Violence, condom breakage and HIV infection among female sex workers in Benin, West Africa

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Abstract

Objective—To examine the relationship between violence, condom breakage and HIV prevalence among female sex workers (FSWs).

Methods—Data were obtained from the 2012 cross-sectional integrated biological and behavioural survey conducted in Benin. Multivariable log-binomial regression was used to estimate the adjusted prevalence ratios (APRs) of HIV infection and condom breakage in relation to violence towards FSWs. A score was created to examine the relationship between the number of violence types reported and HIV infection.

Results—Among the 981 women who provided a blood sample, HIV prevalence was 20.4%. During the last month, 17.2%, 13.5% and 33.5% of them had experienced physical, sexual and

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Conflicts of interest

There is no conflict of interest.

Author's contributions

Authors' contribution: FKT had the main responsibility for data analysis and drafted the manuscript. SD participated in the supervision of data collection and contributed significantly to data analysis and preparation of the manuscript. FAG and FK participated in the data collection and reviewed critically the content of the manuscript. CA, DMZ, AP and EB were involved in the study design and implementation, and reviewed critically the content of the manuscript. RB contributed significantly to data analysis and preparation of the manuscript. MA was responsible for the overall study design and the implementation of the survey, and contributed significantly to the preparation of the manuscript. All authors approved the final content of the manuscript.

psychological violence, respectively. In addition, 15.9% reported at least one condom breakage during the previous week. There was a significant association between all types of violence and HIV prevalence. The APRs of HIV were 1.45 (95% confidence interval [95%CI]: 1.05 – 2.00), 1.42 (95%CI: 1.02 – 1.98), and 1.41 (95%CI: 1.08 – 1.41) among those who had ever experienced physical, sexual and psychological violence, respectively. HIV prevalence increased with the violence score ($p=0.002$, test for trend), and physical and sexual violence were independently associated with condom breakage (p values 0.010 and 0.003, respectively).

Conclusion—The results show that violence is associated with a higher HIV prevalence among FSWs and that condom breakage is a potential mediator for this association. Longitudinal studies designed to analyse this relationship and specific interventions integrated to current HIV prevention strategies are needed to reduce the burden of violence among FSWs.

Keywords

Violence; condom failure; HIV; female sex workers; sub-Saharan Africa

Introduction

The highest burden of the HIV pandemic is carried by countries in sub-Saharan Africa. In 2011, they harboured 69% of the 34 million people living with HIV infection worldwide [1]. In West Africa, where the HIV epidemic is driven by heterosexual transmission [2] female sex workers (FSWs) and their clients are disproportionately contributing to its spread to the general population at low risk [2].

Otherwise, in different parts of the world including Benin (where HIV prevalence was estimated in 2008 at 26.5% among FSWs and at 1.2% in the general population [1]), FSWs are generally stigmatized and marginalized, and due to inadequate laws, their human rights are often insufficiently protected [3, 4]. Consequently, they are frequently subject to harassment, rape and other psychological, physical and sexual violence from their regular intimate partners, their clients, their brothel owners/managers and also from the police [3, 5]. Indeed, in previous studies, it has been reported that 14.6% to 64% of FSWs were exposed to physical and sexual violence [6, 7]. Violence including sexual assault against women is a public health issue. Indeed, it is associated with poorer HIV-related and HIV-unrelated health outcomes [8]. Also, it represents a critical barrier to women's ability to negotiate condom use and it increases the likelihood of non-condom use [9, 10]; condom slippage or breakage and the acquisition of HIV and other sexually transmitted infections (STI) [7, 11]. In Tanzania and Rwanda, HIV-positive women from the general population were more likely to report a history of physical, sexual or psychological violence than HIV-negative ones [12, 13] and in Uganda, intimate partner violence was associated with new HIV infections [14]. To our knowledge, only two studies conducted in India [15] and Argentina [16] have so far, investigated the association between violence and HIV infection among FSWs. In addition, neither study analysed sexual, physical and psychological violence distinctly. Furthermore, though it has been suggested that violence could cause HIV infection through inconsistent condom use [17] and condom breakage [7, 11] no study has yet formally analysed the association between violence and condom breakage. The aim of our study was to estimate

the frequency of sexual, physical and psychological violence and to assess their relationship with HIV infection and condom breakage among FSWs in Benin.

Methodology

This cross-sectional study is based on data collected during the integrated biological and behavioural survey (IBBS) conducted among FSWs in Benin in 2012. Based on the most recent mapping, 386 sites were sampled with a probability proportional to size among all the known settings for commercial sex transactions (brothels, public places, hotels, nightclubs, etc.). All women aged ≥ 15 years in each selected site were asked to participate to the study. Overall, 1100 FSWs were contacted. A face-to-face structured questionnaire, elaborated by Family Health International and validated by the Joint United Nations Program on HIV/AIDS [18] was used to collect information on sexual behavior and on different socio-demographic characteristics including age at first paid sex, literacy, duration in sex work, number of clients/non-paying partners, and condom use during the last week (week before the interview). The number of condom breakages with all partners over the same period was also assessed. Questions related to violence were added to the structured questionnaire and the whole questionnaire was pretested before the survey. Irrespective of the perpetrators (clients, boyfriends, sites owners or managers, police or other men in uniform, colleagues (other FSWs), etc.), violence was assessed over the past 30 days. Physical violence was defined as a push/slap/beat/hurt/torture/mutilation or attack with a weapon. Sexual violence referred to forced sexual touches or forced sex and psychological violence comprised insult/mockery/threat/humiliation/harassment/contempt/deliberate privation of diverse forms of emotional support or blackmail.

After the interview, the participants were invited to provide a capillary blood sample (dried blood spots on filter paper) for HIV testing and a self-collected vaginal swab for *Neisseria gonorrhoeae* (NG) and *Chlamydia trachomatis* (CT) testing. All these biological specimens were frozen at -20°C and transported to Cotonou (the largest city of Benin). For HIV, the tests were performed at the Central laboratory of the National AIDS Control Program (NACP) while for NG and CT they were performed at the STI laboratory of Centre de santé Cotonou-1. HIV antibody was detected by using an Enzyme-linked immunosorbent assay (Vironostika HIV mixt, Organon, Teknika, Bostel, the Netherlands) and positive sera were confirmed with a rapid and discriminatory test (Determine HIV 1/2 test, Abbott Diagnostic Division, Hoofddorp, The Netherlands). NG and CT were detected by using the Strand Displacement Amplification technique, SDA BD (Probetec ET NG/CT, Becton-Dickenson, Sparks, Maryland, USA) as instructed by the manufacturer. An external quality control was performed on all positive results and 5% of negative ones.

A ticket with a coded number was given to every participant who wished to receive the result of her HIV test. For this purpose, the participant had to go to a reference medical centre that was designated in each study locality and where HIV care was available. Information on the availability of free HIV testing throughout the country was also provided to the participants. Women reporting STI symptoms during the interview were also referred for free STI diagnosis and care according to the national guidelines.

Statistical analysis

Data were analysed using SAS version 9.3 (SAS institute, Inc, Cary, North Carolina, USA). To analyse the association between sexual, physical, and psychological violence and HIV infection, we used univariate and multivariate log-binomial regression models to estimate adjusted prevalence ratios (APRs) with 95% confidence intervals (95%CI). After univariate analyses, all variables with a p-value <0.05 were entered in multivariate models containing the potential confounding variables described in the literature (literacy, duration of sex work, sex work typology, and number of clients and non-paying partners [15]) Then, we removed the variables with a p-value > 0.05 unless they had a confounding effect on the association of interest. We created a combination score to see whether there was a relationship between the number of violence's types concurrently experienced by the women and HIV infection, and we tested for linear trends (combination score as a continuous variable) by using the Wald's chi-square. We checked for multi-collinearity in the final models.

To assess whether condom breakage could be a mediator for the association between violence and HIV infection, we conducted additional log-binomial regression models to estimate the association between a) the predictor (violence) and the potential mediator (condom breakage), and b) the mediator and the outcome (HIV) while controlling for the predictor [19].

Ethical considerations

The 2012 of an integrated biological and behavioural survey was approved by the ethics committees of the Ministry of Health of Benin and of the Centre hospitalier *affilié* universitaire de Québec, Québec, Canada. The objectives, procedures and potential risks related to the participation in the survey were explained to each woman and a written consent was obtained before enrolment. Consenting participants signed or apposed their fingerprint on the consent forms. The recruitment of minors aged 15 years or older was approved by the two ethics committees without consent of a parent, caretakers, guardians, or other adult, because these young people were involved in the prostitution environment and were no longer in contact with their parents or guardians. Therefore these young women were considered as an adult. Anonymity was respected at all levels of the procedure.

Results

Women general characteristics

The response rates were 92.4% for the interview and 89.2% for the provision of biological samples (capillary blood and vaginal swab). All the analyses were restricted to women who provided blood sample (n=981). Participants' general characteristics are described in Table 1. The women were mainly from Benin and their median age was 29 years. Median duration in sex work was 5 years. Overall, 33.5%, 17.2% and 13.5% of the women reported having experienced psychological, physical and sexual violence, respectively, during the month preceding the interview. All three types of violence were mentioned by 6.3% of the participants whereas physical and sexual, physical and psychological, and sexual and psychological combinations were reported in 7.4%, 12.7% and 9.5% of them, respectively.

Consistent condom use was reported by almost two-third of the women (63.6%) and HIV prevalence was 20.4%.

Association between physical, sexual and psychological violence and HIV infection

The three types of violence were independently associated with HIV infection. APRs were 1.45 (95% CI: 1.05 – 2.00), 1.42 (95% CI: 1.02 – 1.98) and 1.41 (95% CI: 1.08 – 1.85) for physical, sexual and psychological violence, respectively (table 2). Women concurrently exposed to all three types of violence were more likely to be HIV-positive compared to those who reported no episode of violence (APR = 1.97, 95% CI: 1.24 – 3.11) and HIV prevalence increased with the number of violence concurrently experienced by the women (adjusted p-value for trend = 0.002, table 3). In all multivariate models (tables 2 and 3), HIV prevalence was lower among women who reported inconsistent condom use (p-values = 0.003).

Association between violence and condom breakage

Overall, 15.9% of the women reported at least one condom breakage during the week before the interview. In univariate analyses, a statistically significant association was observed between the three types of violence and condom breakage (table 4). But, the associations remained significant for physical and sexual violence after adjusting for sex work typology, age at first paid sex, duration in sex work, number of clients and non-paying partners, and literacy: APR = 1.59 (95% CI: 1.12 – 2.27), and 1.72 (95% CI: 1.20 – 2.47), respectively. Condom breakage prevalence increased across the categories of the violence score (types of violence concurrently experienced by women) with an adjusted p-value for trend = 0.002). However, the association was statistically significant only when three concurrent types of violence were reported by the participants (p-value = 0.004). Whatever the type of violence was, in the multivariate models, a higher number of clients (> 15) was associated with condom breakage (all p-values < 0.0001, results not shown).

Association between condom breakage and HIV infection

As shown in table 5, HIV prevalence was slightly higher among women who experienced condom breakage than among women who did not: APR = 1.03 (95% CI: 0.69 – 1.53).

Discussion

In this study conducted in Benin, physical, sexual and psychological violence perpetrated against FSWs were relatively common and independently associated with HIV infection. In accordance with previous studies, more than one-third of the women reported at least one episode of violence during the thirty days preceding the interview [6, 7, 15]. These high rates of violence among FSWs are partly due to the criminalisation of the sex work milieu [20]. In this environment where brutality is common, FSWs become an easy target for violence [20]. Also, violence is a consequence of gender power inequality that generally confers to men the authority to control women [21]. Violence against FSWs is tolerated and under-reported to the police because some law enforcement agents are unfortunately among the perpetrators of violent acts [5]. The higher proportion of psychological violence (33.5%) is in accordance with the marginalization and the tendency of most of the people to reject FSWs [16].

All three types of violence were associated with a higher prevalence of HIV infection. These results are supported by those of two previous studies from India and Argentina in which HIV prevalence was 1.58 and 1.8-fold higher among FSWs who experienced violence compared to those who did not [15, 16]. At the general population level, different studies observed that women who reported intimate partner violence were also more likely to be infected with HIV [13, 14, 22]. Since violence *per se* cannot transmit HIV infection, different mechanisms that could explain the relationship between both factors have been mentioned in the literature. First, sexual coercion and forced sex could intimidate women in such a way that their enthusiasm to negotiate condom use could be inhibited [23]. Also, a past history of abuse can compromise condom negotiation due to the fear of another violent episode [16] and men who commit violent acts against women are more likely to have higher levels of risky sexual behaviour and to be infected with HIV and/or other STI [24]. Consequently, inconsistent condom use has been considered as a mediator between violence and HIV infection. However, in accordance with the results of two prospective studies [14, 22] we did not observe any evidence in favour of this hypothesis. Moreover, in our study, inconsistent condom use was associated with a lower prevalence of HIV infection. This finding, also reported in south India where HIV prevalence in women of the general population who ever used a condom was 3.3 times higher than that of those who never used a condom [25] is certainly due to reverse causality since women may start using condoms consistently after realising that they are at high risk of infection or even after becoming aware of their HIV-positive status. Similarly to two studies conducted in China and in Thailand [7, 11] we observed that physical and sexual violence were independently associated with condom breakage among FSWs. Vaginal tearing or trauma along with condom slippage or breakage resulting from forced sex can increase susceptibility to HIV infection [7, 11]. Condom breakage leads to a skin to skin contact and to direct exchange of genital fluids that can facilitate HIV/STI transmission, especially if the vaginal mucosa is altered by violent sex. In our study, sexual violence was more strongly associated with condom breakage than was physical violence. This suggests that condom breakage due to sexual violence could effectively be a direct pathway for HIV acquisition while the association between physical violence and HIV infection could be bidirectional. On one hand, physical violence could precede sexual violence which entails condom breakage. Actually, among the 173 women who reported physical violence, 42.2% have concomitantly experienced sexual violence. On the other hand, being recognized as an HIV-positive person could expose a FSW to physical violence [26]. However, apart from their colleagues, their boyfriends and the sites owners or managers, there is no reason for FSWs to reveal their HIV seropositivity to their clients and to law enforcement agents. Concerning psychological violence, childhood abuse and sex work are associated with chronic or recurrent depression [27] which in turn can result in lack of condom use with clients [28] and facilitate HIV transmission. However, in our study, we investigated only recent episodes of psychological violence and, in addition, inconsistent condom use was rather a confounding factor. Therefore, we cannot reasonably exclude the possibility that being HIV-positive was the reason why some women were experiencing psychological violence. Indeed, this type of violence comprises behaviours like insults, mockeries and humiliation that can emanate from everybody (relatives and closer friends such as colleagues, boyfriends and sites owners or managers) to whom the HIV-positive status may have been disclosed. This hypothesis is

partially supported by the fact that psychological violence was the more prevalent form of violence reported in our study. Over one-third of the participants (33.5%) reported it while only 17.2% and 13.5% reported physical and sexual violence, respectively. In addition, psychological violence was the only type of violence that was not independently associated with condom breakage, a likely mediator between violence and HIV infection.

However, we did not find a statistically significant association between condom breakage and HIV infection probably because condom breakage was measured over a short period of time (the week preceding the survey) that was insufficient for HIV acquisition. As shown by Gray et al [29], the probability of HIV transmission per unprotected sexual intercourse is very low (0,001) even in the presence of STI (0,004). Also, we have observed a relatively limited number of vaginal sexual acts during the last seven days (mean number = 13). Indeed, Mann et al, have found that the probability of HIV infection was only 3 % for 30 unprotected sexual intercourses [30].

To our knowledge, this study is the first to assess the relationship between physical, sexual and psychological violence and HIV infection, and to observe that HIV prevalence increases with concurrent exposure to different types of violence among FSWs in Sub-Saharan Africa. This is also the case concerning the independent association between physical/sexual violence and condom breakage, one of the potential mediators between violence in general and sexual violence in particular and HIV infection. It should be noted that the association between sexual violence and HIV infection in FSWs has already been observed in China [11]. The main limitation of the study is the cross-sectional design that did not allow us to thoroughly analyse lack of condom use as a pathway between violence and HIV infection. Also, because of a possible reverse causality effect related to the cross sectional design, being HIV-positive could have been the reason why FSWs were exposed to violence, especially psychological violence. Because of gender power imbalance that increases the social tolerance of violence against women and also because of the sensitive nature of questions related to violence, and for fear of intimidation some women might have under-reported the violence episodes they had faced, particularly if the perpetrator was the boyfriend, the brothel owner/manager or the police. However, if this were the case, our results should be considered as conservative. Further research based on prospective data is needed to analyse in greater detail not only the pathway between violence and HIV infection but also the impact of violence on women reproductive health, in particular unwanted pregnancies and abortion. However, even in the absence of additional research, governments in sub-Saharan Africa should revise their prostitution-related laws and work tightly with organizations representing FSWs, religious leaders, legislators, public personalities and with the civil society to fight violence against women in general and FSWs in particular.

Conclusion

Violence in general and sexual violence in particular was associated with both HIV prevalence and condom breakage that appeared to be the main intermediate factor between violence and HIV infection. To prevent violence against FSWs, there is a need for all the community to contribute to the protection of their human rights.

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Table 1

Frequency of violence and general characteristics of the female sex workers participating in the integrated biological and behavioural survey, Benin, 2012, N=981

Characteristics	Number (%) or median (IQR [‡])
HIV-positive	
Yes	200 (20.4)
No	781 (79.6)
Physical violence	
Yes	168 (17.2)
No	810 (82.8)
Sexual violence	
Yes	132 (13.5)
No	846 (86.5)
Psychological violence	
Yes	326 (33.5)
No	648 (66.5)
Violence score [‡]	
0	578 (59.3)
1	227 (23.3)
2	108 (11.1)
3	61 (6.3)
Literacy	
Illiterate	276 (29.1)
Literate	672 (70.9)
Nationality	
Beninese	386 (40.6)
Ghanaian	94 (9.9)
Nigerian	120 (12.6)
Togolese	303 (31.9)
Others	47 (5.0)
Marital status	
Married/Cohabiting	140 (14.6)
Single	818 (85.4)
Having dependents	
Yes	576 (59.1)
No	398 (40.9)
Illicit drug use	
Yes	95 (9.8)
No	870 (90.2)
Age in years, median (IQR)	29 (23 – 37)
Age at first sex (years), median (IQR)	16 (15 – 18)
Age at first paid sex (years), median (IQR)	20 (18 – 27)

Characteristics	Number (%) or median (IQR [‡])
Duration in sex work, (years) median (IQR)	5 (2 – 11)
Number of clients (last week), median (IQR)	9 (3 – 19)
Condom use	
Inconsistent	348 (36.4)
Consistent	609 (63.6)
Condom breakage	
No	702 (84.1)
Yes	133 (15.9)

[‡] Number of types of violence concurrently experienced by women;

[‡] IQR= interquartile range.

Table 2

Multivariate log-binomial models assessing the association between violence and HIV infection among 981 female sex workers participating in the integrated biological and behavioural survey, Benin, 2012

Variables	Physical violence			Sexual violence			Psychological violence		
	HIV + (%)	APR [‡] (95% CI)	P-value	HIV + (%)	APR (95% CI)*	P-value	HIV + (%)	APR (95% CI)	P-value
Having experienced violence									
No	19.6	1.00	-	19.4	1.00	-	18.0	1.00	-
Yes	24.4	1.45 (1.05–2.00)	0.025	27.3	1.42 (1.02–1.98)	0.037	25.2	1.41 (1.08–1.85)	0.013
Sex work typology									
Home-based	17.4	1.00	-	17.4	1.00	-	17.4	1.00	-
Brothel-based	26.4	1.81 (1.09–3.02)	0.023	26.4	1.72 (1.03–2.87)	0.038	26.4	1.73 (1.03–2.88)	0.037
Other	18.4	1.32 (0.80–2.18)	0.272	18.4	1.29 (0.78–2.12)	0.321	18.4	1.30 (0.79–2.13)	0.308
Duration in sex work									
Less than two years	19.6	1.00	-	19.6	1.00	-	19.6	1.00	-
At least two years	21.2	1.67 (1.18–2.36)	0.004	21.2	1.20 (0.80–1.80)	0.371	21.2	1.17 (0.78–1.75)	0.455
Literacy									
Being literate	18.2	1.00	-	18.2	1.00	-	18.2	1.00	-
Being illiterate	24.6	1.28 (0.96–1.69)	0.088	24.6	1.28 (0.96–1.70)	0.083	24.6	1.25 (0.94–1.66)	0.128
Number of clients (last week)									
Less than 15 clients	18.7	1.00	-	18.7	1.00	-	18.7	1.00	-
At least 15 clients	23.9	0.94 (0.70–1.25)	0.656	23.9	0.93 (0.70–1.25)	0.630	23.9	0.94 (0.70–1.26)	0.680
Regular partners (last week)									
None	22.6	1.00	-	22.6	1.00	-	22.6	1.00	-
At least one	14.4	0.72 (0.50–1.02)	0.065	14.4	0.75 (0.52–1.07)	0.107	14.4	0.74 (0.52–1.05)	0.094
Neisseria gonorrhoeae									
Negative	20.0	1.00	-	20.0	1.00	-	20.0	1.00	-
Positive	26.2	1.04 (0.61–1.77)	0.894	26.2	1.02 (0.61–1.73)	0.928	26.2	1.05 (0.62–1.78)	0.860
Antecedent for STI									
No	21.2	1.00	-	21.2	1.00	-	21.2	1.00	-
Yes	17.6	0.80 (0.55–1.18)	0.268	17.6	0.84 (0.66–1.23)	0.371	17.6	0.83 (0.57–1.21)	0.326
Condom use									

Variables	Physical violence			Sexual violence			Psychological violence			
	HIV + (%)	APR [‡]	(95% CI)	P-value	HIV + (%)	APR (95% CI) [*]	P-value	HIV + (%)	APR (95% CI)	P-value
Inconsistent	13.5	1.00		-	13.5	1.00	-	13.5	1.00	-
Consistent	24.6	1.67 (1.18–2.36)		0.004	24.6	1.70 (1.20–2.42)	0.003	24.6	1.69 (1.19–2.40)	0.003

[‡]APR, adjusted prevalence ratio of HIV infection (mutually adjusted for all the variables listed in the table);

^{*}CI, Confidence interval.

Table 3

Multivariate log-binomial model assessing the association between violence score and HIV infection among 981 female sex workers participating in the integrated behavioural and biological survey, Benin, 2012

Variables	HIV+ (%)	APR* (95% CI**)	P-value
Violence score[†]			
0	17.3	1.00	-
1	23.8	1.31 (0.95 – 1.80)	0.102
2	22.2	1.44 (0.96 – 2.16)	0.076
3	31.2	1.97 (1.24 – 3.12)	0.004
P-value for trend	-	-	0.002 [‡]
Sex work typology			
Home-based	17.4	1.00	-
Brothel-based	26.4	1.78 (1.07 – 2.97)	0.026
Other	18.4	1.34 (0.82 – 2.14)	0.244
Duration in sex work			
Less than two years	19.6	1.00	-
At least two years	21.2	1.19 (0.80 – 1.79)	0.384
Literacy			
Being literate	18.2	1.00	-
Being illiterate	24.6	1.26 (0.95 – 1.68)	0.108
Number of clients (last week)			
Less than 15 clients	18.7	1.00	-
At least 15 clients	23.9	0.92 (0.69 – 1.24)	0.600
Regular partners (last week)			
None	22.6	1.00	-
At least one	14.4	0.74 (0.52 – 1.04)	0.089
Neisseria gonorrhoeae			
Negative	20.0	1.00	-
Positive	26.2	1.06 (0.63 – 1.81)	0.819
Antecedent for STI			
No	21.2	1.00	-
Yes	17.6	0.80 (0.55 – 1.17)	0.254
Condom use			
Inconsistent	13.5	1.00	-
Consistent	24.6	1.73 (1.22 – 2.45)	0.002

[†]Number of types of violence concurrently experienced by women;

[‡]Wald test;

* APR, adjusted prevalence ratio of HIV infection (mutually adjusted for all the variables listed in the table);

** CI, confidence interval.

Table 4

Relationship between physical, sexual and psychological violence and condom breakage among female sex workers participating in the integrated biological and behavioural survey, Benin, 2012

Type of violence	Condom breakage (%)	Univariate (unadjusted)		Multivariate (adjusted) [†]			
		PR*	95%CI**	P-value	PR	95%CI	P-value
Physical	24.0	1.72	1.22 – 2.41	0.002	1.59	1.12 – 2.27	0.010
Sexual	25.9	1.82	1.27 – 2.61	0.001	1.72	1.20 – 2.47	0.003
Psychological	19.3	1.38	1.01 – 1.88	0.041	1.31	0.94 – 1.81	0.105
Violence score [‡]							
0	12.9	1.00	-	-	1.00	-	-
1	16.7	1.29	0.88 – 1.88	0.193	1.24	0.83 – 1.85	0.294
2	22.6	1.74	1.12 – 2.71	0.013	1.57	1.00 – 2.48	0.054
3	27.8	2.15	1.32 – 3.49	0.002	2.04	1.26 – 3.33	0.004
P-value for trend [¶]	-			0.003			0.002

[†] Adjusted for sex work typology, age at first paid sex, duration in sex work, number of clients and non-paying partners and literacy;

[‡] Number of types of violence concurrently experienced by women;

[¶] Wald test;

* PR, Prevalence ratio of condom breakage (at least one versus none with any sexual partner during the last seven days);

** CI, Confidence interval.

Table 5

Relationship between condom breakage and HIV infection among female sex workers participating in the integrated biological and behavioural survey, Benin, 2012

Variables	HIV+ (%)	APR [‡] (95% CI [*])	P-value
Condom breakage			
None	21.51	1.00	-
At least one	21.05	1.03 (0.69 – 1.53)	0.882
Sex work typology			
Brothel-based	17.4	1.00	-
Brothel-based	26.4	1.91 (1.06 – 3.43)	0.031
Other	18.4	1.37 (0.77 – 2.45)	0.283
Duration in sex work			
Less than two years	19.6	1.00	-
At least two years	21.2	1.14 (0.76 – 1.71)	0.520
Literacy			
Being literate	18.2	1.00	-
Being illiterate	24.6	1.31 (0.98 – 1.75)	0.067
Regular partners (last week)			
None	22.6	1.00	-
At least one	14.4	0.74 (0.51 – 1.06)	0.104
Number of clients (last week)			
Less than 15 clients	18.7	1.00	-
At least 15 clients	23.9	0.87 (0.64 – 1.18)	0.370
Condom use			
Inconsistent	13.5	1.00	-
Consistent	24.6	1.55 (1.06 – 2.26)	0.024
Neisseria gonorrhoeae			
Negative	20.0	1.00	-
Positive	26.2	1.02 (0.69 – 1.73)	0.955
STI history			
No	21.2	1.00	-
Yes	17.6	0.90 (0.62 – 1.33)	0.607

[‡]APR, Adjusted prevalence ratio of HIV infection (adjusted for all the variables listed in the table);

^{*}CI, Confidence interval.