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Hazardous drinking and exposure to interpersonal and community violence on both sides of the U.S. -Mexico border

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Abstract

Objective—Different patterns of heavy drinking occur by country and proximity to the U.S. Mexico border. Few studies describe the impact of violence on drinking between countries and along the border.

Methods—Survey data is from U.S. Mexican origin adults living in Texas and Mexican border and non-border cities, N=4,796. Participants were asked about alcohol consumption, interpersonal physical violence (IPV) and exposure to community violence. Monthly hazardous drinking (5+/4+ for men/women) was the primary outcome. Multivariate logistic regression model comparisons identified best predictors.

Results—In the U.S. hazardous drinking was associated with past year IPV ($OR_{adj}=2.5$; 1.8–3.5) and community violence ($OR_{adj}=1.4$; 1.1–1.8). In Mexico, IPV ($OR_{adj}=3.9$; 2.0–7.4) and border proximity ($OR_{adj}=0.5$; 0.4–0.8) were associated with hazardous drinking but not community violence.

Conclusion—Hazardous drinking is associated with IPV in both countries, but violence did not explain border hazardous drinking differences where they existed in Mexico.

Introduction

In 2012 33.7 million U.S. residents were of Mexican origin with 11.4 million having been born in Mexico. Among U.S. Hispanics, Mexican origin residents make up the largest sub-population at 64% with the border region having the highest concentration of Mexican origin residents (Gonzalez-Barrera and Hugo Lopez, 2013). Little is known about alcohol consumption patterns, and in particular, hazardous, heavy or binge drinking in the U.S.-Mexico border region. Heavy drinking is associated with multiple health (Dawson, 2000; Greenfield, 2001) and social problems (Room et al., 1995) and higher risk for injury (Kerr et al., 2015). The context for drinking along the border has changed significantly over the past

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decade as violence, homicide, and drug and gun smuggling (Hendricks, 2007; White House, 2009) has increased. The border region is also the site of increasing policy and legal tensions with heightened security measures being used to enforce border rules (Serrano, 2014).

A previous study of a multistage probability sample of 1,288 U.S. Mexican American non-border residents (living in Houston and Los Angeles) compared to a household probability sample of 1,307 border residents described no difference in rates of binge drinking, total alcohol volume, or current drinking by border proximity (Caetano et al., 2012). However, in the border area women were more likely to engage in binge drinking compared to the non-border areas. US border residents who crossed into Mexico to drink were more likely to report binge drinking. Proximity to the border, the authors hypothesized, made such activities more convenient (Caetano et al., 2013).

A 1996 Texas study of 1,665 border residents reported that 23% of U.S. Hispanic border residents engaged in heavy drinking (5 or more drinks on an occasion at least monthly). Crime or violence in the border region was widely reported (83%) along with drug trafficking (84%). Heavy drinking was more common in El Paso compared to the two remaining border cities (Wallisch, 1998). Multivariate analyses included only demographic variables and thus, no information was provided to assess the effect of crime or violence on heavy drinking or drug use patterns (Wallisch, 1998).

Using data from the U.S.-Mexico Study on Alcohol and Related Conditions (UMSARC) higher rates of AUD were reported in U.S. compared to Mexico and marginally higher rates of AUD were reported in the U.S. border ($p=0.10$) region compared to the U.S. non-border region. An opposite and more distinct pattern was revealed in Mexico ($p<0.001$) with higher rates of AUD in the non-border region. It is unclear why this pattern is reversed but perceived or actual stress among non-border residents in Mexico was hypothesized as an explanatory factor. (Cherpitel et al., 2015).

Residents in the border region are hypothesized to be at **high risk for heavy alcohol use** due to the lower drinking age in Mexico (compared to the U.S.) and easy access to alcohol, availability of prescription pharmaceutical recreational drugs in Mexico, drug trafficking, younger age, stresses related to high unemployment and poverty, the convergence of cultures, heavy alcohol advertising (Fleming et al., 2004), perceived neighborhood violence and low collective efficacy (Escobedo and de Cosío, 1997; Vaeth et al., 2015; Wallisch and Spence, 2006). The combination of poverty and poor employment opportunities has fostered illicit activities involving drug and gun trafficking and the related growth of gang activities. (Mata et al., 2002) These activities create a climate of normalcy to violence with higher tolerance, (Valdez, 1993; Valdez et al., 1997) and increased likelihood of violent events occurring. The difference in alcohol use disorders among men between Texas border (Laredo) vs. non-border (San Antonio) cities was partially explained (via drinking motives) by men's exposure to community violence (among other factors). (Zemore et al., 2016) The current study explores in more detail, the impact of exposure to two types of violence using a framework where heavy drinking occurs to cope with stress related to exposure to violence. (Kilpatrick et al., 1997; Lazarus and Folkman, 1984; Lown and Vega, 2001a, 2001c; Neff et al., 1995; Tschann et al., 2005) and also, that use of alcohol increases

opportunities where participants are exposed to violence. (Waller et al., 2012) Exposure to violence and subsequent reactions occur in the ecological context of the border. (Bronfenbrenner, 1979; Dawson et al., 2007; NIAAA, 1997; Stockdale et al., 2007)

Both **community and interpersonal violence** are strongly associated with heavy alcohol use, alcohol dependence, and deleterious drinking patterns in general (Abbey et al., 2002; Bell et al., 2006; Caetano et al., 2000; Caetano et al., 2001; Cunradi, 1999; Doherty et al., 2012; Fagan et al., 2015; Grunbaum et al., 2002; Livingston, 2008; Lown and Vega, 2001c; Miller et al., 2000; Toomey et al., 2012; Waller, et al., 2012) and among Mexicans and Mexican-origin individuals (Lown and Vega, 2001a, 2001c; Rivera-Rivera et al., 2006; Rivera-Rivera et al., 2004). One study along the U.S. border describes higher rates of binge drinking near the border region among men who perceive greater neighborhood violence, but not among women. (Vaeth, et al., 2015). Among women, perceived neighborhood violence was associated with a perception of greater social disorder which in turn increased binge drinking (Vaeth, et al., 2015). The reverse has also been documented with higher rates of hazardous drinking contributing to an environment of aggression increasing both community and interpersonal violence. (Roizen, 1993; Room, et al., 1995; Wells and Graham, 2003; Wells et al., 2005) The co-occurrence of hazardous drinking and violence may further increase life hardships that in turn increase risk factors for more alcohol use and violence (Byrne et al., 1999) creating a cycle of violence and heavy drinking.

Despite the association between interpersonal and community violence, little research examines both types of violence together and their relationship to hazardous drinking patterns among Mexican origin residents living on both sides of the border. Exposure to violence may help explain differences in drinking between countries and by border proximity in Mexico.

The present paper, using data from the UMSARC, builds on previous findings describing higher rates of AUD in the non-border areas of Mexico compared to border areas with smaller differences by border proximity in the U.S. (Cherpitel, et al., 2015) The current paper describes hazardous (heavy) drinking and violence (interpersonal and community) by country of residence (U.S. or Mexico) and by proximity to the border. The present study tests the hypothesis that: 1) both IPV and community violence are associated with greater hazardous drinking regardless of country or border proximity and 2) IPV and community violence will explain higher rates of hazardous drinking in non-border cities in Mexico.

Methods

Study Design and Sample

Data from the UMSARC represent a cross sectional sample, using multistage area-probability sampling, stratified by city, of 4,796 Mexican-origin individuals participating in household face-to-face surveys taking 45 minutes each. Randomly selected respondents between the ages of 18 and 65 were interviewed during 2011–2013 on both sides of the US-Mexico border. The UMSARC received human subjects approval from the Public Health Institute and the Instituto Nacional de Psiquiatría in Mexico Institutional Review Boards. Following informed consent, face-to-face interviews were carried out with Mexican-origin

respondents in the three Texas metropolitan areas, including two border areas Laredo (Webb County) (n=751) and McAllen/Brownsville (Cameron/Hidalgo Counties) (n=814) and one non-border metropolitan area of San Antonio (San Antonio county) (n=771). On the Mexico side, parallel sampling was carried out on respondents living in the respective border sister metropolitan areas (sister cities) of Nuevo Laredo (n=828) and Reynosa/Matamoros (state of Tamaulipas) (n=821) and in the non-border metropolitan area counterpart of Monterrey (state of Nuevo Leon) (n=811).

Details of study sampling are described elsewhere (Cherpitel, et al., 2015). The combined cooperation rate was 84% for the U.S. sample (53.1% response rate) and 71.4% for the Mexico sample (63.3% response rate). The cooperation rate was based on including only those households in which enumeration indicated that an eligible respondent was confirmed to reside, while the response rate was based on including the fraction of those households in which enumeration was not conducted that were estimated to contain eligible residents.

Measures

Volume of alcohol consumption was obtained using an adapted Knupfer series (Greenfield, 2000; Room, 1990) that includes questions on the frequency of drinking, and the amount usually consumed per day, separately for wine, beer and spirits, over the last year, and then summed across beverages. For each beverage type, the respondents were asked how often they usually had the type of alcohol beverage during the last 12 months, with selection options ranging from “more than once a day”, “once a day”, to “less than once a month but more than once a year” and “never during last year” and how many drinks they usually have per day when they drank the beverage.

Hazardous drinking is based on the maximum and total volume drinking questions (Greenfield et al., 2006). Respondents were asked the largest number of drinks they had on any single day for all kinds of alcohol beverages combined during the last 12 months, with selection options being “24 or more drinks”, “12–23 drinks”, “8–11 drinks”, “5–7 drinks”, “4 drinks”, “3 drinks”, “2 drinks” and “1 drink.” Heavy drinking indicators: any 5+, 8+ or 12+ for men and any 4+ or 8+ for women, were then combined with total consumed volume to classify respondents into drinking pattern groups that represent 5 or more drinks for men/4 or more drinks for women occurring at least monthly during the past year.

Interpersonal physical violence includes adult physical assault, ever, and in the past year. An individual was considered positive if he/she answered ‘yes’ to the following question from the Conflict Tactics Scale. (Straus, 1990c). “Since you turned (age) 18 did anyone ever throw something at you, push, grab, shove or slap you or did anyone ever kick or bite you, hit with a fist, try to hit you with something, beat you up, threaten you with a knife or gun or use a knife or gun against you?” “Did this happen in the past year?”

Direct and indirect exposure to *community violence* was assessed. Direct community violence was assessed by asking, “Have you personally been a victim of any of the following crimes in your neighborhood in the last 12 months? Theft or break-in to your home, theft or break-in to your car, a mugging where you were robbed, a physical attack where you were not robbed, racist attack (either verbal or physical).” Next residents were asked about

indirect exposure to violence, including incidents that were “seen or heard around your neighborhood” in the past 12 months. Questions included: “heard gunshots; seen somebody arrested; seen drug deals; seen someone being beaten up; seen somebody get stabbed; seen somebody get shot; seen someone pull a gun on another person, seen violence related to drug dealing or gang warfare.”(Martinez and Richters, 1993; Richters and Martinez, 1993) Continuous subscales were created for direct and indirect exposure to community violence. A summary scale included all 13 items. Using each scale a dichotomous variable was calculated to indicate those who reported any direct, any indirect or any overall community violence.

Data analysis

In both the U.S. and Mexico, data were weighted to reflect a multistage clustered sampling procedure, followed by use of an algorithm that allowed for the adjustment of sampling weights to match census data by education, gender, and age separately within each site. The weighted prevalence data is reported. To adjust for design effects inherent in multistage clustered sampling, Stata’s *svy* commands (Stata Corp, 2009) were used for all model parameter estimations.

The sample was described by demographic factors and by drinking status according to country noting significant differences. Next the prevalence of lifetime and past year interpersonal and community violence is described by country and by border proximity using chi-square tests, odds ratios (ORs) and 95% confidence intervals (CI). The prevalence of and association between each type of violence and hazardous drinking is described separately by country, again using chi square statistics with ORs and 95% CI. Finally, three multivariate models were developed for each country to predict hazardous drinking by border proximity and, to assess the influence of the two types of violence on that relationship. To test the mediating effect of violence we assessed changes in the measures of effect between border/non-border cities and hazardous drinking and by comparing model fit using log likelihood ratios comparisons between models and retaining the violence variables when they improved the fit ($p<.05$). Models controlled for demographic predictors (gender, age, and education).

Results

By design, the sample was roughly evenly divided between the two countries and by border proximity (Table 1). In both the U.S. and Mexico, 33% lived in the non-border city and 67% lived in two border municipalities. Compared to the Mexican sample, U.S. residents were older, more likely to be college graduates, current drinkers, and hazardous drinkers.

Hazardous drinking was more common in the U.S. (19.5%) compared to Mexico (6%), ($OR_{crude}=3.8$; 3.1–4.6) (Table 2). In the U.S. sample, lifetime (IPV) was reported by 37.5% and past year violence by 8.0% of residents. Lifetime IPV in the Mexican sample was lower, (10.9%) as was past year IPV (3.1%). The odds of reporting lifetime violence in the U.S. compared to Mexico were 4.9 (95% CI 4.2–5.7). In the U.S. community violence was reported by 62.9% of participants, with direct exposure reported by 23.7% and indirect exposure (e.g., seeing someone shot or hearing gunshots) by 57.2%. In Mexico, community

violence was significantly more common (82.8%) than in the U.S. Direct victimization was reported by 25.2% and indirect exposure was reported by 80.1%. The odds of reporting community violence was lower in the U.S., ($OR_{crude}=0.4$; 95% CI 0.3–0.4). In the U.S. and Mexico both lifetime IPV and community violence (summary measure) were more commonly reported by non-border residents compared to border residents.

Violence and hazardous drinking were strongly associated in both countries (Table 3). Participants reporting lifetime IPV in the U.S. were 3.2 times more likely to engage in hazardous drinking, whereas in Mexico, the odds ratio was 5.1. Exposure to indirect community violence was significantly associated with hazardous drinking in the U.S. ($OR=1.8$) and in Mexico ($OR=1.6$).

In the U.S. participants reporting lifetime IPV (versus not) were more likely to engage in hazardous drinking ($OR_{crude}=3.2$; 2.6–4.0). Reporting past year community violence was also associated with significantly increased odds of hazardous drinking ($OR_{crude}=1.7$; 1.3–2.1). When assessing direct and indirect community violence, only indirect community violence was significantly associated with hazardous drinking. Among Mexican residents, lifetime IPV was also associated with greater odds of engaging in hazardous drinking ($OR_{crude}=5.1$; 3.5–7.4) as was direct and indirect exposure to community violence ($OR_{crude}=1.7$; 1.2–2.4 and $OR_{crude}=1.6$; 1.0–2.6 respectively.)

In multivariate models for the U.S., hazardous drinking was not different by border proximity and thus, mediation was not assessed and one model (including both forms of violence) was presented (Table 4). In this model both past year IPV, ($OR_{adj}=2.5$; 1.8–3.5) and community violence ($OR_{adj}=1.4$; 1.1–1.8) were significant predictors for hazardous drinking controlling for demographic factors.

In the case of Mexico, model 1 shows that border city residence was protective for hazardous drinking, ($OR_{adj}=0.5$; 0.4–0.8). The inclusion of the IPV variable (model 2) improved the model fit but did not substantially explain differences in drinking by border proximity. The inclusion of community violence (model 3) did not further improve the model fit. In both countries being female and having a high school education were protective for hazardous drinking.

Discussion

In the U.S., residents were more likely to be hazardous drinkers, and more likely to report lifetime or past year physical violence, but less likely to report community violence. Both IPV and community violence were significantly associated with hazardous drinking in the U.S. and Mexico. Close border proximity was associated with a lower likelihood of hazardous drinking in Mexico but not in the U.S. Neither the presence of IPV nor community violence explained the border drinking differences in Mexico and thus did not confirm our hypothesis that violence explained border differences. Thus, the authors conclude that factors other than violence are playing a more important role in explaining hazardous drinking differences by border proximity in Mexico.

Similar to the present study, a previous study of the U.S. border region also found no differences in binge drinking (defined similarly to hazardous drinking) by proximity to the border (Caetano, et al., 2013) in four border states (Texas, New Mexico, Arizona and California). The non-border cities included were quite different from San Antonio, the border city for the present study. Houston, is twice as far from the border as is San Antonio and Los Angeles falls on the far side of San Diego, in both cases buffering border effects. Despite sample differences, consistency of findings where heavy drinking was not different by border proximity strengthens confidence in the present report. The addition of violence-related measures in the present study did not alter the border-drinking findings. In a second publication from the above study perceptions of greater neighborhood disorder (Vaeth, et al., 2015) was protective for binge drinking, which again, would be consistent with the current findings that perceptions of community violence were strongly associated with hazardous drinking.

Collective efficacy; the experience of neighborhood social order, is considered protective for partner violence (Browning, 2012) and would be anticipated to be greater in non-border cities (further from drug and arms trafficking and related community violence and heavy migration patterns) (Hendricks, 2007; White House, 2009). Instead, the present study described increased risk of hazardous drinking as well as increased reporting of IPV and community violence in the Mexican non-border cities and no differences in the U.S. border cities.

Results from the current study show that violence is strongly associated with hazardous drinking. While the addition of IPV into models significantly improved prediction for hazardous drinking, IPV did not explain drinking differences by proximity to border in Mexico. It may be that confounding factors, also associated with violence and border residence in Mexico, are playing a strong role influencing hazardous drinking. It is possible that local stresses, greater availability of alcohol, or social context supportive of heavier drinking contribute to greater hazardous drinking in the non-border region of Mexico.

Strengths and limitations

The present study is a large, representative study of drinking patterns along the U.S.-Mexican border region providing new data about alcohol use in both countries and by border proximity. The U.S.-Mexico border is well known for the presence of crime and violence. This is the first epidemiological study on both sides to examine how drinking patterns in the region may differ according to the presence of violence. This study has some limitations, however. The geographic focus on Texas could limit generalizability. However, Texas includes two-thirds of U.S.-Mexico border counties providing considerable coverage of the region. The data are cross-sectional making it difficult to discern the temporal order of violence and hazardous drinking. To better understand border and non-border differences in hazardous drinking future studies may need to incorporate additional measures of stress and assess changes over time to document the temporal order of violence and hazardous drinking. Efforts aimed at prevention of violence and hazardous drinking should consider methods of strengthening the overall ecology of communities in order to reduce exposure to

IPV and community violence and increase protective factors that will help individuals and families to cope in the face of violence.

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Table 1

Sample description, N=4,796

Factor	N (actual)	Weighted %	U.S. N=2336 48.7%	Mexico N=2460 51.3%
Women	2238	51.5	52.5	50.5
Men	2558	48.5	47.5	49.5
Age ^a 18–29	1572	31.1	29.5	32.6
Age ^a 30–29	2150	47.7	46.0	49.3
Age ^a 50+	1074	21.2	24.5	18.1
Education ^a <high school graduate	2300	48.0	36.1	69.1
high school graduate	1003	20.9	19.3	15.1
some college	815	17.0	25.4	4.9
college graduate +	652	13.6	19.1	10.9
City ^a : San Antonio	771	16.1	33.0	
Laredo	751	15.7	32.1	
Brownsville/McAllen	814	17.0	34.8	
Monterrey	811	19.9		33.0
Nuevo Laredo	828	17.3		33.
Reynosa/Metamoros	821	17.1		33.4
US non-border	771	16.1	33.0	
US border	1565	32.6	67.0	
Mexican non-border	811	16.9		33.0
Mexican border	1649	34.4		67.0
Drink status ^a : Current drinker	2983	61.2	71.2	51.8
Drink status ^a : Ex-drinker	412	7.7	8.0	7.3
Drink status ^a : Lifetime abstainer	1399	31.1	20.8	40.9

Factor	N (actual)	Weighted %	U.S. N=2336 48.7%	Mexico N=2460 51.3%
Hazardous Drinking ^a ; No	4179	87.4	80.4	94.0
Hazardous Drinking ^a ; Yes	615	12.6	19.6	6.0

^a=significantly different prevalence by country, P<.05). Missing data result in some columns not adding to 100% (e.g., education has 0.5% missing data).

Percent and Crude Odds Ratio for hazardous drinking and exposure to interpersonal and community violence by country, and then by proximity to border in the US and Mexico, separately.

Table 2

Type of Violence	U.S.	Mexico	OR _{crude} U.S. vs. Mexico	US Non- Border	US Border	OR _{crude} U.S. non- border vs. Border	Mex Non- Border	Mexico Border	Mexico: non- border vs. border
			OR _{crude} 95%CI	%	%	OR _{crude} 95%CI	%	%	OR _{crude} 95%CI
Hazardous drinking	19.6	6.0	3.8 (3.1–4.6) ***	19.7	19.5	1.0 (0.8–1.2)	8.9	4.6	0.5 (0.4–0.7) ***
IPV									
Lifetime IPV	37.5	10.9	4.9 (4.2–5.7) ***	47.3	32.7	1.9 (1.6–2.2) ***	13.8	9.5	1.5 (1.2–2.0) ***
Past year IPV	8.0	3.1	2.8 (2.1–3.7) ***	8.6	7.8	1.1 (0.8–1.5)	2.3	3.5	0.7 (0.4–1.1)
Community Violence									
Summary measure	62.9	82.8	0.4 (0.3–0.4) ***	71.6	58.7	1.8 (1.5–2.1) ***	85.0	81.6	1.3 (1.0–1.6) *
Direct experience	23.7	25.2	0.9 (0.8–1.1)	27.8	21.7	1.4 (1.1–1.7) **	24.4	25.5	0.9 (0.8–1.1)
Indirect experience	57.2	80.1	0.3 (0.3–0.4) ***	66.5	52.6	1.8 (1.5–2.1) ***	82.4	79.0	1.2 (1.0–1.5) *

* p .05,

** p .01,

*** p .001.

Table 3

Percent reporting IPV and community violence by hazardous drinking status, described separately by country. Odds ratios are given for hazardous drinking given reported violence. Unweighted N=4,794

	Hazardous drinking YES N=456, 19.5%	Hazardous drinking NO N=1880 80.5%	OR _{crude} (95% CI) χ ² p value	Hazardous drinking YES N=147 6%	Hazardous drinking NO N=2311 94%	OR _{crude} (95% CI) χ ² p value
	U.S. N=2336			Mexico N=2460		
Lifetime IPV						
No	39.7	68.0	3.2 (2.6–4.0) ***	65.3	90.6	5.1 (3.5–7.4) ***
Yes	60.3	32.0		34.7	9.4	
Past year IPV						
No	83.6	94.0	3.1 (2.3–4.2) ***	90.5	97.4	3.9 (2.1–7.1) ***
Yes	16.4	6.0		9.5	2.6	
Past year community violence, summary						
No	28.1	39.3	1.7 (1.3–2.1) ***	12.2	17.6	1.5 (0.9–2.6)
Yes	71.9	60.7		87.8	82.4	
Past year direct-community violence						
No	74.3	76.8	1.1 (0.9–1.4)	64.9	75.5	1.7 (1.2–2.4) **
Yes	25.7	23.2		35.1	24.2	
Past year indirect-community vio.						
No	31.6	45.5	1.8 (1.5–2.2) ***	13.6	20.3	1.6 (1.0–2.6) *
Yes	68.4	54.5		86.4	79.7	

* p .05,
** p .01,
*** p .001.

Table 4

Multivariate models predict hazardous drinking by border proximity and violence (interpersonal and community) controlling for demographic factors.

Factor	US	Mexico	Mexico	Mexico
	Model 1 OR (95% CI)	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)
non-border city	1.1 (0.8–1.3)	0.5 (0.3–0.8) ***	0.5 (0.4–0.8) ***	0.5 (0.4–0.8) ***
border cities	Ref	Ref	Ref	Ref
Past year IPV	2.5 (1.8–3.5) ***	--	3.9 (2.0–7.4) ***	3.8 (2.0–7.2) ***
Community violence	1.4 (1.1–1.8) **	--	--	1.5 (0.9–2.5)

P .001,

**
P .01,

P .05.

All models control for age, gender, and education. Best fit model is bold.