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Alcohol Policies and Alcohol Involvement in Intimate Partner Homicide in the U.S.

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Abstract

Introduction: Intimate partner violence (IPV) results in deaths of both primary and corollary (i.e., non–intimate partner) victims. Alcohol use is a known risk factor for IPV, yet the relationship between alcohol policies and IPV homicides is unclear. This repeated cross-sectional study characterizes alcohol involvement, and the relationship between alcohol policies and alcohol involvement, among IPV homicide victims in the U.S.

Methods: Homicide victim data from 17 states in the National Violent Death Reporting System from 2003 to 2012 were analyzed in 2017–2018. Alcohol Policy Scale scores characterized alcohol policy environments by state year, and were used in generalized estimating equation logistic regression models to predict the odds of alcohol involvement among IPV homicide victims.

Results: Among IPV homicide victims, 36.5% of primary and 41.1% of corollary victims had a blood alcohol concentration (BAC) >0.00%. Of victims with a positive BAC, 67.6% had a BAC ≥0.08%. In adjusted models, a 10-percentage point increase in Alcohol Policy Scale score was

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associated with reduced odds of having a positive BAC (AOR=0.77, 95% CI=0.64, 0.93) and having a BAC ≥0.08% (AOR=0.82, 95% CI=0.68, 0.99) among all victims, primary victims (AOR=0.78, 95% CI=0.63, 0.98; AOR=0.82, 95% CI=0.65, 1.04), and corollary victims (AOR=0.61, 95% CI=0.42, 0.89; AOR=0.68, 95% CI=0.48, 0.97).

Conclusions: Alcohol use was prevalent among IPV homicide victims, and more-restrictive alcohol policy environments were associated with reduced odds of alcohol involvement. Strengthening alcohol policies is a promising strategy to reduce alcohol-involved IPV homicide victimization.

INTRODUCTION

The WHO estimates that 30% of women who have been in a relationship have experienced intimate partner violence (IPV) and that intimate partners commit up to 38% of female homicides.[1,2] In the U.S., approximately 36% of women and 34% of men report lifetime contact with sexual violence, physical violence, or stalking by an intimate partner,[3,4] and in 2014, intimate partners were suspects in 23% of U.S. homicides.[5] In addition to intimate partner deaths, IPV also leads to deaths of non-intimate partners or corollary victims (e.g., family, other intimate partners, friends, law enforcement), which may account for 20% of IPV fatalities in the U.S.[6,7]

Alcohol use is an established risk factor for IPV victimization and perpetration.[1,8–15] Alcohol use is a recognized risk factor for homicide in general,[12,13,16] and IPV homicide specifically.[17] The extent to which potential corollary homicide victims also may have high blood alcohol concentrations (BACs) is not known, but of great importance to those planning violence prevention and intervention programs.

Although there is good evidence to show that more-restrictive alcohol policies may reduce binge drinking[18] and alcohol-related morbidity and mortality,[19] there are inconsistent and limited data on how alcohol policies relate to IPV and IPV homicide.[20–23] Furthermore, most studies on alcohol policies and IPV outcomes have accounted for individual policies, rather than the broader alcohol environment. Past research on individual alcohol policies and IPV has led to conflicting results in regard to alcohol outlet density,[14,15,23] alcohol pricing,[14,15,21–23] and hours and days of sale.[14,23,24] For instance, a study focusing on the restriction of hours of sale in a Brazilian city found a significant decrease in homicides, but this did not hold for assaults against women after adjusting for trends.[24] It is possible that one of the reasons for these conflicting data is that single policies may have limited impact on a downstream outcome such as IPV or IPV homicide, or that the presence or lack of other existing policies may obscure those associations. Both of these would suggest the importance of utilizing a broader measure of the alcohol policy environment.

Recent research found that more-restrictive alcohol policy environments were significantly protective of alcohol involvement among homicide victims.[25] To expand on this research, this study sought to describe alcohol involvement among primary and corollary victims of IPV homicide specifically, and to assess the relationship between state alcohol policy environments and odds of alcohol involvement among these decedents. The study hypothesis

was that more-restrictive alcohol policy environments would be associated with reduced odds of alcohol involvement among victims of IPV homicide.

METHODS

This was a repeated cross-sectional study that characterized alcohol involvement among IPV homicide victims, and assessed the relationship between alcohol policies and alcohol involvement in IPV homicide victims in the U.S. Specifically, the objectives were to describe primary and corollary victims of IPV homicide in relation to BACs, and to assess whether a 10–percentage point increase in the restrictiveness of the alcohol policy environment was associated with reduced odds of alcohol involvement among IPV homicide victims.

Study Sample

Alcohol policies by state year were characterized using Alcohol Policy Scale (APS) scores. APS scores are based on the presence of any of 29 alcohol policies in each U.S. state after taking into account the relative theoretic efficacy of each policy and the degree to which it was implemented or legislated in each state year.[26,27] The APS includes policies such as alcohol taxes, outlet density laws, dram shop liability laws, and keg registration laws. APS scores are standardized on a scale from 0 to 100, with higher APS scores indicating more-restrictive environments. For example, in 2011, APS scores ranged from 32.9 (Wisconsin, the least restrictive state) to 68.5 (Utah, the most restrictive state). The predictor of interest was a 10–percentage point increase in state APS score, and was chosen as it approximated the IQR of APS scores. The APS has similarly been used to assess the relationship between the alcohol policy environment and binge drinking, alcohol involvement in underage motor vehicle fatalities, and alcoholic liver cirrhosis.[17,18,25,26,28,29]

Measures

This study utilized U.S. homicide data from the National Violent Death Reporting System (NVDRS) from the Centers for Disease Control and Prevention from 2003 to 2012, which were analyzed in 2017–2018.[30] NVDRS provides information on all violent deaths that occur in participating states. Each victim record includes information about the victim, suspect(s), the relationship of the victim to the suspect(s), toxicology results for the victim (if available), and any weapon(s) that were involved in the incident. NVDRS connects violent deaths that occur within the same event, which allows for the examination of intimate partner and corollary victims. NVDRS collects data from sources such as death certificates, coroner/medical examiner records, law enforcement reports, and toxicology reports.

Homicide victims were first identified through manner of death coding in NVDRS; IPV homicides were homicide victims for whom IPV was indicated. As this study focused on alcohol involvement, only homicide victims with BAC testing were included in the study. For example, in 2012, the percentage of alcohol-involved IPV homicides ranged from 20% (Wisconsin) to 100% (Alaska). The victim–suspect relationship variable in NVDRS was used to differentiate primary and corollary victims. Primary victims included those who

were a spouse, ex-spouse, girlfriend, boyfriend, ex-girlfriend, or ex-boyfriend. All other victim-suspect relationships were categorized as corollary victims (e.g., parent, child, sibling). In cases of homicide-suicide, if the homicide was committed by an intimate partner, then the homicide was considered an IPV homicide and the suicide would not be included in the study.

Statistical Analysis

Generalized estimating equation logistic regression models were used to determine the association between a 10–percentage point increase in APS score and the individual-level odds of alcohol involvement among IPV homicide victims, while accounting for state- and individual-level covariates and year. Alcohol involvement was assessed at multiple BAC thresholds, with >0.00% and ≥0.08% being the primary thresholds of interest.

Alternating logistic regression was used to account for clustering at the state level and also counties nested within states because of homicide clusters at the county level noted in prior research.[31,32] Alternating logistic regression is a version of generalized estimating equation logistic regression that models association between pairs of observations (the cluster effect) through ORs, rather than correlations, which is appropriate for binary outcomes. Alternating logistic regression and generalized estimating equation analyses are appropriate for multilevel models with both cluster-level (e.g., state-level APS scores) and individual-level (e.g., demographic characteristics) variables. ORs, AORs, and 95% CIs were calculated for the odds of alcohol involvement (BAC >0.00% vs 0.00%, and BAC ≥0.08% vs <0.08%) among IPV homicides in relation to a 10–percentage point increase in APS score. State-year APS scores were related to state-year NVDRS data using a 1-year lag for all study years, as there may be a delay between the time a policy is enacted and its effect on a population. Therefore, 2002–2011 policies were related to 2003–2012 IPV homicides. To account for states that may conduct toxicology tests preferentially, states with toxicology testing rates <30% (i.e., South Carolina and New Jersey) were excluded, and BAC testing rates in the 17 states were controlled for in analyses.

The fully adjusted model included state-level covariates that have been identified as being associated with homicide, including: the proportion of males, individuals aged ≥21 years, individuals by race/ethnicity, individuals with college degree or above, and unemployed individuals; median family income; police rate per 100,000 population; degree of urbanization; state-year BAC testing rate; and religious composition.[33–35] Individual-level covariates, supplied by NVDRS directly, included age, sex, race/ethnicity, marital status, and whether the victim was known to have a mental health issue. All analyses were conducted using SAS, version 9.3.

RESULTS

Between 2003 and 2012, there were 41,587 homicide victims, of which 26,974 (64.9%) had BAC testing and were included in the final sample. Of those decedents, 4,267 (15.8%) were victims of IPV homicide who died in 4,031 unique incidents. IPV homicide victims were predominantly female (58.6%), aged 21–49 years (72.1%), white non-Hispanic (48.8%) or black non-Hispanic (33.6%), unmarried (65.0%), and living in cities (75.8%) (Table 1).

Firearms were involved in 57.7% of IPV homicides. The IPV homicide victims included 2,901 (68.0%) primary victims, 1,181 (27.7%) corollary victims, and 185 (4.3%) with unknown victim–suspect relationship status (Table 1). Most primary victims were female (76.6%), whereas most corollary victims were male (80.0%). Corollary victims included acquaintances (73.4%), family members (19.3%), and strangers (5.2%) (data not shown).

Among IPV homicide victims, 38.2% had a BAC >0.00% (Table 1). Among victims with a positive BAC, 67.6% had a BAC ≥0.08%, 34.8% had a BAC ≥0.16%, and 13.9% had a BAC ≥0.24%. Alcohol involvement was more common among males than females (50.9% vs 29.2%), and males were also more likely to have higher BAC levels than females (Table 1, Figure 1). Among American Indians/Alaska Natives victims, 71.2% had a BAC >0.00%. Alcohol involvement was most common when the victim was female and suspect was male (56.4%), and least common when both victim and suspect were female (30%).

Alcohol involvement was more prevalent among corollary victims than primary victims (41.1% vs 36.5%, Table 1). With respect to demographic subgroups, 47.4% and 52.8% of corollary victims aged 21–29 and 30–39 years had positive BACs, compared with 28.5% and 39.7% of primary victims in these same age groups. Alcohol involvement among corollary victims was also higher than primary victims for most racial ethnic groups. Corollary victims who were married, had a history of mental health or substance use disorders, and who were killed in firearm-involved incidents all had higher rates of alcohol use than their primary victim counterparts.

In fully adjusted models, a 10–percentage point increase in APS score (representing a more-restrictive policy environment) was associated with reduced odds of having a positive BAC among all IPV homicide victims (AOR=0.77, 95% CI=0.64, 0.93), primary victims (AOR=0.78, 95% CI=0.63, 0.98), and corollary victims (AOR=0.61, 95% CI=0.42, 0.89) (Table 2). A 10–percentage point increase in APS score was also associated with reduced odds of having a BAC >0.08% for all IPV homicide victims (AOR=0.82, 95% CI=0.68, 0.99) and corollary victims (AOR=0.68, 95% CI=0.48, 0.97), but was not statistically significant for primary victims.

The relationship between APS scores and the odds of alcohol involvement for IPV homicides was also assessed among various sociodemographic strata (Table 2). A 10–percentage point increase in APS score was associated with significantly reduced odds of having a BAC >0.00% or ≥0.08% across a wide range of subgroups, including Hispanics, those in rural areas, and those with a history of mental health or substance use disorders. Among victims whose deaths involved a firearm, a 10–percentage point increase was significantly associated with reduced odds of alcohol involvement at the BAC ≥0.08% threshold, but not at BAC >0.00%.

Because such a high proportion of alcohol-involved IPV homicides involved BAC levels >0.08%, the relationship between APS scores and the odds of having progressively higher BAC levels was explored further (Table 3). A 10–percentage point increase in APS score was associated with reduced odds of having a BAC ≥0.12% for all victims (AOR=0.77, 95% CI=0.63, 0.94) and for corollary victims (AOR=0.61, 95% CI=0.42, 0.87) but was not

statistically significant for primary victims. At higher BAC thresholds that included progressively fewer victims, point estimates were <1.00 but were not significant or contained sample sizes too small to analyze.

DISCUSSION

This is the first study to characterize alcohol involvement among both primary and corollary victims of IPV homicide, and to examine the relationship between more-restrictive alcohol policy environments and the odds of alcohol involvement among IPV homicide victims. Almost 40% of IPV homicide victims had a BAC >0.00%; most of these victims had a BAC ≥0.08%, and more than one third had a BAC ≥0.16%.[36] The high proportions of both primary and corollary victims with BACs >0.16% indicates that many decedents were highly intoxicated or even incapacitated at the time of death. Alcohol involvement was particularly prevalent among corollary victims who were male, American Indian/American Native, or with a history of substance use disorder. Consistent with previous literature, primary victims were mostly female adults of white non-Hispanic or black non-Hispanic descent, whose deaths were linked to a male suspect.[37]

Although the high BAC levels among victims are concerning, these findings should not be interpreted to mean that victims' alcohol use is to blame for their deaths. Drinking among perpetrators and victims of violence are correlated,[12,38] and NVDRS does not capture alcohol use among perpetrators, many of whom were likely to have been drinking.[11–13]

In the current sample, corollary victims comprised 28% of decedents. Most were male (80.0%), suggesting that males either intervene on behalf of primary victims or were also targeted by the perpetrator. Alcohol use may increase one's risk of becoming involved by associating with others who drink, decreasing inhibitions to intervene on behalf of the primary target, decreasing the ability to do so effectively so as to de-escalate the encounter, or decreasing the ability to defend oneself if also a target.[9,23,39] Corollary victims represent an important, yet overlooked dimension of IPV homicide, and the overall public health burden of IPV as related to alcohol.

The extent to which the alcohol policy environment was associated with alcohol involvement in IPV homicides was also examined. In adjusted analyses, a 10–percentage point increase in APS score was associated with a 23% reduced odds of any alcohol involvement among IPV homicide victims, with similar estimates among primary and corollary victims. Reduced odds of alcohol involvement in IPV homicides were also observed at higher BAC levels and was consistent across multiple sociodemographic subgroups. These findings are consistent with the authors' previous research, finding that stricter policies are protective for alcohol-related homicides and traffic fatalities.[17,25,29,40] Given the associations between alcohol and violence, strengthening alcohol policies may be a promising means to reduce IPV homicide victimization.

Limitations

This study is subject to a number of limitations. The results of these analyses are associative, and causality cannot be inferred. Reverse causality cannot be excluded as a possible

explanation (i.e., states where alcohol-involved IPV homicide is a concern may be more likely to increase the restrictiveness of alcohol policies). An alternate analytic approach would have been to examine trends in changes in alcohol policy environment and IPV homicides longitudinally rather than choosing a cross-sectional design that accounts for time as a fixed effect. However, as alcohol policies in most states did not change substantially over the study period, the repeat cross-sectional design with a 10–percentage point increase as the exposure was chosen. Although the analysis accounted for state- and individual-level covariates, there is a possibility that other factors could influence these relationships (e.g., gender inequality, gun policy). NVDRS homicide data was limited to 17 states, and this affects generalizability. NVDRS is subject to variation in data collection across jurisdictions and potential bias in substance use variables.[41] Selective BAC testing is a potential source of bias (e.g., states with lower testing rates may preferentially test those for whom alcohol involvement is strongly suspected). To address this, the authors eliminated data from two states with testing rates <30% and controlled for state-year BAC testing rate. However, it is possible that BAC testing differs among specific subgroups (e.g., children), and it is unclear how this might have affected the final sample or results. NVDRS is limited to decedents; therefore, little can be said about perpetrators of IPV homicide unless they too died in the incident. Victims of IPV represent only one portion of the involved individuals, and studies on alcohol involvement among perpetrators of IPV would provide vital insight into this complex and urgent public health problem.

CONCLUSIONS

In summary, this study finds that a substantial proportion of IPV homicides involve alcohol, and suggests that enacting stricter alcohol policies may be a promising strategy to prevent alcohol-involved IPV homicide fatalities among both primary and corollary victims. As such, the alcohol policy environment should be considered a priority in the broader discussion of IPV prevention and intervention efforts and future research. Examples of effective alcohol control policies include increasing alcohol taxes, reducing alcohol outlet density, and restricting hours of sales.[42]

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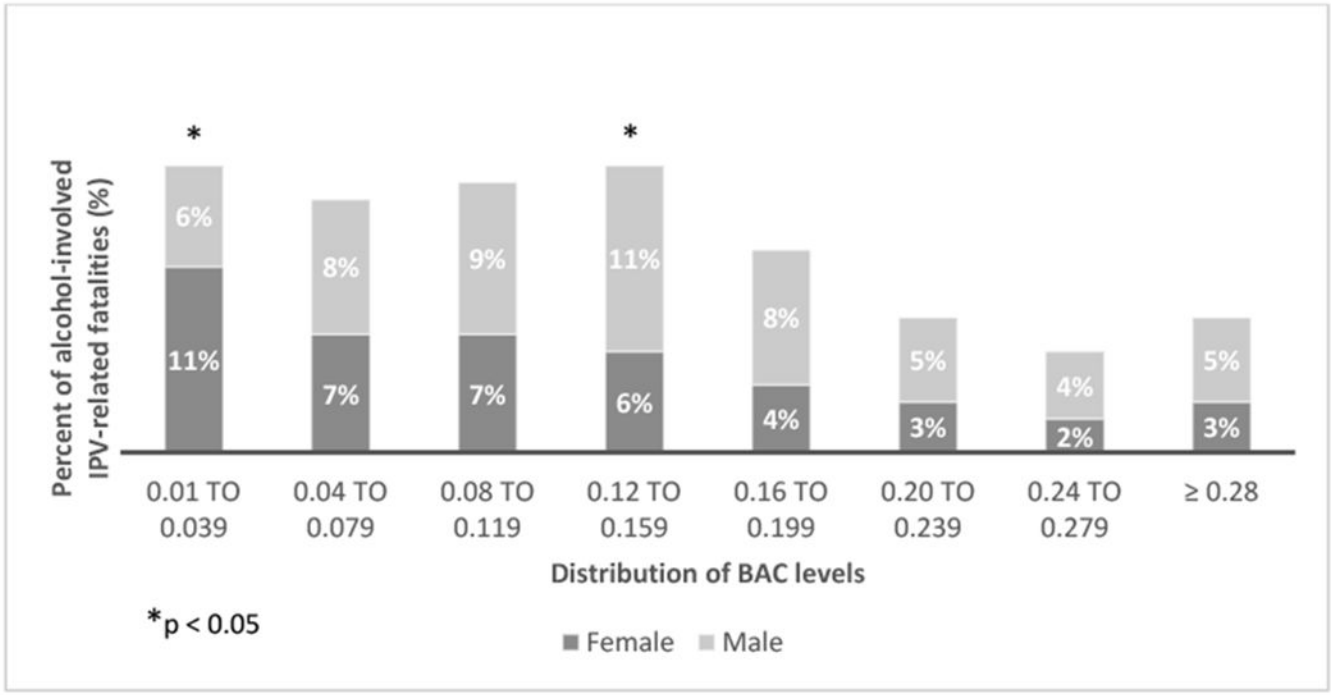

Figure 1.

BAC levels among male and female IPV homicide victims with BAC>0.00%.

BAC, blood alcohol concentration; IPV, intimate partner violence.

Table 1.

Intimate Partner Violence-Related Homicide Victims With Blood Alcohol Content (BAC) Levels >0.00%, 2003–2012, NVDRS

Victim characteristics	All IPV victims *n* (% with BAC>0)	Primary victims[a] *n* (% with BAC>0)	Corollary victims[a] *n* (% with BAC>0)
Overall	4,267[b] (38.2)	2,901 (36.5)	1,181 (41.1)
Sex			
Male	1,765 (50.9)	677 (56.7)	942 (46.6)
Female	2,501 (29.2)	2,223 (30.3)	239 (19.3)
Age, years			
<21	419 (17.0)	162 (17.3)	232 (14.2)
21–29	1,003 (35.2)	624 (28.5)	312 (47.4)
30–39	1,083 (43.7)	766 (39.7)	273 (52.8)
40–49	992 (47.2)	754 (46.4)	215 (49.3)
≥50	769 (34.2)	594 (33.5)	149 (36.2)
Race			
White non-Hispanic	2,080 (37.8)	1,499 (36.0)	516 (42.3)
Black non-Hispanic	1,434 (37.4)	945 (37.3)	406 (36.5)
AI/AN non-Hispanic	104 (71.2)	67 (70.2)	35 (74.3)
Hispanic	444 (37.6)	246 (31.3)	169 (45.0)
Other	205 (31.7)	144 (30.6)	55 (30.9)
Victim–suspect sexes			
Male–male	1,050 (47.3)	55 (65.5)	887 (45.6)
Male–female	674 (56.4)	619 (55.9)	49 (61.2)
Female–male	2,417 (29.0)	2,198 (30.2)	198 (17.2)
Female–female	60 (30.0)	19 (42.1)	39 (25.6)
Veteran			
Yes	288 (44.8)	180 (47.2)	96 (40.6)
No	3,632 (37.8)	2,481 (36.0)	1,000 (41.4)
Unknown	347 (36.0)	240 (34.2)	85 (37.7)
Marital status			
Married/civil union	1,465 (32.6)	1,185 (31.1)	243 (41.6)
Unmarried	2,774 (41.0)	1,699 (40.1)	931 (40.9)
Metropolitan status			
Yes	3,234 (36.9)	2,217 (35.8)	868 (38.8)
No	1,004 (41.6)	669 (38.1)	303 (47.9)
Mental health problem			
Yes	79 (29.1)	62 (24.2)	12 (50.0)
No/unknown	4,188 (38.3)	2,839 (36.8)	1,169 (41.0)
Substance use disorder			
Yes	108 (50.0)	76 (46.1)	26 (53.9)
No/unknown	4,159 (37.8)	2,825 (36.3)	1,155 (40.8)

Victim characteristics	All IPV victims *n* (% with BAC>0)	Primary victims[a] *n* (% with BAC>0)	Corollary victims[a] *n* (% with BAC>0)
Firearm-involved			
Yes	2,461 (32.6)	1,577 (29.9)	757 (36.9)
No	1,797 (45.7)	1,318 (44.4)	422 (48.6)

[a]Primary victims included those who were categorized as spouses or ex-spouses, girlfriends or boyfriends, ex-girlfriends or ex-boyfriends, and girlfriends or boyfriends when it was not unspecified whether current or ex. Other victims were categorized as corollary victim.

[b]Of the 4,267 IPV homicide victims with BAC testing, 2,901 and 1,181 were classified by victim–suspect relationship as primary victims and corollary victims, respectively, and 185 could not be categorized due to unknown victim-suspect relationship.

NVDRS, National Violent Death Reporting System; IPV, intimate partner violence; AI/AN, American Indian/Alaska Native

Table 2.

AORs[a,b] of Alcohol Involvement Among IPV Homicide Victims in Relation to a 10% Increase in APS, by BAC and Sociodemographic Characteristics, 2003–2012, NVDRS

Characteristics	BAC>0.00% (n=1,628)	BAC≥0.08% (n=1,101)
Victim group		
All victims	**0.77 (0.64, 0.93)**	**0.82 (0.68, 0.99)**
Primary victims	**0.78 (0.63, 0.98)**	0.82 (0.65, 1.04)
Corollary victims	**0.61 (0.42, 0.89)**	**0.68 (0.48, 0.97)**
Sex		
Male	**0.71 (0.53, 0.94)**	0.81 (0.62, 1.06)
Female	**0.76 (0.60, 0.96)**	dnc[c]
Age, years		
≤29	**0.72 (0.53, 0.99)**	**0.64 (0.46, 0.89)**
30–39	0.80 (0.54, 1.19)	0.92 (0.62, 1.36)
>40	**0.74 (0.56, 0.97)**	0.81 (0.61, 1.08)
Race/ethnicity		
White non-Hispanic	0.93 (0.73, 1.20)	0.95 (0.73, 1.24)
Black non-Hispanic	0.83 (0.56, 1.22)	1.47 (0.87, 2.47)
Hispanic	**0.42 (0.19, 0.97)**	**0.50 (0.27, 0.93)**
Other	0.88 (0.46, 1.68)	0.79 (0.40, 1.55)
Veteran		
Yes	dnc[c]	1.04 (0.37, 2.93)
No/unknown	**0.74 (0.61, 0.91)**	**0.81 (0.67, 0.98)**
Marital status		
Married/civil union	0.95 (0.73, 1.25)	dnc[c]
Unmarried	**0.70 (0.56, 0.88)**	**0.76 (0.61, 0.94)**
Metropolitan status		
Yes	0.81 (0.65, 1.01)	0.97 (0.79, 1.19)
No	**0.53 (0.30, 0.93)**	**0.47 (0.27, 0.81)**
Mental health problem		
Yes	dnc[c]	dnc[c]
No/unknown	**0.78 (0.64, 0.94)**	**0.83 (0.69, 0.99)**
Substance use disorder		
Yes	dnc[c]	dnc[c]
No/unknown	**0.78 (0.64, 0.94)**	**0.82 (0.68, 0.99)**
Firearm		
Yes	0.77 (0.59, 1.00)	**0.75 (0.57, 0.98)**
No	**0.70 (0.54, 0.90)**	0.87 (0.66, 1.15)

Note: Boldface indicates statistical significance ($p<0.05$).

[a]AOR was based on 10-point increase in APS score.

[b] GEE Model IV used throughout. Adjusted GEE Model IV controls for decedent's age, sex, marital status, mental health status, state proportions of male, age ≥21 years, racial and ethnic composition, college degree or above, unemployment, median family income, police rate per capita, degree of urbanization, religiosity, year and BAC testing rate. South Carolina and New Jersey were removed from analysis for all years due to low BAC testing rates (<30% all years) and high rates of alcohol involvement.

[c] dnc indicates that models did not converge due to sample size limitations; therefore no results were available to report.

IPV, intimate partner violence; APS, Alcohol Policy Scale; BAC, blood alcohol concentration; NVDRS, National Violent Death Reporting System; GEE, generalized estimating equation.

Table 3.

AORs[a,b] of Alcohol-Involvement Among IPV Homicide Victims in Relation to a 10% Point Increase in APS for BAC Strata, 2003–2012, NVDRS

BAC cutoff	Overall intimate partner victimization, n=4,107 AOR (95% CI)	Primary victimization, n=2,796 AOR (95% CI)	Corollary victimization, n=1,135 AOR (95% CI)
BAC≥0.12%	**0.77 (0.63, 0.94)**	0.79 (0.61, 1.03)	**0.61 (0.42, 0.87)**
BAC≥0.16%	0.84 (0.67, 1.07)	0.84 (0.62, 1.13)	0.67 (0.41, 1.08)
BAC≥0.20%	0.86 (0.66, 1.13)	0.92 (0.64, 1.33)	0.58 (0.27, 1.22)
BAC≥0.24%	0.88 (0.62, 1.25)	0.96 (0.62, 1.50)	dnc[c]
BAC≥0.28%	0.95 (0.60, 1.51)	dnc[c]	dnc[c]

Note: Boldface indicates statistical significance ($p<0.05$).

[a]AOR was based on 10-point increase in APS score.

[b]Adjusted GEE model IV controls for victim's age, sex, race/ethnicity, marital status, mental health status, state proportions of male, age ≥21 years, racial and ethnic composition, college degree or above, household income, unemployment, police rate per capita, degree of urbanization, religiosity, year, and BAC testing rate. South Carolina and New Jersey were removed from analysis for all years due to low BAC testing rates (<30% all years) and high rates of alcohol involvement.

[c]dnc indicates that models did not converge due to sample size limitations; therefore no results were available to report.

IPV, intimate partner violence; APS, Alcohol Policy Scale; BAC, blood alcohol concentration; NVDRS, National Violent Death Reporting System; GEE, generalized estimating equation.