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High burden of previously undiagnosed HIV infections and gaps in HIV care cascade for conflict-affected sex workers in northern Uganda

Running head: HIV cascade for conflict-affected sex workers

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ABSTRACT

Given the disproportionate HIV burden faced by sex workers (SWs) and limited data regarding SWs' engagement in the HIV cascade in conflict-affected settings, we examined prevalence and associations with new HIV diagnoses and ART use among SWs in conflict-affected Northern Uganda. Data were collected via sex worker/peer-led outreach, interview-administered questionnaires and voluntary HIV testing. Of 400 SWs, 33.5% were living with HIV, of whom 33.6% were new/previously undiagnosed infections and 32.8% were on ART. Unstable housing and heavy alcohol/drug use were independently associated with increased odds of new HIV diagnoses, whereas exposure to condom demonstrations and number of lifetime pregnancies were negatively associated. In sub-analysis among known HIV-positive women, age and time since diagnosis were associated with ART use, whereas STIs were negatively associated. Findings suggest the need for SW-tailored, peer-based, and integrated HIV and sexual and reproductive health programs to address gaps in HIV testing and treatment for SWs in conflict-affected communities.

Keywords: sex workers, antiretroviral therapy, HIV diagnosis, women living with HIV, key populations

INTRODUCTION

In recent years, there have been rising calls to expand access to the HIV 'cascade of care' for key populations, who remain disproportionately impacted by HIV, yet face significant gaps in access and engagement with the HIV cascade, including timely diagnosis and access to antiretroviral therapy (ART)[1]. In 2012, the World Health Organization launched international guidelines on HIV prevention, treatment and care among sex workers, which call attention to suboptimal access to ART for sex workers as a result of many of the same structural drivers that have been shown to increase HIV risks, including criminalization, violence, and stigma[2].

Although sex workers face a disproportionate HIV burden[3] and are a recognized priority population within the global HIV response[4, 5], research on sex workers' access to the HIV 'cascade of care' remains limited[6, 7], with most studies focused on primary prevention. A recent review found a concerning lack of data on the HIV cascade among sex workers living with HIV, with data only available from a limited number of settings[6]. Existing evidence suggests significant disparities and suboptimal outcomes for sex workers across the cascade, including ART interruptions and low rates of viral suppression[8-18]. In particular, whereas timely access to testing and knowing one's HIV status represent critical early steps in the HIV cascade, few studies have examined new HIV diagnoses among sex workers[19], despite the importance of such information for responding to gaps in health access and for understanding HIV transmission trends and burden. Although factors at multiple levels of influence, including criminalization, violence, unsafe living and working environments, stigma, and sexual and drug-related risks, are known influencers of HIV risks in sex work[13, 14, 16, 20, 21], less is known about their influence on the HIV cascade, with most research focused on individual and clinical factors.[6]

Within sub-Saharan Africa, a region heavily impacted by armed conflict and population displacement, even less is known about access and uptake of the HIV 'cascade of care' for conflict-affected sex workers. Important gendered effects of conflict have been demonstrated for women, including increased sex work engagement[22, 23], and conflict-affected sex workers may experience enhanced barriers to care resulting from socio-economic marginalization, displacement, and human rights violations. Armed conflicts are also associated with population displacement, widespread human rights

violations, the collapse of livelihoods and health systems, and a breakdown of social structures, all of which may influence access and retention in HIV testing, treatment, and care[22-31].

In Northern Uganda, a two-decade long conflict between the Lord's Resistance Army (LRA) and the Governments' Ugandan Peoples Defense Forces led to the displacement of over 1.8 million people to internally displaced persons camps[32]. Although war-related human rights violations and other structural vulnerabilities faced by sex workers in conflict-affected settings have been recently linked to enhanced HIV risks and barriers to sexual health access[33-36], evidence regarding the HIV cascade among conflict-affected sex workers remains sparse. Therefore, the aim of this study was to examine the prevalence and associations of the HIV cascade of care, including new HIV diagnoses and ART uptake, among women sex workers in Gulu, Northern Uganda.

MATERIALS AND METHODS

Data collection

We drew on questionnaire and HIV serological data collected with 400 women sex workers in Gulu, Northern Uganda from May 2011- January 2012. The study was conducted in partnership with The AIDS Service Organization (TASO) Gulu, a branch of the largest indigenous HIV service organization in East Africa, as well as sex workers and youth, women's, and health services organizations. As previously described[33], procedures were guided by extensive consultation with community, sex workers, and external stakeholders (NGOs, health services, police) and the research team involved experiential (i.e., sex workers) as well as non-experiential staff. The study was approved by ethics review boards at the University of British Columbia and The AIDS Support Organization (TASO) and the protocol is registered at the Ugandan National Council for Science and Technology (UNCST).

Based on formative work and mapping of sex work spaces, women were recruited through sex worker-led outreach to bars, hotels, and truck stops, as well as TASO-led outreach to former IDP camps and the TASO Gulu centre[33]. Consultations with peer sex work leaders and service providers gathered input on the questionnaire, which was pilot-tested prior to implementation. The study was explained to

potential participants in Luo and participants provided written informed consent or for those with limited literacy, a thumbprint was provided. Eligible participants were ≥ 14 years and exchanged the commercial exchange of sex for money or resources (e.g. food, cell phone air time, jewelry, shelter, childcare etc.) in the previous month. Youth 14-18 years old were eligible if they were self-supporting emancipated minors and completed an additional youth consent process. Following informed consent, interviewer-administered questionnaires were offered by female Acholi community research assistants in Luo and voluntary HIV counseling and testing was offered from TASO Gulu.

Serological testing

Participants were offered voluntary HIV counselling and testing through peer/SW-led outreach and TASO, or provided informed consent to link to previous HIV test diagnoses with TASO. Testing followed the Ugandan Ministry of Health algorithm.¹⁵ Rapid testing used the Alere Determine HIV-1/2 test; for positive rapid test results, confirmatory testing used the STAT PAK test. In cases of discordant results, the Unigold confirmatory test was used. All participants received condoms, education and referrals (e.g., food security, pap testing). Women who tested newly HIV-positive and were not in care were immediately linked to treatment and care at TASO or referred to another provider of their choosing.

Measures

The questionnaire gathered information on lifetime socio-demographic factors (e.g., age, education, sex work income) as well as measures of sexual and drug-related risks in the last 6 months, including patterns of alcohol/drug use, drug and alcohol use with clients, and inconsistent condom use with clients. Structural factors were also assessed, including housing; migration history; current places of servicing clients (e.g., bar/club, lodge, hotel, highway/truckstop, clients place, own place); the WHO intimate partner violence scale;^[37] workplace verbal, physical and sexual violence by clients, police and military; policing and criminalization (e.g., police harassment, arrest, incarceration); and conflict-related exposures. Sexual and reproductive health included reproductive history (e.g., lifetime pregnancies), STI diagnoses, and exposure to HIV and SRH programs (e.g., condom demonstrations, HIV and STI testing, pap smears, contraceptives). Women with previously diagnosed HIV infections were asked about access

and experiences with HIV-related care, including timing of diagnosis, current and past ART use, and related experiences within and outside of clinical settings (e.g., HIV status disclosure).

Data analysis

A continuum of HIV care was developed to assess the proportions of sex workers living with HIV who were (1) previously diagnosed HIV infections (i.e., HIV-seropositive and aware of status), (2) linked to care (i.e., ever used ART or saw an HIV doctor), and (3) currently on ART among female sex workers living with HIV, as per recent guidelines[38]. Given this study took place within a low-resource setting, as in many settings sub-Saharan African, we did not have the capacity for measuring viral load within the local setting.

Associations of new HIV diagnoses and ART use

Analyses of new HIV diagnoses were conducted among all HIV-seropositive women (n=134); the analysis of current ART use was restricted to previously diagnosed HIV infections (n=89). Two dependent variables were used: (1) new HIV diagnosis, defined as those who were HIV-seropositive at the study visit and self-reported being HIV-negative or of unknown status; and (2) ART use, defined as those who had a known HIV-positive diagnosis and self-reported current ART use. Separate bivariate and multivariable logistic regression models were used to evaluate differences in independent variables hypothesized *a priori* to be related to outcomes of interest. Variables with $p < 0.10$ in bivariate analyses were considered for inclusion in multivariable models. Model selection was constructed using a backward process where Akaike's Information Criteria was used to determine the most parsimonious model. Analyses were performed using SAS version 9.4. All p-values are two sided.

RESULTS

Of 400 sex workers, 134 (33.5%) were living with HIV. Among HIV-positive participants, 89 (66.4%) were previously diagnosed infections who were aware of their HIV status; 69 (51.5%) regularly engaged in HIV-related care (i.e., saw an HIV doctor every 3 months); 48 (35.8%) ever used ART; and 44 (32.8%) were currently on ART (Figure 1).

New HIV diagnoses

One-third (n=45) of women living with HIV were new HIV diagnoses (either new HIV infections or previously undiagnosed HIV positives), whereas two-thirds (n=89) were aware of their status. Self-reported rates of recent HIV testing were low, with only 13.3% of new diagnoses having been tested in the six months prior to the study visit, and 48.9% tested in the past year.

In comparison with women with a previously known HIV diagnosis, newly diagnosed women were younger (median age: 24 (Inter-Quartile Range (IQR): 20-26) vs. 25 (IQR: 23-28), $p=0.066$) and earned a higher weekly income from sex work (median: 50,000 vs. 37,500 Ugandan shillings, $p=0.093$) (Table 1).

Newly diagnosed women were more likely to report recent sexual and drug-related risks, including heavy drug or alcohol use (42.2% vs. 13.5%, odds ratio (OR): 4.63, 95% Confidence Interval (CI): 1.98-10.82), substance use with clients (77.8% vs. 56.2%, OR: 3.41, 95% CI: 1.42-8.18), and inconsistent condom use with clients (93.3% vs. 79.8%, OR: 3.55, 95% CI: 0.99-12.77) (Tables 1, 2).

In terms of structural exposures, women with newly diagnosed HIV infections were more likely to be unstably housed (62.2% vs. 43.8%, OR: 1.01-4.40). Most participants reported soliciting clients in bars (89.6%) and servicing clients in lodges or hotels (85.1%), with no significant differences in work environment. In terms of sexual and reproductive health, sex workers with new HIV diagnoses reported fewer lifetime pregnancies than women with a known HIV-positive status (median: 2 vs. 3, OR: 0.63, 95% CI: 0.47-0.85) and although they were more likely to have ever received a pap smear (8.9% vs. 2.3%, $p=0.180$), they were less likely to have been exposed to condom demonstrations (62.2% vs. 77.5%, OR: 0.51, 95% CI: 0.23-1.12).

In multivariable analysis (Table 2), heavy alcohol/drug use (Adjusted Odds Ratio (AOR): 5.73, 95% CI: 2.22-14.78) and recent unstable housing (AOR: 2.48, 95%CI: 1.05-5.85) were positively associated with

new HIV diagnoses, whereas exposure to condom demonstrations (AOR: 0.39, 95%CI: 0.15-0.97) and number of lifetime pregnancies (AOR: 0.65, 95%CI: 0.47-0.89) were negatively associated.

Antiretroviral therapy (ART) use

Among women living with HIV who were aware of their status (n=89), the median duration since diagnosis was 1.4 years (IQR: 0.5-3.3) and most (77.5%) reported seeing a doctor about their HIV regularly. Among women with known HIV status (n=89), most (80.9%) reported having previously disclosed their HIV status to someone else (e.g., partner, family member). Stigma/discrimination was high, with the majority reporting having their HIV status 'outed' (disclosed without their consent) (70.8%). Almost two-thirds (61.8%) perceived that their HIV was negatively affecting them, and a greater proportion (69.7%) had been abused for being HIV-positive.

In comparison with women living with HIV who were not using ART, women currently accessing ART had been HIV-positive for longer (median: 3 vs. 0.6 years, OR: 1.32, 95% CI: 1.05-1.66), were significantly older (median age: 26 vs. 25, OR: 1.15, 95% CI: 1.03-1.29), and were less likely to report inconsistent condom use with clients (72.7% vs. 86.7%, OR: 0.41, 95% CI: 0.14-1.22) (Tables 3, 4). They were also less likely to report recent police harassment without arrest (18.2% vs. 33.3%, OR: 0.44, 95% CI: 0.17-1.91) or a recent STI diagnosis (38.6% vs. 60.0%, OR: 0.42, 95% CI: 0.18-0.98).

In multivariable sub-analysis of factors associated with ART use (Table 4), older age (AOR: 1.16/year, 95%CI: 1.02-1.32) and duration since diagnosis (AOR: 1.28/year, 95%CI: 1.02-1.59) were positively associated with ART use, whereas having a recent STI was associated with lower odds of ART use (AOR: 0.35, 95%CI: 0.14-0.90).

DISCUSSION

Findings of this study highlight the serious gaps in the HIV cascade faced by conflict-affected sex workers in sub-Saharan Africa, with over one-third being newly diagnosed and almost half of women living with HIV not having been linked to care. This study adds to the limited body of evidence describing

the health and social inequities faced by conflict-affected women engaged in sex work[33-36], and to our knowledge remains one of the only studies reporting on the HIV 'cascade of care' among conflict-affected sex workers in sub-Saharan Africa. Over one-third of sex workers living with HIV were newly diagnosed infections, which is higher than a recent study in Malawi (20%)[39] and lower than a study in Zimbabwe in which half of sex workers with confirmed HIV infection were unaware of their status, with the majority not on ART.[8] Women reporting unstable housing and substance use were more likely to be newly diagnosed, whereas accessing condom demonstrations and greater number of lifetime pregnancies were protective, likely reflecting linkage to HIV testing and care services through accessing SRH and condom promotion services[40-42]. Of additional concern, only one-third of sex workers living with HIV (32.8%) were currently on ART, with youth and those with acute STI infections being less likely to use ART. This figure is slightly lower than that reported in other low and middle-income countries as part of a recent review the HIV cascade of care among sex workers[6, 39].

These gaps in conflict-affected sex workers' access to HIV testing, diagnosis and treatment suggest the need to develop and implement programs to ensure equitable, voluntary access to lifesaving HIV interventions and comprehensive services that reduce morbidity, mortality and improve quality of life. Of particular concern was the high proportion of HIV-seropositive women with an unknown HIV status, suggesting gaps in accessible, sex worker-friendly HIV testing and diagnosis within conflict-affected regions, as well as concern of growing rates of new HIV infections. Strong evidence has linked the health disparities and barriers to HIV services faced by sex workers to the pervasive marginalization and structural barriers many sex workers face, including workplace violence[43-50], stigma[51-53], and criminalization[54-58]. Qualitative research from sub-Saharan Africa and India suggests that sex workers living with HIV face additional challenges accessing services due to fear of violence, stigma, or a loss of work upon disclosing their status; food insecurity; limited social support; economic concerns; and experiences of disrespectful, degrading or stigmatizing treatment within healthcare settings[59-61]. Such barriers may be exacerbated by structural vulnerabilities related to conflict, criminalization, physical and sexual violence, and unsafe working and living conditions[13, 14, 16, 33].

Addressing these inequities remains critical for supporting sex workers' health, wellbeing, and human rights, particularly within conflict-affected settings, where there remains a dearth of sex worker-friendly and rights-based services[36]. UNAIDS recently launched the '90-90-90' strategy to scale-up HIV testing, ART, and viral suppression by 2020,[7] and in 2015, new guidelines by WHO[62] and the International Association of Providers of AIDS Care[38] advised offering ART to all HIV+ patients irrespective of CD4 count. These initiatives have identified the need to address inequities faced by key populations and have prioritized addressing gaps in the HIV cascade faced by key populations, including sex workers, including through calls for concerted efforts and interventions to promote more equitable access and improved outcomes [5, 7]. Our findings specifically highlight the importance of community-based services, sex worker-friendly/peer-led outreach, and improved integration and linkages between HIV and SRH services as a means of promoting access to regular, voluntary HIV testing and HIV care for conflict-affected sex workers. Special attention is needed to engage younger sex workers, women who use substances, and those facing structural barriers (e.g., unstable housing) through community-based approaches. Current evidence indicates that to address disparities in health access and outcomes among people living with HIV, there is a critical need for interventions addressing structural factors (e.g., within living, work, and health service environments)[5, 38]. Recent work has estimated that ART scale-up could avert up to 34% of HIV infections among sex workers and clients, but would only be feasible in tandem with structural changes to facilitate sex workers' ability to access services without fear of persecution (e.g., removal of criminalized laws, violence).[16] As evidence from the HIV prevention field shows that HIV interventions are most effective when they are community-based and sex worker-led[4, 63], future efforts to scale-up access across the HIV cascade of care should address structural factors and meaningfully partner with and leverage the expertise of sex work communities.

Several strengths and limitations should be considered when interpreting our data. As a cross-sectional study, causal inferences cannot be made; prospective and intervention studies remain needed to better understand patterns of drop-off and interventions to retain sex workers across the cascade of care. However, as among the first sex worker-led HIV outreach efforts in Gulu, our community- and peer-based team was able to build rapport, reduce stigma, and connect with diverse populations of sex workers across different venues (e.g., bars, truck stops), which may explain the high proportion of sex

workers not linked to HIV care in this study. Given that this study was conducted as a sub-analysis of women living with HIV enrolled within a larger cohort, analyses may have been underpowered to detect all associations of interest, including key structural factors. As our cascade measures were based largely on self-reported data, future studies involving viral load monitoring or linkage to clinical records are recommended.

CONCLUSIONS

In this study, over one-third of participants were newly diagnosed HIV infections, suggesting serious gaps in the HIV continuum for sex workers. Women reporting unstable housing and substance use were more likely to be newly diagnosed, whereas accessing SW-led condom demonstrations and greater number of lifetime pregnancies were protective, likely reflecting linkage to HIV testing and care services through accessing SRH and condom promotion. Half of participants previously diagnosed as HIV-positive were not using ART, with youth, recent diagnoses, and STI-positive women less likely to use ART. Sex worker-tailored and integrated HIV and SRH programs remain vital for enhancing sex workers' voluntary, respectful, and timely access to essential medicines and HIV prevention, testing, and care in conflict-affected settings.

Figure 1: HIV cascade of care among sex workers living with HIV (n=134) in Gulu, Northern Uganda, 2011-2012

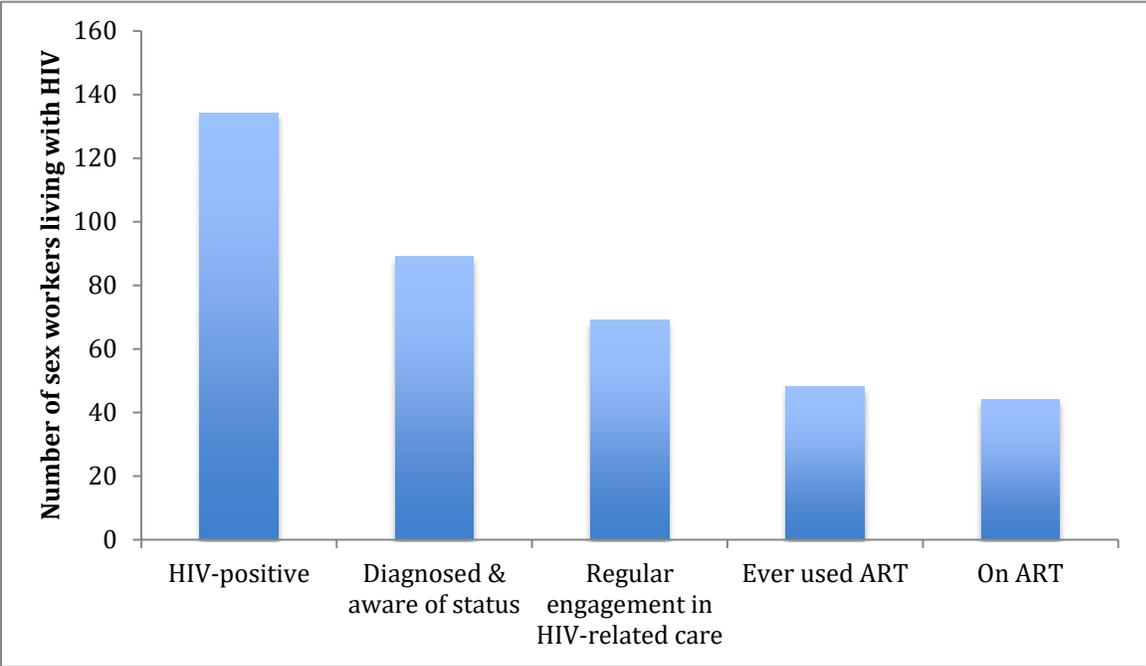


Table 1: Comparison of socio-demographics, sexual and substance-related risks, structural exposures, and sexual and reproductive health among sex workers with new vs. previously diagnosed HIV infections (N=134) in Gulu, Northern Uganda, 2011-2012

Variable	New HIV diagnosis (N=45) n (%)	Previous HIV diagnosis (N=89) n (%)	Total (N=134) n (%)	p-value
Socio-demographics				
Age, years (<i>median, IQR</i>)	24.0 (20.0-26.0)	25.0 (23.0-28.0)	25.0 (22.0-27.0)	0.066
Less than primary education**	33 (73.3%)	70 (78.7%)	103 (76.9%)	0.491
Weekly income from sex work, in Ugandan shillings (<i>median, IQR</i>)*	50,000 (30,000-80,000)	37,500 (20,000-70,000)	40,000 (30,000-70,000)	0.093
Sexual and substance risks				
Weekly client volume*	9 (4-12)	6 (4-13)	7 (4-12)	0.295
Heavy drug/alcohol use*	19 (42.2%)	12 (13.5%)	31 (23.1%)	<0.001
Drug/alcohol use w/clients*	35 (77.8%)	50 (56.2%)	85 (63.4%)	0.005
Inconsistent condom use w/clients*	42 (93.3%)	71 (79.8%)	113 (84.3%)	0.042
Structural exposures				
Unstable housing*	28 (62.2%)	39 (43.8%)	67 (50.0%)	0.044
Migrant to Gulu district**	21 (46.7%)	31 (34.8%)	52 (38.8%)	0.184
Place of solicitation*				
<i>Lodges/hotels</i>	25 (55.6%)	41 (46.1%)	66 (49.3%)	0.300
<i>Bars/clubs</i>	41 (91.1%)	79 (88.8%)	120 (89.6%)	0.675
<i>Outdoors/street/truck stop</i>	27 (60.0%)	54 (60.7%)	81 (60.5%)	0.940
Place of service*				
<i>Lodges/hotels</i>	40 (88.9%)	74 (83.2%)	114 (85.1%)	0.378
<i>Bars/clubs</i>	7 (15.6%)	18 (20.2%)	25 (18.7%)	0.512
<i>Outdoors/street/truck stop</i>	2 (4.4%)	10 (11.2%)	12 (9.0%)	0.336
Client sexual/physical violence*	22 (48.9%)	39 (43.8%)	61 (45.5%)	0.578
Moderate/extreme intimate partner violence (WHO scale)*	25 (55.6%)	47 (52.8%)	72 (53.7%)	0.763
Police harassment without arrest*	15 (33.3%)	23 (25.8%)	38 (28.4%)	0.364

Sexual and reproductive health

# pregnancies** (<i>median, IQR</i>)	2 (1-3)	3 (2-3)	2 (1-3)	0.002
Recent STI diagnosis*	25 (55.6%)	44 (49.4%)	69 (51.5%)	0.503
Received STI testing*	8 (17.8%)	13 (14.6%)	21 (15.7%)	0.614
Received a pap smear**	4 (8.9%)	2 (2.3%)	6 (4.5%)	0.180
Received a condom demonstration**	28 (62.2%)	69 (77.5%)	97 (72.4%)	0.090

*In last 6 months

**In lifetime

NOTE: All data refer to n (%) of participants, unless otherwise specified.

Table 2: Factors associated with new vs. previously known HIV diagnoses among sex workers living with HIV (N=134) in Gulu, Northern Uganda, 2011-2012

Variable	Unadjusted Odds Ratio	95% Confidence Interval	Adjusted Odds Ratio	95% Confidence Interval
Age, years	0.93	0.85-1.01		
Weekly income from sex work, per 1000 Ugandan shillings*	1.01	1.00-1.02		
Heavy drug/alcohol use*	4.63	1.98-10.82	5.73	2.22-14.78
Drug/alcohol use w/clients*	3.41	1.42-8.18		
Inconsistent condom use w/clients*	3.55	0.99-12.77		
Unstable housing*	2.11	1.01-4.40	2.48	1.05-5.85
# pregnancies**	0.63	0.47-0.85	0.65	0.47-0.89
Received a condom demonstration**	0.51	0.23-1.12	0.39	0.15-0.97

*Last 6 months

**In lifetime

Table 3: Comparison of socio-demographics, sexual and substance-related risks, structural exposures, and sexual and reproductive health stratified by ART use among sex workers living with a known HIV diagnosis (N=89) in Gulu, Northern Uganda, 2011-2012

Variable	Using ART (N=44)	Not on ART (N=45)	Total (N=89)	P- value
	n (%)	n (%)	n (%)	
Socio-demographics				
Duration of known HIV positivity, <i>years (median, IQR)</i>	3.0 (1.2-4.3)	0.6 (0.2-2.1)	1.4 (0.5-3.3)	<0.001
Age, <i>years (median, IQR)</i>	26.0 (23.5-29.0)	25.0 (21.0-26.0)	25.0 (23.0-28.0)	0.014
Less than primary education**	36 (81.8%)	34 (75.6%)	70 (78.7%)	0.471
Weekly income from sex work, in Ugandan shillings (<i>median, IQR</i>)*	30,000 (20,000-50,000)	40,000 (30,000-70,000)	37,500 (20,000-70,000)	0.320
Sexual and substance-related risks				
Weekly client volume*	5.0 (3.0-14.0)	8.0 (4.0-12.0)	6.0 (4.0-13.0)	0.124
Heavy drug/alcohol use*	6 (13.6%)	6 (13.3%)	12 (13.5%)	0.933
Drug/alcohol use w/clients*	27 (61.4%)	23 (51.1%)	50 (56.2%)	0.330
Inconsistent condom use w/clients*	32 (72.7%)	39 (86.7%)	71 (79.8%)	0.102
Structural exposures				
Migrant to Gulu district**	17 (38.6%)	14 (31.1%)	31 (34.8%)	0.456
Place of solicitation*				
<i>Lodges/hotels</i>	21 (47.7%)	20 (44.4%)	41 (46.1%)	0.756
<i>Bars/clubs</i>	41 (93.2%)	38 (84.4%)	79 (88.8%)	0.192
<i>Outdoors/street/truck stop</i>	27 (61.4%)	27 (60.0%)	54 (60.7%)	0.895
Place of service*				
<i>Lodges/hotels</i>	36 (81.8%)	38 (84.4%)	74 (83.2%)	0.741
<i>Bars/clubs</i>	9 (20.5%)	9 (20.0%)	18 (20.2%)	0.957
<i>Outdoors/street/truck stop</i>	4 (9.1%)	7 (15.6%)	11 (12.4%)	0.354
Client sexual/physical violence*	17 (38.6%)	22 (48.9%)	39 (43.8%)	0.330
Moderate/extreme intimate partner violence (WHO scale)*	22 (50.0%)	25 (55.6%)	47 (52.8%)	0.600
Police harassment without arrest*	8 (18.2%)	15 (33.3%)	23 (25.8%)	0.103

Sexual and reproductive health

Recent acute STI infection*	17 (38.6%)	27 (60.0%)	44 (49.4%)	0.044
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*In last 6 months

**In lifetime

NOTE: All data refer to n (%) of participants, unless otherwise specified.

Table 4: Factors associated with ART use among sex workers living with a known HIV diagnosis (N=89) in Gulu, Northern Uganda, 2011-2012

Variable	Unadjusted Odds Ratio	95% Confidence Interval	Adjusted Odds Ratio	95% Confidence Interval
Duration since HIV diagnosis, <i>years</i>	1.32	1.05-1.66	1.28	1.02-1.59
Age, <i>years</i>	1.15	1.03-1.29	1.16	1.02-1.32
Drug/alcohol use w/clients*	1.52	0.65-3.53		
Inconsistent condom use w/clients*	0.41	0.14-1.22		
Police harassment without arrest*	0.44	0.17-1.91		
Recent acute STI infection*	0.42	0.18-0.98	0.35	0.14-0.90

*Last 6 months

**In lifetime

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