

Original Article

Prevalence of Human Immunodeficiency Virus among Female Sex Workers and Associated Risk Factors in Rwanda, 2019

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Abstract

Background

Female sex workers (FSWs) are more likely to be infected by Human immunodeficiency virus (HIV) than the general population. In Sub-Saharan countries, 18% of new HIV infections is attributed to FSWs.

Study objective

To determine HIV prevalence and its determinants among FSWs in Rwanda.

Methodology

A cross-sectional biological and behavioral surveillance survey in hotspots was conducted among FSWs countrywide. HIV laboratory tests were performed. Proportions and 95% confidence interval (CI) were calculated. Multivariable logistic regression was performed to determine factors associated with HIV in FSWs.

Results

The survey enrolled 1,883 FSWs. Of 1,770 FSWs who consented for HIV testing, 607 were HIV positive, giving the prevalence of 34% (95%CI= 32.11-36.54). High HIV prevalence was associated with age of 25 years or more (aOR = 3.68; 95%, CI: 2.62–5.18) and more than 5 years of sexwork (aOR = 1.31; 95% CI: 1.05–1.63). HIV prevalence and having more than three dependents (aOR= 0.34; 95%CI=0.23-0.5) and completing secondary and beyond education (aOR=0.50; 95%CI=0.36-0.71) were inversely related.

Conclusion

HIV prevalence is still high among FSWs in Rwanda. Prevention strategies should target the old ones in five first years of sex work and the less educated.

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Keywords: Female sex workers, HIV, prevalence, Risk factors, Rwanda

Introduction

Female sex workers (FSWs) remain a key population groups at high risk of acquiring and transmitting human immunodeficiency virus (HIV) to the general population mostly because of the cumulative frequency of sexual encounters and multiple sexual companions.

In 2020, 65% of all new infections globally were accounted from key populations (sex workers and their clients, gay men and other homosexual men, illicit drug injection users, transgender people) and their sexual partners. Of all new HIV infections, 93.0% are accounted from outside of the sub-Saharan Africa region and 39% in the sub-Saharan Africa.[1]

In 2019, 95% of all new HIV infections were registered in Middle East and North Africa region.[2] In low and middle income countries, female sex workers are 13.5 times more likely to be infected by HIV than the general population. [3] In southern Africa and Eastern Africa, the prevalence of HIV among female sex workers is even extremely high. For instance in Eswatini, Lesotho, Malawi, South Africa and Zimbabwe, 50% of female sex workers live with HIV.[1,4]

The prevalence of HIV among FSWs in Uganda was estimated at 33%, [5] while in Tanzania it was estimated to range from 14% and 37% in 2014. [6] In Rwanda, while the prevalence of HIV remained stable at 3% in the general population from 2005, the prevalence of HIV among FSWs remained high decreasing from 51% in 2010 to 45.8% in 2015. [7-8]

To reach the 90-90-90 goal of getting HIV free generation, Rwanda and many other countries have decided to concentrate their HIV prevention efforts on high risk groups including mobile and hidden population. The 2013-2020 National strategic plan for HIV has prioritized FSWs as a high risk group to be monitored. Facility based interventions (including prevention services like condom and lubricants provision, screening for STIs and HIV at regular interval, ART initiation to those who turn HIV positive, family planning services, awareness and sensitization to service utilization) and community based interventions (HIV testing services (HTS), STI screening, and condom distribution through outreach strategies, support group through peer education approach and mass campaigns to increase their awareness and service utilization) are implemented in Rwanda. However, although routine surveillance is important in HIV monitoring, it does not provide enough information about the key drivers of the infection and what most effective interventions in the prevention and control of new transmission.

To overcome this challenge, the government of Rwanda decided to use combined biological and behavioral surveillance surveys (BSS)

among female sex workers and other high risk groups to monitor the evolution of their sexual behavior and the prevalence of HIV among those groups. The analysis of the fifth BSS aimed at assessing the prevalence and determinants of HIV infection among female sex workers.

Methods

Design, setting and population

This study was a secondary data analysis of the Rwanda 2018 BSS data. The 2018 BSS was a cross-sectional study targeting self-reported FSWs who practice sex work across all the districts of Rwanda in 2018. A FSW was defined as any girl or woman aged 15 years and above whose main income is from sex commercial work. The total number of FSW who responded to the socio-demographic characteristics questions were 1833 but only 1770 agreed to undergo a HIV test.

Inclusion and Exclusion criteria

The study included FSWs aged 15 years and above, engaged in female sex work twelve months prior to data collection who were at the survey sites during data collection and consented to participate in the interview and biological tests which included HIV, STIs and Hepatitis. Any FSW who were unable to provide an informed consent were excluded from this study.

Sampling process

In the BSS, clustered and stratified sampling were employed and primary sampling units included street-based (street or market) and venue based (bars or hotels) hotspots. The sampling frame was constructed based on the mapping of commercial sex sites conducted in 2017 in Rwanda. This mapping identified 866 hotspots and estimated 13,569 in the country. Probability proportional to size (PPS) was used to select hotspots and hotspots size at the province and Kigali City level. The 2018 BSS used time location sampling to recruit participants.

Data collection

Data on socio-demographic characteristics, sexual behaviors, knowledge and use of condoms, knowledge of STIs, opinions and attitudes on HIV/AIDs, exposure to HIV prevention interventions, sexual and reproductive health history, family planning, type of physical and sexual violence experienced by FSW and PMTCT use were collected during interviews using a structured designed questionnaire. Biological sample of one 8ml EDTA of tube blood was collected for every participant and transported to Rwanda National Reference laboratory (NRL) for laboratory testing for HIV, Syphilis, Hepatitis B and Hepatitis C.

Data analysis

Two datasets; one for the behavioral surveillance survey received from HIV/AIDS, STIs and Viral Hepatitis division of the Rwanda Biomedical center (RBC) and another for the biological survey which comprised of HIV results from NRL) were used. Using Stata version 13 software (STATA Corporation, College Station, Texas 77845 USA), the two datasets were merged and laboratory data linked to behavioral survey data using unique identifier code. Data were analyzed by computing proportions and 95% confidence interval (CI). Logistic regression for bivariate model was also run estimating crude odds ratios (cOR) and 95% CI. Factors that were found to have an association with HIV infection were included in a multivariable logistic regression model. HIV prevalence and adjusted odds ratios (aOR) with their 95% CI were estimated to fit the reduced model with variables which were found to achieve a p value <0.05.

Results

Socio-demographic characteristics of respondents

Overall 1,833 FSWs participated in the survey (Table 1), of whom 1,494 (81.51%) were greater or equal to 25 years old and 1,148 (62.63%) were single. While 1,138 (62.08%), had finished only primary school and 361(19.69%) completed secondary

or higher education, 334(22.37%) did not attend any school. Most respondents were Christians 1,078 (58.81%). Most of them 1,472 (80.31%) reported not having any other alternative source of income than sex work, 1,160 (63.28%) indicated having practiced sex work for less than or equal to five years, and majority, (1,233, 67.27%) had one to three dependents. A large proportion of the FSWs 1,639(89.42%) were recruited at a venue, while those recruited on the street were 194(10.58%).

Table 1. Socio-demographic characteristics of respondents

Variables	N = 1833	%
Age group		
15-24 years	339	18.49
≥ 25 years	1,494	81.51
Marital status		
Single	1,148	62.63
Married/cohabitating	47	2.56
Divorced/Separated	638	34.81
Alternative source of income other than sex work		
No	1,472	80.31
Yes	361	19.69
Years of Experience as FSW		
≤ 5years	1,160	63.28
> 5 years	673	36.72
Recruitment place		
Venue based	1,639	89.42
Street based	194	10.58

Factors associated with HIV infection among FSWs

Of the total participants, 1,770 (96.56%) FSWs performed confirmatory HIV laboratory test (ELISA), of whom 607 were confirmed HIV positive, representing HIV prevalence of 34.29% (95% CI: 32.11 – 36.54). During bivariate analysis several factors were found significantly associated with HIV infection among FSWs. These include age greater or equal to 25 years compared to those aged less than 25 years (cOR = 3.39, 95%CI: 2.47 – 4.66); those residing in Southern province were less likely compared to Kigali city (cOR = 0.59, 95% CI = 0.44 – 0.78),

secondary and beyond education were with lower odds of being infected with HIV (cOR = 0.043, 95% CI: 0.31 – 0.60) than being non-educated; ever experienced of sex violence (cOR = 1.37, 95% CI= 1.12 – 1.68) and having more or equal to 5 years of experience in sex work (cOR = 1.60, 95% CI: 1.30 – 1.97). However, there was no statistically significant association observed among the following factors, for those who had more than 18 years at first paid sex (cOR = 1.33, 95% CI: 0.90 – 1.21), consistent condom use in last 30 days (cOR = 0.83, 95% CI: 0.66 – 1.04), taking alcohol in last four weeks (cOR = 0.62, 95%CI: 0.35 – 1.09), had HIV comprehensive knowledge (cOR= 0.93, 95%CI: 0.76 – 1.14) and had STI symptom in last 12 months (cOR= 1.04, 95%CI: 0.79 – 1.37). For the reduced multivariable logistic model (Table 2), FSWs with greater or equal to 25 years old were found to have 3.68 times more risk of

being infected with HIV than those aged less than 25 years (aOR = 3.68, 95%CI= 2.62 – 5.18). Having more than five years of experience in sex work was found to be associated with more odds of being infected with HIV than having less than 5years of experience in sex work (aOR= 1.31, 95%CI: 1.05 – 1.63). Similarly, for FSWs who experienced violence while practicing sex work were more likely to be infected by HIV than the ones who did not experience violence (aOR= 1.24, 95%CI: 1.00 – 0.54). On the other hand, the fact of having more than 4 dependents was showing lower odds of being infected with HIV than not having any dependent (aOR= 0.34, 95%CI: 0.23 – 0.51). Moreover, completing secondary education and beyond was associated with less odds of being infected with HIV than not having completed any education (aOR= 0.50, 95%CI= 0.36 – 0.071).

Table 2. Factors associated with HIV infection among FSWs

Variables	N	%	95%CI	Bivariate			Multivariable		
				cOR	95%CI	p value	aOR	95%CI	P value
HIV infection^a	1,770	34.29	32.11-36.54						
Age group^b									
15-24 years	323	15.78	12.19-2019	1.00			1.00		
≥25 years	1,385	38.91	36.37-41.51	3.39	2.47-4.66	<0.001	3.68	2.62-5.18	<0.001
Province^b									
Kigali city	475	36.63	32.40-41.07	1.00			1.00		
South	486	25.51	21.82-29.58	0.59	0.44-0.78	<0.001	0.58	0.43-0.78	<0.001
West	384	41.4	36.57-46.41	1.22	0.92-1.61	0.153	1.15	0.86-1.54	0.339
North	222	34.23	28.27-40.73	0.90	0.64-1.25	0.539	0.91	0.64-1.29	0.623
East	141	40.42	32.61-48.75	1.17	0.79-1.72	0.414	1.26	0.84-1.90	0.248
Years of Experience as FSW^b									
≤5years	1,091	30.61	27.94-33.41	1.00			1.00		
>5 years	617	41.49	37.65-45.43	1.60	1.30-1.97	<0.001	1.30	1.05-1.62	0.016
Experienced violence									
No	1,169	31.82	29.21-34.55	1.00			1.00		
Yes	601	39.1	35.27-43.07	1.37	1.12-1.68	0.002	1.23	0.99-1.54	0.056

^aTotal agreed for HIV test (1770 out of 1833)

^b62 FSWs out of 1770 were missing for age, province and years of experience

Discussion

To purpose of this study was to assess the prevalence and determinants of HIV infection among FSWs in Rwanda. The study found the HIV prevalence of 34.29% among FSWs, which is 11 times higher than the HIV prevalence of the general population of Rwanda.[8,9] This study adds to different studies from developing countries, especially sub Saharan countries, which have consistently demonstrated high HIV prevalence among FSWs, among others Uganda, Tanzania and Burundi.[5,6,10–12] However, it was much lower than 51% found by Mutagoma et al. in a survey conducted in 2010, and 45.8% estimated in 2015.[7,8]. The lower prevalence found in this study may be attributed to combined strategies that are used by Rwanda for key populations including FSWs, such as provision of family planning services, distribution of condom through outreach strategies, campaigning to increase awareness towards HIV prevention and educating key population using peer education approach.[13]

Geographical location was also found to be associated with HIV infection among FSWs, whereby southern province had lower risk of acquiring HIV than those located in Kigali city with statistically significant association. Location in Western and Eastern provinces was associated with higher HIV infection rate in FSWs though the association was not statistically significant. This could be due to interaction with many sex partners as the urban areas have more population compared to rural areas making the spread of HIV higher.

Having greater or equal to 25 years and more than 5 years of experience as a sex worker was associated with high risk of HIV infection, most likely due to the number of cumulated sexual encounters than young and non-experienced FSWs. This observation was made by other studies in different countries including Rwanda, Congo and Nepal.[7,14,15]

HIV infection among FSWs was also found to be associated with the level of education,

with FSWs who attended secondary school and beyond having 52% lower risk of acquiring HIV infection than their counterpart who have not been to school. This is consistent with another study in Uganda which demonstrated association with low HIV infection with high levels of education.[5] Violence during sex work and having STI symptom are also associated to high risk of HIV infection. One of the reasons is that having STI suggests having had unprotected sex and or multiple partners. [16]

FSWs using consistent condom and with comprehensive knowledge on HIV lower HIV infection rate, although the association was not statistically significant. This may be attributed to the role of awareness interventions assuming that FSWs with improved awareness are most likely to take measures protecting them against HIV infection.[17]

Strengths and limitations of the study

The main strengths of this study were using a large sample size and recruitment of participants using a robust sampling techniques across the whole county. As a result, the sample for the study had a higher level of representativeness. Nonetheless, the following are some of the study's limitations that should be taken into account when interpreting the results: the fact that the study methodology was cross-sectional for which the direction of causal relationships cannot be determined and also the use of secondary data which sometimes are incomplete for key variables, thus limiting the analysis for all potential risk factors of HIV. In addition, measures of behavior such as sexual activity, number of partners, age of first paid sex, and consistent condom use were based on self-report taken at the time of recruitment. Data are thus subject to reporting errors/bias.

Conclusion

FSWs remain at high risk of acquiring HIV infection compared to the general population in Rwanda. The prevalence of HIV among FSWs is 11 times greater than the general population of Rwanda. These findings suggest the need to increase interventions towards HIV prevention care and treatment among FSWs because they represent a very important mode of transmission of HIV in Rwanda.

Education and prevention interventions should target especially for the factors that were proven to be associated with high HIV infection in FSWs. These factors include ageing greater or equal to 25 years, spending many years in sex work, non-education and FSWs not having any dependent and geographical locations.

Interventions that seek to improve consistent condom use, improved HIV comprehensive knowledge have to be intensified. STIs surveillance, prevention and treatment are also recommended for HIV prevention among female sex workers.

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Conflict of interests

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Author contributions

DN designed the study, cleaned and analyzed data, and drafted the manuscript. AN, NB, MH analyzed, interpreted data and participated in the finalization of the manuscript. JN directed the whole process of the study and manuscript writing. All authors read and approved the final manuscript.

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