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Knowledge, attitudes and practices on HIV/AIDS and prevalence of HIV in the general population of Sucre, Bolivia

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ABSTRACT

Background: To analyse knowledge, attitudes and sexual practices on HIV/AIDS, and estimate HIV prevalence among residents of Sucre (Bolivia).

Methodology: Population-based survey of residents aged 15–49 randomly selected during 2008/2009. Blood samples were collected on Whatman-filter paper and tested with enzyme-linked immunosorbent assay. Knowledge on HIV/AIDS, sexual risk practices and discriminatory attitudes against people living with HIV/AIDS (PLWHA) were modelled with multiple logistic regression.

Results: Of 1499 subjects, 59% were women. All subjects were HIV-negative. Inadequate knowledge of HIV/AIDS transmission and prevention was observed in 67% and risk factors varied by gender (interaction p-value < 0.05). Discriminatory attitudes were displayed by 85% subjects; associated factors were: rural residence, low educational level and low income. Unsafe sex was reported by 10%; risk factors varied by residence area (interaction p-value < 0.05). In urban areas, risk factors were male sex, younger age and being in common-law union.

Conclusions: Prevalence of HIV infection is very low and unsafe sex is relatively uncommon. Inadequate knowledge on HIV/AIDS and discriminatory attitudes towards PLWHA are extremely high and are associated to gender, ethnic and economic inequalities.

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Introduction

In spite of large regional differences, the HIV epidemic in Central and South America has shown a stable pattern over the last decade. In the majority of countries in the region, the epidemic is concentrated and remains at a low level.[1,2] Among men who have sex with men (MSM), prevalence stands at around 10% in most countries, though heterosexual transmission of HIV has increased, particularly in South America.[3]

There is little information on the epidemiology of HIV in Bolivia is available. Surveillance data indicate that 4889 HIV cases were reported from 1984 to 2009; 89% of which came from La Paz, Santa Cruz and Cochabamba.[4] In 2009, it was estimated there were 12,000 [range 9000–16,000] persons living with HIV/AIDS (PLWHA) and the estimated prevalence in the population aged 15–49 years was 0.2% [95% CI: 0.1–0.3%].[5] The HIV epidemic in Bolivia is concentrated in the MSM group.[5–7] In the department of Chuquisaca according with the Departmental Health Service (SEDES-Chuquisaca) data report of 2010 (unpublished result), only 27 new HIV cases were reported in 2010; 78% were residents of Sucre, but no HIV prevalence estimates in the general population are available.

Studies on knowledge, attitudes and practices (KAP) have been widely used to design public health policies and for planning health interventions taking into account the needs of the community.[8,9] There is limited information on KAP on HIV/AIDS among the general population of Bolivia, a multicultural nation with great ethnic diversity and marked socio-economic inequalities. Therefore, the aims of this study were to analyse knowledge on HIV/AIDS, as well as attitudes and practices with respect to HIV/AIDS and to estimate the prevalence of HIV infection among inhabitants aged 15–49 years residing in the town of Sucre (department of Chuquisaca, Bolivia) in 2008–2009.

Materials and methods

We conducted a cross-sectional population-based study consisting of a KAP survey linked to a sero-survey using Whatman paper to estimate HIV prevalence. Inclusion criteria were subjects aged 15–49 years who had resided in Sucre during the preceding 12 months and consented to participate, excluding those who had some mental disability or refused to participate in the study. Sample size calculations were based on an expected prevalence of HIV-related knowledge of 12%, based on a previous study developed by the Simon Bolivar Andean University (UASB) with UNAIDS on 2006 (unpublished result), with a 95% confidence level, and a precision of 2%. Separate sample size calculations were made for the estimation of the HIV prevalence in Sucre as the prevalence of HIV was expected to be low. For an expected HIV prevalence of 1%, with a 95% confidence level, and an absolute precision of 0.5%, the necessary sample size was 1500 subjects. Due to budgetary constrictions, the HIV determinations could only be done in 1000 persons with the inevitable loss of precision. Subjects were randomly selected within each of the urban and rural districts of Sucre, with a proportional allocation to the respective district populations. Since there are no population-based registries in Sucre, we used the address records kept by Health Centres, selected homes at random, and then interviewed the first person in the household who fulfilled the inclusion/exclusion criteria, with a maximum of one person being interviewed per dwelling.

Data were collected by personal interviews conducted by trained interviewers, followed by the extraction of a blood specimen. Interviewers (fourth-year students attending the Faculty of Medicine at San Francisco Xavier of Chuquisaca University, and physicians and nurses at health centres coming under the aegis of the Ministry of Health) underwent one month's training and were additionally required to speak Quechua, the native language. The survey was administered personally, lasted approximately 25 min, and was conducted from September 2008 to March 2009. No survey response rate was formally recorded, though acceptance was good and none of the persons who were offered the blood test refused to participate. It was only for budgetary reasons that blood tests were conducted in only 998 persons, 67% of the total number of interviewees.

The questionnaire was made up of five sections: (a) sociodemographic characteristics; (b) knowledge about modes of HIV/AIDS transmission; (c) attitudes and practices with respect to HIV/AIDS; (d) clinical history of sexually transmitted infections (STI) and/or HIV/AIDS; and (e) other risk factors related to HIV/AIDS. Data collected in the questionnaire were used to construct the KAP indicators, based on the recommendations of the Basic Indicators of the Joint United Nations Programme on HIV and AIDS, (UNAIDS) and applied to the epidemic situation in Bolivia.[10,11]

Indicator definitions

Indicator of knowledge about prevention and transmission of HIV in the population

"Adequate knowledge": In response to the question as to whether the subject knows how to prevent the sexual transmission of HIV, he/she answers, "by using condom" and "by having a single sexual partner". In response to the question as to whether a healthy looking person may have HIV/AIDS, the subject answers, "yes"; and in response to the question as to whether he/she knows the ways in which the disease is transmitted, rejects the options, "by mosquito bite" and "by cohabiting with a PLWHA".

"Inadequate knowledge": Number of men and women who answer any of these questions differently.

Indicator of attitudes of discrimination and stigmatisation

"Attitude of discrimination": the subject responds negatively to the questions, "would you be willing to give accommodation to a relative if you knew that he/she had HIV/AIDS?", "would you allow a teacher who has HIV/AIDS to continue teaching at the school?", and "would you buy from a fruit vendor, if you knew he/she had HIV/AIDS?"; and responds affirmatively to the question: "if some relative had the infection, would you prefer that no-one knew?".

"Attitude of acceptance": subject shows attitudes of acceptance towards any of the four questions posed about PLWHA.

Indicator of sexual risk practices

"Unsafe sex": adolescents, young adults and singletons who report having had sex in the preceding 12 months with more than one partner; and persons who are either married, in a common-law union, widowed and divorced who report having had unprotected sex (without a condom) outside the couple.

"Safe sex": adolescents, young adults and singletons who report not having had sex in the preceding 12 months with more than one partner; and persons who are either married, in a common-law union, widowed and divorced who report not having had unsafe sex outside the couple.

Laboratory analysis

Blood samples were collected on Whatman N° 5 filter paper with measures to ensure asepsia; the pad of the fingertip (ring finger of the left hand for right-handed persons and right hand for left-handed persons) was punctured with a sterile lancet; specimens were left to air dry and stored at 4 °C with desiccants, until being dispatched, in line with international regulations for transport of biological samples for diagnostic purposes, to the Retrovirus and Papillomavirus Unit at the National Centre for Microbiology of the Carlos III Institute of Health in Spain, for analyses. A commercial assay Genscreen HIV-1/2 (BioRad, France) was used for HIV antibodies detection. A 5 mm diameter discs were punched from dried blood spots (DBS) using Delfia Wallac Plate Punch (Perkin Elmer, USA) and placed into a 96-well plate for elution in 125 μL of phosphate-buffered saline-Tween 80 (pH 7.2; 0.05% Tween 80 and 0.005% sodium azide). The plate was incubated overnight at 4 °C under shaking. HIV antibody detection assay was performed using 80 μL of DBS eluate.

Statistical analysis

Descriptive analyses of patients' socio-demographic characteristics were stratified by sex and compared using the Chi Squared test (χ^2 test) for trend. The three indicators used as response variables were inadequate knowledge on HIV/AIDS, unsafe sex, and discriminatory attitudes towards PLWHA. Crude Odds Ratios (ORs) and 95% confidence intervals (95% CI) were calculated to quantify the association between each potential risk factor and the response variables and modelled using multivariate logistic regression. The final model was selected using a "backwards" procedure. Possible interactions between risk factors and outcome variables were investigated. As sex was found to be an effect modifier for the risk factors associated with inadequate knowledge on HIV/AIDS, (p-value for interaction < 0.05), analyses were stratified by sex. Also, as area of residence was found to be an effect modifier for the risk factors associated with unsafe sex (p-value for interaction < 0.05), analyses were stratified by residential area. Analyses were performed with SPSS for Windows v. 12.0 and Stata version 10.

Ethical considerations

The study obtained Departmental STI/HIV/AIDS Programme approval from the Ministry of Health in Chuquisaca, which acted as the ethics committee in 2008. Prior to undertaking the survey, the interviewers explained the aims of the study, the voluntary nature of participation and blood-extraction procedure to all participants. In addition, participants were informed they would only be contacted if they tested positive. Subjects were requested to give their oral consent, and for the blood test, they had to sign or placing their fingerprint on the informed consent form.

Results

A total of 1499 persons, 614 men and 885 women, were interviewed. Table 1 shows their sociodemographic characteristics by gender showing significant differences; with more male residents in urban areas and more female residents in rural areas. Broken down by marital status, 60% were single (mainly men). No age-related differences were found between men and women. While most of the population had a medium/high educational level (secondary/university), the percentage that had scarcely completed their primary education was higher among women than among men (15% vs. 7%). There were gender-related differences by language and income; more women spoke "Spanish and Quechua" or only Quechua and more women reported lower monthly family incomes.

Prevalence of HIV infection

Of the 1499 persons surveyed, only 998 (67%) had blood samples taken due to budget limitations. None refused to have blood taken. No seropositive cases were found thus prevalence of HIV infection was 0.0% (95% CI: 0.0–0.4%). There were not statistically significant differences between the characteristics of the people who had and had not blood tests done (data not shown).

Knowledge of prevention and transmission of HIV

Overall, prevalence of inadequate knowledge of the correct forms of prevention and transmission of HIV/AIDS was 67% (95% CI: 64.6–69.4%); broken down by gender 69% (95% CI: 65.4–71.5%) in women and 65% (95% CI: 61.2–68.8%) in men. The risk factors associated with this indicator varied by gender (interaction p-value < 0.05) and multivariate analysis were stratified by gender (Table 2). In women, inadequate knowledge was associated with rural vs. urban residence [OR = 3.9 (95% CI: 1.9–8.29)], speaking Quechua vs. only Spanish, [OR = 1.4 (95% CI: 1.0–1.9)], low educational level [OR = 7.8 (95% CI: 3.1–19.7)] and earning a monthly family income of "Bs < 1000", [OR = 2.0 (95% CI: 1.4–2.7)]; in men, associated factors were rural residence [OR 7.3 (95% CI: 2.6–21.0)] and speaking Quechua [(OR 1.6 95% CI: 1.1–2.6)]).

Discrimination and stigmatisation

Prevalence of attitudes of discrimination and stigmatisation towards PLWHA was 85% (95% CI: 83.3–86.9) and were almost three times higher among subjects in the "rural area" than in the urban area [OR 2.9 (95% CI: 1.4–5.0)], in persons with a low educational level and family income, [OR 2.1 (95% CI: 1.1–4.2)] and [OR 2.0 (95% CI: 2.0–0.5)], respectively (Table 3).

Table 1 – Socio-demographic variables stratified by gender.

	Male N (%) 614 (41.0)	Female N (%) 885 (59.0)	Total N (%) 1499 (100.0)	*p*-value[a]
Place of birth				0.042
Beni	5 (0.8)	6 (0.7)	11 (0.7)	
Chuquisaca	440 (71.7)	686 (77.5)	1126 (75.1)	
Cochabamba	7 (1.1)	11 (1.2)	18 (1.2)	
La Paz	17 (2.8)	21 (2.4)	38 (2.5)	
Oruro	11 (1.8)	5 (0.6)	16 (1.1)	
Pando	2 (0.3)	2 (0.2)	4 (0.3)	
Potosí	107 (17.4)	114 (12.9)	221 (14.7)	
Santa Cruz	15 (2.4)	28 (3.2)	43 (2.9)	
Tarija	7 (1.1)	12 (1.4)	19 (1.3)	
Argentina	3 (0 .5)	0 (0.0)	3 (0.2)	
Residential setting				0.012
Urban (centre/outskirts)	548 (89.3)	750 (84.7)	1298 (86.6)	
Rural	66 (10.7)	135 (15.3)	201 (13.4)	
Age				0.424
15–24	323 (52.6)	447 (50.5)	770 (51.4)	
25–49	291 (47.4)	438 (49.5)	729 (48.6)	
Marital status				<0.001
Married	156 (25.4)	270 (30.5)	426 (28.4)	
Divorced/widowed	10 (1.7)	20 (3.2)	38 (2.5)	
Single	408 (66.4)	489 (55.3)	897 (59.8)	
Common-law (stable) union	40 (6.5)	98 (11.1)	138 (9.2)	
Language				<0.001
Spanish or Spanish and another non-native language	339 (55.2)	357 (40.3)	696 (46.4)	
Spanish and native language or only native language	275 (44.8)	528 (59.7)	803 (53.6)	
Religion				0.001
Catholic	513 (83.6)	788 (89.0)	1301 (86.8)	
Other	61 (9.9)	72 (8.1)	133 (8.9)	
None	40 (6.5)	25 (2.8)	65 (4.3)	
Educational level				<0.001
Low	40 (6.5)	129 (14.6)	169 (11.3)	
Medium/high	574 (93.5)	756 (85.4)	1330 (88.7)	
Monthly family income (in Bolivianos)				0.005
<1000	236 (38.4)	408 (46.1)	644 (43.0)	
≥1000	374 (60.9)	466 (52.7)	840 (56.0)	
No reply	4 (0.7)	11 (1.2)	15 (1.0)	
No. of family members				0.258
<1 to 5	392 (63.8)	590 (66.7)	982 (65.5)	
≥6	222 (36.2)	295 (33.4)	517 (34.5)	

[a] χ^2 test.

Sexual risk practices

Prevalence of unsafe sex among persons who had already initiated their sexual life was 10.7% (95% CI: 8.6–12.1%), and was higher in urban, 11% (95% CI: 8.9–12.5%), than in rural areas, 8% (95% CI: 3.5–11.9%). Risk factors for this indicator were different in the rural and urban area (p-value for interaction < 0.05) and multivariate analysis were stratified by residential area (Table 4). Increased prevalence of unsafe sex in the urban area was reported by men, the "youngest" segment and subjects living in a "stable union" while in the rural area, no variable was found to have a statistically significant association with unsafe sex.

Discussion

Inadequate knowledge on HIV/AIDS transmission and prevention mechanisms and the discriminatory attitudes towards persons with HIV are very frequent in Sucre in spite of relatively low prevalence of unsafe sex behaviour and a very low prevalence of HIV infection. Moreover, indicators of knowledge, attitudes and practices on HIV/AIDS display important differences according to gender, ethnic and socio-economic origin, and urban versus rural residence.

The prevalence of HIV in the general population aged 15–49 in Sucre was 0.0% (95% CI: 0.0–0.37) and is lower than the

Table 2 – Prevalence of inadequate knowledge on HIV prevention and transmission mechanisms and adjusted OR estimated by multivariate logistic regression.

	Prevalence *n* (%)	Adjusted OR (95% CI)	*p*-value[a]
Women	606 (68.5)		
Residential setting			
Urban	480 (64.0)	1.0	
Rural	126 (93.3)	3.9 (1.9–8.2)	<0.001
Language			
Spanish or Spanish and another non-native language	201 (56.3)	1.0	
Spanish and/or Quechua	405 (68.5)	1.4 (1.0–1.9)	0.031
Educational level			
Medium/high	482 (63.8)	1.0	
Low	124 (96.1)	7.8 (3.1–19.7)	<0.001
Family income (in Bolivianos)			
≥1000	271 (58.2)	1.0	
<1000	324 (79.4	2.0 (1.4–2.7)	<0.001
Men	399 (65.0)		
Residential setting			
Urban	337 (61.5)	1.0	<0.001
Rural	62 (93.9)	7.3 (2.6–21.0)	
Language			
Spanish or Spanish and another non-native language	195 (57.5)	1.0	0.013
Spanish and native language or only native language	204 (74.2)	1.6 (1.1–2.3)	

[a] χ^2 test.

prevalence estimated by UNAIDS in 2010 for the general population of the same age in Bolivia, namely, 0.2% (95% CI: 0.1–0.34). These data rank Sucre as one of the regions with the lowest estimated prevalence in South America.[3]

Prevalence of inadequate knowledge on HIV/AIDS transmission and prevention mechanisms in Sucre is high; 65% in men and 69% in women. Furthermore, risk factors differ by gender. Although inadequate knowledge is more frequent in rural areas and among Quechua-speakers of both genders, among women it is additionally associated with a low educational and socio-economic level, highlighting their vulnerability. The prevalence of inadequate knowledge observed by our study is lower than that reported by previous studies conducted in Bolivia. The study developed in Chuquisaca by the UASB with UNAIDS on 2006 (unpublished result) also used the UNAIDS indicators and estimated the prevalence of inadequate knowledge as being 88% in rural areas, mostly Quechua-speaking, in the department of Chuquisaca, and data furnished by the most recent (2008) Bolivian National Demographic & Health Survey[12] estimated inadequate knowledge of modes of HIV transmission among

Table 3 – Prevalence of discriminatory attitudes to PLWHA[a] and adjusted OR estimated by multivariate logistic regression.

	Prevalence *n* (%) 1276 (85.1)	Adjusted OR (95% CI)	*p*-value[b]
Residential setting			
Urban	7 (7.4)	1.0	0.004
Rural	8 (7.7)	2.9 (1.4–5.0)	
Educational level			
Medium/high	6 (7.1)	1.0	0.030
Low	6 (8.3)	2.1 (1.1–4.2)	
Family income			
≥1000	271 (58.2)	1.0	
<1000	324 (79.4	2.0 (1.4–2.7)	0.027

[a] PLWHA: people living with HIV/AIDS.
[b] χ^2 test.

Table 4 – Prevalence of unsafe sex practices and adjusted OR estimated by multivariate logistic regression in the urban setting.

	Prevalence n (%) 114 (10.7)	Adjusted OR (95% CI)	*p*-value[a]
Sex			
Male	83 (17.4)	1.0	
Female	31 (5.3)	0.3 (0.2–0.4)	<0.001
Age			
15–24 years	75 (16.7)	1.0	
25–49 years	39 (6.4)	0.4 (0.2–0.6)	<0.001
Marital status			
Married	19 (5.2)	1.0	
Divorced-widowed	3 (9.1)	2.3 (0.6–8.2)	0.221
Single	75 (13.4)	1.30 (0.7–2.4)	0.457
Common-law (stable) union	17 (15.0)	2.9 (1.4–6.1)	0.004

[a] χ^2 test.

persons aged 15–49 as being 76% in men and 78% in women. Apart from methodological differences in the instruments for measuring and selecting the sample, these discrepancies may be due to the higher mean educational level of persons who answered our survey given that Sucre is a university city with a large number of residential students. Our study's findings are comparable to those of the 2008 El Salvador National Family Health Survey,[13] which describes inadequate knowledge of HIV as 66% among persons aged 15–49 and 63% among aged 15–24 but suggests higher levels of inadequate knowledge than other countries. In Brazil, inadequate knowledge of HIV was estimated at 39% and 43% in 2005.[14,15] It is noteworthy that, as in El Salvador, inadequate knowledge was higher in rural women with low educational and socio-economic levels, and that, as in Brazil,[16] in persons with lower education level. Finally, while there are other studies on knowledge and practices with respect to HIV/AIDS in Latin America, their results are not comparable to ours, since they were not conducted on the general population.[16,17]

The prevalence of attitudes of discrimination and stigmatisation towards persons living with HIV/AIDS in this study was very high, 85%, being higher in the rural area, a prevalence similar to those reported in the Simon Bolivar Andean University (UASB)-UNAIDS study (2006) (unpublished result). In our study, persons with a low socio-economic level displayed the most pronounced attitudes of rejection; this is important to be considered when designing preventive strategies as it has been acknowledged that attitudes of stigmatisation and discrimination towards PLWHA reduce the effectiveness of programmes and services.[18]

The prevalence of unsafe sexual risk practices was relatively low, 10%, and was higher in men than in women. These figures are lower than those from Brazil,[15] where unsafe sex in the general population aged 15–54 were 41% in women and 33% in men. In our study, there were no significant differences in the rural area for any of the variables, in line with the findings of the UASB-UNAIDS study in the rural area of Chuquisaca. In the urban area, however, women reported a significantly lower prevalence of unsafe sex than men, and adolescents and young adults reported more frequent unsafe sex practices than older adults aged 25–49. A study conducted in Brazil[15] reported that persons aged 40–54 had higher prevalence of unsafe sex than adolescents and young adults. In our study, 22% of the population had initiated sexual relations before the age of 15 years, though this was commoner in men than in women. This percentage was higher than that reported by the 2008 Bolivian National Demographic & Health Survey.[12] Compared to other countries in the region, the age of initiation of sexual relations in Bolivia is higher.[16]

One of the limitations of this study is not having the response rate since no data were gathered to calculate it. Another limitation is the loss of relative precision in the estimation of HIV prevalence due to the restricted sample size, nevertheless the absolute precision is still low and our result is consistent with previous studies that have reported low HIV prevalence in Bolivia. Since no optimal sampling framework was available, random sampling was not strictly fulfilled due to the difficulties of reaching subjects in the rural area. An effort was also made to minimise information bias, by rendering the survey anonymous, ensuring interviewers were of the same gender as interviewees, and indicating beforehand that nothing subjects might say would be judged, and that it was hoped they would reply as honestly as possible as results would be useful, not only for themselves but also for many other persons. All these helped create a climate of trust and reduce information bias, though underreporting of sexual risk behaviours motivated by the need to give socially acceptable replies cannot be ruled out.

In conclusion this is the first study to analyse knowledge, attitudes and sexual practices with respect to HIV/AIDS and prevalence of HIV infection among the general population of Sucre, Bolivia. The results of this study that highlight profound and unfair differences by gender, ethnic and socio-economic origin, and urban versus rural residence should allow to design policies that take into account ethnic, intercultural, regional and gender-related realities, aligned with current national community and intercultural health policy as to provide an adequate response to the HIV/AIDS epidemic in Bolivia.

Conflicts of interest

The authors declare no conflicts of interest.

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