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Prevalence and vulnerability of homeless people to HIV infection in São Paulo, Brazil

ABSTRACT

OBJECTIVE: To assess the prevalence and vulnerability of homeless people to HIV infection.

METHODS: Cross-sectional study conducted with a non-probabilistic sample of 1,405 homeless users of shelters in the city of São Paulo, southeastern Brazil, from 2006 to 2007. They were all tested for HIV and a structured questionnaire was applied. Their vulnerability to HIV was determined by the frequency of condom use: those who reported using condoms only occasionally or never were considered the most vulnerable. Multinomial and logistic regression models were used to estimate effect measures and 95% confidence intervals.

RESULTS: There was a predominance of males (85.6%), with a mean age of 40.9 years, 72.0% had complete elementary schooling, and 71.5% were non-white. Of all respondents, 15.7% reported being homosexual or bisexual and 62,0% reported having casual sex. The mean number of sexual partners in the last 12 months was 5.4. More than half (55.7%) of the respondents reported lifetime drug use, while 25.7% reported frequent use. Sexually-transmitted disease was reported by 39.6% of the homeless and 38.3% reported always using condoms. The prevalence of HIV infection was 4.9% (17.4% also tested positive for syphilis) and about half of the respondents (55.4%) had access to prevention programs. Higher HIV prevalence was associated with younger age (18-29 years, OR = 4.0 [95%CI 1.54;10.46]); past history of sexually-transmitted disease (OR = 3.3 [95%CI 1.87;5.73]); homosexual sex (OR = 3.0 [95%CI 1.28;6.92]); and syphilis (OR = 2.4 [95%CI 1.13;4.93]). Increased vulnerability to HIV infection was associated with being female; young; homosexual sex; having few partners or a steady partner; drug and alcohol use; not having access to prevention programs and social support.

CONCLUSIONS: The HIV epidemic has a major impact on homeless people reflecting a cycle of exclusion, social vulnerability, and limited access to prevention.

DESCRIPTORS: Homeless Persons. HIV Infections, epidemiology. Risk Factors. HIV Seroprevalence. Syphilis Serodiagnosis. Health Vulnerability. Sexually Transmitted Diseases, epidemiology.

INTRODUCTION

The AIDS epidemic in Brazil is characterized by major urban concentration of cases[8] in specific population groups including sex workers[23] (HIV prevalence rates of 4.8%), men who have sex with men (MSM) (13.6%)[13] and drug users (23.1%).[13] The greater impact of the HIV/AIDS epidemic in these groups is mainly associated with individual factors and social and institutional contexts

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especially unsafe sexual behavior and drug use; discrimination; social inequality; and poor access to care services. All these factors strongly affect homeless people in Brazil,[3,a,b] and in other countries.[7,11,16,20] Studies assessing the impact of the HIV/AIDS epidemic on homeless people are scarce in Brazil.[2,3,b] There is little information on HIV prevalence rates, risk factors associated with HIV infection, and other aspects that may guide specific prevention actions in this group.

Homeless population in the city of São Paulo, southeastern Brazil, was estimated at 13,666 individuals by the end of 2009,[c] a 1.6 times increase from that recorded in 2000. Most (79%) homeless people reported spending the night in shelters and/or similar facilities.[a] This group is characterized by high prevalence of tuberculosis,[1,d] sexually transmitted diseases (STDs) including syphilis and hepatitis,[3] and mental illness.[2] Their condition is further aggravated by extreme social vulnerability with high drug and alcohol use (74%), incarcerations in detention facilities (27%), no official documentation (43%), no source of livelihood and experience of street violence (67%).[a]

The few studies on the AIDS epidemic in homeless people in Brazil have mainly focused on people living with HIV/AIDS[c] or assessed HIV prevalence and risk factors in homeless segments including individuals incarcerated in jails or in other correctional institutions.[30] One study assessing the prevalence of HIV and other STDs in homeless people was conducted in a non-probabilistic sample of 330 users of overnight shelters in a central area of the city of São Paulo[3] between 2002 and 2003.

The present study aimed to assess the prevalence of HIV infection, factors associated and the profile of vulnerability of homeless people to HIV infection.

METHODS

Cross-sectional study conducted with a non-probabilistic sample of 1,405 homeless individuals older than 18 in the city of São Paulo, Brazil, between October 2006 and March 2007. Users of 25 shelter facilities located in the central, west, east and south areas of the city were approached. The study facilities met the following inclusion criteria: capacity of providing shelter to at least 50 homeless people and replying to the invitation to participate in the study. This is part of a large study conducted by the São Paulo STD/AIDS Reference Center designed to evaluate the feasibility of using rapid syphilis testing in homeless people.

Data were collected through structured questionnaire administered by health providers after an education intervention on STD and AIDS. Blood samples were collected for syphilis and HIV serum testing.

The Brazilian Ministry of Health algorithm for HIV testing was followed: samples were defined as positive when they presented a positive result in the enzyme linked immunosorbent assay (ELISA) and was confirmed by immunofluorescence and/or Western Blot. Those with indeterminate results were excluded from the analysis. Samples were defined as positive for syphilis when they presented any titer in the Venereal Diseases Research Laboratory (VDRL) test that was confirmed by the Treponema pallidum hemagglutination test (TPHA).

The following factors associated with higher HIV prevalence were studied: sociodemographic variables; sexual behavior; condom use during sex; knowledge on transmission and prevention of STDs; self-reported history of STDs; syphilis status; and reporting and frequency (regular / non-regular) of alcohol and drug use and injectable drug use in their lifetime (Table 1). A logistic regression model was used to control for confounders and estimate measures of effect (odds ratio [OR] and their related 95% confidence intervals [95%CI]). All variables in the analysis were included in the initial model and were excluded when $p > 0.05$.

The respondents' vulnerability to unsafe sexual behavior and HIV infection was assessed through self-reported condom use. Those who reported sometimes or never using condoms were considered the most vulnerable. This analysis included the same variables used for assessing HIV infection prevalence in addition to the following ones: attending prevention activities (counseling, education groups and talks), and involvement in health and social care (referral to health and social services and support homes). Drug use was analyzed using lifetime use of any drug, except tobacco, alcohol and sleeping pills, as a reference. Multinomial regression was used to control for confounders and to estimate measures of effect. All variables were included

[a] Fundação Instituto de Pesquisas Econômicas. Principais resultados do perfil socioeconômico da população de moradores de rua da área central da cidade de São Paulo, 2010. São Paulo [cited 2011 Dec 23]. Available from: http://www.prefeitura.sp.gov.br/cidade/secretarias/upload/chamadas/3_1275334714.pdf

[b] Ouriques CQ. Do menino ao jovem adulto de rua portador de HIV/AIDS: um estudo acerca de sua condição e modo de vida. [dissertação de mestrado]. Porto Alegre: Pontifícia Universidade Católica do Rio Grande do Sul; 2005.

[c] Fundação Instituto de Pesquisas Econômicas. Principais resultados do censo da população em situação de rua da cidade de São Paulo, 2009. São Paulo: Fundação Instituto de Pesquisas Econômicas; 2019 [cited 2011 Dec 23]. Available from: http://www.prefeitura.sp.gov.br/cidade/secretarias/upload/chamadas/2_1275339508.pdf

[d] Secretaria de Estado da Saúde e Defesa Civil do Rio de Janeiro. Tuberculose e pessoas vivendo em situação de rua no Rio de Janeiro: estudo de prevalência e propostas de adesão ao diagnóstico e tratamento: relatório do projeto. Rio de Janeiro; 2011 [cited 2011 Dec 23]. Available from: http://www.fundoglobaltb.org.br/download/TB%20POP%20RUA%202011_INTERNET.pdf

Table 1. Prevalence of HIV infection in homeless people. São Paulo, Brazil. 2006-2007.

Characteristics		HIV status				Total	
		HIV +		HIV -			
		n	%	n	%	n	%
Total[a]		69	4.9	1,333	95.1	1,402	100.0
Gender	Female	13	6.4	189	93.6	202	14.4
	Male	56	4.7	1,144	95.3	1,200	85.6
Age group (years)	18-29	14	5.2	255	94.8	269	19.2
	30-39	27	6.9	364	93.1	391	27.9
	40-49	20	5.4	349	94.6	369	26.3
	50 or more	7	1.9	354	98.1	361	25.7
	Missing information	1		11		12	0.9
Schooling	No schooling	7	9.2	69	90.8	76	5.4
	Elementary schooling	46	4.6	964	95.4	1,010	72.0
	Middle and high schooling	16	5.2	291	94.8	307	21.9
	Missing information	-		9		9	0.6
Self-reported skin color	White	21	5.4	367	94.6	388	27.7
	Non-white	48	4.8	957	95.2	1,005	71.7
	Missing information	-		9		9	0.6
Age at sexual initiation	> 15 years	24	4.2	554	95.8	578	41.2
	≤ 15 years	42	5.5	716	94.5	758	54.1
	Missing information	3		63		63	4.5
Sexual orientation	Homosexual	9	13.6	57	86.4	66	4.7
	Bisexual	12	7.8	142	92.2	154	11.0
	Heterosexual	48	4.2	1,108	95.8	1,156	82.5
	Missing information	-		26		26	1.9
Type of sex partner	Steady and casual partner	13	7.9	151	92.1	164	11.7
	Casual partner only	35	5.0	670	95.0	705	50.3
	Steady partner only	11	6.2	167	93.8	178	12.7
	No partner	10	2.8	344	97.2	354	25.2
	Missing information	-		1		1	0.1
Number of partners	No partner	10	2.8	344	97.2	354	25.2
	1-3	39	6.0	616	94.0	655	46.7
	4-10	12	4.2	272	95.8	284	20.3
	11 or more	8	7.3	101	92.7	109	7.8
Always use condom	Yes	31	5.9	496	94.1	527	37.6
	No	38	4.5	811	95.5	849	60.6
	Missing information	-		26		26	1.9
Knowledge on prevention[b]	Yes	54	6.0	843	94.0	897	64.0
	No	15	3.0	490	97.0	505	36.0
Lifetime use of alcohol	Yes	55	4.7	1,111	95.3	1,166	83.2
	No	14	6.1	214	93.9	228	16.3
	Missing information	-		8		8	0.6
Lifetime use of drugs	Yes	47	6.0	734	94.0	781	55.7
	No	22	3.5	599	96.5	621	44.3
Frequent drug use[c]	Yes	25	6.9	335	93.1	360	25.7
	No	44	4.2	998	95.8	1,042	74.3

Continue

Table 1. Continuation.

Characteristics		HIV status				Total	
		HIV +		HIV -			
		n	%	n	%	n	%
Lifetime use of injectable cocaine	Yes	8	10.3	70	89.7	78	5.6
	No	61	4.6	1,251	95.4	1,312	93.6
Past history of STDs	Yes	43	7.9	501	92.1	544	38.8
	No/don't know	25	3.0	805	97.0	830	59.2
	Missing information	1		27		28	2.0
Syphilis status	Positive	12	12.5	84	87.5	96	6.8
	Negative	57	4.4	1,235	95.6	1,292	92.2
	Missing information	-		14		14	1.0
Attending prevention actions[d]	Yes	45	5.8	732	94.2	777	55.4
	No	24	3.8	601	96.2	625	44.6
Social support program	Yes	42	5.6	710	94.4	752	53.6
	No	27	4.2	623	95.8	650	46.4

[a] Three respondents indeterminate results and were excluded from the analysis
[b] Refers to forms of sexual transmission and condom use
[c] Except for alcohol use and sleep-inducing pills
[d] Including counseling. education groups and talks
STDs: Sexually transmitted diseases

in the initial model and then those with p>0.05 were excluded. The analyses were performed using SPSS (version 13).

The study was approved by the Research Ethics Committee of the São Paulo STD/AIDS Reference Center (Protocol 025/2005 and addendum 044/2011). All respondents signed a free informed consent.

RESULTS

Of 2,110 homeless individuals who were invited to participate in the study, 86.6% (1,405) agreed to participate. Those who refused to participate reported that they were not willing to wait for testing (8.9%) and/or fear of blood drawing (6.5%). Most respondents were male (85.6%), mean age 40.9 years, had elementary education (72.0%) and self-reported as non-white (71.7%). The mean age of sexual initiation was 15.3 years; most (82.5%) reported engaging in heterosexual sex, had at least one casual partner (62.0%) in the last 12 months and an average of 5.4 partners during the same period. Homosexual/bisexual sex was reported by 15.7% (38 females and 182 males) and 38.8% reported STDs (Table 1).

Table 2. Crude and adjusted odds ratios for factors associated with HIV prevalence in homeless people. São Paulo, Brazil. 2006-2007.

Characteristics		n	Crude OR	Adjusted OR	95% CI[c]	p-value
Age group (years)	18-29	269	2.8	4.0	1.54;10.46	0.004
	30-39	391	3.8	3.9	1.61;9.37	0.003
	40-49	369	2.9	3.0	1.22;7.37	0.017
	50 or more	361	1	1	1	
Sexual orientation	Homosexual	66	3.6	3.0	1.28;6.92	0.011
	Bisexual	154	2.0	1.6	0.76;3.17	0.228
	Heterosexual	1,156	1	1	1	
Past history of STDs	Yes	544	2.8	3.3	1.87;5.73	<0.001
	No/don't know	830	1	1	1	
Syphilis status	Positive	96	3.1	2.4	1.13;4.93	0.022
	Negative	1,292	1	1	1	

STDs: sexually transmitted diseases

Slightly more than half of the respondents reported lifetime use of psychoactive drugs (55.7%) and 25.7% reported frequent use at the time of the study. The main drugs used were: marijuana (50.8%); snorted cocaine (34.2%); and crack/merla (25.0%) (data not shown). Lifetime use of injectable cocaine was reported by 5.6% (Table 1).

The prevalence of HIV infection was 4.9%. Higher prevalences were seen in those who reported engaging in homosexual sex (13.6%); who had no access to formal education (9.2%); who tested positive for syphilis (12.5%); and those who reported lifetime use of injectable cocaine (10.3%). Lower rates were found in those aged 50 or more (1.9%) and who had no sexual partners in the last 12 months (2.8%) (Table 1). HIV-syphilis coinfection was found in 17.4% of HIV-infected respondents.

Higher prevalence of HIV infection was associated with age, and respondents were less likely to be infected with increasing age (OR 18-29 years = 4.0, 95% CI 1.54;10.46); past history of STDs (OR = 3.3, 95%CI 1.87;5.73); homosexual sex (OR = 3.0, 95%CI 1.28;6.92), and active syphilis infection (OR = 2.4, 95%CI 1.13;4.93) (Table 2). The following variables were not associated with higher HIV prevalence: gender; schooling; self-reported skin color; age at sexual initiation; number and type of sexual partners; condom use; alcohol and drug use (including use of injectable cocaine); knowledge on STD prevention; attending prevention activities; and social support.

Respondents who reported always using condoms were 38.3% while occasional and never condom use was reported by 32.6% and 29.2%, respectively. Always using condoms was more commonly reported in those with 11 or more sex partners in the last 12 months (50.0%); those who reported casual partners (44.1%); and who did not report drug use (43.0%) (Table 3).

Never using condoms was associated with being female (OR = 2.5, 95%CI 1.54; 3.90); no partners in the last 12 months (OR = 3.0, 95%CI 1.05;8.77); or having one to three partners in the last 12 months (OR = 2.91, 95%CI 1.31;6.46); having a steady partner (OR = 2.1, 95%CI 1.22;3.47); not having any casual partners (OR = 2.7, 95%CI 1.41;5.05); lifetime drug use (OR = 1.9, 95%CI 1.32;2.75); and no attending prevention activities (OR = 1.7, 95%CI 1.17;2.37). Being young was a protective factor against not using condom use (OR = 0.5, 95%CI 0.34;0.74) (Table 4).

The variables associated with occasional condom use were: being between 18 and 29 years (OR = 2.00, 95%CI 1.25; 3.16) or between 40 and 49 years (OR = 1.7, 95%CI 1.13;2.58); bisexual sex (OR = 2.4, 95%CI 1.51;3.73); having a steady partner (OR = 2.0, 95%CI 1.33; 3.11); lifetime alcohol use (OR = 2.1, 95%CI 1.37;3.32); frequent drug use (OR = 1.8, 95%CI 1.24;2.54); and social support (OR = 1.8, 95%CI 1.29;2.46).

The variables gender and skin color showed slight differences in the likelihood of occasional condom use. Schooling, age of sexual initiation, and knowledge on transmission and prevention of STDs were not associated with condom use.

DISCUSSION

The prevalence of HIV infection among homeless people in the city of São Paulo is disproportionately high compared to the general population. Although higher HIV rates were associated with younger age, homosexual sex, past history of STDs, and syphilis infection, all segments analyzed by demographic characteristics, sexual practices, and drug and alcohol use showed infection rates higher than in the Brazilian population (0.6% in adults), from three to 20 times higher. Higher vulnerability to HIV infection in the homeless population studied based on unsafe sexual behavior is associated with a complex array of factors including gender and generational differences, sexual practices and type of sexual partners, drug and alcohol use and no access to STD and AIDS prevention. Inconsistent condom use (occasional/never) was reported in approximately two-thirds of the respondents and it was found a high rate of HIV-syphilis coinfection.

The particularities of cross-sectional studies must be taken into consideration while interpreting these findings. Factors associated with higher HIV prevalence tended to reflect characteristics that are less variable (e.g., sexual behavior) or are more likely to occur over time (past history of STD/syphilis). On the other hand, characteristics that reflect practices and living conditions present at the time of the study could be further explored in the analysis of the vulnerability profile that showed a complex scenario involving classic situations associated with increased risk of HIV infection.

Another important aspect is that the study was conducted using a non-probabilistic sample which restricts extrapolation of results to the large population of homeless people. However, it is the first study conducted in Brazil assessing the prevalence and vulnerability to HIV in a significant sample of homeless people. The study sample included more than 10% of the estimated size for this population in São Paulo,[d] and demographic characteristics related to gender, age, skin color, and schooling seen in the non-probabilistic sample are similar to those reported in a census of homeless people in São Paulo.[c] However, the homeless people studied are shelter users and may be different from those who sleep alone on the streets and tend to be more socially vulnerable.[28]

Table 3. Condom use and characteristics of homeless people. São Paulo, Brazil. 2006-2007.

Characteristics		Condom use						
		Always		Occasional		Never		Total
		n	%	n	%	n	%	n
Total[a]		528	38.3	449	32.6	402	29.2	1,379
Gender	Female	45	22.7	55	27.8	98	49.5	198
	Male	483	40.9	394	33.4	304	25.7	1,181
Age group (years)	18–29	86	32.8	114	43.5	62	23.7	262
	30–39	162	41.6	152	39.1	75	19.3	389
	40–49	140	38.6	121	33.3	102	28.1	363
	50 or more	136	38.3	60	16.9	159	44.8	355
	Missing information	4		2		4		10
Self-reported skin color	White	159	41.4	104	27.1	121	31.5	384
	Non-white	368	37.3	341	34.5	278	28.2	987
	Missing information	1		4		3		8
Sexual orientation	Homosexual	25	37.3	21	31.3	21	31.3	67
	Bisexual	37	24.5	78	51.7	36	23.8	151
	Heterosexual	466	40.3	350	30.3	341	29.5	1,157
	Missing information	-		-		4		4
Number of sex partners	No partner	107	32.3	71	21.5	153	46.2	331
	1–3	232	35.4	218	33.2	206	31.4	656
	4–10	134	47.5	113	40.1	35	12.4	282
	11 or more	55	50.0	47	42.7	8	7.3	110
Steady partner	Yes	88	25.6	122	35.5	134	39.0	344
	No	439	42.6	325	31.5	267	25.9	1,031
Occasional partner (in the last 12 months)	Yes	382	44.1	334	38.5	151	17.4	867
	No	146	28.7	112	22.0	250	49.2	508
Lifetime use of alcohol	Yes	438	38.0	403	34.9	313	27.1	1,154
	No	90	41.5	42	19.4	85	39.2	217
	Missing information	-		4		4		8
Lifetime use of drugs	Yes	268	34.6	301	38.8	206	26.6	775
	No	260	43.0	148	24.5	196	32.5	604
Frequent drug use[b]	Yes	110	30.7	176	49.2	72	20.1	358
	No	418	40.9	273	26.7	330	32.3	1,021
Attending prevention actions[c]	No	222	36.3	170	27.8	219	35.8	611
	Yes	306	39.8	279	36.3	183	23.8	768
Social support program	Yes	266	35.8	283	38.0	195	26.2	744
	No	262	41.3	166	26.1	207	32.6	635

[a] 26 did not answer
[b] Except for alcohol use and sleeping inducing pills
[c] Including counseling, education groups and talks

In addition, safer sex practices may have been overestimated while alcohol and drug use may have been underestimated as information was collected following an education intervention and shelter facilities have well-defined rules such as restrictions on psychoactive drug use.

Studies[3,10,11,16,17,25,27] conducted in several different cities around the world showed that the prevalence of HIV infection among homeless people is significantly higher than in the general population. In the present study, however, this rate was as high as in those population groups most affected by the HIV/AIDS

Table 4. Multinomial regression to assess vulnerability of homeless people to HIV infection based on condom use. São Paulo. Brazil. 2006-2007.

Characteristics			Occasional condom use				Never use condom use			
		n	Crude OR	Adjusted OR	95% CI	p	Crude OR	Adjusted OR	95% CI	p
Gender	Female	177	1.5	1.6	1.00;2.70	0.050	3.5	2.5	1.54;3.90	< 0.001
	Male	1,110	1	1			1	1		
Age group (years)	18-29	253	3.0	2.0	1.25;3.16	0.004	0.6	0.4	0.25;0.67	< 0.001
	30-39	361	2.1	1.5	0.96;2.24	0.076	0.4	0.3	0.20;0.46	< 0.001
	40-49	338	2.0	1.7	1.13;2.58	0.012	0.6	0.5	0.34;0.74	0.001
	50 or more	335	1	1			1	1		
Self-reported skin color	White	357	0.7	0.7	0.53;0.99	0.043	1.0	1.0	0.74;1.42	0.866
	Non-white	930	1	1			1	1		
Sexual orientation	Homosexual	66	1.1	1.1	0.56;2.01	0.852	1.2	0.9	0.46;1.85	0.831
	Bisexual	140	2.8	2.4	1.51;3.73	< 0.001	1.3	1.6	0.92;2.75	0.097
	Heterosexual	1,081	1	1			1	1		
Number of sex partners	No partner	298	0.8	1.3	0.54;3.01	0.588	9.8	3.0	1.05;8.77	0.041
	1-3	613	1.1	1.2	0.75;1.99	0.429	6.1	2.9	1.31;6.46	0.009
	4-10	271	1.0	1.2	0.69;1.93	0.573	1.8	1.5	0.64;3.48	0.354
	11 or more	105	1	1			1	1		
Steady partner	Yes	320	1.9	2.0	1.33;3.11	0.001	2.5	2.1	1.22;3.47	0.007
	No	967	1	1			1	1		
Occasional partner (in the last 12 months)	No	464	0.9	0.8	0.43;1.50	0.497	4.3	2.7	1.41;5.05	0.002
	Yes	823	1	1			1	1		
Lifetime use of alcohol	Yes	1,090	2.0	2.1	1.37;3.32	0.001	0.8	0.9	0.60;1.34	0.529
	No	197	1	1			1	1		
Lifetime use of drugs	Yes	730	2.0	1.2	0.87;1.75	0.231	1.0	1.9	1.32;2.75	0.001
	No	557	1	1			1	1		
Frequent drug use[b]	Yes	341	2.5	1.8	1.24;2.54	0.002	0.8	1.2	0.77;1.79	0.461
	No	946	1	1			1	1		
Attending prevention actions[c]	No	566	0.8	1.2	0.84;1.62	0.360	1.7	1.7	1.17;2.37	0.005
	Yes	721	1	1			1	1		
Social support program	Yes	707	1.7	1.8	1.29;2.46	0.001	0.9	1.1	0.79;1.61	0.505
	No	580	1	1			1	1		

[a] Except for alcohol use and sleeping inducing pills
[b] Including counseling, education groups and talks

epidemic in Brazil such as sex workers[23] (4.8%) and MSM[13] (13.6%). Despite specific population and living conditions, high HIV prevalence was also reported in Tehran,[27] Iran, in a 2007 study of 202 users of a social support facility. It was found an infection rate of 6.4%, associated with drug use and STDs. AIDS case reports of homeless people receiving support at welfare centers in Medellin,[25] Colombia, in 2008, showed an HIV prevalence of 2.2%. The analysis of records of 23,216 individuals who sought HIV testing in 110 care facilities in Massachusetts,[16] U.S., in 1993 showed an HIV prevalence of 4.3% among homeless people, which was 1.78 times higher than that found in non-homeless population. A study in Brazil reported a 1.8% prevalence of HIV in homeless people in the central area of São Paulo. The difference in the prevalence compared to our

results may be attributable to the sample size and specific characteristics of the populations analyzed in each study.

The study results suggest, in homeless people, social indicators such as schooling and skin color are not adequate to discriminate those who are more exposed to non-condom use and HIV infection. It might be consequential to the extreme vulnerability that is inherent to living on the streets,[1,15,28] and such a condition overlaps with other factors typically associated with poverty and social inequality in the general population. In other words, living on the streets and insecurity related to having no housing[7,11,20,28] are per se factors that bring about situations of greater exposure to HIV such as violence and no access to services.[14,26,29]

These same particularities may largely explain the study finding that young, female and homeless individuals engaging in homosexual sex are more vulnerable to HIV infection. We found that, among those engaging in homosexual sex, at least one out of 10 are living with HIV. Also, homosexual sex (15.7%) was more frequently reported among homeless people than in the Brazilian population (3.1% reported in a 2008 household survey[e]). Those homeless who were younger than 29 years were 4 times more likely to be infected with HIV than those aged 50 or more. And half of the women reported not using condoms during sex with their steady or casual partners.

Greater vulnerability of young homeless, females and individuals engaging in homosexual sex has been consistently reported. In San Francisco, US,[18] there was found higher HIV prevalence (29.6%) in individuals engaging in homosexual sex (user and non-users of injectable drugs) than in homeless individuals who were injectable drug users and did not engage in homosexual sex (7.7%) and other groups studied (5.0%) of non-homosexual/non-injectable drug users. A high prevalence (17%) was also reported in a probabilistic sample of young (15-24 years) homeless living on the streets of three cities of Ukraine[10] in 2008. This prevalence increased to 28% among young homeless orphans. Increased exposure to HIV was reported in homeless women in Los Angeles, US.[24] They showed higher rates of STDs than men. Greater exposure to HIV in these three groups has been attributed to situations that become more extreme in their daily life on the streets such as intolerance and gender differences. As a result, these groups more frequently report sexual abuse, violence, discrimination, drug and alcohol use, and exchange of sex for money and favors.[6,9,14,21,22,26] Among homosexuals, homophobia has been identified as the main factor driving them onto streets.[4,19] A qualitative study conducted in Los Angeles[21] showed that women's choice to use condoms is strongly affected by their emotional involvement and trust in their partner, and that sex occur due to various reasons including sexual abuse and need for affective involvement.[21,28]

Our study also found low (less than 50%) consistent (always) condom use in all groups analyzed. There are many factors affecting condom use among homeless people; some factors negatively affect use while others increase it use but not always. Having fewer partners in the last 12 months and a steady partner were predictors of non-condom use; and alcohol and drug use was associated with inconsistent condom use whereas having more partners, a casual partner and attending education activities have promoted consistent condom use. In turn, social support promoted occasional condom use.

The relationship between high/low condom use, type of sexual partner and alcohol and drug use is consistent with a pattern reported in the general population and in other groups highly vulnerable to HIV infection.[13,e] It can be affected by a relationship of affection, awareness of the risk, and trust in sexual partners, among others. Alcohol and drug use impairs an individual's ability to make a choice on condom use, especially when used before sex. All these factors have a stronger weight in the population studied. They need to be targeted in prevention programs given the high proportion of respondents reporting psychoactive drug use and casual sex partners; i.e., more than eight out of 10 reported lifetime use of alcohol, of which six reported frequent use.

It should be noted that education interventions have a positive effect and can increase the likelihood of homeless people engaging in safe sex behavior. They can become more effective if they are integrated to health promotion and social support and inclusion actions.[5,12,28] This aspect has been consistently reported in the literature,[5,12] with reduction of drug use, increase in safe sex behavior and improved HIV care and treatment adherence and utilization of health services. Almost half of the homeless respondents reported having no access to prevention programs and social support, being excluded from overnight shelter support.

This study evidenced a cycle where social exclusion of homeless people increases their vulnerability and brings about situations of greater exposure to HIV, especially among younger individuals, females, and those engaging in homosexual sex. Education interventions proved to be effective and may be a turning point for improving quality of life and health of homeless people, especially when combined with social support actions.

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