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Signs and symptoms associated with sexually transmitted infections in Brazil, 2005

ABSTRACT

OBJECTIVE: Sexually transmitted infections (STIs) are a major determinant of population disease burden worldwide. The objective of the study was to assess self-reported morbidity associated to STIs according to gender.

METHODS: The study data were obtained from a 2005 study consisting of a multistage probabilistic sample of 5,040 respondents, aged 16–65 years, living in urban areas in Brazil. These data were compared with those from a previous 1998 study. Bivariate analyses were carried out using Pearson's chi-square test and simple linear regression followed by logistic regression.

RESULTS: In both men and women, the variables: previous HIV testing, personal belief in unfaithful love, and number of sexual partners in a lifetime were significantly associated to STIs. In women only, the covariates: low family income, living in the Mid-West, Southeast and South regions, and reporting of physical violence were independently associated to STIs. In men, the variables associated were: age group (35 years or more), living in the South region and in the state of São Paulo, and self-perceived HIV infection risk.

CONCLUSIONS: Signs and symptoms associated to STIs have strong gender differences in the general population and education interventions should be specifically targeted to either men or women.

DESCRIPTORS: Sexually Transmitted Diseases, epidemiology. Acquired Immunodeficiency Syndrome, Epidemiology. Morbidity Surveys. Sexual and Reproductive Health. Brazil. Cross-sectional Studies.

INTRODUCTION

In diverse settings worldwide and particularly in developing countries, sexually transmitted infections (STIs) are a major determinant of population disease burden.[8,17] They comprise a complex set of infections caused by several different microorganisms, with very specific clinical presentations and natural histories, and therefore further investigation is needed on basic concepts.

The term "sexually transmitted infection" (STI) is preferred to the commonly used "sexually transmitted disease" (STD), since many infections have a predominantly or completely asymptomatic course. However, in self-reported morbidity surveys not supported by laboratory testing, STD seems to be the most appropriate term to describe them as these studies capture information exclusively related to symptomatic cases. But there remains an unanswered question regarding population-based surveys not supported by any clinical or laboratory investigation: to what extent does self-reported morbidity reflect people's actual health status.[12]

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Although many STI cases remain asymptomatic for extended periods, this does not prevent an eventual progression to more severe disease forms such as infertility, chronic pelvic pain and different cancers as well. This characteristic long asymptomatic course of STIs has been described by Eng & Butler[8] (1997) as a "hidden epidemic," and their actual magnitude and severity can only be verified through population-based studies combining survey questionnaire data and laboratory testing.

STDs are determining cofactors of HIV infection and transmission, playing a crucial role in the dynamics of HIV spread worldwide.[1,22] They are a particularly important public health concern due to the severity of cancers secondary to the two sexually transmitted virus infections: hepatitis B virus (HBV) infection, which may lead to liver cirrhosis, liver failure and cancer; and human papillomavirus (HPV) infection, which is associated to several different cancers, notably cervical and anal cancer, and has been recently described as causing tonsil cancer and other head and neck cancers.[16]

Varying STD prevalences, incidence and morbidity rates may be a result of biological predisposition to acquire certain infections/diseases, sexual behaviors determining increased or reduced infection risk, diverse social and cultural environment of both men and women (which also includes gender inequalities and/or unequal access to material and non-material resources such as education and adequate income), the availability of preventive actions for health maintenance and promotion and access to health services.[10,20]

In particular, women are more susceptible to HIV-1 infection due to hormonal changes; physiology and ecology of their vaginal flora; higher prevalence of other STDs;[21] sexual and affective mixing patterns usually involving the interaction of younger women with older male partners (who have higher background prevalences for different STIs in diverse settings);[14] besides restraints against the use and maintenance of protective measures in situations of marked gender inequality and even violence.[11]

Population-based studies have been scarce in Brazil and they fulfill three main purposes: a) to support the implementation of strategies for management and treatment of major clinical syndromes associated with STDs;[18] b) to support public policies, epidemiological studies and mathematical modeling on HIV/AIDS given that STIs/STDs comprise major cofactors for sexual HIV spread;[1,22] and c) to provide markers potentially associated to the prevalence of sexual risk behaviors in baseline and follow-up studies.[22]

The objective of the present study was to assess self-reported morbidity of major STDs and their variables associated according to gender.

METHODS

The analyses refer to findings of the survey "*Comportamento Sexual e Percepções da População Brasileira sobre HIV/Aids*"[a] (Sexual behavior and perceptions of the Brazilian population regarding HIV/AIDS), carried out in 2005, and compared to a similar survey carried out in 1998.[b] Data were obtained through a multistage probabilistic sample comprising 5,040 subjects aged between 16 and 65 years who were living in large metropolitan areas in Brazil and collected through the administration of individual standardized questionnaires. A similar survey was carried out in 1998 in a sample of 2,416 subjects. The survey methods and sampling are detailed elsewhere.[3]

Both surveys included representative samples of Brazilian urban population drawn from microregions defined by the *Instituto Brasileiro de Geografia e Estatística* (Brazilian Institute of Geography and Statistics, IBGE). A four-step stratified sampling resulted in three strata in capital cities and census tracts, private households and individuals aged between 16 and 65 years were successively drawn in all microregions studied. Data that were analyzed are from post-strata, defined based on a weighing process that corrects the probability of inclusion of any household in the sample, as described by Bussab.[3]

The questionnaire on STDs included questions addressing self-reported signs and symptoms suggestive of STDs (perceived illness) and history of STDs based on the diagnosis conveniently communicated by an accredited health provider (physician or biomedical provider) (Table 1).

Bivariate analyses were first conducted using Pearson's chi-square test for categorical variables and simple linear regression for discrete or continuous variables, checking whether angular coefficient was significantly greater than zero. This was intended to select potential risk factors for STDs in the logistic regression model. Analyses were carried out according to gender, at a 10% significance level in bivariate analyses and at 5% significance level in the logistic regression model. A more conservative significance level was set because it was a large comprehensive population-based sample. Variables selected for the analysis are displayed in Table 1. Since the study data have a complex structure, the "svy" command of Stata 8.0 was used as it allows to incorporating weighted estimates for complex samples into variance estimates.

Additional analyses were conducted excluding the symptom "vaginal discharge" since, strictly speaking, it is recognizably non-specific and weakly associated to STDs.[19]

[a] Survey conducted by the Centro Brasileiro de Análise e Planejamento (Cebrap) and the Brazilian Ministry of Health.
[b] Berquó E, coordenador. In: Comportamento sexual da população brasileira e percepções do HIV/AIDS. Brasília (DF): Ministério da Saúde, Secretaria de Políticas de Saúde, Coordenação Nacional DST e Aids; 2000. (Série avaliação, 4).

Table 1. Description of variables associated to the prevalence of self-reported sexually transmitted diseases.* Brazil, 2005.

Name	Coding
Outcome	
Sexually transmitted infection	0. "Never had this disease" (reference value)
	1. "Already had it but does not have it anymore" or "Has such disease right now"
Covariable	
Age group	0. "16–34"
	1. "35 or more"
Region of residence	0. "North and Northeast" (reference value)
	1. "Center-West and Southeast"
	2. "State of São Paulo"
	3. "South"
HIV testing	0. "No" (reference value)
	1. "Yes"
Personal belief in unfaithful love	0. "No" (reference value)
	1. "Yes"
Self-perceived risk of getting AIDS	0. "High/Intermediate" (reference value)
	1. "None/Low"
Family income	0. "Greater that 2 MMWs*
	1. "Up to 2 MMWs"
Estimated number of lifetime sexual partners	0. "1" (reference value)
	1. "2–5"
	2. "6 or more"
History of physical violence	0. "No" (reference value)
	1. "Yes"

MMWs: monthly minimum wages
* Data from the survey "Comportamento Sexual e Percepções da População Brasileira Sobre HIV/AIDS"; the choice was for a two-way analysis.

The project of the survey *"Comportamento Sexual e Percepções da População Brasileira Sobre HIV/Aids"* was approved by the Ethics Committee of Faculdade de Saúde Pública of Universidade de São Paulo.

RESULTS

The comparison between 2005 and 1998 surveys data showed an increased proportion of respondents who reported knowledge on one or two STDs. In regard to the most common STDs such as AIDS, gonorrhea and syphilis (the latter two usually known as "classic bacterial STDs"), the proportion of respondents who reported any knowledge increased to 8.8%, 42.5% and 67.4%, respectively. Yet, prior knowledge on these diseases was already pronounced, i.e., 90.7%, 62.1% and 47.6% reported any knowledge on AIDS, gonorrhea and syphilis, respectively, in 1998.

As for Chlamydia, hepatitis B, lymphogranuloma venereum and HPV infection, while they were seldom reported in the 1998 survey, an increased proportion of respondents were able to identify these conditions from a list in the 2005 survey (Figure 1).

Table 2 shows respondents' signs and symptoms potentially associated to STIs, stratified by sociodemographic and behavioral characteristics, reported in 2005. The proportion of subjects who reported having none of the signs and symptoms inquired (discharge, ulcers, wounds or genital warts) was significantly lower among women (40.8%) than men (84.4%).

The proportions of respondents who reported never having any STD signs and symptoms were 76.8% and 67.7% in those aged 16–19 and 20–24 years, respectively. This proportion ranged between 54% and 62% in the other age groups.

Of those who attended elementary and middle school, 61.7% and 64.7%, respectively, reported never having any STD signs and symptoms, compared to 53.5% (p=0.0001) among those with higher schooling. In addition, 16.2% of men and 66.4% of women with university/graduate schooling reported (urethral or vaginal) discharge.

In the analysis stratified by family income, the proportions of respondents who reported never having any STDs was similar in all strata studied (p=0.2989), 57.6% in those with family income less than one monthly minimum wage (MMW) and 58.3% in those with income greater than 10 MMWs.

The proportion of those who reported never having any STD signs and symptoms was 78.9% in single respondents, 49.4% in separated and widowed and 53.8% in those either married or living with a partner and the difference was statistically significant (p<0.000). It was also found a higher proportion of those who reported having no sexual intercourse in the 12 months prior to the interview compared to those who reported sexual intercourse during this same period. However, the difference was not statistically significant (61.1% *vs*. 59.6%; p=0.572).

The proportion of respondents who reported no signs and symptoms was lower among those living in Mid-West (52.8%) and Northeast cities (59.8%), compared to those living in other Brazilian regions. These differences were statistically significant (p=0.007).

Table 3 shows the covariates selected in the bivariate analysis as potentially associated to STDs according to gender. The prevalence of self-reported STDs was 26% in men over 35 years of age. In women, STDs were mostly reported (20.6%) in those aged between 25 and 44 years. In both men and women, higher prevalences of self-reported STDs were seen in those over 35 years of

Table 2. Self-reported prevalence of conditions associated to STDs. Brazil, 2005.

Variable	Reported symptoms				
	Urethral discharge (men)	Vaginal discharge (women)	Genital ulcers or wounds	Genital warts	Did not have any of these problems
Male	13.6	-	1.2	1.2	84.4
Female	-	58.6	3.6	1.4	40.8
p-value			<0.000	0.632	<0.000
Age (years)					
16–19	3.6	44.0	0.5	0.9	76.8
20–24	5.7	56.8	2.6	1.1	67.7
25–34	9.7	66.0	1.9	1.1	59.3
35–44	20.1	63.7	4.1	1.9	54.1
45–54	20.0	55.6	3.1	1.4	58.0
55–65	21.1	48.8	1.8	1.3	62.0
p-value	<0.000	<0.000	0.004	0.595	<0.000
Schooling					
Elementary	14.7	57.2	2.4	1.2	61.7
Middle	10.4	56.0	2.3	1.3	64.7
University/graduate	16.2	66.4	3.7	1.4	53.5
p-value	0.027	0.009	0.227	0.813	<0.000
Family income (MMWs)					
Up to 1	18.1	55.0	2.7	1.1	57.6
More than 1 up to 2	12.0	54.3	1.7	0.9	63.0
More than 2 up to 3	8.7	59.1	2.2	1.6	63.4
More than 3 up to 5	13.5	60.7	3.0	1.3	61.1
More than 5 up to 10	15.1	60.6	2.5	0.9	63.1
More than 10	16.9	63.7	4.6	2.3	58.3
p-value	0.061	0.191	0.110	0.512	0.299
Marital status					
Single	7.1	49.0	1.5	0.9	78.9
Married	17.3	60.8	3.0	1.3	58.2
Separated/widowed	16.9	58.1	2.5	1.9	49.4
Living with a partner	17.2	65.4	3.5	1.8	53.8
p-value	<0.000	<0.000	0.014	0.326	<0.000
Sexually active in the last 12 months?					
Yes	14.7	62.8	2.8	1.4	59.6
No	6.0	49.9	1.9	1.9	61.1
p-value	0.005	<0.000	0.258	0.424	0.572
Region of residence					
North	17.1	34.6	1.9	1.3	72.7
Northeast	19.7	56.5	2.3	1.4	59.8
South	11.4	48.7	3.9	1.5	65.4
Southeast	10.0	63.2	2.6	1.3	61.7
Center-West	23.4	64.2	0.3	1.3	52.8
p-value	<0.000	<0.000	0.054	0.958	0.007

age (20.9%) while 14.5% prevalence was seen in those aged between 16 and 34 years (Table 3).

Higher prevalence of self-reported STDs was found among those with income less than 2 MMWs, 21.5% in women, 22.4% in men, and 21.8% in both men and women. In those with family income over 10 MMWs, the prevalences were around 20.0% and very similar in all categories.

Table 3. Prevalence of self-reported STDs according to selected covariables. Brazil, 2005.

Variable	Male %	Total n	Female %	Total n	Both men and women %	Total n
Age group						
16–34	10.2*	1080	18.9	1014	14.5*	2152
35 or more	26.1	1128	16.5	1335	20.9	2507
Family income						
Up to 2 MMWs	22.4**	522	21.5**	677	21.8*	1228
Greater than 2 MMWs	17.1	1686	15.9	1672	16.6	3431
Region of residence						
North/Northeast	23.4**	573	22.8**	612	22.9*	1220
Center-West/Southeast	22.0	681	15.5	706	18.7	1422
State of São Paulo	10.4	649	16.9	671	13.6	1342
South	17.4	305	13.8	360	15.8	676
Number of sexual partners in the last 12 months						
None	11.1**	134	14.3*	334	13.5*	478
1	17.8	1608	17.3	1914	17.6	3612
2 or more	22.3	465	32.2	101	23.9	570
Number of partners with age difference greater than or equal to 10 years						
None	16.3*	1637	17.0**	1622	16.7*	3338
1 or more	28.3	436	22.7	393	25.5	843
Estimated number of lifetime sexual partners						
1	2.6*	133	13.4*	1107	12.4*	1271
2–5	7.9	535	19.0	957	15.2	1535
6 or more	23.8	1395	33.0	240	25.0	1663
Category of sexual partner						
Steady partner only	19.8	1468	18.0**	1801	18.9**	3351
Steady and/or occasional partners	17.9	534	28.5	118	19.5	662
No sexual partners in the last 12 months	10.9	135	13.9	353	13.2	497
Occasional/steady partner: condom use (always)						
No	20.0**	1602	16.5**	1977	18.1	3652
Yes	14.1	601	23.7	360	17.7	989
HIV testing						
No	16.8**	1546	15.6**	1372	16.2*	2975
Yes	22.1	655	20.6	965	21.1	1666
Personal belief in unfaithful love						
No	17.2**	1633	16.4*	2004	16.8*	3717
Yes	22.5	535	24.2	322	23.1	879
Self-perceived risk of AIDS						
High/Intermediate	23.9	216	24.1**	273	23.5*	509
None/low	17.7	1978	16.6	2033	17.2	4094
History of physical violence						
No	17.6**	2007	16.1*	2016	16.8*	4103
Yes	25.5	200	26.7	332	26.4	552

* $p<0.005$
** $p<0.05$

Male and female respondents living in North/Northeast, Center-West/Southeast cities showed higher prevalences of self-reported STDs (22.9% and 18.7%, respectively) than all the strata (men, women and both men and women) of people living in the South (15.8%). The lowest STD prevalences were found in women living in the Center-West/Southeast (15.5%) and South regions (13.8%).

In all groups (men, women and both), STD prevalence was often higher in those who reported having more

lifetime sexual partners as well as when greater age difference was seen between the respondent and their partner, though it was gender-related. Higher STD prevalence was found in women who reported having had two or more sexual partners in the 12 months prior to the interview. In men, the covariate associated to higher STD prevalence was an age difference to their sexual partner greater than or equal to 10 years. Those who had six or more sexual partners in their lifetime reported higher rates of STDs, 33.0% among women and 23.8% among men.

With respect to occasional and steady partners in the 12 months prior to the interview, women (28.5%) more often reported STDs compared to men (17.9%) and both men and women (19.5%). Of all respondents who reported not having sexual intercourse in the 12 months prior to the interview, men showed lower prevalences of self-reported STDs (10.9%) compared to women and both men and women (around 14%).

Previous HIV testing was less frequently reported by women (20.6%) and both men and women (21.1%) compared to men (22.1%).

Respondents were asked to self-assess their risk of acquiring AIDS as high, intermediate or low/no risk. In both men and women, 23.5% self-perceived their risk of acquiring AIDS as high. A significant difference in prevalence of self-reported STDs was found in both men (p=0.0495) and women (p=0.0076) who reported high risk (23.9% *vs.* 24.1%, respectively).

Table 4 summarizes estimates of the logistic regression model for men and women. The variables independently associated to STDs were as follows: older age in men (adjusted odds ratio [OR] 3.60; 95% CI: 2.62;4.95); family income less than 2 MMWs in women (adjusted OR 1.47; 95% CI: 1.06;2.02); HIV testing in men and women (adjusted OR 1.52; 95% CI: 1.10;2.09 and 1.35; 95% CI: 1.02;1.79, respectively); personal belief in unfaithful love in men and women (OR 1.49; 95% CI: 1.05; 2.10 and 1.51; 95% CI: 1.05; 2.16, respectively); estimated number of lifetime sexual partners in men (OR 8.38; 95% CI: 3,14;22,32) and in women (OR 2.49; 95% CI: 1.67; 3.70) for a cut-off value "six or more lifetime partners"; and physical violence in women (OR 1.62; 95% CI: 1.17; 2.25).

Some covariates showed either an independent or inverse association to STDs (protective variables): region of residence, where the comparison category was those living in the North and Northeast regions with those "living in the state of São Paulo" (OR 0.35; 95% CI: 0.23;0.53), among men. For those living in the South, estimated OR were 0.63 (95% CI: 0.43;0.92) among men, and 0.52 (95% CI: 0.34;0.79) among women. A comparison of those living in Center-West and Southeast cities showed OR 0.63 (95% CI: 0.41;0.98) among women.

Table 4. Models for self-reported STDs. Brazil, 2005.

Covariable	OR (95% CI)	
	Male	Female
Age group 35 years or more	3.60 (2.62;4.95)	1.01 (0.79;1.29)
Family income up to 2 MMWs	1.29 (0.93;1.78)	1.47 (1.06;2.02)
Region of residence		
Center-West and Southeast	0.80 (0.56;1.13)	0.63 (0.41;0.98)
State of São Paulo	0.35 (0.23;0.53)	0.72 (0.46;1.11)
South	0.63 (0.43;0.92)	0.52 (0.34;0.79)
HIV testing	1.52 (1.10;2.09)	1.35 (1.02;1.79)
Personal belief in unfaithful love	1.49 (1.05;2.10)	1.51 (1.05;2.16)
Self-assessment of risk of AIDS as none or low	0.54 (0.34;0.86)	0.78 (0.53;1.14)
Estimated number of lifetime sexual partners		
2–5	2.83 (0.98;8.19)	1.32 (0.99;1.76)
6 or more	8.38 (3.14;22.32)	2.49 (1.67;3.70)
History of physical violence	1.56 (0.97;2.52)	1.62 (1.17;2.25)

The variable "self-assessment of AIDS as low/no risk" was associated to STDs (OR 0.54; 95% CI: 0.34;0.86) in men.

The variables "condom use with an occasional or steady partner," "number of partners with age difference greater than or equal to 10 years," and "category of sexual partner in the 12 months prior to the interview" were not significantly associated to self-reported STD prevalence in any of the study analyses. However, these variables are related to information over different time periods.

DISCUSSION

Although the present study does not allow to assessing an actual STD prevalence as it is based on self-reported information, it can reasonably be assumed that, to a certain extent, self-reported morbidity is consistent to the respondents' STD history. However, asymptomatic infections have to be ruled out and information bias have to be taken into account as respondents tend to underreport information related to subjects that may cause embarrassment to them.[9,15] Information bias can show major gender-related differences. Further studies would be needed for better understanding this phenomenon which could provide more in-depth analysis despite not being as comprehensive. A more in-depth

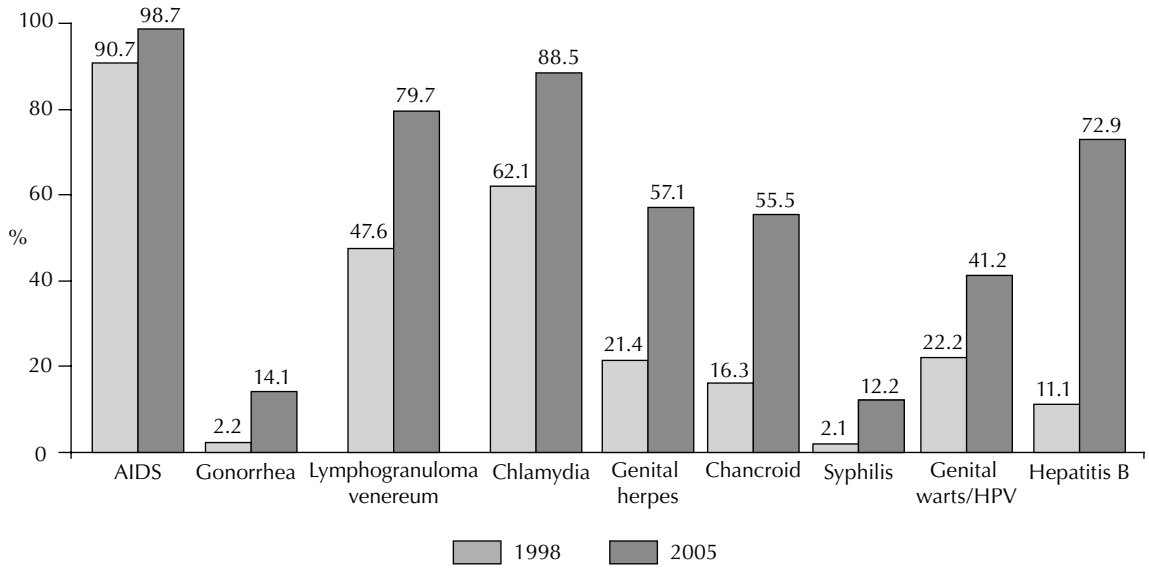

Figure. Proportion of respondents who reported knowledge on sexually transmitted diseases. Brazil, 1998 and 2005.

analysis could be achieved through the application of comprehensive instruments, as well as through qualitative studies linked to epidemiological data.

STD and related conditions were more often reported among those with higher schooling and family income. Similar findings were reported in a survey on AIDS/STDs by the *Instituto Brasileiro de Opinião Pública e Estatística* (Brazilian Institute of Public Opinion and Statistics, IBOPE), commissioned by the Brazilian Ministry of Health, and conducted between January 26 and 29, 2003. The IBOPE survey comprised a representative sample of Brazilian sexually active population aged 14 years or more.[a] Among those who reported any sex organ/urinary condition, 38% had elementary schooling, 43% middle schooling and 45% had university/graduate schooling.

Factors such as failure/inability of translating a set of signs and symptoms into a STD diagnosis, and demanding care and potentially difficult access to health providers once the empirical diagnosis of STD has been made seem to be more common among poor and less educated populations. These factors could explain the fact that STDs were more frequently reported among those with higher schooling and family income.

As a result, on one hand, there would be an inconsistency between STD clinical and laboratory diagnosis and, on the other hand, self-perception and diagnostic designation by the very individuals affected and health providers caring for them. This situation is mediated by one's ability to self-diagnose these conditions, the demand for and actual access to health services and capacity of these services to accurately diagnose these conditions. This inconsistency can and should be reverted through health education interventions, increased access to health services and training of health providers in the diagnosis and adequate management of STDs.

Inconsistency related to high prevalence of vaginal discharge is remarkable in both community settings and health services providing care to these patients, despite its poor correlation with actual STD manifestations.[19] In contrast, severe gynecological infections can have an asymptomatic or oligosymptomatic progress over the years in a considerable proportion of women, causing severe complications such as chronic pelvic infections in the medium and long run.[6]

Clinical and laboratory research studies conducted in Brazil have showed conflicting objective results, i.e., higher rates of STDs in poor populations. In a study conducted in 24 reference centers in Brazil, Rodrigues et al[23] reported higher rates of syphilis in 3,047 puerperal women with family income lower than 1 MMW compared to other puerperal women in the study sample.

Similarly, in a study assessing STD prevalence in a sample comprising 200 women aged 14–29 years who attended an HIV testing service in the city of Rio de Janeiro, it was found an 8% prevalence of HIV infection, 6.5% of syphilis, 8% of Chlamydia and 9.5% of gonorrhea. HIV infection was statistically associated to low schooling.[5]

[a] IBOPE. Brasil (2003). DST. Pesquisa com a população sexualmente ativa. Brasília: Ministério da Saúde; Secretaria de Vigilância em Saúde; Programa Nacional de DST e Aids. [Acesso em 24/10/2007] Disponível em: http://www.aids.gov.br/main.asp?View=%7BA62BDF6E-914A-4DF7-A10E-CE06AB4E26F7%7D&Team=&params=itemID=%7BAEAB8D56-0731-4276-A8B2-B7C2729EE8BB%7D%3B&UIPartUID=%7B585687B3-F650-459E-AC6E-23C0B92FB5C4%7D

A study carried out in Salvador, Northeastern Brazil,[7] compared STD prevalence between women who attended family planning clinics, public school students and people living in low-income communities. Women who attended family planning clinics had higher schooling and lower STD prevalence compared to those women in the other two groups.

In the present study, the prevalence of self-reported STDs was significantly higher among women, corroborating the findings of IBOPE survey on AIDS/STDs that found that 21% of men compared to 62% of women had already had a sex organ/urinary condition.[a]

Tanfer et al,[23] in 1995, based on two US national research studies, showed that, after controlling for sexual behavior and care with one's own health, STD self-reporting varies according to gender, race and socioeconomic condition. These authors have also emphasized the importance of number of lifetime sexual partners and socioeconomic condition for the occurrence of STDs.[24] In the present study, a significant difference was evidenced in the "number of lifetime sexual partners" between men and women, and this covariate was of greater magnitude when men reported having had six or more partners in their lifetime.

In the final logistic model, the covariate "region of residence" was independently associated to STDs both in men and women. However, it showed a greater effect on men living in the South region and women living in the state of São Paulo. The association between region of residence and STDs was not further discussed due to the lack of additional studies that would allow comparisons between Brazilian regions.

The covariates "lower family income" and "history of physical violence" had a stronger impact among women, confirming, as pointed out by Quinn & Overbaugh[21] (2005), that poverty/inadequate income and violence can be social determinants of women's vulnerability globally. These factors act together with other key aspects such as sexual and cultural behavior practices that promote discrimination and inequality.[11]

Additionally, the covariate "age group" was found to be associated to higher rates of STDs, especially among men. Bradner & Lindberg[2] (2000) compared the findings of a national longitudinal study on male adolescents in the United States with subjects followed up since the age of 15, and found that non-adolescent males were less likely to receive prevention education on AIDS or STDs when compared to adolescents.

"Self-perceived AIDS risk" and "HIV testing" were significantly associated to STD reporting, mostly among men. Although these covariates can be considered markers of risk perception, perception of vulnerability is not always a motivation for engaging in safe behavior.[13]

A 2002 population-based health survey comprising subjects aged 20 years or more living in the metropolitan area of Pelotas, Southern Brazil, assessed STD symptom prevalence and associated factors. It was found 13.5% STD prevalence, which was higher among younger women and those with lower schooling.[4]

The present study and Carret et al[4] findings are consistent regarding higher prevalence of STD symptoms in women; however they contrast with respect to higher prevalence of symptoms among those younger and less educated, which was found in the Pelotas study. These discrepancies could be explained by different population samples (Brazilian urban population vs. urban population of a medium-size city), different approaches and instruments (questionnaire applied by an interviewer vs. self-applied questionnaires) and even data analyses following distinct weighing criteria and adjustments.[4]

In a study carried out in Salvador,[7] Northeast Brazil, men reported STDs at a higher rate than women recruited in similar settings. As in the present study, however, male respondents were less likely to report symptoms that would be associated to STDs.

The present study did not find any association between sexual behaviors and practices in the 12 months prior to the interview and self-reported STDs. Such an association can be commonly found in cross-sectional studies, especially those based on information obtained at different time periods. While being more comprehensive and representative, national surveys do not allow to exploring the dynamics of behavioral changes during the lifetime of subjects and their partners. The implementation and integrated analysis of in-depth comprehensive ethnographic or epidemiological studies are key strategies for better understanding the subtleties of human sexuality and potential risks to sexual and reproductive health.

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