

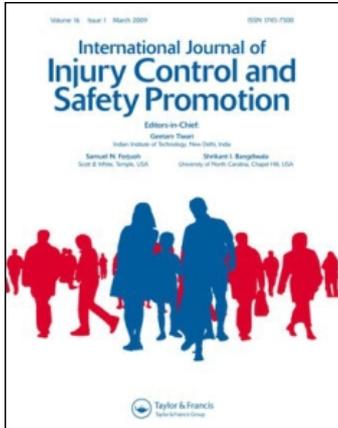
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SHORT REPORT

Alcohol-associated injury visits to emergency departments in Pasto, Colombia in 2006

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1. Introduction

According to the Pan American Health Organization (PAHO), alcohol is the most important risk to health in low- and middle-income countries in the Americas and the second in developed countries (Monteiro, 1993). Despite regional variation, alcohol consumption in the Americas averaged more than 50% higher than worldwide consumption (Rehm & Monteiro, 2005). The biggest problem is not alcoholism, but excessive consumption by people who drink socially.

In Colombia, the relationship between alcohol use and injuries has not been well studied. In a national survey (Republica de Colombia, Ministerio del Interior y de Justicia. Direccion Nacional de Estupefacientes. Estudio Nacional sobre Consumo de Sustancias Sico-activas. Departamento Nacional de Estupefacientes, 1996), 59.8% of respondents consumed alcohol in the previous year and 35% in the last month. The Forensic Medicine Institute, which tests blood alcohol concentration (BAC) identified excessive consumption as a precipitating factor for child maltreatment, and intimate partner violence (Forensis, Datos para la Vida. Instituto Nacional de Medicina Legal y Ciencias Forenses, 2006). In 2006, 13% of homicides and 17% of road traffic-related deaths had a positive BAC (C.E. Betancourt, S. Morales, & K. Balvuela, personal communication, September 2008). The Road Traffic Prevention Foundation reported that alcohol consumption was also an important cause of pedestrian injuries (Fondo de Prevención Vial – Fonvial, 2005).

The fatal injury surveillance system in Pasto, Colombia includes nonfatal injuries, incidents of domestic violence and child maltreatment. Quarterly reports have consistently mentioned the high prevalence of alcohol use among patients treated for injuries

in emergency departments (EDs) (Observatorio del Delito: Boletín Informativo de la Alcaldía de Pasto). Although more than 90% of cases in this system have information for alcohol status, the relationship between alcohol use and ED visits has not been systematically investigated. The goal of this study was to use 2006 surveillance data to estimate the prevalence of alcohol-associated injury visits (AAIVs) to EDs and identify factors that might inform prevention strategies.

2. Methods

ED physicians fill out data collection forms when patients are first seen for an injury. After data quality is reviewed, electronic files from the 16 participating hospitals are aggregated at the central injury surveillance office for analysis. The 2006 baseline dataset, which excluded nonresidents and patients < 18 years, included 10,131 ED injury visits. We excluded 848 cases coded as unknown alcohol consumption, 132 cases with missing alcohol information and 90 cases coded as 'suspected alcohol use', yielding an analysis dataset with 9061 ED visits. AAIVs were identified by clinical observation, i.e. clear signs of alcohol consumption based on the breath and behaviour of the patient and noted in the medical record.

Bivariate descriptive analyses were used to explore the association of AAIVs with age, gender, the day of the week and time of the ED visit, and injury intention (violence-related, unintentional, self-inflicted, and other/unknown), and mechanism (sharp or blunt object, falls, road traffic-related, poison, firearm, and other). Chi-squared and Fisher's exact tests at a significance level of $p < 0.05$ were used to test statistical

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significance. Rates of alcohol use and injury per 100,000 population, stratified by age and intention were also calculated. Population data were only available for 5-year age groups so rates were not calculated for the 18- to 19-year age group.

A multiple logistic regression analysis was performed to assess whether AAIVs were independently associated with admission to the hospital as opposed to being treated in the ED and discharged. The following variables were specified as dichotomous: AAIV, gender, time of day (day: 6 am to 6 pm; night 6 pm to 6 am the next morning). Injury intention was specified as intentional, unintentional or self-inflicted. Age was represented by a series of dummy variables representing 5-year age groups from of 20 to 64 and 65 and over, with the 18- to 19-year age group as the referent category. Day of the week was represented by a series of dummy variables with Sunday as the referent category. The following injury mechanism categories were represented by dummy variables with blunt object as the referent group: sharp object, fall, road-traffic related and other. All analyses were performed with SAS (version 9.1) statistical software.

3. Results

In 2006, 21.6% of ED injury visits ($n = 1956$) in Pasto were alcohol associated. More than 85% of those occurred on or near the weekend – 63.5% on Saturday and Sunday, 22.0% on Friday and Monday. Visits over this period were 2.7 times more likely to be AAIVs than visits on the rest of the week. If AAIVs were evenly distributed, about 14% would fall on any day. But in our data, 21.7% of all injury visits occurred on Sundays and 48.0% of these were alcohol-associated. For both sexes, the highest percentage of AAIVs occurred on Sundays. However, on weekends men were more than three times more likely than women to have an AAIV. Almost 64% of patients with AAIVs treated on Sundays were between the ages of 20 and 34 (data not shown).

Throughout the week, AAIVs represented 12.9% of the daytime (6 am to 6 pm) and 41.0% of the nighttime (6 pm to 6 am) ED patient load. On the weekends – Saturday and Sunday, AAIVs represented 24.3% of the daytime and 54.6% of the nighttime load. Across the whole week, AAIVs were two to five times more likely at night than during the day. During the work week, Monday and Friday nights had the highest percentages of AAIVs, and Tuesday and Wednesday daytimes had the lowest percentages (Figure 1).

Males accounted for 67.6% of all ED injury visits, but 89.1% of AAIVs. They were 8.1 times more likely than females to have AAIVs ($p < 0.001$, Fisher's exact test). The most common injury intention for AAIVs

was interpersonal violence, 63.0% for males and 52.3% for females. For visits that were not alcohol related, the most common intention was unintentional injuries (82.9% for males and 84.8% for females) (Table 1). For both males and females, the association between intention and alcohol status was statistically significant ($p < 0.001$ by chi-squared test).

The highest rates of AAIVs for interpersonal violence, unintentional and self-inflicted injuries were among patients age 20–24. In this age group, the rate for interpersonal violence injuries was 2.4 times that for unintentional injuries and 18.9 times that for self-inflicted injuries. For patients ≥ 60 years, rates for unintentional injuries predominated (Figure 2).

For patients with AAIVs, a sharp object accounted for almost 50% of injuries. For visits not related to alcohol, falls were the most common mechanism of injury, accounting for 30% of injuries. Firearm injuries accounted for 0.8% of AAIVs and 0.6% for visits not related to alcohol.

Although more than 80% of patients were treated for their injuries and then discharged from the ED, patients with an AAIV were 40% more likely to be admitted to the hospital than patients whose visit was not alcohol related, with 16.4% vs. 11.7% admitted, respectively. The highest admission rate, 22.8%, was on Mondays. The multivariate analysis showed that an AAIV was a significant determinant of admission to the hospital (odds ratio 1.6, 95% confidence interval 1.3–1.9).

4. Discussion

The study results show that almost a quarter of ED injury visits were alcohol related. Earlier reports from EDs (Alcohol and Injury in Emergency Departments, 2007; Andreuccetti, Carvalho, Ponce, Darvalho, & Leyton, 2008; Borges et al., 1999; Borges, Cherpitel, & Mittleman, 2004; Borges, Cherpitel, Medina-Mora, Mondragon, 2004; Borges, Mondragon, Orozco, Zambrano, & Cherpitel, 2005; Carlini-Cotrim & da Matta Chasin, 2000; Consumo de Alcohol y Accidentabilidad; Distribución de lesionados; Gazal-Carvalho, Carlini-Cotrim, Silva, & Sauaia, 2002; Hosking, Ameratunga, Bullen, Civil, & Rogers, 2007; Informe VESPA, 1997; Marcin, Pretzlaff, Whittaker, & Kon, 2003; Odero, Garner, & Zwi, 1997; Secretaria Distrital de Salud, 1994; Waller, Hill, Maio, et al., 2003; WHO Collaborative Study Group on Alcohol and Injuries) show a wide range of prevalence, from about 10 to 85%. However, those studies had a variety of limits. For example, they covered only a single institution, a limited time period (e.g. a single month), a limited target population or have many missing values for the

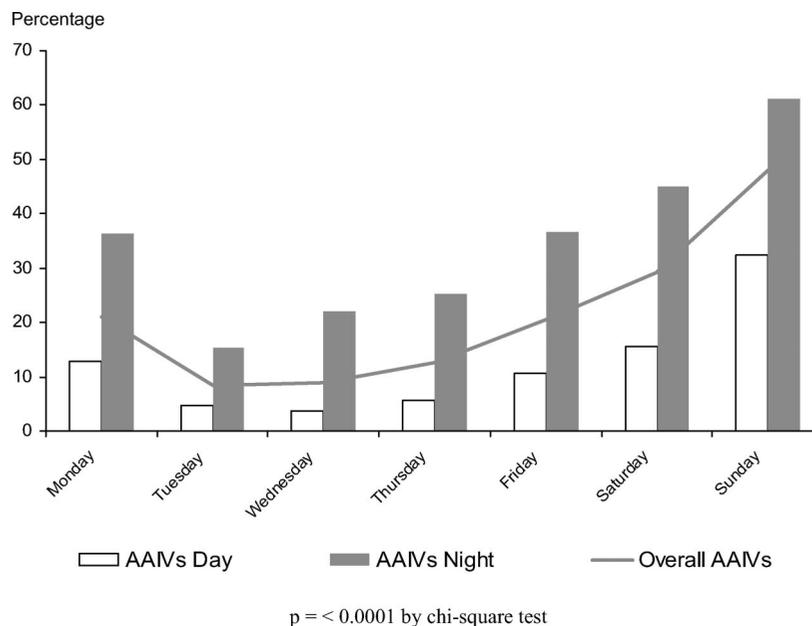


Figure 1. Distribution of AAIVs to ED by day of week, Pasto, 2006.

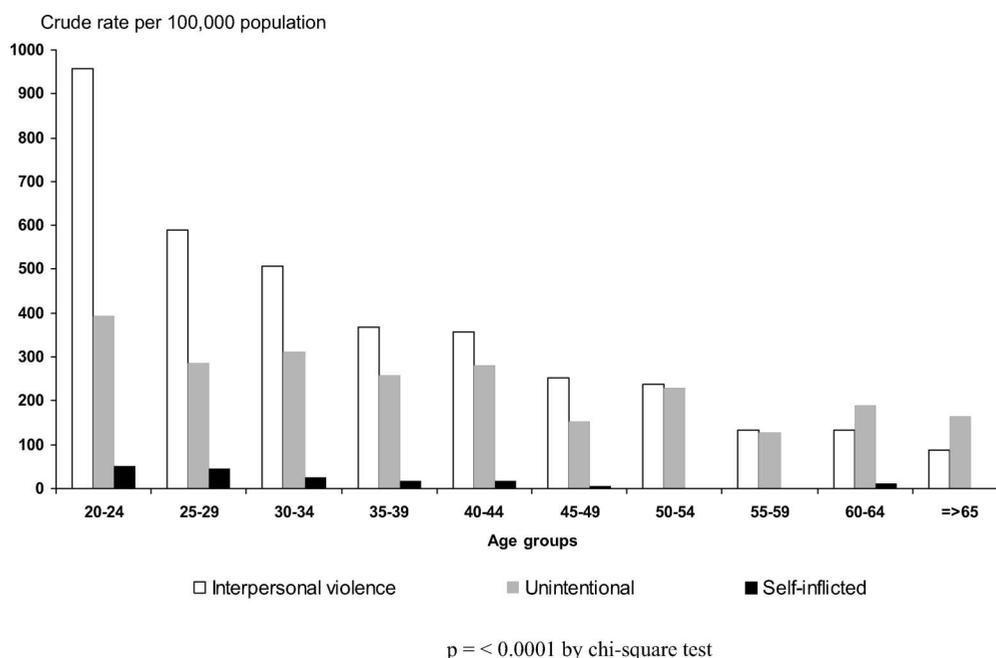


Figure 2. Rates of AAIVs to ED by age and intention, Pasto, 2006.

alcohol variable. The current study covered a full year of injury visits to all EDs in Pasto and had alcohol data for more than 90% of the records from a surveillance system. Therefore, this estimate is less subject to selection bias than previous studies.

Earlier studies show that elevated BACs among trauma patients are associated with a 2.6-fold increase in trauma-related infections (Gentilello et al., 1993) and that alcohol-associated ED visits are associated

with an increase in Injury Severity Scores of 30% (Waller, Hill, Maio, et al., 2003). In the current study, multivariate analyses showed that AAIVs were associated with a 40% increase in hospitalisation.

This study has limitations. The alcohol relatedness of the visit was determined by clinical observation of signs of the breath and behaviour of the patient. In a study by Gentilello et al. (1999), physicians who used clinical observation failed to identify 23% of acutely

Table 1. Per cent AAIVs to ED by intention and sex, Pasto, 2006.

Intention/sex/alcohol	Male		Female		Overall	
	Alcohol+, (n = 1963)	Alcohol-, (n = 4141)	Alcohol+, (n = 241)	Alcohol-, (n = 2686)	Alcohol+, (n = 2204)	Alcohol-, (n = 6827)
Interpersonal violence	63.0 (1236)	16.1 (665)	52.3 (126)	13.1 (351)	61.8 (1362)	14.9 (1016)
Unintentional injuries	33.9 (665)	82.9 (3433)	37.3 (90)	84.8 (2278)	34.3 (755)	83.7 (5711)
Self-inflicted	2.5 (50)	1.0 (41)	10.0 (24)	1.9 (51)	3.4 (74)	1.3 (92)
Other/undetermined	0.6 (12)	0.05 (2)	0.4 (1)	0.2 (6)	0.6 (13)	0.1 (8)

$p < 0.0001$ chi-square test.

The values are represented as per cent (number).

Thirty cases are missing in this table.

intoxicated patients, and patients with negative BACs were more likely to be falsely suspected of intoxication or alcohol dependence if they were either young, male, perceived as disheveled, uninsured or having a low income. A similar bias may have affected our results, particularly those regarding young males and weekend ED visits. However, the goal in this study was to ascertain alcohol use only, not intoxication or alcohol dependence. Because information about when alcohol was consumed in relation to the times of the injury and ED visit was not available, for some patients the time between alcohol consumption and the ED visit may have been long enough for the clinical signs of alcohol use to disappear. This could have led to an underestimate of alcohol-associated visits, a limitation shared with studies that used BAC and breathalyser measures. One option for future studies would be to use a validated self-report method such as the AUDIT (World Health Organization, 2005). Another option is verbal self-report of alcohol consumption prior to the injury event, shown reliable in an international study (Cherpitel et al., 2007) across contexts and countries. Either method would not only provide better surveillance data, but could also help initiate appropriate treatment, perhaps a brief intervention.

These findings have important public health implications. Given the large percentage of AAIVs that occur in Pasto on weekends and nights, a programme similar to the Cardiff model (Violent Crime Task Group, Cardiff Community Safety Partnership, 2007) seems warranted: identifying and monitoring establishments associated with alcohol-related injury incidents; redeploying police to hot spots at night and implementing SBI and increasing support and referral for ED patients injured in domestic violence. Several years after implementation, Cardiff EDs experienced a 40% reduction in visits related to alcohol and violence. In Diadema, Brazil, limiting hours during which beverage alcohol could be sold led to a statistically significant decrease in homicides (Dualibi et al., 2007). The WHO provides additional

prevention measures (World Health Organization, 2005).

In Pasto city government and representatives from the health, police, legal, transportation and education sectors have already implemented interventions such as check points for drunk drivers and increased control of underage patrons in bars (Observatorio del Delito: Boletín Informativo de la Alcaldía de Pasto). If these interventions were supplemented by the successful strategies implemented in Cardiff, dramatic decreases in AAIVs might be realised.

In conclusion, the injuries and violence associated with excessive alcohol consumption pose an important but preventable problem. This study demonstrates that AAIVs to EDs in Pasto, Colombia cluster on and near the weekend, particularly weekend nights and are associated with higher rates of hospital admission. These results provide local authorities, health care professionals and community groups with basic information that can be used to devise injury control strategies to decrease alcohol-related cost and harm.

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