

# Violence and Substance Use among an Injured Emergency Department Population

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## Abstract

**Objectives:** This study evaluated a sample of emergency department (ED) patients for history of violence and substance abuse. **Methods:** Injured patients ( $n = 320$ ) completed questionnaires (14% refusal rate) during a visit to a Level 1 urban ED after an acute injury. Specific questions were asked regarding whether the injury was related to acute violence (AV), whether there was past-year violence history (VH), including violence victimization and perpetration in both partner and nonpartner relationships, as well as any substance use in the past month and any substance-related consequences in the past year. **Results:** Fourteen percent of the participants presented with an AV-related injury, and 53% reported VH. Most AV patients (89%) reported VH. No significant differences were found between the participants with AV and VH in demographic,

substance use, or substance-related consequences. The AV and VH groups were combined (V), with analyses comparing these participants with those without AV and VH. Men were significantly more likely than women to report V (odds ratio = 2.0). V was significantly related to substance use and substance-related consequences. For example, in comparison with the participants reporting no alcohol or drug use, those reporting illicit drug use were 6.2 times as likely to report V, and those drinking any alcohol only were 2.0 times as likely to report V. **Conclusions:** A large percentage of injured patients in this urban ED experienced violence in the past year. Alcohol and illicit drugs appear to be concomitant with violence. **Key words:** substance abuse; violence; injury; alcohol. *ACADEMIC EMERGENCY MEDICINE* 2003; 10: 764–775.

Each year more than 37 million patients visit emergency departments (EDs) with injuries.<sup>1</sup> Of these visits approximately 17% are related to violence.<sup>2</sup> Of all fatal injuries, 20% are violence-related.<sup>2</sup> Violence-related injuries, defined as intentional injuries, have reached epidemic numbers, exceeding 2 million persons annually.<sup>3</sup> Often, violence-related injuries are caused by a partner.<sup>4</sup> On average each year from 1992 to 1996, approximately 8 in 1,000 women and 1 in 1,000 men aged 12 years or older experienced a violent victimization perpetrated by a current or former spouse, boyfriend, or girlfriend.<sup>4</sup> Among nonpartner violence, often the victim and assailant know each other, with friends or relatives involved in the majority of gun-related violence.<sup>5,6</sup> A goal of Healthy People 2010 as well as the American College of

Emergency Physicians is to extend protocols for routinely identifying, treating, and properly referring victims of violence.<sup>7</sup>

A potentially critical factor in violence may be alcohol and illicit drug use. One of the few ED studies of alcohol and acute injury resulting from violence (intentional injury) found that alcohol use and alcohol-related problems were elevated among violent groups compared with nonviolent groups.<sup>8</sup> The role of illicit drugs in violent injuries is less well known than the role of alcohol. A paucity of studies have examined illicit drug use in relation to violence among an ED sample. One study found patients with violent injuries were more likely to self-report past-year illicit drug use than patients with nonviolent injuries.<sup>9</sup>

Prior studies of alcohol/illicit drug use and violence among injured ED patients have several limitations. These studies typically have used inadequate violence measures, classifying all intentional injuries as "violent" or "assaults," with no further description. Some prior studies have focused only on domestic assaults without assessing violent behavior (perpetrated violence) or victimization in nonpartner relationship types (e.g., friends, strangers). Typically, these studies include only subsets of the ED population, such as women,<sup>10-14</sup> or include only patients injured severely enough to require trauma consultations.<sup>15,16</sup> Thus, these prior studies are missing a large section of the injured population who are treated and

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released. Furthermore, prior research has focused only on the acute injury presentation, limiting the ability to explore a possible recent history of involvement with violence among various relationships in the patient's life. This is important because although many patients with violent injuries are victims experiencing an isolated tragic event, others may be caught in a cycle of violence. For example, studies have demonstrated that the psychological and descriptive profiles of assailants and victims of intentional injury are quite similar; frequently the victims are the offenders in other assaults.<sup>17</sup> Thus, data regarding the relationship between violence (across victim/perpetrator/partner/nonpartner exchanges) and substance use among a broad sample of injured patients (e.g., motor vehicle crash, assault, falls, burn) could provide valuable information for urban EDs. The goal of our study was to determine the amount of violence and substance abuse in our patient population.

## METHODS

**Study Design.** This study used a cross-sectional design in which research assistants surveyed a convenience sample of injured ED patients regarding acute injury, history of violence victimization and perpetration, and history of substance use and substance-related consequences. Study procedures were approved and conducted in compliance with the University of Michigan's and Hurley Hospital's Institutional Review Board (IRB) for Human Subjects guidelines.

**Study Setting and Population.** Hurley Medical Center (HMC) is a 550-bed teaching hospital, a primary teaching site for the Emergency Medicine Residency Program at the University of Michigan, and a Level I trauma center, located in Flint, Michigan. HMC serves the city of Flint and a three-county region with a population of more than 450,000. The annual census in the ED is approximately 75,000 patients, and the ED cares for all age ranges. The ED serves an inner-city population with a large caseload of trauma, and substance abuse. According to the 2000 Census, 41.4% of Flint, Michigan, is white, 53.5% are African American, and 5.3% are other minorities.<sup>18</sup>

Flint is located in Genesee County, Michigan. Violence is a significant problem in Flint as evidenced by both crime and violence statistics, and the level of poverty in the city. Flint led the nation in rates of assault (1,647.8 per 100,000) and burglary (2,810.4 per 100,000) in 1999.<sup>19</sup> Nationally, Flint ranked sixth in rapes (103.5 per 100,000) and tenth in murders (29.4 per 100). In 1998, deaths per 100,000 population under 25 years of age in Genesee County due to homicide and suicide were 8.8 and 5.7, respectively.<sup>20</sup> Michigan's rates for homicide and suicide were 8.1 and 4.2, respectively. Genesee County reported the

second highest domestic violence cases in Michigan in 1998.<sup>21</sup> Flint also has high levels of poverty and, overall, these are much higher than the entire state. Flint ranks 277 out of 329 metropolitan areas in the United States in unemployment rate (1 being the lowest rate).<sup>22</sup>

**Study Protocol.** Eligible participants included ED patients who were 19 years of age or older entering the ED at Hurley Hospital within 24 hours of any injury.<sup>23</sup> Both violent (e.g., assault) and nonviolent (e.g., motor vehicle crash, fall) injuries were eligible and both admitted and nonadmitted injured patients were approached for the study. Prisoners, pregnant females, victims of sexual assaults, patients presenting with self-inflicted injuries, patients who had experience near-drowning, and individuals who could not read English due to language barriers were excluded at the point that such conditions became evident. Patients who were severely injured (e.g., University of Michigan class I trauma) such that they were in need of immediate lifesaving procedures (e.g., unconscious, intubated, unstable vital signs) were excluded from the study. Patients who were intoxicated were not approached until they were clinically sober and competent to sign informed consent. For the duration of the study recruitment period (February, March, and April 2000), the ED was staffed seven days per week with a research assistant during the afternoon shift (4 PM–12 AM). All injured patients (as noted by the triage nurse/ED log) presenting during the afternoon shifts were approached to participate in a study by research assistants about "injury, health behaviors, and conflict." Patients were informed that the study would include questions about injury, alcohol use, smoking, depressed feelings, disagreements with others, and alcohol and drug experiences. Participants were told that the entire assessment required about 45 minutes to complete and remuneration was \$15.00 in cash. Participants who provided written informed consent completed a computerized health survey using personal digital assistants and several paper-and-pencil questionnaires. Research assistants recorded basic demographic information (i.e., age, race, gender) on injured patients who refused participation at the time of refusal. Similarly, injured patients present in the ED log during afternoon shifts, who were not approached for the study, were labeled "missed" and research assistants recorded basic demographic information. In accordance with IRB requirements, no other information was recorded for patients who had not provided written informed consent.

## Measurements

**Alcohol-related Assessment.** Three quantity and frequency questions assessed average alcohol con-

sumption and binge episodes in the past three months. Several alcohol screening instruments were used to assess current alcohol-related problems, including the CAGE,<sup>24</sup> the TWEAK,<sup>25</sup> and the DrInc.<sup>26</sup> Recommended cutoff scores indicating hazardous drinking are 2 or more for the CAGE questionnaire and 3 or more for the TWEAK (among an ED population).<sup>27</sup> In addition, the 15-item Short Index of Problems–Recent Version of the DrInc was used, which assesses alcohol-related consequences for the past three months. Two items from the longer version of the DrInc were added also because of their relevance to this project: “While drinking or intoxicated, I have been physically hurt, injured, or burned”; and “I have been arrested for driving under the influence of alcohol.” This measure has not been previously used in an ED population, with published norms available only among substance abuse treatment samples. An appropriate cutoff is therefore unknown for this population.

**Illicit Drug Consumption.** Participants reported the number of days in the past month that they used each of the following drugs/drug classes: marijuana, cocaine or crack, nonprescribed stimulants, nonprescribed sedatives, heroin, other nonprescribed opiates, phencyclidine (PCP), other hallucinogens, inhalants, and anabolic steroids. For each drug, slang names or street names were printed beside each drug type.

**Alcohol and Drug Severity.** Participants indicated the severity of alcohol and illicit drug problems in the past year using the University of Arkansas Substance Abuse Outcomes Module.<sup>28</sup> All 25 items are based on Diagnostic and Statistical Manual IV (DSM IV) abuse and dependence diagnoses and thus assess tolerance, withdrawal, loss of control, and psychosocial consequences (i.e., “I needed more and more alcohol or drugs to get the same effect as before”; “I neglected family or friends for two or more days in a row as a result of alcohol or drugs”). For each item, participants indicated whether the symptom was due to alcohol only, drugs only, or both alcohol and drugs. A substance use severity scale was computed by summing the number of alcohol or other drug consequences that the participant endorsed (Cronbach’s alpha = 0.95).

**Conflict Questionnaire.** An expanded version of the Partner Abuse Inventory<sup>29</sup> was self-administered to assess conflict. The original Partner Abuse Inventory measure has several advantages over the commonly used Conflict Tactics Scale (CTS).<sup>30</sup> First, it contains ten questions and thus is shorter than the CTS. Second, it includes questions related to sexual violence. The expanded version retained the original questions and response formats, and repeated them

using four parallel sets of questions asked about being the: victim of partner violence, perpetrator of partner violence, victim of nonpartner violence, and perpetrator of nonpartner violence. Partners were defined as: “partners, spouse, or significant others.” Nonpartners were defined as: “anyone else other than your spouse or significant other (including friends, relatives, strangers, co-workers, bosses, police).” First, participants were asked to indicate whether any of ten violent events had occurred in the past year, ranging from moderate violence (e.g., thrown something at you, pushed you) to severe violence (e.g., used a gun or knife, forced you to have sex when you didn’t want to). Second, for each type of violence, participants were asked whether it resulted in an injury with response choices of “no injury,” “yes, possible injury,” “yes, definite injury.” Although the original version of the Partner Abuse Inventory has been validated, the expanded version requires further validation.

**Chart Review.** Emergency department charts were reviewed by a research assistant who completed a training course on injury scoring and E-code mechanisms to obtain more specific information regarding: nature of injury (i.e., ICD-9-CM codes) and mechanism of injury (i.e., ICD-9 E-codes).<sup>23,31</sup> E-codes identified intentionality of injury (e.g., unintentional cut/pierce is E-code 01 and intentional cut/pierce is E-code 02). Participants’ injury severity was determined using the Injury Severity Score (ISS).<sup>32</sup> Scores were based on the Abbreviated Injury Scale (AIS)-90 conventions,<sup>33</sup> using Tri-Code injury scoring software 9.<sup>34</sup>

**Data Analyses.** All paper-and-pencil data were double-entered by research assistants; comparisons of the two data entry files were conducted and discrepancies were verified and corrected to ensure a complete and accurate data analysis file. Descriptive information regarding rates of patients presenting to the ED with an acute violent injury (AV) (based on ED presenting injury classification) and patients reporting a violence history in the past year (VH) (based on self-report of past-year conflict excluding current AV injury presentation), either victimization or perpetration in partner or nonpartner relationships, are presented first as percentages.

Second, analyses focused on comparisons of AV and VH groups, based on demographic (i.e., age, race, gender, marital status, education, employment), alcohol and drug use (i.e., drinking days per week, drinks per drinking day, binges, illicit drug use), and alcohol and drug consequences variables (i.e., DrInc, TWEAK, CAGE, Substance Use Severity). Pearson correlation coefficients were calculated for all of the variables examined. In order to examine the unique association of each variable, a series of univariate analyses were conducted (i.e., chi-square tests or Wilcoxon rank sum

as appropriate). The distribution-free Wilcoxon rank sum test was used when a variable did not satisfy the normality assumption (based on the Shapiro Wilk test). Because of the lack of significant differences between the two violence types (AV and VH), these groups were combined to create a binary, any-violence (V) variable.

Third, analyses focused on comparisons of patients involved in any violence (V) with patients not reporting violence (No-V) based on demographic, alcohol and drug use, and alcohol and drug consequences variables. As stated above, because of interest in unique contributions of each predictor variable and concern regarding moderate to high correlations among substance use variables, a series of univariate tests were performed using chi-square tests or Wilcoxon rank sum tests (as appropriate). For statistically significant associations, odds ratios (ORs) and 95% Wald-based confidence intervals (95% CIs) are reported for predicting the probability of V. In order to succinctly illustrate the observed differences, two additional variables were created: substance use summary (no alcohol or drug use, alcohol use only, some illicit drug use—with or without alcohol use) and substance-related consequences summary (no alcohol or drug consequences, alcohol consequences only, at least some drug consequences—with or without alcohol consequences). V/No-V groups were compared on these summary variables (using chi-square tests) and odds ratios (ORs) and 95% Wald-based confidence intervals (95% CIs) are reported. In addition, for the summary variables, analyses were conducted (using chi-square tests) comparing the alcohol use only group with the illicit drug use group to determine whether illicit drug use significantly increased the risk for violence above the use of alcohol alone. The consistency in the pattern of findings for summary substance use and substance-related consequences and violence was examined by comparing the former variables with each of the four violence types (i.e., victim of partner violence, perpetrator of partner violence, victim of nonpartner violence, perpetrator of nonpartner violence) using chi-square tests.

Fourth, because of significant gender difference in V, multivariate models controlling for gender were conducted using logistic regression to predict V/No-V. To maintain parsimony in these multivariate models, separate models were conducted for summary substance use and summary substance-related consequences.

Finally, because of special interest in weapon-related violence (due to the potential for increased injury severity), a two-category violence variable was created based on weapon use: report of V involving a weapon (i.e., threat or use of gun or knife) and report of V not involving a weapon. Logistic regression models were conducted predicting this

weapon variable with substance use summary and substance-related consequences entered in separate equations as predictor variables.

## RESULTS

A total of 320 adults (163 women, 51%) were surveyed in the ED during the study period. The mean age of the participants was 38.6 years (SD  $\pm$  17.6), with a range from 19 to 90 years of age. Forty-five percent (44.5%) were White and 48.7% were African American [2.3% were Hispanic and the remainder (4.4%) were either multiethnic or "other"]. Regarding marital status, 42.4% were married or cohabiting, 3.6% were widowed, 19.1% were divorced/separated, and 35% were never married. Regarding education, 23.9% did not complete high school, 37.4% completed high school, and 38.7% completed at least some college. Almost half were working full-time (48.9%), 15.2% were working part-time, and 35.9% were not currently working. Most participants (66.6%) completed the assessment independently. However, due to the nature of the presenting injury, 5.0% obtained assistance from a significant other and 17.7% obtained assistance from the research assistant to complete the assessment.

**Acute Injury Presentation.** Of the 320 injured patients who participated in this study, mechanism of injury (E-codes ranging from 1 to 62) was abstracted from the patient's medical chart and classified into the following groups: 13.5% of the participants ( $n = 44$ ) presented with acute violent injury (e.g., intentional use of firearm, intentional cut/pierce, intentional striking by object). The remaining injuries were unintentional: 19.5% in motor vehicle collisions, 25.6% falls, 11.8% cuts/pierces, 8.7% struck by objects (unintentional), 11.8% muscle strains/sprains, 2.3% burns, 1.6% bicycle injuries, and 5.2% miscellaneous. Of those patients who presented with an acute violent injury (AV), 54.5% were men and 44.5% were women. The following data were abstracted and coded from patient charts: ISS score (median = 1, quartiles: 25% = 1, 50% = 1, 75% = 2), NISS score (median = 1, quartiles: 25% = 1, 50% = 1, 75% = 2), 24.9% arrived via ambulance, and 3.9% were admitted to the hospital.

**Refusals.** Refusal reasons were compiled in a log as they occurred by the research assistant. Overall, 53 refusals (14.2%) were recorded during the recruitment period. Among those refusing participation, reasons for refusal included: too ill or in too much pain (28.4%), unknown/would not give reason (24.5%), respondent was too overwhelmed (11.3%), family refused to let the individual participate (9.4%), hostile toward research (5.7%), would take too much time

(5.7%), and concerned about confidentiality (1.9%). Additional information was recorded on refusals: 49.1% were women, 63.5% were nonwhite minorities, and the average age was 41.3 years (SD  $\pm$  15.0). No other information was obtained on patients who refused to participate in the study.

**Missed Patients.** Research assistants maintained a log of injured patients who were potentially eligible for the study during afternoon shifts, but who were not approached about the study before they were discharged from the ED. Overall, 32 potentially eligible injured patients (8.0%) were missed during the study period; 50% were women and 40% were minorities (nonwhite). No additional information was abstracted on these patients.

**Past-year Violence History Self-report.** Overall, 52.7% (167/317) of the participants reported a violence history (VH) at some time during the past year (e.g., either violence victimization or perpetration in any relationship type prior to the current injury for which they sought current ED evaluation). More specifically, 32.2% reported being the victim of partner violence, 26.5% reported being the perpetrator of partner violence, 27.4% reported being the victim of non-partner violence, and 22.4% reported being the perpetrator of nonpartner violence. Among the participants who reported past-year violence (VH), 55.2% were men and 44.8% were women. Among VH, 26.1% of the violence was moderate (e.g., pushing, slapping) and 73.9% was severe (e.g., kicking, hitting with fist, weapon involvement); 36.0% of the patients with a past-year VH reported violence involving a weapon in the past year and 8.3% indicated that the incident included a sexual assault. Among those

with VH, 45.2% indicated that the event resulted in an injury (based on patient self-report as described above in the "measurements" section) to one of the people involved in the violence.

There was considerable overlap in types of violence that participants reported experiencing. For example, among those who reported any past-year violence, 57.5% of the patients reported being the victim of violence and perpetrator of violence, and 36.5% of the patients reported experiencing violence in both their partner and nonpartner relationships.

**Comparison of AV and VH.** When comparing AV with VH, 89.4% of the patients with AV reported VH; thus for most patients, the AV was not the first incident of violence experienced in the past year. The AV and VH groups were compared on a variety of demographic and substance use and substance-related consequences. No significant differences were found between the AV and VH groups on these variables (Table 1). Based on these results, the AV and VH groups were combined to create an any-type-of-violence (V) group for remaining analyses comparing those with V and those without V.

#### Comparison of V and No-V Groups

**Demographics.** Descriptive statistics for the explanatory variables were calculated for the two groups, any violence V and no violence No-V reported (Table 2). Analyses were conducted to test the differences between V and No-V based on the chi-square statistic or the Wilcoxon rank sum statistic. The only demographic variable that was significant was gender. Men from this population were two times more likely (95% CI = 1.4 to 3.4) than women to report V. Next,

**TABLE 1. Descriptive Characteristics of Patients Presenting with Acute Violent Injury (AV) and Past-year Violent History (VH) by Demographic and Substance-related Variables**

Category	Variable	AV (n = 44)	VH (n = 125)
Demographics	Mean age (yr $\pm$ SD)	37.2 ( $\pm$ 17.5)	36.6 ( $\pm$ 17.3)
	Race (white/minority)	47.7%	37.9%
	Gender (male/female)	54.6%	56.5%
	Married (no/yes)	61.4%	62.9%
	Educational level ( $\leq$ 12/ $>$ 12 years)	72.7%	62.9%
	Employed (no/yes)	47.7%	31.7%
Alcohol and drug consumption	Drinking days per week ( $\pm$ SD)	2.6 ( $\pm$ 2.6)	1.9 ( $\pm$ 2.2)
	No. drinks/drinking day		
	Women ( $\geq$ 3), Men ( $\geq$ 4)	32.6%	41.9%
	Women (1-2), Men (1-3)	25.6%	34.7%
	Zero	41.9%	23.4%
	Binges in past month ( $\geq$ 4/ $<$ 4 times)	20.5%	11.3%
Past-month illicit drug use (yes/no)	36.4%	27.7%	
Alcohol and drug consequences	Drinc score ( $>$ 0/0)	40.9%	37.1%
	TWEAK score ( $\geq$ 3/ $<$ 3)	29.6%	24.2%
	CAGE score ( $\geq$ 2/ $<$ 2)	18.2%	14.5%
	Alcohol/drug severity ( $>$ 0/0)	46.8%	40.7%

Note: SD = standard deviation. For dichotomous variables, column values reflect the first category (i.e., for gender, 54.6% of males).

**TABLE 2. Descriptive Statistics and Odds Ratios for Patients with Any Violence (V) and No Violence (No-V)**

Category	Variable	No-V (n = 145)	V (n = 172)	OR (95% CI)
Demographics	Mean age (yr ± SD)	40.7 (±17.9)	36.8 (±17.3)	0.99 (0.97, 1.00)
	Race (white/minority)	50%	40.5%	0.68 (0.43, 1.07)
	Gender (male/female)**	37.1%	56%	2.1 (1.4, 3.4)
	Married (no/yes)	51.8%	62.5%	0.64 (0.41, 1.02)
	Educational level (≤12/>12 years)	56.4%	65.5%	1.5 (0.9, 2.3)
	Employed (no/yes)	35.7%	35.9%	0.99 (0.6, 1.6)
Alcohol and drug consumption	Drinking days per week (±SD)***	1.3 (±1.8)	2.1 (±2.3)	1.2 (1.1, 1.4)
	Drinks per drinking day**			
	Women (≥3), Men (≥4)	15.8%	28.1%	2.6 (1.4, 4.7)
	Women (1–2), Men (1–3)	26.6%	32.3%	1.8 (1.04, 3.0)
	Zero	57.6%	39.5%	
	Past-month binges** (≥4/<4 times)	4.3%	13.7%	3.5 (1.4, 9.0)
Past-month illicit drug use*** (yes/no)	8.6%	31.1%	4.5 (2.3, 9.0)	
Alcohol and drug consequences	Drinc score*** (>0/0)	20.7%	38.1%	2.4 (1.4, 4.0)
	TWEAK score*** (≥3/<3)	10.7%	25.6%	2.9 (1.5, 5.4)
	CAGE score** (≥2/<2)	4.3%	15.5%	4.1 (1.6, 10.2)
	Alcohol/drug severity*** (>0/0)	13.4%	42.4%	4.8 (2.7, 8.4)

Note: For the categorical variables, the degrees of freedom can be calculated by the number of categories – 1. Note that for dichotomous variables, column values reflect the first category (i.e., for gender, 37.1% of males). \*\*p-value < 0.01, \*\*\*p-value < 0.001.

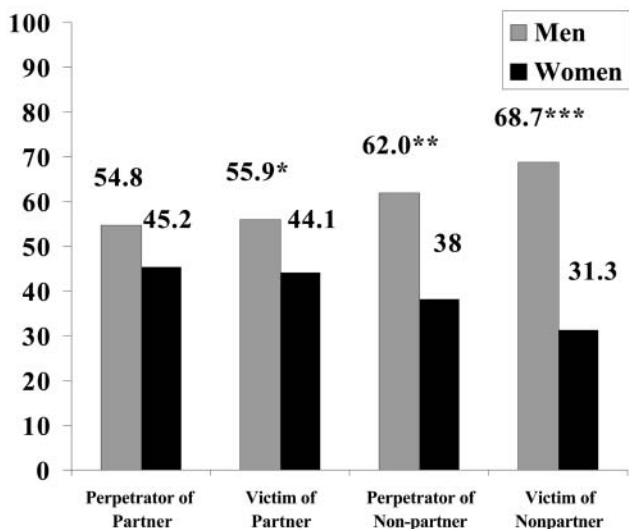
analyses examined whether the identified relationships between violence and gender differed based on the violence typologies (victim of partner violence, perpetrator of partner violence, victim of nonpartner violence, perpetrator of nonpartner violence; each coded yes/no). Figure 1 shows gender differences for the four groups. Similar to the findings for overall V, with the exception of perpetrated violence, men were significantly more likely than women to report all forms of violence.

**Substance Use and Consequences.** All of the alcohol and drug use predictors examined were statistically significant in predicting the probability of V (Table 2). Patients involved with V were significantly more likely than patients with No-V to drink more days per week, consume greater quantities on drinking days, binge more frequently, and use illicit drugs. Figure 2 illustrates our finding for average drinks on drinking days and shows that even drinking in amounts often considered “low-risk” (e.g., 1–2 drinks per drinking day for women and 1–3 drinks per drinking day for men) significantly increased the risk for violence. Likewise, the substance-related consequence measures were all statistically significant in predicting any violence (Table 2).

**Summary Variables.** Similarly, summary substance use and substance-related consequence variables significantly distinguished V/ No-V groups. Figure 3 shows expected odds ratios (with CIs) for violence, based on the summary substance use and substance-related consequence variables. Alcohol use significantly increased the probability of violence in comparison with nonusers. Illicit drug use significantly

increased the probability of violence as compared with alcohol users only, as well as compared with non-alcohol users or non-illicit drug users. These findings were magnified when alcohol and drug consequences were examined. Next, the specific violence typologies were examined to determine whether the identified relationship between summary substance use and violence varied by type (i.e., victim of partner violence, perpetrator of partner violence, victim of nonpartner violence, and perpetrator of nonpartner violence). Similar to the findings for V, summary substance use was significantly related to all four violence typologies (see Table 3 for descriptive characteristics). An identical pattern of findings was observed for summary substance-related consequences; the summary substance-related consequence variable was significantly related to the four violence typologies.

**Models Controlling for Gender.** Because gender was significantly related to V, hierarchical logistic regression analyses were used to determine whether the summary variables (summary substance use, summary substance-related consequences) predicted V/No-V, while controlling for gender. For these models, gender was entered on step 1 and the summary substance use was entered on step 2 (as two variables: alcohol use only, yes/no, and illicit drug use, yes/no). In the first model, summary substance use was a significant predictor of V/No-V even when including gender [step 1:  $\chi^2(1) = 10.24$ ,  $p < 0.01$ ; step 2:  $\chi^2(2) = 22.66$ ,  $p < 0.001$ ; model:  $\chi^2(1) = 32.90$ ,  $p < 0.001$ ]. In the final model, gender (beta =  $-0.54$ ,  $p < 0.05$ ), alcohol use only (beta =  $1.69$ ,  $p < 0.001$ ), and illicit drug use (beta =  $0.57$ ,  $p < 0.05$ ) were significant. Similarly, the final model with

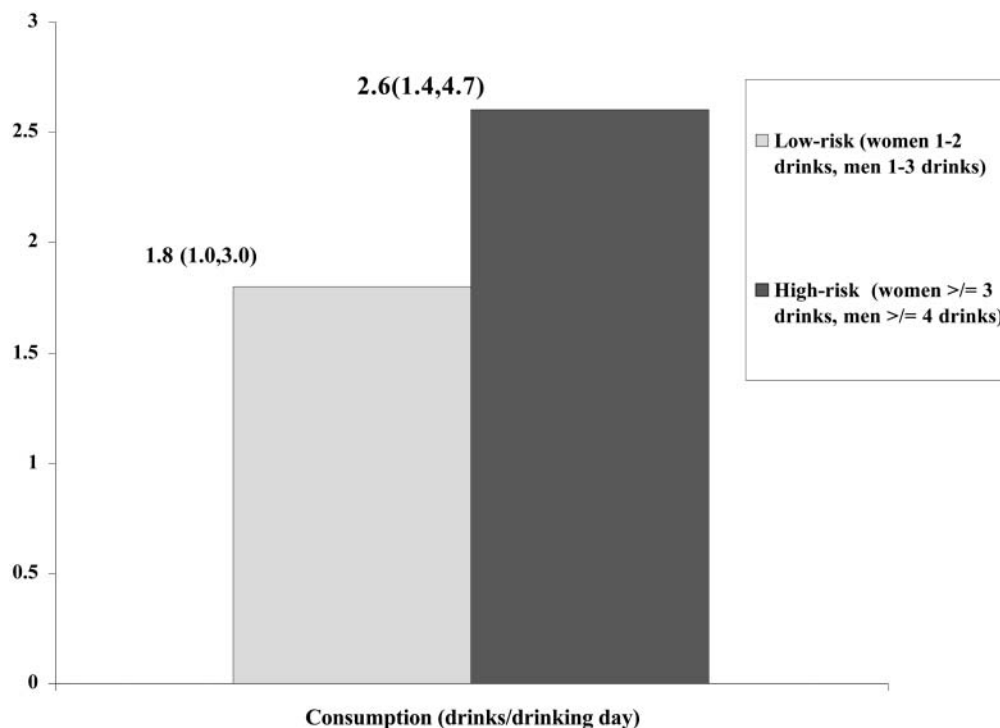


**Figure 1.** Gender differences in violence typologies. \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

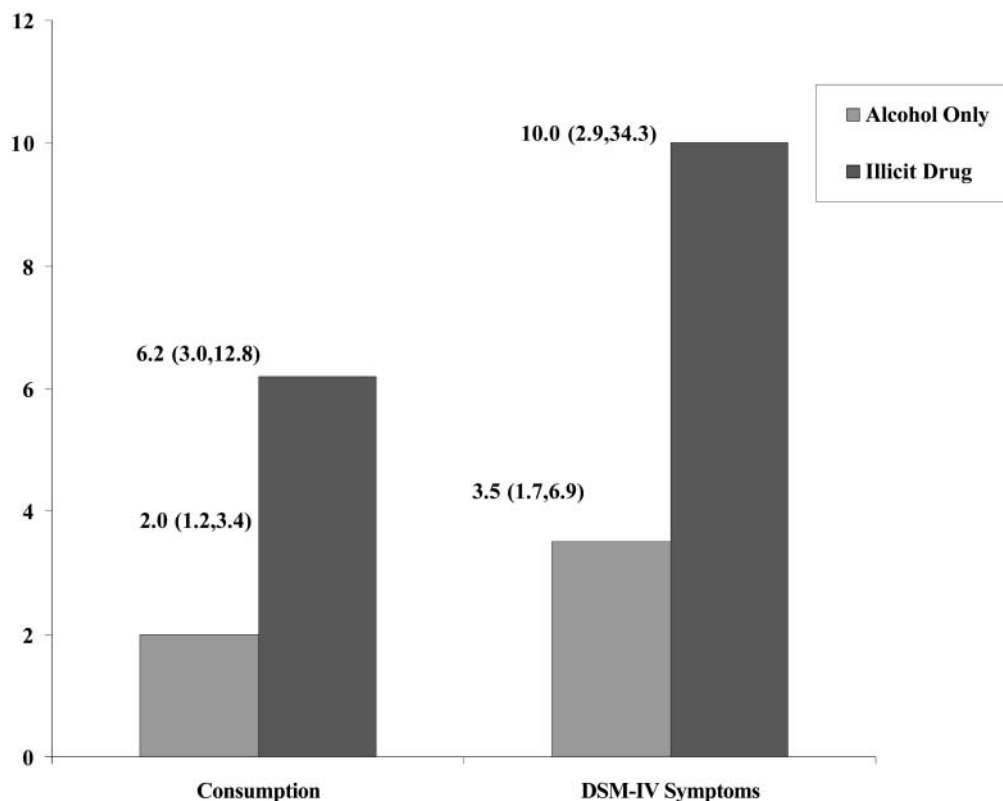
gender and summary substance-related problems (entered as two variables: alcohol problems only, yes/no, and illicit drug problems, yes/no) was significant [step 1:  $\chi^2(1) = 12.99, p < 0.001$ ; step 2:  $\chi^2(2) = 23.32, p < 0.001$ ; model:  $\chi^2(1) = 36.31, p < 0.001$ ]. Gender (beta =  $-0.58, p < 0.05$ ), alcohol problems only (beta =  $2.13, p < 0.01$ ), and illicit drug problems (beta =  $1.08, p < 0.01$ ) were significant.

**Comparison of Weapon Violence and Nonweapon Violence.** Analyses were conducted within the V

group to examine potential variation in violence patterns. First, the V group was divided into two groups based on whether the violence involved threatening or using a knife/gun (weapon violence) or not (nonweapon violence). Hierarchical logistic regression analyses were used to predict weapon violence. Demographic variables were entered into step 1 to examine their combined influence on weapon violence (sex; race—White/African American; years of education; employed—yes/no; age; and married—yes/no). Next, summary substance use (entered as two variables: alcohol use only, yes/no, and illicit drug use, yes/no) was entered into step 2 to determine its impact beyond the influence of demographic factors. Finally, a parallel analysis strategy was used to examine the relationship between summary substance-related consequences (entered into step 2 as two variables: alcohol problems only, yes/no, and illicit drug problems, yes/no). For summary substance use, in step 1 the demographic variables were significant [ $\chi^2(6) = 21.15, p < 0.01$ ]. In step 2, summary substance use was not significant [ $\chi^2(2) = 1.02, p > 0.05$ ]; however, the overall model was still significant [ $\chi^2(8) = 22.18, p < 0.01$ ]. In the overall model, significant demographic variables included sex ( $p < 0.01$ ) and being married ( $p < 0.05$ ) (see Table 4 for descriptive statistics). For analyses examining summary consequences, in step 1 demographic variables were significant [ $\chi^2(6) = 16.3, p < 0.05$ ]. However, in step 2 summary consequences were not significant [ $\chi^2(2) = 0.7, p > 0.05$ ], although the overall model remained significant [ $\chi^2(8) = 17.05, p < 0.05$ ].



**Figure 2.** Odds ratios and confidence intervals for violence based on alcohol consumption patterns.



**Figure 3.** Odds ratios and confidence intervals for violence based on summary substance use and substance-related consequences. DSM-IV = Diagnostic and Statistical Manual IV.

The only significant demographic variable was sex ( $p < 0.05$ ).

## DISCUSSION

Findings from this study suggest that most patients who present to our urban ED with minor injury (of all types) have experienced recent violence (53%). Virtually all (89%) patients who presented with an acute violence-related injury had a previous violent interaction in the past year. Very few patients with a violence history or acute violent event (2%) were admitted. Therefore, interventions aimed at admitted patients or only those patients presenting after an

event of recent violence causing injury (14%) would miss a significant opportunity for addressing violence, among our urban population with a high incidence of trauma recidivism. In this study, violence interactions involved severe violence (such as kicking, hitting with fist, weapons) at least as often as moderate violence (such as pushing, slapping). Thus, the high rates of past-year violence histories have potentially serious consequences in terms of injury, including lethality. For example, from our data, one in five injured patients presenting to our urban ED experienced weapon-related violence in the past year. Note that this number most likely underestimates weapon carriage. Detection of weapon carriage would

**TABLE 3. Descriptive Statistics of Violence (%) Typology Breakdowns (Victimization, Perpetration, in Partner and Nonpartner Relationships) for Summary Substance Use/Consequences Variable**

Variable	Victim of Partner Violence	Perpetrator of Partner Violence	Victim of Nonpartner Violence	Perpetrator of Nonpartner Violence
Summary substance use	(n = 96)	(n = 78)	(n = 77)	(n = 65)
None	22.3	19.8	15.7	10.7
Alcohol use only	33.0	26.1	29.6	27.0
Alcohol and illicit drug use	52.5	40.7	40.7	35.6
Summary substance-related consequences	(n = 95)	(n = 77)	(n = 77)	(n = 68)
None	24.9	17.6	17.2	15.4
Alcohol use only	42.9	44.9	51.0	36.7
Illicit drug use	70.4	59.3	51.9	59.3



**TABLE 4. Descriptive Statistics of Weapon Use and Violence Based on Explanatory Variables**

Category	Variable	Violence and Weapon Use (n = 54)	Violence and No Weapon (n = 96)
Demographics	Mean age (yr ± SD)	38.6 (±18.2)	36.7 (±18.0)
	Race* (white/minority)	29.6%	46.9%
	Gender*** (men/women)	70.4%	46.9%
	Marital status* (married/not married)	24.1%	43.8%
	Educational level* (≤12/>12 years)	74.1%	62.5%
	Employed (no/yes)	42.5%	31.3%
Summary	Substance use****		
	None	24.5%	32.6%
	Alcohol use only	40.8%	41.1%
	Alcohol and illicit drug use	34.7%	26.3%
	Substance-related consequences****		
	None	52.1%	64.1%
Alcohol use only	27.1%	23.9%	
Illicit drug use	20.8%	12.0%	

Note that for dichotomous variables, column values reflect the first category (i.e., for gender, 70.4% of males). \* $p < 0.05$ , \*\*\* $p < 0.001$ , \*\*\*\* $p < 0.0001$ .

present an opportunity for ED interventions for reduction of weapon-related injury. Although patients reporting weapon violence were significantly more likely than patients reporting other types of violence and nonviolent patients to be younger, to be minorities, to be unmarried, and to have less than a high-school education, the relationships between alcohol and illicit drug use were similar regardless of whether the violence involved a weapon.

Data from this study suggest that the majority of patients (both men and women) were involved in a cycle of violence: 57% of the patients who were victims of violence were also perpetrating violence (although perhaps not in the same encounter or relationship type). In addition, patients who were experiencing violence in partner relationships were often (37%) experiencing violence in their nonpartner relationships. Partner violence may be underestimated in this study, given that some of our participants may not have had partners in the past year and would have responded “no” to partner violence. In contrast, approximately one-third (31%) of the patients reported being the victim of violence without also perpetrating violence, and only 12% reported perpetrating violence without being the victim of violence.

Men were more likely to be involved in all types of violence (including violence perpetration and victimization in partner and nonpartner relationship types) than women. However, it is important to emphasize that the severities of violence and subsequent injuries may differ by gender. For example, there is clear evidence that men are more physically aggressive than women,<sup>35</sup> and violence perpetrated by women is influenced by their partner’s violent behavior.<sup>36</sup> In this study, only 6.5% of the total sample were women with acute violent injury. The majority of prior research in ED violence has focused exclusively on

this group, thus missing the vast majority of injured ED patients who have experienced violence. These findings suggest that future research that considers both genders and the history of violence may aid in developing a more complete understanding of the complex risk factors in violent injury. Such increased understanding could lead to interventions that meet the needs of a broader array of patients.

Goldstein has proposed that the relationship between substance use and violence can be characterized by three models.<sup>37</sup> According to the pharmacological model, violence is related to the pharmacological effects of substances, including disinhibition, impulsivity, hyperactivity, and paranoid delusional thinking. The economic-compulsive model states that violence is related to substance use through the occurrence of violent crime (e.g., robbery) to support the cost of supporting a drug habit. Based on the systemic model, violence occurs in relation to contextual factors that are inherently part of a culture of substance use, including drug distribution and gang relationships.

Consistent with Goldstein’s theory of the close relationship among substance use and violence,<sup>37</sup> this study found that any alcohol use, even at levels often considered “low-risk drinking” (e.g., 1–2 drinks for women and 1–3 drinks for men), significantly increased the risk for past-year violence. Research supports the notion of alcohol’s involvement with violence. Crime data suggest that one in four victims of violent crime each year reports that the offender had been drinking prior to committing the crime.<sup>38</sup> Similarly, high rates of alcoholism (30%–64%) are found among batterers<sup>39–41</sup> and individuals incarcerated for violent offenses.<sup>42,43</sup> It is likely that the epidemiology of alcohol-related violence among ED samples differs from that for samples from the community or the criminal justice system.

There is evidence that the acute pharmacological effects of some drugs (e.g., cocaine) may increase aggressiveness.<sup>44</sup> Criminal Justice data note that 5% of assailants were reported to be under the influence of drugs at the time of their crime.<sup>38</sup> Cocaine has been the most widely drug studied,<sup>45-48</sup> with findings noting that users of cocaine are at increased risk for injuries sustained while under the influence of cocaine,<sup>49</sup> and are frequent victims of violence.<sup>49,50</sup> Among substance abuse treatment samples, rates of past-year partner violence often exceed 50%,<sup>10,11, 40,51,52</sup> in contrast to rates between 7.8% and 21.5% found among community-based samples.<sup>53,54</sup>

Illicit drug use exacerbated the risk for past-year violence in our study above the effects of alcohol alone. These findings were consistent regardless of the alcohol or drug consumption variable examined, and for all alcohol or drug consequence measures. For example, patients drinking any alcohol in the past month were twice as likely to report experiencing past-year violence than patients who did not drink alcohol. In addition, patients reporting any illicit drug use in the past month were six times as likely to report past-year violence than patients who did not report illicit drug use. Regarding consequences, in comparison with patients not experiencing alcohol- or illicit drug-related consequences, patients reporting any alcohol-related consequences in the past year were three to four times more likely to report past-year violence and patients reporting illicit drug-related consequences were ten times as likely to report violence. These findings for the relationship between alcohol and drug use, and consequences, and violence, were consistent regardless of whether the participant perpetrated the violence or was a victim, or whether it occurred in partner or nonpartner relationships. Therefore, assessment of alcohol and drug problems in all patients having experienced violence (as either perpetrators or victims) may be warranted.

## LIMITATIONS

Limitations of this study relate to the relatively small sample size, the lack of inclusion of important injury groups (such as sexual assaults, and self-inflicted injuries), and the inability to enroll patients during day and midnight shifts. A design limitation of this study is that the cross-sectional design does not allow for conclusions regarding causality of the of violence/substance abuse relationship. Future large-scale epidemiology studies are needed replicate the study findings. The findings of the present study are limited by several other measurement issues. First, all data for violence and alcohol and illicit drug use were obtained by self-report without corroboration; however, the use of standardized measures, the assurance of confidentiality, and the lack of consequences for

reports increase the validity of data regarding both substance use and involvement with illegal activities.<sup>55,56</sup> Second, it was not possible to gather detailed information regarding violent events, such as partner dyads. For example, it was not possible to determine whether violence was motivated by desire to control/dominate or for self-defense, and whether substance use occurred on the same day as the violence (possibly indicating acute intoxication effects) or different days (potentially indicating sociocultural influences). Third, some of the time frames of the assessment measures varied (e.g., past month for substance consumption and past year for violent events). Fourth, it was not possible to include structured diagnostic instruments to determine substance abuse/dependence diagnoses in the study. Fifth, the partner abuse inventory was expanded in this study to assess non-partner violence, and thus requires further validation. Sixth, we did not obtain socioeconomic information (i.e., income) in this study. Our pilot work revealed that this population (i.e., lower-income minority patients) was reluctant to provide this information. Although educational level was not significantly related to violence/no violence, participants with a high-school education or less were more likely to report weapon carriage than more educated participants. Finally, our patient population is drawn from a community that is very violent compared with many other communities. Generalizing our results to other settings may not be appropriate.

## CONCLUSIONS

About half of all injured patients seeking treatment at our urban ED may have experienced violence in the past year. Much of this violence is severe, with great potential for injury. Alcohol and illicit drugs are often concomitant with violence. Referrals or other interventions for violence/violent injury need to consider alcohol and drug use, individual violence issues (e.g., partner/nonpartner, perpetration/victimization), and patient gender.

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