VIOLENCE EXPOSURE AND TRAUMATIC STRESS SYMPTOMS AS ADDITIONAL PREDICTORS OF HEALTH PROBLEMS IN HIGH-RISK CHILDREN

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Objective To test the hypotheses that both violence and traumatic stress symptoms are associated with negative health status among poor preschool children.

Study design This cross-sectional analysis of a Head Start preschool age cohort (n = 160) studied health outcomes parallel to those assessed in the 2001 National Health Interview Survey of child health (asthma, allergy, attention deficit hyperactivity disorder, global appraisal) as well as two stress-related somatic complaints, gastrointestinal problems and headache. Risk factors include sociodemographics, mothers' health factors, extent of exposure to violence and maltreatment, and mother- and teacher-reported traumatic stress symptoms.

Results Compared with poor children in the National Health Interview Survey and their Head Start peers, children exposed to violence and those with high levels of traumatic stress had significantly worse outcomes, in a dose-response relation. Being abused, exposed to domestic violence, and having a mother using substances were associated with a higher number of health problems. The hierarchical model established the mother’s own poor physical health and the child’s level of traumatic stress as the strongest predictors of poor child health.

Conclusions These two risk factors are amenable to intervention by health care providers who treat children. (J Pediatr 2005;146:349-54)

The 2001 National Health Interview Survey (NHIS) reports high levels of children’s health problems associated with decrements in social development and educational attainment. The focal health conditions that affect a large proportion of children (an otherwise healthy age group) are allergies, asthma, and attention deficit hyperactivity disorder (ADHD). Overall child health and specific health problems were greater for poor and single-mother–headed families. However, other potential predictors of children’s poor health were not included.

Studies have linked caregiver stress, low socioeconomic status, and parenting difficulties to specific health outcomes, such as asthma and atopic immune profiles, in preschool children. Children’s exposure to maltreatment, interparental violence, and community violence are additional stressors that could affect child health, especially for those in poor neighborhoods. Although young children exposed to interparental violence have been found to have higher rates of anxiety, fears, aggression, and greater risk for perpetrating violence in their relationships with others, studies of their physical health are rare. Retrospective studies have associated such adverse childhood experiences (ACEs) with lower adult health, more health risk behaviors, chronic pain conditions, cancer, cardiovascular disease, and diabetes. What is missing is the way in which responses to ACEs, including posttraumatic stress sequelae, may mediate or add to risk for negative health status.

Posttraumatic stress is one plausible biological mechanism for negative health outcomes among victims of violence. Posttraumatic stress disorder (PTSD) becomes chronic in a large proportion of people exposed to violence and abuse in childhood and thus could remain a proximate factor in development of disease through psychoneuroendocrine as well as behavioral pathways across the lifespan. Exposure to violence in the family and

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ACE Adverse childhood experience
ADHD Attention deficit hyperactivity disorder
NHIS National Health Interview Survey
PTSD Posttraumatic stress disorder
community is linked to PTSD in children. Victimization and PTSD contribute to mental, physical, and substance use problems in women, above and beyond the poor health associated with poverty and chronic stress. Thus, the well-known association between poverty and poor child health may be related not only to the chronic stressors of poverty and single parenting accounted for in national surveys but also to violence exposures, violence-related morbidity in the mother, and the child’s own trauma exposures and traumatic stress reactions that frequently co-occur with poverty. In this study, we posit that exposure to community violence, child abuse, and intimate partner violence contribute to adverse health outcomes for young children. We predict that children’s health will be worse for those whose mothers may be depressed, abusing substances, or are in poor health. As with adults, children responding to ACEs with symptoms of posttraumatic stress will be the most vulnerable. Thus, additional variance in child health will be accounted for by the level of posttraumatic stress symptoms of the child.

METHODS

Design

These data are derived from a subset of instruments collected in the second wave of a longitudinal study of the impact of systemic violence on children’s development. This study relied on standardized instruments and mothers’ self-report in face-to-face interviews conducted by trained graduate students. Mothers assessed their children’s physical health problems and global health. Teachers completed assessments of behavioral problems and global physical health. Children’s health is compared with the NHIS data, and a number of probable risk and protective factors are used to predict child health outcomes.

Sample

One hundred sixty mothers, 160 children, and all of their teachers participated in the study. Families’ incomes were primarily low but varied ($M = $1589, $SD = 1348, range = 0 to $12,000). One family with high income was dropped. Children’s ages ranged from 4 to 6 years ($M = 4.62, $SD = 0.53), with equal numbers of boys and girls. Most of the children were white (52%), with 44% black or biracial and 4% other (primarily Hispanic). All of the mothers had at least a high school education. The majority of mothers were single (35.7% married).

Procedure

After institutional review board approval, families were recruited through the Head Start Community Action Agency offices in two Michigan counties. Mothers were interviewed either in their homes or at another outside location. As mandated reporters, procedures were in place for referring suspected cases of abuse and neglect. These and other procedures were described in the mothers’ informed consent document. Researchers also obtained permission from the mother to contact the child’s teacher. All teachers completed the questionnaires describing the child’s health as well as behavioral adjustment. Mothers were paid $30 for their participation; teachers were paid $10.

Measures

CHILD health. Mothers rated their children’s general physical health at the time of the interview. Ratings were made by using a 5-point Likert-type scale ranging from poor to excellent. In addition, 8 physical health conditions selected in part from the NHIS were assessed to create a total health problems score. Six conditions were assessed with a checklist indicating whether the child had asthma, flu, cold, headache, stomachache, and dizziness. Specifically, mothers and teachers were asked, “Within the past year, has this child had any of the following medical problems?” Evidence for interrater reliability is provided by intercorrelation of the sum of teachers’ and sum of mothers’ ratings of the same 6 health conditions ($r = 0.89, P = .001). The presence of severe allergies was determined when the mother indicated that the child was taking allergy medication. The eighth health problem was ADHD (of the hyperactive/impulsive subtype most common in this age group), assessed by the child’s teacher at two time points, using the Teacher Report Form (coefficient $\alpha = 0.92$). Children were assessed at approximately age 3 to 4 years and again at age 4 to 5 years. Only children with 6 or more symptoms that lasted for more than 1 year in the current study and thus meeting DSM-IV criteria were classified with ADHD.

EXPOSURE TO VIOLENCE. Community violence exposure was assessed by use of the Survey of Exposure to Community Violence, Parent Version. This survey evaluates exposure to moderately severe violence (threats, accidents, drug deals, arrests), severe violence (shootings, stabbings, rapes), and less severe violence (beatings, chasings). Questions ask parents to report their children’s exposure to incidents in terms of the presence/absence of that form of exposure. This measure has been used studies by Richters and Saltzman and Martinez and Ritchers. Reliability for the present study was 0.69. The Conflict Tactics Scale measures dyadic violence within the family by asking about the ways in which conflict is resolved by family members. The frequency of both mild violence and severe violence tactics is assessed with items concerning the use of physical force ranging from pushing and shoving, to beating up, and threatening to use or using a gun or knife. The Conflict Tactics Scale has been successfully used to assess violence to children by parents and siblings in other studies. The $\alpha$ value for partner-to-woman violence in the national survey was 0.83 and 0.68 in the present study for violence against the mother and 0.63 for violence against the child.

MOTHER’S HEALTH. Mothers rated their own general current physical health by using the Likert scale described above. Mothers were also asked to report whether and how much
they used cigarettes, alcohol, medications, mild drugs, and hard drugs. The Likert scale ranged from 1 to 5 (never to daily). The 5 items were summed to obtain a total Substance Use score. Reliability was \( \alpha = 0.71 \). The Beck Depression Inventory, a phenomenologic measure of depressive state that has received extensive validation study, \(^{27,28} \) has a short form that was used to measure maternal depression in this study with a reliability coefficient of 0.76.

**Child Traumatic Stress Symptoms.** The Preschool Posttraumatic Stress Symptoms Inventory consists of 17 items measuring symptoms of PTSD that reflect the traumatic distress of preschoolers. \(^{29} \) Mothers were asked how their child responded to an identified traumatic event that included witnessing or being the victim of violence at home or in the community. Items were scored 0 to 2 (not present, present, present for more than 1 month). A total traumatic stress symptom score consists of the sum of items present for more than 1 month. The measure was reliable (\( \alpha = 0.86 \) for mothers and 0.92 for teachers). Mothers’ scores correlated significantly with the PTSD scale derived from the Teacher Report Form (\( r = 0.239, P = .003 \)).

Analysis

NHIS data for children reflecting the prevalence of common health problems were compared with the frequency of health problems of the children in this study. General health perception ratings for both the mothers and preschool children similarly were compared with NHIS findings. Odds of having each outcome were calculated for the violence-exposed and traumatic stress affected children. We developed and tested a model consisting of a number of risk factors in the child’s life by using hierarchical regression in relation to the outcome of child physical health problems.

RESULTS

Most of the children in this sample (65.2%) were exposed to at least one incident of violence in the community, and 46.7% were exposed to at least one incident of mild or severe violence in their family, including child maltreatment and interpersonal violence. Seventy-eight percent of the children were exposed to at least one form of violence. Although fewer children had reactions to the violence exposure that were characterized as PTSD (20.2%), many more children (89.5%) exhibited at least 1 symptom of traumatic stress lasting for more than 1 month. Five contacts were made to protective services during the course of the study to describe suspected cases of child abuse and neglect.

Describing Preschool Children’s Health Problems

Mothers rated their child’s current physical health as 4.42, with little variation (SD = 0.62; range of scores, 3 to 5). Only 6.9% rated their child’s health as less than good. However, in the NHIS, only 1.8% of the total sample and 3.8% of the poor children were rated by their family member as having only fair or poor health. There was greater variation in mother’s endorsement of the number of health problems currently experienced by the child, with a range of from 0 to 8 and a mean of 2.39 problems (SD = 1.40). Mothers’ ratings of the child’s physical health were not related to the child’s ethnicity, age, sex, mother’s education, or mother’s age but were positively related to monthly family income (\( r = 0.168, P = .038 \)).

Table I depicts prevalence of several individual conditions. Rates of asthma for the Head Start children were higher than for the NHIS sample as a whole but similar to the rate for poor children. Reported rates of allergy are lower across the board in the Head Start sample. The Head Start children had more than double the rate of ADHD. This difference could be due to greater case findings for ADHD in a Head Start sample, where all are in preschool and are being assessed by the teacher. Although the rates of health problems were similar between the violence-exposed and total Head Start sample, the highest rates of health problems were among the children with traumatic stress symptoms.

There was little overlap in health conditions, as only 1.3% had 2 of the 3 focal health problems of asthma, allergies or ADHD, and no child had all 3. None of the children’s health problems in the current study were related to the child’s ethnicity, age, sex, mother’s education, mother’s age, or family income. However, more children were likely to have asthma and allergies when living in single-parent (25%) rather than married families (12%) (\( \chi^2(1) = 4.68, P = .031 \)). Children who had 1 or more of the 3 focal health problems (asthma, allergies, and/or ADHD) were significantly more likely than expected to be exposed to intrafamilial violence (\( \chi^2 (1) = 3.91, P = .048 \)) and to have diagnosable traumatic stress (\( \chi^2 (1) = 10.752, P = .001 \)). Many of the children with health problems were also traumatized by these events in their lives and had a diagnosis of PTSD. Children with asthma and with gastrointestinal problems were approximately 4 times more likely to have a PTSD diagnosis than were children without these health problems.

Factors Predictive of Child Health Problems

The preschool children in this study were exposed to many incidents of violence at home and in their community during their lifetime. Specifically, mothers reported that their child was exposed to a mean of 1.81 (SD = 1.97) acts of community violence. Violence against children in the family was high with a mean of 72.97 tactics or acts describing mild and/or severe child maltreatment reported by the mothers. These events varied considerably (SD = 165.46) and ranged from 0 to 1095. There were fewer reported experiences of domestic or intimate partner violence in the family (\( M = 47.64 \)); yet, these events also varied from none to 808 during the child’s life (SD = 123.09).

Mothers’ global assessments of their own current physical health also varied (\( M = 3.77, SD = 0.80 \); range of scores, 1 to 5). Mother’s reported substance use was low (\( M = 4.74, SD = 0.62 \)).
Table I. Percentage of children with health problems in the National Health Survey and the current sample, percent and odds ratio of those exposed to violence and with PTSD diagnosis

<table>
<thead>
<tr>
<th>Study Sample</th>
<th>NHIS</th>
<th>Head Start</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Poor</td>
</tr>
<tr>
<td>Health problem</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asthma</td>
<td>12.7</td>
<td>16.0</td>
</tr>
<tr>
<td>Allergy</td>
<td>12.6</td>
<td>12.6</td>
</tr>
<tr>
<td>ADHD</td>
<td>6.3</td>
<td>7.1</td>
</tr>
<tr>
<td>Gastrointestinal</td>
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<td>n/a</td>
</tr>
<tr>
<td>Headache</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Cold/flu</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Combined asthma, allergy, or ADHD</td>
<td>31.6</td>
<td>35.7</td>
</tr>
<tr>
<td>Allergy/asthma</td>
<td>25.3</td>
<td>28.6</td>
</tr>
</tbody>
</table>

*aStandard error on this estimate in the NHIS is >30% and may not be reliable or precise.
**P < .01.
1Prevalence for ADHD is estimated for 3- to 4-year-olds rather than 0- to 4-year-olds.
Mantel-Haenszel common odds ratio estimate.

SD = 2.85; range, 0 to 12), with most reports of cigarette use and few of hard drug use. Maternal depression scores ranged from 20 to 69, with a mean of 34.59 (SD = 9.91). Children’s total trauma symptoms scores ranged from 0 to 36, with a mean of 5.93 (SD = 6.78). There was a significant intercorrelation among child trauma symptoms and child health problems ($r = 0.43, P < .001$).

A number of known risk factors for children in high-risk environments were combined in the regression model and tested for the relative strength of their contributions to children’s health problems. The dependent variable was the number of health problems indicated by the mother. Predictor variables were demographics, child exposure to violence (child maltreatment, domestic violence, community violence), mothers’ physical health and depression, as well as mothers’ substance use. To assess the contribution of the child’s traumatic stress reactions over and above that of other risk factors, child traumatic stress was entered in the final step of a hierarchical regression analysis.

Various risk factors in the model uniquely predicted increased risk of health problems as shown in Table II. Children were at high risk of having more health problems when they were abused and exposed to domestic violence. Variance in the number of children’s health problems was also predicted by mother’s substance use and overall health. Children’s traumatic stress reactions were predictive of their health over and above the significant contributions of child maltreatment, domestic violence, maternal substance use, and mothers’ current health. Importantly, the individual child’s response to adverse childhood events, here in the form of posttraumatic stress symptoms, was a salient predictor of child health problems.

**DISCUSSION**

Within the Head Start sample, the rates of health problems for the violence-exposed children were not significantly different from the sample as a whole. However, rates for every condition except ADHD were higher for children who had symptoms of traumatic stress. Children in the traumatic stress group had a 4-fold risk for asthma and gastrointestinal problems. None of the children’s health problems in the present study were related to the child’s ethnicity or sex, regardless of whether assessed by global rating or specific health problem. Future studies, especially those with older groups of children, should continue to consider sex as a factor, since at adrenarche and puberty, sex, and PTSD interactions may occur, leading to different health effects. Despite a lack of findings in the current study, there is so little known about ethnicity, PTSD and children’s health that this issue also remains worth including in future studies.

In the multivariate model, exposure to violence remained independent and significantly associated with having health problems, but the effect of having a mother who is having health problems and the effect of having traumatic stress reactions to the violence are more strongly predictive and in an additive rather than mediating manner.

Since the rates of violence and posttraumatic stress are higher among poor and mother-headed households, it is possible that some of the higher morbidity attributed to poverty and single-mother family structure in the NHIS may, in fact, be more accurately attributable to violence against women and children, to community violence, to maternal health compromised as a sequelae of victimization and chronic stress, and to the child’s own traumatic stress symptoms, factors that are not measured in the NHIS. This has important implications for future child health research. In this study, marital status did not contribute to variance in child health. It has been shown that adult female victims of violence are more likely to live in poverty, to be revictimized, and to have health and mental health problems that are more strongly associated with interpersonal abuse and posttraumatic stress than with the stress of poverty per se. It may be that the same is true for children.
More research is needed that factors in the effects on child health of community and intrafamilial violence exposures, child traumatic stress symptoms, and traumatic stress behavioral sequelae that are health risk factors (for both adults and children, especially adolescents), such as substance use, disordered eating, early and risky sexual behavior, and participating in violence. Although the stressors of poverty, including more exposures to environmental toxins and more experiences of discrimination, certainly contribute to poor health, the additive effects of violence and traumatic stress are important to consider, since they represent additional avenues for intervention.

In addition to the limitations noted above, results attributed to violence exposure may have been influenced by mothers’ reactions to events, which were not evaluated. Given the young age of the children, the parent’s own response to trauma may have been a significant mediator of the child’s distress.33

This study is also limited in its reliance on a single source of data for some variables. For example, the assessment of children’s asthma problems relied primarily on the mother, whereas the assessment of ADHD relied on the child’s teacher. The use of medical records to document histories would have strengthened the study by adding validity to mothers’ and teachers’ reports.22 Similarly, the assessment of violence in the home and in the community relied primarily on mothers’ reports. Data from police records or a second reporter would have added validity. However, when compared with actual police reports of community violence, Martinez and Richters21 found that children’s reports more closely matched those of the crime statistics than did parents’ reports, suggesting that parents underreported the violence to which their children actually were exposed. Studies of children exposed to marital conflict and domestic violence also show similar discrepancies in parents’ and children’s reports.34–35 Thus, it is likely that the children in the current study may have been exposed to even more violence than reported, lending additional salience to results concerning the impact of such violence in their lives.

These results underscore the value of having pediatric health care providers be vigilant for child maltreatment but also to be assessing the cumulative effect of violence against the mother and violence in the community on the child. Perhaps intervening to support the woman’s efforts to increase safety and paying attention to the mother’s mental and physical health also could contribute to improved child health.

In the research on adult health sequelae of trauma exposures, PTSD is often a mediator. In this study, it appeared to have an additive effect. This is probably because the exposure to violence had not ended for all of the children in this sample. Many still were living in violent neighborhoods, perhaps still exposed to abuse of their mother, and still vulnerable to maltreatment themselves. Although stopping intrafamilial and community violence may be daunting projects beyond the scope of health care providers’ direct practice, clinical interventions to increase the mother’s safety and improve her ability to protect her child are of the highest priority. Child traumatic stress symptoms also are treatable,12 and referring violence-exposed child patients to group or individual therapy specifically aimed at bolstering their power to cope and at reducing posttraumatic stress reactions may be effective in preventing some of the adult sequelae of these adverse childhood events.

REFERENCES


