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# Emergency departments as under-utilized venues to provide HIV prevention services to female sex workers in Nairobi, Kenya

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## Abstract

**Background** Female sex workers (FSW) in sub-Saharan Africa are disproportionately affected by HIV and remain a key target population for efforts to reduce transmission. While HIV prevention tools such as PEP and PrEP are available through outpatient FSW clinics, these services are underused. Emergency medicine is a rapidly expanding field in Kenya and may provide a novel venue for initiating or optimizing HIV prevention services. This study examined the characteristics of FSW from Nairobi, Kenya, who had utilized an emergency department (ED) during the past year to broaden our understanding of the patient factors related to usage.

**Methods** An anonymous questionnaire was administered to a convenience sample of 220 Nairobi FSW attending dedicated clinics from June to July 2019. The participants were categorized into those who attended an ED over the past year (acute care users) and clinic-only users (control). A modified version of the WHO Violence Against Women Instrument assessed gender-based violence. Multivariable negative binomial logistic regressions evaluated predictors of health care use among these populations.

**Results** Of the total 220 women (median [IQR] age 32 [27–39]), 101 and 116 were acute care and control populations, respectively. Acute care users had  $12.7 \pm 8.5$  healthcare visits over a 12-month period, and the control population had  $9.1 \pm 7.0$  ( $p < 0.05$ ). ED attendance did not improve the PrEP usage, with 48.5%, and 51% of acute care and clinic users indicated appropriate PrEP use. Patient factors that correlated with health care utilization among acute care users included client sexual violence (OR 2.2 [1.64–2.94],  $p < 0.01$ ), PrEP use (OR 1.54 (1.25–1.91),  $p < 0.01$ ), and client HIV status (OR 1.35 (1.02–1.69),  $p < 0.01$ ).

**Conclusions** Many FSW at high risk for HIV were not accessing HIV prevention tools despite attending a dedicated FSW clinic offering such services. FSW who had attended an ED over the past year had a higher prevalence of HIV risk factors, demonstrating that emergency departments may be important acute intervention venues to prevent HIV transmission in this population. These results can guide policy design, health care provider training, and facility preparedness to support strategies aimed at improving HIV prevention strategies for FSW in Kenyan ED's.

**Keywords** Female sex workers, Emergency medicine, Acute care, HIV

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## Background

The prevalence of HIV among female sex workers (FSW) in sub-Saharan Africa is disproportionately high, estimated to be between 24 and 72% in some regions [1, 2]. UNAIDS data demonstrate that FSW of reproductive age in low- and middle-income countries have a 24 times greater risk of HIV infection than women in the general population [2]. Therefore, FSW from sub-Saharan Africa are a key target population for ongoing efforts to reduce global HIV transmission.

The use of HIV pre-exposure prophylaxis (PrEP) improved antiretroviral access for people living with HIV, and peer-based prevention programs have all been demonstrated to decrease HIV transmission [3]. However, there are barriers to achieving these benefits in FSW populations, including low levels of engagement, health literacy, and adherence. Reduced health care utilization by FSW may be driven by legal and systemic barriers that impact ability and desire to seek care [4–9]. Thus, despite effective prevention tools, HIV rates remain high among this population and improved implementation methods are urgently needed in this population.

The criminalization of sex work in Kenya fuels a pervasive stigmatization of FSW [10]. The illegal nature of sex work creates an environment that allows for law enforcement, clients, and intimate partners to harass and assault sex workers [11], and the resultant unregulated violence towards FSW has been directly linked to increased rates of HIV acquisition [12]. Furthermore, stigmatization of FSW is also practiced by health care workers [11]. This engenders mistrust of the healthcare system in FSW, an important barrier to engagement in HIV prevention and treatment services [8].

A relatively unexplored venue for HIV prevention among FSW is the acute care setting. Emergency departments (ED) provide care to large volumes of individuals presenting for episodic care, including FSW who may rely on its services as their sole source of care. Recently, emergency medicine has been established as a rapidly expanding field in the Kenyan healthcare system [13, 14]. Common reasons for the usage of acute care medicine by FSW include physical and sexual violence, obstetrical complications, and HIV exposure [9, 15]. Acute care settings may give an opportunity to provide HIV post-exposure prevention (PEP), as well as HIV prevention education [14]. However, despite this potential, no structured guidelines exist for the management of FSW in the ED [15, 16]. The aim of this paper is to broaden our understanding of patient factors that contribute to usage of acute care services by FSW in Nairobi, Kenya, with a particular focus on the need for HIV prevention tools.

## Methods

### Participant recruitment and survey administration

An anonymous questionnaire was administered to Nairobi FSW attending Kenya AIDS Control Project (KACP) clinics during June–July 2019. All women who were currently exchanging sex for money or goods were considered FSW for the purposes of this study. The participants were eligible if they were HIV-negative and over the age of 18. The participants were recruited on a convenience basis equally across the seven clinics. The participation was voluntary, and informed consent was provided and the participants were compensated 300 KSH for their time. The study was part of a quality improvement initiative approved by the Institutional Review Boards at Kenyatta National Hospital (Kenya) and the Universities of Toronto and Manitoba (Canada). Surveys were administered in a one-on-one interview in Kiswahili or English, and responses were recorded by staff administering the survey. HIV testing was performed according to Kenyan national guidelines, with initial screening by antibody-based rapid test Determine HIV1/2 (Inverness Medical, Tokyo, Japan) and confirmation of positive tests using SD Bioline HIV1/2 (Standard Diagnostics Inc., Kyonggi Do, South Korea).

### Measures of intimate partner, client-perpetrated and other violence

An intimate partner was defined as any non-paying sexual partner, such as a husband or boyfriend. A client was defined as a partner who exchanged sex for money, rent, school fees, or other parameters. “Other” perpetrators of violence were defined as anyone other than a client or intimate partner (i.e., police, city askaris, family members). Gender-based violence was defined as any violence perpetrated against the women and manifested through acts of physical, sexual, or emotional violence. The items were structured using a modified version of the World Health Organization Violence Against Women Instrument (VAWI), which assessed experiences of 13 specific acts of physical (six items), sexual (three items), or emotional violence (four items) [17]. An extra item assessing forced sex without a condom was added to the sexual violence section, for a total of 14 items. A “yes” to at least one question in each category constituted an experience of violence, and women were dichotomized accordingly in each violence sub-group (physical, sexual, emotional). The items were asked once for the perpetration of violence by an intimate partner, once for the perpetration of violence by clients, and once for any “other” perpetrations of violence. The VAWI has demonstrated good internal validity (Cronbach's  $\alpha = 0.88$ ) [18].

### Pre-exposure prophylaxis (PrEP) use

PrEP use was operationalized into four categories determined by the following question series. Participants were asked “Have you ever used PrEP?” If no, they were categorized as “never used.” If yes, the participants were asked “Are you currently taking PrEP?” If no, they were categorized as a “past user.” If yes, the participants were asked “How often do you take your PrEP pill?” If participants responded with less than six to seven times per week, they were categorized as a “current sub-optimal user.” If participants responded six to seven times per week they were categorized as a “current optimal user.”

### Depressive symptoms

Current levels of depressive symptoms were assessed using the nine-item self-reported Patient Health Questionnaire-9 (PHQ-9) to assess both diagnostic categories and severity of symptoms [19]. The participants rate the chronicity of symptoms using a four-point scale ranging from 0 (not at all) to 3 (nearly every day). The total scores of all items were summed, and the participants were categorized as meeting criteria for moderate depression (PHQ-9 = 10) or not meeting criteria (PHQ-9 < 10). The PHQ-9 has been utilized widely in both research and clinical settings and possesses strong psychometric properties [20, 21]. Two large-scale validation studies in healthcare settings found excellent internal consistency for the measure (Cronbach’s  $\alpha = 0.86$  to  $0.89$ ) and support for strong test–retest reliability ( $r = 0.84$ ) across a 48-h timeframe [22]. It has been validated among Kenyan HIV/AIDS populations ( $\alpha = 0.78$ ), with acceptable test–retest reliability (ICC =  $0.59$ ) [23].

### Generalized anxiety symptoms

Current levels of anxiety symptoms were similarly measured using the seven-item self-reported Generalized Anxiety Disorder-7 (GAD-7) designed to assess for both presence and severity of symptoms of generalized anxiety disorder [24]. Participants rate the chronicity of symptoms using a four-point scale ranging from 0 (Not at all) to 3 (Nearly every day). Total scores of all items were summed, and the participants were categorized as meeting criteria for moderate generalized anxiety (GAD = 10) or not meeting criteria (GAD < 10). The GAD-7 has demonstrated strong psychometric properties in validation studies including excellent internal consistency (Cronbach’s  $\alpha = 0.92$ ) and strong test–retest reliability ( $r = 0.83$ ). It has been validated among Kenyan HIV/AIDS populations ( $\alpha = 0.82$ ), with acceptable test–retest reliability (ICC =  $0.70$ ) [25].

### Emergency department health care utilization

Survey participants indicated the number of health care visits in the past year. Following this, they indicated if the visits were at an acute care or emergency department (hospital) or primary care site: pharmacy, traditional medicine, clinic, or other. If participants selected “ever” utilizing hospital services, they were classified as “acute care users.” All other participants were classified as “out-patient clinic users.” Of note, to access hospital services in Kenya, the participants must first visit the emergency department [26].

### Statistical analysis

Categorical variables were reported as counts with percentages and analyzed with analysis of variance (ANOVA) or Fisher’s exact test whenever appropriate. Dichotomous variables were reported with percentages. Continuous variables were assessed for normal distribution using a normal probability plot and were reported as mean with standard deviation if normally distributed or median with interquartile range (IQR) if not normally distributed. Continuous variables were compared between groups using Welch’s  $t$  test if normally distributed or Mann–Whitney  $U$  test if not normally distributed. There were no multiple imputations performed.

Two negative binomial logistic regression models evaluated healthcare utilization as an outcome among the two populations. The following a priori covariates (chosen based on clinical relevance and parsimony) were included in the models: [age, years in sex work, marital status, education level, intimate partner violence (emotional, physical, and sexual), client violence (emotional, physical, and sexual), “other” violence (emotional, physical, and sexual), PrEP use, PEP use, depressive symptoms, generalized anxiety symptoms, and recent HIV-positive partner). For data acquisition and analysis, IBM SPSS version 28.0.0.0 (Armonk, New York, USA) and Stata were used.

## Results

### Participant demographics

In total, questionnaires were completed by 217 HIV-negative clinic attendees meeting the study criteria (Table 1).

One hundred one participants were defined as “acute care users,” and 116 were defined as the control population. The mean number of health care visits by acute care users was  $12.7 \pm 8.5$ , which was higher than the  $9.1 \pm 7.0$  visits reported by controls ( $p < 0.05$ ). Among acute care users, 86 (85%) reported any form of intimate partner violence, and 93 (92%) reported any form of client perpetrated violence (Table 1), not statistically different from the control population. Only 64 (64%)

**Table 1** Population demographics

Characteristic	Sub-characteristic	Acute Care Users	Outpatient Care Only Users	P-value
N	-	101	116	-
# healthcare visits 1 yr	-	12.7 (2-38)	9.1 (1-53)	P<0.01
Age	-	32 (19-56)	34 (21-56)	0.15
Age Sex Work Began	-	23 (14-52)	25 (12-43)	0.16
# clients/week	-	11 (2-35)	13 (2-57)	0.13
Level of Education	Primary or less	49 (48.5%)	55 (47.4%)	0.64
	secondary	42 (41.6%)	46 (39.7%)	
	Greater than secondary	10 (9.9%)	15 (12.9%)	
Marital Status	Married	14 (13.9%)	13 (11.2%)	0.55
	single	42 (41.6%)	55 (47.4%)	
	Divorced/ widowed	45 (44.6%)	48 (41.45)	
IPV	No IP	24	29	-
	emotional	52 (67.5%)	56 (48.3%)	0.64
	physical	44 (57.1%)	50 (43.1%)	0.59
	sexual	48 (62.3%)	45 (38.8%)	0.93
Client Perpetrated Violence	emotional	76 (75.2%)	83 (71.6%)	0.56
	physical	50 (49.5 %)	65 (56.0%)	0.37
	sexual	74 (73.3%)	75 (64.7%)	0.16
Other** Violence	emotional	48 (47.5%)	58 (50.0%)	0.57
	physical	39 (38.6%)	47 (40.5%)	0.61
	sexual	26 (25.7%)	23 (19.8%)	0.37
PHQ9score	<9 (mild)	41 (40.6%)	53 (45.7%)	0.37
	10-14 (moderate)	36 (35.6%)	40 (34.5%)	
	15+ (severe)	24 (23.8%)	23 (19.85)	
GAD7	mild	51 (50.5%)	61 (52.6%)	0.94
	mod	35 (34.7 %)	37 (31.9%)	
	severe	15 (14.9%)	18 (15.5%)	
PreP use	Current optimal	49 (48.5%)	57 (49.1%)	0.03
	Poor use, non use	52 (51.5%)	59 (50.9%)	
Birth control	Condoms only	55 (54.5%)	49 (42.2%)	0.18
	OCP	11 (10.9%)	12 (10.3%)	
	depo/IUD	35 (34.7%)	55 (47.4%)	
Physician trust	low	16 (15.8%)	12 (10.3%)	0.12
	ambiguous	21 (20.8%)	19 (16.4%)	
	high	64 (63.4%)	85 (73.3%)	
Self-rated health status	good	39 (38.6%)	61 (52.6%)	0.01
	ambiguous	36 (35.6%)	37 (31.9%)	
	poor	26 (25.7%)	18 (15.5%)	
Substance Use	alcohol	69 (68.3%)	80 (69%)	0.54
	other	45 (44.6%)	44 (37.9%)	0.31
Pep Use	-	52 (51.5%)	57 (49.1%)	0.77
Lube Use	-	66 (65.3%)	81 (69.8%)	0.43
HIV test within 3 months	-	89 (88.1%)	112 (96.6%)	0.05
Condom use with 100% of clients	-	76 (75.2%)	88 (75.9%)	0.78
Previously treated STI	-	67 (66.3%)	73 (62.9%)	0.54
HIV+ Client in prior 6 Months	-	66 (65.3%)	51 (44%)	0.03

Continuous variables are reported as median (interquartile range) unless otherwise specified

PHQ9 Patient Health Questionnaire-9, GAD7 Generalized Anxiety Disorder-7, PrEP pre-exposure prophylaxis, \*\*Other is defined as any other perpetrator of abuse other than an IP or client, most frequently documented as Law-Enforcement

of acute care users reported high physician trust. The average PHQ9 and GAD 7 scores for acute care users were  $11.5 \pm 5.2$  and  $9.2 \pm 4.5$ , respectively. Finally, 49 (48.5%) and 57 (49.1%) of acute care users and control users, respectively, were currently taking PrEP as prescribed.

**Violence**

Violence was commonly reported, although the prevalence of all forms of violence did not differ between acute care users and the control population. Multivariate analysis (Table 2) indicated that client perpetrated physical violence was associated with a decrease in health care visits among acute care users (OR 0.65 [0.51–0.82],  $p < 0.01$ ). Increases in health care visits corresponded with having experienced client perpetrated sexual violence among acute care users (OR 2.2 [1.64–2.94],  $p < 0.01$ ). IPV was found to have no association with the number of health care visits (Table 2). Neither of these variables was associated with the

number of health care visits in the control population (Table 3).

**Anxiety and depression scores**

There was no difference in GAD7 and PHQ9 scores between acute care users and control participants, and depression did not correlate with health care utilization in either cohort. High levels of anxiety were associated with decreased health care visits among acute care users (low anxiety OR 1.61 (1.18–2.20),  $p < 0.01$ ). The relationship was not replicated in the control population (0.92 (0.66–1.28),  $p = 0.91$ ).

**Sex practices**

Sexual and health care practices (e.g., lubricant use, HIV testing, PEP use, contraception) did not differ significantly between the control group and group of interest. High PrEP risk (defined as lack of or poor PrEP adherence) was found to be correlated with decreased health

**Table 2** Factors associated with increase healthcare use among FSW who utilized emergency departments

Parameter	Sub-group	OR	CI	P value
Marital status	Divorced/widowed	1	-	-
	Single	0.80	0.64–0.98	0.05
	Married	0.56	0.41–0.77	< 0.01
Education	Post secondary (ref)	1	-	-
	Secondary	0.83	0.57–1.20	0.33
	Primary or less	0.66	0.45–0.94	0.03
Prep risk	High (ref)	1	-	-
	Low	1.54	1.25–1.91	< 0.01
Client physical violence	No (ref)	1	-	-
	Yes	0.65	0.51–0.82	< 0.01
Client sexual violence	No (ref)	1	-	-
	Yes	2.2	1.64–2.94	< 0.01
Other physical violence	No (ref)	1	-	-
	Yes	1.39	1.10–1.75	< 0.01
Physician trust	High (ref)	1	-	-
	Ambiguous	0.96	0.73–1.25	0.75
	Low	1.33	1.06–1.76	0.05
GAD7	High (ref)	1	-	-
	Mod	1.36	1.00–1.85	0.05
	Low	1.61	1.18–2.20	< 0.01
HIV pos partner	No (ref)	1	-	-
	Yes	1.35	1.02–1.69	< 0.01
PEP use	No (ref)	1	-	-
	Yes	0.77	0.62–0.95	0.014
Age		1.13	0.99–1.028	0.06
IP sexual violence		No impact		

Negative log binominal analysis assessing how FSW-specific characteristics influence health care utilization among those who endorsed seeking healthcare at both ED's and outpatient clinics

**Table 3** Factors associated with increase healthcare use among FSW who utilized outpatient clinics

Parameter	Sub-group	OR	CI	P value
Marital status	Divorced/widowed	1	-	-
	Single	1.24	0.95–1.62	0.12
	Married	0.91	0.61–1.62	0.64
Education	Post-secondary (ref)	1	-	-
	Secondary	0.69	0.47–1.00	0.05
	Primary or less	0.75	0.51–1.11	0.15
Prep risk	High (ref)	1	-	-
	Low	1.76	1.40–2.22	< 0.01
Client physical violence	No (ref)	1	-	-
	Yes	0.93	0.69–1.24	0.41
Client sexual violence	No (ref)	1	-	-
	Yes	1.15	0.82–1.62	0.41
Other physical violence	No (ref)	1	-	-
	Yes	1.01	0.70–1.45	0.95
Physician trust	High (ref)	1	-	-
	Ambig	0.92	0.65–1.32	0.65
	Low	0.72	0.49–1.07	0.10
GAD7	High (ref)	1	-	-
	Mod	1.24	0.87–1.76	0.24
	Low	0.92	0.66–1.28	0.91
HIV pos partner	No (ref)	1	-	-
	Yes	1.01	0.79–1.29	0.92
PEP use	No (ref)	0.85	0.66–1.10	0.21
	Yes	1.02	1.00–1.03	0.06
Age	18–24	1.02	1.00–1.03	0.06
	25–34	1.02	1.00–1.03	0.06
	35–44	1.02	1.00–1.03	0.06
IP sexual violence	No violence	1	-	-
	Violence	0.67	0.48–0.94	0.019
	No partner	0.79	0.56–1.12	0.18

Negative log binominal analysis assessing how FSW-specific characteristics influence health care utilization among those who endorsed seeking healthcare only at outpatient clinics

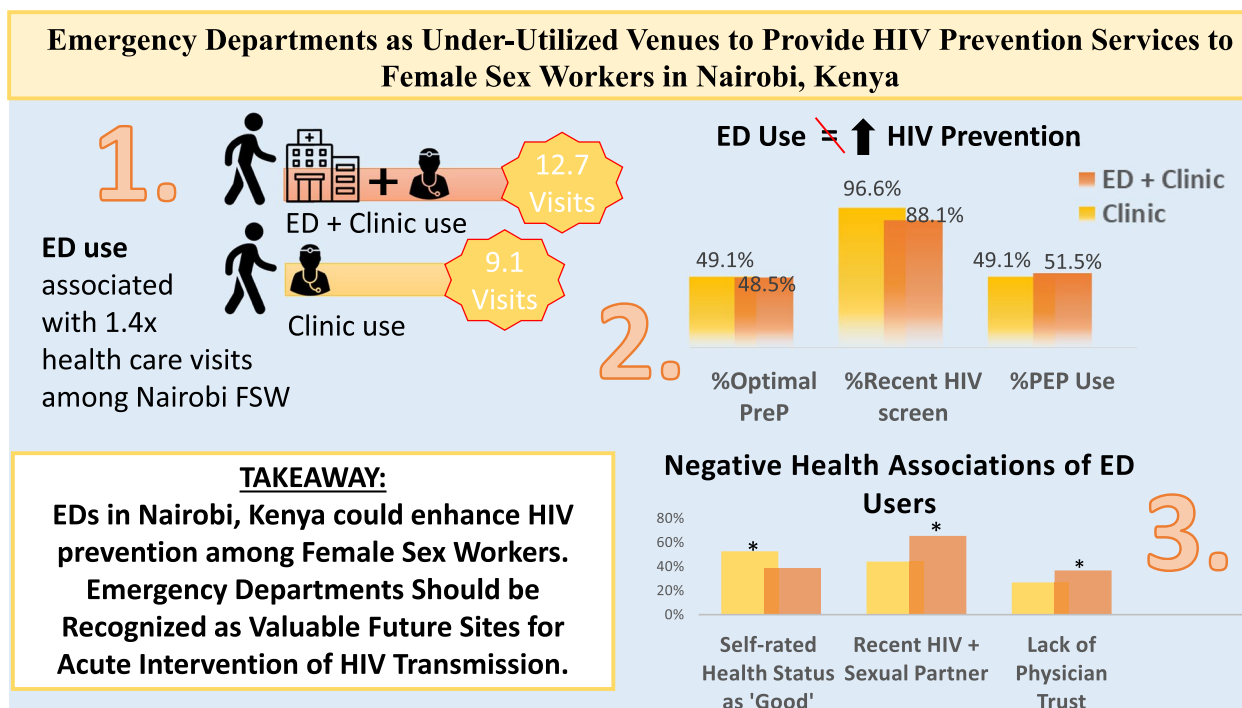
care utilization in both acute and control populations. Individuals with lower PrEP risk (proper PrEP use and adherence) were more likely to seek out care (acute use OR = 1.54 (1.25–1.91),  $p < 0.01$ , control cohort OR = 1.76 (1.40–2.22),  $p < 0.01$ ). Having an HIV-positive partner in the past 6 months was correlated with increased acute care utilization (OR = 1.35 (1.02–1.69),  $p < 0.01$ ), but not clinic use by the control population.

### Discussion

There are currently disproportionately high rates of HIV incidence and prevalence among FSW in sub-Saharan Africa. Interestingly, little research has been done to characterize how ED in these countries may be utilized to support HIV prevention in FSW populations. Our goal was to investigate the relationship between emergency department utilization and FSW characteristics. We found that despite the use of greater services over

a 1-year period, FSW’s who utilized both emergency departments and clinics as opposed to outpatient clinics alone reported no improvements in HIV prevention tools usage, such as PEP and PrEP uptake (Fig. 1). Moreover, the FSW population who utilize emergency departments reported lower HIV testing rates, lower-self reported health status, and greater exposure to HIV-positive partners than clinic users. These findings suggest the need for optimizing emergency departments as HIV intervention sites for FSW, as can be used to inform policy aiming to utilize these settings for HIV prevention strategies.

Despite ongoing education and improved access, the proportion of our study participants who engaged in safe sex practices was lower than anticipated. Roughly half of participants reported no or inappropriate PrEP usage. Poor PrEP use was associated with decreased healthcare utilization in both the acute care population and outpatient clinic population, suggesting FSW are unmotivated



**Fig. 1** ED use facilitates HCP interactions with FSW, no improvement in HIV prevention. Legend: *HCP* healthcare provider, *FSW* female sex worker, *ED* emergency department. “ED + Clinic” defined as FSW whom accessed health care through emergency departments and outpatient sex worker-specific clinics. “Clinic” represented FSW who utilized only clinics when accessing care

to seek care when exposures occur [27]. Additionally, the results of our study demonstrate that acute care users engaged in more health care visits over the period of study, but did not report improved access to contraception or HIV prevention tools. We know the opposite to be true in locations such as North America and Europe, where ED used by marginalized populations increases uptake of HIV prevention tools [28, 29]. This data suggests emergency departments in Kenya are not effectively addressing FSW-specific health care needs when this population uses these services. Emergency departments should be aware that a low percentage of sex workers is taking PrEP effectively or accessing other HIV prevention services, as to utilize emergency department encounters as educational opportunities. While our study was limited to HIV seronegative individuals, the results are supportive of the ED as a unique venue for increased HIV testing, PrEP access, and education.

The associations between sex work and gender-based violence have been well documented [30, 31]. Our study found that client-perpetrated sexual violence was associated with increased healthcare utilization; however, client perpetrated physical violence was associated with decreased health care usage among acute care users. Given that sexual assault is not a sex worker-specific occurrence among Kenyan women, it is reasonable to

infer that FSW use these services without needing to disclose the nature of their work. However, the criminalization of sex work in Kenya creates an environment in which violence is tolerated, making physical violence by a client much more complicated to report [32]. Reasons for lack of reporting include fear of punishment and lack of guaranteed safety after reporting, shame, financial barriers, lack of access to services, and distrust of healthcare workers [30, 33, 34]. Following, lack of reporting directly impacts HIV transmission, with FSW being over seven times more likely to contract HIV in a country where sex work is illegal [32]. There are excellent examples of how emergency departments have begun to integrate violence care guidelines into their practice which have led to improved provider comfort in delivery of care and patient satisfaction [35–38]. However, so far, these guidelines only address gender-based violence among the general population and thus fail to address sex worker-specific needs. Specific interventions taking into consideration the needs of local populations must be implemented among sub-Saharan FSW populations to directly combat HIV acquisition amongst this cohort.

Further, our study found that high levels of anxiety were associated with decreased acute healthcare utilization but not decreased clinic service utilization. A likely

contributor to this decrease is due to the experienced or anticipated stigma from health care workers, as opposed to the dedicated FSW clinics designed for use by these populations. Discrimination and perceived stigma from health care workers catalyze avoidance of medical services among FSW, subsequently depriving them of access to health services [8, 32, 34]. This is counterproductive towards government efforts to reduce HIV rates, as the emergency department could serve as an excellent touch point in providing HIV preventative care in these patients. As emergency medicine care in Kenya expands, efforts can be made to shift Kenyans' negative attitudes towards sex workers through anti-discrimination policies and sensitivity-based training [11, 39–41].

Although our study contributes important findings to the limited existing literature on emergency department utilization among FSW, several limitations exist. A major limitation to our study is that we do not have access to information about individual health care visits and are operating under assumptions that many of the visits are due to FSW specific needs. Further, questionnaires were only administered to FSW attending KACP clinics, and data could only be assessed from those attendees who agreed to participate. Therefore, based on the limits of convenience sampling, it remains unknown to what extent the results apply to FSW not in care, who accessed other services, or who declined the questionnaire. In addition, the use of a facility-based convenience sample may have led to our study having an enriched enrolment of FSW taking PrEP or FSW more engaged in health care. Further, our study is cross-sectional in design, and so, the direction of causation cannot be defined for the associations that we describe. Finally, reporting bias (overreporting of PrEP and/or underreporting of violence) may have skewed associations. Our results may have been confounded by other unmeasured factors, such as adverse childhood experiences, violence predating the 12-month time frame, indirect cost of accessing services, or other non-measured reasons for non-adherence to PrEP such as fear of side effects. Nonetheless, our results have clear implications for quality improvement within the ED and merit broader consideration within FSW clinics elsewhere.

## Conclusions

Across North America and Europe, the role of emergency medicine in the prevention of HIV among vulnerable populations has been long established [14]. In contrast, there are only limited reports of programs focusing on HIV prevention among vulnerable FSW populations in the ED in low-resource countries such

as Kenya [14, 15]. In an effort to better understand this population and their use of emergency departments, our study demonstrates that ED utilization among FSW is not successfully increasing access to HIV prevention with the same success as North American and European EDs. The results of this study should be used to guide policy design, health care provider training, and facility preparedness to support improved relationships between FSW and ED visits in attempts to curb HIV transmission.

## Outcomes and impact

- (1) Educate clinicians on sex worker characteristics and the vulnerability factors clinicians must consider.
- (2) Advance a research and culturally competent clinical training agenda that can optimize health care engagement and utilization within the sex work community.

## Abbreviations

FSW	Female sex workers
GAD7	Generalized Anxiety Disorder-7
IPV	Intimate partner violence
KACP	Kenya Aids Control Project
PHQ9	Patient Health Questionnaire-9
PrEP	Pre-exposure prophylaxis
VAWI	Violence Against Women Instrument

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Not applicable.

## Authors' contributions

AP, ML, MM, AK, RK and JK designed and conceived the study. ML and MM collected the data. AP analyzed and interpreted the patient data. AP and ML wrote and edited the manuscript. All authors read and approved the final manuscript.

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## Availability of data and materials

The datasets generated and/or analyzed during the current study are not publicly available due patient privacy reasons but are available from the corresponding author on reasonable request.

## Declarations

### Ethics approval and consent to participate

The study was part of a quality improvement initiative approved by the Institutional Review Boards at Kenyatta National Hospital (Kenya) and the Universities of Toronto and Manitoba (Canada). Written informed consent was obtained from all participants and from a parent and/or legal guardian.



The authors certify that the study was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

#### Consent for publication

Not applicable.

#### Competing interests

The authors declare no competing interests.

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