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Health, ED use, and early identification of young children exposed to trauma

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Abstract

Background—Childhood trauma is an important public health problem with financial, physical health, and mental health repercussions. Emergency Departments are often the first point of contact for many young children affected by emotionally or psychologically traumatic events (e.g., neglect, separation from primary caregiver, maltreatment, witness to domestic violence within the family, natural disasters).

Study Objectives—Describe the prevalence of physical health symptoms, ED use and health related problems in young children (birth through 5 years) affected by trauma, and to predict whether or not children experiencing trauma are more likely to be affected by health related problems.

Methods—Community-based, cross-sectional survey of 208 young children. Traumatic events were assessed by the Traumatic Events Screening Inventory – Parent Report Revised. Child health symptoms and health related problems were measured using the Caregiver Information Questionnaire, developed by ORC Macro.

Results—Seventy-two percent of children had experienced at least one type of traumatic event. Children exposed to trauma were also experiencing recent health related events, including visits to the ED (32.2%) and the doctor (76.9%) for physical health symptoms, and recurring physical health problems (40.4%). Children previously exposed to high levels of trauma (4 or more types of events) were 2.9 times more likely to report having had recently visited the ED for health purposes.

Conclusions—Preventing recurrent trauma or recognizing early trauma exposure is difficult but essential if long-term negative consequences are to be mitigated or prevented. Within emergency

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departments, there are missed opportunities for identification and intervention for trauma-exposed children, as well as great potential for expanding primary and secondary prevention of maltreatment-associated illness, injury and mortality.

Keywords

pediatric; trauma exposure; physical health; prevention

INTRODUCTION

Each year, millions of children in the US are exposed to emotionally or psychologically traumatic events (e.g., child neglect, separation from primary caregiver, maltreatment, witness domestic violence within the family, natural disasters) as both victims and witnesses. Childhood trauma is an important public health problem: besides the serious mental and physical health consequences to the child, the estimated financial burden (e.g., medical costs, law enforcement, child welfare) to society of children's exposure to trauma is estimated at \$103 billion annually.¹

Exposure to trauma in early childhood (age birth through 5 years) has been linked to poor physical functioning, worse health-related quality of life,² greater use of health services,³ and long-term poor physical health outcomes.⁴⁻⁷ Specifically, the Adverse Childhood Experiences (ACE) Study, which assessed the associations between childhood maltreatment and later-life health and well-being, found that certain experiences are major risk factors for the leading causes of illness and death as well as poor quality of life for adults in the United States.⁵⁻⁶ Preventing recurrent trauma or recognizing early trauma exposure is difficult but essential if long-term negative consequences are to be mitigated or prevented. Despite the fact that child survivors of trauma have higher emergency department use than the general pediatric population,⁸ and emergency departments (EDs) are often the first point of contact for many young children affected by trauma, screening for trauma experienced during childhood is limited to queries regarding mothers' perceptions of safety in the home⁹ or further probing when there are suspicions of child maltreatment due to bruising, spiral fractures or head trauma.¹⁰ Thus, there may be missed opportunities for identification and intervention of trauma exposure within the ED.

To better understand the trauma exposure of children who use ED services, more research is needed to determine the rates of trauma experienced by this population. Additionally, little is known about the relationship between trauma rates and health related problems in the population. The aim of this study was to describe the prevalence of physical health symptoms and health related problems in young children affected by trauma, and to predict whether or not children experiencing trauma are more likely to be affected by health related problems.

MATERIALS AND METHODS

Procedures and Participants

A descriptive cross-sectional design was used and data were collected as part of an evaluation of early childhood, family-based systems-of care (SOC) that took place across several communities in the Northeastern US. Families in the study were seeking mental health, developmental assessment, and intervention services for their children.

At intake into SOC services, families were invited to participate in an outcome evaluation. Data used in the current study were collected at intake into services from 208 families who consented to participate in the SOC evaluation. Semi-structured interviews conducted by trained research interviewers were completed with the child's caregiver within 30 days of enrollment into the SOC. Data were collected in English (96.6%) or Spanish (3.4%), depending on the respondent's preference and all measures were read aloud to address any literacy issues. Caregivers received a \$40 gift card to a local vendor at the completion of the interview. Declining to participate to the evaluation had no impact on families' receipt of services. The Institutional Review Board at the authors' academic institution approved all study procedures and provided oversight in the protection of research participants.

Measures

Child and caregiver descriptive data were collected. Child exposure to trauma was assessed by the *Traumatic Events Screening Inventory-Parent Report Revised-Long Version* TESI-PRR;¹¹ a 24-item measure designed to capture in-depth information regarding children's exposure to traumatic events (e.g., neglect, witness to domestic violence within the family, separation from primary caregiver, natural disasters). We calculated a trauma history score that represents a sum of the TESI-PRR items that caregivers endorsed (i.e., "yes" a child has been exposed to a particular type of trauma at any time in the past; thus, the score had a potential range of 0–24). Trauma exposure was coded as a binary variable to assess whether or not a child had ever been exposed to trauma. Based on previous literature^{2,12,13} trauma exposure was also collapsed into three categories with no exposure, low level of exposure defined as 1–3 different types of trauma exposure, and high level of exposure defined as 4 or more different types of trauma. The primary outcome measure was child health status, gathered using the *Caregiver Information Questionnaire*, developed by ORC Macro for use in national evaluations of SOC by the Center for Mental Health Services of the Substance Abuse and Mental Health Services Administration.¹⁴ Health items used in study analyses were: (a) "Does the child have reoccurring or chronic physical health problems such as allergies, asthma, migraine headaches, diabetes, epilepsy, cancer, etc?"; (b) "Is the child currently taking medication related to his/her physical health problem?"; and (c) "During the past 6 months, have the regular activities the child participates in (such as school, social activities,...) been disrupted because of problems related to his/her recurring or chronic physical health problems?" Three additional items asking how many times in the past 6 months the child: (a) saw a doctor or other primary health care provider for a physical health problem; (b) went to the emergency department (ED) to seek treatment for a physical health problem; and (c) was hospitalized for a physical health problem. Binary yes/no variables

were created for each of these questions for use in study analyses. All data used in this study was gathered by caregiver report.

Covariates. We selected covariates based on previous literature and models relating trauma exposure to physical health.^{12,15} Child-related covariates were race/ethnicity (non-Hispanic white, Hispanic, Multiracial, and other), and gender. The caregiver-related covariate was educational attainment (less than high school degree, high school degree or equivalent, and greater than high school degree), and the household-related covariate was household income (<\$10,000, \$10,000–\$19,999, \$20,000–\$49,999, and \$50,000).

Analyses

We conducted descriptive analyses to describe characteristics of the sample and the proportion of children who experienced trauma and physical health outcomes. Trauma exposure was measured as both a binary variable (whether or not a child had been exposed to any type of trauma) as well as a categorical score (no exposure versus exposure to 1–3 trauma types versus exposure to 4 or more trauma types) to assess level (zero to high) of exposure. Separate binary direct logistic regressions were performed for each of the 6 health questions to assess the impact of a number of factors (e.g., child gender, age) on the likelihood that children exposed to trauma experienced health problems. Each logistic regression was comprised of the categorical trauma variable (no, low and high exposure), the child's age, gender, and race/ethnicity, household income, and caregiver's education as the independent variables. Missing data were minimal 99.5% complete) to not present (100% complete) for the physical health outcome variables. Missing data were minimal for the individual TESI–PRR items, with 92.3% to 99.5% complete data. The binary trauma exposure score did not include missing data as the scores represent whether or not caregivers endorsed any trauma exposure.

RESULTS

The study sample consisted of 208 children with a median age of 4 years (SD = 1.1; range 1.4 to 5.9 years) and their caregivers. Ninety-four percent of respondents were biological parents; 159 (76.4%) were biological mothers. The majority of children were non-Hispanic white (56.7%) or Hispanic (22.1%; Table 1). Forty-seven percent of caregivers had 6-month household incomes less than \$20,000 and 17% had less than a high school education.

Seventy-two percent of young children had experienced at least one type of traumatic event; 99 (48.6%) experienced 1–3 events, and 51 (24.5%) had experienced 4 or more events. The most common types of traumatic events experienced by young children were separation from a caregiver (32.2%), witness to physical violence within the family (23.6%), witness to direct threats of physical violence within the family (18.8%), and the arrest or imprisonment of a family member (17.3%). Overall, young children exposed to trauma were also experiencing recent health related events. Eighty-four (40.4%) children were experiencing recurring physical health problems, including asthma (58.3%), allergies (23.8%), ear infections (15.5%), and gastrointestinal issues (13.1%). The most prevalent types of physical health related events included visits to the doctor (76.9%), visits to the ED (32.2%), and the need to take medication for physical health problems (21.6%; see Table 2).

In binary logistic regression analyses, the full model for children who had to visit the ED because of physical health symptoms containing all predictors was statistically significant, $\chi^2(12, N = 196) = 25.1, p = .014$, indicating that the model distinguished children who visited the ED due to physical health symptoms and those who did not. The model as a whole explained between 12.0% (Cox and Snell R square) and 16.7% (Nagelkerke R squared) of the variance in health status, and correctly classified 69.4% of cases. High levels of trauma exposure (4 or more types of exposures) significantly contributed to the model, recording an odds ratio of 2.9. This indicated that young children previously exposed to high levels of trauma were almost 3 times more likely to report having had recently visited the ED for health purposes, than those children who had not experienced high levels of trauma, controlling for all other factors in the model (Table 3). Analyses also indicated that younger age was associated with fewer ED visits for physical health reasons. Binary logistic regression analyses conducted with the other 5 health outcomes were not significant.

DISCUSSION

This study evaluated the relationship between exposure to psychologically traumatic events, physical health, and emergency department use among children aged birth through 5 years. The findings suggest that nearly three-fourths (72%) of young children with behavioral challenges experienced at least one type of trauma event in their lifetime and that a large percentage of these children were also experiencing physical health symptoms and health related problems. In addition, young children previously exposed to high levels of trauma (4 or more types of trauma) were almost 3 times more likely to have visited the ED for health purposes than their non-exposed peers after controlling for age, gender, race/ethnicity, household income, and caregiver's education. The current study supports recent research indicating that systematic screening for psychological trauma exposure in EDs may be effective in increasing the detection of trauma, including suspected child abuse and/or neglect.¹⁶ Further, it points to the need to screen for other types of traumatic events in childhood (e.g., natural disaster, witness to family violence) as these events have also been found to lead to stress-related disease,¹⁷ which in turn may affect health, subsequently leading to greater use of health services and increased financial burden to society.

Currently, there are missed opportunities for identification and for intervention with respect to psychological trauma exposure in children seeking services within the ED setting, which may be due in part to current screening practices. Young children who have or are currently experiencing trauma exposure and who are seeking services in hospital EDs but do not present with standard abuse markers (e.g., head trauma, fractures, suspicious bruising), are not being identified. Health care providers could benefit from additional training to move beyond identification of the typical signs of abuse and neglect to recognize a child in danger and/or distress (e.g., those presenting with urinary tract infections could have a history of sexual trauma). Training and public service messages that focus on trauma-informed care would educate health care providers in identification of non-typical symptoms, referral procedures for children affected, and ways to engage children and families in care. Early identification, intervention, and continued follow-up for children exposed to trauma has been found to be successful in reducing the impact of exposure overtime.^{18,19}

Limitations

There are some limitations with this study that should be considered. This study is representative only of families choosing to receive mental health, developmental, and/or assessment services. Moreover, the study uses caregiver-report data, which could be substantiated with an additional respondent such as a health professional. For example, a health professional may be able to provide information on young children's subjective physical complaints and any objective medical issues, in order to further explicate how trauma exposure may compromise healthy development and place children at risk for persistent serious physical problems throughout the lifespan. Although our objective was to evaluate exposure to psychologically traumatic events and its relationship to physical health among young children upon entry into a children's mental health system of care, the present study is unable to disentangle the timing of events. A longitudinal design that could track over time how trauma exposure leads to worse physical health outcomes would help to strengthen the findings. Future research could use a longitudinal design to examine the impact of trauma exposure on young children's health trajectories.

CONCLUSION

Few studies have evaluated the relationship between trauma exposure, physical health and ED services among young children. Our findings suggest that exposure to trauma during early childhood may be associated with physical health challenges. Because health problems that are a result of childhood trauma are largely preventable,⁵ this study supports the need to gain a better understanding of the context in which young children may develop. Such insight could assist with the development of trauma-informed practice and more appropriate intervention strategies. The implementation of policies and procedures within emergency departments to screen young children to identify those exposed to trauma is essential as early identification and service implementation may remediate the potential impact of the trauma exposure. For instance, interdisciplinary Suspected Child Abuse and Neglect (SCAN) screening programs – in place in some of the larger hospitals in the US and Canada – are designed to recognize, to respond to and to manage cases of injury and harm caused by abuse and neglect in patients seen at hospitals and clinics. Such programs perform systematic screening of risk when injuries or stories are suspicious and provide education and support to frontline staff. Overall, findings underscore the need to better understand the relationship between trauma exposure and physical health in young children while supporting more thorough trauma screening and referral procedures within EDs. Doing so has the potential to lower the financial burden to society and to positively affect physical health across the lifespan.

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Appendix A

Traumatic Events Screening Inventory- Parent Report Revised: Brief Version¹

Children may experience stressful events, which may affect their health and well-being. Please indicate *if* your child has experienced any of these potentially stressful events by answering the shaded questions. If you have any questions or comments about any of the questions, we would be happy to talk to you about them.

SAMPLE ITEM (<i>Instructions are in italics</i>)	☐ Yes	☐ No	☐ Unsure
A. Has your child ever had a doctor's visit? <i>mark your answer in the next column</i>			
1.1 Has your child ever been in a serious accident where someone could have been (or actually was) severely injured or died? (like a serious car or bicycle accident, a fall, a fire, an incident where s/he was burned, an actual or near drowning, or a severe sports injury)	☐ Yes	☐ No	☐ Unsure
1.2 Has your child ever seen a serious accident where someone could have been (or actually was) severely injured or died? (like a serious car or bicycle accident, a fall, a fire, an incident where someone was burned, an actual or near drowning, or a severe sports injury)	☐ Yes	☐ No	☐ Unsure
1.3 Has your child ever been in a serious natural disaster where someone could have been (or actually was) severely injured or died? (like a tornado, hurricane, fire, or earthquake)	☐ Yes	☐ No	☐ Unsure
1.4a Has your child ever experienced the severe illness or injury of someone close to him/her?	☐ Yes	☐ No	☐ Unsure
1.4b Has your child ever experienced the death of someone close to him/her?	☐ Yes	☐ No	☐ Unsure
1.5 Has your child ever undergone any serious medical procedures or had a life threatening illness? Or been treated by a paramedic, seen in an emergency room, or hospitalized overnight?	☐ Yes	☐ No	☐ Unsure
1.6 Has your child ever been separated from you or another person who your child depends on for love or security for more than a few days <u>OR</u> under very stressful circumstances? For example due to foster care, immigration, war, major illness, or hospitalization.	☐ Yes	☐ No	☐ Unsure
1.7 Has someone close to your child ever attempted suicide or harmed him or herself?	☐ Yes	☐ No	☐ Unsure
2.1 Has someone ever physically assaulted your child, like hitting, pushing, choking, shaking, biting, or burning? Or punished your child and caused physical injury or bruises. Or attacked your child with a gun, knife, or other weapon? (This could be done by someone in the family or by someone not in your child's family).	☐ Yes	☐ No	☐ Unsure
2.2 Has someone ever directly threatened your child with serious physical harm?	☐ Yes	☐ No	☐ Unsure
2.3 Has someone ever mugged your child? Or has your child been present when a family member, other caregiver, or friend was mugged?	☐ Yes	☐ No	☐ Unsure
2.4 Has anyone ever kidnapped your child? (including a parent or relative) Or has anyone ever kidnapped someone close to your child?	☐ Yes	☐ No	☐ Unsure
2.5 Has your child ever been attacked by a dog or other animal?	☐ Yes	☐ No	☐ Unsure
3.1 Has your child ever seen, heard, or heard about people <i>in your family</i> physically fighting, hitting, slapping, kicking, or pushing each other. Or shooting with a gun or stabbing, or using any other kind of dangerous weapon?	☐ Yes	☐ No	☐ Unsure
3.2 Has your child ever seen or heard people <i>in your family</i> threaten to seriously harm each other?	☐ Yes	☐ No	☐ Unsure
3.3 Has your child ever known or seen that a family member was arrested, jailed, imprisoned, or taken away (like by police, soldiers, or other authorities)?	☐ Yes	☐ No	☐ Unsure
4.1 Has your child seen or heard people <i>outside your family</i> fighting, hitting, pushing, or attacking each other? Or seen or heard about violence such as beatings, shootings, or muggings that occurred in settings that are important to your child, such as school, your neighborhood, or the neighborhood of someone important to your child?	☐ Yes	☐ No	☐ Unsure
4.2 Has your child ever been directly exposed to war, armed conflict, or terrorism?	☐ Yes	☐ No	☐ Unsure

4.3 Has your child ever seen acts of war or terrorism on the television or radio?	☐ Yes	☐ No	☐ Unsure
5.1 Has someone ever <i>made</i> your child see or do something sexual (like touching in a sexual way, exposing self or masturbating in front of the child, engaging in sexual intercourse)	☐ Yes	☐ No	☐ Unsure
5.2 Has your child ever been present when someone was being forced to engage in any sort of sexual activity?	☐ Yes	☐ No	☐ Unsure
6.1 Has your child ever repeatedly been told s/he was no good, yelled at in a scary way, or had someone threaten to leave or send him/her away?	☐ Yes	☐ No	☐ Unsure
6.2 Has your child ever gone through a period when s/he lacked appropriate care (like not having enough to eat or drink, lacking shelter, being left alone when s/he was too young to care for herself/himself, or being left with a caregiver who was abusing drugs)	☐ Yes	☐ No	☐ Unsure
7.1 Have there been other stressful things that have happened to your child?	☐ Yes	☐ No	☐ Unsure

¹ Ghosh-Ippen C, Ford J, Racusin R, Acker M, Bosquet K, Rogers C, Ellis C, Schiffman J, Ribbe D, Cone P and others. Traumatic Events Screening Inventory - Parent Report Revised. San Francisco, CA: The Child Trauma Research Project of the Early Trauma Network and The National Center for PTSD Dartmouth Child Trauma Research Group; 2002.

1. Why is this topic important?

Childhood trauma (e.g., maltreatment, neglect) is a major public health concern that carries an enormous cost to society, both in lives affected and dollars spent. The financial burden to society from childhood abuse and trauma—encompassing medical costs, mental health utilization, law enforcement, child welfare, and judicial system costs—is approximately \$103 billion annually¹.

2. What does this study attempt to show?

This study describes the prevalence of exposure to trauma, ED use and health related problems in young children (birth through 5 years), and predicts whether or not children experiencing trauma are more likely to be affected by health related problems.

3. What are the key findings?

Seventy-two percent of children had experienced at least one type of traumatic event. Children exposed to trauma were also experiencing recent health related events, including visits to the ED (32.2%) and doctor (76.9%) for physical health symptoms, and recurring physical health problems (40.4%). In addition, young children previously exposed to high levels of trauma (4 or more types of trauma) were almost 3 times more likely to have visited the ED for health purposes than their non-exposed peers.

4. How is patient care impacted?

There is increased use of ED services in young children exposed to trauma. Currently, there are missed opportunities for identification and for intervention with respect to trauma exposure in children seeking services within the ED setting. The current study supports recent research indicating that systematic screening for trauma in EDs may be effective in increasing the detection of trauma, including suspected child abuse and/or neglect. Further, it points to the need to screen for other types of traumatic events in childhood (e.g., natural disaster, family violence) as these events have also been found to lead to stress-related disease.

Table 1Baseline Demographic Characteristics ($N = 208$)

	Mean (SD)
Age in years	4.00 (1.1)
	<i>n</i> (%)
Gender	
Female	56 (26.9)
Male	152 (73.1)
Race/Ethnicity	
Non-Hispanic white	118 (56.7)
Hispanic	46 (22.1)
Multiracial	24 (11.5)
Other	18 (8.7)
Unreported	2 (1.0)
Household income (last 6 months)	
Less than \$10,000	58 (27.9)
\$10,000 – \$19,999	40 (19.2)
\$20,000 – \$49,999	49 (23.6)
Over \$50,000	54 (26.0)
Unreported	7 (3.4)
Caregiver education	
Less than a high school diploma	36 (17.3)
High School diploma or GED ^a	130 (62.5)
Greater than High School	40 (19.2)
Unreported	2 (1.0)

^aGeneral Education Diploma.

Table 2

Frequency of Recent Health Related Events and the Number of Types of Trauma Exposures Experienced by Young Children

	Number of Trauma Types <i>n</i> (%)			
	Zero	1 – 3 Types	4+ Types	Any Trauma
Recurring physical health problem (<i>n</i> = 83, 39.9%)	18 (21.7)	44 (53.0)	21 (25.3)	65 (78.3)
Currently taking medication for physical health problem (<i>n</i> = 45, 21.6%)	7 (15.6)	22 (48.9)	16 (35.6)	38 (84.4)
Physical activity reduced because of physical health (<i>n</i> = 30, 14.4%) ^a	7 (23.3)	12 (40.0)	11 (36.7)	23 (76.7)
Visit doctor because of physical health (<i>n</i> = 160, 76.9%) ^a	48 (30.0)	72 (45.0)	40 (25.0)	112 (70.0)
Visit ED because of physical health (<i>n</i> = 67, 32.2%) ^a	11 (16.4)	33 (49.3)	23 (34.3)	56 (83.6)
Hospitalized because of physical health (<i>n</i> = 11, 5.3%) ^a	2 (18.2)	5 (45.5)	4 (36.4)	9 (81.8)

^a Occurred within the past six months.

Table 3
Binary Logistic Regression Results for Young Child Visits to the ED due to Physical Health Symptoms

	B	SE	W	OR	CI (95%)
High trauma exposure*	1.1	0.5	4.8	2.9	1.1, 7.6
Low trauma exposure	0.8	0.4	3.1	2.1	0.9, 4.9
No trauma exposure ^a					
Age*	-0.3	0.2	4.0	0.7	0.6, 1.0
Male	0.2	0.4	0.4	1.3	0.6, 2.7
Non-Hispanic white ^a					
Hispanic	0.6	0.4	2.0	1.8	0.8, 4.1
Multiracial	-0.5	0.6	0.8	0.6	0.2, 1.9
Other	1.0	0.6	2.7	2.6	0.8, 8.2
Less than high school degree ^a					
High school degree or equivalent	-0.6	0.5	1.8	0.5	0.2, 1.3
Greater than high school degree	-0.4	0.6	0.5	0.7	0.2, 2.1
Income less than \$10,000 ^a					
\$10,000 – \$19,999	0.3	0.5	0.3	1.3	0.5, 3.3
\$20,000 – \$49,999	0.2	0.5	0.2	1.2	0.5, 3.0
\$50,000 and over	-0.6	0.5	1.6	0.5	0.2, 1.4

^aTrauma reference category = No exposure; Race reference category = Non-Hispanic white; Household income reference category = <\$10,000; Caregiver education reference category = Less than a high school diploma.

* *p* .05.