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ORIGINAL PAPER

Sexual Violence Against Men Who Have Sex with Men in Brazil: A Respondent-Driven Sampling Survey

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Abstract We estimated the prevalence of sexual violence (SV) experience among men who have sex with men (MSM) in Brazil and identified its associated risk factors. We recruited 3859 MSM through respondent driven sampling. A multivariable hierarchical analysis was performed using an ecological model. The prevalence of having ever experienced SV was 15.9 % (95 % confidence interval [CI] 14.7–17.1). SV experience was independently associated with discrimination due to sexual orientation (odds ratio [OR] 3.05; 95 % CI 2.10–4.42), prior HIV testing (OR 1.81; 95 % CI 1.25–2.63), ≤14 years at first sex (OR 1.86; 95 % CI 1.28–2.71), first sex with a man (OR 1.89; 95 % CI 1.28–2.79), presenting STI symptoms (last year) (OR 1.66; 95 % CI 1.12–2.47), and having suicidal ideas (last 6 months) (OR 2.08; 95 % CI 1.30–3.35). The high levels of SV against MSM in Brazil place them at a markedly higher risk of SV than the general population. Homophobic prejudice is the strongest determinant of SV and urgently needs to be included at the forefront of the national response to SV.

Resumen Se estimó la prevalencia de haber experimentado violencia sexual (VS) entre hombres que tienen sexo con hombres (HSH) en Brasil y se identificó sus factores de riesgo. Se reclutó 3859 HSH mediante respondent driven sampling. Se realizó un análisis multivariado hierárquico usando un modelo ecológico. La prevalencia de

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experiencia de VS alguna vez fue 15.9 % (Intervalo de confianza [IC] 95 % 14.7–17.1). Los factores asociados independientemente con haber sufrido VS alguna vez fueron discriminación debida a orientación sexual (odds ratio [OR] 3.05; 95 % CI 2.10–4.42), haber realizado la prueba del VIH (OR 1.81; 95 % CI 1.25–2.63), ≤14 años de edad en la primera relación sexual (OR 1.86; 95 % CI 1.28–2.71), primera relación sexual con un hombre (OR 1.89; 95 % CI 1.28–2.79), presentar síntomas de ITS durante el último año (OR 1.66; 95 % CI 1.12–2.47), y tener ideas suicidas durante los últimos 6 meses (OR 2.08; 95 % CI 1.30–3.35). Los altos niveles de VS contra los HSH en Brasil sitúan este grupo ante un riesgo de VS superior que la población general. La homofobia es el determinante más importante y debe de encabezar urgentemente la respuesta nacional ante la VS.

Keywords Sexual violence · Risk factors · MSM · Respondent-driven sampling · Brazil

Introduction

Although the vulnerability of MSM to violence has been demonstrated [1], sexual violence (SV) against MSM is an unrecognised public health priority. As a consequence of SV, men can experience physical and mental symptoms, including post-traumatic stress symptoms, depression, and suicide [2]. Limited studies have suggested an increased risk of HIV infection among MSM experiencing SV [3] while other studies did not establish an association between these factors [4–6]. MSM more frequently experience extreme forms of SV, such as rape, than non-MSM [4]. In some African countries, up to 10 % of MSM consider violence as the most important threat to their personal health, constituting a greater concern than HIV/AIDS [5].

SV involving MSM has received little attention, with few studies conducted in low and middle-income countries [4, 7–10] but systematically showing high levels of SV victimization. The hidden and stigmatized nature of MSM populations in much of the world [11], and the difficulty of measuring socially constrained and stigmatized behaviors [12], presents challenges for research on SV among MSM and results in an underestimation of the extent of SV in this group [1].

Nevertheless, MSM have consistently reported high levels of SV experience at some point in their lives. Up to 10 % of Hispanic MSM in the USA [13] and 14 % of Puerto Rican gay men [9] reported having experienced intimate partner SV. In both India [8] and Thailand [10], convenience samples including a high proportion of transgender and male sex workers showed male-on-male SV rates of 18 %. In South Africa, a respondent driven sampling (RDS) study found that 16 % of MSM experienced male-on-male SV [4], while in Brazil, 20 % of urban MSM reported experiencing intimate partner SV [14]. In addition, reported rates of male-on-male SV victimization have been higher than among non-MSM [4, 14].

Our understanding of the factors associated with SV against MSM is far from complete. In a six country survey that included Brazilian MSM, experience of homophobia were shown to increase the risk of reporting intimate partner SV [15]. In South Africa, black MSM, those 25 years or older, and those who had fathered a child showed an increased risk of SV victimization [4]. Some risk behaviors have also been associated with SV experience, specifically an increased number of male sexual partners, drug use, and buying sex [10, 16].

Because SV is a complex and multifaceted problem, we used the ecological model to examine it [17]. This theoretical framework discusses 4 levels of risk: socio-demographic, community, relationship, and individual. The model provides a framework for understanding the influence of biological, psychological, social, cultural, and economic factors and their interplay (Fig. 1).

The aim of this study was to estimate the prevalence of SV in a national sample of MSM in Brazil and to examine the societal, community, relationship, and individual factors associated with SV experience. Understanding the extent of SV among MSM, as well as its context, will contribute to implementing prevention and care interventions for this group.

Methods

Study Design

We conducted a cross-sectional study of MSM in 10 Brazilian cities in 2008–2009 [18]. The objectives of the national study were to estimate the prevalence of HIV and syphilis and to identify their associated risk factors. The pooled HIV prevalence was estimated at 14.2 % (95 % CI 12.1–16.6) [18]. The cities were chosen by the Department of STD, AIDS and Viral Hepatitis of the Brazilian Ministry of Health based on their regional, socioeconomic, and cultural diversity. The cities included were Manaus, Recife, Salvador, Campo Grande, Brasília, Curitiba, Itajaí, Santos, Belo Horizonte, and Rio de Janeiro. The study was approved by the National Ethics Research Committee (CONEP # 14494).

Study Population and Sampling Method

Eligible participants were 18 years or older, residents of the selected cities, had sex with a man or a transgender

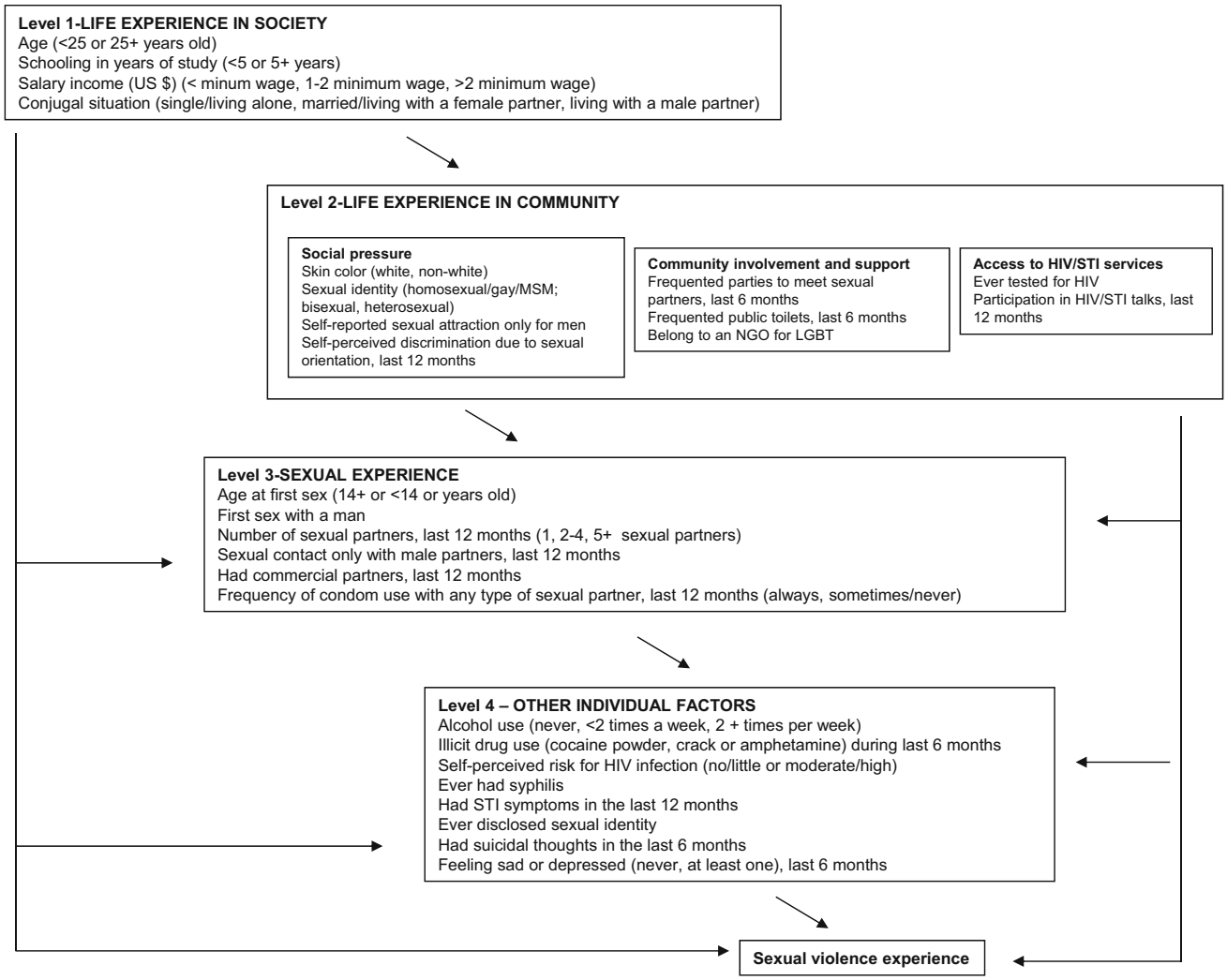

Fig. 1 Ecological model to examine sexual violence experience

person in the last 12 months, did not identify as transgender, and provided written consent to participate in the study.

Given the hidden nature of MSM in Brazil, participants were recruited using the RDS strategy [19, 20]. Briefly, this is a chain referral method, but the recruitment process is restricted at each wave and implemented to calculate selection probabilities [21, 22]. By accessing respondents through their social network, the sample is potentially extended throughout a population, in this case, a key population at high risk for HIV.

In each city, the recruitment was initiated with about six MSM, known as seeds. The research team conducted informal interviews with MSM to discuss the need and nature of incentives, the choice of the most appropriate educational materials to be distributed, preferences for procedures and study logistics such as criteria for interviewers and coupons, and to identify potential seeds. The seeds were purposively selected to represent different ages and socio-demographic characteristics. Each seed received three coupons to recruit peers. These peers were referred to the study site, which was usually an HIV Voluntary and Counselling Testing Center (VCTC) and part of the Brazilian National Health System. Those enrolled were also provided with three coupons to recruit new participants. The process was repeated until the study reached the desired sample size (approximately 350 per city). Each participant received Brazilian Real (R$) 15.00 (≈US$ 10.00) for participation and R$ 10.00 (≈US$ 6.67) for each eligible person they recruited who completed the survey.

Data Collection

The participants were interviewed face-to-face using a structured questionnaire at the VCTC. Information was

collected on socio-demographic characteristics; HIV and syphilis testing history; sexual identity and attraction and sexual behaviour; substance use and mental health; social network characteristics and size, experience of discrimination, violence (verbal, physical, sexual); openness and disclosure; social integration and participation; sources of information about STIs and access to condoms; and healthcare and history of STIs. Participants were invited for HIV and syphilis testing using finger prick rapid tests. They received HIV pre- and post-test counselling, educational materials, and condoms. Those who tested positive for HIV or syphilis were referred to specific clinics for treatment.

Measures

The main measure of interest was lifetime history of SV identified as being forced to have sex against their will. For those who reported having suffered SV, the following contextual characteristics were assessed: who perpetrated the SV (intimate partner, parents, relatives, acquaintances, strangers, health professionals or others); to whom, if anyone, the individual communicated about the episode of SV (health professionals or police), if it was a recent episode of SV (within the last 12 months), experience of physical violence, and being verbally threatened or humiliated.

Each of the blocks of the ecological model comprised several explanatory variables:

Block 1—Life experience in society: including age, years of formal education, monthly income, and conjugal situation. Block 2—Life experience in community: including (1) social context such as skin colour, sexual identity, sexual attraction only for men, and perceived discrimination due to sexual orientation in the last 12 months; (2) community involvement and support including places frequented to meet male sexual partners in the last 6 months, and whether they belonged to a Non-governmental Organization (NGO) supporting lesbian, gay, bisexual, and transgender (LGBT) individuals; and (3):having ever been tested for HIV, and participation in HIV/STI talks in health services or NGOs over the last 12 months. Block 3—sexual experience such as age at first sex, first sex with a man, number of sexual partners in the last 12 months and their gender, commercial partners in the last 12 months, and consistent condom use with any type of sexual partner in the last 12 months. Block 4—Other factors, mainly individual ones: including current illicit drug use (cocaine powder, crack or amphetamine) during the last 6 months, current alcohol intake (never, <2 times a week, 2 times a week or more), self-perceived risk of HIV infection (no/little or moderate/high), having ever had syphilis or STI symptoms in the last 12 months, ever disclosed sexual identity feeling sad or depressed during the last 6 months (never, at least once), and having had suicidal thoughts in the last 6 months.

Statistical Analysis

The data were analysed using STATA version 10.0 (Stata Corp, College Station, TX, USA). The participant's personal network sizes were used in the analysis to account for different probabilities of inclusion [21]. In general, larger personal network sizes adjust the crude sample proportion downward whereas smaller ones would adjust the crude proportion upwards. In addition, for pooled results for the 10 cities, the sample was also weighted [18, 23] by the proportion of MSM in each city, relative to the total sample, as estimated by the Brazilian population aged 15–64 years old [24].

A descriptive analysis was carried out including the explanatory variables, the frequency of SV reported, a description of the type of perpetrator inflicting SV, and communication of its occurrence. A comparison between those ever experiencing SV and those who did not was examined using Person's Chi square test. First, weighted bivariate logistic regression models were used to test for significant associations between the experience of SV and each explanatory variable. The magnitude of the association was estimated through weighted odds ratios (wOR) with 95 % confidence intervals (CI). Second, a multivariate hierarchical analysis [25] was performed according to the previously defined ecological model. We ran four logistic regression models, one for each block; each model was fitted using backward selection. Blocks 2, 3, and 4 were adjusted with the statistically significant variables of the previous blocks. To be entered into the logistic models, a significance of $P < 0.25$ was required, and to remain in the model, a significance of $P < 0.05$ was required. The first model was adjusted with the societal variables. The second model added the community block and the variables reaching a P level <0.05 in the societal level. In the third model, the relationship variables were added, and its effect was assessed in the presence of those variables kept from the previous models. The final model added the individual variables and retained all statistically significant variables from the previous blocks. Confounding and interactions between variables were investigated.

Results

Subjects' Characteristics

Among the 4048 MSM recruited, 188 (4.6 %) were ineligible, and 1 refused to participate, resulting in 3859 participants. Of these, 3745 (97.0 %) responded to the SV experience questions and were included in the analysis. On average, there were 15 (range 8–20) waves of recruitment in each city, and approximately one-third of the individuals

Table1 Selected characteristics of 3,859 MSM in Brazil

Characteristics	N[a]	% Weighted[b]
Age in years (mean and range)	30.3	15?70
Older than 25years	1744	58.4
At least 5years of formal education[c]	3473	88.6
Monthly income less minimum wage (US$ 195), previous month	1709	45.9
Conjugal situation		
Single/living alone	3033	85.1
Married/living with a female partner	176	5.0
Living with a male partner	411	9.8
Non-white skin colour	2695	74.0
Sexual identity		
Heterosexual	281	28.6
Bisexual	1111	9.9
Homosexual/MSM/Gay	2286	61.5
Sexual attraction only for same sex	1785	42.0
Discrimination due to sexual orientation, last 12months	1291	27.2
Went to parties, last 6months	443	19.2
Went to public toilets, last 6months	116	6.3
Belong to an NGO for LGBT	405	10.0
Ever tested for HIV	1956	51.4
Participated in HIV/STI talks, last 12months	1106	23.6
At least 14years at first sex	1280	31.7
First sex with a man	2017	49.5
Number of sexual partners, last 12months		
1	532	12.8
2?4	1345	39.2
5+	1832	48.1
Sexual contact with only male partners, last 12months	2377	52.3
Partnership type, last 12months		
Only stable	555	12.8
Only casual and/or commercial	1184	36.6
Stable and others (casual and/or commercial)	1983	51.2
Had commercial partners, last 12months	1356	41.2
Always used a condom with any type of sexual partner, last 12months	1279	30.0
Alcohol use		
Never	768	19.3
<2 times a week	1846	45.5
2+ times per week	1106	35.2
Illicit drug use, last 6months	1507	42.9
Moderate/high self-perceived risk for HIV infection	2504	68.2
Ever had syphilis	231	7.4
Had STI symptoms, last 12months	687	22.4
Ever disclosed sexual identity	2727	74.0
Feeling sad or depressed at least once, last 6months	2883	77.5
Had suicidal ideas, last 6months	666	21.4

[a] Excluding missing data

[b] Weighted proportion according to the social network size and the proportion of MSM in the city related to the total sample size

[c] First stage of primary school completed

recruited by their peers participated in the survey. Table 1 shows selected characteristics of the participants. They had a mean age of 30.3 years, 85.1 % were single or living alone, 74.0 % were non-white, 61.5 % identified as homosexual/gay/MSM, and 42 % reported sexual attraction only for same sex.

Prevalence of SV

Among the 3,745 MSM who responded to SV history, 596 reported ever having experienced SV, resulting in a prevalence of 15.9 % (95 % CI 14.7–17.1 %). The majority had suffered SV from acquaintances (34.6 %), followed by relatives (27.7 %), strangers (22.8 %), casual partners (8.2 %), and intimate partners (6.8 %). Most of those who suffered SV did not communicate the fact to health professionals (95.7 %) or to the police (93.7 %). About half of the SV victims (54.1 %) had suffered SV in the last 12 months. A third (30.8 %) had also experienced physical violence, and 19.9 % did so in the last 12 months. Most (66.0 %) of the SV victims had been verbally threatened or humiliated, and half (51.0 %) had experienced a threat or humiliation in the past year.

Bivariate Analysis of Factors Associated with SV Experience

Tables 2 and 3 summarise the results of the bivariate analysis. None of the variables in the societal block were associated with an increased likelihood of SV experience. In the community block, eight variables were associated with an increased likelihood of SV: self-identity as homosexual/gay/MSM or bisexual, sexual attraction only for men, perceived discrimination due to sexual orientation during the last 12 months, went to parties to meet sexual partners during the last 6 months, went to public toilets during the last 6 months, belonged to an NGO for LGBT, had ever tested for HIV, and had participated in HIV/STI presentations during the last year. In the relationship block, 4 variables were associated with SV experience: younger age at first sex ($\leq$14 years), first sex with a man, at least 5 sexual partners during the last 12 months, and sexual contacts only with male partners over the last year. In the individual block, drinking alcohol at least twice a week, perceiving themselves as being at higher or moderate risk for HIV infection, ever having syphilis, presenting STI symptoms during the last 12 months, feeling sad or depressed during the last 6 months, and having suicidal ideas during the last 6 months, were all statistically associated with an increased likelihood of SV experience.

Multivariate Analysis of Factors Associated with SV

The results of the multivariate weighted hierarchical analysis are summarised in Table 4. Self-perceived discrimination due to sexual orientation during the last 12 months (OR 3.05, 95 % CI 2.10–4.42, $p < 0.001$), having ever tested for HIV (OR 1.81, 95 % CI 1.25–2.63, $p = 0.002$), younger age at first sex ($\leq$14 years) (OR 1.86, 95 % CI 1.28–2.71), first sex with a man (OR 1.89, 95 % CI 1.28–2.79, $p < 0.001$), presenting STI symptoms during the last 12 months (OR 1.66, 95 % CI 1.12–2.47, $p < 0.01$), and having suicidal ideas during the last 6 months (OR 2.08, 95 % CI 1.30–3.35, $p = 0.002$), were all independently associated with SV experience.

Discussion

This is the first study in Brazil to investigate SV against MSM in a national sample that includes 10 cities across the country. The prevalence of SV against MSM was as high as 16 %, which is consistent with that found in an RDS study in South Africa that assessed male-on-male SV victimization (16 %) [6]. Our estimate is within the range of SV reported in previous MSM studies (9.5–18.4 %) [4, 5, 8–10, 13] that vary depending on the sampling method used and the severity of the violence being measured. As observed in other settings, the levels of SV against MSM were higher than that reported by Brazilian women (13 %) [26] and markedly higher than the general urban male population [14]. Some specific populations in Brazil, such as patients with mental illness, have shown higher levels of lifetime SV (19.8 %) than MSM [27]. In this study, SV often coexisted with physical and psychological violence, which is in agreement with previous studies showing that SV against MSM rarely occurred in an isolated fashion [7, 13, 14, 28]. Importantly, more than half (54.1 %) of the participants also reported recent SV, possibly reflecting repeated and lasting victimization of this population, which is often mentioned in studies of MSM [10]. Unlike women's SV reports [29], MSM were more often exposed to SV that was perpetrated by acquaintances or strangers, usually outside their domestic environment.

The hierarchical model used in this study allowed for the examination of different levels of predictors and their interdependency [25]. In our study, reported homophobic discrimination was the strongest determinant of SV. Heterosexist social pressure, including homophobic discrimination, was associated with an increased risk of SV among MSM in 6 countries, including Brazil [15]. In Brazil, intense homophobia remains widespread [30]. Characterization of prejudice in Brazilian society is equivocal: almost all respondents (92 %) recognise that prejudice against MSM exists, but only a quarter admit being prejudiced themselves [31]. This finding argues that the need to address homophobia is at the forefront of developing interventions to prevent SV against MSM. Importantly, there is no specific law in Brazil that criminalizes homophobia. The country launched in 2004 'Brazil without homophobia', a governmental plan to provide institutional protection to MSM. However, public programs do not appear either sufficient or effective in reducing homophobic violence in Brazil.

Table 2 Factors associated with sexual violence experience in MSM in Brazil, bivariate analysis

Characteristics	Non SV experience (N = 3149) n (%)[a]	SV experience (N = 596) n (%)[a]	OR[b] (95 % CI)	*p* value
Life experience at society level				
Age (years)				
≤25	1694 (87.4)	269 (12.6)	1	0.06
>25	1420 (82.9)	324 (17.1)	1.43 (0.99–2.07)	
Formal education (years)				
<5	205 (87.4)	28 (12.6)	1	0.54
5+[c]	2908 (84.5)	565 (15.5)	1.28 (0.59–2.79)	
Monthly income (US$), previous month				
<Minimum wage (<195)	143 (84.4)	278 (15.6)	1	
1–2 minimum wages (195–391)	1053 (84.6)	205 (15.4)	0.98 (0.65–1.50)	0.94
>2 minimum wages (>391)	639 (86.2)	112 (13.8)	0.86 (0.55–1.38)	0.54
Conjugal situation				
Single/living alone	2563 (85.4)	470 (14.6)	1	
Married/living with a female partner	151 (80.5)	25 (19.5)	1.42 (0.67–3.03)	0.37
Living with a male partner	324 (80.7)	87 (19.3)	1.40 (0.75–2.60)	0.29
Life experience at community level				
Skin colour				
White	867 (87.8)	158 (12.2)	1	0.13
Non-white	2258 (83.7)	437 (16.3)	1.40 (0.90–2.17)	
Sexual identity				
Heterosexual	259 (92.9)	22 (7.1)	1	
Bisexual	978 (86.1)	133 (13.9)	2.12 (0.94–4.76)	0.07
Homosexual/gay/MSM	1850 (83.2)	436 (16.8)	2.63 (1.26–5.50)	0.01
Sexual attraction				
Same sex + opposite sex	1704 (87.7)	233 (12.3)	1	0.005
Only same sex	1422 (80.8)	363 (19.2)	1.70 (1.71–2.46)	
Discrimination due to sexual orientation, last 12 months				
No	2154 (89.3)	276 (10.7)	1	<0.001
Yes	971 (72.6)	320 (27.4)	3.17 (2.18–4.59)	
Went to parties to meet sexual partners, last 6 months				
No	910 (85.6)	206 (14.5)	1	0.02
Yes	342 (75.0)	101 (25.0)	1.97 (1.11–3.50)	
Went to public toilets, last 6 months				
No	1172 (84.8)	271 (15.2)	1	0.003
Yes	80 (64.4)	36 (35.6)	3.08 (1.47–6.46)	
Belong to an NGO for LGBT				
No	2835 (86.2)	482 (13.8)	1	0.001
Yes	291 (72.4)	114 (27.6)	2.37 (1.42–3.95)	
Ever tested for HIV				
No	1554 (89.1)	212 (10.9)	1	<0.001
Yes	1572 (80.8)	384 (19.2)	1.94 (1.34–2.81)	
Participated in HIV/STI talks, last 12 months				
No	2240 (87.1)	376 (12.9)	1	0.001
Yes	886 (77.4)	220 (22.6)	1.97 (1.32–2.93)	

SV sexual violence

[a] Weighted proportion according to the social network size and the proportion of MSM in the city related to the total sample size

[b] Weighted odds ratio

[c] First stage of primary school completed

Table 3 Factors associated with sexual violence experience in MSM in Brazil, bivariate analysis

Characteristics	Non SV experience (N = 3,149) n (%)[a]	SV experience (N = 596) n (%)[a]	OR[b] (95 % CI)	*p* value
Sexual experience level				
Age at first sex (years)				
14+	2122 (88.1)	297 (11.9)	1	<0.001
≤14	984 (77.4)	296 (22.6)	2.16 (1.48–3.16)	
First sex with a man				
No	1538 (90.8)	153 (9.2)	1	<0.001
Yes	1585 (78.7)	432 (21.3)	2.66 (1.81–3.94)	
Number of sexual partners, last 12 months				
1	471 (89.6)	61 (10.4)	1	
2–4	1140 (85.8)	205 (14.2)	1.43 (0.81–2.52)	0.22
5+	1505 (82.7)	327 (17.3)	1.81 (1.03–3.15)	0.04
Sexual contact only with male partners, last 12 months				
No	1188 (88.3)	156 (11.7)	1	
Yes	1937 (82.2)	440 (17.8)	1.63 (1.08–2.43)	0.02
Had commercial partners, last 12 months				
No	1999 (86.0)	367 (14.0)	1	
Yes	1127 (83.1)	229 (16.9)	1.25 (0.45–1.83)	0.26
Condom use with any type of sexual partner, last 12 months				
Always	1092 (86.7)	187 (13.4)	1	
Sometimes/never	2009 (83.8)	401 (16.2)	1.27 (0.88–1.84)	0.20
Other individual factors				
Illicit drug use, last 6 months				
No	1852 (84.4)	356 (15.6)	1	
Yes	1267 (85.4)	240 (14.6)	0.92 (0.63–1.35)	0.68
Alcohol use				
Never	642 (81.3)	126 (18.7)	1	
<2 times a week	1526 (84.1)	320 (15.9)	0.82 (0.50–1.34)	0.43
2+ times per week	957 (87.7)	149 (12.3)	0.61 (0.35–1.01)	0.09
Self-perceived risk for HIV infection				
No/little	923 (89.9)	132 (10.1)	1	
Moderate/high	2091 (84.4)	413 (15.6)	1.63 (1.09–2.43)	0.02
Ever had syphilis				
No/don't know	2972 (86.2)	519 (13.8)	1	
Yes	154 (67.9)	77 (32.1)	2.93 (1.54–5.59)	0.001
Had STI symptoms, last 12 months				
No	2576 (86.7)	459 (13.3)	1	
Yes	550 (78.3)	137 (21.7)	1.81 (1.84–2.76)	0.006
Ever disclosed sexual identity				
No	577 (88.1)	66 (11.9)	1	
Yes	2228 (82.7)	499 (17.3)	1.55 (0.92–2.63)	0.10
Feeling sad or depressed, last 6 months				
Never	1182 (88.4)	156 (11.6)	1	
At least once	2401 (83.3)	482 (16.7)	1.53 (1.00–2.33)	0.05
Had suicidal thoughts, last 6 months				
Never	2618 (87.6)	436 (12.4)	1	
At least once	506 (74.6)	160 (25.4)	2.40 (1.56–3.68)	<0.001

SV sexual violence

[a] Weighted proportion according to the social network size and the proportion of MSM in the city related to the total sample size

[b] Weighted odds ratio

Table 4 Factors associated with sexual violence experience, hierarchical logistic regression analysis

Characteristics	Community	*p* value	Relationship	*p* value	Individual	*p* value
Discrimination due to sexual orientation, last 12 months	3.05 (2.10–4.42)	<0.001				
Ever tested for HIV	1.81 (1.25–2.63)	0.002				
Age at first sex (years) (≤14)			1.86 (1.28–2.71)	0.001		
First sex with a man			1.89 (1.28–2.79)	0.001		
Had STI symptoms, last 12 months					1.66 (1.12–2.47)	0.01
Had suicidal thoughts, last 6 months					2.08 (1.30–3.35)	0.002

Data indicate adjusted odds ratios and 95 % CI weighted according to the social network size and the proportion of MSM in the city related to the total sample size

Having ever tested for HIV, which is used here as a proxy for access to health care, was significantly associated with reporting SV. HIV prevalence was 26.1 % in those reporting SV and 16.3 % in those who did not report SV ($p < 0.001$). Among MSM in India, having ever had an HIV test was not associated with reports of SV [8]. However, in that study, the MSM experiencing SV also reported increased physician visits. Worryingly, most of the MSM in our study (95.7 %) did not communicate an SV episode to health professionals. This result is in agreement with data from male patients with mental illness in Brazil, among whom a high proportion (86 %) never communicated SV to health professionals [27]. This indicates missed opportunities for early and appropriate intervention within health services to prevent further episodes of SV and to provide adequate care for those in need. The underreporting of SV may be the result of several factors. First, MSM in primary health care services in Brazil experience situations of symbolic violence (i.e. almost unconscious modes of cultural/social domination exercised by health staff in dealing with MSM) and discrimination that leads them to mask their sexual orientation [32]. Second, the dual stigma of being MSM and a victim of SV may raise even greater reluctance to communicate with health professionals. Finally, patients might not disclose SV simply because health staff did not inquire about it. This lack of reporting of SV suggests that SV interventions in health services may not benefit MSM in Brazil because health facilities are not welcoming environments for MSM. Similarly, most MSM (93.7 %) did not report SV to the police, which has been noted in other studies as well [33, 34]. One study showed that MSM perceived police as helpless in response to SV and that those with previous experience of homophobia tended to anticipate rejection and discriminatory behavior from the police [34].

Regarding the sexual experience factors, younger age at first sex was significantly associated with reporting SV experience, consistent with previous studies [8, 35]. In addition, this first sex was often with another man. For many MSM, SV might have begun in childhood because younger men are more likely to experience sexual coercion at initiation than older men [9]. In Brazil, child protection services related to sexual abuse are limited. Specialized social services for children in general are offered through the publicly funded Unified Social Assistance System but are found in only half of the municipalities in Brazil (2,245 out of 5,570). These services are characterised by a lack of coordination among psychological, legal, and medical services for the SV victim [36]. While the Federal Constitution (article 227, paragraph 4), strongly penalizes abuse, violence and sexual exploitation of children and adolescents in Brazil, there is a gap in enforcement and interventions to protect the child. These factors are reflected in the high proportion of very young victims of SV. In a database of officially reported data, 70 % of the victims are less than 9 years of age [37]. A meta-analysis documented the prevalence of childhood sexual abuse among MSM to be as high as 27.3 % [38]. At the individual level, those presenting STI symptoms during the past year were significantly more likely to report SV experience. A consistent association between these two variables was found among Brazilian men [14]. We also found an association between suicidal toughts and SV experience. This association has been observed in university studies across the world [39] and among men in the United States as well [40].

We observed that those who reported SV experience were more likely to self-identify as bisexual and homosexual/gay/MSM, were sexually attracted to men only, frequented parties or public toilets to meet sexual partners, were involved in an NGO for LGBT, and had ever disclosed their sexual orientation. We hypothesised that MSM with a greater acceptance and openness about their homosexuality, and with greater participation and

involvement within the MSM community, ameliorated the impact of SV through personal support from their peers. A close attachment to the gay community may provide a protective effect to those who had experienced SV, removing MSM from circumstances of vulnerability, and giving them more opportunities to avoid risk. Conversely, those MSM most exposed to social interactions may be the most exposed to episodes of SV. However, these factors were not significant in the multivariate model.

This study has several limitations. First, the study was not primarily designed to collect data regarding SV, and the relevant questions were limited. For instance, we did not measure frequency of SV and we have few details regarding the environment of the sexual assault. Therefore, we cannot differentiate well those who suffered childhood sexual assault or describe the settings where the SV occurred. Second, the data collection was conducted in health clinics, and this might limit the disclosure of sensitive and stigmatized behavior. Third, the cross-sectional design of this study means that causation cannot be discussed. Although HIV testing was used as a proxy for access to health care, we have to consider that HIV testing decision involve other issues, such as fear of rejection, quality of counselling, perceived prejudice, internal homophobia, availability of MSM friendly health services, and lack of an appropriate way of broaching the topic of SV in clinical encounters. In our sample, those who had tested at least once for HIV were more likely to perceive themselves as most at risk (OR 1.54, 95 % CI 1.14–2.09, $p = 0.005$) and this factor might also have influenced the decision to test for HIV. Last, some of the limitations inherent in RDS have been described previously [18]. One of the main limitations of RDS that needs to be considered are claims that RDS generates a probability sample. Although RDS is commonly used for studies in hard-to-reach populations, interpretation of RDS data remains controversial. RDS improves on snowball sampling by generating longer chains containing individuals who share less and less with the originating seed, and where properly implemented is operationally systematic and rigorous [18]. While characteristics of seeds and recruitment rules were uniform across the 10 cities, each recruitment network may have sampled different sectors of the MSM population category. Aggregating the independent networks to generate a single sample violates a fundamental assumption of RDS that a sample forms one complete network component [22]. However, pooling the data may be acceptable if each city is considered a stratum weighted according to their respective estimated MSM population size, as proposed. In studies using RDS, ethical concerns regarding recruitment, coupons, and incentive have been raised [41]. However, adequate formative research conducted before data collection was used to optimize the implementation of relevant study procedures and protect participants [42]. The incentive amount used was minimized and reflected participant's time and transport costs to reduce the potential of participants selling coupons or participants falsely reporting as MSM. Each participant received only 3 coupons to avoid those searching only for remuneration. It has been suggested that recruitment using RDS may expose participants to risk by disclosing stigmatized behaviors to other members of their social network [22]. However, the potential risk of unwanted disclosure seems unlikely among participants because MSM–MSM recruitment did not include information on HIV risk or behavior.

In conclusion, MSM reported high rates of SV in Brazil. Given the magnitude of the problem and the severe consequences for individuals, there is an urgent need to identify policies and programs and to scale them up. Homophobic discrimination emerged as the strongest factor associated with SV. Given these findings, the Brazilian government should give priority and accelerate the approval of a legal framework to protect LGBT against violence, discrimination and prejudice on the grounds of gender identity and sexual orientation, i.e. criminalization of homophobia. Responding to SV only through interventions in clinical settings will likely be insufficient and a broader and more comprehensive program is required. This could include broad communication interventions that discuss gender power and sexuality in general, not just with reference to LGBT, positions discussions of discrimination in the context of human rights and individual freedom, and considers the difficult problems faced by hetero-alternative identities. However, professionals that interact with MSM and others regarding SV, such as health providers, police and in the judicial system, will require special training. In Brazil, a network of health services specialized in SV prevention and care to protect children and adolescents from SV has been in place since 2002, albeit with insufficient coverage as an important study from the Ministry of Justice argues [43]. However, that study emphasizes the need to train health care teams to screen MSM who have suffered or are at risk of suffering SV during routine and regular care. Health services will need substantial changes, in fact, to create a friendly and non-discriminatory environment and to remove barriers that discourage MSM from disclosing relevant personal information.

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