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HIV Testing and Associated Factors among Female Sex Workers in Tanzania: Approaching the First 90% Target?

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Abstract

Use of HIV testing services among FSW in sub-Saharan Africa (SSA) is below the desired UNAIDS target of 90%. We estimated the prevalence and factors associated with HIV testing among FSW in Dar es Salaam, Tanzania. A respondent-driven sampling method was used to recruit FSW aged 18. Modified Poisson regression models were used to determine factors associated with recent HIV testing. Of 958 surveyed FSW (median age 26 years), 85.4% (95% CI: 82.3, 88.1) reported to have ever been tested for HIV and 65.3% (95% CI: 61.2, 69.3) tested in the past 12 months. Condom use on the last day worked (prevalence ratio (PR) = 1.17; 95% CI: 0.99, 1.38), no or low self-perceived risk of HIV acquisition (PR = 1.16; 95% CI: 1.02, 1.32), having never felt stigmatized as a sex worker (PR = 1.18; 95% CI: 1.04, 1.33), and having been in contact with a peer educator (PR= 1.33; 95% CI: 1.18, 1.49) during the past year preceding the survey were associated with recent HIV testing. Interventions aiming to mitigate stigma due to sex work, improve health education to address risk perception as a barrier to HIV testing, and scaling up peer educator's engagement should be given priority.

Keywords

HIV; testing; female sex workers; sub-Saharan Africa; key population

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Authors contributions

MM, collected, analyzed the data, interpreted the results, and wrote the first draft of the manuscript, KM, TB, SL, AM, GH, NM, MTL, AR, and TL, interpreted the results and critically revised the manuscript for important intellectual content. DM and EJM, designed the study, collected the data, interpreted the results, and critically revised the manuscript. All authors read and approved the final version of the manuscript.

Competing interests

The authors declare that they have no conflict of interest.

Introduction

The Joint United Nations Programme on HIV/AIDS (UNAIDS) set an ambitious ‘90-90-90’ treatment target: 90% of HIV infected individuals should know their HIV status, 90% of those who know their HIV positive status should be on anti-retroviral therapy (ART), and 90% of those using ART should have attained viral suppression by the year 2020. These targets form part of the efforts aiming to end the HIV/AIDS epidemic by 2030 (UNAIDS, 2014). The first of the three treatment targets, HIV diagnosis, is a critical step in achieving the other two. To date, progress made to achieve this important treatment target in sub-Saharan Africa (SSA) varies across countries and population subgroups. Among females aged 15 to 64, the proportion of people living with HIV infection (PLHIV) who know their HIV infection status ranges from 43.2% in the Republic of Cote d’Ivoire to 90.7% in Eswatini (PHIA, 2018). Disproportionate access to HIV testing services across different population subgroups signals for existence of different sets of pull (related to service provision) and push (related to the person seeking care) factors affecting access to the services (PHIA, 2018).

Female sex workers (FSW) are among population subgroups with the highest risk of HIV infection; globally, over half of them (55%) are estimated to be living with HIV (UNAIDS, 2019). Despite this, studies in SSA have documented large variations in the proportion of FSW who have tested for HIV (26.6% in Guinea, 65.3% in Benin, 64.0% in Zimbabwe, 82.0% in South Africa) (Aho et al., 2012; Batona, Gagnon, Simonyan, Guedou, & Alary, 2015; Cowan et al., 2017; Schwartz et al., 2017). A recent study among FSW in Iringa region, Tanzania, reported that nearly half (47.7%) of the FSW had been tested for HIV in the past six months and only 30.5% were previously aware of their HIV status (Kerrigan et al., 2017).

Studies have identified various barriers to FSW seeking HIV services including HIV testing: stigma ascribed to sex work and HIV infection, marginalization of FSW, abuse of human rights, discrimination by health care providers, delays when seeking services, and limited access to service provision points (Chanda et al., 2017; Hamilton et al., 2019; Mtetwa, Busza, Chidiya, Mungofa, & Cowan, 2013; Nnko et al., 2019; Tokar, Broerse, Blanchard, & Roura, 2018; UNAIDS, 2018). To address these barriers, interventional measures such as community and social network support, provision of HIV education through peer educators and the establishment of FSW-friendly service outlets have been implemented with different rates of success (Chanda et al., 2017; Herce et al., 2018; Johnston et al., 2017). In this study, we analyzed data from the largest integrated biological and behavioral survey (IBBS) to date among FSW in the largest metropolitan city of Dar es Salaam, Tanzania in order to inform the development of context-specific interventions to facilitate the achievement of the intended national and global goals.

Materials and Methods

Design and setting

A cross-sectional integrated bio-behavioral survey was conducted in Dar es Salaam, Tanzania between September and December 2017. Dar es Salaam is the largest city in Tanzania with a population of about 5 million (The United Republic of Tanzania., 2013). The HIV prevalence among FSW in Dar es Salaam was estimated to be 26.6% in a survey conducted in 2013 (NACP, 2013).

Study population

Eligibility for this study required being a female aged 18 years or above and to have exchanged sex for money or goods during the last three months prior to the survey. Participants were also required to be residents of Dar es Salaam (having an address in the city and having lived there for at least six months).

Sampling and recruitment of study participants

Study participants were recruited using respondent-driven sampling (RDS). RDS is a method designed to sample from populations for which a sampling frame is not available. RDS accounts for the network sizes of study participants for statistical adjustments so as to generalize findings from the sample. The technique has been used previously and has been widely described (Heckathorn, 1997; Wejnert, 2009). Initial participants (“seeds”) are recruited and requested to refer other members of the population for possible enrolment. This occurs in succession until the desired number of study participants is reached.

Data collection tools

Data were collected using a questionnaire adapted from a similar survey in Tanzania four years earlier (NACP, 2013). The questions in the questionnaire were based on the toolbox for conducting HIV biobehavioural surveillance among key populations from University of California, San Francisco (UCSF Institute for Global Health Sciences, n.d.). We pre-tested the questionnaire among a few selected FSW (peers) to receive feedback on language, formatting and length, and the acceptability of the electronic data collection method. Information was collected through face-to-face interviews. The interviews were done in Swahili, a widely spoken and the national language of Tanzania.

Reported HIV testing during the past one year was used as the outcome variable for analysis of factors associated with HIV testing. Various socio-demographic variables such as age, education level, marital status, the time the person had lived in the study area, income and current living arrangements were measured using standard questions previously used in other surveys (NACP, 2013; NBS, 2018), including the demographic and health surveys. HIV/AIDS related knowledge was measured using a set of questions which were later decomposed into a scale. The median score was used to dichotomize the sample (i.e., those who scored median and above were considered to have comprehensive knowledge about HIV/AIDS whereas those who scored below the median were not). A similar approach was used to dichotomize the sample with respect to experiences of stigma. The type of stigma assessed was enacted stigma which refers to own experience of feeling stigmatized.

To assess this type of stigma, participants were asked questions related to name-calling, being insulted in any ways, having been excluded from social events, and having lost respect from other people. Participants were also asked whether they consumed alcohol while working as sex workers, whether they perceived themselves to be at risk of getting HIV infection, and condom use while having sex with clients. Risk perception was assessed by asking participants questions on how they perceived themselves to be at risk based on some behavioural characteristics such as having sex without using condom, having sex while drunk, and having multiple sexual partners. Participants were also asked whether they had had an opportunity to contact a peer educator (a trained fellow FSW who provide HIV preventive education to other members of the FSW community) in the past one year.

Data collection procedures

Five seeds were selected so as to represent variation with respect to age, place of residence, and where they engaged in sex work (street, brothel, clubs, and/or bar-based). Prior to interviews, all study participants had provided written informed consent to take part in the study. To ensure that only eligible FSW were included in the study, a trained screener who was an FSW herself, screened participants prior to enrolment. For data collection, Android based tablets equipped with an Open Data Kit (ODK) were used during interviews. Upon completion of study procedures, each participant was given three invitation coupons to take part in the study and asked to pass them on to fellow FSW and invite them to participate in the study.

Data analysis

Data analyses were done using STATA version 15 and the RDSAT statistical package. In RDS recruitment approach, participants with larger networks are more likely to be represented than those with smaller network sizes (Heckathorn, 1997; Wejnert, 2009). We therefore weighted the data to control for network size and clustering. HIV testing in the past 12 months was set as the outcome variable in the analyses of factors associated with recent HIV testing. Since recent HIV testing was common, we used weighted modified Poisson regression to estimate the prevalence ratio (PR) instead of the odds ratio (Tamhane, Westfall, Burkholder, & Cutter, 2016). Adjusted Poisson regression was also used to determine factors associated with HIV testing and receiving results during the past year preceding the survey. Multivariate model building was based on the selection cut-off point of $p < 0.2$ in bivariate analysis. Statistical interactions were assessed after a priori scrutiny of the variables that showed some potential of interaction between them. All statistical tests were evaluated at 0.05 significance level.

Ethical consideration

Ethical approval to conduct this survey with reference number 2017-07-21/AEC/Vol. XII/76 was obtained from the Research and Publication Committee of the Muhimbili University of Health and Allied Sciences, Dar es Salaam, Tanzania. Permissions to conduct the study were provided by the national and local authorities. Participants received health education on safer sex and were given condoms upon completion of their study procedures as per protocol. Participants gave written informed consent prior to commencing of an interview. Each participant received a compensation for their transport and time amounting TSHS 8,000/=

(equivalent to about 3.5 USD). Further, since they were supposed to escort their referrals from their networks for recruitment, each participant received TSHS 4,000/= (equivalent to about 1.8 USD) for each participant they referred.

Results

Characteristics of the study participants

We recruited 958 FSW through 6 to 16 waves (successive generations of recruitment emanating from RDS) of recruitment. Table 1 presents unweighted and weighted proportions of socio – demographic, behavioral, societal, and structural characteristics of the study participants. The median age was 26 years (inter-quartile range [IQR]: 22 to 32), 69.8% (95% Confidence Interval (CI): 66.8, 72.7) reported to have completed primary school education, 67.3% (95%CI: 64.3, 70.3) had never been married, and half (49.9%, 95%CI: 46.7, 53.1) were born and raised in the study city (Dar es Salaam). Lack of comprehensive knowledge of HIV/AIDS was reported by 53.7% (95%CI: 50.4, 56.9) of the participants (Table 1).

Distribution of behavioral, societal, and structural factors

Three quarters (76.6%; 95%CI: 72.0, 80.6) reported to have used alcohol while doing sex work during the past week preceding the survey. Nearly three quarters (70.9%; 95%CI: 66.8, 74.7) of the FSW reported to have used a condom on the last day they worked and a similar proportion (71.2%; 95%CI: 66.8, 75.2) perceived themselves as either being at medium or high risk of acquiring HIV infection. When asked about disclosure of sex work to family members, only a little over a third (39.3%; 95%CI: 35.3, 43.5) reported to have disclosed their sex work status to family members. Stigma related to sex work was common with 62.5% (95%CI: 58.4, 66.5) reporting to have felt stigmatized due to being sex workers. About a third (34.4%; 95%CI: 30.4, 38.7) felt that HIV is a stigmatized disease and a similar proportion reported to have had a contact with a peer educator in the 12 month-period prior to the survey (36.5%; 95%CI: 32.7, 40.5) (Table 2).

Use of HIV testing services

Overall, 831 of the 958 participants (weighted proportion= 85.4%; 95%CI: 82.3, 88.1) reported to have ever had an HIV test for which they had also received the results. A total of 622 participants (65.3%) reported having had an HIV test and received the result in the past year (95%CI: 61.2, 69.3) (Table 3). Of the 958 participants, 60 (6.3%) knew their HIV positive status and were dropped in subsequent analyses.

Factors independently associated with use of HIV testing services

The results of multivariable modified Poisson regression analysis of factors associated with use of HIV testing services among FSW are presented in Table 4. Compared to FSW who reported living with a friend or fellow FSW, those who lived with a boyfriend or husband or a family member had 18% higher odds of having had an HIV test in the past year (PR = 1.18; 95%CI: 1.00, 1.40; p = 0.05). FSW who reported to have used a condom the last day they worked were 20% more likely to have been tested for HIV over the past year (PR = 1.2; 95%CI: 1.0, 1.4; p = 0.06). Other factors associated with increased probability of HIV

testing in this population included having no or low self-perceived risk of HIV acquisition (PR = 1.2; 95%CI: 1.0, 1.3; p = 0.03), never felt stigmatized as a sex worker (PR = 1.2; 95%CI: 1.0, 1.3; p < 0.01), and been in contact with a peer educator (PR= 1.3; 95%CI: 1.2, 1.5; p < 0.01) during the year preceding the survey.

Discussion

Early HIV diagnosis is paramount in linkage to care and is associated with increased survival and prevention of HIV transmission. In this population, 85% of the participants reported to have ever tested for HIV, indicating a greater potential to closing the first of UNAIDS's 90-90-90 targets, which is a pre-requisite for reaching the other goals (Hakim et al., 2019; Lancaster, Cernigliaro, Zulliger, & Fleming, 2016). These estimates are comparable to some other FSW studies in the region. A study along Malaba-Kampala highway in Uganda and a survey among FSW in Port-Elizabeth, South Africa have reported high HIV testing rates in the range of 82 – 86% (Pande et al., 2019; Schwartz et al., 2017). However, this estimate is higher compared to that of women in the general population in Tanzania, estimated to be 56% in 2017 (NBS, 2018). Intensive efforts to implement the comprehensive guidelines for HIV prevention and treatment among key populations initiated in 2014 could explain the higher testing rate among FSW as compared to women in the general population (NBS, 2018). These efforts are also similar to the unique and intensive community based FSW engagement and nurse-led mobile HIV testing in South Africa and extensive community-based testing in Uganda.

In this study, we found that 65.34% of the FSW surveyed had recently (during the past one year) tested for HIV and received the result. This estimate is comparable to findings from studies conducted in similar settings within sub-Saharan Africa where recent HIV testing (within the preceding year) ranged from 67.6% in Kampala, Uganda to 87.6 in Mombasa, Kenya (Doshi et al., 2018; Lafort et al., 2018; Muhindo et al., 2019). The estimate from this study suggests that concerted efforts to scale up HIV testing are effective in closing the gap to accelerate attaining the UNAIDS treatment targets of 90-90-90.

Our study also examined factors associated with recent access to HIV testing among FSW in Dar es Salaam, Tanzania. Individual factors associated with access to HIV testing in this population were low self-perceived risk of HIV acquisition and having used a condom on the last day engaged in sex work. Condom use on the last day worked has been reported to relate to higher knowledge of HIV risks (Budhwani et al., 2017; Faust & Yaya, 2018). Good knowledge of HIV risks has been found to be associated with higher uptake of HIV services in general, including HIV testing (Rhead et al., 2018). Our finding of low self-perceived risk of HIV acquisition as a predictor of uptake of HIV testing is similar to findings by Johnston et al., that observed high risk perception as a less motivating factor to getting tested for HIV (Johnston et al., 2017). However, findings from several other studies have indicated low HIV risk perception to be a barrier against HIV testing uptake (Ameyan, Jeffery, Negash, Biruk, & Taegtmeier, 2015; Batona et al., 2015; Hamilton et al., 2019). The roll-out of the “test and treat” approach in HIV programming in Tanzania, together with ongoing HIV interventions among FSW including knowledge of HIV care and treatment could be reasons for the observed difference. The FSW who perceived themselves at low risk of contracting

HIV infection might have wanted to maintain their knowledge of HIV negative status and hence higher uptake of the service.

Stigma ascribed to sex work was a significant barrier to HIV testing. Although we did not demystify the different types of stigma in our survey questions, the questions related to stigma referred to enacted stigma that FSW experience as sex workers when accessing health services. Several other studies, have reported stigma due to sex work as one of the important barriers to accessing HIV related services (Chanda et al., 2017; Mtetwa et al., 2013; Nakanwagi, Matovu, Kintu, Kaharuzza, & Wanyenze, 2016; Nyblade et al., 2017; Tokar et al., 2018; Wanyenze et al., 2017). In order to make a stride towards achieving the UNAIDS 90-90-90 treatment targets (UNAIDS, 2014), interventions to address various forms of stigma in health care settings should be implemented widely. Family support, especially living with a partner or a family member, was associated with higher uptake of HIV testing. This is in line with findings in a systematic review of HIV testing among FSW that found married FSW to have higher uptake of HIV testing (Tokar et al., 2018). A qualitative inquiry by Chanda et al. reported that, FSW suggested measures to improve HIV testing be linked to community and social network support (Chanda et al., 2017). Extension of such measures to the community and society will also help in reducing stigma associated with sex work in relation to HIV infection. Lyons et al. found improvement of access to various HIV services among key populations in Senegal when a three-tier intervention model was implemented in efforts to mitigate stigma (Lyons et al., 2017).

Contact with a peer educator in the past one year was observed to be associated with higher uptake of HIV testing in our study. It provides an opportunity for exposure to information about HIV that is likely to enhance uptake of services. Nakanwagi et al. in Uganda found that, inadequate information about HIV among FSW was a barrier to linkage and reception of various HIV related services (Nakanwagi et al., 2016). Other scholars have also found peer support as an important factor in accessing various HIV related services including HIV testing (Deering et al., 2015; Tokar et al., 2018). Various HIV interventions pioneered by the peers are widespread in Dar es Salaam and have reached almost all parts of the city. Thus, HIV treatment and prevention programs should consider increasing usage of intervention approaches that uses peer educators in motivating uptake of HIV services among FSW.

This survey is the largest, to date, among FSW in Tanzania involving seeds (initial recruiters) from varying status of social, demographic, and economic as well as types of sex work within the city. Our recruitment mechanism also involved use of FSW peer screeners to screen for eligibility. This approach aimed to ensure that only eligible participants from all the strata of FSWs are included in the study. We are therefore confident that our results are generalizable to the population of FSW in Dar es Salaam.

However, our results should be interpreted in light of a number of limitations. The cross-sectional design of our survey could not infer causality of the various factors associated with HIV testing presented. However, most factors identified in this study have also been published in other studies which have used more robust designs. Also, we recruited our study participants by starting with seeds, some of which, may have worked as peer educators. This could have potentially resulted into recruiting participants who have

an advantage in accessing HIV testing services. In this regard, our results may have overestimated the extent of use of HIV testing services in this population. However, our RDS sample reached equilibrium and included participants from wide range of strata with low possibility for selection bias. Data presented in this study emanate from self-reported information and are therefore prone for desirability bias. Desirability bias could have resulted into overestimating the extent of HIV testing in this population if those who never tested for HIV reported to have tested. However, we inquired a series of questions including if they had collected their test results and if they would like to share their results which may potentially reduce desirable answers.

Conclusion

HIV testing among FSW in Dar es Salaam, Tanzania is promising and closer to the global target. Stigma due to sex work is common and an important barrier to HIV testing. Knowledge of HIV risks, social network support, and use of peer educators are important factors associated with higher uptake of HIV testing. Renewed efforts addressing individual, community and structural factors are needed to close the first UNAIDS 90 target for this high-risk population in Tanzania.

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Table 1.

Distribution of socio-demographic characteristics of female sex workers in Dar es Salaam, Tanzania, n = 958.

Characteristic	n	Unweighted proportion in %	Weighted proportion in % [†] (95% CI)
Age, in years (median, IQR)	26 (22 to 32)		
18–24	415	43.3	47.7 (43.5, 51.9)
25–34	342	35.7	35.0 (31.1, 39.1)
35 and above	201	21.0	17.3 (14.4, 20.6)
Education level			
No formal	135	14.1	15.3 (12.1, 19.0)
Primary	669	69.8	68.7 (64.4, 72.6)
Secondary and above	154	16.1	16.1 (13.1, 19.5)
Marital Status ^a			
Never married	645	67.3	70.3 (66.2, 73.9)
Married/cohabiting	22	2.3	1.9 (1.0, 3.2)
Divorced/separated	290	30.3	27.9 (24.2, 31.8)
Income past month (TZS)			
<75,000	88	9.2	11.0 (8.5, 13.9)
75,000 – 150,000	237	24.7	29.9 (25.8, 34.2)
150,001–300,000	337	35.2	32.8 (29.1, 36.7)
>300,000	296	30.9	26.4 (22.9, 30.2)
Time lived in Dar es Salaam ^a			
Lived for 5 years or less	194	20.3	23.9 (20.3, 27.8)
Lived for 6 years or more	284	29.7	28.9 (25.2, 32.8)
Born and raised	478	50.0	47.3 (43.0, 51.5)
Currently living with			
Boyfriend/Husband/Family	386	40.3	41.3 (37.2, 45.6)
Alone	369	38.5	37.1 (33.1, 41.3)
Friends/Fellow FSW	203	21.2	21.6 (18.3, 25.1)
Comprehensive HIV Knowledge			
Yes	444	46.4	46.3 (42.1, 50.5)
No	514	53.6	53.7 (49.4, 57.9)

[†]: percentages are weighted for network size

CI, Confidence Interval; IQR, Inter-quartile range; TZS, Tanzanian Shillings; 1 USD = 2300 TZS; FSW, Female Sex Workers.

^aVariables had missing responses: Marital status (1) and Time lived in Dar es Salaam (2)

Table 2.

Distribution of behavioural, societal and structural factors among female sex workers in Dar es Salaam, Tanzania, n = 958.

Characteristics	n	Unweighted proportion in %	Weighted proportion [†] in % (95% CI)
Using alcohol while working – (Past one week) ^a			
Yes	544	77.2	76.6 (72.0, 80.6)
No	161	22.8	23.4 (19.4, 28.0)
Condom use last day you worked			
Yes	693	72.3	70.9 (66.8, 74.7)
No	265	27.7	29.1 (25.3, 33.2)
HIV Risk Perception ^a			
No/Low risk	234	26.1	28.8 (24.8, 33.2)
High/Medium risk	661	73.8	71.2 (66.7, 75.2)
Family member know of your SW status			
Yes	397	41.4	39.3 (35.3, 43.5)
No	561	58.5	60.7 (56.5, 64.7)
Feel stigmatized as a sex worker			
Yes	604	63.1	62.5 (58.3, 66.5)
No	354	36.9	37.5 (33.5, 41.6)
HIV is a stigmatizing disease			
Yes	296	30.9	34.4 (30.4, 38.7)
No	608	63.5	59.8 (55.5, 64.0)
Neutral	54	5.6	5.8 (3.8, 8.5)
Contact with peer educator past 12 months			
Yes	412	43.0	36.5 (32.6, 40.5)
No	546	57.0	63.5 (59.5, 67.3)

[†]: percentages are weighted for network size

SW, Sex Work;

^aVariables had missing responses: Using alcohol while working (253) and HIV risk perception (63)

Table 3.

Distribution of individual, societal and structural factors by HIV testing among female sex workers in Dar es salaam, Tanzania (N=958).

Variable	n	Proportion Tested for HIV (95% CI)	p-value
Ever tested for HIV and received results	958	85.4% (82.3, 88.1)	na
HIV testing past 12 months	958	65.2% (61.2, 69.2)	na
Age groups (years)			
18–24	415	64.05 (57.56, 70.07)	0.77
25–34	342	67.18 (60.52, 73.21)	
35 and above	201	65.18 (55.99, 73.36)	
Education level			
No formal	135	63.43 (51.96, 73.61)	0.93
Primary	669	65.82 (60.94, 70.37)	
Secondary and above	154	65.10 (53.59, 75.08)	
Marital Status ^a			
Never married	645	61.79 (56.69, 66.65)	0.02
Married/cohabiting	22	76.07 (44.02, 92.78)	
Divorced/separated	290	73.68 (66.77, 79.59)	
Income past month (TZS)			
<75,000	88	67.87 (55.73, 78.00)	0.45
75,000 – 150,000	237	62.56 (53.89, 70.48)	
150,001–300,000	337	69.40 (63.10, 75.05)	
>300,000	296	62.40 (54.12, 70.01)	
Time lived in Dar es Salaam ^a			
Lived for 5 years or less	194	62.91 (53.99, 71.02)	0.24
Lived for 6 years or more	284	70.76 (63.60, 77.01)	
Born and raised	478	63.22 (57.00, 69.02)	
Currently living with			
Boyfriend/Husband/Family	386	69.77 (63.00, 75.77)	0.03
Alone	369	66.29 (59.69, 72.31)	
Friends/Fellow FSW	203	55.22 (46.36, 63.76)	
Comprehensive HIV Knowledge			
Yes	444	68.27 (62.37, 73.63)	0.18
No	514	62.82 (56.98, 68.30)	
Using alcohol while working (Past one Week) ^a			
Yes	544	63.01 (57.43, 68.26)	0.57
No	161	63.91 (52.76, 73.74)	
Condom use (Last one-time client)			
Yes	703	70.99 (66.52, 75.09)	<0.01
No	255	51.16 (42.87, 59.38)	
Refuse one-time sex if condom was not used ^a			

Variable	n	Proportion Tested for HIV (95% CI)	p-value
Yes	533	74.44 (69.44, 78.87)	<0.01
No	353	50.29 (43.37, 57.20)	
Condom use last day you worked			
Yes	693	70.55 (65.87, 74.84)	<0.01
No	265	52.64 (44.49, 60.65)	
HIV Risk Perception ^a			
Perceived to have no or low risk	234	75.79 (67.12, 82.75)	<0.01
High/Medium risk	661	62.02 (57.04, 66.75)	
Family member know of SW status			
Yes	397	63.76 (57.18, 69.86)	0.53
No	561	66.37 (60.96, 71.37)	
Feel stigmatized as a sex worker			
Yes	604	61.37 (55.94, 66.54)	0.01
No	354	71.96 (65.69, 77.47)	
HIV is a stigmatizing disease			
Yes	296	72.19 (65.55, 77.99)	<0.01
No	608	63.40 (58.14, 68.36)	
Neutral	54	44.48 (26.49, 64.05)	
Contact with peer educator past 12 months			
Yes	412	78.01 (72.49, 82.68)	<0.01
No	546	58.07 (52.48, 63.45)	

CI, Confidence Interval; TZS, Tanzanian Shillings; 1 USD = 2300 TZS; FSW, Female Sex Workers.

^aVariables had missing responses: Marital status (1), Time lived in Dar es Salaam (2), Using alcohol while working (253), Refuse one-time sex if condom was not used (72), and HIV risk perception (63).

Table 4.

Modified Poisson Regression Modeling of Factors associated with Access to HIV Testing Services among FSW in Dar es Salaam, Tanzania.

Variable [‡]	PR (95%CI)	p-value	APR [§] (95%CI)	p-value
Age categories, in years				
15–24	1	Ref		
25–34	1.05 (0.91, 1.20)	0.50		
35 and above	1.02 (0.86, 1.20)	0.85		
Education level				
No formal	1	Ref		
Primary	1.03 (0.86, 1.25)	0.69		
Secondary and above	1.03 (0.80, 1.30)	0.84		
Marital Status				
Never married	1	Ref	1	Ref
Married/cohabiting	1.23 (0.87, 1.73)	0.24	1.12 (0.76, 1.67)	0.56
Divorced/separated	1.19 (1.06, 1.34)	<0.01	1.09 (0.96, 1.23)	0.16
Currently living with				
Friends/Fellow FSW	1	Ref	1	Ref
Alone	1.20 (1.00, 1.44)	0.05	1.11 (0.93, 1.32)	0.23
Boyfriend/Husb/Family	1.26 (1.05, 1.52)	0.01	1.18 (1.00, 1.40)	0.05
Income past month (TZS)				
<75,000	1	Ref		
75,000 – 150,000	0.92 (0.74, 1.14)	0.454		
150,001–300,000	1.02 (0.85, 1.23)	0.816		
>300,000	0.92 (0.74, 1.13)	0.443		
Time lived in Dar es Salaam				
Lived 5 years or less	1	Ref	1	Ref
Lived 6 years or more	1.13 (0.95, 1.33)	0.16	1.13 (0.96, 1.34)	0.13
Born and raised	1.00 (0.85, 1.19)	0.95	0.98 (0.83, 1.15)	0.78
Comprehensive HIV Knowledge				
No	1	Ref	1	Ref
Yes	1.09 (0.96, 1.23)	0.18	1.07 (0.94, 1.20)	0.28
Using alcohol while working (Past one week)				
Yes	1	Ref		
No	1.02 (0.84, 1.23)	0.86		
Condom use last day you worked				
No	1	Ref	1	Ref
Yes	1.34 (1.13, 1.58)	<0.01	1.17 (0.99, 1.38)	0.05
HIV Risk Perception				
High/Medium risk	1	Ref	1	Ref
No/Low risk	1.22 (1.07, 1.39)	<0.01	1.16 (1.02, 1.32)	0.03
Feel stigmatized as SW				

Variable [‡]	PR (95%CI)	p-value	APR [§] (95%CI)	p-value
Yes	1	Ref	1	Ref
No	1.17 (1.04, 1.32)	<0.01	1.18 (1.04, 1.33)	<0.01
A family member know of SW status				
No	1	Ref		
Yes	0.96 (0.84, 1.09)	0.55		
Have been in contact with a peer educator in past 12 months				
No	1		1	
Yes	1.34 (1.19, 1.51)	<0.01	1.33 (1.18, 1.49)	<0.01

[‡]Variables in this table had a p-value of 0.25 or less in bivariable analysis and were included in the multivariable analysis.

[§]Variables included in the model: marital status, living group, HIV knowledge, HIV risk perception, stigmatized as a sex worker, and been in contact with a peer educator.

PR, Prevalence Ratio; APR, Adjusted Prevalence Ratio; CI, Confidence Interval; Ref, Reference Category;