



## Short Communication

# Violence and non-violence-related injuries and alcohol in women from developed and developing countries: A multi-site emergency room study<sup>☆</sup>



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## HIGHLIGHTS

- Association between alcohol consumption and the occurrence of injuries in women
- Women attending the emergency room from developing and developed countries
- Violence-related injury was more prevalent in developing countries (18% × 9%).
- Women from developed countries had higher levels of education (43% × 37%).
- The data can inform prevention of violence-related injury, health promotion and treatment.

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## ABSTRACT

This study sought to analyze the association between alcohol consumption and the occurrence of injuries in women attending the emergency room (ER) from developing and developed countries. The sample consisted of ER data from women in 15 countries that were collected as part of two multi-site studies using similar methodologies: the *Emergency Room Collaborative Alcohol Analysis Project (ERCAAP)*, and *World Health Organization Collaborative Study on Alcohol and Injuries (WHO Study)*. Women ranged in age from 18 to 98 years. Those from developed countries had higher levels of education (43% completed high-school) than women from developing countries (37%). Over half of the women from developing countries reported they had not consumed alcohol in the last 12 months (abstentious), while 2% reported drinking every day. In addition, current drinking women from developing countries reported more binge drinking episodes (33% reported 5 to 11 drinks and 15% reported 12 or more drinks on an occasion) compared to those from developed countries (28% and 11%, respectively). Violence-related injury was more prevalent in developing countries (18%) compared to developed countries (9%). An association between injury and the frequency of alcohol consumption in the last 12 months was observed in both developing and developed countries. Although women from developing countries who suffered violence-related injuries were more likely to demonstrate alcohol abstinence or have lower rates of daily alcohol consumption, these women drank in a more dangerous way, and violence-related injuries were more likely to occur in these women than in those living in developed countries.

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## 1. Introduction

It is well documented that alcohol consumption increases the occurrence of injuries (Borges et al., 2008; Cherpitel & Ye, 2010) that result in emergency room (ER) visits. The consequences of these injuries can be extremely incapacitating since alcohol consumption is a leading risk factor for mortality and morbidity related to both intentional and unintentional injuries (Macleod & Hungerford, 2011; Miller & Spicer, 2012; Who, 2009).

Alcohol is known to affect psychomotor skills leading to injuries due to incidents such as car accidents and falls (Cherpitel & Ye, 2010; Mascarenhas et al., 2009). Furthermore, individuals who are exposed to alcohol may put themselves in dangerous situations and may become more aggressive and less able to perceive the risks involved in alcohol abuse, which can lead to drowning and burns, and intentional injuries (Cherpitel & Ye, 2010; Mascarenhas et al., 2009). Both intentional and unintentional injuries related to alcohol consumption are more prevalent among men (Mascarenhas et al., 2009; Quigg, Hughes, & Bellis, 2012) than women, and increases in injury risk have been found at an average of about 2 drinks per day for both males and females (Cherpitel & Ye, 2009).

Alcohol abuse and/or dependence are associated with several negative repercussions for women's physical, mental and social health, such as suicide (suicide rates are elevated among women who have more than 3 drinks daily), changes in menstrual cycle, fetus damage in pregnant women, endocrine alterations, and reduced identification of problems related to alcohol consumption in primary care (Bond et al., 2010).

Many studies have analyzed differences in the association of alcohol and violence-related injuries between genders, but none have compared associations among women, between developing and developed countries. Therefore, this study sought to analyze the association between alcohol consumption, violent-related injury and blood alcohol concentration in women who received ER treatment in both developing and developed countries.

## 2. Methods

### 2.1. Sample

This sample analyzed women who participated in either of two multi-site studies, covering, together, 15 countries and both using a similar methodology (Cherpitel, 1989), the *Emergency Room Collaborative Alcohol Analysis Project* (ERCAAP) (Cherpitel et al., 2003) and the *World Health Organization (WHO) Collaborative Study on Alcohol and Injury* (Who, 2005).

The ERCAAP, conducted between 1984 and 2003, included seven countries (Argentina, Australia, Canada, Mexico, Poland, Spain and the United States), while the WHO study, conducted between 2001 and 2002, included eleven countries (Argentina, Belarus, Brazil, Canada, Mexico, China, Czech Republic, India, South Africa, Sweden and New Zealand). Argentina, Canada and Mexico were included in both studies; therefore, the data provided for these countries were combined.

Data collection was similar in all countries; patient's probability samples were drawn from ER admission forms at all sites, with equal representation of each shift for each day of the week. Following informed consent, trained interviewers breathalyzed patients and interviewed them. Some patients did not participate in the study because of refusal, incapacitation, being discharged before completing the interview, being in police custody or language barriers. Completion rate for the ERCAAP study was 72%, and 91% for the WHO study. Patients with severe injury were interviewed as soon as their condition stabilized. Analyses were restricted to patients who reported to the ER within 6 h of the injury event.

### 2.2. Measures

A structured questionnaire of about 25 min in length was used to obtain data on sociodemographic characteristics, alcohol consumption and violence-related injury indicated by one of the following: physical aggression, fighting, rape, assault or suicide attempt.

The Alco-Sensor III breathalyzer was used to estimate blood alcohol concentration (BAC). Only BACs taken within 6 h of patient arrival in the ER were retained for analysis. BACs were collapsed into a binary variable consisting of positive ( $\geq 0.01$ ) or negative.

Patients were asked whether or not they had consumed any alcohol in the 6 h prior to the injury event. To evaluate alcohol use patterns, questions were asked regarding the frequency of usual consumption and higher consumption times (5 to 11 drinks and 12 or more drinks on a single occasion) over the last 12 months.

Usual drinking frequency was categorized as: 1) abstinent – patients who did not drink in the last year; 2) rarely – between 1 and 11 times a year; 3) occasionally – 1 and 3 times a month; 4) frequently – 1 and 4 times a week and 5) very frequently – every day or nearly every day. The socio-demographic variables included age, education and employment status.

The Human Development Report of the United Nations Development Programme (UNDP) served as the basis for the categorization of developed and developing countries (UNDP, 2010). Developed countries are considered those with high human development and include Australia, Canada, Spain, the United States, New Zealand, the Czech Republic and Sweden. In contrast, developing countries are those with average human development and included South Africa, Argentina, Belarus, Brazil, China, India, Mexico and Poland.

### 2.3. Statistical analysis

The analysis included data from the 3,937 women interviewed in both studies, 1,883 in developing countries and 2,054 in developed countries. Chi-square tests were performed for associations between categorical variables; in cases of insufficient samples, Fisher's exact test was applied. For all statistical tests, a 5% level of significance was used (Hair, Anderson, Tatham, & Black, 1998).

## 3. Results

The women average age was 40 years, ranging from 18 to 98 years.

In developing countries, women were more likely to have primary (45%) or high school (37%) education, whereas women from developed countries were more likely to have completed high school (43%) or have at least some college (37%).

Almost half of the women from both developing and developed countries were retired or unemployed (47%). However, the proportion of those working or studying differed significantly, with 35% of those in developing countries being students and only 19% employed, while in developed countries, 34% were employed and 19% were students.

Over half of the women from developing countries reported not having consumed alcohol in the last 12 months (abstinent), and only 2% reported drinking every day. In developed countries, the distribution of alcohol consumption during the previous 12 months was more homogeneous, with 20% reporting abstinence and another 20% reporting drinking occasionally, while 23% drank frequently, and 9% reported drinking very frequently.

Although the majority of those in developing countries and a fifth of those in the developed countries did not drink during the last year, among women who did report drinking, 33% in developing countries

**Table 1**  
Distribution of women according to violence-related injuries, BAC and self-report.

	Country				Total	
	Developing		Developed			
	N	%	N	%	N	%
Women with violent-related injury	1.804	18	1.926	9	3.730	13
$\chi^2 = 73.41$ ( $p < 0.0001$ )						
Women with BAC positive	1.791	22	1.835	19	3.626	20
$\chi^2 = 4.60$ ( $p = 0.0320$ )						
Women with self-report positive	1.880	10	2.049	11	3.929	10
$\chi^2 = 62.47$ ( $p < 0.0001$ )						

207 cases without information of violent-related injury.

311 cases without information of BAC.

8 cases without information of self-report.

and 28% in developed countries reported consuming between 5 and 11 drinks on a single occasion, while 15% and 11%, respectively, reported 12 or more drinks on an occasion during this time.

In both developing and developed countries, falls accounted for a similar proportion of injury events (38%), as did traffic accidents (18%). Cutting and piercing injuries were the most prevalent type, accounting for over half of all injuries in developing and developed countries.

Notably, a larger proportion of women reported having been admitted to the ER in the last year in the developed countries (26%) compared to women from developing countries (18%), and of these 15% reported four or more visits during this time in developed countries compared to 6% of women from developing countries.

Women in developing countries were twice as likely to report a violence-related injury (18%) than those in developed countries (9%), and were also more likely to have a positive BAC (22% vs. 19%), but were no more likely to report drinking prior to the injury event. It is also observed that the BAC is a more sensitive method to obtain BAC than the self-report (Table 1).

Significant associations ( $p < 0.01$ ) between violent-related injury and the frequency of alcohol consumption over the last 12 months were found for both developing and developed countries. While the proportion of violence-related injury was greater in developing countries compared to developed countries at all alcohol use frequency levels, and it was the largest for both developing and developed countries for frequent drinkers (27% and 12%, respectively) (Table 2).

#### 4. Discussion

Findings indicate that women living in developing countries had substantially higher abstention rates (over half reported no drinking in the last year) than those in developed countries (9%), and were less likely to report daily drinking. However, among those reporting drinking, women in developing countries were more likely to engage in binge drinking, with nearly half (48%) of these drinkers reporting 5 or more drinks on an occasion, compared to 38% of those in the developed countries.

A stronger association between alcohol consumption and violence-related injury among women in developing countries was found, and previous studies have found that heavy episodic drinking predicts violence-related injury (Wells et al., 2007). Interestingly, both those in developing and developed countries were twice as likely to present to the ER with a positive BAC than to report drinking prior to the injury event, which has not been found, heretofore, in ER samples of either

intentional or non-intentional injuries (Cherpitel et al., 2005). In fact, the opposite has consistently found to be true and has been attributed to the time elapsed between injury and arrival at the ER (Cherpitel et al., 2005), although these previous analyses have not been gender specific, it may be that women in both developing and developed countries are more likely to deny alcohol consumption prior to injury due to the perceived stigma associated with drinking and subsequent injury.

Some studies have also suggested that socio-economic status may be directly associated with alcohol use (Cerdá, Johnson-Lawrence, & Galea, 2011; Giskes, Turrell, Bentley, & Kavanagh, 2011). As observed by Giskes et al. (2011), men and women with higher socio-economic status were the primary alcohol consumers, whereas the socio-economically disadvantaged participants, while drinking less frequently, consumed larger quantities of alcohol, suggesting that socio-economic disadvantage at the individual or family level may be an important alcohol consumption determinant (Cerdá et al., 2011; Giskes et al., 2011).

Previous studies have also focused on gender-related violence, including violence between intimate partners and sexual violence (Testa et al., 2012), and have found that greater gender inequality predicts greater violence in a country (Graham et al., 2008). As women have been poorly represented in epidemiological studies concerning alcohol consumption, strength of the present study is that it analyzed a large women sample and identified alcohol consumption correlates and injury.

Scientific evidence has shown that alcohol use is more frequent in men than in women across all cultures and societies (Obot & Room, 2005). This phenomenon has led to the paucity of studies concerning the alcohol use by women and, consequently, has helped to disguise, hide or neglect their problems. Gender differences in alcohol dependence prevalence are narrowing in various countries. Moreover, alcohol use is occurring at an increasingly early age, more people are progressing to addiction, and there is a tendency for greater damage to women's health (Zilberman, Tavares, & El-Guebaly, 2003).

Alcohol abuse problems among women are still treated prejudicially, and drinking is typically considered a 'manly' activity (Bloomfield, Gmel, & Wilsnack, 2006). In this regard, women have faced many barriers related to asking for help when they experience alcohol problems (Copeland, 1997; Schober & Annis, 1996; Thom, 1986; Tomás-Dols et al., 2007). Data from this sample suggest that women living in developing countries were less likely to report any ER use in the last year, and made fewer visits to ERs among those who did report ER use, than did women from developed countries. The majority of patients with problems with alcohol are not seen in specialized services; instead, a large number of these patients seek help in ERs due to injuries or trauma, as well as other conditions related to their alcohol consumption, for example, gastric problems and cirrhosis. Many studies have shown the importance of approaching these patients in non-specialized services (Cherpitel et al., 2009).

The present study has limitations. Data were collected in selected ERs using a cross sectional study design and, therefore, findings cannot be generalized beyond these specific ERs. Additionally these data represent a sub-sample from a collaborative multi-site study which was not designed to explore factors that might be specific to women in understanding the alcohol-injury relationship. For example, additional data (concerning religiosity, number of children, stability of relationships and the individual instigating the aggression in violence-related injury) could expand scientific evidence and better characterize this sample of women who suffered injury after consuming alcohol.

The clinical implications of these data are that clinicians must take into consideration socioeconomic differences, patterns of consumption and the violence context, when dealing with violence-related injury associated with alcohol consumption among women, in order to inform prevention of violence-related injury, health promotion and appropriate treatment of this population (Kim & Kim, 2008).

Future population-based longitudinal studies of women, alcohol consumption and different types of injury should be conducted to broaden scientific evidence and improve public health policies and practices related to gender that exist in many countries worldwide.

**Table 2**  
Distribution of women according to country type, violent-related injuries and usual frequency of drinking.

Self-report/injury	Violent-related injury			
	Developing country		Developed country	
Frequency of use	%	N	%	N
Abstinent	18	322	9	166
Rarely	20	183	7	28
Occasional	14	63	6	33
Frequent	14	32	9	33
Very frequent	27	38	12	54
	18	6	10	18
	$\chi^2 = 17.01$ ( $p = 0.0019$ )		$\chi^2 = 13.50$ ( $p = 0.0090$ )	

280 cases without information of injury and frequency of consumption.

Test of homogeneity between injury and type of country-abstinent –  $\chi^2 = 35.32$ ;  $p < 0.0001$ .

Test of homogeneity between injury and type of country use rare –  $\chi^2 = 18.11$ ;  $p = 0.0011$ .

Test of homogeneity between injury and type of country-casual use –  $\chi^2 = 4.47$ ;  $p = 0.0345$ .

Test of homogeneity between injury and type of country-frequent use –  $\chi^2 = 17.98$ ;  $p < 0.0001$ .

Test of homogeneity between injury and type of country-heavy use Fisher's exact test –  $p = 0.2300$ .

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Rosiane Lopes Da Silva	USCA	None	None	None	None	None	None
Alessandra Diehl	BAIRRAL	WHO	None	None	None	None	None
Cheryl J. Cherpitel	Alcohol Research Group	NIAAA: AA 013750	None	Supported writing time	None	None	None
Neliana B. Figlie	UNIFESP	WHO	None	None	None	None	None

Note: USCA = Health unit of child and adolescent; BAIRRAL = Americo bairral institute; unifesp = Federal university of sao Paulo; WHO = World health organization; NIAAA = National institute on alcohol abuse and alcoholism.

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