

# PrEP acceptability and initiation among women engaged in sex work in Uganda: Implications for HIV prevention

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## Summary

**Background** Women engaged in sex work (WESW) are disproportionately affected by HIV. In Uganda, HIV prevalence among WESW is estimated at 37%, accounting for 18% of all new infections in the country. WESW experience poverty, gender-based violence, and other issues that reduce their power and limit their ability to negotiate condom use. Female-controlled strategies, including pre-exposure prophylaxis (PrEP), may afford women more transmission protection, but barriers to access and use persist. This cross-sectional study examined baseline PrEP acceptability and initiation among WESW recently enrolled in a randomized clinical trial in Uganda to test the impact of a combination HIV risk reduction and economic empowerment intervention on sexual risk outcomes (clinicaltrials.gov, NCT03583541).

**Methods** A total of 542 WESW from 19 high HIV-prevalent geographical areas were enrolled in the Kyatereka study between June 2019 and March 2020. Women were eligible for the study if they: (1) were age 18 or over; (2) reported engagement in transactional sex (a sex act in exchange for pay) in the past 30 days; and (3) reported engagement in one or more episodes of unprotected sex in the past 30 days. Women completed a baseline assessment, were tested for HIV and other sexually transmitted infections (STIs) at enrollment, and were connected with antiretroviral therapy (ART), STI treatment, or PrEP, based on need and interest. Descriptive statistics examined baseline data on PrEP acceptability and initiation. Independent variables (i.e. years in sex work, recent sexual coercion, perceived HIV and sex work stigmas, harmful alcohol use, barriers to medical care, and social support) were derived from the empirical literature and women's self-report. Bivariate analysis was performed to test associations between main effects of these variables. Using binomial logistic regression, predictive models were evaluated for two distinct outcomes—PrEP acceptability and PrEP initiation/uptake.

**Findings** At baseline, 59% of women ( $n = 322$ ) tested HIV negative. Among WESW testing negative, 11% ( $n = 36$ ) were already PrEP enrolled. Most women reported willingness to use PrEP ( $n = 317$ ; 91%). Slightly over half of WESW not already on PrEP agreed to initiate PrEP ( $n = 158$ ; 55%). Logistic regression models demonstrate that acceptability of or willingness to use PrEP was significantly associated with fewer years engaged in sex work (AOR= 0.18, 95% CI 0.05–0.66,  $p < .01$ ) and greater perceived social support from family (AOR= 1.39, 95% CI 1.03–1.88,  $p < .05$ ). PrEP initiation was negatively associated with greater perceived social support from friends (AOR= 0.81, 95% CI 0.68–0.97,  $p < .05$ ) and positively associated with higher perceived stigma due to sex work among family members (AOR= 2.20, 95% CI 1.15–4.22,  $p < .05$ ).

**Interpretation** Despite endorsing PrEP use, many WESW remain reluctant to use it. This gap in prevention practice highlights the heart of a failing PrEP prevention cascade. Findings point to the important role family and friend support may play in destigmatizing sex work and PrEP use for women. Social and structural-level efforts are needed to

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improve educational messaging and to integrate positive messaging into health promotion campaigns for women and their families, while also working toward decriminalizing sex work.

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**Keywords:** Sex work; FSW; Pre-exposure prophylaxis; PrEP; Stigma

### Research in context

#### *Evidence before this study*

We searched PubMed on April 10, 2021 for empirical studies with the terms “PrEP,” “female sex workers,” or “FSW” and “Uganda” or “sub-Saharan Africa” for the past 5 years. Previous research in the region shows a growing number of studies with findings demonstrating that PrEP acceptability and uptake among women engaged in sex work remains limited. Among extant studies, findings indicate that the major barriers to PrEP uptake include HIV stigma, access, and the need for daily regimen. Facilitators include easy access to PrEP and improved feeling of self-worth. Yet, few studies examine factors impeding uptake among large samples of women currently engaged in sex work in regional HIV hot spots.

#### *Added value of this study*

Even among women with relative access to PrEP via clinical trial supports, and who find the idea of its use acceptable, findings from our study show that stigma related to sex work – arguably a community or structural-level factor – remains a persistent barrier to PrEP uptake among women engaged in sex work.

#### *Implications of all the available evidence*

The PrEP prevention cascade requires increased PrEP initiation to succeed. Efforts to increase uptake among women engaged in sex work in this region require strategies for reducing family and community stigma associated with sex work and for promoting access to PrEP in ways which may de-stigmatize women’s identities as sex workers.

## Introduction

Globally, key populations, including women engaged in sex work (WESW), disproportionately carry the burden of HIV prevalence. The term WESW here uses person first language to describe women engaged in sex work as opposed to the more currently conventional “FSW” for female sex worker. WESW have a relative risk of HIV acquisition 21 times higher compared to the

general population.<sup>1</sup> Similarly, while HIV prevalence among adults in Uganda aged 15–49 years is estimated at 5.6% in 2019, similar to other sub-Saharan African (SSA) countries with high HIV burden, Uganda reports high rates of HIV prevalence among WESW, estimated at 37% and accounting for 18% of all new infections in the country.<sup>2</sup> While there is concern regarding this highly-mobile population, given prevalence rates 30% higher than other residents of the same communities, existing literature does not support the perception that WESW increase transmission to the general population.<sup>3</sup> Concern persists, however, for the care and treatment of HIV positive WESW, and for prevention access to those who remain HIV-negative.

Individual and structural level barriers impede HIV prevention for WESW. At the individual level, severe marginalization associated with poverty, gender based violence, high transience, alcohol or substance use, and other issues that reduce power and limit ability to negotiate condom use are major barriers to women’s access to prevention.<sup>4</sup> At the structural level, cultural and economic inequities, stigma and government policies criminalizing sex work, and lack of access to medical services, including HIV prevention services and treatment options, further increase susceptibility to HIV infection.<sup>5</sup>

Female-controlled HIV risk reduction strategies, including PrEP, may afford women more protection, but barriers to access and use persist. PrEP is a highly effective biomedical prevention method that is recommended by the World Health Organization (WHO) for those at high risk, including WESW.<sup>6</sup> In SSA, oral PrEP was first introduced in South Africa in 2016 and has been integrated into combination HIV prevention programs.<sup>7</sup> Since the 2017 national rollout of oral PrEP by the Uganda Ministry of Health, the program has expanded rapidly to initiate 30,000 persons on PrEP by 2020 at 142 out of 1860 health care facilities providing HIV care services.<sup>8</sup> Subsequent cost-effectiveness studies have recommended PrEP be incorporated into combination interventions targeting WESW in SSA, emphasizing cost at scale.<sup>9</sup>

A global systematic review of the PrEP care continuum among women who sell sex and/or use drugs found high PrEP acceptability among WESW.<sup>10</sup> In a recent study in Uganda, Muwonge et al.<sup>8</sup> found that

among 56 WESW, 86% indicated willingness to take PrEP if offered and reported common barriers to include stigma, transportation, accessibility, and pill burden. In Kenya, while 21 WESW interviewed had little knowledge of PrEP, most reported willingness to take it.<sup>11</sup> Stigma, adherence difficulty, and side effects were noted as barriers to use.

In their systematic review, Glick et al.<sup>10</sup> also describe the limited studies of PrEP initiation and the varied levels of uptake, with most remaining low. For instance, in urban South Africa, Eakle et al.<sup>12</sup> found that 98% (224/241) of WESW who were HIV negative agreed to initiate PrEP, although only 22% remained on PrEP at 12-month follow up. In Senegal, Sarr et al.<sup>13</sup> found that among 324 WESW, 82% of eligible participants chose to take PrEP. In contrast, Busza et al.<sup>14</sup> reported that uptake ranged from 12% to 42% among WESW in Zimbabwe. Yet, these studies have relatively small sample sizes and many relied solely on self-report.

Consistent with other forms of HIV prevention, barriers to PrEP use among women appear to occur at individual and structural levels. Bazzi et al.,<sup>15</sup> in a study among WESW in Kenya, found that both substance abuse and violence may hinder the uptake and consistency of PrEP use. The use of alcohol before and during sex work acts as a barrier to PrEP use.<sup>8</sup> Eakle et al.<sup>12</sup> study monitoring PrEP use among HIV negative women in South Africa showed that fear of confusing PrEP with ART was a barrier and that there was a high decline in use over time. Fearon et al.<sup>16</sup> found that women who were younger and/or newer to the sex work profession and using alcohol 2–3 times per week were less likely to adhere to PrEP use. On the other hand, the older women got, the more likely they were to adhere to PrEP use. Sarr et al.<sup>13</sup> also found that older age was associated with longer continuation and adherence. Other inhibitors of PrEP use among WESW include criminalization and subsequent stigma.<sup>7,8,17,18</sup> There is strong evidence demonstrating that the criminalization of sex work greatly enhances sex work stigma, which reduces HIV prevention among WESW.<sup>19</sup> PrEP stigma also stems from the fact that it requires daily pill intake, very similar to HIV treatment.<sup>7,18</sup>

Facilitators of PrEP use among WESW included a sense of self-worth,<sup>15,18</sup> “less stigma,” proximity to home, and privacy and free services.<sup>8</sup> Others saw use of PrEP as an act of self-love<sup>11</sup> or a way to get protection beyond using condoms due to challenges such as partners refusing to use condoms, having partners with unknown HIV status, having multiple partners, involvement in sex work, or having a partner living with HIV.<sup>7</sup>

Like the HIV treatment cascade, the “cascade of prevention” approach suggests a strong need for increasing oral PrEP uptake, particularly among those at highest risk for HIV, to reduce transmission over time.<sup>20</sup> Where there is high HIV prevalence, added efforts to offer and sustain PrEP use are critical to slowing and preventing

HIV transmission. However, women themselves must have autonomy to make such decisions, leaving researchers and practitioners, in collaboration with consumers, to identify and address pervasive barriers until they are reduced.

To further address this gap, this study examined interpersonal and structural barriers and facilitators to PrEP acceptability and uptake among WESW in HIV hot spots in southwestern Uganda who recently enrolled in a randomized clinical trial (RCT) to test the impact of a combination HIV risk reduction and economic empowerment intervention on risk reduction outcomes.

## Methods

### Study design and participants

The study is based on baseline data of an ongoing RCT in the Greater Masaka region of Uganda. The trial is evaluating the efficacy of a combination intervention adding microfinance components to traditional HIV risk reduction (HIVRR) on reducing new incidence of STIs among 542 WESW across 19 different geographical hotspots in the region (clinicaltrials.gov, NCT03583541).<sup>21</sup> In the original study design, women were randomized into three distinct intervention conditions: (1) HIVRR only as a control group, (2) HIVRR plus Savings plus Financial Literacy (HIVRR + S + FL) treatment group; and (3) HIVRR plus S plus FL plus Vocational Skills Training and Mentorship (V) (HIVRR + S + FL + V). Due to COVID-19 restrictions, the trial combined HIVRR plus Savings plus Financial Literacy with HIVRR plus Savings plus Financial Literacy plus Vocational Skills training into a single group, leaving two randomized conditions. This issue, however, is not relevant to this cross-sectional sub study. The current study examined factors influencing PrEP use and attitudes at the baseline among enrolled WESW. This study follows the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.

Between June 2019 and March 2020, 542 women were enrolled in the trial. Recruitment strategies were informed by previous pilot studies in Mongolia and Uganda led by the investigative team.<sup>21,22</sup> Women were eligible to participate if they met the following criteria: (1) age 18 or over; (2) reported engagement in transactional sex (defined as a sex act in exchange for pay) in the past 30 days; and (3) reported engagement in one or more episodes of unprotected sex in the past 30 days. After completing written, informed consent (in English and/or Luganda), blood and vaginal swab samples for gonorrhoea, chlamydia, trichomonas, and HIV were collected from all participants who were also connected with antiretroviral therapy, STI treatment, or PrEP, based on need and interest. Local health collaborators

conducted all support associated with testing (i.e. counseling, patient notification, referral to treatment, outreach).<sup>23</sup>

Women completed an interviewer-administered survey lasting approximately 90 min in a private space upon enrollment. All consent forms and related study materials have been translated into Luganda by a certified translator from the School of Languages, Literature and Communication at Makerere University, then reviewed by research staff proficient in Luganda, and subsequently back translated. Women were compensated for each assessment. In order to ensure that compensation was “fair” and consistent with human subjects regulations, we determined compensation based on other studies in the region, and with input from our Community Collaborative Board, to ensure that it was neither coercive (too high) nor exploitive (missing or too low). We do not believe that compensation necessarily increased social desirability in the study.

### Procedures

Baseline data captured biological HIV and STI testing outcomes, sociodemographics, and self-report measures examining women’s willingness to use PrEP, PrEP use, reasons for not doing so, experience of sexual coercion, perceived stigma (related to HIV and sex work), alcohol use, and access to medical care and social support. The team facilitated PrEP initiation at the time of baseline assessment and during HIVRR sessions. Acceptability of PrEP was assessed by asking, “If PrEP were safe, effective, and free, how likely would you be willing to use it?”.<sup>24</sup> Recent sexual coercion was measured dichotomously (presence or absence) and taken from the Revised Conflict Tactics Scale, asking, “In the past 90 days, has anyone ever insisted you have sex even though you did not want to?”.<sup>25</sup> An adaptation of the Sex Worker Stigma Index assessed perceptions of sex work stigma, e.g., community stigma, by the extent of agreement with the statement, “I feel that if I disclosed being a sex worker to some people, they would treat me differently,” and family stigma, by the extent of agreement with the statement, “I feel that if I disclosed being a sex worker to my family, they would treat me differently”.<sup>26</sup> HIV stigma was measured using a question from the HIV Stigma Scale, e.g., the extent of agreement with the statement, “People who have HIV/AIDS should be treated the same as everyone else.”.<sup>27</sup> Harmful alcohol use was measured dichotomously regarding whether or not the participant scored an 8 or higher on the Alcohol Use Disorder Identification Test (AUDIT).<sup>28</sup> Access to medical care was measured dichotomously by asking women’s agreement with the statement, “I am able to get medical care whenever I need it” Kalichman et al.<sup>29</sup> Social support was measured using the Multidimensional Scale of Perceived Social Support (MSPSS), a 12-item questionnaire to identify

an individual’s perceived level of social support with family, friends, and significant others.<sup>30</sup>

### Data analysis

To characterize the sample and independent and outcome variables of interest, we ran univariate, descriptive statistics, including means and standard deviations for continuous variables, and percentages for categorical variables. Where distributions were non-normal, we also included medians. There was negligible missing data determined to be missing at random, requiring no special handling. Reliability tests were conducted to ensure a Cronbach alpha threshold for reliability ( $\alpha > 0.700$ ) was met for all validated scales (AUDIT, Barriers to Care scale) and sub-scales including the MSPSS (Family and Friends domains), HIV Stigma Scale (Discrimination domain), and Sex Worker Index (Family and Community domains). Composite scores for barriers to care, HIV discrimination, and social support domains were used in predictive models. We used logistic regression for predictive models, which do not require the assumption of normality. Bivariate analysis using Pearson’s Chi-Square tests was performed to test associations between independent variables and outcomes of interest. Binomial logistic regression was used to determine the relationship between PrEP acceptability (women’s perceptions) and PrEP uptake (women’s initiation of PrEP) and independent variables of interest, after adjusting for age and education. We did not elect to include an ethnicity variable, as while participants may be from a variety of linguistic or tribal groups, these data were not collected, as they are not a typical variable in HIV prevention studies in the region. It was determined that there were no significant interaction effects among respective stigma predictors (HIV Discrimination, Sex Worker Stigma) or between the independent variable PrEP willingness and these same stigma predictors. IBM Statistical Package for the Social Sciences (SPSS) version 28 was used to conduct these analyses.

### Ethical approval

All study procedures were approved by the Washington University in St. Louis Institutional Review Board (#201,811,106), Columbia University Institutional Review Board (AAAR9804), and the in-country local IRBs in Uganda: Uganda Virus Research Institute (UVRI) Research Ethics Committee (GC/127/18/10/690) and the Uganda National Council of Science and Technology (UNCST –SS4828). Informed voluntary written consent was obtained from all study participants prior to participation.

### Role of the funding source

The funders of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report.

## Results

A total of 909 women completed screenings, of which 347 did not meet eligibility criteria, 18 did not have identification, and 2 declined participation in the study. Sample characteristics and baseline values of study variables are summarized in Table 1. The average age was 31.4 years. Of the total sample ( $N = 542$ ), 41% of participants tested HIV positive ( $n = 220$ ) and 59% of women ( $n = 322$ ) were HIV negative. The great majority of women reported willingness (acceptability) to use PrEP ( $n = 317$ ; 91%). Among women testing HIV negative, 11% ( $n = 36$ ) reported that they were already using PrEP. Therefore, we limited the analytic sample to women who tested HIV negative and were not already using PrEP. Of the WESW not already on PrEP ( $n = 286$ ), slightly more than half agreed to initiate PrEP ( $n = 158$ ; 55%) at baseline, while the remaining women declined PrEP initiation ( $n = 128$ , 45%). The three top self-reported reasons for declining initiation

were: inability to adhere to daily medication ( $n = 52$ , 16.4%), fear of the drug or concerns about side effects ( $n = 16$ , 5%), and fear of stigma associated with HIV-positive status ( $n = 12$ ; 3.8%). When asked from whom and where they would like to get more information about PrEP, most women preferred to receive information from physicians ( $n = 314$ ; 90%). They preferred to obtain PrEP through venues that are convenient ( $n = 258$ ; 91.2%) and offer higher quality care ( $n = 234$ ; 82.7%) and greater privacy protection ( $n = 249$ ; 88%).

Table 2 shows results of the logistic regression model examining selected independent variables on PrEP acceptability. Findings show that PrEP acceptability was significantly negatively associated with having engaged in sex work for more than 5 years (AOR = .18, 95% CI 0.05–0.66,  $p < .01$ ) and positively associated with greater perceived social support from family (AOR = 1.39, 95% CI 1.03–1.82,  $p < .05$ ). Other factors

Variable	HIV Negative $n = 283$		Total Sample $N = 542$	
	% or Mean (SD)	Median	% or Mean (SD)	Median
<b>Individual level factors</b>				
HIV status (negative)	100		59.4	
Mean Age (Min/Max: 18–55)	29.6		31.4	
<b>Marital Status</b>				
Married/ In a relationship	29.3 (83)	–	25.6 (139)	–
Single, divorced, separated, widowed	70.7 (200)	–	74.4 (403)	–
No. of children in household (Min/Max: 0–10)	1.88 (1.56)	3.00	1.83 (1.67)	3.00
<b>Level of education</b>				
Did not go to school	2.5	–	7.6	–
Some primary school education or lower	51.6	–	55.9	–
Some high school education or higher	45.9	–	36.5	–
<b>Household Income in Ugandan Shillings</b>				
Total Household Income (UGX)	330,710.3 (325,476.6)	305,000.0	329,405.9 (329,577.6)	280,000.0
Individual monthly income earned	224,773.9 (238,584.6)	220,000.0	223,319.2 (230,144.0)	210,000.0
Individual monthly income earned in sex work	194,710.3 (196,460.7)	130,000.0	203,088.6 (204,474.7)	180,000.0
<b>Interpersonal Factors</b>				
Years in Sex Work (5 or more)	50.9		58.9	
Recent Sexual Coercion	54.8		53.9	
Social Support (family) (Min/Max: 0–4)	2.79 (1.45)	2.00	2.76 (1.50)	2.00
Social Support (friends) (Min/Max: 0–4)	2.77 (1.47)	2.00	2.66 (1.53)	3.00
Social Support (sig other) (Min/Max: 0–4)	3.01 (1.38)	2.00	2.97 (1.38)	2.00
Harmful alcohol use (AUDIT score =>8)	26.9		29.7	
<b>Structural factors</b>				
HIV stigma (high)	47.3		49.1	
Sex work stigma-Community (high)	55.5		56.1	
Sex work stigma- Family (high)	49.8		48.5	
Barriers to Medical Care (Min/Max:0–10)	3.92 (2.67)	4.00	3.82 (2.58)	3.25
<b>Outcome Variables</b>				
PrEP acceptability (positive endorsement)	88.7		81.1	
PrEP Initiation (positive endorsement)	55.1		29.2	

Table 1: Sample demographics.

Variable	Adjusted Odds Ratio	Confidence Interval [95%]	P-value
<b>Covariates</b>			
Age [Mean 29.73]	.99	[-.91–1.08]	.77
Level of Education [ref: Primary education or lower]	.89	[.33–2.42]	.82
<b>Risk Factors</b>			
Years engaged in sex work [ref: Less than 5yrs]	.18	[-.05–0.66]	.01**
Experienced of sexual coercion [ref: yes]	1.34	[-.50–3.57]	.56
Harmful alcohol use [ref: No]	.42	[.11–1.57]	.19
<b>Perceived Barriers to PrEP Acceptability</b>			
HIV-related Discrimination [ref: low]	.54	[.19–1.49]	.23
<u>Community Stigma[ref: low]</u>			
Moderate community stigma related to sex work	1.00	[-.19–5.36]	.99
High community stigma related to sex work	.44	[.13–1.47]	.18
<u>Family Stigma[ref: low]</u>			
Medium degree of family stigma related to sex work	.40	[.09–1.79]	.23
High family stigma related to sex work	3.74	[.71–19.79]	.12
Barriers to medical care	.96	[.80–1.16]	.69
<b>Protective Factors</b>			
Social Support from Family [ref: low]	1.39	[1.03 –1.88]	.03*

**Table 2: Adjusted Logistic Regression of Factors Influencing the Likelihood of PrEP Acceptability Among Vulnerable Women in Masaka region, Uganda [n = 273<sup>3</sup>].**

\*p ≤ .05; \*\*p ≤ .01.

<sup>3</sup>Sample size represents all women testing negative at baseline (N = 286) minus 13 women who reported either “do not know” to the PrEP acceptability question at the time of the assessment.

in the model were not significantly associated with acceptability.

Table 3 shows results of the logistic model examining selected independent variables on PrEP initiation. Findings show that PrEP initiation was negatively associated with greater perceived social support from friends (AOR=.81, 95% CI .67–0.97, p<.05) and positively associated with higher perceived sex work stigma among family members (AOR= 2.20, 95% CI 1.15–4.22, p<.05). No other predictors were significantly associated with PrEP initiation.

### Discussion

This study examined PrEP acceptability and initiation among HIV negative WESW enrolled in a clinical trial conducted in HIV hotspots in Uganda where HIV prevalence remains among the highest in the world. Three main factors, namely years in sex work, stigma associated with sex work, and levels of social support, were found to be significantly associated with PrEP acceptability and initiation.

We found that higher perceived social support from one’s family and fewer years in sex work were associated with higher willingness to use PrEP. Age and years in sex work are often correlated yet represent different factors. While we found that WESW for fewer than five years were more likely to accept PrEP, we concur with others that targeting women for whom sex work is newer and incorporating it as part of a set of prevention

tools may strengthen acceptability and subsequent uptake.<sup>13,16</sup> Women who were older and perhaps had spent more time engaged in sex work may be more difficult to target for changing behavior, but for all women, strengthening peer-based education and social norms may increase acceptability.

Studies of social support and networks among WESW are limited, and most were not conducted in SSA. Extant literature suggests that women’s health behaviors – including HIV risk reduction such as condom use — are often dependent upon perceived support from individuals in their networks, and that behaviors are strengthened when social norms for taking up a new behavior are evident among supports.<sup>31</sup> The fact that stronger perceived family support was associated with PrEP acceptability suggests that women may find their families supportive of health concerns, including HIV prevention. The fact that this same support was not related to PrEP initiation, coupled with the findings that higher family stigma associated with sex work is related to PrEP initiation, suggests an important area for intervention. Women may be highly concerned about the stigma associated with sex work and initiating PrEP and following a daily regimen may be associated with risks of being outed as a sex worker.

Findings related to stigma and discrimination as barriers to PrEP initiation are somewhat inconsistent with extant studies.<sup>10,11</sup> Culturally sex work is highly stigmatized in Uganda. Yet among this sample women perceiving higher family stigma associated with sex work

Variable	Adjusted Odds Ratio	Confidence Interval [95%]	P-value
<u>Prep Willingness[ref: unwilling]</u>			
Unknown Willingness to use PrEP	2.14	[-.80–5.72]	.13
High willingness to use PrEP	3.75	[-.86–16.36]	.08
<b>Covariates</b>			
Age [Mean 29.73]	1.02	[-.98–1.06]	.41
Level of Education [ref: Primary education or lower]	1.01	[-.61–1.68]	.97
<b>Risk Factors</b>			
Years engaged in sex work [ref: Less than 5yrs]	.68	[-.38–1.22]	.20
Experience of sexual coercion [ref: yes]	1.49	[-.89–2.49]	.13
Harmful alcohol use [ref: No]	1.05	[-.60–1.86]	.86
<b>Perceived Barriers to PrEP Initiation</b>			
HIV-related Discrimination [ref: low]	.86	[-.52–1.43]	.56
<u>Community Stigma[ref: low]</u>			
Moderate community stigma related to sex work	1.00	[-.42–2.39]	.99
High community stigma related to sex work	1.00	[-.52–1.92]	.99
<u>Family Stigma[ref: low]</u>			
Moderate family stigma related to sex work	1.50	[-.65–3.47]	.35
High family stigma related to sex work	2.20	[1.15–4.22]	.02*
Barriers to medical care	.933	[-.85–1.03]	.15
<b>Protective Factors</b>			
Social Support from Friends [ref: low]	.809	[-.68–0.97]	.02*

**Table 3: Adjusted logistic regression of factors influencing the likelihood of PrEP initiation among vulnerable women in Masaka region, Uganda [n = 283<sup>4</sup>].**

\*  $p \leq .05$ .

<sup>4</sup>Sample size represents all women who tested HIV negative at baseline ( $N = 286$ ) minus 3 women who believed themselves to be HIV positive at the time of baseline completion.

were more likely to initiate PrEP. Given the high levels of PrEP acceptability, perhaps for some women this study was the first time they were directly offered access to PrEP and agreed to initiate it. Proximity and access to health care is often a barrier to PrEP initiation and this study offered women the opportunity to initiate PrEP as part of the protocol, making it more convenient. Additionally, if women were to become HIV infected, their families would ask how it happened, and they would have to disclose their sex work and risk being further stigmatized by family members. Or this may be one way that HIV stigma - or fear of becoming infected - shows up, even when we are not seeing that HIV discrimination or stigma itself as measured through our assessment is significantly associated with PrEP initiation. Further, we did not see HIV-related stigma as a significant barrier. One reason that HIV stigma was not associated with PrEP uptake may be that our analytic sample were all women who tested HIV negative. A recent large-scale analysis of WESW in SSA examining the role of sex work stigma and HIV prevention risk found high rates of stigma associated with sex work and also with subsequent negative consequences. Consequences included lack of disclosure of women's sex work to family or health providers, lack of HIV prevention uptake, and increased physical and sexual violence.<sup>19</sup> Family support may be related to whether

women feel comfortable disclosing sex work to family. Higher perceived social support among friends as a barrier to PrEP initiation, while counterintuitive, may be related to this fear of disclosure as someone who engages in sex work. If a woman is in relationship with more friend supports, she may have less privacy and fear that a daily medical regimen like PrEP would either out her as a sex worker or raise questions regarding her higher risk of HIV and association with HIV-related medications. Generally, social support, trust, and solidarity with peers are positively associated with HIV prevention efforts among WESW.<sup>31</sup> The complexity of this finding warrants further study and may speak to issues related to the intersection of structural and individual level barriers to PrEP use.

Second generation PrEP drugs, including the dapivirine vaginal ring and injectable cabotegravir (CAB LA), are dosed at least monthly, provide an adherence advantage over daily dosing, and can be used discreetly by a stigmatized population. The dapivirine vaginal ring has now been approved for use in Uganda, including by WESW who may struggle with taking a daily pill.<sup>32</sup> We believe that dissemination of these second generation PrEP drugs would increase PrEP uptake among our sample and endorse their availability and dissemination.

Findings demonstrate that a number of factors previously found to be associated with PrEP acceptability and initiation, including sexual coercion/violence, harmful alcohol use, and access to medical services, were not found to be significant barriers among this sample of women for either acceptability or initiation of PrEP. There may be a number of reasons for these findings. First, while sexual coercion could be at the hands of intimate partners or commercial partners, when it is a barrier to PrEP use – a method virtually invisible to commercial partners – it is more likely coercion at the hands of an intimate that is of concern. Most women in our sample, however, did not report having an intimate partner (Table 1), and this may have led to this lack of finding. Harmful alcohol use is more often associated with adherence to PrEP so may not have been reported as a concern among this sample of women regarding initiating PrEP. Finally, given our sample's proximity and access to medical services as part of the study's protocol, there may be few, if any, barriers to services. Some of the inconsistent findings may also attribute to different measurements of key variables across different studies.

The criminalization of sex work and subsequent, related stigma have been linked to poor participation in HIV prevention programs in Uganda among WESW. This will continue to be a major barrier to HIV prevention and treatment as prevention progress.<sup>33</sup> This study lends additional support to findings from prior studies highlighting the fact that stigma – which is related to the legal status of sex work – may operate jointly in increasing individual-level HIV burden, including lack of PrEP uptake.<sup>19</sup> Despite the scale up of PrEP availability, PrEP initiation among WESW lags. Scale up and support, as recommended by Muwonge et al.<sup>8</sup> in Uganda, will also require additional attention to persistent barriers, including working with government bodies regarding decriminalization.

Our study should be interpreted in light of the study's methodological limitations. Study data were cross-sectional and therefore difficult to interpret temporally, however, we plan to examine temporal trends in future papers. Most independent variables relied on self-report, including questions related to stigma and other adverse experiences, which might be influenced by social expectancies and recall biases. Our outcome variable, however, PrEP initiation, was a behavioral measure and not based on self-report. Generalisability may be limited as our study sample is restricted to women in the Masaka region of Uganda, whose circumstances may differ considerably from those in the capital city of Kampala, for example. We do know, however, that WESW in this region, given the presence of the fishing villages and transience of workers, have higher levels of HIV infection compared to other regions of the country.

WESW in this region of Uganda demonstrate among the highest risk levels for HIV infection globally, making access to PrEP essential to improve health outcomes for women and to end the epidemic. The persistent discordance between women's endorsement of PrEP and lack of uptake highlights that prevention approaches must be better tailored to women's individual needs, and context-specific to support retention<sup>17</sup>; but moreso that larger, structural changes, including decriminalization of sex work, are warranted to ensure reduced stigma and greater access to care for women. We need to focus on how best to create supports for WESW to feel worthy and safe to access care through increased education to destigmatize PrEP. Consistent with other researchers and advocates, we believe that it is critical to incorporate women themselves into the study team and policy and to practice initiatives to devise how best to ensure PrEP initiation specifically, and HIV prevention initiatives more generally.<sup>17,34</sup> Findings reinforce the need to create easy yet confidential access to PrEP with ongoing medical support in conjunction with structural-level efforts to destigmatize PrEP use by integrating positive messaging into health promotion campaigns for women and their families. This should be augmented by efforts to build community strengths and assets/resources among WESW, which have proven most effective globally.<sup>4,35</sup> There is also a need for ongoing qualitative research to more closely examine how best to reduce barriers to PrEP uptake and to strengthen needed family social supports to sustain PrEP use in conjunction with other prevention measures.

### Contributions

SSW and FS designed the parent study and all of its protocols, and obtained funding. PF and SSW conceptualized the study, accessed the data and conducted the analyses, interpreted the results and served as the lead authors in preparing the manuscript. PN, OSB, and LJMW, critically reviewed and edited the manuscript. FN, CD, YT, JK, JN, AM, JK, and MM contributed to the investigation, project administration, validation, review and editing of the manuscript. All authors had the final responsibility for the decision to submit for publication.

### Data Sharing statement

Once all of the data has been de-identified, cleaned, and validated, and main findings have been published, the Investigators expect to share data with the scientific community. The research team will make datasets available to any individual who makes a direct request to the PIs and indicates the data will be used for the purposes of research (per CFR Title 45 Part 46: "Research is defined as a systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge.").

## Declaration of interests

We declare no competing interests.

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## Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:[10.1016/j.eclinm.2022.101278](https://doi.org/10.1016/j.eclinm.2022.101278).

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