

# A systematic review of alcohol use and sexual risk-taking in Latin America

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## Suggested citation

Vagenas P, Lama JR, Ludford KT, Gonzales P, Sanchez J, Altice FL. A systematic review of alcohol use and sexual risk-taking in Latin America. *Rev Panam Salud Publica*. 2013;34(4):267-74.

## ABSTRACT

**Objective.** To provide an account of published literature on the association between alcohol use and sexual risk-taking, focusing on Latin America.

**Methods.** A search of MEDLINE, Embase, Web of Science, LILACS, and Cochrane databases identified 561 unique articles. After excluding those that were not directly relevant, 30 studies were retained for review.

**Results.** Twenty-seven studies showed direct or indirect associations between alcohol abuse and unprotected/risky sex. Three studies, however, showed no association between these variables, suggesting that the public health message of safer sex may have been effective.

**Conclusions.** Further research is needed to identify factors and behaviors that could be modified to reduce the association between alcohol use disorders and risky sexual behavior.

## Key words

Alcoholic intoxication; alcohol-related disorders; alcoholism; sexual behavior; unsafe sex; HIV; sexually transmitted diseases; Latin America; South America.

Alcoholic beverages have been consumed for centuries and, in one form or another, are intricately linked to local culture in many parts of the world. Alcohol is a central nervous system depressant and its consumption leads to euphoria, relaxation, and disinhibition. For that reason, its use can lead to symptoms of psychological and physical dependence and result in development of alcohol use disorders (AUDs) ranging from heavy drinking to alcoholism. The long-term consequences of AUDs can have dire effects on physical health, the

most severe of which include liver failure and cancers. In addition to the physical effects, AUDs can lead to social and behavioral changes, such as violence, aggressiveness, and extensive risk-taking. AUDs have also been shown to negatively affect adherence to medications, including antiretroviral therapy (ART), thereby exacerbating the complications from HIV infection (1).

Sexual disinhibition has been shown to be among the behavioral consequences of alcohol consumption (2). Sexual risk-taking includes engaging in unprotected sex, having high numbers of sexual partners, and engaging in sex work and other situations where the risk for contracting sexually transmitted infections (STIs), including HIV, increases. STIs, especially when undetected for an extended period, can have severe

consequences, including pain, sterility, organ failure, and death. Detection of STIs is easy in resource-rich settings where diagnostic facilities are readily available, but more difficult in low- and middle-income countries (LMICs), especially for STIs such as herpes simplex virus (HSV), human papillomavirus (HPV), and syphilis, which remain asymptomatic for years. Once detected, treating STIs is usually easy and leads to complete recovery; however, some STIs are incurable, such as HIV/AIDS and chronic viral infections, and require lifetime medical treatment. Moreover, the presence of STIs may facilitate HIV transmission. While ART can control viral replication in HIV, it must be taken daily for the rest of the patient's life, and the cost of the regimen is prohibitive for many of the world's most affected pop-

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ulations. Therefore, behavioral and/or medical interventions that reduce sexual risk-taking can have a significant impact on the health of those who need it most.

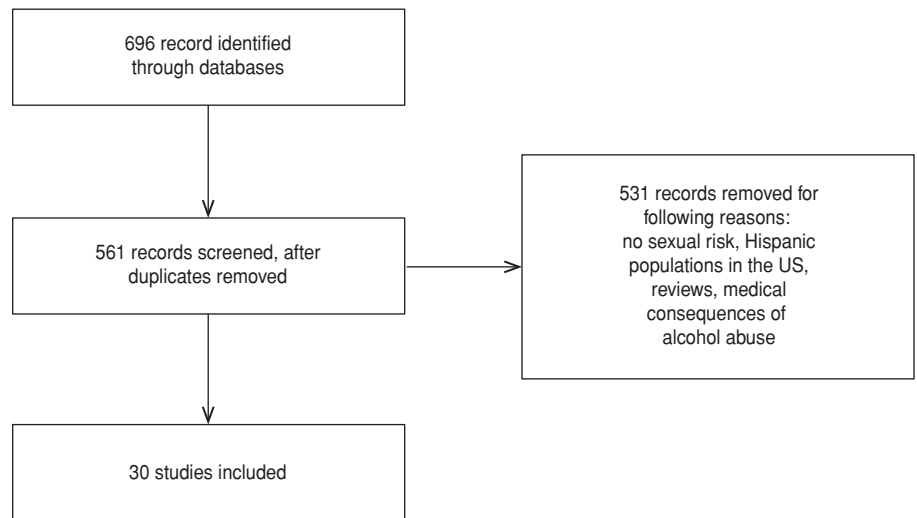
Latin America, defined herein as the countries of South America, Central America, and Mexico, comprises LMICs with a relatively low HIV prevalence (3). Nevertheless, in many of these countries, rampant concentrated epidemics are observed in vulnerable populations, such as men who have sex with men (MSM) and sexual and racial minorities. Alcohol use and abuse is a major concern in several countries in the region, including Brazil, Mexico, and Peru, and some data indicate that AUDs contribute considerably to sexual HIV risk-taking (4, 5), as well as a lack of awareness of HIV infection (6).

While a number of studies have examined the effect of alcohol use on sexual risk-taking in Latin America, to the best of the current authors' knowledge, no other systematic review has comprehensively examined and interpreted the data to better inform researchers planning behavioral and/or medical interventions in these countries. The aim of this review is to examine the association between alcohol use and sexual risk-taking in Latin America by compiling and analyzing all published work in this field.

## MATERIALS AND METHODS

This review followed the systematic review methodology previously published as part of the PRISMA<sup>3</sup> guidelines (7). Literature searches were conducted in November 2012. The MEDLINE database (1948 to present) was searched using the OvidSP platform (Ovid, New York, USA). Three groups of Medical Subject Headings (MeSH)<sup>4</sup> were used and combined in the final search. The group for alcohol contained the following terms: *alcoholism*, *alcohol abuse*, *alcohol drinking*, and *alcohol intoxication*. The group for geographic location contained the search term '*explode*' *South America* (to capture data from all South American countries) plus *Latin America* and *Mexico* (island countries/territories in the Caribbean were not included in the analysis). The group for sexual risk-taking included *unsafe sex*, *safe sex*, *sexual partners*, *sexual*

**FIGURE 1. Results of search for literature on the association between alcohol use and sexual risk, Latin America, 2012<sup>a</sup>**



<sup>a</sup> Based on the PRISMA flowchart for systematic reviews (7).

*behavior*, *HIV infections*, *acquired immunodeficiency syndrome (AIDS)*, *sexually transmitted infections*, *HIV*, *HIV-1*, *condoms*, and *risk-taking*. Only articles written in English, Spanish, or Portuguese, about studies conducted in humans, were considered. The same search terms, adapted for syntax, were used in Scopus (which contains the Embase database) and in Web of Science, LILACS, and Cochrane Library databases.

Figure 1 shows the results of the literature search based on the PRISMA flowchart for systematic reviews. Briefly, the initial search, after eliminating duplicates, yielded 561 articles. Two of the authors of this review (PV and KTL) examined all of the articles to eliminate those that did not fit the search criteria in all three groups (e.g., studies that addressed alcohol use and sexual risk-taking but were conducted among Hispanic populations in the United States or Europe, and those that discussed AUDs within the context of driving, violence, or criminal activity versus sexual risk or unsafe sex). Where there was discordance about whether or not to eliminate an article from the review, a third author (FLA) broke the tie. Following this elimination process, 30 articles remained and were included in the review.

## RESULTS

Table 1 lists the 30 studies selected for review, the definition used for problem-

atic alcohol consumption, and the outcomes relating to sexual risk-taking. The definition of alcohol use varied greatly between studies, with only five of the studies reviewed (16.7%) using internationally validated instruments such as the AUDIT<sup>5</sup> (8) or CAGE<sup>6</sup> (9) screening instruments. Most studies used their own criteria to define what they perceived as problematic drinking (e.g., five or more drinks within a two-hour period (10)). Outcomes were also defined in multiple ways. While some articles used quantitative measures, such as odds ratios, others only indicated percentages of drinkers versus non-drinkers with a similar indication of unsafe sexual practices.

Fourteen of the 30 articles that were reviewed directly associated alcohol use with unprotected sex. A number of studies reviewed were conducted in Brazil, South America's largest country. A study among male sex workers (MSWs), a group previously identified as consuming considerable quantities of alcohol (11), showed a significant association between inconsistent condom use and higher AUDIT scores (12). A study in

<sup>5</sup> Alcohol Use Disorders Identification Test developed by the World Health Organization (WHO).

<sup>6</sup> Alcoholism screening instrument containing the following questions: "Have you ever felt you needed to Cut down on your drinking?" "Have people Annoyed you by criticizing your drinking?" "Have you ever felt Guilty about drinking?" and "Have you ever felt you needed a drink first thing in the morning (Eye-opener) to steady your nerves or to get rid of a hangover?"

<sup>3</sup> Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

<sup>4</sup> Vocabulary thesaurus of the U.S. National Library of Medicine.

adolescents associated inconsistent condom use with being under the influence of alcohol (13). Two studies among Brazilian urban residents found significant associations between “regular” alcohol use and unprotected sex; this association was even stronger in younger males (14, 15). A study among STI clinic clients showed that non-alcoholic men were significantly more likely to use alcohol before risky sex than women, but among alcoholics, there was no difference between men and women, who were equally likely to engage in risky sex (16). Brazilian adolescents were shown to be approximately threefold more likely to engage in unprotected sex if they were moderate or heavy drinkers compared to those who abstain from alcohol use (10). Brazilian women were significantly more likely to acquire a STI following heavy alcohol consumption compared to those who did not consume more than five drinks on one occasion (17). Three qualitative studies in Brazil, one conducted among truck drivers and commercial sex workers (CSWs), another in adolescents, and the third in adult travelers, suggested that alcohol consumption leads to unprotected sex and vulnerability for HIV infection (18–20). Two studies in Peru found a high prevalence of AUDs, and associations between alcohol consumption and unprotected sex (21, 22). A study among shantytown dwellers in Lima indicated that sex-related alcohol expectancies (SRAEs) were significantly associated with unprotected sex (22). Another study among travelers to Cuzco, Peru, indicated that inebriated subjects were tenfold more likely to engage in “any” sexual activity, compared to those that reported no inebriation, and 36-fold more likely to be under the influence of alcohol before any sex (21). One study found that only 16% of respondents failed to use condoms, but there was no significant association between alcohol consumption and unprotected sex. However, the same study did show that inebriated women were more likely than men not to use condoms. Although this study mainly interviewed foreign travelers, 40% of participants reported sexual relations with locals and/or local sex workers. Another study conducted in Mexico found that more than 60% of participants with one or more symptoms of alcohol abuse did not use condoms during their last sexual encounter (23). Finally, a study in secondary school stu-

dents in Colombia found a significant association between alcohol use and risky sexual behaviors (24).

A total of 13 of the 30 articles reviewed provided indirect links between alcohol abuse and sexual risk (i.e., the studies they described did not provide direct associations between alcohol abuse and unprotected sex but contained implied associations). A study among university students in Brazil found that 14% of participants had an AUD, and almost half of all participants (48.7%) did not use condoms during their last sexual encounter (25). A study of Mexican female sex workers (FSWs) and their clients showed that both were more likely to be drunk than not during sex; unprotected sex was also found to occur more often under these circumstances. The reason for the risky sexual behavior provided by the subjects in this study, however, was lack of condoms, not the use of alcohol (26), implying some element of cognitive dissonance. Two studies in Colombia and Peru associated alcohol dependence or hazardous drinking with positive SRAEs and sexual disinhibition (27, 28). Another study in Peru found that heavy drinkers were threefold more likely than infrequent drinkers to engage in high-risk sexual activities, such as sex with casual partners, MSM, or sex workers (29). A study of Brazilian adolescent females found that those who drank regularly over a 12-month period were fourfold more likely to become pregnant (30), an indicator of unsafe sex. A similar study in Mexico found that 22% of women drank weekly; those with multiple partners were sixfold more likely to acquire HPV, another indicator of unsafe sexual practices (31). A study among Brazilian adolescents found an association between alcohol use and having an STI (32). In a multi-country study of FSWs, immigrant FSWs in Uruguay were found to be twice as likely as native FSWs to use alcohol regularly; unprotected sex in this study was included as a covariate and significant in the multivariate model (33). Two studies of adolescents in Colombia and Mexico showed that they were more likely than not to use alcohol before sex (34, 35), and a high percentage of those asked (> 77% in the Mexican study) reported engaging in unprotected sex (35). In the Colombian study, the mean number of partners reported was 2, and only 22% used condoms (34). A study of FSWs in

Guyana showed that the vast majority of those interviewed (88%) used alcohol regularly and did not use condoms with regular partners (72%), and some (35%) did not use condoms with clients (36). A case-control study among HIV-infected patients showed that they were twofold more likely than HIV-negative patients to be “alcoholic” (37).

Finally, three of the 30 studies reviewed found no association between alcohol abuse and risky sexual behaviors. A study among female adolescents in Brazil found no association between alcohol use and HIV infection, but showed that more than 70% of participants had used alcohol in the past 30 days (38). A study of Venezuelan FSWs showed high levels of condom use with clients (80%), and low alcohol use (12%), and did not identify any HIV-infected FSWs (39). Similarly, a study of Argentine MSWs found a relatively low prevalence of unsafe sexual practices (e.g., only 9.7% of sexual encounters were unprotected anal insertive sex, and there was no unprotected anal receptive sex) and a very moderate level of drinking (57% drank weekly, and 3% drank daily) (40).

## DISCUSSION

This is the first systematic review to examine the association between alcohol use and sexual risk-taking in Latin American countries. While the subject of alcohol and sexual risk has been studied extensively, to the best of the authors’ knowledge no previous systematic reviews have focused specifically on Latin America—a place where alcohol, as the evidence above indicates, is associated with high-risk sexual behaviors that can contribute to STI risk and an expanding HIV epidemic. Like many other cultures around the world, Latin American culture is intricately interwoven with drinking practices. Most countries in the region produce their own liquors and beers, and drinking is highly prevalent among most age groups. Recent work in Peru has shown that AUDs defined using international screening criteria are highly prevalent and seem to be one of the primary factors fueling STI transmission and the HIV epidemic (5). Therefore, a review of available peer-reviewed literature is timely and serves to highlight an area that merits more focused research in the future, especially where the HIV epidemic is still concentrated

**TABLE 1. Studies selected for literature review of data on alcohol use and risky sexual behavior, including definition(s) used for problematic alcohol consumption and outcomes relating to sexual risk-taking, Latin America, 1999–2012**

Study/ year published	Study site and population	n	Alcohol abuse definition	Sexual risk definition	Outcome	Limitations
(23) 2012	Adolescents in Mexico	1 238	DSM-IV alcohol abuse and dependence symptoms and frequency of alcohol use	Unprotected sex; number of sexual partners	61.9% of participants with 3 or more symptoms of alcohol abuse or dependence did not use a condom at last sexual encounter; 66.7% of those with 1–2 symptoms did not use a condom	No statistics for this measure
(25) 2012	Young adults in Rio Grande do Sul, Brazil	351	AUDIT <sup>a</sup> (0–7 points, low risk; 8–15, risky; 16–19, harmful; 20+, dependence)	Unprotected sex; number of sexual partners	48.7% of students did not use condom at last sexual encounter; 10.5% had 3–10 sexual partners in last 12 months; 14% reported problematic alcohol use.	No statistics for this measure
(21) 2011	Adolescent and adult travelers to Cusco, Peru, and their partners	1 295	Inebriation; self-reported	Unprotected sex	Inebriated (vs. non-inebriated) more likely to engage in sexual activity (odds ratio (OR) 10.6 [5.4–20.6]) and to be under the influence before sex (OR 36.1 [3.9–331.1]) No significant association between condom use and inebriation (OR 0.5 [0.1–2.6]) Women: inebriated, more likely than men not to use condoms (OR 6.4 [1.2–33.5])	Mostly foreign tourists, but sex with locals reported
(26) 2011	Adult clients of FSWs <sup>b</sup> who work in bars, Mexico	211	Binge drinking (≥ 5 drinks at a time), being drunk during sex with FSWs, FSWs drunk during sex; self-reported	Unprotected sex; sex with FSWs	Drunk during sex with FSW (OR 3.12 [1.54–6.30]) FSW drunk during sex (OR 3.24 [1.43–7.45]) Unprotected sex due to lack of condoms (OR 1.92 [1.03–3.59])	Did not directly associate being drunk with risky sex
(12) 2011	Adult MSWs <sup>c</sup> in Santo André, Brazil	86	AUDIT (mean scores)	Inconsistent condom use ("not always" vs. "always" or "never")	Men with inconsistent condom use have significantly higher ( $P = 0.02$ ) AUDIT scores vs. men with consistent condom use	
(24) 2010	Secondary school students in Colombia	3 575	Lifetime alcohol use	Pattern of risky behavior for reproductive and sexual health (PRBRSH); sum of 2+ risky sexual practices (inconsistent condom use; sexual intercourse after alcohol consumption; sexual intercourse after illegal drugs consumption; or sexual intercourse with a casual partner) over lifetime	Lifetime alcohol use was associated (OR 2.5 [1.3–5.1]) with PRBRSH; 18.4% reported sexual intercourse following alcohol consumption	
(38) 2010	Female adolescents in Porto Alegre, Brazil	388	Any alcohol use in last 30 days	Unprotected sex; sex for money; sex with IDU; sex for drugs; HIV infection	No significant association between alcohol and HIV infection (OR 0.71 [0.27–1.19])	Talks about alcohol use in general
(28) 2009	Adult residents of Bucaramanga, Colombia	1 199	Arbitrary categories, based on CAGE <sup>d</sup> and CP-alcohol tests <sup>e</sup>	Increased sexual desire	Subjects with positive expectations on alcohol and sexuality are more likely to be in category C (dependent) (OR 1.6 [1–2.5]). Those with positive expectations related to disinhibition and feelings of power are more likely to be in category C (OR 2.2 [1.1–4.3])	Did not directly associate alcohol abuse with risky sex
(29) 2009	Young adult (18–30) residents of a shantytown in Lima, Peru	793	Heavy episodic drinking (HED) (≥ 5 drinks in a row, at least 1 x / month)	Unprotected sex; sex with a casual partner; sex with sex worker; male homosexual sex; STI <sup>g</sup> symptom	HED associated with sex with casual partner, sex worker, or MSM <sup>f</sup> under the influence of alcohol (adjusted OR (AOR) 3.1 [1.4–6.8])	
(27) 2009	Young adult (18–30) residents of a shantytown in Lima, Peru	793	AUDIT (0–7, not hazardous; 8+, hazardous)	Sex-related alcohol expectancies (SRAEs)	Men with 1 or 2 SRAEs more likely to be hazardous drinkers (AOR 2.3 [1.4–3.8]) Men with 3 or more SRAEs more likely to be hazardous drinkers (AOR 3.9 [2.1–7.3]) No associations in women	Did not directly associate alcohol abuse with risky sex

(Continues)



**TABLE 1. Continued**

Study / year published	Study site and population	n	Alcohol abuse definition	Sexual risk definition	Outcome	Limitations
(13) 2009	Adolescents in Minas Gerais, Brazil	5 981	Alcohol use: "never," "experienced/no longer use," "sometimes/always"	Unprotected sex	Males were less likely to use condoms consistently if under the influence of alcohol. Consistent condom use was less frequent among those that used alcohol compared to those who did not drink (60.7% vs. 71.1%).	
(22) 2008	Young adult (18–30) male residents of a shantytown in Lima, Peru	312	HED (> 5 drinks in a row, at least 1x / month)	Number of partners; sex with casual partner; sex with sex worker; unprotected sex; SRAEs	HED related to multiple partners (AOR 3.1, <i>P</i> < 0.05) SRAEs related to unprotected sex last encounter (AOR 1.24, <i>P</i> < 0.01) and unprotected sex with casual partner (AOR 1.33, <i>P</i> < 0.05)	
(37) 2008	Adult residents of Lima, Peru	396	Latin American Alcoholism Test	HIV infection	HIV positive are more likely to be alcoholics (AOR 2.47 [1.56–3.93])	Did not directly associate alcohol abuse with risky sex
(30) 2008	Pregnant adolescents in Piracicaba, Brazil	220	Weekly drinking	Pregnancy	Weekly intake of alcohol over 12 months associated with becoming pregnant (OR 4.2 [1.7–10.3])	
(14) 2008	Adult urban area residents in Brazil	5 040	> 4x / week	Unprotected sex	Regular alcohol (or drug) use leads to less frequent condom use ( <i>P</i> = 0.012 for those in stable relationships; <i>P</i> = 0.007 for males 16–24 years old with casual partners)	
(15) 2008	Adults in Brazil	5 040	Regular alcohol use	Unprotected sex	18% used alcohol regularly; 8.2% did not use condom because they were under the influence of alcohol	
(33) 2008	Immigrant and native adult FSWs in Argentina, Bolivia, Ecuador, and Uruguay	1 845	Any use of alcohol	Unprotected sex; history of STIs (including HIV infection)	Use of alcohol is significantly associated with immigrant (vs. native) FSWs in Uruguay (AOR 2.25 [1.05–4.83]; no association in Argentina, Bolivia, or Ecuador (unprotected sex included in multivariate model)	Did not directly associate alcohol abuse with risky sex
(20) 2007	Adult tourists in São Paulo State, Brazil	77	Any use of alcohol	Unprotected sex	Qualitative interview transcripts suggesting alcohol increases vulnerability to HIV through unsafe sex	Qualitative
(19) 2006	Adult truck drivers and FSWs in Itajaí, Brazil	43	Daily / weekly use	Unprotected sex	Majority of truckers (67%) and FSWs (62%) used alcohol at least weekly; all engaged in risky sexual behavior (unprotected sex with FSWs and truck-stop employees)	No quantitative measures
(16) 2006	STI clinic clients in Bahia, Brazil	625	CAGE	Unprotected sex; STIs	Non-alcoholic men significantly more likely ( <i>P</i> = 0.009) to use alcohol before risky sex vs. women; no difference among alcoholic men and women	
(39) 2006	Adult FSWs in Isla Margarita, Venezuela	613	> 1x / day	Unprotected sex; STIs (including HIV)	Low alcohol abuse (12%), high condom use (80%) with clients, 0% HIV-infected	No statistics
(17) 2004	Adolescent and adult women in Rio de Janeiro, Brazil	200	> 5x / one occasion	Unprotected sex; STIs; number of partners; sex work	Alcohol consumption significantly associated with STIs ( <i>P</i> = 0.03)	
(18) 2004	Adolescents in Salvador, Brazil	76	Any use of alcohol	Condom use	Adolescents believe alcohol is associated with unprotected sex	Qualitative
(32) 2004	Adolescents in Rio de Janeiro, Brazil	356	≥ 6x / previous month	Unprotected sex; STIs	Significant ( <i>P</i> < 0.05) association with having STI	
(40) 2003	Adult MSWs in Córdoba, Argentina	31	5-point scale from "never" to "daily"	Unprotected sex	Alcohol (53.3% weekly, 3% daily) and unsafe sex practices (9.7% insertive anal sex without condom, 0% receptive anal sex without condom)	Did not directly associate alcohol abuse with risky sex

(Continues)

TABLE 1. Continued

Study / year published	Study site and population	n	Alcohol abuse definition	Sexual risk definition	Outcome	Limitations
(10) 2003	Adolescents in São Paulo, Brazil	1 808	HED ( $\geq 5$ drinks in 2 hours)	Unprotected sex	In public school students: unprotected sex more likely in drinkers (AOR 2.98 [1.22–7.27]) and heavy episodic drinkers (AOR 3.69 [1.49–9.12]) vs. abstainers	
(35) 2003	Adolescent hotel employees in Puerto Vallarta, Mexico	288	Any alcohol use prior to intercourse	Unprotected sex	41% drank alcohol before intercourse; 77.3% engaged in unsafe sex; alcohol drinking by peers and hotel guests associated with alcohol drinking by subjects (peers OR 2.52 [1.23–5.2], guests OR 2.60 [1.11–6.11])	Did not directly associate alcohol abuse with risky sex
(31) 2002	Adolescents and young adults in Morelos, Mexico	194	Weekly	Human papillomavirus (HPV) infection	High alcohol consumption (men 75%, women 83%). Women with 2 or more partners during year, more likely to get HPV (OR 6 [1.7–21.1])	Did not directly associate alcohol abuse with risky sex
(34) 1999	Adolescents in Cali, Colombia	230	Any alcohol use prior to intercourse	Condom use; number of partners	14% used alcohol prior to intercourse; age associated with higher alcohol use (AOR 3.6 [1.49–8.44])	Did not directly associate alcohol abuse with risky sex
(36) 1999	Adult FSWs in Guyana	124	Any alcohol use	Unprotected sex	88% reported regular alcohol consumption while looking for clients; 72% never used condoms with regular sex partners; 35% never used condoms with clients	Did not directly associate alcohol abuse with risky sex

<sup>a</sup> Alcohol Use Disorders Identification Test developed by the World Health Organization.

<sup>b</sup> FSWs: female sex workers.

<sup>c</sup> MSWs: male sex workers.

<sup>d</sup> CAGE: alcoholism screening instrument containing the following questions: "Have you ever felt you needed to Cut down on your drinking?" "Have you ever felt Guilty about drinking?" and "Have you ever felt you needed a drink first thing in the morning (Eye-opener) to steady your nerves or to get rid of a hangover?"

<sup>e</sup> Alcohol screening instrument for identifying problematic consumption (*consumo problemático*, CP) (41).

<sup>f</sup> MSM: men who have sex with men.

<sup>g</sup> STI: sexually transmitted infection.

but there is growing evidence of a generalizing epidemic.

The vast majority of studies reviewed here were cross-sectional. The lack of prospective longitudinal studies and randomized controlled trials serves as additional evidence that AUDs and their correlation to risky sexual behaviors have been understudied in this locale. Most of these studies were problematic because of the diverse definitions used within them for alcohol use and/or internationally recognized screening tools. The majority of them showed significant associations between "some" level of alcohol consumption (versus none) and sexual risk-taking, both directly and indirectly. Most studies did not clearly distinguish alcohol abuse, alcohol dependence, or binge drinking from what could be perceived as social drinking within the Latin American context. Codifying the level of alcohol consumption is important because the effectiveness of certain interventions differs depending on the severity of alcohol consumption. Therefore, there remains a need for scientific standardization among researchers' methods. The WHO AUDIT questionnaire (8) is currently considered one of the most useful tools in assessing drinking patterns because it not only defines alcohol dependence but also distinguishes among lower levels of AUDs, defined as "hazardous" or "harmful" drinking. Future studies assessing alcohol consumption should make use of these types of internationally standardized and validated tools, when possible.

A similar issue identified in this review was the use of non-standardized definitions for risky sexual behavior. Most articles (22, or 73%) clearly defined this term as unprotected sex (i.e., sex without a condom), but some (8, or 27%) used more indirect definitions of risky sex (e.g., "has STI infection"), most likely because their primary aims were to assess other factors, such as pregnancy (30) or acquisition of a specific STI (17). Moreover, statistical associations between alcohol consumption and unsafe sex were not performed by all studies, making it harder to draw quantitative conclusions. Future studies would benefit by including more numerical data and appropriate statistical tests.

The study that examined alcohol and sexual risk among foreign tourists in Peru, in which 40% reported engaging in sexual activity with locals (21), illustrates

how globalization and the vastly increased movement of people affect global health and potential HIV transmission. Areas or regions with low incidence of certain diseases may not have fully developed programs to protect their populations from exposure to those diseases. For example, the “safe sex” message may not have spread as much in low-HIV prevalence areas such as the countries of Latin America compared to higher-prevalence areas such as sub-Saharan Africa and Southeast Asia. Visitors originating from the latter areas (or tourists that have previously been to those areas) may unwittingly contribute to the rapid spread of these diseases.

Only three (10%) of studies reviewed here found either no association between alcohol consumption and unsafe sex or a very low prevalence of such risky behaviors (38–40). In some cases, this may be because the associations were not specific enough. For example, looking at general

alcohol consumption and unlikely events such as HIV infection is unlikely to show statistically significant associations (38). In other cases, the results from these three studies versus the other 27 studies reviewed may lead to speculation that behavior modification interventions such as public health campaigns about safe sex have worked in certain locales, although without previous data from the same areas for comparison it is impossible to make an informed conclusion.

### Limitations

Although this study provides the first systematic review examining the association of alcohol consumption and risky sex, it had important limitations. First, the use of MeSH terms for the selection of journal articles in some databases (such as OvidSP) may have introduced selection bias. However, the use of more generic search terms in other databases

(such as LILACS) should have captured any potential “misses” resulting from the use of MeSH terms.

### Conclusion

This systematic review on alcohol consumption and sexual risk in Latin America, the first of its kind, confirms that alcohol can lead to risky sexual behaviors in the region, as has been suggested by the results of studies conducted in other parts of the world. The relatively small number of studies that have examined this issue and the suggestions of high occurrence of alcohol abuse in Latin America suggest that this region is in need of more detailed studies to identify modifiable factors and practices in order to reduce alcohol abuse and dependence, improve sexual health, and reduce the incidence of STIs.

**Conflicts of interest.** None.

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Manuscript received on 9 March 2013. Revised version accepted for publication on 7 October 2013.

## RESUMEN

### Revisión sistemática de la relación entre el consumo de alcohol y la toma de riesgos sexuales en América Latina

**Objetivo.** Proporcionar una descripción de la bibliografía sobre la asociación entre el consumo de alcohol y la toma de riesgos sexuales, con foco en América Latina.

**Métodos.** Una búsqueda en las bases de datos MEDLINE, Embase, Web of Science, LILACS y Cochrane permitió seleccionar 561 artículos singulares. Tras excluir los que no eran pertinentes, se retuvieron 30 estudios para su análisis.

**Resultados.** Veintisiete estudios revelaron asociaciones directas o indirectas entre el consumo excesivo de alcohol y el sexo sin protección o de riesgo. Sin embargo, tres estudios no mostraron ninguna asociación entre estas variables, lo que sugiere que las recomendaciones de salud pública en pro de una actividad sexual de menor riesgo podrían haber sido eficaces.

**Conclusiones.** Se requiere llevar a cabo nuevas investigaciones para establecer los factores y los comportamientos que podrían ser objeto de modificación para reducir la asociación entre los trastornos por consumo de alcohol y el comportamiento sexual de riesgo.

## Palabras clave

Intoxicación alcohólica; trastornos relacionados con alcohol; alcoholismo; conducta sexual; sexo inseguro; VIH; enfermedades de transmisión sexual; América Latina; América del Sur.