Ethnicity and HIV risk behaviour, testing and knowledge in Guatemala

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Published online: 16 May 2014.

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Objectives. To describe levels of risky sexual behaviour, HIV testing and HIV knowledge among men and women in Guatemala by ethnic group and to identify adjusted associations between ethnicity and these outcomes.
Design. Data on 16,205 women aged 15–49 and 6822 men aged 15–59 from the 2008–2009 *Encuesta Nacional de Salud Materno Infantil* were used to describe ethnic group differences in sexual behaviour, HIV knowledge and testing. We then controlled for age, education, wealth and other socio-demographic factors in a multivariate logistic regression model to examine the effects of ethnicity on outcomes related to age at sexual debut, number of lifetime sex partners, comprehensive HIV knowledge, HIV testing and lifetime sex worker patronage (men only).
Results. The data show low levels of risky sexual behaviour and low levels of HIV knowledge among indigenous women and men, compared to other respondents. Controlling for demographic factors, indigenous women were more likely than other women never to have been tested for HIV and to lack comprehensive HIV knowledge. They were less likely to report early sexual debut and three or more lifetime sexual partners. Indigenous men were more likely than other men to lack comprehensive HIV knowledge and demonstrated lower odds of early sexual debut, 10 or more lifetime sexual partners and sex worker patronage.
Conclusions. The Mayan indigenous population in Guatemala, while broadly socially vulnerable, does not appear to be at elevated risk for HIV based on this analysis of selected risk factors. Nonetheless, low rates of HIV knowledge and testing may be cause for concern. Programmes working in indigenous communities should focus on HIV education and reducing barriers to testing. Further research into the factors that underlie ethnic self-identity and perceived ethnicity could help clarify the relative significance of these measures for HIV risk and other health outcomes.

Keywords: HIV risk; Guatemala; Mayan; ladino; indigenous; ethnicity

Introduction

Guatemala has a concentrated HIV epidemic with general prevalence estimated at 0.8% from antenatal surveillance data and the country's case reporting system (UNAIDS 2010). No national surveys in Guatemala have yet included HIV testing, but elevated prevalence has been reported in studies of sex workers (4.3%) and men who have sex with men (MSM) (12.1%) (Soto et al. 2007; UNAIDS 2010; García 2010). While other countries in the region show stable or declining HIV prevalence, rates in Guatemala have yet to

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plateau (The World Bank 2011a). By 2009, 62,000 people in the country were reported to be living with HIV, the majority in the country's urban centres (UNAIDS 2010).

Little is known about HIV risk or prevalence in Guatemala's large indigenous population. The government of Guatemala recognises four major population groups, or *pueblos*: Ladino, Maya, Xinca and Garífuna (Instituto Nacional de Estadística 2009). The latter three are officially designated as indigenous, and Mayans make up the overwhelming majority of the indigenous population (Instituto Nacional de Estadística de Guatemala 2002). Twenty-three Mayan subgroups, the largest of which are K'iche, Kaqchikel, Mam, and Q'eqchi, are centred in the country's rural *altiplano*, or western highlands. According to the most recent national census report, Mayans represent approximately 39% of the total population (Instituto Nacional de Estadística de Guatemala 2002).

'Ladino' is often used synonymously with 'mestizo' in Guatemala to denote non-indigenous individuals who speak Spanish and exhibit western dress and other characteristics ('ladino' 2012). An estimated 60% of Guatemalans are ladino (Instituto Nacional de Estadística de Guatemala 2002). These estimates point to a crucial issue: to draw quantitative conclusions about ethnicity in a population, a system of ethnic classification is needed. Simon and Piché (2012) note that 'the *statistical representation* of diversity is a complex process which reveals the foundations of societies and their political choices' (1357). Gibbons and Ashdown (2010) affirm that in Guatemala ethnic identification is complex, fluid and multidimensional and make the case for the use of a scale or continuum to describe one's ethnicity versus a binary choice (indigenous/ladino). Although cultural factors such as clothing or language may be generally associated with Mayan or ladino identity, distinctions between the two groups are not clearly definable. Nearly all Mayans and most ladinos in Guatemala report both Amerindian and Spanish ancestry (Adams 1994). Nonetheless, by any measure, ethnic inequality is pervasive in Guatemala, and ethnic distinctions have had profound effects on social, economic and political life there for more than a century (Adams 1994).

Guatemala's population is one of the most disadvantaged in Latin America; 54% of people live in poverty and high infant, child and maternal mortality persist (The World Bank 2011b). Decades of disenfranchisement, social prejudice and political violence have resulted in an even bleaker picture among indigenous groups in the country: while 70% of ladino women receive care from a physician or a nurse during delivery, only 30% of Mayan women do (Haub and Gribble 2011). Likewise, 66% of Mayan children are chronically undernourished, compared with 36% of ladino children (Haub and Gribble 2011). A recent secondary analysis of the 2008–2009 *Encuesta Nacional de Salud Materno Infantil* (ENSMI) offered evidence of similar disparities in indigenous Guatemalan women's use of modern reproductive health care (Ishida et al. 2012). These disparities were attributed to discrimination at health care facilities and the indigenous population's distrust of institutional health care services (Rohloff, Díaz, and Dasgupta 2011).

Data from the national HIV case surveillance system further indicate that compared to ladinos, a higher percentage of indigenous Guatemalans are detected at advanced stages of infection (65.5% of cases among the indigenous versus 55.8% among ladinos), reflecting unequal access to HIV counselling and testing (Miller et al. 2011). High unmet need for services likely also results in underestimates of HIV prevalence among the indigenous population; in Guatemala as elsewhere these figures are largely based on cases detected through antenatal screening and case surveillance. Consequently, there has

been little firm evidence to either support or refute the hypothesis that the sizeable indigenous population in Guatemala, while broadly socially vulnerable, does not exhibit increased risk for HIV relative to other ethnic groups.

This study begins to address that gap in information, comparing HIV risk behaviour, testing and knowledge among ethnic groups in Guatemala to test whether the indigenous population is at a disproportionate, previously unrecognised risk for HIV acquisition and transmission. The analysis examines associations between ethnicity and selected outcomes using data from a nationally representative survey, controlling for major socio-demographic factors. Participants were not tested for HIV as part of the survey; outcomes used in the study include self-reported history of HIV testing, comprehensive HIV knowledge, early sexual debut, lifetime number of sexual partners and sex worker patronage (men only; questions related to sex work were not included in the women's interview).

The selection of these outcomes is based on theory and research. Lack of access to HIV testing can increase the risk of acquiring and transmitting the virus. A 2005 meta-analysis concluded that 'the prevalence of high-risk sexual behaviour is reduced substantially after people become aware they are HIV positive' (Marks et al. 2005). Decisions about pregnancy, birth and breastfeeding may also be HIV status-dependent. Testing facilitates early referral to medical treatment for people living with HIV, which has the potential to reduce a patient's viral load, lowering the risk of transmission (Quinn et al. 2000). Lack of HIV knowledge may also affect one's risk perception and behaviours; individuals who believe that HIV cannot be prevented, for example, might fail to adopt effective methods such as condom use even if widely available and otherwise acceptable.

Factors related to sexual behaviour likely have a more direct influence on infection risk. Early sexual debut, higher numbers of lifetime sexual partnerships and sex worker patronage can all increase potential exposure to HIV, sometimes dramatically. Multiple studies suggest that early sexual debut is associated with increased prevalence of HIV and other sexually transmitted infections (Greenberg, Magder, and Aral 1992; Kaestle et al. 2005; Wand and Ramjee 2012; Stöckl et al. 2013). Additional evidence indicates that early sexual debut is related to risky sexual behaviour including multiple partnerships and decreased condom use (Gigante et al. 2004; Wand and Ramjee 2012). Sex worker patronage also has been shown to be associated with increased HIV prevalence (Couture et al. 2008; Shaw et al. 2013). Sabidó et al. (2011) found an HIV prevalence of 1.5% among clients of female sex workers in Escuintla, Guatemala – nearly double the national estimate.

Methods

Data source

We conducted a secondary analysis using data from the men's and women's 2008–2009 *Encuesta Nacional de Salud Materno Infantil*, or ENSMI. The survey used a multi-stage probability sample, identifying eligible respondents from approximately 30 randomly chosen households in each of 733 selected geographic clusters. This yielded a nationally representative sample of 16,819 women aged 15–49 years and 7086 men aged 15–59 years (MSPAS 2010).

In-person interviews were completed in Spanish or one of more than nine Mayan languages based on respondent preference. Fieldwork took place from October 2008 to June 2009 and generated response rates of 96% for women (MSPAS 2010) and 89% for men (MSPAS 2011).

Dependent variables

All dependent variables were dichotomous. HIV testing was defined as ever having been tested for HIV. Comprehensive HIV knowledge was based on the UNAIDS definition. Respondents were counted as lacking comprehensive HIV knowledge if they did not reject the two most common transmission misconceptions, failed to identify fidelity and condom use as effective methods of HIV prevention, or did not know that a person with HIV can look healthy.

We defined early sexual debut as reported age at first sex of 14 years or younger, a common standard (Joint United Nations Program on HIV/AIDS [UNAIDS] 2011). Lifetime number of sex partners was defined based on the skip patterns in the men's and women's questionnaire and the coding of the original variables. All men who had ever had sex were asked about the number of lifetime sexual partners. Due to pre-defined response categories in the questionnaire, the variable was coded as one to nine lifetime sexual partners versus 10 or more. Only women who had sex in the 12 months prior to the survey were asked to report their number of lifetime partners. Based on coding of the original variable, these categories were defined for women as one to two lifetime partners and three or more lifetime partners. Men who reported ever having paid for sexual relations with a woman (including payment in-kind) were defined as having a lifetime history of sex worker patronage.

Defining ethnicity

Ethnicity, the primary independent variable for this analysis, was measured using two separate items in the ENSMI questionnaire. Participants were asked: 'Do you consider yourself to be indigenous, ladino or some other ethnicity?' Interviewers additionally recorded their own assessment of the respondent's ethnicity as indigenous or non-indigenous. Preliminary analyses demonstrated a lack of agreement between results on the two measures. Among women, 37% were recorded as indigenous on both measures, and 47% were recorded as ladino on both measures. However, 25% of women who self-identified as indigenous were interviewer-classified as ladino; this group constituted 13% of the women's sample. Male respondents were classified as indigenous (45%) or ladino (44%) on both measures in similar proportions. Another 8% of all men self-identified as indigenous but were interviewer-classified as ladino.

Approximately 2% of both men and women self-identified as ladino but were interviewer-classified as indigenous. The remaining 1 to 2% of respondents had Other/No Response recorded on one or both ethnicity variables. See Table 1 for details. We dropped both of these groups from analysis due to their small sizes, leaving a sample of 16,205 women and 6822 men for analysis.

The striking frequency with which self-identified indigenous respondents were classified as ladino by their interviewers led us to combine the two ethnicity measures and create a variable with three mutually exclusive categories. Respondents in the indigenous group both self-identified and were interviewer-classified as indigenous. Similarly, we considered respondents to be ladino if they both self-identified and were interviewer-classified as ladino. The third group, 'cross-identified' respondents, self-identified as indigenous but were interviewer-classified as ladino. Most women included in our analysis were ladino (49%) followed by indigenous (38%) and cross-identified

Table 1. Distribution of male and female respondents by ethnic group, ENSMI 2008–2009.

Self-identification	Interviewer classification	Women		Men	
		N	Weighted %	*N*	Weighted %
Ladino	Ladino	8088	47.2	3095	44.0
Ladino	Indigenous	233[a]	1.5	155[a]	2.0
Ladino	Other/no response	8[a]	<0.1	4[a]	0.1
Indigenous	Ladino	2217	12.6	582	7.8
Indigenous	Indigenous	5900	36.6	3145	44.6
Indigenous	Other/no response	2[a]	<0.1	0[a]	0
Other/no response	Ladino	298[a]	1.6	64[a]	0.9
Other/no response	Indigenous	51[a]	0.3	24[a]	0.4
Other/no response	Other/no response	22[a]	0.1	17[a]	0.2
Total		16,819	100%	7086	100%

[a]Cases omitted from analysis.

(13%). Forty-six per cent of men were included in the ladino group, 46% in the indigenous group and nearly 8% were included in the cross-identified group.

Other independent variables

Categorical socio-demographic factors used as control variables in the multivariate analysis included: age group (15–24 years and 25+ years), highest education level attained (none, primary, secondary and post-secondary), civil status (married/in union, single and never married, separated/widowed/divorced) and administrative region of residence. Rural/urban residence was controlled for in this analysis. Based on the 2002 census, urban residence was assigned to individuals living in officially designated cities or localities with 2000 or more inhabitants and where 51% or more of the inhabitants had electricity and running water. Wealth quintile was also included as a covariate. This variable uses an index based on observed dwelling characteristics and reported ownership of consumer items to assign households to wealth quintiles, with the poorest 20% in the lowest quintile and the wealthiest 20% in the highest quintile (MSPAS 2010).

Analysis

All estimates presented here are the results of weighted procedures performed in Stata version 12.0 using the *svyset* commands, which adjust for differential probabilities of selection, the non-independence of individuals selected from sampling clusters and sample stratification. Analysis was conducted in two stages, bivariate and multivariate. First, we assessed the distribution of key socio-demographic characteristics, knowledge, attitudes and behaviour among respondents in the three ethnicity categories (indigenous, ladino and cross-identified respondents), for men and women separately. Unadjusted cross-tabulations and logistic regression were conducted to evaluate bivariate associations for the outcomes of interest by ethnic group.

Finally, multivariate logistic regression models were constructed to assess associations between ethnic group and the outcomes of interest controlling for socio-demographic characteristics, including age group, highest education level, rural/urban residence, administrative region of residence, marital status and household wealth quintile. Statistically

significant associations were assessed at the $p < 0.05$ level. Marginal statistical significance is indicated by $p < 0.10$. Potential interactions between ethnicity and age, and between ethnicity and rural/urban residence, were explored using an adjusted Wald test. Neither of the interactions was found to be significant. Models containing all six covariates (age group, education, rural/urban residence, administrative region of residence, marital status and household wealth quintile) were tested for model fit using the Pearson's goodness of fit test.

Results

Demographics

Results revealed the cross-identified group to resemble ladinos on some demographic measures, including language. On other measures, such as education and wealth quintile, cross-identified respondents appeared to be situated squarely between the indigenous and ladino groups. See Tables 2 and 3 for additional details.

Virtually all ladino and cross-identified respondents reported that they could speak and understand Spanish and spoke it regularly at home. This contrasted notably with the indigenous group, especially for women. Only 78% of indigenous women indicated that they could understand Spanish and only 34% reported speaking it regularly at home. Among indigenous men, the ability to understand Spanish was more common (94%), and 53% of indigenous men indicated that they spoke Spanish regularly at home. Asked if anyone in their household spoke a Mayan language, just 3% of ladino women and 14% of the cross-identified group responded affirmatively, compared to 87% of indigenous female respondents. Men's results were similar. Thirteen per cent of indigenous women and 27% of indigenous men indicated that no one in their household had any ability to speak a Mayan language.

Among women, urban residence was more common for ladinos (57%) than those in the cross-identified and indigenous groups (41% and 33%). Ladino and cross-identified men were more likely to be urban residents (59% and 50%) than their indigenous counterparts (32%).

The data on education and wealth also supported well-established differences between ethnic groups. Whereas just 10% of ladino women and 15% of the cross-identified group had no formal education, fully 35% of indigenous women had never attended school. Men reported higher levels of access to education, but ethnic group differences held constant: 7% of ladinos, 8% of cross-identified men and 21% of indigenous men had never attended school. Forty-eight per cent of women in the ladino group had any secondary or post-secondary education, compared to 31% of the cross-identified women and just 15% of indigenous women. Half of the men in the ladino and cross-identified groups had been educated beyond primary school, while only 22% of indigenous men had. Whereas nearly one-third of ladino men and women ranked in the highest wealth quintile for the sample overall, the same was true for only 14% of cross-identified women, 17% of cross-identified men, 6% of indigenous women and 5% of indigenous men.

Region of residence showed a number of ethnic group differences. Thirty per cent of ladino women, 20% of cross-identified women and 7% of indigenous women resided in the metropolitan region (Guatemala City). Men showed similar results: 32% of ladinos, 19% of cross-identified men and 8% of indigenous men were living in the metropolitan region. Indigenous men and women were clustered in the northern and north-western regions, which had only small percentages of ladino and cross-identified respondents. The

Table 2. Demographic characteristics of women age 15–49, % by ethnic group, Guatemala, 2008–2009 (*N* = 16,205).

Socio-demographic characteristics	Indigenous % (95% CI) (*n* = 5900)	Cross-identified % (95% CI) (*n* = 2217)	Ladino % (95% CI) (*n* = 8088)
Age group			
15–19	24.0 (22.6–25.6)	25.4 (22.8–28.0)	22.2 (21.0–23.5)
20–24	18.5 (17.3–19.8)	18.7 (16.5–20.9)	17.6 (16.4–18.8)
25–29	15.5 (14.5–16.5)	17.0 (14.7–19.4)	15.8 (14.8–16.8)
30–34	13.1 (12.2–14.0)	12.0 (10.6–13.4)	14.2 (13.1–15.4)
35–39	12.3 (11.4–13.2)	11.1 (9.5–12.6)	11.3 (10.5–12.1)
40–44	5.6 (7.7–9.5)	8.4 (6.9–9.9)	9.7 (8.8–10.6)
45–49	7.9 (7.0–.8)	7.3 (5.8–8.9)	3.0 (8.1–9.9)
Residence			
Urban	33.2 (28.7–37.7)	41.1 (36.3–45.9)	57.0 (53.1–60.8)
Rural	66.8 (62.3–71.3)	58.9 (54.1–63.7)	43.0 (39.2–46.9)
Language			
Speak Spanish	69.0 (64.7–73.2)	99.8 (99.7–100.0)	100.0
Understands Spanish	77.8 (74.2–81.4)	99.9 (99.8–100.0)	100.0
Spanish spoken regularly at home	33.5 (29.3–37.7)	98.6 (98.0–99.2)	99.8 (99.7–100.0)
Household member speaks Mayan language	87.1 (84.7–89.5)	14.3 (11.7–16.8)	3.3 (2.6–3.9)
Education			
None	35.0 (32.7–37.3)	14.6 (12.5–16.8)	10.0 (8.7–11.2)
Primary	50.2 (48.3–52.2)	54.0 (51.0–57.0)	42.4 (40.1–44.6)
Secondary	13.3 (11.6–15.0)	28.4 (25.2–31.5)	38.2 (36.1–40.3)
Post-secondary	1.5 (0.9–2.1)	3.0 (1.9–4.1)	9.4 (7.9–11.0)
Wealth quintile			
Lowest	35.4 (31.3–39.4)	16.0 (12.9–19.0)	8.0 (6.7–9.4)
Second	27.9 (25.6–30.1)	21.9 (18.9–25.0)	14.3 (12.7–15.9)
Middle	20.4 (18.2–22.6)	24.1 (21.3–27.0)	19.8 (17.7–22.0)
Fourth	10.7 (9.1–12.4)	24.0 (20.9–27.1)	26.7 (24.7–28.6)
Highest	5.6 (4.3–6.9)	14.0 (11.6–16.4)	31.2 (27.6–34.8)
Marital status			
Married/partnered	62.3 (60.5–64.2)	60.6 (57.7–63.4)	58.5 (56.8–60.1)
Single/never married	6.9 (6.0–7.8)	8.6 (7.0–10.2)	9.6 (8.7–10.4)
Separated/widow/divorced	30.8 (29.0–32.5)	30.8 (28.0–33.6)	32.0 (30.3–33.7)
Region			
Metropolitan	7.0 (4.3–9.8)	19.5 (14.1–24.9)	30.3 (24.7–36.0)
Northern	20.8 (15.1–26.4)	3.0 (1.2–4.7)	2.8 (1.6–4.0)
North-eastern	2.8 (1.3–4.4)	11.4 (8.4–14.3)	12.5 (9.9–15.1)
South-eastern	0.8 (0.4–1.2)	16.5 (12.1–20.9)	14.2 (11.0–17.4)
Central	9.9 (6.7–13.1)	10.8 (7.5–14.2)	13.7 (9.9–17.4)
North-western	27.5 (21.4–33.6)	4.4 (1.9–6.8)	5.6 (3.1–8.3)
South-western	29.0 (23.9–34.1)	32.3 (26.0–38.5)	16.7 (13.1–20.4)
Petén	2.2 (0.8–3.6)	2.1 (0.9–3.3)	4.1 (2.4–5.8)

south-western region showed very high concentrations of indigenous and cross-identified men and women and was home to smaller but still relatively high proportions of ladinos.

HIV knowledge, sexual practices and testing history

Results suggest important differences among indigenous, cross-identified and ladino respondents in terms of HIV testing history, knowledge and risk behaviour (see Table 4).

Table 3. Demographic characteristics of men age 15–59, % by ethnic group, Guatemala, 2008–2009 (N = 6822).

Socio-demographic characteristics	Indigenous % (95% CI) (n = 3145)	Cross-identified % (95% CI) (n = 582)	Ladino % (95% CI) (n = 3095)
Age group			
15–19	25.5 (23.3–27.7)	30.2 (24.9–35.6)	23.7 (21.1–26.3)
20–24	13.0 (11.5–14.5)	15.1 (10.7–19.4)	15.7 (13.8–17.6)
25–29	12.8 (10.9–14.7)	14.3 (10.0–18.6)	11.9 (10.4–13.5)
30–34	12.2 (11.1–13.4)	9.1 (6.8–11.4)	13.1 (11.6–14.5)
35–39	9.9 (8.8–11.0)	9.8 (7.1–12.6)	9.3 (8.2–10.4)
40–44	8.2 (7.2–9.3)	5.2 (3.5–7.0)	7.6 (6.4–8.7)
45–49	7.9 (6.7–9.1)	6.8 (4.5–9.1)	6.9 (5.7–8.1)
50–54	6.2 (5.2–7.3)	4.7 (2.4–6.9)	6.5 (5.2–7.8)
55–59	4.2 (3.3–5.0)	4.8 (2.0–7.5)	5.3 (4.3–6.3)
Residence			
Urban	31.6 (27.7–35.5)	50.0 (42.0–58.0)	58.8 (54.3–63.2)
Rural	68.4 (64.5–72.3)	50.0 (42.0–58.0)	41.2 (36.8–45.7)
Language			
Speak Spanish	91.8 (89.4–94.1)	99.7 (99.2–100.0)	100.0
Understands Spanish	94.2 (92.5–95.9)	99.8 (99.5–100.0)	100.0
Spanish spoken regularly at home	53.3 (48.0–58.5)	98.0 (96.3–99.6)	99.8 (99.7–100.0)
Household member speaks Mayan language	73.0 (69.0–77.0)	13.3 (9.1–17.6)	4.0 (3.0–5.0)
Education			
None	20.6 (18.4–22.7)	8.0 (5.6–10.3)	7.4 (5.0–8.8)
Primary	57.3 (54.6–60.5)	42.1 (36.1–48.1)	39.1 (35.7–42.4)
Secondary	20.4 (17.8–22.9)	44.6 (38.4–50.7)	41.9 (39.0–44.8)
Post-secondary	1.8 (1.2–2.3)	5.3 (2.3–8.3)	11.6 (9.7–13.6)
Wealth quintile			
Lowest	33.8 (29.8–37.8)	9.9 (7.0–12.7)	6.0 (4.8–7.2)
Second	27.9 (25.1–30.6)	19.6 (14.7–24.6)	13.9 (11.9–15.9)
Middle	20.5 (18.0–22.9)	24.1 (19.0–29.3)	20.7 (18.3–23.2)
Fourth	13.3 (10.8–15.8)	29.1 (22.9–35.4)	27.1 (246–29.7)
Highest	4.6 (3.4–5.8)	17.2 (8.9–25.5)	32.2 (28.4–36.0)
Marital status			
Married/partnered	62.7 (60.3–65.1)	54.7 (49.4–59.9)	55.7 (53.2–58.1)
Single/never married	2.7 (1.9–3.4)	5.4 (3.2–7.7)	4.3 (3.3–5.3)
Separated/widow/divorced	34.6 (32.2–37.1)	39.9 (34.7–45.1)	40.1 (37.6–42.5)
Region			
Metropolitan	7.6 (4.3–10.8)	18.8 (12.1–25.4)	32.1 (25.9–38.3)
Northern	17.6 (12.6–22.6)	4.3 (1.5–7.1)	2.3 (1.2–3.4)
North-eastern	5.6 (3.5–7.6)	13.6 (9.2–17.9)	12.1 (9.4–14.8)
South-eastern	2.8 (1.7–3.9)	13.8 (9.5–18.0)	14.4 (11.0–17.8)
Central	10.7 (7.8–13.5)	10.1 (5.0–15.2)	15.0 (10.5–19.4)
North-western	21.2 (16.1–26.2)	6.0 (2.3–9.8)	5.9 (3.1–8.7)
South-western	31.9 (26.8–37.0)	30.8 (21.2–40.3)	13.4 (10.2–16.8)
Petén	2.7 (1.4–3.9)	2.6 (0.9–4.4)	4.7 (2.6–6.8)

Fewer ladino and cross-identified women (79% and 82%, respectively) and men (82% and 89%) had never been tested for HIV compared to indigenous women and men (95% in both groups). After adjusting for socio-demographic factors, ladino and cross-identified women exhibited lower odds of never testing compared to indigenous respondents

Table 4. Unadjusted and adjusted association between HIV risk behaviours and ethnicity among men and women, Guatemala 2008–2009.

	Women			Men		
	% (95% CI)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)[a]	% (95% CI)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)[a]
Never tested for HIV						
Indigenous	94.7 (93.8–95.4)***	1.0	1.0	94.5 (92.7–96.2)***	1.0	1.0
Cross-identified	82.3 (79.7–85.0)	0.26 (0.20–0.33)***	0.37 (0.29–0.47)***	89.3 (85.8–92.7)	0.49 (0.29–0.82)**	0.83 (0.45–1.53)
Ladino	78.7 (77.2–80.2)	0.21 (0.17–0.25)***	0.41 (0.31–0.50)***	82.1 (79.9–84.2)	0.27 (0.18–0.39)***	0.63 (0.38–1.04)*
Lack of comprehensive HIV knowledge						
Indigenous	85.3 (83.6–86.9)***	1.00	1.0	84.4 (82.4–86.6)***	1.0	1.0
Cross-identified	78.7 (76.1–81.2)	0.64 (0.52–0.78)***	0.86 (0.70–1.05)	71.5 (62.9–80.0)	0.46 (0.29–0.72)**	0.68 (0.45–1.03)*
Ladino	66.8 (64.9–68.7)	0.35 (0.30–0.40)***	0.61 (0.53–0.71)***	67.1 (64.6–69.6)	0.37 (0.31–0.46)***	0.63 (0.51–0.79)***
Early sexual debut						
Indigenous	15.3 (13.9–16.7)*	1.0	1.0	15.5 (13.0–18.1)***	1.0	1.0
Cross-identified	17.0 (14.7–19.5)	1.14 (0.93–1.39)	1.48 (1.16–1.88)**	28.0 (22.6–33.5)	2.12 (1.55–2.89)***	1.50 (1.07–2.10)***
Ladino	13.6 (12.3–14.9)	0.87 (0.75–1.01)*	1.41 (1.17–1.71)***	31.2 (28.3–34.1)	2.46 (2.05–2.95)***	1.83 (1.44–2.32)***
Lifetime sex partners[b]						
Indigenous	2.6 (1.8–3.4)***	1.0	1.0	11.1 (9.2–13.0)***	1.0	1.0
Cross-identified	6.0 (4.2–7.8)	2.39 (1.54–3.73)***	1.65 (1.06–2.59)*	23.9 (18.0–29.7)	2.50 (1.73–3.60)***	1.71 (1.20–2.43)***
Ladino	7.9 (6.8–8.9)	3.21 (2.30–4.48)***	1.86 (1.29–2.70)**	28.6 (26.0–31.2)	3.20 (2.57–3.98)***	1.95 (1.48–2.57)***
Lifetime sex worker patronage						
Indigenous	–	–	–	18.9 (16.5–21.3)***	1.0	1.0
Cross-identified	–	–	–	34.5 (28.3–40.7)	2.26 (1.65–3.10)***	1.70 (1.21–2.38)***
Ladino	–	–	–	34.4 (31.5–37.2)	2.24 (1.87–2.71)***	1.62 (1.29–2.03)***

*p < 0.10; **p < 0.05; ***p < 0.01.
[a]Adjusted for age group, highest education level, marital status, household wealth quintile, urban/rural residence and geographic region of residence.
[b]Among men 10+ lifetime partners; among women 3+ lifetime partners.

(OR: 0.41, 0.31–0.50 and OR: 0.37, 0.29–0.47, respectively). Ladino men had marginally lower odds of never testing, compared to indigenous men (OR: 0.63, 0.38–1.04).

Strong unadjusted relationships also existed between ethnicity and comprehensive HIV knowledge for both men and women. Fewer ladino and cross-identified women (67% and 79%, respectively) and men (67% and 72%) lacked HIV knowledge compared to indigenous women (85%) and men (84%). In the adjusted model, however, only the difference between the ladinos and the indigenous group was significant (women: OR: 0.61, 0.53–0.71; men: OR: 0.63, 0.51–0.79).

Among women, there was no unadjusted association between ethnicity and early sexual debut. However, after controlling for other socio-demographic characteristics, the odds of early sexual debut were nearly 1.5 times higher for both ladino and cross-identified women compared to indigenous women. More ladino and cross-identified men (31% and 28%) reported early sexual debut compared to indigenous men (16%). In the adjusted model, the odds of early sexual debut were 1.83 (1.44–2.32) and 1.50 (1.07–2.10) times higher for ladinos and the cross-identified group, respectively, compared to indigenous men.

More ladino and cross-identified women (8% and 6%) reported having three or more lifetime partners compared to indigenous women (3%). In the adjusted model, the odds were significantly higher for ladino (OR: 1.87, 1.30–2.71) and cross-identified women (OR: 1.65, 1.06–2.58) compared to indigenous women. Differences among ethnic groups in the number of lifetime sexual partnerships were similar for men in both the unadjusted and adjusted models. After controlling for other factors, membership in the ladino or cross-identified group increased men's odds of having 10 or more lifetime sexual partners by 1.95 (1.48–2.57) and 1.71 (1.20–2.43) times, respectively, compared to the indigenous group.

The odds of sex worker patronage were also significantly higher for ladino and cross-identified men compared to indigenous men in both the unadjusted and adjusted models. The odds of ever paying for sex were 1.62 (1.29–2.03) and 1.70 (1.21–2.38) times higher for ladino and cross-identified men, respectively, compared to indigenous men, controlling for other factors.

Discussion

Ethnicity emerges as a strong correlate of nearly every HIV risk factor included in this analysis, primarily serving to distinguish the indigenous group from the cross-identified and ladino groups among both Guatemalan men and women. Controlling for rural/urban residence, age group, education level, wealth quintile and marital status, indigenous women had the lowest adjusted odds of early sexual debut and of having three or more lifetime sexual partnerships. Indigenous women also exhibited markedly lower levels of comprehensive HIV knowledge and HIV testing, compared with ladinos.

For men in the study, being indigenous was associated with lower odds of early sexual debut, of having 10 or more lifetime partners and of sex worker patronage. However, like indigenous women, indigenous men were less likely than those in other ethnic groups to exhibit comprehensive HIV knowledge. These results held in the adjusted models suggesting that differences in knowledge and behaviour were not simply the result of indigenous men's and women's comparatively rural existence and lesser access to schooling and other resources. A recent profile of evidence related to the

epidemic in Guatemala similarly concluded that levels of HIV awareness and knowledge are lower in the indigenous population than in other ethnic groups (Miller et al. 2011).

The analysis also highlights important issues related to the measurement of social constructs like ethnicity. Sizeable percentages of both male and female respondents in this national survey self-identified as indigenous yet were classified by their interviewers as ladino. While a conceptual framework developed in Guatemala to guide the inclusion of indigenous populations in statistical work proposes that 'ethnic identity is the definition and classification one chooses for oneself' (Instituto Nacional de Estadística 2009, 15), even recent official reports of the ENSMI use only the interviewer's classification, in order to maintain consistency with earlier reports (personal communication, 2012).

In addition to altering estimates of the size of the indigenous population, the choice of ethnicity measure may have profound implications for interpreting ethnic disparities, including differences in HIV risk behaviour, testing and knowledge. Research conducted as far back as 1974 has acknowledged as problematic census enumerators' reliance on *estimación social*, or social judgement, to gauge the ethnicity of participants (Early 1974, 1975). A study comparing census estimates to vital registry data collected by community residents suggested that in 1950 Mayans may have constituted around 56% of the total population instead of the slightly less than 54% reported; in 1964, they may have constituted 50% rather than 42% (Early 1974). The authors hypothesised that ladino enumerators, lacking experience with the nuanced local standards for indigenousness in historically Mayan communities, tended to classify anyone not wearing traditional Mayan clothing as ladino.

Our analysis suggests that consensus is still lacking on the relationship between ethnic group identity and ethnic markers like language, and that certain markers may still be assigned more or less importance by Guatemalans who identify as indigenous versus those who do not. Further study of the distinctions between one's ethnic self-identity and perceived ethnicity could increase our understanding of the validity and reliability of these measures, as well as their possible association with HIV risk factors and health outcomes in Guatemala. Indigenous or ladino self-identity might, for example, support the adoption of group norms for sexual behaviour and HIV prevention methods. The ethnic group to which someone is generally *presumed* to belong might also affect risk by provoking discrimination or social advantage. In addition, language or other elements of ethnic identity may be independently associated with outcomes of interest. Burton, Nandi, and Platt (2010) argue for measurement systems in which variations over time and within families can be 'seen as assets rather than as problems for consistency.' It may be more appropriate to measure ethnic identity using continuous scales; at least one study from Guatemala has established the usefulness of a continuous measure to represent this complex construct (Gibbons and Ashdown 2010).

This work is subject to several important limitations. Since the 2008–2009 ENSMI did not collect biomarker data, we are unable to draw any conclusions about the prevalence of HIV in Guatemala's indigenous or ladino populations, or to evaluate relationships between risk factors and HIV status. In addition, the cross-sectional study design limits our ability to assess causality. For some outcome variables, such as lifetime number of sexual partners, skip patterns in the questionnaire led certain respondents to be excluded. We have indicated these exclusions in footnotes in the tables.

While the authors are unaware of research investigating response bias specifically in surveys of sexual behaviour in Central American populations, underreporting due to

social desirability is probably common. Underreporting may also be more or less prevalent among indigenous respondents versus other respondents, which has the potential to bias estimates of HIV risk differences related to ethnicity as well.

Studies in neighbouring countries have found evidence of elevated HIV prevalence among the Garífuna population (Paz-Bailey et al. 2009). The number of Garífuna respondents in the ENSMI is too low to enable meaningful analysis of risk factors or other characteristics in this group. The same is true for other ethnic groups in Guatemala such as the Xinca, who are present only in small numbers in standard national survey samples.

Finally, we are also unable to assess ethnic differences related to HIV risk factors such as migration and sexual partner concurrency, which were not included in the 2008–2009 ENSMI. A working paper on concurrent sexual partnerships and HIV infection using evidence from a number of national surveys found that sexual concurrency was associated with HIV-positive status for both men and women, even after adjusting for potential confounders including educational level, wealth status, urban/rural residence and condom use (Mishra and Bignami-Van Assche 2009).

A recent literature review also noted associations between mobility and risk behaviour among indigenous groups in Central America and Mexico (Goldenberg et al., 2012). Studies of Mexican migrants in the USA and communities of origin have further indicated that compared to non-migrants, Mexicans with the USA migration experience were more likely to report sex worker patronage, multiple sex partners and illicit non-injection drug use (Parrado and Flippen 2010; Magis-Rodriguez et al. 2009).

In summary, respondents' ethnic self-identity and ethnicity as perceived by the interviewer yielded measurably different enumerations of Guatemala's indigenous population in the 2008–2009 ENSMI. Our analysis incorporates both items and offers a detailed profile of ethnic group differences on a variety of demographic and HIV variables. Results indicate low levels of risky sexual behaviour in the indigenous population relative to other groups. While it is possible for low levels of risk to coexist with high disease burden in a subgroup, we conclude that HIV prevalence among the indigenous population in Guatemala is likely to be low.

Our findings support the notion that HIV prevention strategies in Guatemala should continue to be largely oriented towards key populations at higher risk, such as sex workers and MSM. However, indigenous respondents displayed low levels of HIV knowledge as well as limited access to testing and exhibit poor health by most other measures. Continued HIV risk monitoring in indigenous communities and programmatic attention to these disparities is therefore warranted. Without adequate prevention knowledge or sufficient access to testing and counselling services, indigenous Guatemalans living with HIV remain more vulnerable than other groups to late diagnosis, HIV-related complications and early death from infection.

Indeed, several qualitative research studies conducted with indigenous adolescents and adults in Guatemala have indicated that cultural influences exert a powerful limiting effect on condom use and other preventive behaviours in this group (Options Consultancy Services Ltd 2007; Ministerio de Salud Publica y Asistencia Social de Guatemala, Departamento de Regulación de los Programas de Atención a las Personas, y OPS/OMS Guatemala 2010). Although the epidemic in Guatemala is still a concentrated one, programmes working in the country's indigenous communities may wish to focus their efforts on increasing HIV awareness and knowledge of basic prevention strategies and on

identifying and eliminating barriers to testing in this underserved population. We further hope that the findings from this study will spur additional examination of what motivates people in Guatemala to describe themselves or others as 'indigenous' or 'ladino,' how these motivations relate to health outcomes and the assumptions that underlie statistics presented by ethnic group.

Acknowledgements

Key messages

(1) Indigenous men and women in Guatemala are not at increased risk for HIV relative to other ethnic groups based on this analysis of sexual behaviour, testing and knowledge from a 2008–2009 national health survey.

(2) Low levels of HIV knowledge among the indigenous, pervasive social inequality and debate about how best to measure ethnic identity suggest a need for further study to understand HIV risk in Guatemala's major ethnic groups.

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