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Research article

Unmet health care needs among children of mothers exposed to violence

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ABSTRACT

Background: Existing literature shows that maternal exposure to violence has negative consequences on the health and behavioral outcomes of their children, but how it affects unmet child healthcare needs is unknown.

Objectives: To examine associations between maternal violence exposure and unmet child healthcare needs in vulnerable families.

Participants and setting: We used data from the third and fifth years of Fragile Families and Child Wellbeing Study, a birth cohort study of urban children born between 1998 and 2000 n = 2848.

Methods: Mothers completed a self-reported questionnaire or interview. Maternal violence exposure was measured through direct (victim) and indirect (witness) exposure. Unmet child healthcare needs was operationalized through: not having seen a doctor when needed, not having a well-child visit in the past year, and never had a dental check-up.

Results: In adjusted logistic regression models, children of mothers who were victims of violence were more likely to not have seen a doctor when needed (odds ratio = 3.36, $p < 0.01$), not have a well-child visit in the past year (odds ratio = 2.50, $p < 0.01$), and never have a dental check-up (odds ratio = 1.54, $p < 0.01$). There was no association between maternal witnessing violence and unmet child healthcare needs.

Conclusions: In this study of urban children, having a mother who was a victim of violence was associated with unmet healthcare needs. These findings underscore the need to invest in efforts to reduce the prevalence of violence. Such efforts would reduce unmet child healthcare needs in vulnerable families.

1. Introduction

Violence exposure affects millions of people every year in the United States and around the world (Butchart, Mikton, Dahlberg, & Krug, 2015). It is estimated that 2.7 million people aged 12 or older experienced at least one violent victimization in the United States in 2015 (Truman & Morgan, 2016). Exposure to violence, which can take the form of victimization or witnessing violence perpetrated on someone else, has negative health consequences such as depression and substance abuse (Huang, King, & McAtee, 2018; Johnson et al., 2009; Mitchell et al., 2010).

Violence has greater negative lifelong health consequences in women and children than adult men (Butchart et al., 2015). Mothers exposed to violence are at greater risk of depression and maternal distress (Apter et al., 2010; Huang et al., 2018). Exposure

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to violence in mothers also has negative consequences on their children. Maternal violence exposure can lead to adverse birth outcomes (Shah & Shah, 2010), and increased aggressive behaviors in children (Oravecz, Koblinsky, & Randolph, 2008; Zhang & Eamon, 2011). Mothers with poor mental health tend to have lower parenting quality and are more likely to neglect their children, which may lead to greater behavioral and mental problems in children (Cummings & Davies, 1994; Rahman, Patel, Maselko, & Kirkwood, 2008; Silverstein, Augustyn, Cabral, & Zuckerman, 2006).

Despite the available evidence documenting the negative consequences of maternal exposure to violence and poorer health and behavioral outcomes in children, little is known about the association between maternal exposure to violence and unmet child healthcare needs. We draw from two distinct theoretical frameworks that may indicate that maternal violence exposure may be contributing to unmet healthcare needs in children. First, the Family Stress Model provides a theoretical framework discussing risk factors that may predict child outcomes (Conger, Conger, & Martin, 2010; Conger, Rueter, & Conger, 2000), which in this study are related to abuse and neglect. The model posits that various forms of hardship – including economic – may negatively affect parenting, leading to adverse child development. Some studies have argued and found that economic hardship is associated with violence exposure (Golden, Perreira, & Durrance, 2013; Lucero, Lim, & Santiago, 2016). The second theoretical framework we draw from is the Andersen Behavioral Model of Health Services Use (Andersen, 1995, 2008). The model posits that enabling resources (e.g., financial hardship, poverty) and predisposing factors (e.g., poor mental health) affect the use of healthcare services and health outcomes. As a result, the model would predict that maternal violence exposure may be affecting unmet child healthcare needs through predisposing factors such as poor parental mental health. Given that the risk factors affecting child abuse and neglect and unmet healthcare needs in children from the two frameworks are similar, we believe that violence exposure is likely to be linked with child unmet healthcare needs, which may be through the poor parenting practices and/or poor mental health of the primary caregiver. Since maternal exposure to violence has been found to increase the risk of depression and child neglect (Huang et al., 2018; Leschied, Chiodo, Whitehead, & Hurley, 2005), it is may be more likely for their children to have unmet healthcare needs.

Inequities in access to healthcare and unmet medical needs are among the leading concerns of health disparities in public health policies (Woolf & Braveman, 2011). The American Academy of Pediatrics recommends at least annual well-child visits for children older than three years (Committee on Practice & Ambulatory Medicine, 2000). Failing to meet these medical and healthcare needs can lead to more health complications and future health problems in childhood, adolescence and adulthood (Heckman, 2006). Additionally, poor childhood health has been shown to negatively influence school performance through the inability to focus, along with declined learning capabilities (Clark et al., 2010; Shi, Tubb, Fingers, Chen, & Caffrey, 2013). Similarly, these negative consequences, can also be traced forward to adulthood, when the mental and physical toll of unmet medical needs can lead to susceptibility to disease, lack of social and professional skills, job absenteeism, and lower income (Heckman, 2006; Oreopoulos, Stabile, Walld, & Roos, 2008).

The objective of the current study of a sample of children and their mothers predominantly from low-income families was to examine the associations between maternal exposure to violence and unmet child healthcare needs. We hypothesized that children of mothers exposed to violence are more likely to have unmet healthcare needs.

2. Methods

2.1. Data

The Fragile Families and Child Wellbeing Study (FFCWS) is a longitudinal study of a cohort of children born between 1998 and 2000 in 20 large US cities. The FFCWS uses a stratified random sampling technique with an oversampling of children who were born to unmarried parents (Reichman, Teitler, Garfinkel, & McLanahan, 2001. Both parents were interviewed on a regular basis. The study focuses on unmarried parents and their children as they are at greater risk of separating and living in poverty than more traditional families. The current study focuses on mothers who completed the interviews at year three and year five. Our sample size included 2848 mothers and their children.

2.2. Measures

2.2.1. Unmet healthcare needs in children

Unmet healthcare needs was operationalized using three outcome variables: (1) the child did not go to a doctor or hospital when needed in the past year, (2) the child did not have a regular check up in the past year, and (3) the child never had a dental check up in the past. All these measures are reported by mothers and were recoded into binary outcomes.

2.2.2. Maternal violence exposure

Two variables, being a victim or a witness of violence, were used to capture and measure direct and indirect maternal exposure to violence when the child was five years old (Warner & Swisher, 2014). A mother was classified as a victim of violence if she experienced any of the following circumstances: has been hit, slapped, or beaten by someone, attacked with a weapon, or shot by someone. Similarly, the mother was considered having witnessed violence if she witnessed any of the following: someone being hit, slapped, or beaten by someone else, someone being attacked with a weapon, being shot, or being murdered. Both variables were coded as binary variables if mothers experienced any of the above.

2.2.3. Child abuse and child neglect

Measures of child abuse and child neglect were constructed using the Parent-Child Conflict Tactics Scales (CTSPC) (Straus, Hamby, Finkelhor, Moore, & Runyan, 1998). Mothers were asked about the frequency of physically aggressive parenting behaviors practiced which were: the number of times the mother spanked her child, the number of times she pinched her child, the number of times she slapped her child, the number of times she hit her child, and the number of times she shook her child during the past year. Responses are categorized as: (0) This has never happened, (1) once, (2) twice, (3) 3–5 times, (4) 6–10 times, (5) 11–20 times, (6) more than 20 times, and (7) yes but not in the past year. A binary variable denoting child physical abuse was defined as high frequency aggressive behaviors for any of the parenting behaviors assessed that occurred 11 or more times in the past year.

Four questions were used to assess child neglect: the number of times the mother left the child home alone, the number of times the mother was so caught up with her own problems that she was unable to show love to her child, the number of times the mother was unable to make sure the child got the food he or she needed, and the number of times the mother was so drunk that she had problems taking care of her child. A binary variable denoting child neglect to denote if the mother reported any of the parenting behaviors having occurred in the past year.

2.2.4. Other control variables

The analysis also included several sociodemographic characteristics that were expected to be associated with maternal violence exposure and unmet healthcare needs in children. Mother's age, education, race, immigration status, number of children, relationship status with child's father, employment status, and risk of depression were among these variables. Additionally, living in public housing, and the ratio of household income to Federal Poverty Level (FPL) were used to measure the financial status of the household.

Availability of insurance coverage for both mother and child, along with the child's birthweight (as a proxy for existing medical conditions) are other control variables that were expected to influence the propensity and need to utilize healthcare services.

Finally, several neighborhood level characteristics such as perceived social support, social cohesion, social control, along with the percent of households on public assistance, and percent of families below the Federal Poverty Level were included among the control variables.

2.3. Statistical analysis

We first used bivariate logistic regression to examine the association between maternal exposure to violence and unmet healthcare needs in children. Then, we estimated a second model to assess the adjusted associations of sociodemographic characteristics with the outcomes. Finally, in the third model, we added health insurance coverage status, low birthweight status of the child, child abuse, and child neglect. All the models used clustered standard errors at the city-level.

Several of the explanatory variables in the dataset had missing values. Most of the variables had less than 1–2 % of missing values. A handful of variables had between 4 % and 10 % of missing values. To preserve these observations and improve the precision of the estimates, we imputed these missing values using multiple chained equation (mice using Stata) and created 20 datasets (Royston & White, 2011; Royston, 2009). Since it is not recommended to impute missing values on the dependent variables (Von Hippel, 2007), we dropped these observations (n = 14). Given that the results using listwise deletion (only complete observations) were similar, we presented the estimates using imputed data. All the analyses were conducted using Stata 15 (StataCorp, College Station, TX).

Some of the explanatory variables come from the restricted version of the Fragile Families dataset. Access to this version of the data requires Institutional Review Board review, which was approved by the authors' institution through expedited review.

3. Results

3.1. Descriptive statistics

Table 1 presents descriptive statistics by maternal violence exposure (victim or witness) status. Most of the characteristics between the two groups are statistically different. Mothers exposed to violence were about two years younger at the birth of the child than those who were not exposed to violence. Overall, mothers exposed to violence were more likely to belong to more vulnerable groups than those who were not exposed to violence. Moreover, mothers exposed to violence tended to have lower levels of education. About 77 % of mothers exposed to violence had at most a high school degree compared to 57 % for mothers who were not exposed to violence.

There were also racial disparities by violence exposure. Mothers exposed to violence were disproportionally of racial minorities (87 % vs 70 % Black or Hispanic) and they were more likely to be separated from the child's father (57 % vs 42 %). In addition, mothers exposed to violence were more likely to be depressed (23 % vs 14 %) and their household income to poverty ratio was about half of mothers who were not exposed to violence (1.26 vs 2.19). Finally, mothers exposed to violence were more likely to have occurrences of child physical abuse (29 % vs 22 %) and child neglect (17 % vs 8 %).

3.2. Regression results

Table 2 presents the logistic regression results for the association between maternal violence exposure (victim and witnessed violence) and unmet child healthcare needs. For ease of interpretation, odds ratios are reported. In the unadjusted models (Model 1), children of mothers who were a victim of violence had higher odds of facing unmet healthcare needs: odds ratio = 3.78 (95 % CI:

Table 1
Demographic characteristics of Fragile Families sample.

Variable	Exposed to violence	Not exposed
Age of mother	23.81	25.79***
Mother education		
No high school degree	0.43	0.28***
High school degree	0.34	0.29***
Some college	0.20	0.28***
College degree	0.03	0.15***
Mother race		
White	0.11	0.26***
Black	0.67	0.43***
Hispanic	0.20	0.27***
Other race	0.02	0.04***
Foreign-Born	0.07	0.16**
Mother relationship with child's father		
Married	0.16	0.35***
Cohabitating	0.21	0.19***
Non resident	0.07	0.04***
Separated	0.56	0.42***
Child abuse	0.29	0.22***
Child neglect	0.17	0.08***
Experienced domestic violence	0.11	0.06***
Has a new romantic partner	0.24	0.15***
Lived in public housing	0.18	0.11***
Household income to poverty ratio	1.26	2.19***
Employed	0.54	0.58***
Mother is depressed	0.23	0.14***
Has health insurance	0.87	0.88***
Low birthweight	0.12	0.09*
Social Support	2.86	3.16*
Social Cohesion	2.80	3.09***
Neighborhood social control	3.07	3.17***
Proportion of households on public assistance	0.10	0.07
Proportion of families below poverty level 1999	0.24	0.16***
Number of children	2.49	2.25***

N = 2848.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

Table 2
Logistic regressions of the association between exposure to violence and child unmet health care needs odds ratios, Fragile Families and Child Wellbeing Study n = 2848.

		Model 1	Model 2	Model 3
Not seen a doctor when needed	Victim	3.78** (1.96-7.32)	3.36** (1.68-6.75)	2.65** (1.28-5.49)
	Witness	1.71** (1.00-2.92)	1.62 (0.89–2.95)	1.06 (0.54–2.07)
No well child visit	Victim	1.69 (0.84–3.43)	2.25* (1.07-4.75)	2.53* (1.21-5.27)
	Witness	0.63 (0.41-0.98)	0.97 (0.60–1.57)	1.04 (0.64–1.69)
Never had dental check up	Victim	1.84** (1.24-2.74)	1.62* (1.05-2.50)	1.69* (1.12-2.54)
	Witness	1.03 (0.81–1.31)	1.03 (0.79–1.33)	1.01 (0.78–1.31)

Model 1 is unadjusted. Model 2 controls for all the sociodemographic characteristics. Model 3 includes the control variables from Model 2 and health insurance status, low birthweight, child abuse, and child neglect. 95 % confidence intervals are reported in parentheses. Standard errors are clustered at the city-level.
** $p < 0.01$.
* $p < 0.05$.

1.96–7.32) for not having seen a doctor when needed; odds ratio = 1.69 (95 % CI: 0.84–3.43) for not having a well-child visit in the past year; odds ratio = 1.84 (95 % CI: 1.24–2.74) for never having a dental check-up. In the models adjusting for sociodemographic characteristics, the associations between maternal violence victimization and unmet child healthcare needs remained or became statistically significant: odds ratio = 3.36 (95 % CI: 1.68–6.75) for not having seen a doctor when needed; odds ratio = 2.25 (95 %

Table 3
Logistic regressions of the association between exposure to violence and child unmet health care needs (odds ratios, Model 3 Table 2, Fragile Families and Child Wellbeing Study n = 2848.

	Not seen a doctor when needed	No well child visit	Never had a dental check up
Victim of violence	2.65** (1.28-5.49)	2.53* (1.21-5.27)	1.69* (1.12-2.54)
Witnessed violence	1.06 (0.54–2.07)	1.04 (0.64–1.69)	1.01 (0.78–1.31)
Mother's age	1.04 (0.99–1.09)	1.04* (1.00-1.08)	1.00 (0.98–1.03)
Mother's education			
High school	0.55 (0.27–1.12)	0.73 (0.46–1.15)	1.07 (0.80–1.42)
Some college	0.46 (0.19–1.10)	0.54 (0.31-0.93)	1.27 (0.93–1.73)
College graduate	1.46 (0.32–6.77)	0.52 (0.24–1.13)	0.78 (0.44–1.37)
Mother's race			
Black	1.68 (0.56–4.99)	0.50* (0.26-0.97)	0.85 (0.61–1.20)
Hispanic	2.50 (0.77–8.16)	1.36 (0.79–2.36)	1.03 (0.70–1.52)
Other race	1.00 (1.00-1.00)	0.40 (0.11–1.41)	0.99 (0.47–2.08)
Immigrant	1.26 (0.49–3.23)	3.65* (2.29-5.82)	1.01 (0.68–1.52)
Relationship with father Married	0.79 (0.19–3.36)	1.71 (0.46–6.31)	0.81 (0.46–1.46)
Cohabitating	1.85 (0.50–6.87)	1.75 (0.48–6.39)	1.11 (0.63–1.95)
Separated	0.88 (0.22–3.46)	1.39 (0.37–5.19)	1.17 (0.68–2.00)
New romantic partner	1.59 (0.72–3.52)	0.92 (0.44–1.90)	0.78 (0.55–1.10)
Number of children	1.16 (0.99–1.36)	0.99 (0.84–1.16)	0.94 (0.85–1.03)
Domestic violence	1.77 (0.75–4.19)	0.63 (0.26–1.55)	1.03 (0.69–1.55)
Lives in public housing	1.10 (0.56–2.17)	1.23 (0.66–2.30)	1.04 (0.74–1.45)
Maternal depression	1.31 (0.69–2.51)	0.71 (0.40–1.27)	1.25 (0.94–1.66)
Income to poverty ratio	1.01 (0.89–1.13)	0.98 (0.92–1.06)	1.02 (0.98–1.05)
Employed	0.69 (0.37–1.27)	1.03 (0.68–1.55)	0.95 (0.74–1.21)
Social support	0.92 (0.73–1.17)	0.98 (0.82–1.16)	0.94 (0.85–1.06)
Social cohesion	1.19 (0.79–1.50)	1.12 (0.92–1.35)	0.98 (0.86–1.12)
Neighborhood social	1.07 (0.81–1.40)	1.02 (0.88–1.21)	0.94 (0.84–1.04)
control			
% households receiving public assistance	0.16 (0.00–390.01)	0.14 (0.00–35.31)	0.10 (0.00–3.32)
% households below	7.28 (0.19–279.32)	2.66 (0.19–37.36)	2.18 (0.42–11.20)
poverty level			
Have health insurance	0.60 (0.27–1.36)	1.02 (0.54–1.94)	0.96 (0.67–1.39)
Low birthweight	0.68 (0.23–1.99)	0.59 (0.26–1.34)	1.15 (0.79–1.65)
Child abuse	1.14 (0.59–2.22)	1.13 (0.70–1.83)	1.29 (0.99–1.67)
Child neglect	9.89** (5.42–18.03)	0.47 (0.22–1.02)	0.98 (0.68–1.42)

95 % confidence intervals are reported in parentheses. Standard errors are clustered at the city-level.
** $p < 0.01$.
* $p < 0.05$.

CI: 1.07–4.75) for not having a well-child visit in the past year; odds ratio = 1.62 (95 % CI: 1.05–2.50) for never having a dental check-up. On the other hand, contrary to being a victim of violence, witnessing violence had no statistically significant association with unmet child healthcare needs.

Model 3 further adjusts for health insurance status, low birthweight, child abuse, and child neglect. The associations between maternal violence victimization and unmet child healthcare needs remained statistically significant: odds ratio = 2.65 (95 % CI: 1.28–5.49) for not having seen a doctor when needed; odds ratio = 2.53 (95 % CI: 1.21–5.27) for not having a well-child visit in the past year; odds ratio = 1.69 (95 % CI: 1.12–2.54) for never having a dental check-up. Additionally, the association between witnessing violence and unmet child healthcare needs remained statistically insignificant. Child abuse in itself was not statistically significantly associated with unmet child healthcare needs. Child neglect was only statistically significantly associated with not having seen a doctor when needed (odds ratio = 9.89, 95 % CI: 5.42–18.03). The full model with all the covariates is shown in Table 3. The c-statistic was about 0.8, which indicates a strong model. In addition, the Hosmer-Lemeshow test rejected the null hypothesis of no goodness-of-fit.

4. Discussion

Unmet healthcare needs remain a persistent issue in children, especially the most vulnerable ones (e.g., low-income, or with chronic health conditions) (Silver & Stein, 2001). Because of the negative lifelong consequences of lack of access to healthcare in childhood, understanding the factors that contribute to unmet healthcare needs is important. In the short-term, unmet child healthcare needs could result in delayed medical treatment, medical complications, chronic illness, and poorer health status (Hadley,

2003; Oreopoulos et al., 2008). In the long-term, it could lead to negative developmental outcomes (both physical and mental), poor school performance, catastrophic healthcare costs, and premature death (Kerber et al., 2007; Oreopoulos et al., 2008).

This study used a population-based sample of mainly low-income urban mothers and their children to find that maternal violence victimization was associated with unmet healthcare needs in their children (unable to see a doctor or go to the hospital when needed, did not have a well-child visit in the past year, and never had a dental check-up). Children of mothers who witnessed violence did not have a higher risk of having unmet healthcare needs.

A large body of literature on domestic violence has documented many negative consequences on mothers and children (Abramsky et al., 2011; Rivara et al., 2007; Sousa et al., 2011). Moreover, exposure to community violence perpetrated outside of the home has also negative consequences on mothers and children (Huang et al., 2018; Mitchell et al., 2010). In addition, the negative consequences of maternal violence exposure extend to their children as well. For example, children of mothers exposed to violence had greater aggressive behaviors (Oravecz et al., 2008; Zhang & Eamon, 2011). The findings of this study extend prior research by documenting additional negative consequences of maternal violence exposure on their children. Children of mothers who were victims of violence are substantially more likely to have unmet healthcare needs.

There a few possible explanations for the association between maternal violence victimization and unmet child healthcare needs. First, maternal exposure to violence can lead to poor mental health (Huang et al., 2018), which can affect parenting quality and lead to child neglect (Leschied et al., 2005), thus leading to unmet child healthcare needs. Second, mothers exposed to violence tend to have lower levels of social support and an unstable family structure (Scarpa & Haden, 2006; Westbrook & Harden, 2010), which could explain the link between maternal violence exposure and unmet child healthcare needs. Nevertheless, the associations between maternal violence victimization and unmet child healthcare needs remained statistically significant after accounting for some of these potential factors. Future research should focus on some of the mechanisms that could explain why children of mothers who were victims of violence are at higher risk of unmet healthcare needs.

The findings from this study have potential important implications. The World Health Organization has called for a reduction in the prevalence of violence around the world (Butchart et al., 2015). Mothers exposed to violence tend to be more vulnerable and live in more disadvantaged communities (Joshi et al., 2017). As a result, their children are also disadvantaged and more vulnerable. Their children are also the ones who are more likely to be in poorer health and have behavior problems, thus have a greater need for healthcare services (Oravecz et al., 2008; Zhang & Eamon, 2011). As a result, reducing the prevalence of violence exposure in mothers would, most likely, reduce unmet healthcare needs in their children and reduce health disparities.

There are some limitations to this study. First, our measures of unmet healthcare needs are reported by the mothers. We do not have clinical information to compare (or validate) these responses to. Second, the measures of maternal violence exposure (victim and witness) do not distinguish between a single and multiple occurrence. It may be possible that children of mothers who are repeatedly exposed to violence are at even greater disadvantage. Additionally, our exposure to violence measures only capture physical violence and do not measure any form of potential sexual assault besides domestic. Sexual assault leads to severe trauma and poor mental health outcomes (Campbell, Dworkin, & Cabral, 2009). Third, there is evidence that a non-negligible number of violent crimes are not reported to the police (Truman & Morgan, 2016). It is unclear to what extent mothers in this sample might under-report accounts of violence exposure. Finally, the generalizability of the findings is unclear. Tabulations from a nationally representative sample of children ages 3–5 from the 2003 National Survey of Children's Health (NSCH) shows that about 7 % of them did not have doctor's visit and 7 % of them did not have a dentist visit in the past year. In our sample, about 4.1 % of children did not have a well child visit in the past year and 11.8 % of children have never been to the dentist. We would have expected the percentage of children not having a well child visit to be higher in the Fragile Families because families in this sample tend to be more vulnerable. It could be that since the families are more likely to be vulnerable, they may be more likely to receive public health insurance and other social services, which may include healthcare referrals. For example, we are aware that the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) provides healthcare referrals, which may make families and children more likely to use healthcare services. Another possibility is the slightly different wording of questions. The doctor's visit question from the NSCH may include any visit and not only well child visits. The dentist visit question from the NSCH only asks for the past year while the Fragile Families provides information about children who have never been to the dentist. As a result, a direct comparison may not be straightforward. However, 35 % of mothers in our sample were exposed to violence. We would expect this proportion to be substantially lower in a nationally representative sample of US families and mothers, and would argue that the sample population in this study is a much more relevant one for this research question.

Despite the above limitations, the study contributes to the literature on unmet healthcare needs in children. Children of mothers who were victim of violence were more likely to have unmet healthcare needs. The findings of this study highlight the importance of efforts to reduce the prevalence of maternal violence exposure along with providing affordable and accessible healthcare to those impacted by violence. In addition, special attention should be paid to these groups of children whose mothers may be exposed to violence by first responders, law enforcement, healthcare professionals, social services professionals, and many other individuals or agencies that provide support and referrals. This would likely result in a reduction in unmet healthcare needs in children in vulnerable families and may reduce health disparities. Additional research is needed to understand the mechanisms that could explain this association.

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Declaration of Competing Interest

The authors have no conflict of interest relevant to this article to disclose.

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.chiabu.2020.104363.

References

Abramsky, T., Watts, C. H., Garcia-Moreno, C., Devries, K., Kiss, L., Ellsberg, M., ... Heise, L. (2011). What factors are associated with recent intimate partner violence? Findings from the WHO multi-country study on women's health and domestic violence. *BMC Public Health, 11*(1), 109.

Andersen, R. M. (1995). Revisiting the behavioral model and access to medical care: does it matter? *Journal of Health and Social Behavior, 36*(1), 1–10.

Andersen, R. M. (2008). National health surveys and the behavioral model of health services use. *Medical Care, 46*(7), 647–653.

Apter, A. J., Garcia, L. A., Boyd, R. C., Wang, X., Bogen, D. K., & Ten Have, T. (2010). Exposure to community violence is associated with asthma hospitalizations and emergency department visits. *The Journal of Allergy and Clinical Immunology, 126*(3), 552–557.

Butchart, A., Mikton, C., Dahlberg, L. L., & Krug, E. G. (2015). *Global status report on violence prevention 2014*.

Campbell, R., Dworkin, E., & Cabral, G. (2009). An ecological model of the impact of sexual assault on women's mental health. *Trauma, Violence & Abuse, 10*(3), 225–246.

Clark, C. J., Everson-Rose, S. A., Suglia, S. F., Btoush, R., Alonso, A., & Haj-Yahia, M. M. (2010). Association between exposure to political violence and intimate-partner violence in the occupied Palestinian territory: A cross-sectional study. *Lancet, 375*(9711), 310–316.

Committee on Practice and Ambulatory Medicine (2000). Recommendations for preventive pediatric health care. *Pediatrics, 105*(3), 645–646.

Conger, R. D., Conger, K. J., & Martin, M. J. (2010). Socioeconomic status, family processes, and individual development. *Journal of Marriage and the Family, 72*(3), 685–704.

Conger, K. J., Rueter, M. A., & Conger, R. D. (2000). *The role of economic pressure in the lives of parents and their adolescents: The family stress model*.

Cummings, E. M., & Davies, P. T. (1994). Maternal depression and child development. *Journal of Child Psychology and Psychiatry, 35*(1), 73–122.

Golden, S. D., Perreira, K. M., & Durrance, C. P. (2013). Troubled times, troubled relationships: How economic resources, gender beliefs, and neighborhood disadvantage influence intimate partner violence. *Journal of Interpersonal Violence, 28*(10), 2134–2155.

Hadley, J. (2003). Sicker and poorer—The consequences of being uninsured: A review of the research on the relationship between health insurance, medical care use, health, work, and income. *Medical Care Research and Review, 60*(2_suppl), 3S–75S.

Heckman, J. J. (2006). Skill formation and the economics of investing in disadvantaged children. *Science, 312*(5782), 1900–1902.

Huang, X., King, C., & McAtee, J. (2018). Exposure to violence, neighborhood context, and health-related outcomes in low-income urban mothers. *Health & Place, 54*, 138–148.

Johnson, S. L., Solomon, B. S., Shields, W. C., McDonald, E. M., McKenzie, L. B., & Gielen, A. C. (2009). Neighborhood violence and its association with mothers' health: Assessing the relative importance of perceived safety and exposure to violence. *Journal of Urban Health, 86*(4), 538–550.

Joshi, S., Mooney, S. J., Rundle, A. G., Quinn, J. W., Beard, J. R., & Cerdá, M. (2017). Pathways from neighborhood poverty to depression among older adults. *Health & Place, 43*, 138–143.

Kerber, K. J., de Graft-Johnson, J. E., Bhutta, Z. A., Okong, P., Starrs, A., & Lawn, J. E. (2007). Continuum of care for maternal, newborn, and child health: From slogan to service delivery. *Lancet, 370*(9595), 1358–1369.

Leschied, A. W., Chiodo, D., Whitehead, P. C., & Hurley, D. (2005). The relationship between maternal depression and child outcomes in a child welfare sample: Implications for treatment and policy. *Child & Family Social Work, 10*(4), 281–291.

Lucero, J. L., Lim, S., & Santiago, A. M. (2016). Changes in economic hardship and intimate partner violence: A family stress framework. *Journal of Family and Economic Issues, 37*(3), 395–406.

Mitchell, S. J., Lewin, A., Horn, I. B., Valentine, D., Sanders-Phillips, K., & Joseph, J. G. (2010). How does violence exposure affect the psychological health and parenting of young African-American mothers? *Social Science & Medicine, 70*(4), 526–533.

Oravecz, L. M., Koblinsky, S. A., & Randolph, S. M. (2008). Community violence, interpartner conflict, parenting, and social support as predictors of the social competence of African American preschool children. *The Journal of Black Psychology, 34*(2), 192–216.

Oreopoulos, P., Stabile, M., Walld, R., & Roos, L. L. (2008). Short-, medium-, and long-term consequences of poor infant health an analysis using siblings and twins. *The Journal of Human Resources, 43*(1), 88–138.

Rahman, A., Patel, V., Maselko, J., & Kirkwood, B. (2008). The neglected 'm'in MCH programmes–why mental health of mothers is important for child nutrition. *Tropical Medicine and International Health, 13*(4), 579–583.

Reichman, N. E., Teitler, J. O., Garfinkel, I., & McLanahan, S. S. (2001). Fragile families: Sample and design. *Children and Youth Services Review, 23*(4–5), 303–326.

Rivara, F. P., Anderson, M. L., Fishman, P., Bonomi, A. E., Reid, R. J., Carrell, D., ... Thompson, R. S. (2007). Intimate partner violence and health care costs and utilization for children living in the home. *Pediatrics, 120*(6), 1270–1277.

Royston, P. (2009). Multiple imputation of missing values: Further update of ice, with an emphasis on categorical variables. *The Stata Journal, 9*(3), 466–477.

Royston, P., & White, I. R. (2011). Multiple imputation by chained equations (MICE): Implementation in Stata. *Journal of Statistical Software, 45*(4), 1–20.

Scarpa, A., & Haden, S. C. (2006). Community violence victimization and aggressive behavior: The moderating effects of coping and social support. *Aggressive Behavior, 32*(5), 502–515.

Shah, P. S., & Shah, J. (2010). Maternal exposure to domestic violence and pregnancy and birth outcomes: A systematic review and meta-analyses. *Journal of Women's Health, 19*(11), 2017–2031.

Shi, X., Tubb, L., Fingers, S. T., Chen, S., & Caffrey, J. L. (2013). Associations of physical activity and dietary behaviors with children's health and academic problems. *The Journal of School Health, 83*(1), 1–7.

Silver, E. J., & Stein, R. E. (2001). Access to care, unmet health needs, and poverty status among children with and without chronic conditions. *Ambulatory Pediatrics, 1*(6), 314–320.

Silverstein, M., Augustyn, M., Cabral, H., & Zuckerman, B. (2006). Maternal depression and violence exposure: Double jeopardy for child school functioning. *Pediatrics, 118*(3), e792–e800.

Sousa, C., Herrenkohl, T. I., Moylan, C. A., Tajima, E. A., Klika, J. B., Herrenkohl, R. C., ... Russo, M. J. (2011). Longitudinal study on the effects of child abuse and

children's exposure to domestic violence, parent-child attachments, and antisocial behavior in adolescence. *Journal of Interpersonal Violence, 26*(1), 111–136.
Straus, M. A., Hamby, S. L., Finkelhor, D., Moore, D. W., & Runyan, D. (1998). Identification of child maltreatment with the Parent-Child Conflict Tactics Scales: Development and psychometric data for a national sample of American parents. *Child Abuse & Neglect, 22*(4), 249–270.
Truman, J., & Morgan, R. (2016). *Criminal victimization, 2015.* Washington, DC: US Department of Justice, Office of Justice Programs, Bureau of Justice Statistics. NCJ250180.
Von Hippel, P. T. (2007). 4. Regression with missing Ys: An improved strategy for analyzing multiply imputed data. *Sociological Methodology, 37*(1), 83–117.
Warner, T. D., & Swisher, R. R. (2014). The effect of direct and indirect exposure to violence on youth survival expectations. *Journal of Adolescent Health, 55*(6), 817–822.
Westbrook, T. P. R., & Harden, B. J. (2010). Pathways among exposure to violence, maternal depression, family structure, and child outcomes through parenting: A multigroup analysis. *The American Journal of Orthopsychiatry, 80*(3), 386.
Woolf, S. H., & Braveman, P. (2011). Where health disparities begin: The role of social and economic determinants—And why current policies may make matters worse. *Health Affairs, 30*(10), 1852–1859.
Zhang, S., & Eamon, M. K. (2011). Parenting practices as mediators of the effect of mothers' community violence exposure on young children's aggressive behavior. *Families in society, 92*(3), 336–343.