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Violence: Recognition, Management and Prevention

ANOTHER “LETHAL TRIAD” – RISK FACTORS FOR VIOLENT INJURY AND LONG-TERM MORTALITY AMONG ADULT VICTIMS OF VIOLENT INJURY

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Abstract—Background: Mental illness, substance abuse, and poverty are risk factors for violent injury, and violent injury is a risk factor for early mortality that can be attenuated through hospital-based violence intervention programs. Most of these programs focus on victims under the age of 30 years. Little is known about risk factors or long-term mortality among older victims of violent injury. **Objectives:** To explore the prevalence of risk factors for violent injury among younger (age < 30 years) and older (age 30 ≥ years) victims of violent injury, to determine the long-term mortality rates in these age groups, and to explore the association between risk factors for violent injury and long-term mortality. **Methods:** Adults with violent injuries were enrolled between 2001 and 2004. Demographic and injury data were recorded on enrollment. Ten-year mortality rates were measured. Descriptive analysis and logistic regression were used to compare older and younger subjects. **Results:** Among 541 subjects, 70% were over age 30. The overall 10-year mortality rate was 15%, and was much higher than in the age-matched general population in both age groups. Risk factors for violent injury including mental illness, substance abuse, and poverty were prevalent, especially among older subjects, and were each independently associated with increased risk of long-term mortality.

Conclusion: Mental illness, substance abuse, and poverty constitute a “lethal triad” that is associated with an increased risk of long-term mortality among victims of violent injury, including both younger adults and those over age 30 years. Both groups may benefit from targeted risk-reduction efforts. Emergency department visits offer an invaluable opportunity to engage these vulnerable patients. © 2018 Elsevier Inc. All rights reserved.

Keywords—violence; injury prevention; mental illness; substance abuse; poverty

INTRODUCTION

Background

Interpersonal violence is a major public health problem in America, leading to over 1.8 million injuries requiring medical attention, and generating nearly 9 billion dollars in medical costs annually (1). Well-documented risk factors for subsequent violent injury include prior violent injury, and ongoing mental illness, substance abuse, and poverty (2–4).

Innovative hospital-based violence intervention programs (HVIPs) have demonstrated effectiveness in reducing rates of violent injury recidivism among victims

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of violent injuries by addressing these risk factors (5–7). Most HVIPs cater to younger victims of violent injury, with age cutoffs < 30 years (8–10). However, over 45% of victims of violent injuries in the United States are over 30 (11,12).

There has been little research about risk factors leading up to violent injury or long-term outcomes among victims of violent injury over age 30 years. Understanding these issues is essential for designing interventions with a potential for risk reduction, because risk-reduction efforts targeting adults over age 30 years may need significant modification from the well-founded strategies used in youth-focused programs.

Goals

This study tested the primary hypothesis that poverty, mental illness, and substance abuse are prevalent risk factors for violent injury, for both “younger” (age < 30 years) and “older” (age \geq 30 years) victims of violent injury. Further, two secondary hypotheses were tested. The first was that victims of violent injury treated in our department who were not currently receiving mental health services and who were not acutely psychotic or suicidal have an increased 10-year mortality compared with their general age cohort, whether they are “younger” or “older” patients. The second was that, among victims of violent injury who were not currently receiving mental health services and who were not acutely psychotic or suicidal, the separate risk factors of poverty, mental illness, and substance abuse each are associated with an increased probability of subsequent 10-year mortality.

MATERIALS AND METHODS

Study Design and Setting

This is a retrospective cohort study nested within a randomized controlled trial that was conducted at San Francisco General Hospital (SFGH), the main public hospital and the only Level I trauma center in San Francisco, CA (13). SFGH serves as the city’s medical safety net and treats over 95% of all trauma patients in the city. The study protocol was approved by the University of California, San Francisco Committee on Human Research.

Selection of Participants

Between 2001 and 2004, adult victims of violent injury presenting to SFGH for medical treatment were systematically approached and recruited for a study to evaluate the impact of trauma-informed mental health services (defined as mental health services that acknowledge and

address the impact of trauma on victims’ mental health) on mental health outcomes (13). Exclusion criteria included age < 18 years, lack of English proficiency, residence outside the city of San Francisco, victims of sexual assault, patients with acute psychosis or suicidality, and those already enrolled in mental health services at the time of injury. A total of 1140 patients treated in the emergency department (ED) at SFGH were identified by the hospital staff as potentially eligible, based upon having suffered an apparent violent injury. Of those 1140, 695 (61%) did not fulfill any exclusion criteria and were deemed to be eligible for the study after screening by our study personnel. Of these, 541 (47% of the 1140 or 78% of the 695) were enrolled in the study after granting their informed consent.

Methods and Measurements

Subjects underwent an intake interview to collect demographic information within 1 month of the index injury. The details of these interviews, including methods of making probable diagnoses of mental illness and substance abuse disorders, have been described previously (14). Injury mechanism and injury severity, defined dichotomously by the need for hospital admission, were identified during intake interviews. Dates of death were identified using subjects’ electronic medical records at SFGH and data from the National Social Security Death Index. Data were tabulated in Microsoft Excel (Microsoft Corporation, Redmond, WA) and imported to Stata 13 (StataCorp LLC, College Station, TX) for analysis.

Analysis

We quantified risk factors for violent injury at the time of index injury using probable diagnoses of posttraumatic stress disorder (PTSD), major depression, anxiety disorder, and panic disorder as markers of mental illness, alcohol syndrome and illicit drug use as markers of substance abuse, and homelessness and unemployment as markers of poverty. Baseline PTSD preceding index injury was diagnosed using the PTSD Checklist—Civilian Version (15). We compared the demographic characteristics, risk factors for violent injury, and mortality rates of younger adults (ages 18–29 years old) and older adults (age 30 years and older) using Pearson’s chi-squared test for categorical variables and Student’s *t*-test for continuous variables. We compared all-cause mortality rates in this cohort with age-matched expected 10-year all-cause mortality rates to a hypothetical age-matched cohort from the general U.S. population created using data from the National Vital Statistics Report (NVSr) to calculate relative risk of mortality (i.e., observed mortality/expected mortality) and excess rate of

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