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A REVIEW OF EMERGENCY ROOM STUDIES ON ALCOHOL AND INJURIES CONDUCTED IN LATIN AMERICAN AND THE CARIBBEAN REGION:

A REVIEW ON ALCOHOL AND INJURIES

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Abstract

Issues—Alcohol-attributable burden of injury is one of the most serious public health problems in Latin America and the Caribbean region (LAC). Although knowledge on alcohol's involvement in injuries has progressed along with the implementation of evidenced-based alcohol policies in developed countries, this was not true for the most part of LAC countries for which reducing alcohol-related injuries is an urgent necessity.

Approach—A systematic review was performed in order to identify the most up-to-date information on alcohol and injuries derived from emergency room (ER) studies conducted in LAC.

Key Findings—Findings corroborate that alcohol has a high prevalence among injured patients in the ER setting in LAC, with violence-related injuries showing an increased association with alcohol use compared to unintentional injuries. However, a large number of studies did not include all types of injury and the measurement of injury risk associated with alcohol consumption. The amount of alcohol consumed in the event and hazardous drinking patterns seem to be strongly associated with injury occurrence, as well as drinking in public spaces, but a paucity of data relating to social-contextual factors limits the interpretation of the heterogeneity in the magnitude of the association of alcohol and injuries found across studies.

Conclusions—There is a lack of ER studies able to support strategies to reduce alcohol-related injuries in a region where effective alcohol policies are scant. Future research should focus on understanding how drinking influenced by local contexts and drinking behaviors may affect the risk of injury within each LAC country.

Keywords

Alcohol; Emergency Room; Injuries; Latin America; Review

Background

Alcohol use is estimated to cause approximately 4% of all deaths globally, constituting the major risk factor for the burden of disease in the region of the Americas, especially in low- to middle-income countries in Latin America and the Caribbean region (LAC - which includes Mexico, Central and South American countries). Unintentional and intentional injuries are strongly associated with alcohol consumption and represent nearly half of all alcohol-attributable deaths worldwide [1].

Injuries are also responsible for innumerable hospitalizations and emergency department visits, which produce an enormous social and financial cost for the whole society. For instance, it is estimated that for every youth homicide there are around 20-40 victims of non-fatal youth violence requiring medical treatment [2]. Additionally, there is evidence that acute alcohol intoxication prior to injury significantly reduces the likelihood of a positive outcome following medical treatment [3].

The consumption of alcohol in LAC countries is one of the highest and most hazardous to health in the world, with an estimated one death every two minutes attributed to alcohol [4]. While the differential detrimental impact of alcohol use in this region is recognized and explained by a complex myriad of social-economic factors (e.g. high rates of irregular heavy drinking and lack of adoption of effective evidence-based alcohol policies) [5], there is still a need for more research aiming to explore the influence of these factors on the association between alcohol and injuries. Noteworthy, while LAC suffered 17.4% of the global burden of disease due to alcohol in 2001, only 2.53% of the world's alcohol-related research (measured as the number of publications during 2000-2003) originated from this region [6].

A great number of studies have already substantiated alcohol's association with injury occurrence, but much of the individual-level data have originated from emergency room (ER) studies. To date there are two major reviews of ER studies on alcohol and injuries conducted internationally [7,8]. These reviews indicated that injured patients attended in ERs are more likely to report alcohol consumption prior to the event compared to non-injured, with the risk of injury related to drinking higher for violence-related injuries than for unintentional injuries [8].

However, neither of these reviews were able to include the entire literature on this topic developed in LAC, where injuries as a consequence of the harmful use of alcohol are a leading public health burden. Moreover, the magnitude of this association has considerable variation across studies conducted in different ERs and regions, which may be explained in part by social-cultural contextual variables related to both alcohol use and injury occurrence that have not been fully investigated [9].

Thus, relatively little is known about alcohol use by ER patients in LAC countries. Such information is needed since it is likely to reflect the variation in the patterns of alcohol consumption and cultural aspects related to drinking within each country [10], with great potential to enhance knowledge about the primary factors that influence alcohol-related injuries and affect the risk of injury.

The objective of the present paper is to report a systematic review of ER studies on the association between alcohol and injuries conducted in LAC. The review focused on three main aims which may contribute to improvement of current evaluations and strategies to prevent alcohol-related injuries in this region:

- Identify the study designs and sampling procedures applied, as well as the measures used to determine alcohol's involvement in injuries at the time of the ER visit.

- Summarize the findings on prevalence estimates for alcohol use among ER injured patients in different populations.
- Examine the role of social-contextual factors and other related variables in the association between alcohol and injuries.

Methods

A systematic review was conducted to identify the relevant literature on ER studies in which injured patients were investigated during the ER visit about alcohol use prior to injury. A search of the English-literature on PubMed, Web of Science and the Scientific Electronic Library Online (SciELO) was performed for articles published between 1995 and 2011. The key search terms were selected based on the main descriptors of the topic, and then included in the final search function as follows: (emergency room OR emergency department OR accident OR emergency) AND (alcohol OR drinking) AND (injuries).

An additional search using these same key descriptors translated to Portuguese and Spanish was also conducted on SciELO, which is an electronic database dedicated to improve the access to research published in scientific journals from developing countries, particularly LAC countries. A search for studies on the reference lists of relevant articles and reviews was also carried out, and experts were consulted about ongoing research on the topic.

The original articles (not including brief reports, editorials, meeting communications or reviews) based on research conducted in LAC were selected and reviewed thoroughly. Reviews were checked regarding references, but their results were not included because they did not provide specific results for LAC countries. Only those reports on ER patients sustaining an injury and in which alcohol use before the injury event was measured at the time of the ER visit were included in this review.

Articles which did not report measurement of alcohol consumption or used only intoxicated patients as subjects were excluded. In addition, in order to avoid the inclusion of different reports using the same sample, and therefore containing the same estimates for alcohol use, only the earliest published article meeting criteria was included.

Studies included in the final review were separated according to the country where the data collection was carried out and types of injury, with those covering all injury types distinguished from those restricted to specific types and causes of injury.

Results

Sites and procedures of ER studies on alcohol and injuries

The search using the three electronic databases resulted in a total of 59 original articles derived from LAC. Considering the exclusion criteria previously established, only 32 articles were considered acceptable for inclusion in the review, as depicted in Figure 1.

The selected studies were based on data collected in 8 different countries, with more than two-thirds of the articles derived from Brazil and Mexico (15 and 7, respectively). Most of the articles were published in English (n=13), followed by Spanish (n=10) and Portuguese (n=9) languages. Three studies included in this review contained information from more than one country, thus their data were extracted and analyzed separately for each country of interest [9,11,12].

Table 1 describes the studies in which ER patients presenting all types of injury were sampled (n=15), whereas Table 2 contains the studies restricted to samples of patients

sustaining specific types of injury (n=17). Three-quarters of all studies reported data from probability samples of ER patients (i.e. all times of day and days of week are equally represented during the study period), with the rest using a non-probabilistic or convenience sample of those attending the ER.

The majority of the selected studies have used a cross-sectional design, with only two reporting a case-control design where general population samples were used as control groups [13,14]. Additionally, two other studies have included questions in a cross-sectional questionnaire to enable the conduct of the case-crossover analysis, in which the patient is used as his or her own control so as to compare drinking prior to the event with drinking in a pre-determined time period (e.g. the same time one week prior to injury) [11,12].

Assessment of alcohol consumed in the event

A variety of measures were used for estimating alcohol consumption before injury among patients at the ER. Self-reported questions about drinking were the most used measure in LAC studies, followed by blood alcohol concentration (BAC) estimates by breath-test or chemical analysis of blood. Some studies used both self-report and breath-test measures to estimate alcohol presence at the time of the injury event, while others were based on clinical assessment solely (e.g. perception of alcohol breath) or in combination with patient's report of alcohol use preceding the injury event.

Less than half of all studies restricted the patient sample to those arriving at the ER within 6 hours of the injury event (n=12), a strategy used by all the studies conducted in the World Health Organization (WHO) Collaborative Study on Alcohol and Injuries [11], aiming to control the time lag between the last drink and arrival at the ER, since large differences between BAC and self-report estimates can be found when the time of the injury and time of arrival at the ER are not considered [15].

Among the studies that covered all injury types, prevalence estimates for alcohol use prior to injury derived from self-report ranged from 12.8 to 29.2% (mean average of 19.6%), whereas estimates derived from BAC ranged from 11 to 21.3% (mean average of 16.4%) when breath samples were obtained, and from 10 to 32% (mean average of 25.7%) when blood specimens were analyzed.

When only studies with probability samples of patients admitted within 6 hours of an injury and covering all types of injury were taken into account, the differences observed for prevalence estimates according to the measure used for assessing alcohol revealed that self-report usually provided a higher estimate for alcohol's presence than breath-test, a difference that was found to be as high as 14 percentage points (mean average difference of 5.4%).

Regarding studies that only sampled patients sustaining specific types and causes of injury, those which included violence-related injuries generally presented higher prevalence estimates for alcohol use (varying from 29.6 to 51.2%, with a mean average of 41%) than those covering unintentional injuries (7 to 32.8%, with a mean average of 19.4%), regardless of the measure used to estimate alcohol use.

Amount of alcohol consumed in the event

In general, there is supportive evidence for a dose-response relationship between increased amounts of alcohol consumed and the risk of injury, which increases even with low levels of drinking [11], showing a higher increase for violence-related injuries than unintentional injuries at higher levels of consumption [12].

Assessment of socio-cultural factors

Few studies were able to analyze the influence of contextual variables on the association between alcohol and injuries in LAC. Although some articles that were not included in the present analysis have investigated the level of risk at which drinking patterns and amounts of alcohol consumed place the individual for injury [16,17], as well as the involvement of alcohol in different types, causes and location context of injuries [18], these studies were primarily based on merged data sets from multiple countries rather than individual data for specific countries.

For instance, Cherpitel *et al.* (2005) [9] was the only study reported that provided information at the patient-level on drinking patterns and contextual variables for LAC countries taking into consideration particular societal drinking characteristics of each country. The results suggested that countries with higher detrimental drinking patterns and greater acceptance towards heavy alcohol consumption were more likely to have increased rates of alcohol-related injuries.

In addition, some studies revealed that violence-related injuries had a greater likelihood of occurring in streets and public spaces, whereas self-inflicted injuries were more frequent in residences and private contexts [19,20].

Alcohol abuse and dependence

The assessment of abuse and/or dependence symptoms was also reported by some studies evaluated in this review, with prevalence rates varying from 6.3% in Pachuca, Mexico [21], based on the CIDI (*Composite International Diagnostic Interview*) criteria for alcohol use disorders [22], to 42.4% in Uberlandia, Brazil [23], based on CAGE (*The Cut-down, Annoyed, Guilt, Eye-opener*) criteria for alcohol dependence symptoms [24]. However, a variety of measures were used to estimate these prevalence rates, and the vast majority of the studies did not investigate the impact of alcohol use disorders on injury risk, with only a few reporting that patients diagnosed with alcohol dependence seem more prone to be involved in violence-related injuries than injuries from other causes [13,23].

There is also some controversy regarding alcohol use disorders and the risk of being injured, since non-dependent individuals have been found to be at higher risk of injury than dependent or heavy drinkers [11], which may be related to a greater short-term risk imposed to those who only occasionally drink heavily.

Use of other substances

The prevalence estimates for use of other substances varied from 10.3 to 30.6% among injured patients. Most of these studies estimated the use of other substances using immunoassays rapid tests on urine samples, which do not give information on the amount of drug consumed or recency of consumption; however, cannabis and cocaine were the drugs most prevalent.

Discussion

The present systematic review revealed that studies on alcohol and injuries in the ER setting conducted over nearly two decades in LAC were scarce, especially when quality criteria regarding sampling procedures and the ability of these studies to explore relevant social-contextual variables were taken into account. However, based on the current data available alcohol is associated with a substantial fraction of injuries in LAC, which corroborates the burden of alcohol-related injuries as an issue of great concern for this region.

While the latest WHO Global Status Report on Alcohol and Health (2011) [1] compiled information on alcohol consumption prevalence estimates for a total of 34 LAC countries, we were able to review data from ER studies conducted in only 8 different countries in the same region. Considering the great diversity of drinking behaviors and alcohol policies among these countries, our results underscore the necessity of local research to support evidenced-based strategies to reduce harmful use of alcohol in LAC.

Research focused on the use of alcohol by ER patients shows potential to guide measures targeting harmful drinking both at the societal and individual-level. Nevertheless, future studies with this aim should be concerned with using more strict parameters for design and sampling methods, prioritizing the implementation of probability samples of patients and the inclusion of all types of injury. Moreover, whenever resources are available, the use of control groups or appropriate designs that allow the analysis of risk of injury related to alcohol consumption should also be addressed.

The studies reported here provided a wide range of prevalence estimates for alcohol use prior to injury, which was mainly due to the differing measures which were used and to socio-demographic and cultural differences related to drinking between the populations studied (e.g. age, gender, level of urbanization, trauma center status, among others). Previous studies have already demonstrated the cross-national validity of the patient's self-reported drinking prior to injury compared to BAC estimated from breath analysis, which in turn may not include a significant fraction of those patients who reported drinking, but provides estimates that are highly correlated with chemical analysis of blood [8,25].

Data from earlier reviews confirm that BAC estimates provide a lower prevalence of positive cases for alcohol presence in injuries than self-report [7,8], a difference that may vary across countries and cultures where the studies are conducted.

This difference may be explained by the fact that the alcohol consumed prior to injury may have already been metabolized by the time the BAC was estimated. In fact, a substantial proportion of those reporting some drinking before injury show a zero BAC in ER studies [25], which suggests that the time interval between last drink and the BAC measurement should be measured.

Considering the differences that can be obtained according to the measure selected to estimate alcohol's involvement in injuries, future investigations should include the use of both self-report and BAC estimates [25], allowing researchers to explore measurement errors or other biases while facilitating comparisons between studies.

The results presented here confirmed that violence-related compared to non-violent injuries show the highest alcohol involvement. Nonetheless, it should be noted that the vast majority of studies reporting unintentional injuries were concentrated on traffic injuries, with other types and causes of injury being usually neglected (e.g. falls, burns, and poisonings). Samples sizes for other types of injuries have not been large enough to enable more detailed analysis, even though they significantly impact the burden of injuries, especially among children under 18 years of age, for whom both alcohol consumption and injuries are an increasing public health problem [1,26].

It also remains to be seen whether gender differences in drinking practices within a country can influence the rate of alcohol-related injuries, especially those resulting from a violent event. The gender gap regarding negative consequences related to drinking seems to be greater in LAC than Western European countries [27], a factor that might be important in the interpretation of the alcohol's role in the differential risk of injury between men and women (e.g. risk of partner aggression).

Few studies have included samples of injured patients attended in ERs in which contextual variables related to human factors, rather than those at the country level, were analyzed. Indeed, no study has assessed the effects of different types of alcoholic beverages consumed on the risk of injury. There are important differences between drinkers of beer and spirits, with the first being more likely to be involved in traffic accidents and the latter to manifest aggressive behavior, whereas consumers preferring wine tend to present less alcohol-related problems [28].

If the type of alcohol consumed is associated with the risk of injury, which may vary according to specific patterns of consumption and injury type depending on the region studied, future research aimed to collect such data would be important in the formulation of alcohol public policies, particularly in LAC where restrictive alcohol measures are scant [29]. Additionally, the setting in which alcohol is consumed appears to be related to the type of injury incurred; for example, the greater likelihood of ER patients who drink in a public setting sustaining violence-related injuries [19,20], and highlights the relevance of contextual variables in implementing preventive strategies against harmful alcohol use.

Similarly, little is known about the risks of injury associated with drinking patterns in LAC. As observed in this review, there is evidence that even low levels of drinking can increase the risk of injury, but it is still unknown if specific drinking patterns (e.g. binge or heavy episodic drinking) are more important than the amount of alcohol consumed in influencing the risk of injury. Gruenewald *et al.* (1996) [30], using self-report data on drink-driving from the general population in the United States, found that a higher risk of injury was associated with individuals who consumed large amounts of alcohol occasionally, suggesting that a pattern of binge drinking may be more related to injury than the volume of alcohol consumed.

Data on drinking patterns and risk of injury derived from ER studies may positively influence current strategies that have proved to be effective in reducing harmful alcohol-related consequences worldwide, and have potential to effect the same change in LAC; for example, brief interventions delivered at the ER setting [29], which have been found to provide a unique opportunity to reach heavy drinkers who can benefit from brief counseling or referral to treatment [31].

Although the relationship between alcohol and injuries in LAC countries might differ considerably from developed countries where more studies on this issue have been completed, particularly regarding socio-cultural factors, very few research-derived strategies have been implemented in order to guide future alcohol policies in LAC. In this sense, it seems reasonable to improve the knowledge on cultural aspects of drinking in LAC countries, thus helping advance the implementation of well-established alcohol strategies in the region.

It is also important to note that some studies reported estimates of the use of other substances, which were generally lower compared with those found by Vitale and van de Mheen (2006) [32] in a review of 11 international ER studies on illicit drug use and injuries conducted for the most part in high-income countries, with prevalence rates ranging from 35-40%. Although this is plausible considering that the use of illicit drugs are generally higher in developed countries [33] (primarily cannabis and cocaine which were the substances most prevalent in the studies reported here), data on the risk of injury related to other drug use alone or in combination with alcohol is insufficient, and is a subject that should be targeted in future studies, including the analysis of the quantity of drug used and its impact on the risk of injury.

Advantages and limitations

In this study, a literature search was performed using three different databases, including two of the major international bibliographic databases, and one source covering publications from LAC scientific journals, which permitted a broader search for articles published in languages other than English.

However, there are a few limitations to this study that deserve consideration. We could have applied stricter inclusion criteria for this review, such as those used by Cherpitel (2007) [8] based only on studies that reported data from probability samples of ER patients and covering all injury types or violence-related injuries, but this would have dramatically reduced the number of articles, and made impossible an examination of the demonstrated weaknesses in LAC studies, which suggests future directions for improvement of further research on this issue.

Furthermore, it was not possible to make inferences regarding the differences in prevalence estimates for alcohol use and related disorders across the different LAC countries reviewed here, due to the fact that these studies meeting criteria comprised only a small number of countries from this region and presented significant methodological differences which did not allow generalizing the results beyond the ER in which the data were collected. Finally, biases present in these ER studies that can affect the selection of patients into the study, such as different models of emergency service delivery, non-response rates, and severity of injury, were not evaluated because most of the studies did not provide information on these characteristics.

Implications for the future

This is the first review reported in the literature on the association of alcohol and injuries based on ER studies conducted in LAC countries. The results presented here confirmed that alcohol is an important risk factor for injuries in this region, but also revealed that the current studies are limited by a dearth of information regarding relevant factors that influence the risk of injury associated with alcohol consumption. Future research efforts should be focused on better sampling and design methods, attempting to control for the various biases inherent in ER studies, and in exploring the role of social-contextual variables and drinking behaviors on the risk of injury, thus strengthening evidence-based alcohol policies in LAC. The challenge for improvement of current strategies to reduce alcohol-attributable burden of injury might be achieved by a greater collaboration between developed and developing countries towards enhanced studies aiming to understand better the cultural aspects of drinking within each LAC country and other regions alike.

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Figure 1. Flow chart showing search strategy and number of articles identified during the review process.

Table 1

ER studies covering all injury types among patients from LAC countries.

Country	Study	Locale	Length of data collection (year)	Age	Population and type of injury	Sampling Method	Alcohol Consumption Measure	Injury % positive on measure (n)
Argentina	Alderete and Bianchini (2008) [34]	1 ER in Jujuy Province	4 days (2006)	14	All patients presenting injuries	Non-probabilistic	Blood	10 (493)
	Cherpitel <i>et al.</i> (2005) [9]	1 ER in Mar Del Plata	7 months (2001) 3 months (2001)	18	All patients within 6 hours of an injury event	Probabilistic *	Self-report/Breath	28/14 (230) 22/15 (452)
Brazil	Mascarenhas <i>et al.</i> (2009) [35]	63 ERs in 26 states and the Federal District	60 days (2006-07)	All	All patients presenting injuries	Probabilistic	Clinical signs and/or self report	11 (106,075)
	Freitas <i>et al.</i> (2008) [23]	1 ER in Uberlandia	7 months (2004)	18	All patients presenting injuries	Probabilistic	Blood	31.8 (85)
	Marchese <i>et al.</i> (2008) [36]	1 ER in Alta Floresta	3 months (2006)	18	All patients presenting injuries	Probabilistic	Clinical signs and/or self report	12 (409)
	Borges <i>et al.</i> (2006) [11]	1 ER in Sao Paulo	3 months (2001)	18	All patients within 6 hours of an injury event	Probabilistic	Self-report	12.8 (491)
Colombia	Reis <i>et al.</i> (2006) [37]	1 ER in Sao Paulo	3 months (2001)	18	All patients within 6 hours of an injury event	Probabilistic	Self-report/Breath	13.4/11 (353)
	Gazal-Carvalho <i>et al.</i> (2002) [38]	1 ER in Sao Paulo	1 year (1998-99)	15	All patients within 6 hours of an injury event	Probabilistic	Blood	28.9 (464)
	Espitia-Hardeman <i>et al.</i> (2010) [39]	16 ERs in Pasto	1 year (2006)	18	All patients presenting injuries	Probabilistic	Clinical signs	21.6 (9,601)
	Castro <i>et al.</i> (2006) [40]	1 ER in Cali	26 months (2003-05)	All	All patients presenting injuries	Non-probabilistic	Self-report	14.4 (5,236)
Jamaica	McDonald <i>et al.</i> (1999) [41]	1 ER in Mona	3 months (year not specified)	16	All patients presenting injuries	Non-probabilistic	Blood	32 (111)
Mexico	Borges <i>et al.</i> (2006) [11]	1 ER in Mexico City	2 months (2002)	18	All patients within 6 hours of an injury event	Probabilistic	Self-report	17.2 (454)
	Borges <i>et al.</i> (2003) [42]	1 ER in Mexico City	2 months (2002)	18	All patients presenting injuries	Probabilistic	Self-report/Breath	17.4 (703)/15.5 (452)
	Borges <i>et al.</i> (2003) [21]	8 ERs in Mexico City 3 ERs in Acapulco 1 ER in Tlalpan	1 week (1986) 5 weeks (1987) 6.5 weeks (2002)	All	All patients within 6 hours of an injury event	Probabilistic	Self-report/Breath	27.5/21.3 (1,620) 29.2/21.2 (343) 17.4/15.5 (705)
Venezuela	Borges <i>et al.</i> (1999) [43]	3 ERs in Pachuca	4 months (1996-97)	18	All patients within 6 hours of an injury event	Probabilistic	Self-report/Breath	15.8/17.7 (756)
	Pinero-De Fuentes <i>et al.</i> (1998) [44]	1 ER in Valencia	1 week (1995)	All	All patients presenting injuries	Non-probabilistic	Clinical signs and/or self report	8.1 (148)

* Samples of patients were equally represented during all shifts of the day and days of the week.

Table 2
ER studies restricted to specific types and causes of injury among patients from LAC countries.

Country	Study	Locale	Length of data collection (year)	Age	Population and type of injury	Sampling Method	Alcohol Consumption Measure	Injury % positive on measure (n)
Argentina	Borges <i>et al.</i> (2008) [12]	1 ER in Mar Del Plata	3 months (2001)	18	Patients within 6 hours of a violence-related injury event	Probabilistic *	Self-report	48.1 (56)
	Breitenbach <i>et al.</i> (2011) [45]	2 ERs in Porto Alegre	2 months (2008)	18	Motorcycle drivers injured in traffic accidents	Probabilistic	Self-report/Breath	26.2/7 (361)
Brazil	Caixeta <i>et al.</i> (2010) [46]	1 ER in Goiania	1 year (2005-06)	15-24	Injured patients from traffic accidents	Probabilistic	Self-report (alcohol and/or other drugs)	14.3 (301)
	Leles <i>et al.</i> (2010) [47]	1 ER in Goiania	16 months (2003-04)	All	Patients with maxillofacial trauma	Non-probabilistic	Self-report	44.6 (530)
	Arruda <i>et al.</i> (2009) [48]	1 ER in city of Sao Paulo	19 months (2005-07)	All	Patients within 6 hours of an injury event that resulted in an open fracture	Non-probabilistic	Self-report	12.9 (342)
	Gawryszewski <i>et al.</i> (2008) [19]	62 ERs in 26 states and the Federal District	1 month (2006)	All	Patients presenting violence-related injury	Probabilistic	Clinical signs and/or self report	42.7 (4,345)
	Santos <i>et al.</i> (2008) [49]	1 ER in Teresina	5 months (2006)	All	Injured patients from traffic accidents involving motorcycles	Probabilistic	Self-report	32.8 (430)
Chile	Borges <i>et al.</i> (2008) [12]	1 ER in Sao Paulo	3 months (2001)	18	Patients within 6 hours of a violence-related injury event	Probabilistic	Self-report	36 (50)
	Ladeira and Barreto (2008) [50]	3 ERs in Belo Horizonte	1 month (2003)	All	Injured patients from traffic accidents	Probabilistic	Self-report	15.6 (1,525)
	Faria <i>et al.</i> (2008) [51]	1 ER in Uberlandia	1 year (2002)	18	Patients with traumatic brain injury	Non-probabilistic	Blood	39.3 (84)
	Liberatti <i>et al.</i> (2003) [52]	1 ER in Londrina	1 year (1998)	All	Injured patients from traffic accidents involving motorcycles	Probabilistic	Clinical signs	14.2 (1,561)
Chile	Liberatti <i>et al.</i> (2001) [53]	1 ER in Londrina	6 months (1997) 6 months (1998)	All	Injured patients from traffic accidents	Non-probabilistic	Clinical signs	20.2 (1,274) 16 (1,090)
	Trucco <i>et al.</i> (1998) [54]	1 ER in Santiago	9 months (1996-97)	16	Patients within 6 hours of a work-related injury event	Non-probabilistic	Blood	29.4 (248)
Cuba	Rodriguez and Fernandez (2004) [55]	1 ER in Santiago de Cuba	15 months (1998-99)	15	Patients with maxillofacial trauma from cycling accidents	Probabilistic	Clinical signs	29.4 (194)
Mexico	Borges <i>et al.</i> (2008) [12]	1 ER in Mexico City	2 months (2002)	18	Patients within 6 hours of a violence-related injury event	Probabilistic	Self-report	51.2 (82)
	Hidalgo-Solorzano Edel	3 ERs in Cuernavaca	3 months (2001)	All	Patients within 6 hours of a an injury event occurred in a	Probabilistic	Self-report	21.8 (435)

Country	Study	Locale	Length of data collection (year)	Age	Population and type of injury	Sampling Method	Alcohol Consumption Measure	Injury % positive on measure (n)
	<i>et al.</i> (2005) [56]				public setting			
	Borges <i>et al.</i> (2004) [13]	3 ERs in Pachuca	4 months (1996-97)	18	Patients within 6 hours of a violence-related injury event	Probabilistic	Self-report	38.5 (127)
	Hijar <i>et al.</i> (2002) [20]	4 ERs in Mexico City	3 months (1998)	All	Patients presenting violence-related injury	Probabilistic	Self-report	29.6 (560)
	Casanova <i>et al.</i> (2001) [14]	3 ERs in Pachuca	4 months (1996-97)	18	Patients within 6 hours of a traffic-related injury event	Probabilistic	Self-report/Breath	14.6/13.4 (112)

* Samples of patients were equally represented during all shifts of the day and days of the week