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Rates and Correlates of Violent Behaviors among Adolescents Treated in an Urban ED

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Abstract

Purpose—Violence is a leading cause of death for adolescents in inner-city settings. This paper describes violent behaviors in relation to other risk behaviors (e.g., substance use) among adolescents screened in an urban ED.

Methods—Patients ages 14–18 were approached to self-administer a computerized survey assessing violent behaviors (i.e., physical aggression), substance use (cigarettes, alcohol, marijuana), and weapon carriage.

Results—1128 adolescents (83.8% participation rate; 45.9% male; 58.0% African-American) were surveyed. In the past year, 75.3% of adolescents reported peer violence, 27.6% reported dating violence, and 23.5% carried a weapon. In the past year, 28.0% drank alcohol, 14.4% binge drank, 5.7% reported alcohol-related fighting, and 36.9% smoked marijuana. Logistic regression analyses predicting violent behaviors were significant. Teens reporting peer violence were more likely to be younger, African-American, on public assistance, carry a weapon, binge drink, and smoke marijuana. Teens reporting dating violence were more likely to be female, African-American, carry a weapon, binge drink, screen positive for alcohol problems, and smoke marijuana. Teens reporting alcohol-related fighting were more likely to carry a weapon, binge drink, screen positive for alcohol problems, and smoke marijuana.

Conclusions—Adolescents presenting to an urban ED have elevated rates of violent behaviors. Substance use (i.e., binge drinking and smoking marijuana) is an important risk factor for violent behaviors among urban adolescents. Universal screening and intervention protocols to address multiple risk behaviors, including violent behaviors and substance use, may be useful to prevent injury among adolescents presenting to the urban ED.

Keywords

Violence; Dating Violence; Binge Drinking; Adolescent; Emergency Department

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Introduction

Violent behaviors (e.g., physical aggression) are prevalent among urban adolescents and have enormous impacts on morbidity and mortality. Intentional injury is the leading cause of death among African-American adolescents and the second leading cause of death among Caucasian adolescents[1]. In the past year, 36% of high school students reported being in a physical fight[2] and 10–12% of adolescents reported perpetrating dating violence[3]. In the past month, 19% of high school students reported carrying a weapon[2]. The urban ED represents an important venue for examination of violent behaviors. In the United States, there are over 100 million ED visits each year; 3 million are the result of violence[4]. Lack of a primary care physician, limited insurance coverage, and convenience means that many patients, regardless of illness severity, are treated in the ED and released[5,6]. Frequent ED visits by minority patients, and/or patients of lower economic status, provide a unique window of opportunity to access urban adolescents, who may be missed in school-based studies because of poor attendance. Critical to implementation of youth violence prevention in ED settings is understanding the rate and type of violent behaviors (e.g., peer, dating) and associated risk factors among adolescent ED patients.

An important risk factor for violence is alcohol use. Alcohol use is associated with the four leading causes of death among adolescents including homicide[7]. By age 18, 73% of adolescents have consumed alcohol and 26% report binge drinking (5 or more drinks) in the past month [2]. The relationship between violence and alcohol can be explained by theories of problem behavior clustering as well as the pharmacological effects of alcohol[8,9]. Consistent with these theories, data from the National Longitudinal Study of Adolescent Health (AddHealth) show that rates of violent behavior are higher among adolescent drinkers than non-drinkers, with binge drinking being a salient predictor of violent behavior initiation[10]. Similarly, community surveys show that marijuana use is related to violent behaviors[11], likely due to problem behavior clustering[8]. Regarding acute intoxication effects, among adolescent drinkers who report fighting, one-third report fighting when under the influence of alcohol[12].

Prior studies of violent behavior among adolescents in the ED have focused on peer violence and have been limited to inclusion of patients seeking care for violent injury or patients admitted to inpatient trauma units[13]. These studies show elevated rates of alcohol use, marijuana use, and weapon carriage among the subset of adolescents presenting to the ED with violent injury[14]. A notable exception examined both medical and injured adolescents in the ED and found high rates of violent behaviors compared to community or school samples; however, this study was limited in sample size (n=115)[15]. To our knowledge, no prior ED studies of adolescents have examined dating aggression. Finally, prior adolescent ED studies examining substance use have not generally assessed violence[16,17].

The purpose of this study was to examine rates and correlates of violent behaviors (i.e., peer, dating, and alcohol related fighting) among adolescents presenting to an urban ED for injury or medical complaint. Based on prior work and theory regarding the clustering of problem behaviors, this study hypothesized that adolescents who perpetrate violence differ from their non-violent peers on demographic, substance use, and weapon carriage variables. Specifically, adolescents reporting violent behaviors were expected to be younger, female, African-American, have poor grades in school, receive public assistance, present with injury, use substances and carry a weapon. Findings from this study are essential in order to inform future ED-based injury prevention protocols.

Method

This study used a cross-sectional design. A consecutive sample of adolescent ED patients (ages 14–18), presenting during the afternoon/evening shift, seven days/week, were approached to complete a screening questionnaire as part of a randomized controlled trial of an intervention for alcohol use and violent (aggressive) behaviors; this paper reports on a one-year period (9/2006– 9/2007). The study site, Hurley Medical Center, is a 540-bed teaching hospital, and a Level I Trauma Center located in Flint, Michigan, with approximately 25,000 yearly pediatric visits (75,000 total visits). Study procedures were approved and conducted in compliance with the University of Michigan's Institutional Review Board (IRB) for Human Subjects guidelines. A Certificate of Confidentiality was obtained from NIAAA. Consenting/assenting participants self-administered a 15-minute computerized survey with audio via headphones (due to potential low literacy) and received a token $1.00 gift (e.g., pens, lip balm) for their participation. Research assistants (RAs) administered the survey privately for those who could not physically complete it (e.g., hand injury).

Measures

All measures were selected or adapted to ensure brevity and have demonstrated reliability and validity. Demographic items were selected from AddHealth[18]. For violence questions and weapon carriage, response choices were based on the Conflict Tactics Scale (CTS) [19].

Physical peer violence—Past year peer violence (i.e. fights with friends, strangers, etc; not dating partners) items were drawn from AddHealth[18,20] and the CTS[19]. Moderate violence included: pushed or shoved, hit or punched, slammed someone into wall, and slapped someone (Cronbach's alpha = 0.77). Severe violence included: serious physical fighting, group fighting, caused someone to need medical care, beat up, kicked, and used a knife or gun on someone (Cronbach's alpha = 0.80). Analyses were conducted using a summary variable: none, moderate, and severe.

Physical dating violence—Past year dating violence (i.e., someone you're dating or "going with," a boyfriend or girlfriend) was assessed using a collapsed version of the Conflict in Adolescent Dating Relationships Inventory (CADRI)[21]. Violent victimization from dating partners was not assessed. The original 4-item scale was collapsed into 2 items assessing frequency of moderate (e.g., threw something that could hurt, twisted arm or hair, pushed, shoved, grabbed, or slapped) and severe aggression (e.g., punched or hit with something that could hurt, choked, slammed against a wall, beat up, burned or scalded on purpose, kicked, or used a knife or gun). Analyses were conducted using a summary variable: none, moderate, and severe.

Alcohol-related fighting—Participants were asked how often in the past year they drank alcohol before a serious physical fight. Responses were collapsed to indicate alcohol-related fighting (none/any).

Weapon carriage—Participants were asked how often in the past year they had carried a knife/razor or a gun[22]. Items were collapsed to form a single weapon carriage measure (none/any).

Substance use—Participants were asked to indicate whether they had consumed alcohol more than two or three times in the past year[18]. Frequency, quantity, and heavy alcohol consumption were assessed using the Alcohol Use Disorders Identification Test (AUDIT-C) [23]. Participants were asked to indicate how often they smoked cigarettes and used

marijuana in the past year[24]. The six-item CRAFFT was used to screen for alcohol problems (i.e., 2 or more; sensitivity= 92%, specificity= 82%)[25].

Reason for ED visit—Reason for the ED visit was abstracted from the medical chart by RAs trained on the classification of external causes of injuries, International Classification of Diseases, Ninth Revision, Clinical Modification (ICD–9–CM)[26]. Reasons were classified as medical illness (e.g., abdominal pain, asthma) or injury (ICD–9–CM E800–E999).

Data Analysis: Data were analyzed using SAS 9.0 (SAS Institute, Cary, NC). Descriptive statistics were compiled and bivariate analyses were conducted to compare gender differences in violence and other risk factors. Chi-square tests were used for categorical variables, and independent sample t-tests were used for continuous variables. Because the dynamics underlying violent behaviors based on relationship type (peers, dating partners) may differ and because only 24% of participants reported violent behaviors with both peers and dating partners, we analyzed data separately for these variables. Thus, separate logistic regression analyses were used (proportional odds models) to identify correlates of violent behaviors (none, moderate, severe) toward peers and dating partners. In addition, to understand acute intoxication effects, logistic regression analysis was used to examine correlates of alcohol-related fighting (none/any). Independent variables included: demographics, weapon carriage, binge drinking, cigarette smoking, and marijuana use. [Any alcohol and cigarette use were not included due to high correlations with binge drinking (r=.65) and marijuana use (r=.73), respectively.]

Results

Patients were excluded if they could not provide informed consent due to: under age 18 and no parent/guardian present (n=302), actively suicidal (n=140), abnormal vital signs (n=121), insufficient cognitive orientation (n=27), acute intoxication (n=10), schizophrenia diagnosis (n=5), and other (n=9). Among 1604 potentially eligible patients who presented to the ED during the recruitment period, 83.9% (n=1346) were approached and 16.1% (n=258) were missed. Common reasons for missing participants were: RA occupied with another participant (77.5%) or unable to locate the patient (6.6%); patient discharged (6.6%); computer problems (5.8%); and other (3.5%). Among eligible patients who were approached, 83.8% (n=1128) completed the screen and 16.2% (n=218) refused to participate. Refusal reasons included: family refused (31.2%), too sick (24.8%), too much pain (20.6%), not interested (11.9%), too stressed (6.9%), and other (4.6%).

Among those screened, 54.1% were female; 58.0% were African American, 36.1% were Caucasian, and 5.9% were of other races (i.e., Asian, American Indian). Only 6.0% were of Hispanic/Latino ethnicity, which is typical for the city in which the ED is located. Most participants self-administered the survey; 5% (n=61) were interviewed. The average age was 16 years old (SD =1.47); 59.6% presented for a medical compliant, 35.5% for an unintentional injury, and 5.9% for an intentional injury. Over half the sample (55.8%) reported that their family received public assistance, and one third (32.3%) reported grades of D or lower. Comparisons between the screening sample and refusals indicated similarities across gender (X^2=2.75, p=.10), race (X^2=3.24, p=.07), and ED visit type (X^2=2.18, p=.34). Due to IRB restrictions, no other data was collected on refusals.

Rates of Past Year Risk Behaviors

Rates of peer violence were: 24.7% none, 16.7% moderate only, and 58.6% severe (Table 1). Rates of dating violence were: 72.4% none, 14.7% moderate only, and 12.9% severe. A

cross-tabulation of violent behaviors toward peers and dating partners showed: 22.6% none, 2.1% dating only, 49.8% peer only, and 25.4% both. Regarding other risk behaviors, 23.5% of adolescents carried a weapon; 14.4% reported binge drinking; 7.3% screened positive for alcohol problems; and 26.7% smoked cigarettes.

Gender Differences

Overall, gender was not significantly related to peer violence; 17.4% of males and 16.1% of females reported moderate, and 60.6% of males and 56.9% of females reported severe violence. However, significant gender differences were found for specific behaviors (Table 1). Females were more likely than males to report kicking peers and dating violence (moderate and severe). Males were more likely than females to report beating someone up and weapon carriage. No gender differences were found for substance use.

Bivariate Comparisons

Adolescents reporting severe peer violence differed from those who did not report peer violence on all variables, except gender, grades in school, and ED visit type (Table 2). In comparison to those not reporting peer violence, adolescents reporting severe peer violence were more likely to be younger, African-American, receiving public assistance, carrying weapons, drinking alcohol, binge drinking, having alcohol problems, drinking alcohol prior to a fight, smoking cigarettes, and smoking marijuana. With the exception of binge drinking, adolescents reporting moderate peer violence were similar to adolescents not reporting peer violence.

There were several differences between adolescents who reported any dating violence (either moderate or severe) and those did not report dating violence: adolescents reporting any dating violence were more likely to be female, African-American, receiving public assistance, carrying weapons, binge drinking, drinking alcohol prior to a fight, smoking cigarettes, and smoking marijuana (Table 3). Adolescents presenting to the ED for medical reasons were more likely to report severe dating violence.

Multivariate Models

Parallel multivariate logistic regression models for peer violence, dating violence, and alcohol-related fighting were significant (Table 4). Correlates of peer violence included being younger, African-American, receiving public assistance, carrying weapons, binge drinking, and smoking marijuana. Correlates of dating violence included being female, African-American, carrying weapons, binge drinking, having alcohol problems, and smoking marijuana. Correlates of alcohol-related fighting were being male, carrying weapons, binge drinking, having alcohol problems, and smoking marijuana.

Discussion

The present findings show that adolescents presenting to an urban ED have alarming rates of violent behaviors. Specifically, ~75% of adolescents reported peer violence in the past year; the majority of this violence (~60%) was severe and could likely result in injury. Although direct comparisons are limited by differences in violence measures, these rates of peer violence appear to exceed those of national samples[2] and prior school- and ED-based studies in Flint[15,27]. For example, data from the school-based Youth Risk Behavior Survey shows that 31% of adolescents in Michigan, and 43% of adolescents in Detroit (data is not reported for Flint), report any past year fighting[2]. There are several reasons why adolescent patients presenting to an urban ED may report elevated rates of violence. Urban ED patients over-represent economically disadvantaged groups living in high crime neighborhoods where there is a higher risk of morbidity and mortality due to violence-

related injuries[1]. In addition, these youth are less likely to attend school regularly and may be missed in school-based surveys.

To our knowledge, no prior ED studies have assessed adolescents' dating violence (i.e., physical aggression). About a quarter of youth reported dating violence, which exceeds rates from community samples of adolescents[3]. Consistent with the literature, most adolescents who reported dating violence also reported peer violence[3,28]. Surprisingly, the reason for the current ED visit (e.g., medical, acute injury) was not related to past year history of peer violence; however, adolescents reporting severe dating violence were more likely to present for a medical complaint. Together, these findings highlight the importance of universal screening protocols for peer and dating violence among adolescents in the urban ED.

Although research suggests that male adolescents are involved in more violence than female adolescents [29], in recent years national data has indicated a shift in this gender pattern with females increasingly likely to be involved in violence[30,31]. Overall rates of peer violence in this study were similar for males and females; however, gender differences were noted in specific violent behaviors. Understanding these differences may be important to inform and tailor future interventions by gender. Males were more likely than females to report causing someone to need medical attention and to report weapon carriage. Females were more likely than males to report dating violence (i.e., physical aggression), although males may underreport due to negative social stigmas. Furthermore, violent behavior by males towards a dating partner is more likely to cause injury than violent behaviors by females, perhaps reflecting physical size differences[32]. In addition, females are more likely than males to report reciprocal violence (aggression and victimization) in dating relationships[33] and qualitative studies show gender differences in contexts and motivations for dating violence. For example, male use of dating violence is motivated by a need for respect and control[34]. In contrast, females describe using dating violence for playing, or baiting their male partner to hit them as a sign of commitment or love [34] and report that over half of violent acts are in response to violence initiated by their boyfriend[35].

African-American adolescents reported more severe violence (both peer and dating) after controlling for socio-economic status (i.e., public assistance), but were less likely to report alcohol-related fighting. These findings are consistent with previous research on dating and peer violence [12,36] and may reflect unmeasured socioeconomic factors and/or neighborhood violence[37].

Although alcohol-related fighting was more likely among those who met criteria for alcohol problems, when examined together, most violent behavior did not occur under the influence of alcohol. Only 6% of adolescents reported alcohol-related fighting whereas rates of peer violence were 75%. Thus, our data is consistent with community surveys suggesting that the majority of violent behaviors are not related to acute alcohol consumption[12]. Rather, consistent with theories of problem behavior clustering, adolescents who are [8] binge drinking, smoking marijuana, and carrying a weapon were also likely to be involved in peer and dating violence. These behaviors increase the risk for injury during adolescence[38] and may be related to long-term problems into adulthood (e.g., substance abuse/dependence and psychosocial problems).[39]

Several limitations of this study require mentioning, including the cross-sectional design, which limits interpretation of causality, lack of information regarding other illicit drugs, and lack of distinction regarding the gender of the dating partner. A variety of constructs were not assessed because of feasibility issues inherent to screening adolescents in the ED and based on assessment priorities specific to the randomized controlled trial. Although chart

reviews were audited regularly to ensure reliability for classifying the ED visit, errors cannot be completely ruled out. Future studies should assess victimization, injury, and sexual violence. Findings may not generalize to suburban or rural settings, particularly of higher socio-economic samples. Although our sample reflects the racial/ethnic composition of adolescents in Flint, Michigan, the study requires replication with Hispanic adolescents. Further, findings require replication given that adolescents presenting on midnight and day shifts were not surveyed and severely injured/ill patients could not be included. Given IRB restrictions, it was not possible to obtain information regarding adolescents presenting to the ED without a parent or guardian providing consent. Future multi-site, population-based ED studies should examine these issues among a nationally representative sample of adolescents. Despite these limitations, these findings offer important, unique information regarding violent behaviors among a large, inner-city ED sample of adolescents.

Conclusions and Future Directions

Research suggests that the ED visit may represent a unique “teachable moment” during which adolescents may be receptive to behavioral interventions [40] and linkage to community resources[13]. Prior ED-based intervention programs have focused either on violence[13]) or alcohol[17]. Results from this study suggest that peer and dating violence are common among adolescents presenting to urban EDs, and that alcohol use, marijuana use, and weapon carriage are concomitant risk factors for violence. Given these findings and the potential impact of violence and substance use on future morbidity and mortality, future studies are needed to develop and test screening and interventions protocols that address multiple risk behaviors among adolescents presenting to urban EDs.

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Table 1

Rates and Gender Differences in Violent Behaviors and Substance Use

Item	% Male	% Female	% Total
Moderate Peer Violence			
Pushed or shoved someone	61.2	55.9	58.3
Hit or punched someone	20.3	20.5	20.4
Slammed someone into wall	34.0	23.6***	28.4
Slapped someone	24.9	41.0***	33.6
Severe Peer Violence			
Serious physical fight	45.0	38.9*	41.7
Group Fight	25.5	21.0	23.1
Someone need medical care	22.4	14.9**	18.4
Beat up someone	41.9	35.9*	38.7
Kicked someone	21.0	29.2**	25.4
Used a knife or gun	3.5	3.3	3.4
Dating Violence			
Moderate	8.3	20.2***	14.7
Severe	9.7	15.6***	12.9
Weapon Carriage	27.6	20.0**	23.5
Alcohol Use			
Any alcohol use	28.8	27.3	28.0
Binge drinking	16.0	13.0	14.4
Positive for Alcohol Problems	7.7	6.9	7.3
Drank alcohol prior to fight	7.1	4.4	5.7
Cigarette Smoking	27.4	26.1	26.7
Marijuana Use	39.0	35.1	36.9

* p<.05

** p<0.01

*** p<0.0001

Table 2

Bi-variate Analyses Comparing Peer Violence Severity with Other Risk Factors

	Moderate	Severe
	n= 188 (16.7%)	n=661 (58.6 %)
Risk Factor	**RR (CI)**	**RR (CI)**
Visit Type (Medical)	0.81 (0.65, 1.01)	0.96 (0.88, 1.04)
Age (14–15)	1.17 (0.93, 1.46)	**1.17 (1.08, 1.27)**
Gender (Female)	0.84 (0.68, 1.05)	0.92 (0.85, 1.00)
Race (African-American)	1.09 (0.87, 1.36)	**1.19 (1.09, 1.31)**
Public Assistance (Yes)	1.13 (0.91, 1.41)	**1.23 (1.13, 1.36)**
Grades (A-C)	1.23 (0.95, 1.60)	0.97 (0.88, 1.05)
Carried weapon (Yes)	1.25 (0.92, 1.69)	**1.38 (1.29, 1.49)**
Any alcohol use (Yes)	1.21 (0.94, 1.55)	**1.24 (1.14, 1.34)**
Binge drinking (Yes)	**1.38 (1.01, 1.87)**	**1.28 (1.18, 1.39)**
Positive for Alcohol Problems (Yes)	1.25 (0.76, 2.07)	**1.30 (1.19, 1.42)**
Drank alcohol prior to fight (Yes)	1.24 (0.31, 4.99)	**1.44 (1.36, 1.52)**
Cigarette Smoking (Yes)	1.05 (0.78, 1.40)	**1.27 (1.17, 1.37)**
Marijuana Use (Yes)	1.19 (0.93, 1.51)	**1.37 (1.27, 1.48)**

Abbreviations: RR = Relative Risk; C.I. = Confidence Interval

Reference group: No Violence (n=279, 24.7%).

Table 3

Bi-variate Analyses Comparing Dating Violence Severity with Other Risk Factors

	Moderate	Severe
	n= 166 (14.7%)	n=145 (12.9%)
Risk Factor	**RR (CI)**	**RR (CI)**
Visit Type (Medical)	1.34 (1.00, 1.81)	**1.43 (1.03, 1.98)**
Age (14–15)	0.97 (0.72, 1.28)	0.80 (0.59, 1.10)
Gender (Female)	**2.60 (1.88, 3.59)**	**1.85 (1.35, 2.55)**
Race (African-American)	**1.69 (1.25, 2.28)**	**2.04 (1.45, 2.87)**
Public Assistance (yes)	**1.43 (1.07, 1.91)**	**1.48 (1.08, 2.03)**
Grades (A-C)	1.08 (0.80, 1.47)	0.89 (0.65, 1.22)
Carried weapon (yes)	**1.51 (1.11, 2.04)**	**2.83 (2.12, 3.79)**
Any alcohol use (yes)	1.30 (0.97, 1.75)	**2.15 (1.60, 2.88)**
Binge drinking (yes)	**1.58 (1.12, 2.22)**	**2.17 (1.57, 3.00)**
Positive for Alcohol Problems (yes)	1.43 (0.87, 2.36)	**2.96 (2.11, 4.16)**
Drank alcohol prior to fight (yes)	**1.76 (1.05, 2.96)**	**3.75 (2.72, 5.17)**
Cigarette Smoking (yes)	**1.40 (1.04, 1.87)**	**1.96 (1.46, 2.65)**
Marijuana Use (Yes)	**1.37 (1.27, 1.48)**	**2.50 (1.85, 3.38)**

Reference Group: No Violence (n=817, 72.4 %).

Table 4

Parallel Regression Analyses Predicting Peer Violence Severity, Dating Violence Severity, and Alcohol-Related Fighting

	Peer Violence	Dating Violence	Alcohol-Related Fighting
Variable	**OR (CI)**	**OR (CI)**	**OR (CI)**
Visit Type (Medical)	0.77 (0.59, 1.01)	0.86 (0.63, 1.18)	0.86 (0.46, 1.62)
Age (14–15)	**2.15 (1.65, 2.80)**	1.13 (0.84, 1.51)	0.99 (0.50, 1.96)
Gender (Female)	0.91 (0.70, 1.19)	**2.82 (2.07, 3.86)**	0.59 (0.32, 1.10)
Race (African-American)	**1.96 (1.50, 2.55)**	**2.42 (1.77, 3.32)**	1.55 (0.82, 2.90)
Public assistance (yes)	**1.66 (1.28, 2.14)**	1.23 (0.91, 1.64)	1.28 (0.70, 2.35)
Grades (A-C)	1.01 (0.77, 1.33)	1.19 (0.88, 1.61)	0.88 (0.48, 1.60)
Carried weapon (yes)	**2.91 (2.04, 4.14)**	**2.39 (1.73, 3.30)**	**2.06 (1.13, 3.79)**
Binge drinking (yes)	**1.72 (1.06, 2.81)**	**1.60 (1.01, 2.53)**	**4.23 (2.04, 8.76)**
Positive for Alcohol Problems (yes)	1.39 (0.71, 2.73)	**1.76 (1.02, 3.02)**	**4.68 (2.34, 9.37)**
Marijuana Use (Yes)	**2.46 (1.80, 3.38)**	**1.74 (1.25, 2.42)**	**2.84 (1.24, 6.51)**

Abbreviations: OR = Odds Ratio; C.I. = Confidence Interval

Note: Models: Peer, $p<0.0001$; Dating, $p<0.0001$; Alcohol-Related Fighting, $p<0.001$.

Reference Group: No Violence (n=817, 72.4 %).