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Factors associated with adherence to HIV testing guidelines among HIV-negative female sex workers in Kampala, Uganda

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ABSTRACT

Background: Frequent human immunodeficiency virus (HIV) testing is recommended among female sex workers. This study examined the extent to which HIV-negative female sex workers (FSWs) in Kampala adhere to the HIV testing guidelines, and identified associated factors.

Methods: This cross-sectional study used a simple random sampling method to select 12 sex work hotspots. Two hundred participants were allocated proportionally in each hotspot. Frequencies were used to describe categorical characteristics of FSWs, and a multivariable logistic regression model was used to determine the factors associated with adherence to the HIV testing guidelines.

Results: Eighty-eight percent of the 200 study participants reported their HIV testing status; of these, 56% had tested three or more times in the 12 months preceding the survey. Attaining a secondary education was associated with adherence to the HIV testing guidelines [odds ratio (OR) 1.86, 95% confidence interval (CI) 1.01–3.44; $P=0.047$]. Sexually transmitted infection testing in the preceding 3 months (OR 2.13, 95% CI 0.95–4.74; $P=0.065$) and accessing HIV testing at a drop-in centre (OR 5.90, 95% CI 0.71–49.1; $P=0.101$) were associated with higher odds of adherence to the HIV testing guidelines.

Conclusion: Adherence to the HIV testing guidelines was suboptimal, indicating the need to scale up interventions to improve access to HIV testing, including rigorous behaviour change communication.

Introduction

Globally, female sex workers (FSWs) are recognized as a population that is at increased risk of acquiring human immunodeficiency virus (HIV) infection. As such, emphasis is placed on this key population as a critical target for early and frequent testing to optimize rapid access to HIV prevention and treatment services following diagnosis. Frequent HIV testing every 3–6 months among FSWs is recommended to curb transmission and improve care (World Health Organization 2016; Macdonald et al., 2017). This approach was adopted in 2016 by the Ministry of Health in Uganda to improve care among FSWs (Ministry of Health Uganda 2019).

Various approaches, such as integration of HIV testing services with other health services (Narasimhan et al., 2019), and community-

based testing within sex work hotspots and at drop-in centres (DICs) (Mulongo et al., 2015; Pande et al., 2019; Ma et al., 2020), have been implemented and shown to improve access to routine HIV testing among FSWs (Bassett et al., 2015).

A study conducted in Benin (Batona et al., 2015) reported HIV testing uptake of 40% among FSWs in the first 3 months, and only 21% had tested in the period between 3 to 6 months. A cross-sectional survey among FSWs in Mombasa, Kenya found that 45% were testing for HIV every 3 months (Bengtson et al., 2014). A few studies conducted in Mombasa, Kenya which found high levels of testing among FSWs – 89.2% (Setlhare and Manyeagae, 2017) and 88% (Bengtson et al., 2014) – measured longer intervals between testing (i.e. 12 months) and ever tested.

Previous studies undertaken in Kampala showed that only 53% of FSWs had ever tested for HIV, and of these, 16% had tested in the pre-

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ceding 12 months (Hladik et al., 2017). Results of screening practices among FSWs in Uganda showed that 67% had tested for HIV two or more times in the 12 months preceding the survey (Muhindo et al., 2019).

HIV testing among FSWs is propagated by several factors which have previously been reported to influence routine HIV testing. These include behavioural factors such as high alcohol intake, drug use, and high mobility of FSWs in search of new customers (Bengtson et al., 2014; Deering et al., 2015; Setlhare and Manyeagae, 2017). Further, there are structural factors such as stigma and discrimination, violence and violation of rights (Damacena et al., 2011; Martins et al., 2018), and health system factors such as unfriendly testing centres due to testing hours conflicting with FSWs' work schedules. These factors make FSWs reluctant to seek routine HIV testing services (Decker et al., 2013; Nyblade et al., 2017; Tokar et al., 2018). However, programmes such as the enhanced peer outreach approach, which was developed with an understanding of FSWs' contextual issues, have registered great success in improving access to routine HIV testing services and early diagnosis of HIV infection (Lillie et al., 2019; Olawore et al., 2020).

Although studies in sub-Saharan Africa, particularly Uganda (Hladik et al., 2017; Muhindo et al., 2019), have studied uptake of HIV testing, the majority have focused on examining the history of ever testing, and how recent the tests were (Deering et al., 2015; Setlhare and Manyeagae, 2017; Shokoohi et al., 2017; Martins et al., 2018; Tokar et al., 2018). These studies did not assess the extent that FSWs adhered to the HIV testing guidelines (World Health Organization 2016). As such, the present study examined the extent to which FSWs adhered to the HIV testing guidelines, and assessed factors associated with adherence to the HIV testing guidelines.

Methods

Study design

This cross-sectional study was conducted using structured questionnaires. Simple random sampling was used to select sex work hotspots, and voluntary response sampling, a particular type of convenience sampling, was used to select the participants. Adherence to the HIV testing guidelines for FSWs was assessed by determining the number of times that FSWs had tested for HIV in the 12 months preceding the study.

Study setting

This study was conducted at sex work hotspots in the five administrative divisions of Kampala. These sex work hotspots were defined as geographical locations where sex work trade is concentrated, such as streets, lodges and bars. Kampala is the capital and largest city in Uganda, and is divided into five administrative division: Nakawa, Makindye, Kampala Central, Rubaga and Kawempe. Kampala was selected because it is a highly active and economically vibrant business centre, and attracts potential customers for FSWs due to financial accessibility. The city has many truck drivers that transport commercial goods across Kampala from neighbouring countries of Rwanda, Democratic Republic of the Congo, Tanzania, Kenya, Burundi, Rwanda and South Sudan.

Study population

The study population consisted of FSWs aged ≥ 18 years who operated in the sex work hotspots within any of the five administrative divisions of Kampala at the time of the study. FSWs who were HIV negative, based on self-report, were recruited into this study. FSWs were defined as individuals who had offered sex in exchange for money or other financial or material benefits in the 12 months preceding the survey. Young FSWs (aged < 18 years) were excluded from the study for ethical reasons and due to safety-related concerns. In Uganda, the age of consent is 18 years, and while the young FSWs had a window to consent as emancipated minors, the authors could not guarantee their safety, or rule out

risks associated with unintended breach of confidentiality as some of them still lived with their parents.

Variable measurements

The main outcome measure was adherence to the HIV testing guidelines for FSWs. Adherence was defined as having tested for HIV three times or more within the last 12 months. The exposure variables were demographic and sociobehavioural characteristics, including age, education level, marital status, housing status, and if the FSW had another job other than sex work. The sociobehavioural exposure variables are indicated in Table 2.

Sample size and sampling procedure

Sampling was performed at three stages: (i) administrative division level; (ii) hotspot level; and (iii) FSW level. Kampala is divided into five administrative divisions. All five divisions were included in the first stage sampling. At hotspot level, a list of sex work hotspots with an estimated population of FSWs was obtained from the Infectious Diseases Institute. This institute works with FSW network organizations in Kampala, and has accurate data regarding FSW hotspots in the city. In total, there were 327 mapped hotspots, with an estimated total number of 11,558 FSWs operating in these hotspots. From the list of sites, 30 hotspots were selected at random for the study. A sample of 30 observations is the acceptable minimum requirement for statistical significance (Landreneau and Creek, 2009). However, of the 30 hotspots, there were only 12 gate keepers, so only 12 hotspots were accessible and willing to participate in the orientation meeting in preparation for recruitment and data collection. Consequently, 12 hotspots were considered for the study, and these yielded a total 6761 FSWs. There is minimal variation in how sex work hotspots operate, as FSWs in those hotspots are mobile and have diverse geographical origins. As their characteristics do not necessarily depend on the hotspots they operate in, the 12 included hotspots can be considered to be representative.

For sampling of FSWs, the minimum required sample size was computed using the precision calculation formula, assuming an adherence rate of 50%, a Z-score of 1.96 for a 95% confidence interval (CI), a total population of 6761, and a 5% margin of error. Due to resource constraints, the authors were willing to accept a 7% margin of error in the adherence estimate, as this was within an acceptable margin of error (5–10%) (Habib et al., 2014). When these values were used in Equation [1] (Daniel and Cross, 1999), a sample size of 191 FSWs was obtained. This was rounded to 200 to allow for non-responses.

$$N = ZP(1 - P)/d^2 \quad (1)$$

where, n is the sample size, z is the z-score associated with a level of confidence, p is the sample proportion, expressed as a decimal, d is the margin of error, expressed as a decimal

Proportional allocation procedures were followed to determine the actual number of FSWs for each hotspot, and this involved apportioning the sample size of 200 FSWs to 12 hotspots such that the sample size allocated to each hotspot was proportional to the total number of FSWs at that site.

Participant recruitment

The FSW network organizations were approached in order to introduce the study, and to ask them to help in identification of FSW peer leaders from the selected sex work hotspots. An introductory session was conducted with FSW peer leaders to orient them on the study objectives and all issues related to ethical conduct of the survey. The importance of confidentiality, safety, privacy and the voluntary nature of study participation were emphasized. After orientation, the peer leaders approached various FSWs and introduced them to the study. Those who expressed willingness to participate were allowed to identify a mutually agreed

private and safe place for a detailed interview. Based on proportional allocation, the recruitment process was conducted on a first come, first served basis until enough FSWs were recruited for each hotspot to reach a final sample of 200 FSWs.

Data collection procedures

Validation of tools and data quality assurance

A structured questionnaire and consent documents were developed based on the empirical literature, and prior experience of the research team in HIV programming. From a comprehensive review of the literature, potential factors that influence adherence to the HIV testing guidelines were categorized into different domains: sociobehavioural practices, health-seeking behaviour, HIV testing, availability and access to HIV prevention services, risk perception, stigma and discrimination, and depressive tendencies. After the key domains were identified, relevant questions relating to each domain were developed by considering the Ugandan and FSW contexts. Accordingly, 98 questions assessing all the domains on adherence to the HIV testing guidelines were initially developed. Two members of the team with expert knowledge in HIV prevention performed content validation of the tool to select the most relevant questions, and the total number of questions was reduced to 60. The team also assessed clarity of the instrument. Discussion of each question with two people with a non-medical background was also undertaken to further ensure clarity and face validity of the instrument.

The tools were translated into Luganda, a common local language in Kampala, and backtranslated into English. The questionnaire was piloted in a non-study sex work hotspot in Wakiso district neighbouring Kampala. In total, 12 FSWs were enrolled in the pilot testing process. The pilot testing of the questionnaire helped to determine and correct the limitations of the survey in terms of the format of the questions, clarity, appropriate wording, and the estimated time for questionnaire completion.

Data collection

Data were collected using a hard copy structured questionnaire administered by interviewers in one-on-one interviews. A research team with experience in quantitative data collection among FSWs was recruited and trained to refresh their knowledge in quantitative data collection practices and research ethics. Emphasis was placed on confidentiality and safety, and focused on the sensitivity of collecting data from FSWs, a highly marginalized subpopulation. FSWs who provided verbal informed consent were interviewed in a private place agreed mutually with the researcher, and no identifying information was collected. Data collection was undertaken between November and December 2020.

Data management

Data quality checks were conducted daily during field monitoring by crosschecking discrepancies and completeness of data on all variables. Real-time form review and correction of missing or wrongly captured data was undertaken while still in the field when it was still possible to access participants. Data were entered into Research Electronic Data Capture (REDCap), an online data management tool for surveys which helps to identify discrepancies and errors in the collected data rapidly (Van Bulck et al., 2022). Electronic copies of data were stored on a password protected computer, and backed up on a secure external hard drive. Data were exported into Stata Version 15.0 (Stata Corp., College Station, TX, USA), where further checking for errors, outliers and completeness was conducted.

Statistical analysis

Frequencies and corresponding percentages were used to describe categorical variables. Only complete cases were used in analysis of the

Table 1
Sociodemographic characteristics of the study participants.

Sociodemographic characteristics	Frequency <i>n</i> =200	Percentage
Location		
Kampala Central	60	30.0
Nakawa	22	11.0
Kawempe	62	31.0
Rubaga	37	18.5
Makindye	19	9.5
Age group (years)		
18–24	58	29.0
25–30	85	42.5
31–49	57	28.5
Age at initiation of sex work (years)		
10–17	28	14
18–24	100	50
25–45	69	34.5
Missing	3	1.5
Education		
None	18	9.0
Primary	97	48.5
Secondary	82	41.0
Post-secondary	3	1.5
Marital status		
Single/never married	44	22.0
Married/cohabiting	18	9.0
Separated/divorced/widowed	138	69.0
Has children		
No	28	14
Yes	171	85.5
Missing	1	0.5
Another job other than sex work		
No	128	64
Yes	71	35.5
Missing	1	0.5
Housing status, <i>n</i>=124		
Own/rented house	178	89.0
Housed by relatives/friends	18	9.0
No shelter	4	2.0

dataset. Univariate logistic regression models were used for each independent variable and the binary study outcome (i.e. adherence of HIV-negative FSWs to the HIV testing guidelines). All variables from univariate models which had a *P*-value of ≤ 0.2 were included in the multivariate model. The multivariate logistic regression model started with the variable with the strongest relationship with adherence of FSWs to the HIV testing guidelines. Other independent variables were added to this model one after another using a forward stepwise method. The added variable was subsequently dropped if it weakened the relationship between the first variable and the outcome. The stepwise logistic regression model was used to select a reduced number of independent variables automatically to build the best performing logistic regression model. Odds ratio (OR) was used to assess the relationship with adherence to the HIV testing guidelines after adjusting for other covariates. Adjusting for other covariates was meant to take care of possible confounding of the relationship of an independent variable and the study outcome by another independent variable. Factors with $P \leq 0.05$ were considered significant.

Results

Sociodemographic characteristics of the study participants

Eighty-five (43%) participants aged 25–30 years represented the largest age group in this study, and 100 (51%) participants had started sex work between 18 and 24 years of age. The main source of income for this study sample was sex work (64%, *n*=128). The majority of participants were living in rented homes (89%, *n*=178) and had children (86%, *n*=171). Forty-nine percent (*n*=97) of participants had attained a primary education and 41% (*n*=82) had attained a secondary education (Table 1).

Table 2
Characteristics of female sex workers (FSWs) by adherence to human immunodeficiency virus (HIV) testing guidelines.

Variable	Non-adherence n (%)	Adherence n (%)	P-value
Age group (years) (n=179)			
18–24	22 (27.9)	33 (33.0)	0.398
25–30	38 (48.1)	38 (38.0)	
31–49	19 (24.1)	29 (29.0)	
Education (n=179)			
None	30 (37.9)	32 (32)	0.03 ^a
Primary	20 (25.3)	15 (15)	
≥Secondary	29 (36.7)	53 (53)	
Marital status (n=179)			
Single/never married	15 (19.0)	26 (26.0)	0.512
Married/cohabiting	9 (11.4)	9 (9.0)	
Separated/divorced/widowed	55 (69.6)	65 (65.0)	
Another job other than sex work (n=178)			
No	50 (63.3)	63 (63.6)	0.962
Yes	29 (36.7)	36 (36.4)	
Housing status (n=124)			
Own/rented house	67 (84.8)	91 (91.0)	0.296
Housed by relatives/friends	11 (13.9)	7 (7.0)	
No shelter	1 (1.3)	2 (2.0)	
Condom use by FSW (n=179)			
Consistent	10 (12.7)	11 (11.0)	0.732
Inconsistent	69 (87.3)	89 (89.0)	
Drug use (ever used) (n=176)			
No	58 (74.4)	64 (65.3)	0.196
Yes	20 (25.6)	34 (34.7)	
Regular medical check-ups (n=179)			
No	59 (74.7)	64 (64)	0.126
Yes	20 (25.3)	36 (33)	
Knowledge on testing guidelines (n=178)			
No	24 (30.8)	40 (40)	0.203
Yes	54 (69.2)	60 (33)	
Most recent HIV test (n=179)			
No	57 (72.1)	73 (73)	0.899
Yes	22 (27.8)	27 (27)	
Social support for HIV test (n=178)			
Yes	36 (45.6)	48 (48.5)	0.699
No	43 (54.4)	51 (51.5)	
Receipt of minimum health package in preceding 3 months (n=179)			
No	79 (100)	82 (82.0)	0.001*
Yes	0 (33)	18 (18.0)	
HIV testing awareness campaign (n=179)			
No	12 (15.2)	10 (10.0)	0.294
Yes	67 (84.8)	90 (90.0)	
Concerns about stigma and discrimination (n=178)			
High	31 (39.7)	36 (36.0)	0.567
Moderate	20 (25.6)	33 (33.0)	
Low	27 (34.6)	31 (31.0)	
FSW risk perception about risk of HIV (n=176)			
No risk	11 (14.5)	14 (14.0)	0.747
low risk	33 (43.4)	49 (49.0)	
≥High risk	32 (42.1)	37 (37.0)	

^a $P < 0.05$ was considered to indicate significance.

Adherence to the HIV testing guidelines and associated characteristics

As shown in Table 2, 90% ($n=179$) of the HIV-negative participants reported that they had tested for HIV infection in the preceding 12 months, and 56% ($n=100$) had tested at least three times in the preceding 12 months. Adherence to the HIV testing guidelines was higher among the HIV-negative FSWs who had attained a secondary education compared with the FSWs who had attained a primary education or had no education at all (53%, $n=53$). All of the 18 FSWs in the study who had received the complete FSW minimum health package in the preceding 3 months adhered to the HIV testing guidelines (100%, $n=18$).

Factors that facilitated adherence to the HIV testing guidelines

The prime motivating factor for HIV testing was the desire of FSWs to know their HIV status and seek treatment early should they be found HIV positive (41%, $n=111$). Easier accessibility to testing services since

the testing services had been brought nearer to their communities was also a motivator (11%, $n=32$). Thirteen percent ($n=37$) of participants indicated that their perception of being at elevated risk of HIV infection due to a condom bursting during sexual intercourse prompted them to seek HIV testing (Figure 1).

Factors associated with non-adherence to the HIV testing guidelines

Approximately 22% ($n=40$) of FSWs reported challenges and individual attitudes to routine HIV testing, including low risk perception of HIV infection and fear of knowing their HIV status (43%, $n=17$), lack of transport to visit a health facility for regular HIV testing (28%, $n=11$), and fear of being stigmatized by the health workers (13%, $n=5$). Although 64% ($n=114$) of the participants were aware of the HIV testing guidelines, only 60% ($n=60$) of those who knew about the guidelines were adherent, indicated that they were using condoms consistently and did not see the reason for routine testing (48%, $n=26$), and that the opening hours of the testing centres conflicted with the FSWs' work

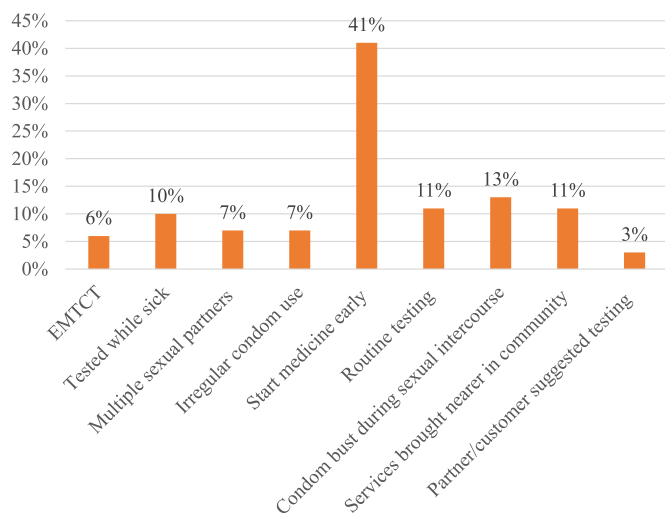


Figure 1. Factors that facilitated adherence to human immunodeficiency virus testing guidelines. EMTCT, elimination of mother-to-child transmission.

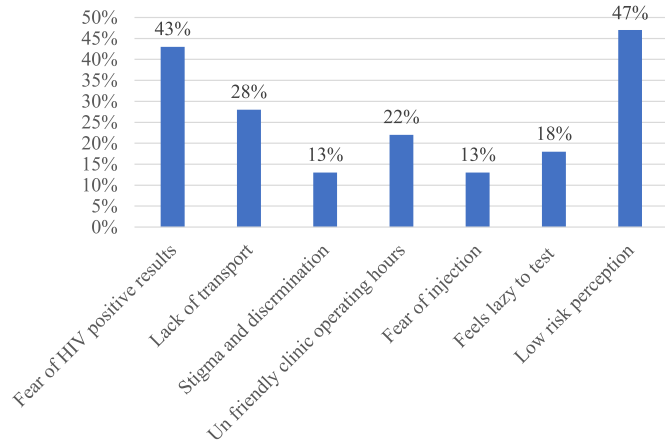


Figure 2. Factors that facilitated non-adherence to human immunodeficiency virus (HIV) testing guidelines.

schedules (22%, $n=12$). Other participants were reluctant to test for unknown reasons (18%, $n=10$) (Figure 2).

Univariate analysis of factors associated with adherence to the HIV testing guidelines among HIV-negative FSWs

On univariate analysis (Table 3), participants who had attained a secondary education were more likely to adhere to the HIV testing guidelines than those who had attained a primary education or no education at all (OR 1.94, 95% CI 1.06–3.55; $P=0.031$). Those participants who had tested for sexually transmitted infections (STIs) in the preceding 3 months (OR 2.13, 95% CI 0.95–4.74; $P=0.065$), as well as those who had accessed HIV testing at a DIC (OR 5.90, 95% CI 0.71–49.1; $P=0.101$), had higher odds of adhering to the HIV testing guidelines, although this was not significant.

Multivariate analysis of factors associated with adherence to the HIV testing guidelines among FSWs

On multivariate logistic regression analysis (Table 4), attaining a secondary education remained significantly associated with adherence to the HIV testing guidelines, after adjusting for use of DICs and routine medical check-ups (OR 1.86, 95% CI 1.01–3.44; $P=0.047$).

Table 3 Univariate analysis of factors associated with adherence to human immunodeficiency virus (HIV) testing guidelines.

Factors	Univariate analysis OR (95% CI)	P-value
Age (years)		
18–24	1	
25–30	0.67 (0.33–1.35)	0.258
31–49	1.02 (0.46–2.24)	0.966
Education		
Primary	1	
≥Secondary	1.94 (1.06–3.55)	0.031 ^a
Marital status		
Single/never married	1	
Married/cohabiting	0.58 (0.19–1.77)	0.336
Separated/divorced/widowed	0.68 (0.33–1.41)	0.304
Another job other than sex work		
No	1	
Yes	0.99 (0.53–1.82)	0.962
Condom use		
No	1	
Yes	1.17 (0.47–2.92)	0.732
Drug use		
No	1	
Yes	1.54 (0.80–2.97)	0.197
Alcohol use		
No	1	
Yes	1.26 (0.61–2.60)	0.535
STI screening in last 3 months		
No	1	
Yes	2.13 (0.95–4.74)	0.065
Routine medical check-ups		
No	1	
Yes	0.86 (0.74–1.02)	0.076
Knowledge of testing guidelines		
No	1	
Yes	1.00 (0.88–1.14)	0.989
Housing status		
Own/rented house	1	
Housed by relatives/friends	0.40 (0.14–1.13)	0.084
No shelter	1.27 (0.11–14.5)	0.847
HIV testing awareness		
No	1	
Yes	1.61 (0.66–3.95)	0.297
Risk perception of HIV risk		
No risk	1	
low risk	1.17 (0.47–2.88)	0.738
≥High risk	0.91 (0.36–2.28)	0.838
Social support		
No	1	
Yes	0.89 (0.50–1.61)	0.699
Use of drop-in centres		
No	1	
Yes	5.90 (0.71–49.1)	0.101

STI, sexually transmitted infection; OR, odds ratio; CI, confidence interval.

^a $P<0.05$ was considered to indicate significance.

Table 4 Multivariate analysis of factors associated with adherence of female sex workers to human immunodeficiency virus testing guidelines.

Factors	Multivariate analysis OR (95% CI)	P-value
Age (years)		
18–24	1	
25–30	0.58 (0.22–1.53)	0.270
31–49	1.12 (0.40–3.20)	0.832
Education		
Primary	1	
≥Secondary	2.18 (1.01–4.71)	0.047 ^a
Routine medical check-ups		
No	1	
Yes	0.88 (0.73–1.05)	0.167
Housing status		
Own/rented house	1	
Housed by relatives/friends	0.37 (0.12–1.13)	0.081
No shelter	0.83 (0.06–11.1)	0.886

OR, odds ratio; CI, confidence interval.

^a $P<0.05$ was considered to indicate significance.

Discussion

This study investigated the extent to which negative FSWs adhere to the HIV testing guidelines, and discussed associated factors. Fifty-seven percent of FSWs had tested three or more times in the preceding 12 months, which is a low percentage relative to the WHO (World Health Organization 2016) and Ugandan guidelines (Ministry of Health Uganda 2019). Previously, few studies have assessed the frequency of testing, and have focused instead on the outcome of recent testing (Tokar et al., 2018). With the introduction of self-testing, studies have reported a potential benefit of increasing the frequency of HIV testing among FSWs (Shava et al., 2020; Wang et al., 2020). As such, the present study highlights a need for programmes and studies to actively track complementary HIV testing outcomes, including accessibility to HIV testing services, willingness to test, and frequency of HIV testing among FSWs.

Education was found to be significantly associated with adherence to the HIV testing guidelines. Other studies have reported similar findings, although in different populations and with different study outcomes. For example, a study on HIV testing among adolescents in Uganda found that individuals with a secondary or higher education were more likely to have ever tested for HIV compared with those who had no education at all (Purba et al., 2018). Similarly, analysis of a demographic and health survey in Zambia found that higher educational attainment was a strong predictor of uptake of HIV testing among women of childbearing age (Muyunda et al., 2018). This implies that less educated FSWs may not fully understand the HIV testing guidelines, and may not realize the benefits of adherence to recommended testing frequencies. Therefore, health promotion models for HIV testing tailored for HIV-negative FSWs with no formal education or primary education alone may help to increase adherence to the HIV testing guidelines. It is also critical to re-evaluate the dissemination, reach and impact of the current messaging on testing guidelines for FSWs.

Findings from this study show that FSWs who were staying with friends or relatives, compared with those who were renting houses on their own, were likely to undertake a greater number of HIV tests in a year. Although non-significant, this finding supports previous reports of other studies about relationships between social support and increased uptake of HIV testing. A systematic review on uptake of HIV testing and counselling among FSWs found that FSWs who were married, those who had peers to remind them to test, and those who were encouraged to test by their employers had higher uptake of HIV testing (Tokar et al., 2018). Other studies (Qiao et al., 2015; Mizinduko et al., 2021) have also shown that FSWs who have social support are likely to seek a range of health services, such as condom use and other reproductive health services. This underscores the need for strengthened programmatic and sustained peer-to-peer support among FSWs, an intervention that has been proven to support increased access to HIV services among FSWs (Nnko et al., 2019; Atuhaire et al., 2021). As such, predictable programme financing for sex work broader than HIV prevention programmes is a strong pillar for sustained support for HIV testing programmes for FSWs.

This study also found that FSWs who had routine health check-ups at health facilities and those who had been tested for STIs in the preceding 3 months showed improved adherence to the HIV testing guidelines. This confirms the finding from previous studies that health-seeking behaviour influences decisions to take HIV tests regularly (Nangendo et al., 2020; Musekiwa et al., 2021). WHO recommends that FSWs should screen for STIs every 3 months (World Health Organization 2016). According to service delivery guidelines for key populations in Uganda, FSWs who visit health facilities for various health needs should also be offered STI screening and provider-initiated HIV testing (Ministry of Health Uganda 2019). If this guidance was followed strictly by health workers, the results would be reflected in increased numbers of FSWs testing for HIV every 3 months. However, due to stigma and discrimination by health workers – a barrier that was reported in this study and in previous studies (Nakanwagi et al., 2016; Wanyenze et al., 2017) – FSWs may not freely self-identify to be practising sex work, and this

may imply that there are missed opportunities for testing FSWs routinely whenever they visit health facilities for other healthcare needs.

In this study, an association was found between use of DICs to test for HIV and adherence to the HIV testing guidelines, but the relationship was not significant. Due to health disparities and barriers to access HIV services, WHO recommends setting up safe spaces where non-judgmental services can be provided, allowing meaningful engagement of FSWs to determine their health priorities (World Health Organization 2016). Previous studies have reported the impact of DICs to increase access to HIV services, including HIV testing, in Uganda (Pande et al., 2019), Mozambique (Lafort et al., 2010) and Malawi (Vu et al., 2021). However, DICs have not been taken to scale, and are therefore inaccessible to FSWs who may have wished to access HIV testing through DICs. The Uganda Ministry of Health is making steps to increase the number of DICs, and has developed guidelines to establish and operate DICs (Ministry of Health Uganda 2020). Setting up DICs in additional districts of Uganda and building their competence to provide appropriate services for FSWs will go a long way to improve the availability of FSW-friendly testing services, and thus improve adherence to the HIV testing guidelines among FSWs.

FSWs in Uganda face various barriers that affect routine HIV testing (Wanyenze et al., 2017; Pande et al., 2019). Health system and individual challenges were reported, including stigma and discrimination from health workers, transportation costs, and the inflexibility of clinic opening hours that do not favour FSW work schedules. These findings are consistent with reports from other studies in Uganda and other countries in the region (Wanyenze et al., 2017; Lafort et al., 2018; Atuhaire et al., 2021). Other barriers reported in this study were individual perceptions related to hesitancy to take routine HIV tests because some FSWs perceived themselves to be at minimal risk due to consistent use of condoms. These findings underscore the need for consistent health education targeting FSWs, as well as periodic evaluation of health promotion models to ensure that concerns and the knowledge gaps of beneficiaries are addressed.

This study had some limitations. Eligibility for inclusion required that a participant be HIV negative, and this was self-reported. Therefore, the possibility of false information regarding seropositivity status cannot be excluded, thus introducing measurement bias. However, this is thought to be a minimal limitation as the authors did not inform the gate keepers about this eligibility criterion, and developed a pseudo short questionnaire that the research team would transition to whenever a participant disclosed their HIV-positive status. Further, due to the cross-sectional nature of the study design, it was not possible to draw causal relationships, but only to determine associations. Lastly, convenience sampling was used in this study, and this could have introduced selection bias. The findings from this study therefore need to be interpreted with caution.

Conclusion

This study has provided critical data on the extent to which FSWs adhere to the HIV testing guidelines. Despite the importance of routine testing in facilitating timely diagnosis and early treatment among FSWs, this study found suboptimal adherence to the HIV testing guidelines. This study showed that attaining a secondary education was significantly associated with routine HIV testing. Other factors associated with improved adherence to the HIV testing guidelines were use of DICs and having social support. However, adherence to the HIV testing guidelines was affected by stigma and discrimination from health workers, transportation costs to access testing, and other health systems barriers. Given these findings, strategies that can improve adherence to the HIV testing guidelines among FSWs are those that increase the reach to HIV testing services, and impact the behaviour change communication messaging. It is recommended that testing programmes should be expanded to reach all FSWs. It is also critical to use real-time programme data continuously in order to assess the current HIV testing strategies and

ascertain their effectiveness in promoting adherence to the HIV testing guidelines. In addition, equipping health workers and FSW peer leaders with skills to deliver messaging in a manner that can be understood by FSWs with a lower level of education will go a long way to improve adherence to the HIV testing guidelines by FSWs.

Declaration of Competing Interest

None declared.

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Ethical approval

This study was approved by the Institutional Review Boards of Uganda Virus Research Institute (Ref. no. GC/12719/08/723), the Ethics Committee of the Faculty of Medicine and Health Sciences of Stellenbosch University (Ref. no S19/05/088), and Uganda National Council of Science and Technology (Ref. no. HS-2665).

Consent to participate

Participants provided verbal informed consent as opposed to written consent, in line with guidance from the Uganda National Council of Science and Technology (Ref. no. HS-2665) on conducting research among key populations.

Data availability

Data are available upon reasonable request.

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