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Men Who Have Sex with Men (MSM) and Factors Associated with Not Using a Condom at Last Sexual Intercourse with a Man and with a Woman in Senegal

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Abstract

Background: Men who have sex with other men (MSM) are a vulnerable population in Africa that has been insufficiently explored. Given the high rate of bisexuality among MSM (73% in the past year), it is important to understand their risk-taking behaviors regarding both men and women.

Methodology/Principal Findings: A socio-behavioral survey was carried out in 2007 among 501 MSM recruited using the snowball sampling method. We explore in this article why a condom was not used during last sexual intercourse with a man and with a woman, taking into account the respondent's characteristics, type of relationship and the context of the sexual act. In the survey, 489 men reported that they had had sexual intercourse at least once with another man during the previous year, and 358 with a man and with a woman. The main risk factors for not using a condom at last sexual intercourse with another man were having sex in a public place (aOR = 6.26 [95%CI: 2.71–14.46]), non-participation in an MSM prevention program (aOR = 3.47 [95%CI: 2.12–5.69]), a 19 years old or younger partner (aOR = 2.6 [95%CI: 1.23–4.53]), being 24 years or younger (aOR = 2.07 [95%CI: 1.20–3.58]) or being 35 years or over (aOR = 3.08 [95%CI: 1.11–8.53]) and being unemployed (aOR = 0.36 [95%CI: 0.10–1.25]). The last sexual intercourse with the respondent's wife was hardly ever protected (2%). With women, the other factors were a 15 years or younger partner (aOR = 6.45 [95%CI: 2.56–16.28]), being educated (primary: aOR = 0.45 [95%CI: 0.21–0.95], secondary or higher: aOR = 0.26 [95%CI: 0.11–0.62]), being a student (aOR = 2.20 [95%CI: 1.07–4.54]) or unemployed (aOR = 3.72 [95%CI: 1.31–10.61]) and having participated in a MSM prevention program (aOR = 0.57 [95%CI: 0.34–0.93]).

Conclusion: Having participated in a prevention program specifically targeting MSM constitutes a major prevention factor. However, these programs targeting MSM must address their heterosexual practices and the specific risks involved.

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Introduction

In Sub-Saharan Africa, HIV transmission was described from the start as an essentially heterosexual problem, and to a lesser extent, as a perinatal problem [1]. The question of homosexual HIV transmission was ignored for many years. Although the existence of homosexual practices on the African continent has long been reported [2], the first epidemiological study to measure HIV prevalence among men having sex with men (MSM) was only conducted in 2004 in Senegal [3]. Since then, several studies carried out in various African countries have confirmed that HIV prevalence among MSM is between 2 to 20 times higher than among the general population [4–6].

As within other continents, African MSM are particularly vulnerable to HIV, especially since in most African countries homosexuality is highly stigmatized; it may constitute a crime and

penal sanctions can even entail the death penalty [7,8]. Men who have sex with other men very often conceal their homosexuality from their families and friends, and avoid seeking health care through fear of rejection [9–12]. HIV prevention programs are insufficiently taking his specific group into consideration: only 27 countries out of 86 (31%) included MSM in their national HIV surveillance report in 2007 [13].

In Senegal, the study conducted in 2004 showed HIV prevalence among MSM to stand at 21.5%, i.e. 30 times higher than among the general population [3]. Thereafter, the health authorities in Senegal, together with certain NGOs, set up programs specifically targeted towards men having sex with other men: a specific program for STI and HIV management, involving health professionals trained to give support and care to this stigmatized population; an awareness campaign about sexual risks within MSM circles; and an appeal to all public figures to urgently

address the specific risks incurred by MSM. An important political argument justifying the implementation of these programs, in a society where homosexuality is condemned, is the protection of the population as a whole: if the epidemic within the homosexual population is not addressed, the efforts in Senegal to control AIDS could be jeopardized, since the epidemic can spread to the entire population through the heterosexual practices of these men.

Yet, little research in Senegal has studied in detail the heterosexual practices of MSM, even though this aspect has been mentioned in the literature. N. Teunis [11] reveals that certain MSM are married or have “girlfriends”. R. Sappe also mentions this bisexual behavior, but reduces it to a heterosexual relationship providing a “social cover” [14]. An ethnographic survey conducted in 2000–2001 in Dakar estimated that 88% of the 250 MSM respondents declared having had vaginal intercourse with a woman at least once during their lifetime [9]. The epidemiological study conducted in 2004 confirmed this high proportion of bisexual practices: 94% of the MSM surveyed had already had sexual intercourse with a woman during their lifetime, and 74% during the previous twelve months [3].

If prevention programs are to be more effective, it is critical to understand the factors behind MSM risky behavior, not only with their male partners, but also with their female partners. We present here an analysis of factors for not using a condom at last sexual intercourse with a man and with a woman, using data from a new epidemiological and behavioral survey carried out in 2007 among men having sex with men in Senegal (the ELIHoS survey). Individual characteristics, characteristics of the relationship and context of the sexual act were included in the analysis.

Methods

The ELIHoS survey (Evaluation of campaigns targeting male homosexuals in Senegal – ANRS 12139) was conducted in 2007. The main objectives of this survey were to measure HIV and STI (sexually transmitted infection) prevalence, and sexual behaviors of MSM, in order to observe trends since 2004 (previous survey), and thus evaluate the effects within this population of prevention campaigns currently underway. This survey was initiated by the AIDS-STI division of the Institut d’Hygiène Sociale in Dakar, with the full agreement of the Senegalese Ministry of Health.

The recruitment method used was the “snowball sampling” technique. MSM peer leaders were in charge of recruiting participants in three places (Dakar, the capital city; Mbour/Thiès, two towns near the tourist coast; Saint-Louis, fairly large town in northern Senegal). Recruitment was carried out in various types of place (bars and nightclubs where MSM meet up, MSM associations, brothels frequented mostly by MSM, certain beaches) and by word of mouth in various social settings. No financial incentive was offered to respondents other than reimbursement of transport costs (10 000 F CFA). On the other hand, MSM peer leaders were remunerated for their participation in the research.

Recruitment criteria were age (18 years or over) and history of sexual intercourse with other men. The survey was presented as a survey into the specific health needs of MSM (including HIV and STI). The survey was conducted in the health units set up in 2003 dedicated to the medical care of MSM, and where respondents knew that they would be made welcome and where total confidentiality was ensured. The men who agreed to participate in the survey went along to these health units where they were interviewed by a doctor and a social worker who explained survey objectives and procedure. After having signed a consent form, they answered a socio-behavioral questionnaire administered by the social worker or by the doctor. Thereafter the doctor carried out a

clinical examination and took samples of blood and urine for biological analysis. If an STI was found, a syndromic treatment was prescribed. The respondent was asked to return two weeks later to pick up the laboratory test results. When he came back, any infection that had been detected was treated. All the treatments were delivered free of charge. If the respondent tested HIV-positive, he was informed by the social worker who had been trained to give this information. He was then taken in hand by the HIV management program where a full biological analysis was carried out in order to decide whether or not he would receive antiretroviral treatment (treatment is free of charge in Senegal). The entire survey guaranteed that respondents would remain strictly anonymous. Questionnaires, consent forms and clinical and biological data were matched using numbered stickers (the numbers were allotted to respondents so that they could collect their laboratory results). The investigators were trained to fully apply this rule of confidentiality.

The epidemiological results of this survey have been published in another paper [15]. We analyze here the factors related to unprotected penetration during last sexual intercourse with a man and during last sexual intercourse with a woman, in the last year before the survey. Only men having had at least one intercourse with a man during the last year before the survey have been considered for the analysis of the last sexual intercourse with a man. Among them, only men having had at least one intercourse with a woman during the last year before the survey have been considered for the analysis of the last sexual intercourse with a woman.

Bivariate associations were determined using Wald test for bivariate logistic regression. Three groups of variables were included in the analysis: respondent characteristics at the time of the survey (survey site, age group, education level, occupation, awareness of HIV, sex of sexual partners during the last year before the survey, sex of regular partners at the time of the survey); type of relationship with the partner of last sexual intercourse (partner type, loving relationship, length of relationship, partner’s age, age difference with the partner); and variables regarding the context of last sexual intercourse (where it took place, awareness of HIV status of partner, payment for this sexual act).

The ‘occupation’ variable distinguishes students and apprentices from individuals receiving salary. For the latter, the common professions among Senegalese MSM were grouped together. These were hairdressers, beauticians, dressmakers, tailors, weavers, artists, photographers, models, bar tenders, waiters and people working in tourism.

Three variables allow the levels of information, awareness of and participation in an HIV prevention program to be assessed: knowledge about HIV counseling and testing centre, participation in at least one prevention program specifically targeting MSM, and membership of an MSM association. Since these variables overlapped, we created a global awareness indicator to account for the following: people unaware of HIV counseling and testing centre location; those aware of an HIV counseling and testing centre location but never having participated in a prevention campaign; those aware of an HIV counseling and testing centre location and having participated in a prevention campaign but not members of an association; and those meeting all three requirements.

In order to avoid chance selection, a first multiple logistic regression model with all factors with $p < 0.20$ in the bivariate analysis was calculated in order to merge modalities of the same variable with similar odds ratio. Then, new models using merged variables were calculated through a step-by-step backwards

elimination procedure. Finally, the model with the lowest AIC (Akaike's Information Criterion) was retained [16,17].

Questionnaires were entered using Microsoft Access, and statistical analysis was carried out using SPSS 16.0 (SPSS Inc; Chicago, Illinois).

Ethics Statement

The national ethics committee of Senegal gave its ethical approval to the study, which was subject to an ethical audit by the Agence Nationale de Recherche sur le SIDA.

Results

The socio-behavioral questionnaire was administered to 501 men (306 men in Dakar, 100 in Mbour/Thiès and 95 in Saint-Louis). The sample was young (80% were under thirty) and fairly well-educated (47% had reached secondary school level or higher education). Ninety per cent lived with their family, and 41% declared themselves to be members of an MSM association.

Six men (1.2%) declared that they had had no sexual intercourse over the last twelve months, and six others had only had female partners during this period. These twelve men were excluded from the analysis. Three hundred and fifty-eight respondents (73%) out of the 489 remaining men had had both male and female partners over the past year. As for last sexual intercourse with a man, anal sex was nearly universal (see Table 1): only two men had not practiced anal sex and only oral-penile sex without use of a condom. Oral-penile sex was almost always unprotected, and neither was oral-anal sex which remained uncommon (5% of last sexual intercourse). Regarding last sexual intercourse with a woman, three men declared no vaginal penetration: one declared oral-penile sex, two others declared anal penetration. This latter practice remained rare with women (1%). As with men, oral-penile sex with women was unprotected.

Regarding last sexual intercourse with a man (Tables 2, 3 and 4), there was a strong association between lack of condom use and the place of the sexual intercourse: 65% of sexual acts that took place in a public place or outside (park, beach, cinema, bar or nightclub toilet) were unprotected, compared with between 16–

21% in other places. When controlling for other factors, the odds ratio for not using a condom was about six times higher when the intercourse took place outside compared to within the respondent's home (aOR = 6.26 [95%CI: 2.71–14.46]). Respondents are too few (n = 34) to assess if other factors come into play when sexual intercourse takes place outside.

The second factor strongly related to not using a condom was the level of information and awareness concerning HIV: proportion of unprotected sex at last sexual intercourse was 41% among individuals with no knowledge of an HIV counseling and testing centre, compared to 10% among MSM association members having participated in a prevention campaign (p<0.001). In particular, having participated at least once in an HIV counseling and testing program specifically targeting MSM was associated with a lesser likelihood of unprotected sex (aOR = 0.28 [95%CI: 2.71–14.46]).

Probability for not using a condom was significantly (p<0.05) higher when the male partner was young (19 years or under), among the younger age group (18–24 years) and among the older age group (35 years and over), and also among unemployed individuals.

Finally, although not significant (p = 0.107), it seemed to be half as high when the serological status of the partner was known.

Concerning last sexual intercourse with a woman, sexual acts with the respondent's wife were hardly ever protected (26 out of 27 times). Secondly, lack of condom use was almost six times higher (aOR = 6.45 [95%CI: 2.56–16.28]) when the female partner was very young (15 years or younger).

Unprotected sex with a woman was more commonly declared by students and apprentices (aOR = 2.20 [95%CI: 1.07–4.54]) and unemployed people (aOR = 3.72 [95%CI: 1.31–10.61]). On the contrary, probability for using a condom was higher among educated people (aOR = 0.45 [95%CI:0.21–0.95] for primary level, aOR = 0.26 [95%CI:0.11–0.62] for secondary or higher level) and individuals having followed a prevention program specifically targeting MSM (aOR = 0.57 [95%CI:0.34–0.93]).

Discussion

The sample used in the ELIHoS survey, as for all samples obtained using the snowball method, incurs a selection bias, since the more "accessible" individuals were more likely to respond to the survey. Thus, for example, only 20% of the surveyed men were 30 years old or older, whereas 51% declared that their sexual partners were 30 years old or older. This is however one of the few recruitment methods possible for use in a survey of a highly stigmatized population and for which no survey base exists. Due to the difficulties inherent to carrying out a survey within this population, our study is the first in Africa to supply information about MSM risk-taking behavior in intercourse with both men and women.

Analysis of last sexual intercourse allows a specific risky behavior to be examined along with the different reasons for this behavior: respondent characteristics along with those of his male or female partner, but also information about their relationship and the location of the sexual acts. Our results show the importance of taking into account the characteristics of the partner and the context of the sexual acts: the main factors for not using a condom with a male partner were the location of sexual intercourse, having not participated in a MSM program and the age of the male partner. With a female partner, the main factors were the type of relationship (spouse or not) and the age of the female partner. It has been long shown that practicing safer sex depends on the cultural context and the relationship involved, and

Table 1. Sexual practices at last sexual intercourse.

| Practices at last sexual intercourse | frequency | | unprotected | |
|--------------------------------------|-----------|-----|-------------|-----|
| | % | n | % | n |
| With a man | | | | |
| Anal sex (insertive or receptive) | 99.6 | 487 | 23.2 | 113 |
| - insertive anal sex | 50.9 | 249 | 24.9 | 62 |
| - receptive anal sex | 52.6 | 257 | 21.4 | 55 |
| Oral-penile sex | 24.9 | 122 | 90.2 | 110 |
| Oral-anal sex | 4.9 | 24 | 83.3 | 20 |
| Total | | 489 | | |
| With a woman | | | | |
| Vaginal sex | 99.2 | 355 | 37.5 | 133 |
| Anal sex | 1.1 | 4 | 75.0 | 3 |
| Oral-penile sex | 7.0 | 25 | 100.0 | 25 |
| Total | | 358 | | |

Sum of columns exceeds 100% (several answers possible).

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Table 2. Unprotected anal or vaginal sex at last sexual intercourse with a man and at last sexual intercourse with a woman (bivariate analysis).

| Last sexual intercourse | with an man ^a | | | with an woman ^b | | |
|-----------------------------------|--|------|----------------------|----------------------------|---------|----------------------|
| | % | n/N | p-value ^c | % | n/N | p-value ^c |
| Respondent characteristics | | | | | | |
| Site | | | 0.070 | | | 0.606 |
| | Dakar | 23.6 | 71/301 | 35.8 | 77/215 | |
| | Saint-Louis | 29.7 | 27/91 | 39.0 | 30/77 | |
| | Mbour/Thiès | 15.5 | 15/97 | 42.4 | 28/66 | |
| Age group | | | 0.001 | | | 0.212 |
| | 18–19 years | 36.5 | 35/96 | 38.9 | 28/72 | |
| | 20–24 years | 24.3 | 46/189 | 36.4 | 47/129 | |
| | 25–29 years | 13.5 | 15/111 | 34.6 | 27/78 | |
| | 30–34 years | 12.3 | 8/65 | 33.3 | 18/54 | |
| | 35 years or over | 32.1 | 9/28 | 60.0 | 15/25 | |
| Education | | | 0.219 | | | 0.002 |
| | None | 29.0 | 20/69 | 62.0 | 31/50 | |
| | Primary | 18.7 | 36/193 | 33.1 | 45/136 | |
| | Secondary | 25.9 | 50/193 | 35.6 | 53/149 | |
| | Higher | 20.6 | 7/34 | 26.1 | 6/23 | |
| Occupation | | | 0.018 | | | 0.170 |
| | None | 37.0 | 10/27 | 55.0 | 11/20 | |
| | Student/Apprentice | 29.4 | 37/126 | 37.8 | 34/90 | |
| | Frequent profession among MSM | 16.7 | 18/108 | 32.4 | 23/71 | |
| | Other profession | 21.1 | 48/228 | 37.9 | 67/177 | |
| Global awareness indicator | | | 0.000 | | | 0.004 |
| | Don't know a place to be tested for HIV | 40.8 | 31/76 | 53.3 | 32/60 | |
| | Know a place to be tested for HIV (a) | 35.7 | 40/140 | 43.8 | 46/105 | |
| | (a) + has participated in an MSM program (b) | 15.1 | 14/93 | 28.8 | 19/66 | |
| | (a) + (b) + is member of an MSM organization | 10.0 | 27/114 | 29.9 | 38/127 | |
| Sexual partners last year | | | 0.367 | | | na |
| | Men exclusively | 26.0 | 34/131 | na | na | |
| | Men and women | 22.1 | 79/358 | 37.7 | 135/358 | |
| Regular partners at the survey | | | 0.608 | | | 0.844 |
| | None | 23.5 | 20/85 | 40.0 | 20/50 | |
| | Women | 29.4 | 15/51 | 41.2 | 21/51 | |
| | Men | 24.0 | 35/146 | 40.0 | 20/50 | |
| | Men and women | 20.8 | 43/207 | 35.7 | 74/207 | |

Continue in Table 3.

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that individual characteristics are not sufficient in explaining a safer approach to sex. Practices can differ depending on the type of relationship with the male or female partner [18,19], the immediate context of sexual intercourse [20] or the power relations between partners [18,21].

Contrary to expectations, condom use did not vary, between partnerships with men or women, according to type of relationship (excluding wives): regular or occasional partner, loving relationship or not, established or recent relationship. Also, condom use does not depend on being exclusively homosexual (or not) at the time of the survey, nor by the sex of regular partners. In another article focusing on the various homo-bisexual situations in this survey, we observed that differences regarding risk-taking behaviors, exposure

to HIV, and HIV prevalence, were not due to different approaches to condom use connected with type of homo-bisexuality, but were due to frequency of sexual intercourse, type of sexual practices (insertive and/or receptive), and individual involvement in different sexual networks and partnerships, as well as their emotional nature [22].

Condom use by bisexual MSM with women was similar to that observed in the general population of Senegal. According to the DHS report (Demographic and Health Survey) carried out in 2005 among the general population in Senegal [23], 4.0% of men aged between 15 and 49 used a condom during last sexual intercourse with wife or live-in female partner, and 61.9% during last high-risk sexual intercourse (neither wife nor live-in female

Table 3. Table 2 continued.

| Last sexual intercourse | with an man ^a | | | with an woman ^b | | |
|---------------------------------------|--------------------------|---------|----------------------|----------------------------|---------|----------------------|
| | % | n/N | p-value ^c | % | n/N | p-value ^c |
| Relationship characteristics | | | | | | |
| Type of partner | | | | 0.686 | | |
| Regular partner | 22.5 | 64/285 | | 30.1 | 56/186 | |
| Occasional partner | 24.0 | 49/204 | | 36.6 | 53/145 | |
| Spouse | na | na | | 96.3 | 26/27 | |
| Loving relationship with this partner | | | | 0.455 | | |
| No | 24.7 | 55/223 | | 35.9 | 47/131 | |
| Yes | 21.8 | 58/266 | | 38.8 | 88/227 | |
| Duration of the relationship | | | | 0.670 | | |
| First time with this partner | 22.1 | 31/140 | | 42.1 | 48/114 | |
| Less than 3 months | 18.6 | 13/70 | | 23.5 | 8/34 | |
| 3 to 12 months | 23.0 | 23/100 | | 35.0 | 28/80 | |
| One year or more | 25.7 | 46/179 | | 39.2 | 51/130 | |
| Age of the partner | | | | 0.001 | | |
| 15 years or under | 57.1 | 4/7 | | 77.4 | 24/31 | |
| 16–19 years | 40.0 | 20/50 | | 35.7 | 55/154 | |
| 20–24 years | 26.8 | 40/149 | | 33.7 | 32/95 | |
| 25–29 years | 16.4 | 23/140 | | 31.8 | 14/44 | |
| 30 years or over | 18.3 | 26/142 | | 29.4 | 10/34 | |
| Age difference with this partner | | | | 0.551 | | |
| Partner younger by 10 years or more | 20.0 | 4/20 | | 58.6 | 34/58 | |
| Partner younger by 2 to 9 years | 20.0 | 16/80 | | 37.7 | 69/183 | |
| Same age (\pm one year) | 27.6 | 37/134 | | 29.1 | 23/79 | |
| Partner older by 2 to 9 years | 23.4 | 46/197 | | 24.1 | 7/29 | |
| Partner older by 10 years or more | 17.5 | 10/57 | | 22.2 | 2/9 | |
| Context of sexual act | | | | | | |
| Location of sexual act | | | | 0.000 | | |
| Respondent's home | 20.1 | 20/149 | | 36.3 | 85/234 | |
| Partner's home | 21.2 | 56/264 | | 43.9 | 25/57 | |
| Public place/Outside | 64.5 | 20/31 | | 50.0 | 3/6 | |
| Hotel/A friend's home | 15.6 | 7/45 | | 36.1 | 22/61 | |
| Partner's HIV status known | | | | 0.014 | | |
| No | 24.7 | 110/445 | | 37.3 | 131/351 | |
| Yes | 6.8 | 3/44 | | 57.1 | 4/7 | |
| Payment for this sexual act | | | | 0.077 | | |
| No | 26.5 | 78/294 | | 39.5 | 115/291 | |
| Yes, money given by respondent | 21.9 | 7/32 | | 27.8 | 15/54 | |
| Yes, money received by respondent | 17.2 | 28/163 | | 38.5 | 5/13 | |
| All | 23.1 | 113/489 | | 37.7 | 135/358 | |

^aBase: 489 MSM who had had at least one male sexual partner over the past year.

^bBase: 358 MSM who had had both male and female sexual partners over the past year.

^cWald test for bivariate logistic regression of the overall variable (null hypothesis: all odds ratio of modalities are equal to 1).

na: not applicable.

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partner). By comparison, in the ELIHoS survey, the proportion of respondents reported using a condom at last sexual intercourse with wife was 3.7%, and 67.1% at last sexual intercourse with other female partner. Our results were also similar to the DHS

results as regards the connection between condom use and education level: in the DHS study, condom use stands at 45% for uneducated men and at 74% for men having reached secondary or higher education levels.

Table 4. Factors associated with unprotected anal or vaginal sex at last sexual intercourse with a man and at last sexual intercourse with a woman (logistic regression).

| | | aOR | 95% CI | p-value (Wald test) |
|---|----------------------|-------|-------------|---------------------|
| Last sexual intercourse with a man^a | | | | |
| Location of sexual act: | public place/outside | 6.26 | 2.71–14.46 | 0.000 |
| Has participated in a MSM prevention program | | 0.28 | 0.18–0.46 | 0.000 |
| Partner is 19 years or younger | | 2.36 | 1.23–4.53 | 0.010 |
| Age of the respondent | 18–24 years | 2.07 | 1.20–3.58 | 0.009 |
| | 25–34 years | 1 | — | — |
| | 35 years or over | 3.08 | 1.11–8.53 | 0.030 |
| Is unemployed | | 2.81 | 1.10–7.19 | 0.031 |
| Partner's HIV status known | | 0.36 | 0.10–1.25 | 0.107 |
| Last sexual intercourse with a woman^b | | | | |
| Partner is the spouse | | 68.75 | 8.76–539.62 | 0.000 |
| Partner is 15 years or younger | | 6.45 | 2.56–16.28 | 0.000 |
| Education of the respondent | None | 1 | — | — |
| | Primary | 0.45 | 0.21–0.95 | 0.037 |
| | Secondary or Higher | 0.26 | 0.11–0.62 | 0.002 |
| Occupation of the respondent | Has a job | 1 | — | — |
| | Student/Apprentice | 2.20 | 1.07–4.54 | 0.032 |
| | Unemployed | 3.72 | 1.31–10.61 | 0.014 |
| Has participated in a MSM prevention program | | 0.57 | 0.34–0.93 | 0.024 |

^aBase: 489 MSM who had had at least one male sexual partner over the past year.

^bBase: 358 MSM who had had both male and female sexual partners over the past year.

aOR: adjusted Odds Ratio. 95% CI: 95% Confidence Interval.

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Our results show that not using a condom in heterosexual relationships was higher when the female partner was very young (15 years or younger). According to the anthropological interviews conducted for the ELIHoS project [24], these very young women were mostly considered to be potential future wives. They appeared to be more submissive and less emancipated from a sexual point of view. Thus, men who found themselves obliged to marry due to social pressure, but planned to have a loving relationship with a man at the same time, were liable to choose this type of inexperienced woman and impose their life style. Several studies have shown that women are more vulnerable when they are the dominated party within the couple [25,21].

Since few years, several papers about quantitative surveys among MSM in sub-Saharan Africa have been published [3,6,15,26–32]. All show that bisexual practices are very common among MSM. If most of them provide indicators on unprotected anal intercourse with men [3,6,15,27–30], only a survey in South Africa [30] and the two Senegalese surveys [3,15] provide indicators on unprotected practices of MSM with women. Five articles have analyzed factors associated with HIV positive status [3,6,26,30,32], but only two have explored factors associated with unprotected anal intercourses [28,29].

In Cameroon in 2008 [28], significant factors positively associated with having had at least one unprotected anal intercourse in the last six months were: having had at least one stable male partner during lifetime and frequency of sexual intercourses. Although not significant, having not been exposed to HIV prevention interventions was associated with an adjusted odds ratio of 2.04 (95% CI: 0.95–4.35, $p=0.066$). In a survey

conducted in 2004 and 2005 in a South African Township [29], reporting unprotected anal intercourse with male partners in prior 6 months was significantly and positively associated with regular alcohol use in last month, not using latex-compatible lubrication and rectal trauma.

To our knowledge, no other study on MSM in sub-Saharan Africa has discussed factors associated with not using a condom with women, nor has taken into account the context of the sexual act or characteristics of partner.

In order to guarantee confidentiality during the survey, the socio-behavioral questionnaire did not require the respondent to give information about his supposed HIV serological status. This implies that we couldn't analyze if men knowing their HIV status differed from the others. Several studies have shown that sexual prevention is different between HIV-infected people and people who are seronegative or have an unknown serostatus [33]. In our studies, the proportion of men knowing their status is probably higher among MSM having participated in HIV counseling and testing program specifically targeting MSM and among association members.

Few men knew the serological status of their partner during last sexual intercourse (9% at last intercourse with a man and 2% with a woman). As respondent's HIV status, the partner's status as known by the respondent was not collected in the survey. Hence, it was not possible to connect condom use with the knowledge held by partners about their respective serological statuses. Neither can we determine possible partner selection strategies according to status. These strategies cannot be excluded however, since three anthropological interviews revealed a matrimonial strategy based on serological status [24].

A number of ideas can be drawn from our results for improving the existing prevention programs.

Firstly, it appears critical to insist upon the necessity of always carrying a condom. Not using a condom proves to be greater when sexual intercourse takes place outside or in a public place, where it is more difficult to get hold of a condom. However, while 60% of men surveyed declared that they always carried a condom, only 17% were able to actually show it to the investigator.

Bisexuality is extremely common among Senegalese MSM. Although informed individuals protect themselves more than others, unprotected sex during intercourse with a woman remains more common than during intercourse with a man. Also, condom use with a woman is no higher than within the rest of the Senegalese general population. But, female partners of MSM are more vulnerable due to high HIV prevalence among MSM. Therefore, programs targeting MSM must also take into consideration the heterosexual practices of this MSM population.

Lastly, while condom use is hardly appropriate with a wife when procreation is the reason for intercourse, screening of both partners should be highly recommended.

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Whether intercourse takes place with a man or with a woman, the fact of having participated in a prevention program specifically targeting MSM constitutes a major prevention factor. This tends to show both the pertinence and effectiveness of these programs, and the necessity to pursue and to extend them.

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Author Contributions

Conceived and designed the experiments: JL ASW AdD.L. Performed the experiments: ASW AKD OD KG. Analyzed the data: JL. Wrote the paper: JL AdD.L. Investigator of the study: ASW AdD.L. Data manager: AM.