



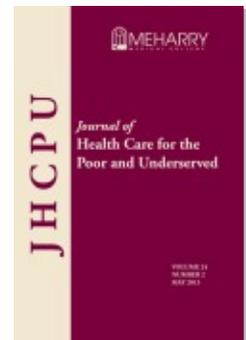
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The Prevalence of Trauma and Childhood Adversity in an Urban, Hospital-Based Violence Intervention Program

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Abstract: Hospitals represent a promising locus for preventing recurrent interpersonal violence and its psychological sequella. We conducted a cross-sectional analysis to assess the prevalence of post-traumatic stress disorder (PTSD) and adverse childhood experiences (ACEs) among victims of interpersonal violence participating in a hospital-based violence intervention program. Participants completed PTSD and ACE screenings four to six weeks after violent injury, and data were exported from a case management database for analysis. Of the 35 program participants who completed the ACE and/or PTSD screenings, 75.0% met full diagnostic criteria for PTSD, with a larger proportion meeting diagnostic criteria for symptom-specific clusters. For the ACE screening, 56.3% reported three or more ACEs, 34.5% reported five or more ACEs, and 18.8% reported seven or more ACEs. The median ACE score was 3.5. These findings underscore the importance of trauma-informed approaches to violence prevention in urban hospitals and have implications for emergency medicine research and policy.

Key words: PTSD, adverse childhood experiences, violence, violence prevention, emergency medicine, urban.

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Interpersonal violence is a major public health problem in the United States and was responsible for 16,259 deaths in 2010 and approximately 1.69 million hospital-treated injuries in 2011.¹ It is the leading cause of death among African Americans ages 15 to 34, compared with fifth among non-Hispanic Whites of this age group.² The economic burden of interpersonal violence is also immense—estimated at \$59.1 billion annually in medical costs and lost productivity.³ Interpersonal violence is a recurrent problem, with a re-injury rate estimated to be as high as 45% and mortality rate as high as 20% at five years follow-up.^{4–7} Being the victim of violence also significantly increases the likelihood of being a perpetrator of interpersonal violence.^{8–10}

In addition to the overtly physical consequences of violent injury, many victims of interpersonal violence experience acute stress disorder (ASD) or post-traumatic stress disorder (PTSD) as a result of their injuries.¹¹ Population-based surveys in urban settings have found rates of probable lifetime PTSD to range between 15% and 23% among victims of interpersonal violence.^{12,13–32} A study of men admitted for violent injury at an urban hospital found that 27% had possible PTSD at three months follow-up and 18% had possible PTSD one year later.^{33–40} A study of adults seeking care for violent injury at a public, urban hospital found that 41% met the criteria for ASD within one month of their injury.⁴¹

Even in the absence of full-blown PTSD or ASD, victims of interpersonal violence may develop severe symptoms of post-traumatic stress—such as hypervigilance, nightmares, flashbacks, and paranoia. Qualitative research suggests that these symptoms might lead many victims of urban violence to feel unsafe and engage in behaviors, such as substance use and carrying a weapon, to restore feelings of safety—thereby increasing risk for re-injury, retaliation, and poor health outcomes.^{7,13,38}

The psychological sequelae of violent injury may also be compounded by the effects of traumatic experiences earlier in life. The Detroit Area Trauma Survey found that individuals who had previously experienced a traumatic event were at substantially greater risk for developing PTSD after a violent assault than those who had not.¹⁴ Results from the Adverse Childhood Experiences (ACE) Study revealed that traumatic experiences early in life significantly increase the risk of being a victim or perpetrator of violence, as well as risk for a range of other deleterious behaviors and adverse health outcomes—including, but not limited to, smoking, obesity, heart disease, and depression.¹⁵

The role of emergency departments in violence prevention. Within health care systems, emergency departments (EDs) are disproportionately burdened by interpersonal violence. Given the risks for re-injury, retaliation, and psychological sequelae associated with violent injury, EDs represent a promising locus for violence intervention.

Hospital-based violence interventions programs (HVIPs) have proliferated across the country—many coming together under the National Network of Hospital-Based Violence Intervention Programs.¹⁶ Hospital-based violence interventions programs operate out of EDs, trauma units, and Trauma Centers. Although HVIPs have demonstrated varying degrees of effectiveness across a range of outcomes, best practices for program design, service delivery, and evaluation are lacking.^{17–21,35,36}

Enhancing the effectiveness of HVIPs requires a robust understanding of the needs, characteristics, and complexities of the population served. Whereas previous evalua-

tions of HVIPs have documented the sociodemographic characteristics of program participants, the psychosocial needs of participants have remained largely unexplored. Knowledge about these characteristics is critical to indentifying programmatic needs, improving program effectiveness, and preventing re-injury and retaliation.

The purpose of this cross-sectional study was to assess the prevalence of PTSD and ACEs among participants of an HVIP with the aim of informing the practice of HVIPs and identifying future directions for emergency medicine, trauma, primary care, and injury prevention research and policy—with a focus on identifying the trauma and adversity encountered by victims of urban violence.

Methods

Setting and study design. Our program is a trauma-informed, HVIP that operates out of a Level 1 Trauma Center at a tertiary care hospital associated with a medical school in a major U.S. city. Our program combines brief hospital intervention with long-term case management services and has five key components—psychosocial needs assessment, case management, mentorship, navigation, and a 10-week psychoeducation curriculum aimed at promoting recovery from trauma and adversity. A comprehensive description of our program, and its components, has been published elsewhere.²²

Patients presenting in the ED with violent injury are identified by ED staff who trigger a referral system to HVIP staff. If the referral occurs on a weekday between 9:00 a.m. and 5:00 p.m., program staff will meet the patient in the hospital and educate them about the program once medically stabilized. If the referral occurs outside this timeframe, program staff contacts the individual by phone within 48 hours of discharge.

We conducted a cross-sectional analysis of individuals who participated in the program during the one-year period between July 1, 2010 and June 30, 2011. Data were exported from a case management database in a de-identified format. Our institutional review board approved all parts of this study.

Study population. Within the study period, 191 violently injured individuals (a group that did not include cases of domestic or sexual violence) were invited to participate in the program; 44 (23%) of them opted to participate. Of these, 35 (78%) completed the PTSD and/or ACE screenings. The study population was predominantly comprised of African American men in their early twenties who were victims of gunshot wounds (Table 1). Sixteen participants had previously received medical care for a violent injury.

Measurement. Post-traumatic stress disorder and ACE screening instruments were administered in person by trained program staff member (i.e., a social worker or community intervention specialist) four to six weeks after injury for case management purposes.

PTSD screening. We used the PTSD Symptom Scale–Self-Report (PSS–SR) version to assess the presence of PTSD among the program population.²³ The PSS–SR contains 17 questions that span three symptom clusters: re-experiencing, avoidance, and arousal. Each question is scored on a scale from 0 to 3, with 0 representing the symptom being present “not at all or only one time” and 3 representing the symptom being present “almost always.” Full PTSD diagnostic criteria is met if a score of 1 or higher is reported for one or more of the re-experiencing questions, three or more of the avoidance ques-

Table 1.
CHARACTERISTICS OF THE STUDY POPULATION

Characteristics	Study Population (N=35)
Demographics	
Median age (years)	22 ^a
Male, %	91.4 (32)
Female, %	8.6 (3)
African American, %	80.0 (28)
Latino, %	11.4 (4)
Non-Hispanic White, %	8.6 (3)
Injury Type, %	
Gunshot wound	71.4 (25)
Assault	8.6 (3)
Domestic violence	8.6 (3)
Stabbing	8.6 (3)
Other	2.9 (1)
Previous Violent Injury, %	48.5 (16) ^b

^aRange 16–35
^bdata on previous injury were missing for three participants, percentage based on N=32.

tions, and two or more of the arousal questions. The PSS–SR also assesses the severity of PTSD symptoms. The total PTSD severity score is calculated by summing the item scores in each symptom cluster (yielding a possible scoring range of 0 to 51).

ACE screening. We assessed the ACEs through a questionnaire using the 10 categories and questions provided by the Centers for Disease Control and Prevention.²⁴ These questions have demonstrated good test-retest reliability.²⁵ Each question is scored dichotomously (yes/no) with a positive response receiving a score of 1. The total ACE score is the sum of positive responses across the 10 categories of questions (yielding a possible scoring range of 0 to 10).

Analysis. We analyzed the data using SAS 9.1 (SAS Institute, Cary NC). Descriptive statistics were generated to measure the proportion of program participants who met the diagnostic criteria for full PTSD as well as for symptom-specific clusters. We also measured the proportion of program participants reporting positive responses to different ACEs and cumulative ACE exposures.

Results

Both PTSD and ACEs were highly prevalent in the study population.

PTSD prevalence. Of the 32 program participants who completed the PTSD screening, 24 (75.0%) met full diagnostic criteria for PTSD (Table 2). An even higher proportion met the diagnostic criteria for symptom-specific clusters—with 29 (90.6%)

Table 2.**PREVALENCE OF PROBABLE PTSD**

Median PTSD Severity Score ^a	24.5
Full PTSD criteria met, %	75.0 (24)
Re-experiencing criteria met, %	90.6 (29)
Arousal criteria met, %	87.5 (28)
Avoidance criteria met, %	81.3 (26)

^aRange: 1–48. PTSD (Post-Traumatic Stress Disorder) data were missing for three individuals. Percentages based on N=32.

meeting reexperiencing criteria, 28 (87.5%) meeting arousal criteria, and 26 (81.3%) meeting avoidance criteria. The median PTSD severity score was 24.5, with a range of 1 to 48.

ACE prevalence. Of the 32 program participants who completed the ACE screening, all reported at least one ACE, whereas 26 (81.3%) reported two or more ACEs, 16 (50.0%) reported four or more ACEs, seven (21.9%) reported six or more ACEs, and two (6.3%) reported eight or more ACEs (Table 3). The median ACE score was 3.5.

Parental separation/divorce (90.6%) was the most commonly reported ACE followed by having a household member incarcerated (53.1%) and having a substance abuser in the household (50%). A large proportion of participants reported experiencing recurrent emotional abuse (34.4%) or emotional neglect (37.5%). A smaller proportion reported recurrent physical abuse (21.9%) or physical neglect (21.9%). Contact sexual abuse was the least frequently reported ACE but still was reported by 12.5% of the participants.

Discussion

Our results are largely consistent with prior research and underscore the need to integrate trauma-informed practice into violence prevention activities—both in and beyond hospital settings. An earlier study of violently injured patients at an urban hospital found similar rates of PTSD symptoms across specific clusters—83.2% re-experiencing, 84.7% avoidance, and 91.7% hyperarousal.⁴¹ To our knowledge, no previous study has documented the prevalence of ACEs among violently injured individuals in an urban setting. Sadly, but not surprisingly, ACEs were much more prevalent among our program participants than the general population. The original ACE Study found that only 63.9% of respondents had one or more ACEs and that only 12.5% had four or more ACEs.¹⁵ The high prevalence of PTSD and ACEs within our study population has implications for HVIP practice and future emergency medicine, trauma, primary care, and injury prevention research and policy.

HVIP practice. *Trauma-informed approaches to practice.* Trauma-informed approaches to practice recognize that many behaviors—such as substance misuse,

Table 3**PREVALENCE OF ADVERSE CHILDHOOD EXPERIENCES**

ACEs, % (N)	
≥ 1	100.0 (32)
≥ 2	81.3 (26)
≥ 3	56.3 (18)
≥ 4	50.0 (16)
≥ 5	34.5 (11)
≥ 6	21.9 (7)
≥ 7	18.8 (6)
≥ 8	6.3 (2)
≥ 9	6.3 (2)
Median ACE score ^a	3.5
Specific ACes, %	
Abuse	
Recurrent emotional abuse	34.4 (11)
Recurrent physical abuse	21.9 (7)
Contact sexual abuse	12.5 (4)
Neglect	
Emotional neglect	37.5 (12)
Physical neglect	21.9 (7)
Household dysfunction	
Parental separation/divorce	90.6 (29)
Incarcerated household member	53.1 (17)
Household substance abuse	50.0 (16)
Mother treated violently	21.9 (7)
Household mental illness	18.8 (6)

^aRange 1–9. ACE data were missing for three individuals. Percentages based on N=32.
ACE=Adverse Childhood Experience

obtaining weapons, and other behaviors that might increase risk for re-injury and retaliation—often serve as adaptive strategies to cope with the sequela of trauma and child maltreatment.²⁶ HVIPs and health care providers that work with violently injured individuals should receive trainings on the biopsychosocial effects of trauma and principles of trauma-informed care. Such trainings hold potential to improve the effectiveness of HVIPs and the quality of interactions among hospital physicians, nurses, and staff and victims of interpersonal violence, and create a health care environment that avoids the risk of re-traumatizing patients.

Screening and case management. Integrating screenings for PTSD and ACes into HVIP practice would allow programs to identify and meet the needs of their participants more successfully. Co-morbid conditions—such as depression and substance abuse—are also common among victims of interpersonal violence and should be screened for.¹¹ While HVIPs may not have the capacity to provide direct mental health services, screening

is the first step in connecting clients with appropriate services and improving their health trajectories.

Screening, however, is only the first step and should be coupled with case management and navigation services to help ensure the delivery of mental health care. Studies indicate that many victims of violence do not seek and obtain needed mental health services—especially low-income, racial minorities that HVIPs often serve.^{33,37} Barriers to accessing services include, but are not limited to, perceived stigma of mental illness, distrust of mental health professionals, and lack of knowledge and logistical barriers to accessing Victim of Crime assistance services.^{39–40} Our program experience has taught us, however, that culturally competent HVIP case workers, trained in trauma-informed care, can break down these barriers and facilitate delivery of mental health care.

Research. Our findings highlight the need for more research on the prevalence of PTSD and ACEs among victims of interpersonal violence in urban hospitals. While innumerable studies have explored the prevalence of PTSD and other mental health conditions after traumatic injuries in ED settings, very few have explored the prevalence of these conditions among African American male victims of interpersonal violence in an urban setting considering the fact that they are the population most impacted by interpersonal violence.^{13,34,41} While this paucity of research may in part be the result of challenges to engaging violently injured African American males in health care research, it raises questions regarding why this population has not received more attention in the field of traumatic stress studies.²⁷

Policy. There currently exists no standard of care for assessing or addressing the mental health needs of traumatically injured patients. Despite the fact that EDs are well positioned to screen violently injured patients for symptoms of traumatic stress, provide basic psychoeducation, and case management for mental health and Victim of Crime compensation services, very few actually do so.^{28–29} Hospitals, health care systems, accrediting bodies, and insurers should consider instituting policies that promote screening for traumatic stress, provide case management services, and educate patients about the potential symptoms of traumatic stress. A simple policy that requires all violently injured ED patients to be provided with information about the possible symptoms of post-traumatic stress and local resources for treatment could mitigate the psychological sequelae of violent injury and prevent re-injury and retaliation.

Limitations. The generalizability of our findings is largely constrained by the cross-sectional nature of our design and small sample size. Our results represent the findings from one study conducted at a single, urban ED-based HVIP at a single point in time. The majority of HVIPs operate in urban settings, however, and serve populations with similar sociodemographic characteristics. Our sample size limits the extent to which our finding can be used to make inferences about the prevalence of PTSD and ACEs in other HVIPs. Our small sample size also did not provide us with the statistical power necessary to explore the correlates of PTSD or associations between ACEs and PTSD or specific symptoms. Such questions, however, were not the objectives of this descriptive study.

Our study population was limited to victims of interpersonal violence who self-

selected to participate in the HVIP. Thus, our findings cannot be used to make generalizations about the prevalence of PTSD or ACEs among all individuals who present in EDs with violent injury. Individuals self-select to participate in all HVIPs, however, and thus this selection bias does not necessarily limit the extent to which our findings are generalizable to other HVIPs.

The fact that data on PTSD and ACEs were missing for nine of the 44 program participants, and that three additional participants only completed the PTSD or ACE screening (as opposed to both), limits the extent to which our results are representative of the entire program population. Nevertheless, our findings have implications for practice given the high proportion of participants with PTSD. Even if all 12 of the participants who did not complete the PTSD screening failed to meet the diagnostic criteria for the disorder, more than half of program participants (24/44, 54.5%) still would have been scored as having PTSD.

While the ACE questionnaire is among the most widely used instruments for assessing the burden of childhood adversity, it has limitations that should be made explicit. The questionnaire gives equal weight to high-level stressors (such as sexual abuse) and lower-level stressors (such as parental separation/divorce) in scoring, despite the fact that the magnitude of their impacts is likely different. The ACE instrument also does not include questions on stressors such as discrimination, poverty, and exposure to community violence which are common in urban settings. We think this limitation highlights the need for an “urban ACEs” questionnaire.

Conclusion. Post-traumatic stress disorder and ACEs were widely prevalent in our program population. Hospital-based violence intervention programs should integrate screening for PTSD and ACEs into program activities and consider embracing trauma-informed practices. These findings also highlight the need for more research on the prevalence and correlates of PTSD and ACEs among victims of interpersonal violence in urban ED settings and policies that help address the psychological consequences of violent injury.

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