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The association of sexual orientation with self-rated health, and cigarette and alcohol use in Mexican adolescents and youths

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ABSTRACT

Evidence of health inequities associated with sexual orientation has been gathered for industrialized countries. The situation for lesbians, gay males, and bisexuals (LGB) from middle- or low-income countries may be worse than those in industrialized nations. Here, we analyze the relationship of sexual orientation with self-rated health and cigarette and alcohol use among a representative sample of Mexican adolescents and youths between the ages of 12 and 29 years, in order to explore whether this association is mediated by discrimination and violence. Three dimensions of sexual orientation (affective attraction, sexual behavior, and identity) were assessed. The outcomes were self-rated health and cigarette and alcohol use. Compared to heterosexuals, LGB youths more frequently smoked ≥6 cigarettes per day, reported having experienced family violence, having crimes perpetrated against them, and having experienced violations of their rights. Among males, gays and bisexuals exhibited a higher risk of poor health than heterosexuals. Compared to heterosexual women, lesbians and bisexual women were more likely to consume alcohol. Many differences in self-rated health and substance use according to sexual orientation were explained by having experienced discrimination and violence. We concluded that lesbian and bisexual females have a higher prevalence of cigarette and alcohol use. It is necessary to develop policies and programs aimed at the reduction of substance abuse among LGB youths (focusing on females who engage in sexual contact with persons of the same gender) and to work against discrimination and violence experienced by LGB people, particularly against non-heterosexual males.

Introduction

Several reports indicate higher rates of alcohol and cigarette use among lesbians, gay males, and bisexuals (LGB) than among their heterosexual counterparts. An explanation for this difference lies in the experiences of prejudice, discrimination, and violence faced by LGB youths which could, lead to stress responses. For example, the rates of physical violence and sexual harassment among LGB youths in Mexico City were 16% and 23% (Ortiz-Hernández, 2006), respectively, whereas the rates among the general population were 7.4% and 5.4% (Medina-Mora et al., 2005). Furthermore, 58% of these LGB youths also reported experiencing verbal abuse.

This violence could yield injury or psychological reactions that manifest as posttraumatic stress disorder. In addition, the violence and discrimination can reaffirm internalized homophobia because LGB youths may blame themselves for the violence they experienced, interpreting it as punishment for their socially unacceptable behavior (Garnets, Herek, & Levy, 1992). Use and abuse of substances could be a (maladaptive) way of coping with the social stress generated by homophobia-related stigma and prejudice because drugs can alleviate emotional distress and enhance one's mood (Sinha, 2001). Social stress can trigger neural and endocrine responses that include chronic activation of the hypothalamic–pituitary–adrenal axis, producing elevated levels of the glucocorticoids associated with symptoms of depression (McEwen, 1998).

In industrialized countries, differences in cigarette and alcohol use among adults of different sexual orientations have been analyzed (Bloomfield, 1993; Burgard, Cochran, & Mays, 2005; Cochran, Keenan, Schober, & Mays, 2000; Cochran & Mays, 2000; Diamant, Wold, Spritzer, & Gelberg, 2000; Drabble, Midanik, & Trocki, 2005; Eisenberg & Wechsler, 2003; Gilman et al., 2001; Gruskin & Gordon, 2006; Gruskin, Hart, Gordon, & Ackerson, 2001; Jorm, Korten, Rodgers, Jacomb, & Christensen, 2002; Mays & Cochran, 2001; Sandfort, Bakker, Schellevis, & Vanwesenbeeck, 2006; Tang et al., 2004; Valanis et al., 2000). To a lesser extent these same data have been gathered in reference to adolescents and

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youths in industrialized nations (Durant, Krowchuk, & Sinal, 1998; Faulkner & Cranston, 1998; Garofalo, Wolf, Kessel, Palfrey, & Durant, 1998; McCabe, Hughes, Bostwick, & Boyd, 2005; Robin et al., 2002; Russell, Driscoll, & Truong, 2002; Ziyadeh et al., 2007). In most of these studies, representative samples of states or countries, including sexual orientation indicators, have been analyzed (Ryan, Wortley, Easton, Pederson, & Greenwood, 2001). This method of data collection overcomes the limitations imposed by the use of convenience samples drawn from the gay community.

In addition to there being limitations to several of these studies, they fail to sufficiently explore some aspects of the relationship between sexual orientation and health. In some studies (Faulkner & Cranston, 1998; Garofalo et al., 1998), gay and bisexual males (GBM) and lesbians and bisexual females (LBF) were included as a single group. Others showed that the relationship between sexual orientation and substance use is stronger in females than in males (Cochran et al., 2000; Cochran & Mays, 2000; Drabble et al., 2005; Eisenberg & Wechsler, 2003; Ford & Jasinski, 2006; Gilman et al., 2001; Gruskin & Gordon, 2006; Mays & Cochran, 2001; Russell et al., 2002). Some studies did not consider gender differences due to their small sample size or because the data solely concerned females (Bloomfield, 1993; Burgard et al., 2005; Diamant et al., 2000; Gruskin et al., 2001; Valanis et al., 2000) or males (Durant et al., 1998).

Other studies focused on high school students (Durant et al., 1998; Faulkner & Cranston, 1998; Garofalo et al., 1998; Robin et al., 2002) or postsecondary students (Eisenberg & Wechsler, 2003; Ford & Jasinski, 2006; McCabe et al., 2005), altogether excluding those not registered in educational institutions. This may imply selection bias, as dropping out of school is higher among LGBs because they encounter problems in educational settings more frequently than do heterosexual youth (Russell, Seif, & Truong, 2001). This could result in the underestimation of differences in substance use according to sexual orientation because LGB school dropouts may encounter prejudice more frequently, making them at higher risk for substance abuse. In other studies, samples from cities or states have been examined (Bloomfield, 1993; Burgard et al., 2005; Diamant et al., 2000; Durant et al., 1998; Faulkner & Cranston, 1998; Garofalo et al., 1998; Gruskin et al., 2001; Gruskin & Gordon, 2006; Jorm et al., 2002; Lock & Steiner, 1999; Robin et al., 2002; Tang et al., 2004) without considering regional differences or town size (e.g., rural vs. urban), therefore their findings are not suitable for generalization on the country level. Some of these studies were carried out in cities or states where there are visible gay communities (e.g., California) or institutional arrangements that promote LGB rights (e.g., Vermont), and these situations could reduce differences among individuals with different sexual orientations. However, these situations are uncommon in most places.

Another drawback is that the majority of studies only included one sexual orientation indicator: identity (i.e., the group to which individuals considered themselves to belong) (Diamant et al., 2000; Garofalo et al., 1998; Gruskin et al., 2001; Gruskin & Gordon, 2006; Jorm et al., 2002; Lock & Steiner, 1999; Mays & Cochran, 2001; Robin et al., 2002; Sandfort et al., 2006; Tang et al., 2004; Ziyadeh et al., 2007) or sexual behavior (i.e., indicated by the gender of the sexual partner) (Burgard et al., 2005; Cochran et al., 2000; Cochran & Mays, 2000; Durant et al., 1998; Eisenberg & Wechsler, 2003; Faulkner & Cranston, 1998; Ford & Jasinski, 2006; Gilman et al., 2001; Valanis et al., 2000). In a few studies, two or more sexual orientation indicators (Drabble et al., 2005; McCabe et al., 2005) or an indicator of affective attraction (McCabe et al., 2005; Russell et al., 2002) were evaluated. Sexual orientation included at least the following two dimensions: the psychological component (including aspects such as erotic attraction, sexual fantasies, affections, and identity) and the behavioral component (which could encompass all forms of sexual encounters) (Sell, 1997). It is important to assess the various facets of sexual orientation because they may be associated differently with health problems.

Due to socioeconomic and cultural differences, negative attitudes toward homosexuality are likely to be more frequent in middle- and low-income countries than in industrialized ones. Therefore, it is foreseeable that health disparities associated with sexual orientation are greater among the former set of nations. In industrialized countries, the proportion of persons who think that homosexuality is never a justifiable behavior is lower than in Latin American nations. Whereas in The Netherlands the rate stands at 7.0%, in Sweden it is 8.4%, in Canada it is 25.3%, and in the U.S. it is 31%. On the other hand, in Chile it is 35.1%, in Mexico it is 48.3%, in Peru it is 55.8%, and in Venezuela it is 61.1% (World Values Survey, 2007). These attitudes correspond to institutional arrangements supporting LGB rights: while same-sex marriage is legal in The Netherlands, Canada, Belgium, Switzerland, England, and the state of Massachusetts in the U.S., few Latin American countries (e.g., Brazil, México and Argentina) have registered same-sex partnerships, and even these do not have rights equal to those of heterosexual couples. In Uruguay and Costa Rica, same-sex couples have the right to health benefits only (IGLHRC, 2007).

The World Health Organization (WHO) defined adolescents as persons aged 10–19 years old, while the term youth refers to individuals between the ages of 10 and 24 years (WHO, 2005). In Mexico, government policy defines youths as inhabitants between 12 and 29 years of age (IMJ & SEP, 2006). In 2005, 32.7% of Mexicans were youths (INEGI, 2005).

In México, there is little information concerning the proportion of individuals with homoerotic desires, and the actual data refer to males only. In Mexico City, 2.1% of adult males reported bisexual behavior during their lifetime and 0.4% reported only male sexual partners (Izazola-Licea, Gortmaker, Tolbert, de Gruttola, & Mann, 2000). A proportion of the subjects maintained same-gender sexual behavior but do not assume a homosexual identity. Among the Mexico City males who were married or living in a consensual heterosexual relationship, 2% reported same-gender sexual behavior at least once in their lifetime (Izazola-Licea et al., 2000).

The rate of alcoholism in a convenience sample of LBFs was higher than the reported data for women in the general population (Ortiz-Hernández & García Torres, 2005); however, there was not a reference group of heterosexual women. To our knowledge, there is no data for cigarette consumption among Mexican LGBs. For these reasons, our objectives were to analyze the relationship between sexual orientation, self-rated health, and cigarette and alcohol use among Mexican youths; to examine whether this association is modified by gender; and to explore the role of discrimination and violence as mediators of such relationships.

Materials and methods

We analyzed the 2005 National Youth Survey (NYS) database (IMJ & SEP, 2006). For sampling, Mexico was divided in five regions and five strata were defined according to town size. In each region, census tracts were selected with size-proportional probability and distributed among the states and strata. In each census tract, a random four-block sample was selected, three households were randomly chosen within each block, and one subject aged 12–29 years was chosen for each household. If there were two or more eligible respondents, the individual whose birthday was closer to the date of the interview was chosen as a study subject. The populations of three cities, eight states, and one county with the highest amount of inhabitants and where the local authorities contributed for field work were over-sampled. At the end of the field work,

12,840 interviews were conducted; after editing the data, the sample was reduced to 12,796 cases. The no-response rate was 15%.

Information was obtained through questionnaires by means of face-to-face interviews. In order to promote the rapport, the interviewers were youths of the same sex as the interviewees. Verbal consent of youths was obtained, and they were isolated from their families to ensure interviewee confidentiality and to improve data quality. The ethical aspects of the NYS were approved by a technical committee of experts from the institutions (UAM, ITESO, COLEF and the Mora Institute) that designed and coordinated the survey.

The questionnaire included three items that served as proxy indicators of sexual orientation: (1) Have you ever fallen in love with someone of your own gender?, (2) Have you ever had sex with someone of your own gender?, and (3) For you, what is your sexual orientation? (options: heterosexual, gay, bisexual, or lesbian). The first question was labeled as sexual orientation according to affective attraction and two groups were formed: subjects with male–female (MF-AA, response = no) and with same-gender affective attraction (SG-AA, response = yes). Individuals responding "I have never fallen in love" and those who did not respond were excluded from the logistic regression analysis. The second question was labeled as sexual orientation according to sexual behavior; respondents who answered "yes" were grouped as subjects with same-gender sexual behavior (SG-SB), respondents who answered "no" were included in the male–female sexual behavior (MF-SB) group, and those who had not had sex were excluded. The last question was classified as sexual orientation based on identity in which two categories were established: heterosexuals and LGBs. Exclusion of subjects who have not fallen in love or not had sexual encounters had been a regular practice (Cochran et al., 2000; Diamant et al., 2000; Drabble et al., 2005; Gilman et al., 2001; Mays & Cochran, 2001; Russell et al., 2002). The Spanish wording of these questions is included in Table 1.

The outcomes of interest included self-rated health and cigarette and alcohol use. Self-rated health was dichotomized as either (a) very good, good, not so good or (b) poor and very poor (hereafter poor health). Three indicators of cigarette use were employed: lifetime cigarette use (Have you ever smoked?); current cigarette use (Do you smoke at the moment?), and smoking ≥6 cigarettes per day (How many cigarettes do you smoke a day?, options: 1; 2–5; 6–10; 11–15, and more than 15 cigarettes). This cut-off is used by the WHO Tobacco Free Initiative (Yach et al., 2002) and can be considered to be a conservative threshold, because even lower tobacco consumption (i.e., one to four cigarettes per day) is associated with higher mortality rates by ischemic heart disease, lung cancer and all causes (Bjartveit & Tverdal, 2005). For alcohol consumption, three variables were analyzed: lifetime alcohol use (Have you ever drunk alcoholic beverages?); current alcohol use (Do you drink any alcoholic beverages at the moment?), and intake of ≥6 drinks per week (How many alcoholic beverages do you drink per week?). The last variable was based on the fact that daily consumption of alcohol is not a common practice in Mexico, but there is abundant (≥5 drinks per sitting at least once a year), although infrequent (once a month/less than once a week) consumption (Medina-Mora, Carreño, & de la Fuente, 1998). In addition, in brief inventories to detect alcohol abuse, ≥6 drinks per occasion is used as the cut-off point because this intake is associated with impairments of function such as slurred speech, unsteadiness, dysarthria, ataxia and loss of consciousness (Saunders, Aasland, Babor, Delafuente, & Grant, 1993).

Three questions that may reflect prejudicial, discriminatory, and violent experiences were analyzed: (1) During the last 12 months, have you been a victim of a crime? (options: no or yes); (2) Is there or has there been violence in your family? (options: no, yes, or yes, to some extent); and (3) From your point of view, have you ever felt that your rights have not been respected because of your sexual orientation? (options: no, yes, or yes, to some extent). For the last two questions, violence was considered present when the responses answered "yes" or "yes, to some extent."

Other variables considered in the analysis were gender, socioeconomic position (assessed by economic problems of the youths' families during their upbringing), and town size (rural, semi-urban, and urban).

Table 1
Original wording of questions in Spanish about sexual orientation use in National Youth Survey and its translation to English.

Indicator of sexual orientation	Spanish	English
Affective attraction	Alguna vez te has enamorado de alguien de tu mismo sexo?	Have you ever fallen in love with someone of your own gender?
	Opciones Nunca me he enamorado Sí No	Options I have never fallen in love Yes No
Sexual behavior	Alguna vez has tenido relaciones sexuales con alguien de tu mismo sexo?	Have you ever had sex with someone of your own gender?
	Opciones Sí No	Options Yes No
Identity	Las personas que prefieren tener relaciones sexuales con alguien del sexo opuesto tienen una orientación heterosexual. Se considera que los hombres que prefieren tener relaciones sexuales con alguien de su mismo sexo tienen una orientación homosexual, mientras que para el caso de las mujeres se considera que son lesbianas. Quienes prefieren tener relaciones sexuales con personas de ambos sexos se considera que son bisexuales. Cuál consideras que es tu orientación sexual?	People who prefer to have sexual encounters with an opposite-gender person have a heterosexual orientation. Men who prefer to have sexual encounters with same-gender person are considered to have gay orientation; in the case of the women they are considered lesbians. Those who prefer sexual encounters with both-gender persons are considered bisexuals. For you, what is your sexual orientation?
	Opciones Heterosexual Homosexual Bisexual Lesbiana	Options Heterosexual Gay Bisexual Lesbian

For the statistical analysis, sampling weights considering oversampling and sample post-stratification were utilized, which resulted in the sample's gender and age distribution being closer to that registered by the 2000 Census. Analysis was performed using the SAS program survey commands, allowing us to take into account the complex design of the NYS (probabilistic, stratified, multistage, and by-clusters sampling). Absolute and relative frequencies of variables were obtained. Differences in discrimination, violent experiences and health outcomes according to sexual orientation were calculated. Then, logistic regression models were estimated; the dependent variables were self-rated health and substance use, and the independent variables were the three sexual orientation indicators. To assess the modifier effect of gender in the logistic regression models the interaction of gender with sexual orientation in the prediction of self-rated health and substance use was assessed. When interaction was statistically significant, the estimations were stratified by gender, otherwise, the total population was used. To evaluate the role of the mediators of prejudice, discrimination and violent experiences on the differences in health status by sexual orientation, the Baron and Kenny (1986) criteria were followed: (1) the exposure must be associated with the event; (2) the exposure must be associated with the mediator; and (3) the effect of the exposure on the event observed in regression models must be attenuated after controlling for the mediator variables. For this reason, mediation was evaluated with regression models only when the first two criteria were fulfilled. Odds ratios with confidence intervals of 95% were estimated. In the analysis, all variables were considered to be categorical.

Results

Most individuals were 15–24 years old, with a nearly equal proportion of males and females, and were classified as follows: 11.6% of youths were SG-AA; 1.6% were LGB, and 1.4% reported SG-SB. More males than females reported SG-AA, SG-SB, and LGB identity. As age increased, the proportions of youths reporting SG-AA, SG-SB, and LGB identity rose as well (Table 2).

Compared to their counterparts, males reporting SG-AA, SG-SB, and gay or bisexual identity experienced family violence, crimes, and violations of their human rights more frequently (Table 3); these differences remained after controlling for demographic variables. Among females the differences were less consistent because, after adjusting for demographic variables, sexual orientation defined by identity was associated with family violence and violated rights only. In addition, risks tended to be higher among GBMs (OR for violated rights = 16.33) than in LBFs (OR = 5.21).

A small number of youths reported suffering poor health (Table 4). One third of the interviewees have smoked during their lifetime, one in five reported current smoking, and 6.7% smoked ≥6 cigarettes per day. Nearly one half of the youths had drunk alcohol, and one third are currently engaged in alcohol consumption. Compared to their counterparts, the youths with SG-AA, LGB identity and SG-SB have higher prevalence rates of almost all outcomes; the exceptions were the prevalence of drinking ≥6 glasses per week was higher in heterosexual than in LGB respondents; the prevalence of poor health was lower in females with lesbian and bisexual identity and with SG-SB than their counterparts; the males with SG-SB had lower rates of current and lifetime cigarette and current alcohol use than heterosexual males.

In the total population (Table 5), those reporting SG-AA had a higher risk of lifetime and current cigarette use, smoking ≥6 cigarettes per day, and lifetime and current alcohol use. Youths who reported being LGB had higher risk of lifetime and current smoking, smoking ≥6 cigarettes per day, and lifetime and current alcohol use. Those with SG-SB exhibited higher risk of smoking ≥6 cigarettes per day and lifetime alcohol use. After adjusting by demographics the following associations remained: affective attraction with current cigarette use, smoking ≥6 cigarettes per day, and lifetime and current alcohol use; identity with lifetime cigarette use, smoking ≥6 cigarettes per day, and lifetime alcohol use; and sexual behavior with smoking ≥6 cigarettes per day, and lifetime

Table 2
Demographics of a national sample of Mexican youth ages 18–29 years, 2005 ($n = 12{,}796$).

Demographics and sexual orientation indicators	All		Sex		Age (years)			
			Males	Females	12–14	15–19	20–24	25–29
	n	%	%	%	%	%	%	%
Sex								
Male	5521	49.0			51.2	48.0	49.5	48.1
Female	7245	51.0			48.8	52.0	50.5	51.9
Age (years)								
12–14	2793	18.7	19.5	17.9				
15–19	4425	30.0	29.4	30.7				
20–24	2900	27.0	27.4	26.7				
25–29	2678	24.3	23.8	24.7				
Lifetime affective attraction								
Did not fall in love	877	6.0	7.0	4.9	7.4	6.3	5.1	5.5
Same-gender ever	1457	11.6	12.9	10.2	7.0	11.4	12.8	13.8
Male–female only	10,338	81.4	79.0	83.7	83.7	81.6	81.6	79.2
Did not answer	124	1.0	1.0	1.1	1.8	0.7	0.5	1.4
Current identity								
Heterosexual	12,302	96.1	95.7	96.4	95.6	97.1	97.7	93.2
Lesbian and gay male	124	0.9	1.3	0.6	0.1	0.6	1.0	1.9
Bisexual	90	0.7	0.9	0.5	0.08	0.4	0.6	1.6
Did not answer	280	2.3	2.1	2.5	4.2	1.8	0.6	3.2
Lifetime sexual behavior								
Did not have sexual relations	7482	50.7	47.7	53.6	98.7	72.6	28.0	12.0
Same-gender ever	178	1.4	1.9	1.1	0.002	0.5	2.0	3.2
Male–female only	4987	46.9	49.9	44.1	0.8	26.5	69.2	83.0
Did not answer	149	0.9	0.5	1.2	0.5	0.4	0.8	1.8

Table 3
Violence and discrimination experiences according to sexual orientation in a national sample of Mexican youth ages 18–29 years, 2005 ($n = 12{,}796$).

Violence and discrimination experiences	SO by lifetime affective attraction[a]				SO by current identity[b]				SO by lifetime sexual behavior[c]			
	Crude		Adjusted		Crude		Adjusted		Crude		Adjusted	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Males												
Family violence	2.04	1.26–3.30	2.04	1.25–3.34	4.18	1.67–10.53	4.57	1.81–11.54	4.48	1.55–12.91	5.56	2.05–15.08
Crime	2.23	1.04–4.75	2.13	1.03–4.38	6.84	1.99–23.52	5.93	1.73–20.30	5.21	1.29–21.07	5.29	1.41–19.87
Violated rights	3.33	1.67–6.63	3.25	1.60–6.58	16.17	5.80–45.09	16.33	5.59–47.67	21.71	7.23–65.17	23.53	7.63–75.58
Females												
Family violence	1.11	0.75–1.63	1.11	0.76–1.64	4.07	1.53–10.84	4.24	1.34–13.43	3.40	1.24–9.33	2.96	0.97–9.02
Crime	1.55	0.76–3.18	1.52	0.74–3.13	4.26	0.65–27.94	3.47	0.56–21.45	2.66	0.47–14.93	2.67	0.46–15.44
Violated rights	1.57	0.90–2.75	1.56	0.89–2.73	5.11	1.74–14.97	5.21	1.79–15.20	3.88	1.31–11.54	2.57	0.98–6.75

Odds ratios (OR) and 95% confidence intervals (95% CI). Adjusted models for age, economic problems and town size.
[a] Exposed (and reference) group was same-gender affective attraction (vs. male–female).
[b] Exposed (and reference) groups were lesbians, gay males, and bisexuals (vs. heterosexuals).
[c] Exposed (and reference) group was same-gender sexual behavior (vs. male–female).

alcohol use. The discrimination and violence indicators explained the following associations: affective attraction with current cigarette and alcohol use; identity with lifetime cigarette use; and sexual behavior with lifetime alcohol use.

Statistically significant interactions between gender and sexual orientation indicators were observed for poor health (with affective attraction and identity) and lifetime and current cigarette use and current alcohol use (with sexual behavior) (Table 5); therefore, in these cases we carried out stratified analysis by gender (Table 6).

A higher risk of having poor health was observed in males with SG-AA in comparison with males with MF-AA (Table 6). Females with SG-SB had higher risks of lifetime and current cigarette use, and current alcohol use.

Discussion

Our main findings of the NYS analysis were the risks of regular smoking and lifetime alcohol use were greater among Mexican youths with SG-AA and LGB identity; the odds of poor self-rated health was higher in males with SG-AA; the risks of current smoking and alcohol use were greater among females with SG-SB; and four out of nine associations of sexual orientations with health outcomes were explained by discrimination and violence indicators.

Non-heterosexual populations and health outcomes

Among non-heterosexual Mexican youths, the affective attraction indicator rendered results different from those of sexual behavior and identity (11.6%, 1.4% and 1.6%, respectively). This discrepancy may reflect the multiple dimensions of sexual orientation; while an important proportion of persons have SG-AA, in the majority of cases this attraction does not translate into a sexual encounter or a socio-erotic identity. The proportion of SG-SB among high school and junior high school students ranged from 6.4% to 8.7% (Durant et al., 1998; Faulkner & Cranston, 1998) and from 1.4% to 6.2% in adults (Burgard et al., 2005; Cochran et al., 2000; Cochran & Mays, 2000; Ford & Jasinski, 2006; Gilman et al., 2001; Michael et al., 1998; Valanis et al., 2000), whereas the frequency of LGB identity among adolescents is from 1.3% to 6.0% (Garofalo et al., 1998; Lock & Steiner, 1999; Robin et al., 2002) and from 1.5% to 4.6% in adults (Diamant et al., 2000; Drabble et al., 2005; Gruskin et al., 2001; Jorm et al., 2002; Mays & Cochran, 2001; Sandfort et al., 2006; Tang et al., 2004). These data suggest that the frequency of non-heterosexuality among Mexican youths, as expressed in sexual behavior and identity indicators, tends to be lower than in industrialized countries. Stronger negative attitudes toward homosexuality that exist in Mexico could inhibit the adoption of LGB identity and reports of same-gender sexual behavior or LGB identity.

Estimates of current cigarette use (20.4%) based on the NYS were similar to those reported for subjects of the same age in the Mexican National Survey of Addictions (21.1%), but the rate of lifetime alcohol use was lower (42.2% vs. 56.8%) (CONADIC & INPRFM, 2002). These differences could be due to the national coverage of the NYS, including both urban and rural localities; in the latter survey, the usage rates were found to be lower.

Inequalities related with sexual orientation

Though there are exceptions (Bloomfield, 1993; Eisenberg & Wechsler, 2003; Russell et al., 2002; Sandfort et al., 2006), most

Table 4
Prevalence of health outcomes according to sexual orientation in a national sample of Mexican youth ages 18–29 years, 2005 ($n = 12{,}796$).

Health outcomes	Total		SO by lifetime affective attraction				SO by current identity				SO by lifetime sexual behavior			
			Males		Females		Males		Females		Males		Females	
	n	%	MF-AA (%)	SG-AA (%)	MF-AA (%)	SG-AA (%)	Het (%)	LGB 9 (%)	Het (%)	LGB (%)	MF-SB (%)	SG-SB (%)	MF-SB (%)	SG-SB (%)
Poor health	121	0.9	0.3	3.5	1.1	1.3	0.6	1.8	1.1	0.0	1.1	1.9	1.3	1.1
Lifetime cigarette use	2997	32.1	42.7	47.2	20.8	29.5	42.8	57.0	22.0	48.4	66.8	54.7	34.9	66.3
Current cigarette use	1783	20.4	29.5	35.6	10.3	17.8	30.0	40.3	11.4	30.9	48.8	48.3	17.2	51.5
≥6 cigarettes per day	510	6.7	9.9	21.8	2.0	3.2	11.2	29.9	2.1	23.9	19.7	36.5	3.2	22.8
Lifetime alcohol use	4229	42.2	51.3	65.3	31.6	38.9	53.0	77.7	32.6	55.9	81.4	87.8	49.3	67.8
Current alcohol use	2602	28.0	39.0	49.4	15.0	19.0	40.8	47.6	15.7	44.0	67.6	55.0	23.7	50.4
≥6 drinks per week	597	5.3	6.5	10.3	3.3	4.5	7.5	7.3	3.4	1.1	10.8	11.0	5.4	8.6

SO, sexual orientation; MF-AA, male–female affective attraction; SG-AA, same-gender affective attraction; Het, heterosexuals; LGB, lesbians, gay males, and bisexuals; MF-SB, male–female sexual behavior; SG-SB, same-gender sexual behavior.

Table 5
Regression models of self-rated health and substance use, having sexual orientation indicators as independent variables in a national sample of Mexican youth ages 18–29 years, 2005.

Health outcomes	Interaction gender × sexual orientation[a]		Crude models		Adjusted models		Mediation models	
	χ^2	p	OR	95% CI	OR	95% CI	OR	95% CI
Lifetime affective attraction[b]								
Poor health	5.09	0.024						
Lifetime cigarette use	0.75	0.387	1.42	1.03–1.96	1.36	0.97–1.90		
Current cigarette use	0.92	0.338	1.58	1.08–2.32	1.51	1.03-2.22	1.41	0.96–2.07
Smoking ≥6 cigarettes/day	0.58	0.447	2.54	1.27–5.08	2.36	1.19–4.68	2.20	1.14–4.24
Lifetime alcohol use	0.86	0.354	1.65	1.23–2.22	1.60	1.20–2.15	1.49	1.11–2.00
Current alcohol use	0.23	0.633	1.54	1.09–2.18	1.46	1.04–2.06	1.38	0.98–1.96
Intake of ≥6 drinks/week	0.14	0.709	1.63	0.94–2.83	1.57	0.90-2.73		
Current identity[c]								
Poor health	216.58	<0.001						
Lifetime cigarette use	0.47	0.492	2.49	1.15–5.36	2.24	1.00–4.97	2.02	0.92–4.42
Current cigarette use	0.68	0.408	2.29	1.00–5.24	2.00	0.84–4.79		
Smoking ≥6 cigarettes/day	1.76	0.184	5.53	2.00–15.31	4.84	3.20–14.07	4.79	1.72–13.35
Lifetime alcohol use	0.18	0.672	3.19	1.62–6.30	2.91	1.54–5.50	2.51	1.29–4.85
Current alcohol use	1.95	0.163	2.23	1.02–4.91	1.91	0.81–4.51		
Intake of ≥6 drinks/week	1.68	0.195	0.95	0.44–2.06	0.84	0.37–1.87		
Lifetime sexual behavior[d]								
Poor health	0.27	0.604	1.31	0.39–4.45	1.32	0.39–4.49		
Lifetime cigarette use	4.58	0.032						
Current cigarette use	3.88	0.049						
Smoking ≥6 cigarettes/day	1.29	0.257	3.48	1.23–9.85	3.46	1.22–9.81	3.55	1.45–8.69
Lifetime alcohol use	0.15	0.694	2.11	1.01–4.41	2.13	1.01–4.49	1.91	0.87–4.18
Current alcohol use	5.01	0.025						
Intake of ≥6 drinks/week	0.47	0.495	1.26	0.61–2.57	1.20	0.55–2.59		

[a] Wald's chi-square of interaction term of sex with sexual orientation. Adjusted models: estimations adjusted by sex, age, economic problems, and town size. Mediation models: adjusted by variables in adjusted model plus family violence, crime, and violated rights. The reference outcomes were very good, good, and not so good; no cigarette use in lifetime; no current cigarette use; smoking ≤5 cigarettes/day; no use of alcohol in lifetime; no current alcohol use, and intake of ≤drinks/week.
[b] Odds ratios (OR) and 95% confidence intervals (95% CI). Exposed (and reference) group was same-gender affective attraction (vs. male–female).
[c] Odds ratios (OR) and 95% confidence intervals (95% CI). Exposed (and reference) groups were lesbians, gay males, and bisexuals (vs. heterosexuals).
[d] Odds ratios (OR) and 95% confidence intervals (95% CI). Exposed (and reference) group was same-gender sexual behavior (vs. male–female).

studies have revealed that LGB youths exhibit higher rates of alcohol use (Faulkner & Cranston, 1998), cigarette use (Jorm et al., 2002), or both (Burgard et al., 2005; Diamant et al., 2000; Durant et al., 1998; Garofalo et al., 1998; Gruskin et al., 2001; Valanis et al., 2000). Mexican youths with LGB identity or SG-AA showed a higher risk of cigarette and alcohol use.

We found that the inequities in health outcomes by sexual orientation among Mexican youths could be the result of differential exposure to discrimination and violence. On one hand, individuals with SG-AA, SG-SB and LGB identity had higher risks of experiencing family violence, crimes and violated rights; however, this difference was more easily observable among males than females. On the other hand, in the general population four out of nine associations between sexual orientation and health outcomes disappeared after controlling for discrimination and violence indicators.

In industrialized countries, the risk (OR, considering LGBs as exposed group) of current cigarette use up to 4.90 have been reported (Diamant et al., 2000; Eisenberg & Wechsler, 2003; Gruskin et al., 2001; Gruskin & Gordon, 2006; McCabe et al., 2005;

Table 6
Stratified analysis by gender of the relationship of sexual orientation with self-rated health and substance use in a national sample of Mexican youth ages 18–29 years, 2005.

Health outcomes	Males						Females			
	Crude models		Adjusted models		Mediation models		Crude models		Adjusted models	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Lifetime affective attraction[a]										
Poor health	11.93	11.79–12.08	12.63	2.34–68.07	14.48	1.43–147.11	1.19	1.17–1.20	1.18	0.38–3.67
Lifetime identity[b]										
Poor health	2.91	2.84–2.98	3.00	0.68–13.29			**		**	
Lifetime sexual behavior[c]										
Lifetime cigarette use	0.60	0.59–0.61	0.62	0.21–1.81			3.67	3.63–3.71	3.34	1.10–10.33
Current cigarette use	0.98	0.97–0.99	1.01	0.34–2.96			5.10	5.05–5.15	4.81	1.69–14.50
Current alcohol use	0.59	0.58–0.59	0.58	0.21–1.61			3.28	3.25–3.31	3.52	1.17–10.70

Odds ratios (OR) and 95% confidence intervals (95% CI) are reported. The reference outcomes were very good, good, and not so good; no use of cigarettes in lifetime; no current cigarette use; and no current alcohol use. Adjusted models: estimations adjusted by sex, age, economic problems, and town size. Mediation models: adjusted by variables in adjusted model plus family violence, crime, and violated rights.
**Not estimable.
[a] Exposed (and reference) group comprised same-gender affective attraction (vs. male–female).
[b] Exposed (and reference) groups comprised lesbians, gay males, and bisexuals (vs. heterosexuals).
[c] Exposed (and reference) group comprised same-gender sexual behavior (vs. male–female).

Tang et al., 2004; Valanis et al., 2000). Valanis et al. (2000) reported a risk of 1.53 of current alcohol use. These risk levels for current cigarette and alcohol use were very similar to those observed in the Mexican sample (the highest levels of risks among women with SG-SB were 4.81 and 3.52, respectively). However, risks for other outcomes were high, but we failed to find studies reporting comparable indicators: 4.84 and 3.46 for smoking ≥6 cigarettes per day among youths with LGB identity and SG-SB, respectively; and 14.48 for poor health among males with SG-AA.

The last set of risks may reflect the lower stigmatization of homosexuality in industrialized countries, where organizations defending LGB rights have attained legislative changes and the implementation of governmental programs aimed to reduce inequalities related sexual orientation (King & Bartlett, 2006).

Although the data from Mexican youths could provide partial evidence that the situation of LGBT people might be worse in a country of middle-income than in those of high-income, it is necessary to consider that some of our estimates are unstable (i.e., wide confidence intervals). In addition, another explanation of high risks of smoking ≥6 cigarettes per day and poor health among males with SG-AA might have arisen from misclassification bias considering that some LGB subjects did not declare their true sexual orientation due to the greater stigmatization of homosexuality in Mexico (ultimately inhibiting sensitive information sharing). Thus, the LGB subjects in the sample of NYS are more likely to be openly homosexual. However, it has been reported that the LGB youths who make their sexual orientation public have lesser probabilities of psychological distress (Frable, Wortman, & Joseph, 1997) which is negatively associated with substance use (Rosario, Hunter, & Gwadz, 1997). Therefore, rather than producing estimates away from the null value this bias would yield estimates closer to the null value.

Differences by gender

Our findings for Mexican youths confirm the modifier role of gender in the relationship between sexual orientation and health (Cochran et al., 2000; Cochran & Mays, 2000; Drabble et al., 2005; Eisenberg & Wechsler, 2003; Ford & Jasinski, 2006; Gilman et al., 2001; Gruskin & Gordon, 2006; Mays & Cochran, 2001; Russell et al., 2002). Whereas the risk of reporting poor health was higher among males with SG-AA, LBF females with SG-SB showed higher risk of cigarette and alcohol use. In another study, GBMs had greater risk of severe depressive disorder and panic attacks than heterosexual males; this difference was not observed among females (Cochran & Mays, 2000). However, no differences were detected when comparing LBFs with heterosexual women in self-rated health (Diamant et al., 2000). In several studies, LBFs were shown to be at a higher risk for heavy alcohol use when compared with heterosexual females (Cochran et al., 2000; Cochran & Mays, 2000; Drabble et al., 2005; Gilman et al., 2001; Gruskin & Gordon, 2006; McCabe et al., 2005) or smoking cigarettes (Eisenberg & Wechsler, 2003). On the other hand, these differences were less clear among males (Drabble et al., 2005; Ziyadeh et al., 2007); were not detected at all (Cochran et al., 2000; Cochran & Mays, 2000; Gilman et al., 2001; Gruskin & Gordon, 2006); or the risk of alcohol use was found to be lower among GBMs (Eisenberg & Wechsler, 2003; McCabe et al., 2005). However, a few studies showed no differences by gender in alcohol (Russell et al., 2002) or cigarette use (Gruskin & Gordon, 2006; McCabe et al., 2005; Tang et al., 2004).

These patterns indicate that LBFs could face the stigma of their sexual orientation differently from GBMs: the former face stress by consuming drugs, the latter express it through negative moods (Cochran & Mays, 2000; Drabble et al., 2005). This argument is supported by the fact that some LBFs adopt masculine traits, while some GBMs exhibit feminine traits (Ortiz-Hernández, 2006). At the same time, masculinity correlates positively with substance use (Lara-Cantú, Medina-Mora, & Gutiérrez, 1990), but negatively with depressive symptoms (Barrett & Raskin, 2002).

The higher alcohol and cigarette use among LBFs might be due to a higher frequency of socialization in bars or to a behavioral response to stress caused by homophobia-related violence and discrimination, and/or by the stigma associated with homosexuality (Aaron et al., 2001; Burgard et al., 2005; Cochran et al., 2000; Drabble et al., 2005; Gilman et al., 2001; Gruskin et al., 2001; Sandfort et al., 2006; Ziyadeh et al., 2007). While there are specialized bars for LBFs in many Mexican cities, there are few bars for heterosexual females. In addition, the consumption of alcohol among women is stigmatized in Mexico. Our results provide litle support for the second explanation because there were no differences in the discrimination and violence indicators among females according to sexual orientation assessed by sexual behavior; therefore, the former indicators cannot be considered as mediators. Although internalized homophobia might explain differences in cigarette and alcohol use (Ortiz-Hernández, 2005), this is hard to prove because heterosexual females cannot experience it. An alternative explanation is that a large proportion of LBFs adopt masculine traits (Ortiz-Hernández, 2006), which are associated with higher cigarette and alcohol use (Lara-Cantú et al., 1990).

Comparison among sexual orientation indicators

With one exception (Eisenberg & Wechsler, 2003), the majority of studies utilizing sexual behavior as a sexual orientation indicator revealed that the individuals with SG-SB had an increased alcohol drinking risk (Cochran et al., 2000; Cochran & Mays, 2000; Faulkner & Cranston, 1998; Gilman et al., 2001) or of both cigarette and alcohol use (Burgard et al., 2005; Durant et al., 1998; Eisenberg & Wechsler, 2003; Valanis et al., 2000). With identity-based sexual orientation indicators, differences have been observed in alcohol use (Drabble et al., 2005; Jorm et al., 2002; Robin et al., 2002), cigarette use (Tang et al., 2004), or both (Diamant et al., 2000; Garofalo et al., 1998; Gruskin et al., 2001; Gruskin & Gordon, 2006). However, these discrepancies in alcohol use were not detected in one study (Lock & Steiner, 1999).

It could be assumed that LGBs defined on the basis of identity might be at greater risk for health problems because they belong to a stigmatized minority, i.e., greater visibility and therefore higher probability of being victims of violence and discrimination (Berrill, 1992). Similarly, individuals with SG-SB might adopt unhealthy behaviors because some may experience conflict as they develop a sexual orientation-based identity (Ford & Jasinski, 2006). Affective attraction is possibly the least associated dimension of sexual orientation with negative health outcomes, because the last do not necessarily imply the adoption of stigmatized lesbian/gay identity and/or same-sex behavior. But it is also possible that the simple experience of homoerotic desire could produce psychological distress due to the homophobic climate.

While the three indicators of sexual orientation were related with health outcomes, we observed associations with affective attraction and identity in the total population, whereas some associations with sexual behavior were observed in females only. McCabe et al. (2005) observed the same trends with all three sexual orientation dimensions (identity, sexual attraction and sexual behavior). More differences were observed in cigarette and alcohol use when using romantic attraction than with romantic relationships (Russell, Franz, & Driscoll, 2001). These trends show that the different dimensions of sexual orientation could have an impact on health; we suggest that these indicators should be assessed in future studies.

Strengths and limitations of our research

A strength of this research lies in that a probabilistic sample of Mexican youths was analyzed allowing the comparison of LGB subjects with heterosexuals; in addition, the results can be applied to the entire youth population in Mexico. To our knowledge, this is the first such report focusing on a middle-income nation. Another virtue is the analysis of indicators of three sexual orientation dimensions.

As with any cross-sectional survey, the NYS does not allow us to know the temporal sequence between exposure, mediators and outcomes. This situation is especially problematic with those indicators that were assessed within the same reference period. In reference to lifetime, several measures of sexual orientation (affective attraction and sexual behavior), outcomes (cigarette and alcohol use) and discrimination and violence indicators (family violence and violated rights) were surveyed.

Unfortunately, the wording of questions about sexual orientation included in the NYS questionnaire did not follow rigorous theoretical principles (Sell, 1997). It has been recommended that sexual orientation be considered as a continuum; therefore, it is more convenient to apply Likert-format scales. In the case of the NYS, responses to questions on sexual orientation were dichotomous. The question of sexual behavior did not allow distinguishing of persons who may have experienced same-sex behavior on occasional situations from those who engage in this on a regular basis; in addition, interviewers did not explain to youths what was understood as a sexual relationship; this could produce an underestimation of same-sex behavior because some individuals would consider a sexual relationship only when there is vaginal or anal intercourse. In NYS, questions on sexual orientation were asked directly, which could produce under-reporting of same-sex behavior and attraction; however, there is evidence (Izazola-Licea et al., 2000) that the prevalence estimates of same-sex behavior in males are not biased by selective survey participation. Another limitation is that only alcohol and cigarette use were measured, which do not reflect the problems of substance abuse and dependence.

Although it was unfortunate that we had no access to the data for the response rate calculations, lower non-response rates are common in surveys from middle- or low-income countries. For example, in the World Health Organization world mental health survey initiative (Wang et al., 2007), the response rate in industrialized countries ranged from 45.9% (France) to 57.8% (Germany). On the other hand, the response rate was 74.8% in Beijing, 76.6% in Mexico, 78.3% in Ukraine and 87.1% in South Africa. The latter figures are consistent with the non-response rate (15%) of the NYS. Finally, there were two problems in the analysis: multiple comparisons were carried out and some estimates were imprecise (i.e., large confidence intervals).

Conclusions

In Mexico, LGBs have a higher risk of smoking $\geq$6 cigarettes per day and current alcohol use. GBMs were more likely to perceive their health as poor, and females with SG-SB were at greater risk for cigarette and alcohol use. Despite its limitations, various results from the NYS analysis are consistent with conclusions drawn in other studies. The higher risk of substance use (especially heavy smoking) among LBFs may result from the adverse treatment that they confront due to the prevailing homophobia in Mexico; nonetheless, it is necessary to explore other possible explanations, such as transgression of gender stereotypes.

Future studies should evaluate the different dimensions of sexual orientation using standardized questionnaires (i.e., Likert format) (Sell, 1997) and techniques that allow access to sensible information (e.g. computer assisted questionnaires). Also, it will be convenient to explore not only substance use, but also abuse and dependence. More research is required to identify motivations and contexts that favor substance use among females with SG-SB, and to know whether there are differences among sexual orientation dimensions regarding their relationship with health outcomes. It is also necessary to develop policies and programs aimed to (1) substance use reduction among LGBs in general, with a special focus on females with SG-SB and (2) work against discrimination and violence experienced by LGB people, especially against non-heterosexual males.

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