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THE RELATIONSHIP BETWEEN HAZARDOUS ALCOHOL USE AND VIOLENCE AMONG STREET-INVOLVED YOUTH

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Abstract

Background and objectives—Alcohol is a major contributor to premature disability and death among youth, often due to physical trauma, violence, and suicide. The purpose of this study was to longitudinally examine the association between hazardous alcohol use and experiences of violence among a cohort of street-involved youth.

Methods—Data were derived from the At-Risk Youth Study (ARYS), a prospective cohort of street-involved youth who use illicit substances in Vancouver, Canada. The outcome of interest was hazardous alcohol use defined by the US National Institute on Alcohol Abuse and Alcoholism as > 14 drinks/week or > 5 drinks on one occasion for men, and > 7 drinks/week or > 4 drinks on one occasion for women. We used Generalized Estimating Equations (GEE) analyses to examine factors independently associated with hazardous alcohol use.

Results—Between 2005 and 2014, 1149 drug-using youth were recruited and 423 (36.8%) reported hazardous alcohol use in the previous six months at study baseline. In multivariable GEE analyses, intimate partner violence (Adjusted Odds Ratio [AOR] = 1.53, 95% Confidence Interval [95% CI] = 1.12–2.10) and non-partner physical assault (AOR = 1.39, 95% CI = 1.21–1.59) were independently associated with hazardous alcohol use after adjusting for multiple potential confounders.

Discussion and conclusions—A considerable proportion of youth in this setting reported hazardous alcohol use, which was independently associated with experiencing recent intimate and non-partner violence.

Scientific significance—Combined interventions for violence and hazardous alcohol use should be integrated into service provision programs for street-involved youth.

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Declaration of Interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this paper.

Keywords

hazardous drinking; alcohol; HIV; youth; violence

Background and Objectives

Alcohol is the leading global risk factor for death among young people aged 15–24 years and for disability-adjusted life-years for young adults aged 20–24 years.¹ The most common causes of death worldwide in this age group - unintentional injuries, intentional self-harm, and assault – are also frequently linked to alcohol use.^{2, 3} The intersection of alcohol use and violence is therefore a major public health concern among youth.⁴

Street-involved youth – that is, young adults who spend all or part of their time working or living on the street⁵ – represent a sub-population of young people with particularly high rates of premature mortality.^{6, 7} Increased exposure to physical endangerment on the street and limited access to resources can predispose to numerous health risks, including violence.^{8, 9} One study of homeless Canadian youth found two out of three youth had been a victim of physical violence and one out of three youth had been sexually assaulted while living on the street.¹⁰ High rates of recent intimate partner violence (IPV) have also been documented among street-involved youth, with estimates ranging between 30–40%.^{9, 11} Childhood experiences of family conflict, violence, and abuse are common reasons why youth leave home¹² and may also predispose them to future development of substance use disorders¹³ and adult victimization.¹⁴

Though high rates of violence among street-involved youth are well documented,^{8–10} the role of alcohol has been less well studied in this population. Among adults, hazardous alcohol is a common sequelae of intimate partner violence, as alcohol may be used to cope with psychological trauma from violence victimization.¹⁵ History of other forms of physical violence, including bullying, are also associated with alcohol related negative consequences among adolescents.¹⁶ Given the extreme vulnerability of street-involved youth to violence and victimization and the high burden of disease attributable to alcohol use in this age group,¹⁷ we sought to longitudinally examine the association between violence and hazardous alcohol use among a cohort of street-involved youth with a history of illicit substance use in Vancouver, Canada. We hypothesized that experiences of intimate partner and non-partner violence would be common in this population and associated with increased hazardous alcohol use.

Methods

Participants and recruitment

Data for this study was collected from the At-Risk Youth Study (ARYS), a prospective cohort of street-involved youth who use illicit substances in Vancouver, Canada. The study has previously been described in detail.¹⁸ This cohort was established in 2005 to examine HIV transmission risk practices among street youth, including transition to injection drug use, in order to inform primary prevention strategies in this population. Eligibility criteria

included: (1) youth between the ages of 14–26 at enrollment, (2) use of an illicit drug other than or in addition to marijuana in the past 30 days, and (3) provision of written informed consent. Participants were recruited through extensive street-based outreach and snowball sampling. The ARYS cohort was approved by the research ethics boards of Providence Health Care and the University of British Columbia.

Procedure

At baseline and every six months thereafter, participants completed an interviewer-administered questionnaire pertaining to socio-demographic information, sex- and drug-related risk behaviors including specific drugs used and modes of use. At every visit, participants received \$30 CAD as remuneration. Data for these analyses were collected from September 2005 to May 2014.

Survey Measures

The primary outcome in our analyses was “hazardous alcohol use”, defined as National Institute on Alcohol Abuse and Alcoholism (NIAAA) risky alcohol use, specifically, >14 drinks/week or >4 drinks on one occasion for men, and >7 drinks/week or >3 drinks on one occasion for all women.¹⁹ A standard drink is defined as one 12-ounce bottle of beer, one 5-ounce glass of wine, or 1.5 ounces of distilled spirits.¹⁹

Key variables of interest included: intimate partner violence (yes vs. no), defined as being attacked, assaulted (including sexual assault) or suffering any kind of violence by an intimate partner (eg. husband, wife, boyfriend, girlfriend or regular sex partner) in the last six months; and non-partner violence (yes vs. no), defined as being attacked, assaulted (including sexual assault) or suffering any kind of violence by anyone other than an intimate partner (eg. stranger, acquaintance, friend, casual sex partner, a drug dealer, police or security guard or other) in the last six months; and history of childhood sexual and/or physical abuse ever in the past by parents, relatives, or others who have been in a position of authority (yes vs. no).

Other variables included: age at baseline (treated as a continuous variable per additional year older); gender (female vs. male); Caucasian race (yes vs. other); high school completion (high school education or greater achieved vs. less the high school level education); homelessness, defined as having no fixed address, sleeping on the street, couch surfing, or staying in a shelter or hostel at some point in the previous six months (yes vs. no); any injection drug use (yes vs. no); daily illicit drug use, defined as daily use of cocaine, crack cocaine, any prescription opioids (codeine, morphine, hydromorphone, OxyContin, street methadone, talwin, and ‘other’), heroin, or crystal methamphetamine (yes vs. no); incarceration, defined as being in detention, prison, drunk tank, or jail in the previous six months (yes vs. no); and engagement in sex work (yes vs. no). All behaviors referred to exposures in the last 6 months.

Statistical Analyses

First, we examined baseline characteristics from participants’ first study visit, stratified by hazardous alcohol use, using Pearson’s χ^2 test and Wilcoxon rank sum test for comparison.

Second, we examined hazardous alcohol use in the past six months during study follow-up using generalized estimating equations (GEE) with a logit link function and an exchangeable correlation structure for the analysis of correlated data.²⁰ To adjust for potential confounding in the multivariable GEE analysis, variables significant at the $p < 0.10$ threshold in bivariable analyses were used in the backwards model selection process. The model with the best overall fit was determined by the lowest quasilikelihood under the independence model criterion (QIC) value.²¹

Our secondary outcome of interest was to assess whether varying intensities of alcohol use were associated with experiences of violence, we created four categories of alcohol use. The reference category “light drinking” included all individuals who did not fulfill criteria for hazardous alcohol use and reported a daily drinking average during the last week of 2 drinks for women or 3 drinks for men. We defined “moderate drinking”, “heavy drinking” and “very heavy drinking” exposure groups. These definitions were based on the median number of drinks per day during the past week reported among hazardous drinkers, stratified by gender (i.e. 8 for women and 10 for men): 1) “Moderate drinking” included individuals who did not fulfill criteria for hazardous alcohol use and reported a daily drinking average during the last week of >2 drinks for women or >3 drinks for men; 2) “Heavy drinking” included individuals who did fulfill criteria for hazardous alcohol use and reported a daily drinking average during the last week 8 for women OR 10 for men; and 3) “Very heavy drinking” included individuals who reported hazardous alcohol use and reported a daily drinking average during the last week >8 for women OR >10 for men. We constructed three GEE models, comparing “moderate drinking”, “heavy drinking”, and “very heavy drinking” separately with “light drinking”. Individuals included in these analyses were surveyed at multiple time points and participants could contribute to more than one drinking category during the study period if the intensity of their alcohol use changed over time. The same explanatory variables of interest were included in bivariable analyses and those significant at the $p < 0.10$ threshold for each exposure group were included in the fixed multivariable models.

All statistical analyses were performed using SAS software version 9.4 (SAS, Cary, NC). All reported p-values are two-sided and considered significant at $p < .05$.

Results

Sample characteristics

A total of 1149 youth were recruited into the ARYS cohort between September 2005 and May 2014. At study entry, among this sample, the median age was 21 years (interquartile range [IRQ] 19 – 23 years), 359 (31%) were female, 780 (68%) were Caucasian, and 852 (74%) had been homeless in the last six months (Table 1). The median number of study visits per participant was 3 (IQR = 1–5). For the 796 participants who had more than one study visit, the median follow-up time per participant was 24.5 months (IQR = 13.3–52.9). This sample contributed 4343 observations, of which 1493 (34%) included a report of hazardous alcohol use.

At baseline, 423 (37%) youth reported hazardous alcohol use in the previous six months, and over the study period a total of 629 (55%) reported hazardous alcohol use. Among participants who reported hazardous alcohol use, the median number of drinks per day during the past week was 10 (IQR = 6 – 17) overall, 8 (IQR = 5 – 15) for women, and 10 (IQR = 6 – 18) for men. Among 1493 observations which involved a report of hazardous alcohol use, 524 (35%) reported 6 drinks per day, 294 (20%) reported 7 – 11 drinks per day, 309 (20%) reported 12 – 17 drinks per day, and 366 (25%) reported > 17 drinks per day.

Baseline characteristics of the study sample stratified by hazardous alcohol use are presented in Table 1. Individuals who reported hazardous alcohol use had a significantly increased odds of having high school or greater education level (Odds Ratio [OR] = 1.30, 95% Confidence Interval [95% CI] = 1.01 – 1.67) and experiencing non-partner violence (OR = 1.39, 95% CI = 1.09 – 1.77). Hazardous alcohol use was associated with decreased odds of older age (OR = 0.95, 95% CI = 0.91 – 0.99), Caucasian race (OR = 0.77, 95% CI = 0.60 – 1.00), injection drug use (OR = 0.39, 95% CI = 0.29 – 0.51), daily illicit drug use (OR = 0.44, 95% CI = 0.33 – 0.59), and engagement in sex work (OR = 0.58, 95% CI = 0.38 – 0.88).

Primary outcome: Factors associated with hazardous alcohol use

Bivariable and multivariable GEE analyses of factors associated with hazardous alcohol use and violence are presented in Table 2. In multivariable GEE analysis, intimate partner violence (Adjusted Odds Ratio [AOR] = 1.53, 95% Confidence Interval [95% CI] = 1.12 – 2.10), non-partner physical assault (AOR = 1.39, 95% CI = 1.21 – 1.59), and homelessness (AOR = 1.30, 95% CI = 1.14 – 1.49) were independently associated with hazardous alcohol use. Older age (AOR = 0.96, 95% CI = 0.92 – 0.99), Caucasian race (AOR = 0.77, 95% CI = 0.64 – 0.94), any injection drug use (AOR = 0.55, 95% CI = 0.46 – 0.67), daily illicit drug use (AOR = 0.67, 95% CI = 0.57 – 0.80), and engagement in sex work (AOR = 0.76, 95% CI = 0.59 – 0.97) were negatively associated with hazardous alcohol use.

Secondary outcome: Dose-response relationship with hazardous alcohol use

There were 2765 (64%) observations in the “light drinking” category, 85 (2%) observations in the “moderate drinking” category, 668 (15%) observations in the “heavy drinking” category and 825 (19%) in the “very heavy drinking” category. Multivariable GEE analyses comparing “moderate drinking”, “heavy drinking”, and “very heavy drinking” with “light drinking” are presented in Table 3 and displayed in Figure 1. A dose-response pattern was observed between non-partner violence and intensity of alcohol use whereby “moderate drinking” was not significantly associated with non-partner violence (AOR = 0.82, 95% CI = 0.47 – 1.41), but “heavy drinking” (AOR = 1.29, 95% CI = 1.07 – 1.56) and “very heavy drinking” (AOR = 1.48, 95% CI = 1.24 – 1.77) were increasingly and significantly associated. A similar pattern emerged with intimate partner violence, with the AOR increasing from 0.28 (95% CI = 0.04 – 1.78) for “moderate drinking”, to 1.41 (95% CI = 0.90 – 2.20) for “heavy drinking”, and 1.71 (95% CI = 1.20 – 2.44) for “very heavy drinking”.

Discussion and Conclusions

Hazardous alcohol use was reported by one third of street-involved youth in this setting. The prevalence of hazardous alcohol use in this population of street-involved youth who use illicit drugs is similar to survey data from the general Canadian population indicating that 30% of youth who drink engage in hazardous levels of alcohol use.²² In this cohort of street-involved youth, hazardous alcohol use was associated with experiencing both intimate partner and non-partner violence. These findings persisted even after intensive covariate adjustment, including adjustment for homelessness and illicit drug use. It was found in statistical analyses for the secondary outcome of interest that experiences of both intimate partner and non-partner violence followed a dose-response pattern suggesting a dose-response relationship between intensity of alcohol use and our key variables of interest.

The associations observed here between hazardous alcohol use and intimate partner and non-partner violence victimization among street-involved youth who use illicit drugs is in keeping with previous studies of people who inject drugs that link alcohol use with being a victim of violence.^{23–26} Though directionality cannot be determined from the present study, it is hypothesized that experiencing both intimate and non-partner violence leads to hazardous alcohol use. In previous studies, experiencing violence in adolescence is one interpersonal factor that has been associated with alcohol related negative consequences, a risk factor for development of alcohol use disorders in young adulthood.¹⁶ It has been suggested that experiences of sexual violence in adolescence result in delays to emotional and social developmental processes that lead to negative health behaviors, including substance use.²⁷ It may be that traumatic experiences from various forms violence victimization, particularly common among street-involved youth, may lead to increased risk for subsequent hazardous alcohol use in this population.

For our secondary outcome, we explored whether intensity of alcohol use was associated with intimate and non-partner violence victimization and found a dose-response relationship. It may be that the relationship between alcohol use and violence is bidirectional and that alcohol use may also lead to increased vulnerability to violence. The psychoactive effects of acute alcohol intoxication, namely impairment of cognitive processes and reduced inhibition may represent one pathway by which hazardous alcohol use can lead to violence.^{27–29} Lending support to this theory, one study investigated the role of substance use among at-risk urban youth and found that reporting being both a victim and a perpetrator of severe violence was more likely to occur on days when participants reported drinking alcohol.³⁰

Though bidirectional intimate partner violence has been associated with methamphetamine use among homeless youth,¹¹ this is the first study to our knowledge that has identified an association with hazardous alcohol use among street-involved youth who use illicit drugs. However, a large body of evidence has linked intimate partner violence victimization with alcohol consumption among youth.^{28, 29} High rates of intimate partner violence have also been documented among adults who inject drugs and partner violence is associated with both drug related (i.e. syringe sharing) and sexual (i.e. unprotected sex) HIV transmission risk behaviors in this population.^{30, 31}

Though childhood sexual abuse has been linked with both re-victimization in adulthood among street-involved youth^{9, 32} and alcohol-related problems in adulthood,³³ we did not observe an association between childhood abuse and hazardous alcohol use in our study. It should be noted that our sample was restricted to youth who use illicit drugs and, in our setting, associations between childhood sexual abuse and initiation of injection drug use³⁴ and childhood physical abuse and progression to regular injection drug use have been observed,³⁵ Hazardous alcohol use has also been linked with sex work and sexual violence in other settings;³⁶ however, we did not observe an elevated risk of hazardous alcohol use among participants who engaged in sex work in this population of street-involved youth.

Combined interventions for both hazardous alcohol use and violence for young adult populations have not been adequately studied.³⁷ Given the observed associations between hazardous alcohol use and non-partner and intimate partner violence, our study underscores the need for implementation of screening and intervention for hazardous alcohol use and violence victimization in programs for street-involved youth. Of note, one randomized trial of screening and brief intervention (SBIRT) in an emergency department setting for urban at-risk adolescents with alcohol use and aggression was found to decrease prevalence of self-reported aggression and consequences secondary to alcohol use (i.e. missed school, trouble with friends),³⁸ though these findings remain to be replicated in other settings.^{39, 40} Health care services for homeless adolescents include: 1) community reinforcement approach, an operant-based behavioral intervention that helps youth develop alternative reinforcing behaviors and plans to avoid negative environmental situations; 2) motivational enhancement therapy, a form of motivational interviewing that includes interviewer feedback; and 3) case management that typically involves case managers linking youth to resources within their community.⁴¹ All three interventions have demonstrated similar efficacy in reducing substance use and associated problems.⁴¹ Policy-level interventions for alcohol have also been shown to reduce violence and other harms associated with alcohol use among youth.⁴² One recent study found that ambulance pickups for violent injuries among high-risk youth aged 15–24 were significantly reduced after introduction of alcohol license restrictions in Richmond, Virginia.⁴³ Given the complex intersection of alcohol use with youth violence, strategic and collaborative efforts that target the levels of public policy, health care systems delivery, and individual risk reduction will be important for successful intervention in this population.⁴⁴

Our study has several limitations. First, we used snowball sampling for recruitment, a procedure which does not produce a truly random sample, to access this “hidden” population of street-involved youth. However, our sample has similar characteristics to other cohorts of street-involved youth in western Canada.⁴⁵ Second, we relied on self-report and socially desirable reporting may occur when discussing risk behaviors, though this would bias our findings towards the null if socially desirable reporting did occur. Third, causality cannot be inferred in this observational study, though we hypothesize as our primary outcome that intimate partner and non-partner violence were outcomes of hazardous alcohol use. Fourth, criteria for enrollment in the ARYS cohort limited eligibility to individuals who used illicit substances in the last thirty days so youth who used alcohol but not drugs would not have been eligible to enroll in the study. We therefore were unable to examine the subset of street-involved youth whose substance use is limited to alcohol.

Scientific Significance

Our findings indicate that experiencing both partner and non-partner physical violence is associated with hazardous alcohol use. Street-involved youth who use illicit drugs and report hazardous alcohol use represents a population at risk for severe harms related to physical exposure to violence on the street and violence in intimate relationships. Multi-level interventions that address alcohol use and violence are needed to address the elevated morbidity and mortality in street-involved youth.

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Figure 1.

Dose-response relationship for intensity of alcohol use. All above estimates used the reference category of “light drinking” that included all individuals who did not fulfil criteria for hazardous alcohol use and reported a daily drinking average during the last week of 2 drinks for women or 3 drinks for men. “Moderate drinking” included individuals who did not fulfil criteria for hazardous alcohol use and reported a daily drinking average during the last week of >2 drinks for women or >3 drinks for men. “Heavy drinking” included individuals who did fulfil criteria for hazardous alcohol use and reported a daily drinking average during the last week 8 for women OR 10 for men. “Very heavy drinking” included individuals who reported hazardous alcohol use and reported a daily drinking average during the last week >8 for women OR >10 for men. Explanatory variables of interest included: age, gender, ethnicity, high school completion, homelessness, any injection drug use, daily illicit drug use, non-partner violence, intimate partner violence, childhood abuse, engagement in sex work, and incarceration. Variables significant at the $p < 0.10$ threshold in bivariable analyses for each exposure group were included in the fixed multivariable models

Table 1Baseline characteristics of street-involved youth stratified by hazardous alcohol use^a (n = 1149)

Characteristic	Hazardous alcohol use		OR(95% CI)	<i>p</i> -value
	Yes <i>n</i> = 423 (36.8%)	No <i>n</i> = 726 (63.2%)		
Median age (IQR)	21 (19–23)	21 (20–23)	0.95 (0.91 – 0.99)	0.026
Gender				
Female vs. Male	131 (31.0)	228 (31.4)	0.98 (0.76 – 1.27)	0.878
Caucasian race^b				
Yes vs. No	272 (64.3)	508 (70.0)	0.77 (0.60 – 1.00)	0.047
High school completion				
Yes. No	164 (38.8)	238 (32.8)	1.30 (1.01 – 1.67)	0.038
Homelessness^c				
Yes vs. No	301 (71.2)	551 (75.9)	0.79 (0.60 – 1.03)	0.085
Injection drug use^c				
Yes vs. No	85 (20.1)	287 (39.5)	0.39 (0.29 – 0.51)	<0.001
Daily illicit drug use^{c, d}				
Yes vs. No	78 (18.4)	246 (33.9)	0.44 (0.33 – 0.59)	<0.001
Non-partner violence^{c, e}				
Yes vs. No	197 (46.6)	278 (38.3)	1.39 (1.09 – 1.77)	0.008
Intimate partner violence^{c, f}				
Yes vs. No	30 (7.1)	37 (5.1)	1.41 (0.86 – 2.32)	0.175
Childhood abuse^g				
Yes vs. No	357 (84.4)	620 (85.4)	0.85 (0.59 – 1.22)	0.377
Sex work^b				
Yes vs. No	32 (7.6)	90 (12.4)	0.58 (0.38 – 0.88)	0.010
Incarceration^c				
Yes vs. No	78 (18.4)	125 (17.2)	1.09 (0.80 – 1.49)	0.586

^a hazardous alcohol use = > 14 drinks per week or > 5 drinks on one occasion for men, and > 7 drinks per week or > 4 drinks on one occasion for women

^b Ethnicity/race: Caucasian race *n*=780 (68%), First Nations/Aboriginal/Inuit *n*=256 (22%), Metis *n*=20 (2%), and other *n*=93 (8%)

^c Denotes activities in the previous six months

^d Any route of consumption other than injection (i.e., sniffing, snorting, or smoking)

^e Non-partner violence defined as being attacked, assaulted (including sexual assault) or suffering any kind of violence by anyone other than an intimate partner (eg. stranger, acquaintance, friend, casual sex partner, a drug dealer, police or security guard or other)

^f Intimate partner violence defined as being attacked, assaulted (including sexual assault) or suffering any kind

^g Denotes having experienced physical and/or sexual abuse ever in the past

Table 2

Bivariable and multivariable GEE^a analysis of hazardous alcohol use^b and violence among street-involved youth in Vancouver, Canada (n = 1149).

Characteristic	Unadjusted Odds Ratio (95% CI ^c)	p-value	Adjusted Odds Ratio ^d (95% CI ^c)	p-value
Non-partner violence^e				
(yes vs. no)	1.38 (1.21 – 1.57)	<0.001	1.39 (1.21 – 1.59)	<0.001
Intimate partner violence^f				
(yes vs. no)	1.39 (1.03 – 1.88)	0.032	1.53 (1.12 – 2.10)	0.008
Childhood abuse^g				
(yes vs. no)	0.98 (0.75 – 1.29)	0.893		

^a GEE = Generalized Estimating Equation

^b hazardous alcohol use = > 14 drinks per week or > 5 drinks on one occasion for men, and > 7 drinks per week or > 4 drinks on one occasion for women

^c CI = Confidence Interval

^d Models adjusted for: age, race/ethnicity, homelessness, any injection drug use, daily illicit drug use, and engagement in sex work

^e Non-partner violence defined as being attacked, assaulted (including sexual assault) or suffering any kind of violence by anyone other than an intimate partner (eg. stranger, acquaintance, friend, casual sex partner, a drug dealer, police or security guard or other) in the past 6 months

^f Intimate partner violence defined as being attacked, assaulted (including sexual assault) or suffering any kind of violence by an intimate partner (eg. husband, wife, boyfriend, girlfriend or regular sex partner) in the past six months

^g Denotes having experienced physical and/or sexual abuse ever in the past

Table 3

Multivariable GEE^a analyses of intensity of alcohol use^g and violence among street-involved youth in Vancouver, Canada (n = 1149)^c

Characteristic	Moderate vs. light drinking		Heavy vs. light drinking		Very heavy vs. light drinking	
	Adjusted Odds Ratio (95% CI) ^d	p-value	Adjusted Odds Ratio (95% CI)	p-value	Adjusted Odds Ratio (95% CI)	p-value
Non-partner violence^e						
(yes vs. no)	0.82 (0.47 – 1.41)	0.470	1.29 (1.07 – 1.56)	0.008	1.48 (1.24 – 1.77)	<0.001
Intimate partner violence^f						
(yes vs. no)	0.28 (0.04 – 1.78)	0.177	1.41 (0.90 – 2.20)	0.131	1.71 (1.20 – 2.44)	<0.001

^a GEE = Generalized Estimating Equation

^b Intensity of alcohol use: 3 separate models fit for 1) moderate vs. light drinking; 2) heavy vs. light drinking; and 3) and very heavy vs. light drinking

^c Separate multivariable models for 3 separate models, each adjusted for age, gender, race/ethnicity, high school completion, homelessness, any injection drug use, daily illicit drug use, non-partner violence, intimate partner violence, childhood abuse, engagement in sex work, and incarceration

^d CI = Confidence Interval

^e Non-partner violence defined as being attacked, assaulted (including sexual assault) or suffering any kind of violence by anyone other than an intimate partner (eg. stranger, acquaintance, friend, casual sex partner, a drug dealer, police or security guard or other) in the past 6 months

^f Intimate partner violence defined as being attacked, assaulted (including sexual assault) or suffering any kind of violence by an intimate partner (eg. husband, wife, boyfriend, girlfriend or regular sex partner) in the past six months