and intervention strategies for children exposed to trauma, detection of early risk factors for exposure to traumatic events in childhood is critical. The present study examined associations between three known prenatal risk factors that characterize environmental instability in utero—prenatal substance exposure, prenatal violence victimization, and unintended pregnancy—and child exposure to interparental violence and other adverse experiences in a sample of 198 mother–child dyads (*M* child age = 44.48 months) referred to a hospital clinic for treatment following exposure to trauma. Prenatal substance and violence exposure were associated with child trauma exposure, and prenatal violence victimization was also associated with maternal severity ratings of traumatic exposures. Unintended pregnancy was not associated with child trauma exposure or severity. These findings expand our understanding of prenatal risk factors for trauma exposure in childhood and, specifically, highlight prenatal substance exposure and violence victimization as risk factors for subsequent exposure to trauma in early childhood. Results suggest that prenatal prevention and intervention programs should target reducing maternal substance use and in-utero exposure to violence.

KEYWORDS

prenatal risk factors, prenatal substance exposure, prenatal violence victimization, preschool-age children, trauma, unintended pregnancy

RESUMEN

Dada la importancia de las estrategias de prevención e intervención tempranas para niños expuestos al trauma, el detectar los tempranos factores de riesgo en el caso de estar expuesto a eventos traumáticos en la niñez es crítico. El presente estudio examinó las asociaciones entre tres conocidos factores de riesgo prenatales que caracterizan la inestabilidad ambiental en el útero –el haber estado expuesto a sustancias prenatalmente, la victimización de la violencia prenatal, y el embarazo no intencional– y el que el niño esté expuesto a la violencia entre progenitores (IPV) y otras experiencias adversas en un grupo muestra de 198 díadas madre-niño (edad promedio del niño = 44.48 meses) que habían sido referidas a una clínica hospital para el tratamiento que seguía al haber estado expuestos al trauma. El haber estado expuesto a sustancia y violencia prenatal

se asoció con el hecho de que el niño había estado expuesto a trauma, y la victimización de la violencia prenatal también se asoció con la severidad maternal de clasificación de la exposición traumática. El embarazo no intencional no se asoció con la exposición del niño al trauma o la severidad. Estos resultados amplían nuestra comprensión de los factores de riesgo prenatales en cuanto al haber estado expuesto al trauma en la niñez y, específicamente, subrayan el haber estado expuesto a sustancias prenatalmente y la victimización de la violencia como subsecuentes factores de riesgo para estar expuesto al trauma en la temprana niñez. Los resultados sugieren que los programas de prevención e intervención prenatales deber enfocarse en reducir el uso de sustancias por parte de la madre y el estar expuesto dentro del útero a la violencia.

PALABRAS CLAVES

factores de riesgo prenatales, estar expuesto a sustancias prenatalmente, la victimización prenatal de la violencia, embarazo no intencional, trauma, niños en edad preescolar

RÉSUMÉ

Vu l'importance des stratégies de prévention précoce et d'intervention pour les enfants exposés au trauma, la détection de facteurs de risque précoce pour l'exposition à des événements traumatiques s'avère critique. Cette étude a examiné les liens entre trois facteurs de risque prénataux connus qui caractérisent l'instabilité environnementale in utero – l'exposition prénatale à des substances toxiques, la victimisation liée à la violence prénatale, et la grossesse involontaire – ainsi que l'exposition à la violence conjugale et d'autres expériences adverses chez un échantillon de 198 dyades mère-enfant (moyenne d'âge de l'enfant = 44,48 mois) envoyées consulter en clinique hospitalière pour un traitement suivant une exposition à un trauma. L'exposition à la toxicomanie et l'exposition à la violence étaient liées à l'exposition de l'enfant au trauma et la victimisation liée à la violence prénatale était également liée à la sévérité des scores maternels d'expositions traumatiques. La grossesse involontaire n'était pas liée à l'exposition au trauma de l'enfant ou à la sévérité. Ces résultats élargissent notre compréhension des facteurs prénataux d'exposition au trauma dans l'enfance et mettent en lumière plus spécifiquement l'exposition à la toxicomanie prénatale et la victimisation liée à la violence en tant que facteurs de risque d'exposition ultérieure au trauma durant la petite enfance. Les résultats suggèrent que la prévention prénatale et les programmes d'intervention devraient cibler la réduction d'utilisation toxicomane maternelle et l'exposition à la violence in-utero.

MOTS CLÉS

facteurs de risque prénatal, exposition à des substances toxiques avant la naissance, victimisation liée à la violence prénatale, grossesse involontaire, trauma, petite enfance

ZUSAMMENFASSUNG

Angeichts der Bedeutung früher Präventions- und Interventionsstrategien bei traumatisierten Kindern, ist die Aufdeckung potenzieller Risikofaktoren für Traumatisierung entscheidend. Die vorliegende Studie überprüft Zusammenhänge zwischen drei bekannten, eine Umgebungsinstabilität in utero charakterisierenden, pränatalen Risikofaktoren (pränatale Drogen- bzw. Gewaltexposition und ungewollte Schwangerschaft) und kindlicher Belastung durch zwischenelterliche Gewalt (interparental violence; IPV) sowie anderen widrigen Erfahrungen. Die Stichprobe bestand aus 198 Mutter-Kind Dyaden (mittleres Alter der Kinder = 44.48 Monate), die sich aufgrund traumatischer Erfahrungen in Behandlung begeben haben. Pränatale Drogen- bzw. Gewaltexposition wiesen Zusammenhänge zu kindlicher Traumatisierung auf. Des Weiteren wies pränatale Gewaltexposition auch einen Zusammenhang zu den mütterlichen Ratings der Traumaschwere auf. Ungewollte Schwangerschaft war nicht mit kindlicher Traumatisierung oder Traumaschwere assoziiert. Diese Ergebnisse ermöglichen es uns, pränatale Risikofaktoren für kindliche Traumatisierung besser zu verstehen. Insbesondere werden pränatale Drogen- und Gewaltexposition als Risikofaktoren für eine darauffolgende Traumatisierung in der frühen Kindheit hervorgehoben. Die Ergebnisse

legen nahe, dass pränatale Präventions- und Interventionsprogramme darauf abzielen sollten, mütterlichen Drogenkonsum und Gewalterfahrungen in utero zu minimieren.

STICHWÖRTER

pränatale Risikofaktoren, pränatale Drogenexposition, pränatale Gewalterfahrung, ungewollte Schwangerschaft, Trauma, Kinder im Vorschulalter

抄録

トラウマに曝された子どもへの早期予防と介入の方法の重要性を考えると、小児期にトラウマとなる出来事に暴露される初期の危険因子を検出することは必須である。本研究は、トラウマに曝され治療のために病院の外に紹介された198組の母子(子どもの平均年齢 44.48 ヶ月)において、胎内の環境不安定性を特徴づける3つの既知の出生前リスク因子-胎児期の薬物暴露、胎児期の暴力虐待、予期せぬ妊娠-と、パートナー間の暴力(IPV)やその他の逆境体験に子どもが曝されること、との関連性を検討した。胎児期の薬物と暴力への暴露は、子どものトラウマ暴露と関連し、胎児期の暴力虐待は母親のトラウマ暴露の深刻さの評価とも関連した。予期せぬ妊娠は子どものトラウマ暴露や深刻さに関連していなかった。これらの結果から小児期のトラウマ暴露に関連する胎児期のリスク因子への我々の理解が広まり、特に胎児期の薬物暴露と暴力虐待は早期小児期のトラウマ暴露に引き続くリスク因子であると強調する。出生前の予防と介入プログラムは、母親の薬物使用と胎児期に暴力に晒されることを減らすことをターゲットにすべきであると、この結果から提案する。

キーワード

胎児期の危険因子, 胎児期の薬物暴露, 胎児期の暴力虐待, 予期せぬ妊娠, トラウマ, 就学前児童

摘要

鑑於經歷過創傷的兒童早期預防和干預策略的重要性, 檢測兒童受創事件的早期風險因素至關重要。本研究在受創傷後轉診到醫院診所接受治療的 198 個母親-兒童二元組樣本中 (平均兒童年齡 = 44.48 個月), 探討三種已知的產前風險因素 - 產前使用物質、產前暴力受害、及意外懷孕 - 做成的不穩定環境與兒童經歷過父母間暴力 (IPV) 和其他不良經歷的關聯。母親產前物質使用和暴力經歷與兒童創傷有關, 產前暴力受害也與母親創傷的評分相關。意外懷孕與兒童創傷或嚴重程度無關。這些研究結果擴展了我們對兒童創傷的產前風險因素的理解, 特別強調產前物質使用和暴力受害, 是隨後兒童早期創傷的風險因素。結果表明, 產前預防和干預計劃的目標, 應該是減少母體物質使用和產前暴力經歷。

關鍵詞

產前風險因素, 產前物質使用, 產前暴力受害, 意外懷孕, 創傷, 學齡前兒童

ملخص

بالنظر إلى أهمية استراتيجيات الوقاية والتدخل المبكرة للأطفال المعرضين للصدمة النفسية، فإن الكشف عن عوامل الخطر المبكرة للتعرض للأحداث الصادمة في مرحلة الطفولة أمر بالغ الأهمية. تناولت هذه الدراسة الارتباطات بين ثلاثة عوامل خطر معروفة قبل الولادة تميز عدم الاستقرار البيئي في التعرض للمواد داخل الرحم قبل الولادة، والإيذاء أثناء الولادة، والحمل غير المقصود - وتعرض الأطفال للعنف بين الوالدين وغيره من التجارب السلبية في عينة من 198 من ثنائيات الأم والطفل (متوسط عمر الطفل = 44.48 شهراً) الذين تم إحالتهم إلى عيادة لتلقي العلاج بعد التعرض للصدمة. وترتبط المواد السابقة للولادة والتعرض للعنف بالتعرض لصدمة الأطفال، كما يرتبط الإيذاء الناتج عن العنف قبل الولادة بتقديرات الأم بشدة الصدمات. ولا يرتبط الحمل غير المقصود بالتعرض لصدمة الأطفال أو شدتها. وتوسع هذه النتائج فهماً لعوامل الخطر قبل الولادة للتعرض للصدمة في مرحلة الطفولة، وعلى وجه التحديد، تسليط الضوء على التعرض لمواد ما قبل الولادة والإيذاء الناتج عن العنف كعوامل خطر للتعرض للصدمة في مرحلة الطفولة المبكرة. وتشير النتائج إلى أن برامج الوقاية والتدخل قبل الولادة ينبغي أن تستهدف الحد من تعاطي المواد أثناء الحمل والتعرض للعنف داخل الرحم.

الكلمات الرئيسية:

عوامل الخطر قبل الولادة، التعرض لمواد ما قبل الولادة، الإيذاء أثناء الولادة، الحمل غير المقصود، الصدمة النفسية، الأطفال في سن ما قبل المدرسة

1 | INTRODUCTION

An estimated 70% of children in the United States experience a Criterion A traumatic event before age 16 years (Copeland, Keeler, Angold, & Costello, 2007). Exposure to traumatic events in childhood is associated with elevated risk for multiple types of psychopathology (Alisic et al., 2014; McLaughlin & Lambert, 2017) and confers risk for impaired functioning across a wide variety of psychological, social, and cognitive domains (e.g., Anda et al., 2006; Bick & Nelson, 2016). A limited line of research has focused on the identification of parental-, household-, and community-level risk factors associated with subsequent child exposure to trauma (Brown, Cohen, Johnson, & Salzinger, 1998; Chaffin, Kelleher, & Hollenberg, 1996), and a separate line of research has focused on developmental correlates of known prenatal risk factors (e.g., Jasinski, 2004; Pallitto, Campbell, & O'Campo, 2005; Taillieu & Brownridge, 2010; World Health Organization, 2011). However, previous research has not examined the intersection of these two areas of study—namely, the identification of prenatal predictors of childhood trauma exposure—which has the potential to improve the detection of risk for adverse childhood outcomes during pregnancy. Such early risk identification could be critical in determining when and how to intervene to mitigate risk for exposure to early childhood trauma and subsequent development of mental illness (Shonkoff et al., 2012).

Using data from a sample of children and parents referred for trauma services at a community hospital, the present study tested the hypothesis that exposure to specific risk factors associated with environmental instability in utero would be associated with later offspring exposure to trauma during childhood. Prenatal environmental risk may confer risk for childhood trauma via prolonged exposure to environmental and relational instability following birth and throughout childhood. To assess environmental risk, the present study focused on three prenatal risk factors that indicate environmental instability: prenatal exposure to violence victimization, prenatal exposure to substances, and unintended pregnancy. As highlighted later, each of these prenatal risk factors has been associated with offspring outcomes across development and was thus selected for this study to test associations with child trauma exposure to further elucidate the complex cascade of risk factors associated with child psychopathology.

1.1 | Effects of prenatal violence victimization on child outcomes

Exposure to violence in childhood is an established risk factor for the development of psychopathology (e.g., Bogat, Dejonghe, Levendosky, Davidson, & von Eye, 2006; Cooley-Quille, Boyd, Frantz, & Walsh, 2001; Fowler, Tompsett,

Braciszewski, Jacques-Tiura, & Baltes, 2009; Lynch, 2003), impairments in cognitive development (e.g., Cohodes, Hagan, Lieberman, & Dimmler, 2015), and impairments in social functioning (e.g., Humphreys, Kircanski, Colich, & Gotlib, 2016). However, there has been substantially less research on the impact of exposure to violence in utero on child developmental outcomes.

Among the limited research on prenatal exposure to interparental violence (IPV; fetal exposure to violence perpetrated against a pregnant mother), IPV exposure in utero has been associated with higher risk for perinatal death (Coker, Sanderson, & Dong, 2004) as well as preterm delivery and low birth weight (Donovan, Spracklen, Schweizer, Ryckman, & Saftlas, 2016). Several studies have also demonstrated the role of exposure to IPV during pregnancy in conferring risk for children's socioemotional development. IPV during pregnancy is associated with the development of posttraumatic stress disorder symptoms and patterns of disrupted attachment, over and above the effect of postbirth exposure to IPV in both infants and preschool-aged children (Levendosky, Bogat, Huth-Bocks, Rosenblum, & von Eye, 2011). Similarly, in school-aged children, IPV exposure during pregnancy is associated with higher rates of dissociative symptoms (Yalch, Black, Martin, & Levendosky, 2016), internalizing and externalizing problems, and heightened cortisol reactivity (Martinez-Torteya, Bogat, Levendosky, & von Eye, 2016).

Despite evidence that IPV exposure during pregnancy is associated with offspring trauma-related symptomatology, to our knowledge, previous studies have not examined whether exposure to IPV during pregnancy is associated with increased risk for exposure to violence in infancy and early childhood. IPV during pregnancy is associated with significant family-level risk including increased number of maternal stressful life events, increased maternal parity (Cokkinides & Coker, 1998), maternal age under 20 years, low household income, maternal history of psychopathology (Kingston et al., 2016), residential neighborhood instability, lack of involvement of partners, and being in an uncommitted relationship (Li et al., 2010), suggesting that this exposure may be associated with parental-level risk that extends beyond the prenatal period. These associated environmental risk factors suggest that beyond the isolated effects of exposure to violence in pregnancy, the correlates of this exposure may confer additional risk for family context and trauma exposure following birth.

1.2 | Effects of prenatal substance exposure on child outcomes

Children exposed to substances during the prenatal period may experience a risk "caravan" (Layne et al., 2010) in childhood, defined as a series of related risk factors that co-occur, as prenatal substance exposure is associated with

several indicators of generalized instability of the family unit and parent–child relationship. For example, prenatal substance exposure during pregnancy is associated with living in high-risk environments, poor nutrition, family instability and homelessness, and limited social support (Freier, 1994) as well as poorer quality of parent–child relationships (Johnson et al., 2002).

Maternal substance use during pregnancy is associated with prenatal complications (Armstrong, McDonald, & Sloan, 1992; O’Leary, Nassar, Kurinczuk, & Bower, 2009), adverse birth outcomes (e.g., Bauer et al., 2005), and later neurodevelopmental functioning and behavior in childhood (Green, 2007; Leech, Richardson, Goldschmidt, & Day, 1999). Individuals with fetal alcohol syndrome and fetal alcohol effects are more likely to experience functional problems later in life (e.g., experiencing trouble with the law, confinement, alcohol and drug problems) (Streissguth et al., 2004). In addition, maternal drug use during pregnancy is associated with higher rates of cognitive deficits in childhood (Nygaard, Moe, Slinning, & Walhovd, 2015) and impairment in developmental functioning (e.g., language, social functioning, vocalizations) at age 3 years (Kartin, Grant, Streissguth, Sampson, & Ernst, 2002), an outcome that is also associated with increased violence victimization (Sobsey, 2006).

1.3 | Effects of unintended pregnancy on child outcomes

Unintended pregnancy rates are higher among low socioeconomic status (SES) mothers (particularly among women who have not completed high school) and single or cohabitating mothers (Finer & Henshaw, 2006; Finer & Zolna, 2011), suggesting that unintended pregnancy may be an indicator of lower stability in the parental relationship and familial context. Previous research has linked unintended pregnancy with risk for adverse perinatal outcomes such as prematurity (e.g., Mohllajee, Curtis, Morrow, & Marchbanks, 2007) and difficulty breast-feeding (Dye, Wojtowycz, Aubry, Quade, & Kilburn, 1997). Later in development, unintended pregnancy has been associated with lower self-esteem in childhood (Axinn, Barber, & Thornton, 1998), diminished educational outcomes (Myhrman, Olsen, Rantakallio, & Laara, 1995), and poorer relationship quality with mothers (Barber, Axinn, & Thornton, 1999; Ispa, Sable, Porter, & Csizmadia, 2007). Most relevant to the present study, unintended pregnancy is associated with increased risk for child abuse and violence exposure (Goto, Yasumura, Yabe, Anazawa, & Hashimoto, 2005; Goto, Yasumura, Yabe, & Reich, 2006; Hunter, Kilstrom, Kraybill, & Loda, 1978; Sidebotham, Heron, & Teamc, 2003; Zuravin, 1987, 1991). In particular, the Avon Longitudinal Study of Parents and Children has reported that children who were registered with an agency for child protective services at age 6 years were almost three times

more likely to have been the result of an unintended pregnancy (as reported by mothers at 12 weeks of pregnancy) (Sidebotham et al., 2003). Although the present study focuses on general offspring trauma exposure rather than just abuse or violence exposure, results of these previous studies have suggested that the unintended nature of a pregnancy may confer significant risk for child trauma exposure postbirth.

1.4 | Associations among risk factors

Some prior evidence has suggested that violence victimization in utero, substance use during pregnancy, and unplanned pregnancy are related risk factors for outcomes following birth. Unplanned pregnancy is associated with increased rates of physical maternal violence victimization during pregnancy, with mothers with unplanned pregnancies being 2.5 to 4 times more likely to become victims of violence than are mothers with planned pregnancies (Campbell, Garcia-Moreno, & Sharps, 2004; Finer & Zolna, 2011; Gazmararian et al., 1995; Goodwin et al., 2000; Lau, 2005). Increased rates of violence victimization during pregnancy among mothers with unexpected pregnancies may be partially explained by perpetrators’ questioning of paternity and resulting anger toward mothers (Chambliss, 2008). Prenatal substance use has also been associated with violence victimization in utero (Li et al., 2010), likely because substances may aggravate interactions between violent perpetrators and pregnant women and due to the fact that alcohol and other substances may provide a coping mechanism following violence exposure (Chambliss, 2008; Lipsky, Holt, Easterling, & Critchlow, 2005; Narayan, Hagan, Cohodes, Rivera, & Lieberman, 2016). In addition, unplanned pregnancy has been linked with increased rates of substance exposure in utero due to the fact that pregnant women may follow typical lifestyle habits prior to knowledge of their pregnancy (Altfeld, Handler, Burton, & Berman, 1998; Floyd, Decouflé, & Hungerford, 1999; Weller, Eberstein, & Bailey, 1987). Despite the fact that these factors are theoretically linked, testing individual pathways among specific risk factors and outcomes in later development is a necessary step in identifying the most cost-effective prevention and intervention approaches, as there are likely unique trajectories of risk associated with each of these factors.

1.5 | The present study

Despite well-documented associations between prenatal risk factors and both contextual risk factors for traumatic exposure in childhood and adverse child developmental outcomes, few studies have tested whether these risk factors directly predict childhood exposure to traumatic events or the severity of these exposures. One such study has found that prenatal maternal substance use predicted child maltreatment and foster care placement transitions (Smith, Johnson, Pears, Fisher,

& DeGarmo, 2007), suggesting that prenatal substance exposure may confer longitudinal risk for children's exposure to adverse life events and compromised parenting stability and functioning. Building on this work, the present study tested the impact of three prenatal risk factors that may represent environmental instability in utero (prenatal substance exposure, prenatal violence victimization, and unintended pregnancy) on offspring exposure to traumatic events in childhood as well as the severity of these events. It was hypothesized that each prenatal risk factor would predict greater childhood exposure to traumatic events and greater maternal-reported severity of trauma exposure in a sample of preschool-aged children exposed to trauma.

2 | METHOD

2.1 | Participants

The current study included 198 children (102 male; $M_{\text{age}} = 44.48$ months, $SD = 15.33$) and mothers ($M_{\text{age}} = 31.04$ years, $SD = 6.59$) who were referred to the Child Trauma Research Program at the University of California, San Francisco, a clinic specializing in trauma-focused therapy for preschool-aged children and their caregivers. Mother-child dyads were referred due to concern about the child's behavior and/or the mother's parenting following the child's exposure to trauma. Referral sources included family court, domestic violence service providers, medical providers, preschools, other agencies, child protective services, former clients, and self-referrals. Dyads met the following inclusion criteria: The child was between the ages of 3 and 5 years at time of intake; the child was exposed to a traumatic event; and in cases involving domestic violence, the perpetrator of parental violence was no longer living in the home with the dyad. Exclusionary criteria consisted of the following: mother or child mental intellectual disability or autism spectrum disorders, current maternal substance abuse, or a maternal or child life-threatening medical condition. In addition, mothers and children had to speak either English or Spanish. In line with the exclusion criteria of the broader trial from which dyads were drawn, cases were excluded if there was documentation of confirmed physical or sexual abuse perpetrated by the mother against the child.

Children in the study were 47.5% Latino/Latina ($n = 94$), 21.7% mixed ethnicity ($n = 43$), 13.1% White ($n = 26$), 12.1% African American ($n = 24$), 3.0% Asian ($n = 6$), and 2.5% "other" ($n = 5$). Children were 42.4% monolingual English speakers ($n = 84$), 20.2% monolingual Spanish speakers ($n = 40$), and 11.1% bilingual English and Spanish speakers ($n = 22$); language data were missing for 25.8% of children in the study ($n = 51$). Mothers were 52.0% Latino/Latina ($n = 103$), 17.7% Caucasian ($n = 35$), 12.6% African American ($n = 25$), 8.6% mixed ethnicity ($n = 17$), 5.1% Asian ($n = 10$), and 4.0%

"other" ($n = 8$). Mothers were 55.6% English-speaking ($n = 110$), 36.4% Spanish-speaking ($n = 72$), and 1.0% bilingual English- and Spanish-speaking ($n = 2$); language data were missing for 6.1% of mothers in the study ($n = 12$). Mothers had completed an average of 12.76 years of education ($SD = 4.11$) and had mean family annual incomes of \$21,965.16 per year ($SD = \$20,209.44$), with 60.6% of families reporting incomes below the federal poverty line per the 2004 Department of Health and Human Services Guidelines.

2.2 | Procedure

The Committee for Human Research at the University of California, San Francisco and the Institutional Review Board of San Francisco General Hospital approved all research procedures, and each participant gave informed consent to participate in all research procedures prior to participating in the study. Mother-child dyads who met study criteria and who were willing to participate were scheduled for an initial clinic appointment. Mothers were scheduled for a clinic visit in which they were administered a semistructured interview that asked about demographic information, mother's pregnancy with the target child, current maternal functioning, and child lifetime trauma exposure and severity as part of a more extensive assessment battery prior to enrolling in an efficacy trial for Child-Parent Psychotherapy. Mothers were assessed by postdoctoral fellows, predoctoral interns, and master's-level trainees in clinical psychology and social work who were supervised by licensed clinical psychologists. Interviews were conducted in an interview room at a hospital-based clinic specializing in early childhood trauma treatment and clinical research. At the end of the intake assessment phase, mothers were paid \$30 for their participation.

2.3 | Measures

2.3.1 | Maternal measures

2.3.1.1 | Prenatal substance exposure

As part of a more extensive demographic interview, during the baseline interview, mothers were asked, "Was there substance use during pregnancy [with the target child]?" Given the relatively low frequency of prenatal substance use reported (16.7%, $n = 33$), a binary variable of "any prenatal substance use," which included any alcohol or drug use during pregnancy, was created.

2.3.1.2 | Prenatal violence victimization

During the baseline interview, mothers were asked whether they had experienced any of 10 types of physical violence during their pregnancy with the target child: being hit in the head, stomach, or elsewhere; choked; pushed; slapped; kicked; thrown to the ground; knifed; or threatened/shot with a gun (10 items; $\alpha = 0.75$). A dichotomous variable of any

$P = .044$, $\beta = 0.14$, despite child age and maternal years of education both emerging as significant predictors of child trauma exposure, $B = 0.03$, $SE = 0.01$, $P = .008$, $\beta = 0.19$ and $B = -0.01$, $SE = 0.01$, $P = .008$, $\beta = 0.19$, respectively. Prenatal substance exposure accounted for 12.70% of the variance in child exposure to trauma following birth. Prenatal substance exposure was not significantly associated with child trauma severity, $B = 0.68$, $SE = 0.44$, $P = .118$, $\beta = 1.57$.

Findings on prenatal violence victimization were also consistent with hypotheses. Controlling for child age, child sex, maternal years of education, and household average monthly income, prenatal violence victimization was positively associated with child trauma exposure, $B = 0.80$, $SE = 0.35$, $P = .024$, $\beta = 0.16$, over and above the effects of child age and maternal years of education, which also emerged as significant predictors in the model, $B = 0.03$, $SE = 0.01$, $P = .007$, $\beta = 0.18$ and $B = 0.14$, $SE = 0.05$, $P = .002$, $\beta = 0.23$, respectively. Prenatal violence victimization was also significantly associated with child trauma severity, $B = 0.71$, $SE = 0.32$, $P = .031$, $\beta = 0.15$, above and beyond the effect of child age, which also emerged as a significant predictor in the model, $B = 0.03$, $SE = 0.01$, $P = .014$, $\beta = 0.17$. Prenatal violence victimization accounted for 13.20% of the variance in child exposure to trauma following birth and 6.90% of the variance in parent-reported severity of child exposure to trauma following birth.

Contrary to hypotheses, controlling for child age, maternal years of education, and household average monthly income, unintended pregnancy was not associated with child trauma exposure, $B = -0.54$, $SE = 0.36$, $P = .136$, $\beta = -0.10$. Similarly, unintended pregnancy did not predict the severity of children's trauma exposures, $B = -0.08$, $SE = 0.33$, $P = .802$, $\beta = -0.02$.

The associations between child trauma exposure with prenatal substance exposure, $B = 0.94$, $SE = 0.47$, $P = .046$, $\beta = 0.14$, and prenatal violence victimization, $B = 0.78$, $SE = 0.35$, $P = .026$, $\beta = 0.15$, held when both risk factors were included in the same model. Consistent with the results reported earlier, when both prenatal violence victimization and prenatal substance exposure were included in the same model, prenatal violence victimization, $B = 0.70$, $SE = 0.32$, $P = .033$, $\beta = 0.15$, but not prenatal substance exposure, $B = 0.67$, $SE = 0.43$, $P = .125$, $\beta = 1.54$, was significantly associated with child trauma severity.

4 | DISCUSSION

In a sample of trauma-exposed preschool-aged children, both prenatal substance exposure and prenatal violence victimization predicted the number of traumatic exposures a child had experienced across his or her lifetime at the time of the inter-

view. In addition, prenatal violence victimization emerged as a predictor of severity of child traumatic exposures. These findings were consistent with our hypotheses; however, contrary to the hypotheses, unintended pregnancy was not associated with child trauma exposure or severity of exposures. Although the present study design precluded testing causal relationships between these prenatal risk factors and child exposure to trauma, these results suggest that environmental instability during pregnancy may be a risk factor for offspring exposure to trauma in childhood.

The emergence of exposure to IPV during pregnancy as a risk factor for exposure to trauma in childhood suggests that familial contexts may remain relatively stable across development, beginning in the prenatal period. The available data in the current study did not allow for the identification of whether the perpetrator of IPV during pregnancy was a perpetrator of violence to whom the offspring was later exposed. However, it may be the case that the same parent remained an active perpetrator of violence toward the mother, resulting in the child's witnessing of domestic violence, or possible direct victimization. Pregnancy may represent a period of particularly high stress between romantic partners (Arizmendi & Alfonso, 1987) and particularly for first-time fathers (Condon, Boyce, & Corkindale, 2004), which may precipitate violence (Jewkes, 2002). Recent research has suggested that victimization in early childhood may confer risk for later violence victimization during pregnancy, especially if the pregnancy is unintended (Narayan, Hagan, Cohodes, Rivera, & Lieberman, 2016). Taken together with findings of the present study, these results suggest that pregnancy may represent a critical time in which risk for the intergenerational transmission of violence victimization is conferred for future generations. Pregnancy may therefore represent an important developmental period for intervention for mothers at risk for violence victimization.

The present study examined prenatal substance exposure (any maternal use of substances during pregnancy), rather than maternal substance abuse (broadly defined as maternal dependence on a substance during pregnancy), as a risk factor for offspring childhood exposure to trauma. Given the significant associations between maternal substance use during pregnancy and child trauma exposure and severity of exposures, future research should further investigate substance abuse as a predictor of child trauma exposure. In addition, future studies would benefit from utilizing a more detailed measure of substance use during the prenatal period (i.e., a measure that queries the type and frequency of substance use) so that profiles of maternal use during pregnancy can be further quantified and assessed in relation to future trajectories of risk. Furthermore, previous research has found that women who reported using substances during pregnancy were significantly more likely to meet criteria for psychopathology than were women who denied use, suggesting that prenatal substance exposure may be associated with additional risk

factors that affect children's future exposure to trauma (Havens, Simmons, Shannon, & Hansen, 2009).

Teratogenic effects of prenatal substance exposure in childhood may be inherently difficult to identify because developmental processes are influenced by social and environmental conditions (Fried, 2002). For example, the effects of prenatal substance exposure may be exacerbated by disrupted caregiving environments associated with ongoing drug use by parents or by risk factors associated with prenatal substance exposure (Mayes, 2002; Mayes, Grillon, Granger, & Schottenfeld, 1998). In this vein, previous research has consistently found the effects of substance use during pregnancy on child outcomes to be moderated by environmental factors such as maternal functioning (Hunt, Tzioumi, Collins, & Jeffery, 2008; Ornoy, Michailovskaya, Lukashov, Bar-Hamburger, & Harel, 1996; Ornoy, Segal, Bar-Hamburger, & Greenbaum, 2001). Furthermore, intervention-focused research has identified pregnancy and early infancy as important developmental time periods when intervention may have particularly long-lasting effects on child development, suggesting that well-timed intervention for substance-using mothers may be associated with the decoupling of prenatal risk factors and postnatal outcomes (Lester, Boukydis, & Twomey, 2000). Future studies should test moderation of traumatic exposure and severity of trauma during childhood by parental functioning, engagement in postnatal services, household stability, and quality of the parent-child relationship.

The present study did not find an association between unintended pregnancy and offspring trauma exposure. The current study differs from past studies examining associations between unintended pregnancy and child abuse and violence directed toward children in familial contexts (Goto et al., 2005; Goto et al., 2006; Hunter et al., 1978; Sidebotham et al., 2003; Zuravin, 1987, 1991) in that overall exposure to trauma among offspring was assessed rather than specifically abuse or violence exposure. While abuse and exposure to violence were undoubtedly captured in our assessment of child trauma exposure, results of the present study suggest that previously noted associations may be specific to abuse rather than a broader cluster of adverse experiences (e.g., neglect, medical trauma).

As outlined in Santelli et al. (2003), note that a dichotomous question regarding whether a pregnancy was intended may not capture the rich cultural, socioeconomic, political, affective, and cognitive factors that influence a woman's contraceptive choices (Gipson, Koenig, & Hindin, 2008). While selecting "no" to the question of whether a pregnancy was planned may indeed capture familial or environmental instability (including lack of access to adequate medical care or contraceptive use), it may also capture ambivalence toward conception of a child within the context of a committed sexual relationship. The variability in specific situations that may lead to endorsement of an unintended pregnancy may preclude investiga-

tion of the targeted environmental instability. Future research should assess more specific measures of parental instability, ambivalence toward parenthood (e.g., "how negative mothers feel about pregnancy"; e.g., Bustan & Coker 1994), and the degree to which mothers feel resolved regarding their own past and their unborn child around the time of conception and pregnancy (Narayan, Bucio, Rivera, & Lieberman, 2016) to better understand whether this established prenatal risk factor is also a sound predictor of offspring exposure to trauma following birth.

Limitations of the present study include retrospective parental report of prenatal risk factors, parental report of child trauma exposure, a sample of participants drawn solely from a clinical setting, and a limited age range of participants. Although recruiting participants from a clinical setting allowed for a sufficient sample in which to test the associations of interest, of note, due to the fact that all participants in the present study had been exposed to trauma, this study was not positioned to adequately examine alternative trajectories for children prenatally exposed to substance use and violence victimization (e.g., among children with these prenatal exposures who do not go on to experience trauma in childhood). Limiting the sample to children and mothers who were no longer living with the perpetrator of domestic violence is an additional selection effect and may have skewed the sample to include children with relatively less severe postnatal exposure. Although several mothers reported that their children had experienced no trauma exposure, all dyads were referred to the clinic from which the sample was drawn due to child exposure to trauma. Mothers may not have reported their children's exposure due to social desirability biases or lack of comprehension of the measure. Because we did not assess the timing of trauma exposure, it is unknown when in early childhood the traumatic events occurred. The developmental timing of risk and trauma may play a substantial role in outcomes (Gee & Casey, 2015; Perry, 2009) and is an important area for future study. In addition, given that this study is based on archival analysis of a data set collected for a broader study, there is limited variability in responses to questions about prenatal substance use, and therefore a binary variable had to be created for the present analyses. Future studies should oversample for children with higher levels of exposure in utero to more effectively employ a continuous measure of prenatal substance exposure, and should use a more detailed measure of frequency and type of substance used in utero. Last, although we propose that ongoing exposure to environmental instability may link prenatal risk factors with child trauma exposure, the present study was not designed to test this mechanism, and future research would benefit from efforts to better understand the ways in which these early risk factors are linked with trauma exposure later in development. For example, future studies should ascertain whether the prenatal risk factors outlined in the present study are associated with the

degree to which a parent promotes safety and security in childhood or whether the quality of the parent–child attachment relationship mediates the association between the intendedness of the pregnancy and subsequent trauma exposure.

Results of the present study indicate a positive correlation between child age and severity of child trauma exposure, which is counter to previous studies suggesting that children under the age of 5 years are disproportionately represented in households with domestic violence and witness roughly half of domestic violence incidents that result in police intervention (Cochran, 1995; Fantuzzo, Boruch, Beriama, Atkins, & Marcus, 1997; Yale Child Study Center, 2005). This association may be explained by the fact that parents may report events that occurred to older children as more severe, given that parents often underestimate the degree to which young children internalize the meaning of traumatic events (Groves, Zuckerman, Marans, & Cohen, 1993). In addition, despite the fact that numerous studies have reported a higher rate of trauma exposure in low-SES populations (e.g., Hatch & Dohrenwend, 2007), the present study found that there was a significant positive correlation between SES and offspring trauma exposure.

Given that prior studies have reported associations between prenatal substance exposure and prenatal violence victimization and broad impairments in developmental outcomes (e.g., Levendosky et al., 2011; Nygaard et al., 2015) and that the present study demonstrates an association between prenatal risk factors and child lifetime exposure to trauma, future research should test whether child trauma exposure mediates associations between prenatal risk factors and later developmental outcomes. Future studies can also improve on the methodology of the present study to further elucidate the nature of prenatal risk for childhood traumatic exposure (e.g., by accessing medical records to document prenatal risk and exposure to trauma in childhood). Effects of prenatal risk factors are likely incremental and observable over the short-term (e.g., the effects of prenatal risk factors are likely observable in early infancy, and outcomes measures in early infancy likely impact later development), and more continuous, longitudinal measurement of developmental outcomes will further elucidate mechanisms by which prenatal risk factors affect long-term outcomes. More broadly, future studies should test additional prenatal risk factors for child trauma exposure and severity (e.g., accessing prenatal care, maternal psychopathology, poverty) across a broader developmental period spanning childhood and adolescence. Although the present study tested associations between prenatal risk factors and parental ratings of the severity of traumatic events to which children had been exposed, future research should test associations with trauma-related symptomatology and sequelae of trauma exposure in addition to associations with specific domains of trauma exposure (e.g., neglect, physical abuse).

In summary, although the present findings do not provide conclusive evidence for continued environmental instability as a mechanism by which exposure to prenatal risk factors in utero may confer risk for postnatal trauma exposure, to our knowledge, this study is the first to examine long-term effects of unintended pregnancy and prenatal exposure to violence and maternal substance on outcomes across childhood. The present study demonstrates that prenatal substance exposure and violence victimization are significant risk factors for child exposure to traumatic events and the severity of these exposures, suggesting that children in high-risk contexts may be at risk of future traumatic exposure from birth. Screening for such risk factors in pregnancy should be used to inform preventative efforts for children at higher risk for exposure to traumatic events given their prenatal history, which could be a powerful way to mitigate risk for trauma and related psychopathology.

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CONFLICTS OF INTEREST

The authors report no conflicts of interest.

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REFERENCES

- Alisic, E., Zalta, A. K., Van Wesel, F., Larsen, S. E., Hafstad, G. S., Hassanpour, K., & Smid, G. E. (2014). Rates of post-traumatic stress disorder in trauma-exposed children and adolescents: Meta-analysis. *British Journal of Psychiatry*, *204*(5), 335–340. <https://doi.org/10.1192/bjp.bp.113.131227>

- Altfeld, S., Handler, A., Burton, D., & Berman, L. (1998). Wantedness of pregnancy and prenatal health behaviors. *Women & Health, 26*(4), 29–43. https://doi.org/10.1300/J013v26n04_03
- Anda, R. F., Felitti, V. J., Bremner, J. D., Walker, J. D., Whitfield, C. H., Perry, B. D., ... Giles, W. H. (2006). The enduring effects of abuse and related adverse experiences in childhood. *European Archives of Psychiatry and Clinical Neuroscience, 256*(3), 174–186. <https://doi.org/10.1007/s00406-005-0624-4>
- Arizmendi, G., & Alfonso, G. (1987). Stressful events related to pregnancy and postpartum. *Journal of Psychosomatic Research, 31*, 743–765.
- Armstrong, B. G., McDonald, A. D., & Sloan, M. (1992). Cigarette, alcohol, and coffee consumption and spontaneous abortion. *American Journal of Public Health, 82*(1), 85–87. <https://doi.org/10.2105/AJPH.82.1.85>
- Axinn, W. G., Barber, J. S., & Thornton, A. (1998). The long-term impact of parents' childbearing decisions on children's self-esteem. *Demography, 35*(4), 435–443.
- Barber, J. S., Axinn, W. G., & Thornton, A. (1999). Unwanted childbearing, health, and mother-child relationships. *Journal of Health and Social Behavior, 40*(3), 231–257. <https://doi.org/10.2307/3004012>
- Bauer, C. R., Langer, J. C., Shankaran, S., Bada, H. S., Lester, B., Wright, L. L., ... Verter, J. (2005). Acute neonatal effects of cocaine exposure during pregnancy. *Archives of Pediatrics & Adolescent Medicine, 159*(9), 824–834.
- Berent, R., Crusto, C. A., Lotyczewski, B. S., Greenberg, S. R., Hightower, A. D., & Kaufman, J. S. (2008). Development and psychometric refinement of a measure assessing young children's exposure to violence. *Best Practices in Mental Health, 4*(1), 19–30.
- Bick, J., & Nelson, C. A. (2016). Early adverse experiences and the developing brain. *Neuropsychopharmacology, 41*(1), 177–196. <https://doi.org/10.1038/npp.2015.252>
- Bogat, G. A., Dejonghe, E., Levendosky, A. A., Davidson, W. S., & von Eye, A. (2006). Trauma symptoms among infants exposed to intimate partner violence. *Child Abuse & Neglect, 30*(2), 109–125. <https://doi.org/10.1016/j.chiabu.2005.09.002>
- Brown, J., Cohen, P., Johnson, J. G., & Salzinger, S. (1998). A longitudinal analysis of risk factors for child maltreatment: Findings of a 17-year prospective study of officially recorded and self-reported child abuse and neglect. *Child Abuse & Neglect, 22*(11), 1065–1078.
- Bustan, M. N., & Coker, A. L. (1994). Maternal attitude toward pregnancy and the risk of neonatal death. *American Journal of Public Health, 84*(3), 411–414.
- Campbell, J., Garcia-Moreno, C., & Sharps, P. (2004). Abuse during pregnancy in industrialized and developing countries. *Violence Against Women, 10*(7), 770–789. <https://doi.org/10.1177/1077801204265551>
- Chaffin, M., Kelleher, K., & Hollenberg, J. (1996). Onset of physical abuse and neglect: Psychiatric, substance abuse, and social risk factors from prospective community data. *Child Abuse & Neglect, 20*, 191–203. [https://doi.org/10.1016/S0145-2134\(95\)00144-1](https://doi.org/10.1016/S0145-2134(95)00144-1)
- Chambliss, L. R. (2008). Intimate partner violence and its implication for pregnancy. *Clinical Obstetrics & Gynecology, 51*, 385–397. <https://doi.org/10.1097/GRF.0b013e31816f29ce>
- Cochran, D. (1995). *The tragedies of domestic violence: A qualitative analysis of civil restraining orders in Massachusetts*. Boston, MA: Office of the Commissioner of Probation, Massachusetts Trial Court.
- Cohodes, E., Hagan, M., Lieberman, A., & Dimmler, M. H. (2015). Maternal meta-emotion philosophy and cognitive functioning in children exposed to violence. *Journal of Child & Adolescent Trauma, 9*(3), 1–9. <https://doi.org/10.1007/s40653-015-0072-x>
- Coker, A. L., Sanderson, M., & Dong, B. (2004). Partner violence during pregnancy and risk of adverse pregnancy outcomes. *Pediatric and Perinatal Epidemiology, 18*(4), 260–269. <https://doi.org/10.1111/j.1365-3016.2004.00569.x>
- Cokkinides, V. E., & Coker, A. L. (1998). Experiencing physical violence during pregnancy: Prevalence and correlates. *Family & Community Health, 20*(4), 19–37.
- Condon, J. T., Boyce, P., & Corkindale, C. J. (2004). The first-time fathers study: A prospective study of the mental health and wellbeing of men during the transition to parenthood. *Australian and New Zealand Journal of Psychiatry, 38*(1–2), 56–64.
- Cooley-Quille, M., Boyd, R. C., Frantz, E., & Walsh, J. (2001). Emotional and behavioral impact of exposure to community violence in inner-city adolescents. *Journal of Clinical Child Psychology, 30*(2), 199–206. https://doi.org/10.1207/S15374424JCCP3002_7
- Copeland, W. E., Keeler, G., Angold, A., & Costello, E. J. (2007). Traumatic events and posttraumatic stress in childhood. *Archives of General Psychiatry, 64*(5), 577–584. <https://doi.org/10.1001/archpsyc.64.5.577>
- Department of Health and Human Services. (2004). Department of Health and Human Services Guidelines, Annual update of the HHS poverty guidelines. Retrieved from <https://aspe.hhs.gov/2004-hhs-poverty-guidelines>
- Donovan, B. M., Spracklen, C. N., Schweizer, M. L., Ryckman, K. K., & Saftlas, A. F. (2016). Intimate partner violence during pregnancy and the risk for adverse infant outcomes: A systematic review and meta-analysis. *BJOG: An International Journal of Obstetrics & Gynaecology, March*. <https://doi.org/10.1111/1471-0528.13928>
- Drake, B., & Pandey, S. (1996). Understanding the relationship between neighborhood poverty and specific types of child maltreatment. *Child Abuse & Neglect, 20*(11), 1003–1018. [https://doi.org/10.1016/0145-2134\(96\)00091-9](https://doi.org/10.1016/0145-2134(96)00091-9)
- Dye, T. D., Wojtowycz, M. A., Aubry, R. H., Quade, J., & Kilburn, H. (1997). Unintended pregnancy and breast-feeding behavior. *American Journal of Public Health, 87*(10), 1709–1711. <https://doi.org/10.2105/AJPH.87.10.1709>
- Fantuzzo, J., Boruch, R., Beriama, A., Atkins, M., & Marcus, S. (1997). Domestic violence and children: Prevalence and risk in five major U.S. cities. *Journal of the American Academy of Child & Adolescent Psychiatry, 36*(1), 116–122. <https://doi.org/10.1097/00004583-199701000-00025>
- Finer, L. B., & Henshaw, S. K. (2006). Disparities in rates of unintended pregnancy in the United States, 1994 and 2001. *Perspectives on Sexual and Reproductive Health, 38*(2), 90–96.
- Finer, L. B., & Zolna, M. R. (2011). Unintended pregnancy in the United States: Incidence and disparities, 2006. *Contraception, 84*, 478–485. <https://doi.org/10.1016/j.contraception.2011.07.013>
- Floyd, R. L., Decouflé, P., & Hungerford, D. W. (1999). Alcohol use prior to pregnancy recognition. *American Journal of Preventive Medicine, 17*(2), 101–107. [https://doi.org/10.1016/S0749-3797\(99\)00059-8](https://doi.org/10.1016/S0749-3797(99)00059-8)
- Fowler, P. J., Tompsett, C. J., Braciszewski, J. M., Jacques-Tiura, A. J., & Baltes, B. B. (2009). Community violence: A meta-analysis on the effect of exposure and mental health outcomes of children and adolescents. *Development and Psychopathology, 21*(1), 227–259. <https://doi.org/10.1017/S0954579409000145>
- Freier, K. (1994). In utero drug exposure and maternal-infant interaction: The complexities of the dyad and their environment. *Infant*

- Mental Health Journal*, 15, 176–188. [https://doi.org/10.1002/1097-0355\(199422\)15:2<176::AID-IMHJ2280150208>3.0.CO;2-8](https://doi.org/10.1002/1097-0355(199422)15:2<176::AID-IMHJ2280150208>3.0.CO;2-8)
- Fried, P. A. (2002). Conceptual issues in behavioral teratology and their application in determining long-term sequelae of prenatal marijuana exposure. *Journal of Child Psychology and Psychiatry*, 43(1), 81–102. <https://doi.org/10.1111/1469-7610.00005>
- Gazmararian, J. A., Adams, M. M., Saltzman, L. E., Johnson, C. H., Bruce, F. C., Marks, J. S., & the PRAMS Working Group. (1995). The relationship between pregnancy intendedness and physical violence in mothers of newborns. *Obstetrics & Gynecology*, 85, 1031–1038. [https://doi.org/10.1016/0029-7844\(95\)00057-X](https://doi.org/10.1016/0029-7844(95)00057-X)
- Gee, D. G., & Casey, B. J. (2015). The impact of developmental timing for stress and recovery. *Neurobiology of Stress*, 1, 184–194. <https://doi.org/10.1016/j.ynstr.2015.02.001>
- Gipson, J. D., Koenig, M. A., & Hindin, M. J. (2008). The effects of unintended pregnancy on infant, child, and parental health: A review of the literature. *Studies in Family Planning*, 39(1), 18–38. <https://doi.org/10.1111/j.1728-4465.2008.00148.x>
- Goodwin, M. M., Gazmararian, J. A., Johnson, C. H., Gilbert, B. C., Saltzman, L. E., & the PRAMS Working Group. (2000). Pregnancy intendedness and physical abuse around the time of pregnancy: Findings from the pregnancy risk assessment monitoring system, 1996–1997. *Maternal and Child Health Journal*, 4, 85–92. <https://doi.org/10.1023/A:1009566103493>
- Goto, A., Yasumura, S., Yabe, J., Anazawa, Y., & Hashimoto, Y. (2005). Association of pregnancy intention with parenting difficulty in Fukushima, Japan. *Journal of Epidemiology*, 15(6), 244–246.
- Goto, A., Yasumura, S., Yabe, J., & Reich, M. R. (2006). Addressing Japan's fertility decline: Influences of unintended pregnancy on child rearing. *Reproductive Health Matters*, 14(27), 191–200.
- Green, J. H. (2007). Fetal alcohol spectrum disorders: Understanding the effects of prenatal alcohol exposure and supporting students. *Journal of School Health*, 77(3), 103–108. <https://doi.org/10.1111/j.1746-1561.2007.00178.x>
- Groves, B. M., Zuckerman, B., Marans, S., & Cohen, D. J. (1993). Silent victims: Children who witness violence. *Journal of the American Medical Association*, 269(2), 262–264. <https://doi.org/10.1001/jama.1993.03500020096039>
- Hatch, S. L., & Dohrenwend, B. P. (2007). Distribution of traumatic and other stressful life events by race/ethnicity, gender, SES and age: A review of the research. *American Journal of Community Psychology*, 40(3–4), 313–332. <https://doi.org/10.1007/s10464-007-9134-z>
- Havens, J. R., Simmons, L. A., Shannon, L. M., & Hansen, W. F. (2009). Factors associated with substance use during pregnancy: Results from a national sample. *Drug and Alcohol Dependence*, 99(1), 89–95. <https://doi.org/10.1016/j.drugalcdep.2008.07.010>
- Humphreys, K. L., Kircanski, K., Colich, N. L., & Gotlib, I. H. (2016). Attentional avoidance of fearful facial expressions following early life stress is associated with impaired social functioning. *Journal of Child Psychology and Psychiatry*, 57(10), 1174–1182. <https://doi.org/10.1111/jcpp.12607>
- Hunt, R. W., Tzioumi, D., Collins, E., & Jeffery, H. E. (2008). Adverse neurodevelopmental outcome of infants exposed to opiate in-utero. *Early Human Development*, 84(1), 29–35. <https://doi.org/10.1016/j.earlhumdev.2007.01.013>
- Hunter, R. S., Kilstrom, N., Kraybill, E. N., & Loda, F. (1978). Antecedents of child abuse and neglect in premature infants: A prospective study in a newborn intensive care unit. *Pediatrics*, 61(4), 629–635.
- Ippen, C. G., Ford, J., Racusin, R., Acker, M., Bosquet, M., Rogers, K., ... Edwards, J. (2002). *Traumatic Events Screening Inventory—Parent report revised*. Hanover, NH: U.S. Department of Veteran's Affairs, National Center for PTSD.
- Ispa, J. M., Sable, M. R., Porter, N., & Cszmadia, A. (2007). Pregnancy acceptance, parenting stress, and toddler attachment in low-income black families. *Journal of Marriage and Family*, 69(1), 1–13. <https://doi.org/10.1111/j.1741-3737.2005.00174.x-i1>
- Jasinski, J. L. (2004). Pregnancy and domestic violence: A review of the literature. *Trauma, Violence, & Abuse*, 5(1), 47–64. <https://doi.org/10.1177/1524838003259322>
- Jewkes, R. (2002). Intimate partner violence: Causes and prevention. *The Lancet*, 359(9315), 1423–1429.
- Johnson, A. L., Morrow, C. E., Accornero, V. H., Xue, L., Anthony, J. C., & Bandstra, E. S. (2002). Maternal cocaine use: Estimated effects on mother-child play interactions in the preschool period. *Journal of Developmental & Behavioral Pediatrics*, 23(4), 191–202.
- Kartin, D., Grant, T. M., Streissguth, A. P., Sampson, P. D., & Ernst, C. C. (2002). Three-year developmental outcomes in children with prenatal alcohol and drug exposure. *Pediatric Physical Therapy*, 14(3), 145–153. <https://doi.org/10.1097/00004583-199401000-00004>
- Kingston, D., Heaman, M., Urquia, M., O'Campo, P., Janssen, P., Thiessen, K., & Smylie, J. (2016). Correlates of abuse around the time of pregnancy: Results from a national survey of Canadian women. *Maternal and Child Health Journal*, 20(4), 778–789. <https://doi.org/10.1007/s10995-015-1908-6>
- Lau, Y. (2005). Does pregnancy provide immunity from intimate partner abuse among Hong Kong Chinese women. *Social Science & Medicine*, 61(2), 365–377.
- Layne, C. M., Olsen, J. A., Baker, A., Legerski, J. P., Isakson, B., Pašalić, A., ... Saltzman, W. R. (2010). Unpacking trauma exposure risk factors and differential pathways of influence: Predicting postwar mental distress in Bosnian adolescents. *Child Development*, 81(4), 1053–1076. <https://doi.org/10.1111/j.1467-8624.2010.01454.x>
- Leech, S. L., Richardson, G. A., Goldschmidt, L., & Day, N. L. (1999). Prenatal substance exposure: Effects on attention and impulsivity of 6-year-olds. *Neurotoxicology and Teratology*, 21(2), 109–118. [https://doi.org/10.1016/S0892-0362\(98\)00042-7](https://doi.org/10.1016/S0892-0362(98)00042-7)
- Lester, B. M., Boukydis, C. F. Z., & Twomey, J. E. (2000). Maternal substance abuse and child outcome. In C. H. Zeanah, Jr. (Ed.), *Handbook of infant mental health* (pp. 161–175). New York, NY: Guilford Press.
- Levendosky, A. A., Bogat, G. A., Huth-Bocks, A. C., Rosenblum, K., & von Eye, A. (2011). The effects of domestic violence on the stability of attachment from infancy to preschool. *Journal of Clinical Child & Adolescent Psychology*, 40(3), 398–410. <https://doi.org/10.1080/15374416.2011.563460>
- Li, Q., Kirby, R. S., Sigler, R. T., Hwang, S. S., LaGory, M. E., & Goldenberg, R. L. (2010). A multilevel analysis of individual, household, and neighborhood correlates of intimate partner violence among low-income pregnant women in Jefferson County, Alabama. *American Journal of Public Health*, 100(3), 531–539. <https://doi.org/10.2105/AJPH.2008.151159>
- Lipsky, S., Holt, V. L., Easterling, T. R., & Critchlow, C. W. (2005). Police-reported intimate partner violence during pregnancy: Who is at risk? *Violence and Victims*, 20(1), 69–86. <https://doi.org/10.1891/088667005780927683>
- Lynch, M. (2003). Consequences of children's exposure to community violence. *Clinical Child and Family Psychology Review*, 6(4), 265–274.

- Martinez-Torteya, C., Bogat, G. A., Levendosky, A. A., & von Eye, A. (2016). The influence of prenatal intimate partner violence exposure on hypothalamic–pituitary–adrenal axis reactivity and childhood internalizing and externalizing symptoms. *Development and Psychopathology*, 28(1), 55–72.
- Mayes, L. C. (2002). A behavioral teratogenic model of the impact of prenatal cocaine exposure on arousal regulatory systems. *Neurotoxicology and Teratology*, 24(3), 385–395. [https://doi.org/10.1016/S0892-0362\(02\)00200-3](https://doi.org/10.1016/S0892-0362(02)00200-3)
- Mayes, L. C., Grillon, C., Granger, R., & Schottenfeld, R. (1998). Regulation of arousal and attention in preschool children exposed to cocaine prenatally. *Annals of the New York Academy of Sciences*, 846(1), 126–143. <https://doi.org/10.1111/j.1749-6632.1998.tb09731.x>
- McLaughlin, K. A., & Lambert, H. K. (2017). Child trauma exposure and psychopathology: Mechanisms of risk and resilience. *Current Opinion in Psychology*, 14, 29–34. <https://doi.org/10.1016/j.copsyc.2016.10.004>
- Mohllajee, A. P., Curtis, K. M., Morrow, B., & Marchbanks, P. (2007). Pregnancy intention and its relationship to birth and marital outcomes. *Obstetrics and Gynecology*, 109(3), 678–686. <https://doi.org/10.1097/01.AOG.0000255666.78427.c5>
- Myrman, A., Olsen, P., Rantakallio, P., & Laara, E. (1995). Does the wantedness of a pregnancy predict a child's educational attainment? *Family Planning Perspectives*, 27(3), 116–119. <https://doi.org/10.2307/2136109>
- Narayan, A. J., Bucio, G. O., Rivera, L. M., & Lieberman, A. F. (2016). Making sense of the past creates space for the baby: Perinatal Child-Parent Psychotherapy for pregnant women with childhood trauma. *ZERO TO THREE Journal*, 36(5), 22–28.
- Narayan, A. J., Hagan, M. J., Cohodes, E., Rivera, L. M., & Lieberman, A. F. (2016). Early childhood victimization and physical intimate partner violence during pregnancy: A developmental and person-oriented approach. *Journal of Interpersonal Violence*, 34(1), 3–26. <https://doi.org/10.1177/0886260516639261>
- Nygaard, E., Moe, V., Slinning, K., & Walhovd, K. B. (2015). Longitudinal cognitive development of children born to mothers with opioid and polysubstance use. *Pediatric Research*, 78(3), 330–335. <https://doi.org/10.1038/pr.2015.95>
- O'Leary, C. M., Nassar, N., Kurinczuk, J. J., & Bower, C. (2009). The effect of maternal alcohol consumption on fetal growth and preterm birth. *BJOG: An International Journal of Obstetrics & Gynaecology*, 116(3), 390–400. <https://doi.org/10.1111/j.1471-0528.2008.02058.x>
- Ornoy, A., Michailevskaia, V., Lukashov, I., Bar-Hamburger, R., & Harel, S. (1996). The developmental outcome of children born to heroin-dependent mothers, raised at home or adopted. *Child Abuse & Neglect*, 20(5), 385–396. [https://doi.org/10.1016/0145-2134\(96\)00014-2](https://doi.org/10.1016/0145-2134(96)00014-2)
- Ornoy, A., Segal, J., Bar-Hamburger, R., & Greenbaum, C. (2001). Developmental outcome of school-age children born to mothers with heroin dependency: Importance of environmental factors. *Developmental Medicine & Child Neurology*, 43(10), 668–675. <https://doi.org/10.1111/j.1469-8749.2001.tb00140.x>
- Pallitto, C. C., Campbell, J. C., & O'Campo, P. (2005). Is intimate partner violence associated with unintended pregnancy? A review of the literature. *Trauma, Violence, & Abuse*, 6(3), 217–235. <https://doi.org/10.1177/1524838005277441>
- Perry, B. D. (2009). Examining child maltreatment through a neurodevelopmental lens: Clinical applications of the neurosequential model of therapeutics. *Journal of Loss and Trauma*, 14(4), 240–255. <https://doi.org/10.1080/15325020903004350>
- Santelli, J., Rochat, R., Hatfield-Timajchy, K., Gilbert, B. C., Curtis, K., Cabral, R., ... Schieve, L. (2003). The measurement and meaning of unintended pregnancy. *Perspectives on Sexual and Reproductive Health*, 35(2), 94–101.
- Shonkoff, J. P., Garner, A. S., Siegel, B. S., Dobbins, M. I., Earls, M. F., McGuinn, L., ... Wood, D. L. (2012). The lifelong effects of early childhood adversity and toxic stress. *Pediatrics*, 129(1), e232–e246. <https://doi.org/10.1542/peds.2011-2663>
- Sidebotham, P., Heron, J., & Teamc, T. A. S. (2003). Child maltreatment in the “children of the nineties:” The role of the child. *Child Abuse & Neglect*, 27(3), 337–352. [https://doi.org/10.1016/S0145-2134\(03\)00010-3](https://doi.org/10.1016/S0145-2134(03)00010-3)
- Smith, D. K., Johnson, A. B., Pears, K. C., Fisher, P. A., & DeGarmo, D. S. (2007). Child maltreatment and foster care: Unpacking the effects of prenatal and postnatal parental substance use. *Child Maltreatment*, 12(2), 150–160. <https://doi.org/10.1177/1077559507300129>
- Sobsey, D. (2006). Violence and disability. In W. M. Nehring (Ed.), *Health promotion for persons with intellectual/developmental disabilities: The state of scientific evidence* (pp. 205–234). Washington, DC: American Association on Mental Retardation.
- Streissguth, A. P., Bookstein, F. L., Barr, H. M., Sampson, P. D., O'Malley, K., & Young, J. K. (2004). Risk factors for adverse life outcomes in fetal alcohol syndrome and fetal alcohol effects. *Journal of Developmental & Behavioral Pediatrics*, 25(4), 228–238. <https://doi.org/10.1097/00004703-200408000-00002>
- Taillieu, T. L., & Brownridge, D. A. (2010). Violence against pregnant women: Prevalence, patterns, risk factors, theories, and directions for future research. *Aggression and Violent Behavior*, 15(1), 14–35. <https://doi.org/10.1016/j.avb.2009.07.013>
- Weller, R. H., Eberstein, I. W., & Bailey, M. (1987). Pregnancy wantedness and maternal behavior during pregnancy. *Demography*, 24(3), 407–412. [https://doi.org/10.1016/03064603\(91\)90037-1](https://doi.org/10.1016/03064603(91)90037-1)
- World Health Organization. (2011). *Intimate partner violence during pregnancy: Information sheet*. Geneva, Switzerland: Department of Reproductive Health and Research.
- Yalch, M. M., Black, J. A., Martin, L. F., & Levendosky, A. A. (2016). Effects of prenatal and postbirth intimate partner violence on preschool-age children's dissociative symptoms. *Journal of Aggression, Maltreatment & Trauma*, 25(7), 741–752. <https://doi.org/10.1080/10926771.2016.1194937>
- Yale Child Study Center. (2005). Child Development-Community Policing Program & Domestic Violence Home Visit Intervention Project (DVHVI). New Haven, CT.
- Zuravin, S. J. (1987). Unplanned pregnancies, family planning problems, and child maltreatment. *Family Relations*, 36(2), 135–139.
- Zuravin, S. J. (1991). Unplanned childbearing and family size: Their relationship to child neglect and abuse. *Family Planning Perspectives*, 23(4), 155–161.

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