REPUBLIC OF SOUTH SUDAN
MINISTRY OF HEALTH

BIO-BEHAVIORAL SURVEY OF FEMALE SEX WORKERS IN WAU, SOUTH SUDAN
EAGLE II SURVEY, 2019

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FOREWORD

The Republic of South Sudan got its independence after decades of civil war that left over two million people dead and absolute destruction of the basic infrastructure, including for health care. The armed conflict that erupted two years after independence has exacerbated the health care challenges. As a development agenda is being undertaken by all arms of the government with support of partners, the HIV response remains a critical area, particularly for key populations, as the country strives to achieve the UNAIDS 95-95-95 targets by 2030.

Information has been limited on the prevalence and dynamics of the HIV epidemic among key populations, especially sex workers, in South Sudan. Only two studies had been conducted in the towns of Juba and Nimule in 2016 and 2017, respectively. This study provided the opportunity for the Ministry of Health (MOH) to better understand the HIV prevalence among this population in other parts of South Sudan and better plan for the interventions that best address the HIV epidemic among female sex workers in South Sudan.

The South Sudan MOH is committed to continuously undertake this kind of study in other locations in South Sudan in order to understand the HIV epidemic and follow trends among this population.

These survey results therefore can be quoted by all institutions, noting the limitations that were encountered in the course of the study.

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LIST OF ACRONYMS AND ABBREVIATIONS

ART	Antiretroviral Therapy
ARVs	Antiretroviral medications/drugs
BBS	Bio-behavioral survey
CDC	Centers for Disease Control and Prevention (United States)
DBS	Dry Blood Spot
FSW	Female sex worker
GIS	Geographic Information System
IOM	International Organization for Migration
MOH	Ministry of Health
NGO	Non-governmental organization
NPHL	National Public Health Laboratory
OVC	Orphans and Vulnerable Children
PEPFAR	President's Emergency Plan for AIDS Relief (United States)
RDS	Respondent-driven sampling
SOP	Standard Operating Procedure
SSP	South Sudanese Pounds
STI	Sexually transmitted infection
UNAIDS	The Joint United Nations Programme on HIV and AIDS
VL	Viral load
WHO	World Health Organization

OPERATIONAL DEFINITIONS

A one-time client: Someone the female sex worker (FSW) has had sex with only once.

An outreach worker: Someone employed by an organization, government, or private agency that might provide HIV services to FSWs outside the health facility.

A peer educator: A fellow FSW who has received HIV-related training and support in HIV.

A regular client: Someone the FSW has had sex with on more than one occasion.

Casual male partner: A man a FSW has sex with but does not feel committed to; however, there is no payment or exchange of goods and services for sex with these partners.

Main sex partner: Someone the FSW is committed to; for example, a spouse, live-in sex partner, or boyfriend who the FSW doesn't receive money, gifts, goods, or services from in exchange for sex.

Male clients: Includes men who paid money or provided goods or services to a FSW in exchange for sex

Non-injection drugs: Any drugs that may be used without injection (e.g., smoked, inhaled, or snorted). These include drugs like marijuana, crystal meth, cocaine, crack, ecstasy, heroin, and opium.

Social cohesion: Social lives and relationships of FSWs with other women and girls who sell and/or exchange sex.

EXECUTIVE SUMMARY

The bio-behavioral survey (BBS) among female sex workers (FSWs) in Wau, South Sudan was conducted between August 2 and September 20, 2019. The goal of the survey was to collect quality information for estimating the prevalence of HIV, syphilis, and hepatitis B among the FSWs to be used for informed planning and decision-making on interventions in South Sudan

The survey had two phases. The first phase estimated the population of FSWs in Wau using three source capture-recapture methods, involving distribution of two different unique objects a week apart and conducting respondent-driven sampling (RDS). The RDS that formed the second phase was a cross-sectional survey where selected peers recruited FSWs in Wau into the study. Data collection was carried out by trained interviewers using open data kit (ODK)-programmed tablets. Data on biomarkers were collected through testing for HIV, syphilis, and hepatitis B by trained nurses. The IntraHealth International finance team compiled cost data using the survey costing template. Excel was used to clean the data and analysis conducted using RDS analyst and STATA 13. The estimates included in the report were generated using RDS analyst and the proportions are population adjusted.

The survey protocol was reviewed and approved by the South Sudan Ministry of Health (MOH) ethical review board and the US Centers for Disease Control and Prevention (CDC), Atlanta.

Results

A total of 693 FSWs completed the survey screening and consented to participate in the study; 679 completed the survey. The population of FSWs as estimated through the capture-recapture method was 3,000 [95%CI: 2,203-6,079].

The median age for FSWs was 24 years; more than half (53%) were less than 25 years old and nearly one-quarter (24%) were below age 20. The majority (93%) of the FSWs were South Sudanese with the rest made up of Ugandans (2%), Congolese (2%), and Sudanese (3%). More than three-quarters (77%) could not read and write in any language and 88% had not studied beyond the primary level of education. More than one-third (39%) were single and had never married and 44% were divorced or separated. The majority (82%) had lived in Wau for five years or more and 60% for ten years or longer. The median stay in Wau was 13 years and nearly all (95%) hadn't been away from Wau for more than a month in the last one year. Three-quarters (75%) of the FSWs were living with at least one child for whom they were responsible. The main source of income for FSWs was sex work (92%) and median monthly income was 20,000 SSP (approximately $153[1]).

[1] *Based on the Bank of South Sudan rate of $1 to 130ssp*

Thirty-six percent of the women screened positive for depression and 23% for alcohol abuse. In the last six months, 23% had used non-prescribed drugs with a majority (99%) using only non-injection drugs.

The median age at first vaginal or anal sex with a male partner was 15 years and 31% had ever had anal sex. Twenty-nine percent had sex before the age of 15 years and more than half (53%) began having sex between the ages of 15-17 years.

Nearly three in four (74%) of the FSWs relied on the social support of their peers when faced with issues related to their business. Fifty-two percent relied on their peers when dealing with difficult or violent clients and 54% when supporting use of condoms.

More than half (53%) had at least one casual sex partner and 37% had used a condom the last time they had sex. Seventy percent could ask their main sex partner to use a condom if they wanted. The main reasons for not using a condom with paying and non-paying partners was not being in possession of one or not having thought of it (paying 42%, non-paying 52%), and partner objection (paying 32%, non-paying 27%).

One-third (33%) of FSWs didn't know where they could obtain male condoms, and 75% didn't know where they could obtain female condoms. The main places FSWs knew where male condoms could be obtained were clinics/hospitals (15%), pharmacies (33%) and from a sexual partner (18%). About one-quarter (27%) of the FSWs had received free condoms in the last 12 months.

Only 27% of the FSWs had received free lubricants in the last 12 months and only 42% had used lubricants during vaginal or anal sex in the last six months. Saliva was the most common lubricant used (32%) in the last six months.

Nearly half (46%) of the FSWs felt ashamed of selling or exchanging sex for money, gifts, goods, or services. The same percentage felt they had lost respect in the community and 39% thought less of themselves.

More than half (56%) of the FSWs in Wau had experienced verbal insults because of engaging in sex work and 26% had been blackmailed. About one in ten (11%) felt that health care workers treated them unfairly (e.g., by increasing costs of procedures) or denied them health care because of selling sex. Fifteen percent had either been stopped or arrested (7%) by uniformed officers in the last 12 months because of selling/exchanging sex for money, goods, or services.

Only 18% of the FSWs had comprehensive knowledge of HIV. Almost all (96%) were unaware that anal sex puts one at the highest risk of HIV infection if a condom is not used. Only 38% and 41%, respectively, knew that being on treatment can reduce the risk of HIV transmission to a sexual partner or from mother-to-child.

Most of the FSWs had been pregnant (82%) and eight percent were pregnant at the time of the survey. The median number of pregnancies was three [IQR 1-5]. Twenty-six percent of the

women had ever experienced a miscarriage and 16% had ever aborted. Nearly one in five (19%) had experienced a live birth in the last 12 months. Among those whose last pregnancies resulted in a live birth, 86% attended antenatal care (ANC) and 87% were tested for HIV of which one percent tested positive; all of those testing positive were enrolled on ART and continued ART after delivery. Only 39% of the women who attended ANC were tested for syphilis.

More than two-thirds (68%) of the non-pregnant FSWs were not trying to get pregnant at the time of the survey yet 45% of them were not using any contraceptive method. Those using contraceptives mainly used injectable contraceptives (44%), pills (21%), condoms (16%) and implants (16%). Three percent used the rhythm/ovulation cycle and less than one percent used other methods.

Only one-third (33%) of the FSWs had ever talked about HIV with a peer educator or an outreach worker, and only 13% had done so within the last three months. The last time they met with peer educators or outreach workers, FSWs had received mainly condoms (47%); up to 35% didn't receive any items. The main service offered to FSWs by peer educators or outreach workers was HIV testing (65%).

Three-quarters (66%) of the FSWs in Wau reported to have ever been tested for HIV and 3.7% said they tested positive. Only 5% of the FSWs had tested for HIV in the last three months. More than three-quarters (69%) were last tested from a health clinic or similar setup, and 25% from outreach or mobile testing. The reasons for not testing for HIV mainly included fear of positive results (16%), no money (18%), and no time (34%). Most women who previously tested sought testing because they were pregnant (45%); one-third (33%) just wanted to know their status. All those who previously tested positive were on ART and 91% had suppressed viral load.

Nearly half (49%) of the FSWs reported having abnormal discharge from the vagina in the last 12 months and more than half (59%) experienced pain in the vagina and/or in the lower abdomen during and/or after sexual intercourse. More than half (55%) of those who had sexually transmitted infection (STI) symptoms didn't seek health care services, citing no time (15%) and lack of money (22%) as reasons for not seeking health care. All the FSWs were screened for STIs during the survey; 10% had genital discharge and 24% lower abdominal pain. All received treatment at the site.

Nearly one-quarter (24%) of the FSWs in Wau had ever experienced physical violence in their life and more than half (53%) of those who did experienced violence because of sex work. Among those who experienced violence, 61% had experienced it during the last 12 months.

More than one in five (22%) of the FSWs had ever experienced sexual violence. Nearly half (49%) of the FSWs who experienced sexual violence had experienced it in the last 12 months. The median age at first episode of sexual violence was 19 years.

The prevalence of HIV, active syphilis, and hepatitis B was estimated at 6.7% [95% CI 4.1-9.4], 2.6% [95% CI 1.4-3.9], and 6.9% [95% CI 3.6-10.3], respectively. The prevalence of FSWs who ever

had syphilis but were treated was estimated at 3.5% [95% CI 2.1-5.0]. The prevalence of HIV-syphilis coinfection was 0.5% [95% CI 0.0-1.1], and HIV-Hepatitis B co-infection was 0.3% [95% CI 0.1-0.5]. There were no HIV-syphilis-Hepatitis B co-infections.

Conclusions and Recommendations

The prevalence of HIV among FSWs in Wau is high (6.7%) compared to the general population prevalence of 2.5%. In addition, low condom use (37%, last sex) and limited access to a comprehensive package of services for key populations puts FSWs at increased risk of contracting HIV in Wau. The MOH needs to prioritize preventive interventions and provision of comprehensive HIV services for FSWs and their clients.

Hepatitis B prevalence among FSWs is high (6.9%) and since government institutions in South Sudan provide neither vaccination for adults nor treatment for hepatitis B, there is potential for this to become a serious health problem. The MOH needs to lobby for funds so that hepatitis B vaccination is included in a package of ANC services for the majority of women to access.

1.0 INTRODUCTION

1.1 Overview

Bio-behavioral surveys (BBS) are used to provide population level estimates to determine HIV prevalence and associated risk factors among key populations. South Sudan's Ministry of Health (MOH) conducted its third bio-behavioral survey among female sex workers (FSWs) in South Sudan in the town of Wau between August and September 2019. Two bio-behavioral surveys had previously been conducted in the towns of Juba (2016) and Nimule (2017). A respondent-driven sampling (RDS) method was used to recruit the study participants and the population of FSWs in Wau was estimated using a three source capture-recapture method.

This report summarizes the quantitative results of the Eagle II survey tailored for policy and program developers at the MOH and South Sudan AIDS Commission (SSAC). This report can also be very useful to organizations and individuals providing services and support to key populations in South Sudan or any country with similar contexts.

1.2 Background

The HIV epidemic in South Sudan is characterized as a mixed epidemic, with low-level prevalence in the general population and higher prevalence in specific populations. The HIV prevalence for adults ages 15-49 is estimated to be 2.5% (CI: 1.9-3.2%) and there are an estimated 190,000 people living with HIV (PLHIV) according to 2019 Spectrum estimates (UNAIDS/MOH). The epidemic is differentiated based on geography, with the highest prevalence in Western Equatoria (4.8%), Central Equatoria (4.6%), and Eastern Equatoria (3.6%) based on the 2017 antenatal care (ANC) sentinel surveillance survey. According to 2016 UNAIDS estimates, HIV incidence per 1,000 population for adults ages 15-49 is 2.26 (CI: 0.97-4.29).

South Sudan has made improvements in understanding the HIV epidemic among the general population as well as among FSWs. As a hard-to-reach population with limited access to health and legal services, FSWs are especially vulnerable to the transmission of HIV and other sexually transmitted infections (STIs). In addition to multiple sex partners, including clients and non-clients, low condom use and poor levels of comprehensive HIV knowledge pose risks for infection among FSWs. A number of qualitative studies have been conducted to describe the FSW population in South Sudan (USAID, 2011; Groenendiijk and Veldwijk, 2011; South Sudan AIDS Commission and UNAIDS, 2012). However, no reliable data on prevalence of HIV and STIs existed for this population until the first BBS among FSWs in South Sudan in 2016-2017. The survey in Juba showed that HIV prevalence among FSWs was high (38%); 65% of HIV-positive FSWs had a CD4 count below 500 cells/mm^3; 12% had ever been infected with syphilis; and 7.3% had active syphilis at the time of the survey (MOH 2016). The HIV prevalence among FSWs in Nimule was estimated at 24%; 41% of HIV-positive FSWs had a CD4 count below 500 cells/mm^3; and 9.3% had active syphilis (MOH 2017). The surveys estimated the population size of FSWs to be 5,800 in Juba (MOH 2016) and 2,700 in Nimule (MOH 2017).

Regarding HIV risk behaviors, past qualitative evidence suggested that FSWs in South Sudan find condoms to be plentiful and inexpensive, yet FSWs reported running out of condoms when engaging in multiple sex acts with the same client, and inconsistent condom use during sex with violent clients (Groenendiijk and Veldwijk, 2011). However, BBS results indicated that 20% (Juba) and 35% (Nimule) of FSWs did not know where to obtain male condoms; 46% (Juba) and 84% (Nimule) of FSWs believed they could get condoms when they wanted, with most women reporting that cost was the biggest barrier to obtaining condoms (MOH 2016, MOH 2017). While 72% (Juba) and 46% (Nimule) of FSWs had used a condom the last time they had sex with a paying client, only 47% (Juba) and 14.9% (Nimule) of FSWs had always used a condom with paying clients in the past six months (MOH 2016, MOH 2017). Economic factors also played a role in choosing to engage in unprotected sex with clients. FSWs indicated that some clients prefer and will pay more for unprotected sex leading to poorer women being more likely to sell sex without a condom (South Sudan AIDS Commission and MOH, 2015).

FSWs also reported gender-based violence manifested in various forms, including refusal to pay for sex services and physical violence. Gender-based violence and the inability to negotiate for safer sex may both increase vulnerability to HIV acquisition (South Sudan AIDS Commission and MOH, 2015). BBS data found that 22% (Juba) and 1% (Nimule) of FSWs had ever experienced physical violence and 20% (Juba) and 1% (Nimule) had experienced sexual violence (MOH 2016, MOH 2017).

FSWs in South Sudan have suboptimal access to HIV education. The BBS found that 38% (Juba) and 26% (Nimule) of FSWs had ever received HIV education through peer education or outreach (MOH 2016, MOH 2017). Furthermore, only 13% (Juba) and <1% (Nimule) of FSWs had a comprehensive knowledge of HIV (MOH 2016, MOH 2017). Nonetheless, uptake of other services was higher and 78.7% (Juba) and 56.8% (Nimule) of FSWs had tested for HIV at least once and 82% (Juba) and 70% (Nimule) of self-reported HIV-positive women had received HIV care. Of those who had ever taken ART, 97% (Juba) and 93% (Nimule) were still on treatment (MOH 2016, MOH 2017). Two substantial barriers to entering HIV treatment were no knowledge of where to get care and distance to the facility. The same is true for children; 2016 UNAIDS estimates reported that only 940 children ages 0 to 14 were on treatment in the entire country and about one-third (32.6%) were newly initiated. It is therefore believed that the children of sex workers also have little access to HIV services. Children of FSWs are at high risk of HIV if the mother is infected with HIV during pregnancy and does not receive prevention of mother to-child transmission (PMTCT) services or treatment.

2.0 GOAL AND OBJECTIVES

There was a need for systematic, high quality quantitative data to document the prevalence of HIV infection and HIV risk behaviors among FSWs in Wau and to urgently provide these data to the MOH for informed HIV service planning and delivery for this key population. The BBS was also undertaken to provide information on the epidemiological profile of FSWs in Wau, which will be used as baseline information for Wau to support national HIV prevention and treatment efforts.

Goal

The goal of the BBS was to collect representative bio-behavioral information about FSWs in Wau, South Sudan to be used for planning HIV prevention, care, treatment, and other STI treatment services targeting them.

Objectives

The objectives of the BBS were to:

(1) Describe the UNAIDS 90-90-90 cascade among FSWs in Wau
(2) Estimate the prevalence of HIV, syphilis, hepatitis B virus, and high blood pressure among FSWs in Wau
(3) Describe barriers and facilitators of HIV service utilization among FSWs in Wau
(4) Characterize HIV genotype and HIV drug resistance and estimate HIV incidence among FSWs in Wau
(5) Estimate the number of FSWs in Wau
(6) Assess HIV positivity and nutritional status among biological children ages 0-5 years of FSWs in Wau
(7) Map the hotspots where FSWs exchange sex in Wau.

3.0 METHODOLOGY

The survey was conducted in two phases. The first phase involved distribution of two different types of unique objects (keychains and bangles) to FSWs using their peer volunteers. The plan was to distribute 1,000 keychains and 1,000 bangles with the second distribution taking place one week after the first. The key chains were distributed first by 24 FSW peer volunteers and received by 958 FSWs. After a week, the bangles were distributed by a different set of 24 volunteers and received by 953 FSWs. The second phase of the survey was a cross-sectional survey that recruited FSWs in Wau through eight seeds identified based on their nationality, age, influence among their peers, and locations. It commenced one week after the second distribution of the unique objects and was conducted between August and September 2019. Interviewers collected data using structured questionnaires in open data kit (ODK)-programmed tablets. Biological components included in the survey involved testing for HIV, syphilis, and hepatitis B.

3.1 Study site

The study site was located within Wau teaching hospital and easily accessible for the referral of HIV-positive clients and linkage and enrolment to ART services at Wau Hospital. The study site was secured, with access only granted to survey staff and participants.

3.2 Study population

The study population were all FSWs in Wau, South Sudan, and their biological children aged 5 years and below who met the inclusion criteria.

3.2.1 Inclusion criteria for FSWs

- Female
- 13 years of age or older[2]
- Have received money, goods, or services in exchange for sex in the past six months
- Resided, worked, or socialized in Wau for at least the last one month
- Able to communicate in English, Juba-Arabic, Amharic, Balanda, or Kiswahili
- Able to verbally consent to the survey administration and/or biologic testing
- In possession of a valid peer recruitment coupon

3.2.2 Inclusion criteria for biological children of FSWs

- Male or female
- Ages 0-5 years
- Mother is able to provide verbal consent for the child to participate in the survey

[2] We requested a waiver of parental permission under conditions 45 CFR 46.116 (d) given the local context. This was granted by the South Sudan MOH ethical review board.

3.2.3 Exclusion criteria

FSWs were excluded from participation if they:

- Were less than 13 years of age
- Could not communicate in English, Juba-Arabic, Amharic, Balanda, or Kiswahili
- Were unable or unwilling to consent to the survey
- Had already participated in a previous BBS. Women can participate only once in each city but can participate in two cities if they move.

Biological children of FSWs were excluded from participation if:

- The mother was unable or unwilling to provide informed consent for the child
- The child was older than 5 years old.

3.3 Sampling and recruitment

Respondent-driven sampling (RDS) was used to recruit the study participants. RDS is a method of chain referral sampling where participants recruit each other. This method is recommended for hidden or hard-to-reach populations. Six seeds were selected based on their age, nationality, neighborhood, and influence. Two additional seeds were added a month later in the course of the survey to reach populations that were poorly represented. After participating in the study, each FSW was given three coupons to recruit other peers. This resulted in a chain of referrals with 16 waves. Most recruitments were done by seed number 3 and two of the seeds didn't do any recruitment. The participants received a transport refund (400SSP, approx. $3), compensation for their time (600SSP, approx. $5) and an incentive for recruiting their peers (300SSP, approx. $2).

3.4 Sample size

The prevalence of HIV among FSWs in Wau is unknown, but the prevalence in the general population in South Sudan is 2.5% (2019 Spectrum estimates, UNAIDS/MOH). The proportion of HIV-positive FSWs with viral load suppression (VLS) is also unknown. For the purposes of calculating sample size, we assumed an expected VLS proportion of 50% and calculated sample size based on varied HIV prevalence and target level of precision for VLS. We thus used an estimated range of HIV prevalence of between 20-40% with a design effect of two (Salganik, 2006) and a precision of 5% to 10% to determine sample size (Table 1).

Table 1. Sample size estimates based on various levels of HIV prevalence and precision

Sample size when HIV prevalence is varied between 20% and 40%, using expected VLS of 50%, design effect of 2, precision of 10%, non-response of 5%, and 5% alpha.					
HIV prevalence	**Expected VLS**	**Target precision**	**Design effect**	**Non-response/ missing data**	**Sample size**
20%	50%	10%	2	5%	1,015
20%	50%	7.5%	2	5%	1,800

Sample size when HIV prevalence is varied between 20% and 40%, using expected VLS of 50%, design effect of 2, precision of 10%, non-response of 5%, and 5% alpha.					
HIV prevalence	**Expected VLS**	**Target precision**	**Design effect**	**Non-response/ missing data**	**Sample size**
20%	50%	5%	2	5%	4,045
25%	50%	10%	2	5%	812
25%	50%	7.5%	2	5%	1,440
25%	50%	5%	2	5%	3,236
30%	50%	10%	2	5%	677
30%	50%	7.5%	2	5%	1,200
30%	50%	5%	2	5%	2,697
35%	50%	10%	2	5%	580
35%	50%	7.5%	2	5%	1,029
35%	50%	5%	2	5%	2,311

Using an estimated prevalence of 25%, expected VLS of 50% and target precision of 10%, a sample size of 812 was found to be sufficient and used for the study.

3.5 Study design and procedures

3.5.1 Recruitment

At the beginning of the RDS survey the seeds were identified, invited to the study site, enrolled, and went through the whole survey process. After participating in the study, each seed was given three coupons to recruit their peers. To help guide participants to the site, a map of the study site and the telephone contact of the study receptionist were printed on the coupon. Peers who came to the study site were screened for eligibility, which also included possession of a valid referral coupon they had received from another peer. Peers who turned up at the study site for the first time with a valid coupon were received by the receptionist, registered and then directed to the coupon manager for eligibility screening. The coupon manager used a short screening interview programmed in a tablet to screen the FSW. Ineligible peers were flagged out based on the responses they provided. FSWs who passed the eligibility screening were then taken through the informed consent process. A consent form was signed for each FSW who consented, then recruited into the study and assigned a study ID. All those who refused to provide consent were not recruited.

3.5.2 Interviews and mapping

Interviewers administered structured questionnaires programmed in tablets to collect the data. The questionnaires were translated into Juba Arabic, Kiswahili, Zande, and Amharic. All interviewers were trained, and the study tools pretested In Juba before the survey. Mapping was conducted using Survey123 for ArcGIS programmed in tablets and wall maps. The survey

participants stuck marking pins on the wall map at the locations where they usually had sex business, then the interviewer used the wall map to mark the location on the map in Survey123.

3.5.3 HIV, syphilis, and hepatitis B testing

3.5.3.1 Pre-test counseling and HIV testing

Upon completion of the interview, participants who consented to testing received pre-test counseling for HIV, following South Sudanese national guidelines, from a trained and certified nurse counselor. The pre-test counseling session consisted of an explanation of: (1) means to prevent and treat HIV/STIs; (2) that with antiretroviral therapy, people with HIV can live a long time and when their viral load is suppressed they cannot transmit HIV to others, (3) a description of the testing procedures used during the study; and (4) the meaning of test results.

While participants were free to opt out of biomarker testing, they were appropriately counseled on the benefits of early HIV diagnosis or remaining HIV-negative with special attention to the high risk among FSWs to ensure they understood the importance of knowing their HIV status.

HIV rapid tests were used for HIV diagnosis following the World Health Organization (WHO) guidelines and South Sudan's national algorithm. Trained nurse counsellors collected approximately 7mls of venous blood into an EDTA vacutainer. Whole blood was used as a sample for the test procedures. A two-step serial testing algorithm for HIV was used in which Determine™ (Alere, MA, USA) was the screening test. If the Determine™ test was non-reactive, the HIV testing was stopped, and the result recorded as HIV-negative. However, if the Determine™ test was reactive, a Uni-Gold™ (Trinity Biotech, Ireland) test was used to confirm the initial result. If the Uni-Gold™ test was reactive, then the result was recorded as positive. If the Uni-Gold™ test was non-reactive, the test was repeated in parallel with Determine and Uni-Gold. If the results were resolved in concordance—i.e., both Determine and Uni-gold are reactive or both Determine and Uni-gold are non-reactive—they were reported as positive or negative, respectively. If the results remained discrepant, the participant was referred for repeat testing two weeks later (at the study site if fieldwork was on-going, or at a referral site if the study had ended). The leftover blood after HIV rapid testing was used in preparation of dry blood spots (DBS) for quality assurance and, in addition, for HIV-positive FSWs, viral load measurement, recency testing, genotyping, and drug resistance testing. The CD4 count was also measured on the spot for all HIV-positive individuals using an Alere PIMA machine.

Viral load testing occurred at the National Public Health Laboratory (NPHL) in Juba. For participants with HIV, total of 3 DBS cards, with 5 spots per card, were prepared by dispensing 75µl of whole blood into the dotted circles of a Whatman 903 filter card and identified by the study ID. The cards were packaged and transported to the NPHL and used for quality assurance, viral load measurement, and storage for any future tests. The cards were also shipped to CDC Atlanta and used for HIV recency testing, HIV genotyping, and HIV drug resistance testing.

3.5.3.2 Syphilis testing

The Chembio DPP Syphilis Screen & Confirm Assay (Chembio Diagnostics Systems Inc., Medford, NY) was used to test for syphilis. This unique assay was the first commercially available dual non-treponemal and treponemal point of care syphilis test. It has been shown in clinical studies to have high sensitivity and specificity for the detection of active syphilis (Castro, 2014; Yin, 2013).

3.5.3.3 Hepatitis B virus testing

The Alere Determine™ HBsAg lateral flow rapid test (Alere Inc., Waltham, MA, USA) was used to test for Hepatitis B. This assay has high sensitivity of 95.16% and specificity of 99.95% for the detection of HBsAg (Khuroo, 2014). It is simple to use and when used appropriately (following simple training of health workers, laboratory staff, or even phlebotomists), it can provide results within 15 minutes. The Alere Determine HBsAg rapid assay required only 50 µl of whole blood, serum, or plasma.

The HBsAg results were returned directly to participants with counseling about prevention and importance of timely completion of the routine childhood vaccine series (includes routine 3-dose hepatitis B vaccine series). Hepatitis B vaccine birth dose and hepatitis B immune globulin are not available in South Sudan. HBsAg results accompanied HIV test results for HIV-positive participants when they were referred for HIV care for proper clinical management.

3.5.3.4 Blood pressure measurements

Participants' blood pressure was measured two times during the first visit. The first measurement was taken before the pre-test counselling and the second was taken after post-test counselling. The two values were averaged for use as the final blood pressure value.

3.5.4 Peer recruitment and primary compensation

While the HIV, syphilis, and hepatitis B rapid tests were processing and before the test results were returned, participants returned to the coupon manager for training on peer recruitment and received their primary compensation.

The coupon manager explained the peer recruitment process to participants. Three coupons were given to each participant and they were asked to identify three peers and offer them survey participation by giving them each a coupon. Interested peers received the referral coupon and called for an appointment or presented themselves at the survey site. Survey participants who indicated they were not interested in recruiting were still encouraged to take the referral coupons in case they changed their mind later.

After being briefed on how to recruit peers, participants received primary reimbursement of 1000 SSP (approximately $8)[3]. This amount of compensation is appropriate given the high cost

[3] Approximate exchange rate is USD $1 = 130 SSP (Bank of South Sudan).

of living in South Sudan as well as because FSWs could earn more money working during time spent at the survey site.

Participants received a reminder card indicating when they should return to the study site to receive their compensation for their recruitment efforts and participate in a short interview about these efforts. They were also invited to bring any biological children aged 0-5 years with them to their second survey visit in order for the child to be tested for HIV, measured for weight and height/length, and for the mother to answer a short 10-minute interview about the child. Finally, FSWs were given condoms and information about HIV prevention and treatment.

3.5.5 Post-test counseling

Rapid test results were recorded immediately in the encrypted computer database by the counselor. All rapid test results, HIV and health referral forms were returned to the participant during post-test counseling. Post-test counseling messages were tailored to test results. Post-test counseling for HIV-negative participants included strategies for risk reduction and regular HIV testing. Counseling of HIV-positive participants included an assessment of psychosocial needs, a discussion of living with HIV infection, the benefits of treatment and having a suppressed viral load, and issues related to discrimination.

Participants who tested positive for HIV were provided with a HIV referral form and actively referred for treatment at the ART center within the hospital and about 200 meters from the study site. This form indicates the participant's age, HIV status, and where and when testing was carried out.

3.5.5.1 Treatment for syphilis and syndromic management of STIs

Syphilis treatment followed the national protocol: 2.4 MU benzathine penicillin was given intramuscularly as a single dose. In case of allergic reactions to penicillin, a shot of hydrocortisone/epinephrine was used. In case of a history of penicillin hypersensitivity, doxycycline was used. The nurse/counselor providing the syphilis testing administered treatment. Following treatment, the participant was referred for follow-up at a nearby health facility of their preference.

The nurse/counselors were also provided with the MOH flow chart to screen participants for STIs using syndromic management. All individuals screened for STIs were treated as appropriate, according to MOH guidelines. A medical kit with commonly used medicines for treating syphilis and other STIs (benzathine penicillin, cefixime, azithromycin, doxycycline, nystatin pessaries, and tinidazole) were available at the study site. A standard operating procedure (SOP) was developed for responding to participants experiencing anaphylactic shock. The nurse asked the participant whether she was pregnant before administering any treatment.

3.6 Second study visit

During the second visit, a participant's appointment was verified by the receptionist and identity verified by the coupon manager using their unique participant code. The coupon manager

asked participants a few questions about the number and characteristics of peers they approached for recruitment using the Second Visit RDS Questionnaire and provided participants with their secondary compensation for recruiting peers. The second visit was scheduled approximately three weeks after the first visit so that by the second visit participants had a chance to recruit peers and have those peers participate. Participants presenting themselves late (after the scheduled date/time) were accepted; however, the scheduled appointments of other recruits were given priority, or a new date/time arranged. The second visit was shorter; thus, participants were not given reimbursement for their time. They received 400SSP (approximately $3) for transportation for this visit. The secondary recruitment reimbursement was 300SSP (approximately $2.3) for each recruited peer who joined the survey up to a maximum 900SSP (approximately $7).

Ending recruitment and reaching sample size

The survey was terminated before reaching the required sample size of 812 because convergence was reached. Once the convergence was nearly reached, no new coupons were distributed. All participants from that point were informed that no more interviews would be conducted once the sample size was reached. Survey sites had SOPs in place for explaining the termination of the survey to those who presented once the sample size was reached.

3.7 FSW population size estimation

We utilized a three-source capture-recapture method to estimate the number of FSWs in Wau. Three-source capture-recapture is a promising new size estimation method that has the potential to obtain substantially more robust population size estimates than two-source capture-recapture. It provides three separate two source-based capture-recapture scenarios. The first unique object, keychains, was distributed two weeks prior to study initiation. The second unique object, bangles, was distributed one week prior to study initiation. Two different sets of 24 FSW peer volunteers were used to distribute the keychains and bangles to their peers. The targeted number of key chains and bangles to be distributed was 1,000 each.

3.8 Human subject protection

3.8.1 Institutional review boards

The Government of South Sudan MOH Research Ethics Committee and the Centers for Disease Control and Prevention Center for Global Health Associate Director of Science reviewed and approved the protocol. The review boards were notified in writing of changes or things not done as per the approved protocol due to circumstances beyond the control of the survey investigators. The viral load results were not returned to the HIV-positive participants as per the time stipulated in the protocol because of delays in testing from the NPHL. Children didn't participate in the survey.

3.8.2 Informed consent

In order to minimize risk to participants, study personnel thoroughly explained the purpose and procedures of the study. Participants were given extensive information regarding their role, potential risks and benefits, and their rights as a research participant. Potential participants were further informed that they could discontinue their participation at any time without explanation or penalty. Participants had the consent form read to them prior to data collection, and any questions that individuals had were answered. A copy of the consent form was given to participants, and the original (signed electronically by the coupon manager) was entered on the tablet by project staff. The MOH Ethics Review Board granted waiver of parental consent for FSWs aged 13-17 years since it is a very sensitive survey and there is need to protect those below the age of consent. Individuals still participated even if they didn't agree to biomarker testing. Participants who met inclusion criteria and provided informed consent were enrolled.

3.8.3 Confidentiality and privacy protection

No identifiable information other than phone numbers was recorded. These phone numbers were kept confidential. All explanations of study procedures occurred in a private room. All forms, logs, and notes were kept in a locked filing cabinet at the study sites. Blood pressure and STI screening and treatment paper forms were sealed in a waterproof envelope, clearly labelled as documents, and transported to Juba.

All participants were assigned a coupon ID code, study ID, and a unique participant code, which were used to link interviewer-signed consent forms, survey data, and test results. At the close of the study, unique participant codes were erased from the cleaned database. Data and other findings will only be reported in summary and released on an aggregate level. The study team was not able to match study documents to individual participants at any time during the study.

All study staff received training in research ethics and confidentiality. Study staff contracts included confidentiality agreements. Study staff responsible for data management and analysis completed an online ethics training certification program. Staff assisting with data collection were trained specifically regarding the study procedures and consent processes pertinent to their responsibilities.

As the study sponsor, CDC conducted monitoring or auditing of study activities to ensure the scientific integrity of the study and to ensure the rights and protection of study participants.

3.9 Survey data management

The in-country study team was responsible for day-to-day oversight of data records and data management, as well as compliance. Survey data and serologic testing data were entered into tablet devices by study staff. Each tablet computer was password protected and all electronic files encrypted. At the conclusion of each data collection day, data from each tablet was uploaded to Ona, the data management server.

At the conclusion of data collection, in agreement with the MOH, the data were sent to IntraHealth and CDC for processing and analysis. The data were stored on the network share drive, which only authorized project staff can access. Once cleaned, the datasets were available to the study team to conduct analyses upon signing a data use and confidentiality agreement.

To ensure confidentiality of the data, names and other personal identifying data were not collected. The data were cleaned in Excel and analyzed using RDS analyst and Stata 13. The analysis involved generating tables of population-adjusted proportions, graphs, and charts.

4.0 RESULTS

4.1 Overview

The results are presented in tables, charts, and graphs based on the thematic areas in the questionnaires and in line with the objectives of the study. Results presented are all Wau FSW population-adjusted.

4.2 Description of the sample participants

A total of 693 FSWs completed the survey screening process. Thirteen of those who completed the screening and were eligible didn't complete the survey and one participant was dropped because of a missing screening form, leaving the number of participants who completed the survey at 679. All 679 participants consented to HIV, syphilis, and hepatitis B testing.

4.3 Estimated population of FSWs in Wau

Using the capture-recapture method, the population size of FSWs in Wau was estimated at 3,000 (95% CI: 2,203-6,079)

4.4 Recruitment of participants in the RDS phase

In total, eight seeds were recruited for the survey, six at the beginning of the survey and two about a month into the survey. The seeds were recruited in consultation with the peer educators. Each seed was given three coupons to recruit three of their peers in the study. There were 16 waves in total and the highest propagation was by seed three. Two of the seeds didn't recruit any peers. The recruitment tree based on the recruitment yield linked to the recruiter through their ID is shown in Figure 1.

Figure 1. Graphic representation of the recruitment tree

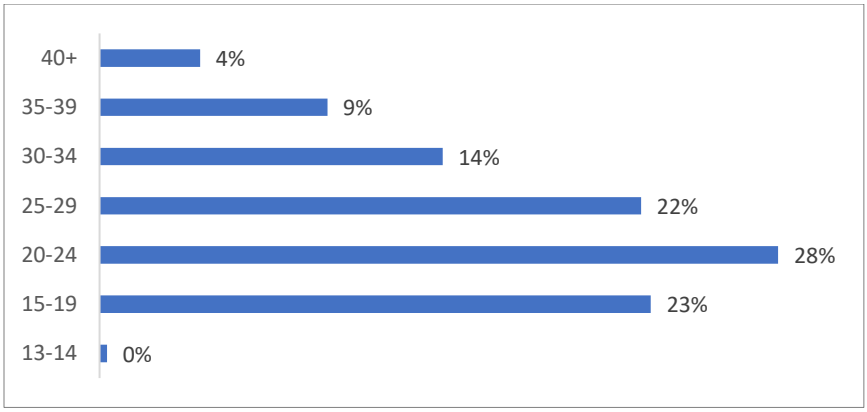
4.5 Socio-demographic characteristics

4.5.1 Basic socio-demographic characteristics

A total of 679 FSWs in Wau participated in the study. The median age was 24 years IQR [20-30] with 24% of the FSWs below 20 years and only 4% being 40 years and above (Figure 2). More than half (53%) of the FSWs were young (below 25 years). The majority (93%) of the FSWs were South Sudanese by nationality and the remaining 7% were Ugandans, Congolese, and Sudanese. FSWs lived in neighborhoods distributed across the two payams (Wau north, Wau South) that make up Wau town with more than half (54%) living in Kosti (11%), Daraja East (11%), Jebel Kheir (10%), Lokoloko 8%, Hai Salaam (8%), and Daraja West (7%) (Figure 3). More than three

quarters (77%) of the FSWs were illiterate and could not read or write in any language while 59% had primary as the highest level of education and 28% did not attend school. Forty-four percent were divorced or separated, 40% were single, and 13% were widowed.

Figure 2. Distribution of participants age (in years)

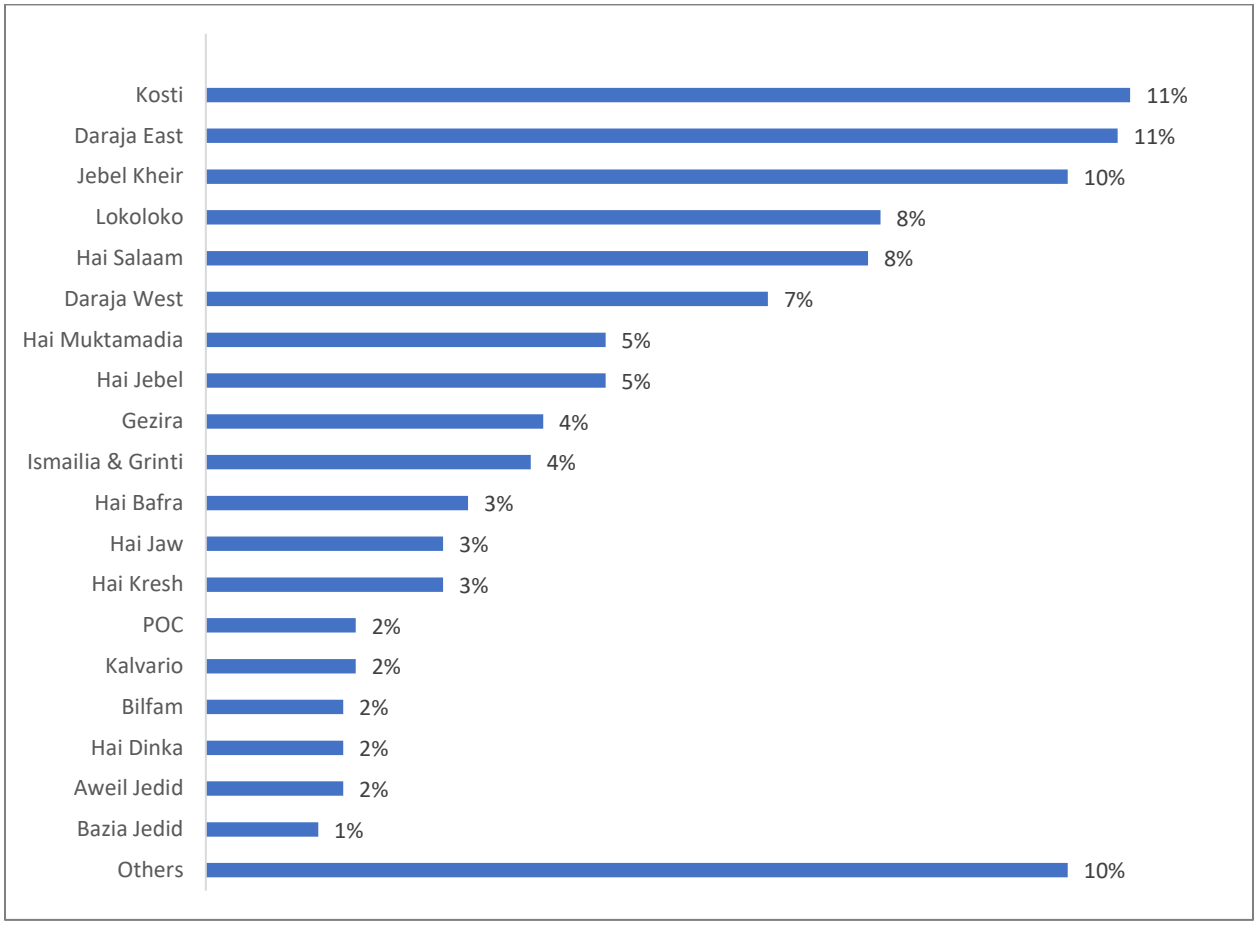


Error! Reference source not found. **Basic sociodemographic characteristics of FSWs in Wau**

Variable	Frequency	Population proportion	
		%	(95% CI)
Median [IQR] age	**24 [20-30]**		
Age of Participants			
13-14	2	0.2	0.0 0.4
15-19	153	23.7	18.4 29.0
20-24	188	28.7	23.0 34.3
25-29	150	20.9	16.1 25.7
30-34	95	13.5	8.6 18.5
35-39	63	8.5	6.1 11.0
>40	28	4.4	2.4 6.5
Age group	**678**		
Younger (13-24 years)	343	52.6	45.2 60.1
Older (>=25 years)	335	47.4	40.0 54.8
Country of Birth	**679**		
South Sudan	615	92.6	88.7 96.6
Uganda	32	2.4	0.6 4.2
Democratic Republic of Congo	18	2.2	0.0 4.4
Republic of Sudan	14	2.7	1.0 4.5
Literacy	**677**		
Cannot read and write	526	77.3	773.2 81.4
Can read and write	151	22.7	18.6 26.8

Variable	Frequency	Population proportion		
		%	(95% CI)	
Highest Education Level Attended	**678**			
Primary	388	59.4	52.9	65.9
Secondary	84	11.8	8.9	14.7
Higher	4	0.5	0.0	0.9
Did not attend School	202	28.3	22.2	34.5
Current Marital Status	**679**			
Single, never married	272	39.4	33.0	45.7
Married (Monogamous)	11	2.4	0.6	4.2
Married (Polygamous)	10	1.4	0.6	2.3
Separated/Divorced	297	44.0	38.1	49.9
Widowed	89	12.8	9.3	16.3
Religion	**679**			
Catholic	558	82.3	77.4	87.2
Protestant	43	5.9	2.1	9.8
Muslim	50	8.1	5.4	10.8
Other	28	3.6	2.2	5.1

Figure 3. Distribution of FSWs current residence in Wau by neighborhood



4.5.2 Monthly income and main source of income of FSW in Wau

The main source of income for most (92%) FSWs was sex work and the median monthly income was 20,000 SSP (approximately $154) [IQR 7,500 SSP-45,000 SSP]. Almost a third (30%) of tFSWs earned less than 10,000 SSP a month and a few (7%) earned 100,000 SSP or more (Figure 4).

Figure 4. Distribution of monthly income among FSWs in Wau

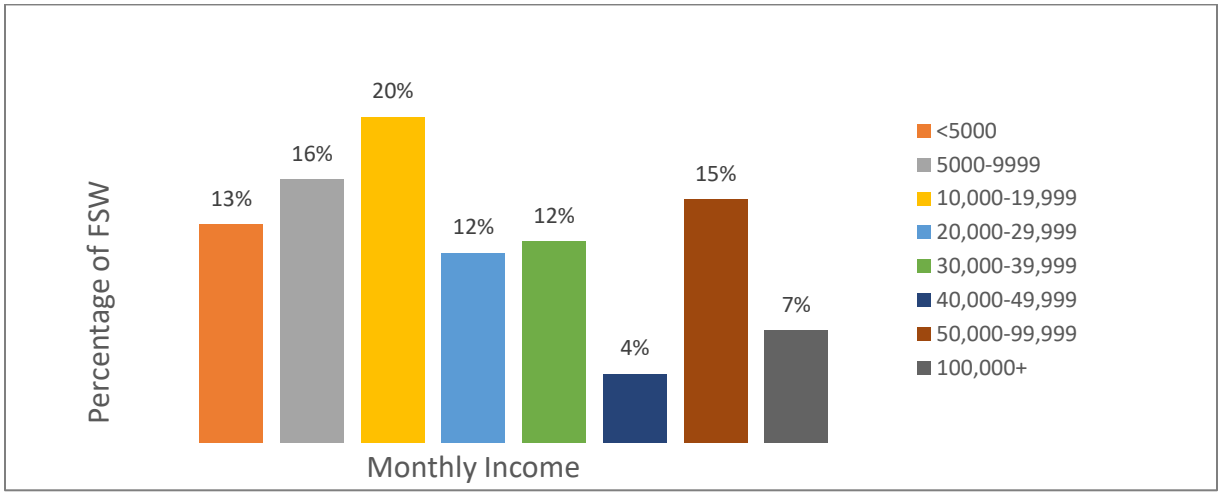


Table 3. Monthly income and main source of income among FSWs in Wau

Variable	Frequency	Population proportion		
		%	(95% CI)	
Median [IQR] monthly income	**20,000 [7,500-45,000] SSP**			
Main Source of income	**679**			
Sex work	626	91.5	88.8	94.2
Other	53	8.5	5.8	11.2
Monthly income (SSP)	**672**			
<5,000	85	13.5	8.0	18.9
5,000-9,999	109	16.2	11.2	21.3
10,000-19,999	132	20.1	16.6	23.5
20,000-29,999	80	11.7	8.8	14.6
30,000-39,999	84	12.4	9.4	15.4
40,000-49,999	32	4.2	2.9	5.6
50,000-99,999	99	15.0	11.4	18.6
100,000+	51	6.9	4.6	9.3

4.5.3 Living arrangements, children, and mobility

Nearly all (99%) of the FSWs had lived in Wau for a year or more with 60% having lived in Wau for 10 years or more. Very few (5%) of the FSWs had been away from Wau for more than a month in the last year and 29% slept in the same place most nights. More than half (55%) of the FSWs lived with two or more children under their care; 20% lived with one child.

Table 4. Living arrangements of FSWs in Wau

Variable	Population proportion			
	Frequency	%	(95% CI)	
Median [IQR] length of stay in Wau	**13 [6-22] years**			
Sleep same place most of the nights	**677**			
Yes	199	29.0	24.4	33.5
Length of stay in Wau	**676**			
<1 year	11	1.5	0.3	2.6
1-4 years	118	16.6	12.7	20.4
5-9 years	146	21.7	17.7	25.8
10+ years	401	60.2	54.0	66.5
Away from home > 1 month in last year	**679**			
Yes	36	5.0	3.2	6.9

4.6 Depression, alcohol use, and non-injection drug use

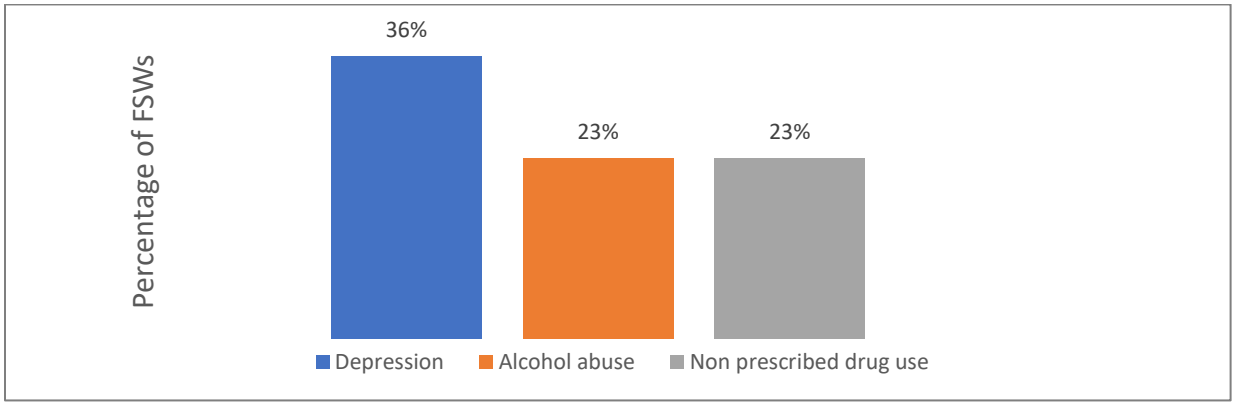
4.6.1 Depression

FSWs were screened for depression using the Patient Health Questionnaire-2 (PHQ-2). A total score of 3 or more from the two questions indicates depressive disorder. Thirty six percent of the FSWs screened positive for depression (Figure 5).

4.6.2 Alcohol and non-prescribed drug use

Assessment for alcohol abuse using the AUDIT-C assessment tool showed that 23% of the FSWs had scores indicative of alcohol abuse. Five percent suffered both depression and alcohol abuse. Nearly one in four (23%) of FSWs had used either a non-injection or injection non-prescribed drug in the last six months.

Figure 5. Distribution of depression, alcohol abuse, and drug use among FSWs in Wau



4.7 Social cohesion among FSWs in Wau

4.7.1 Social life and relationships with other women and girls who sell and/or exchange sex

Many FSWs count on their peers in dealing with violent clients, seeking medical services, and condom use. Sixty-two percent agree that they rely on their fellow sex workers to accompany them when seeking medical services. More than half (52%) agreed that they count on their peers when dealing with difficult clients, partners or persons in life, and 54% agree that they count on their peers for support on condom use. In the last 12 months, FSWs had helped fellow sex workers to negotiate or stand up against police (26%), madams or pimps (14%), and other clients or sexual partners (38%).

Table 5. Social capital and support among FSWs

Variable	Frequency	Population proportion		
		%	(95% CI)	
Count on other sex workers to accompany them to the doctor or hospital	**676**			
Strongly disagree	30	4.7	2.6	6.8
Disagree	148	23.5	17.6	29.4
Neutral	66	9.3	6.9	11.8
Agree	424	61.8	56.3	67.2
Strongly agree	8	0.7	0.4	1.8
Count on other sex workers to help deal with a violent or difficult client, partner, or person in her life	**678**			
Strongly disagree	37	05.8	3.8	7.7
Disagree	188	29.7	24.4	34.9
Neutral	88	12.4	9.6	15.2
Agree	359	51.7	46.3	57.1

Variable	Frequency	Population proportion		
		%	(95% CI)	
Strongly agree	6	0.5	0.0	1.3
Count on other sex workers to support use of condoms	**657**			
Strongly disagree	26	3.5	1.7	5.3
Disagree	186	31.2	24.3	38.1
Neutral	71	11.1	8.3	13.9
Agree	365	53.3	47.1	59.4
Strongly agree	9	1.0	0.0	2.6
Negotiated with or stood up against police in order to help fellow sex worker in the past 12 months	**679**			
Yes	193	25.8	21.7	30.0
Negotiated with or stood up against a madam/broker/pimp in order to help a fellow sex worker in past 12 months	**677**			
Yes	110	14.4	11.4	17.4
Negotiated with or stood up against clients/any other sexual partner in order to help a fellow sex worker in past 12 months	**678**			
Yes	273	37.7	32.7	42.8

4.8 Sexual experience

4.8.1 Sexual debut and lifetime sexual history

The median age at first sex was 15 years [IQR 14-17]; 31% of FSWs had ever had anal sex. Twenty-nine percent had sex before age 15 and approximately half (53%) began having sex between the ages of 15-17; 81% had already had sex before the age of 18 (Figure 6). Only 4% of FSWs began having sex when they were at least 20 years old. Half (51%) were paid or given something in exchange for sex by their first male sex partner and 28% were forced into sex.

Figure 6. Distribution of age at sexual debut (years)

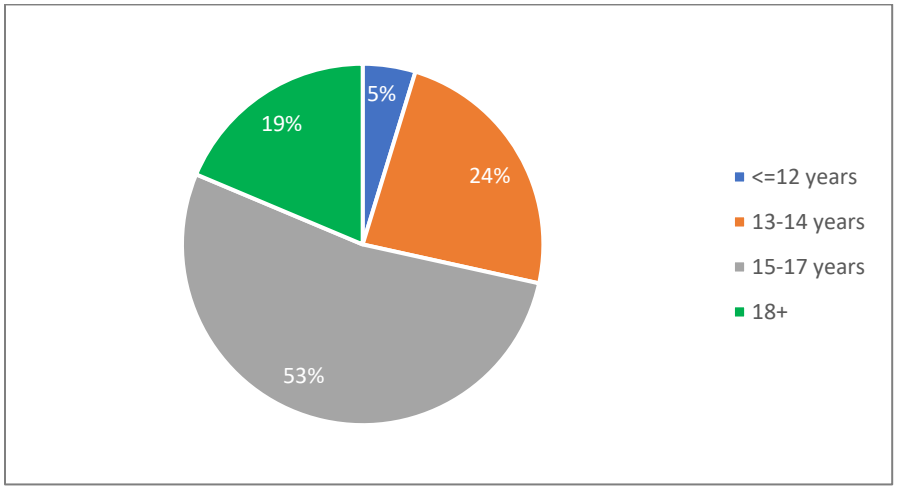


Table 6. Lifetime sexual history of FSWs in Wau

Variable	Frequency	Population proportion		
		%	(95% CI)	
Median [IQR] age at first sex	15 [14-17] years			
Ever had anal sex	**679**			
Yes	222	30.8	26.1	35.5
Age at first sex	**664**			
10-14 years	193	28.3	24.2	32.4
15-19 years	441	67.7	63.5	71.9
20+ years	30	4.0	2.5	5.4
Age of male sex partner at the time of first sex	**610**			
More than 10 years younger than me	22	3.2	1.9	4.4
5-10 years younger than me	94	14.9	9.9	19.8
About the same age	170	28.3	24.1	32.5
5-10 years older than me	255	42.1	37.1	47.2
More than 10 years older than me	69	11.5	8.8	14.3
Paid or given something in exchange for sex by first male sex partner	**677**			

Variable	Frequency	Population proportion		
		%	(95% CI)	
Yes	334	50.6	44.9	56.4
First time had sex was because wanted or forced	**677**			
Wanted	480	71.6	66.3	76.8
Forced	197	28.4	23.2	33.7
First time sex, physically forced or pressured through harassment, threats, or tricks	**197**			
Physically forced	147	69.1	60.3	76.6
Pressured	50	30.9	23.4	39.7

4.9 Sex work characteristics

4.9.1 Initiation, duration, reason, venues of sex work, and mapping of hot spots

Initiation into exchange of sex for money, gifts, goods, or services for FSWs in Wau started at a young age. The median age at first exchange of sex was 19 years [IQR 17-24]. More than half (53%) of FSWs started selling sex between the ages of 15-19 and 80% began below age 25. More than two-thirds (68%) of FSWs had been in sex work for less than 5 years and 7% less than a year. Ten percent had been in the sex business for 10 years or more.

The common venues where FSWs met their clients were hotels (72%), private homes (39%), lodges (34%), and bars or clubs (17%). Some FSWs (10%) have agents that facilitate them to meet clients. The main agents being used were family members (24%), friends (29%), and hotel managers (16%).

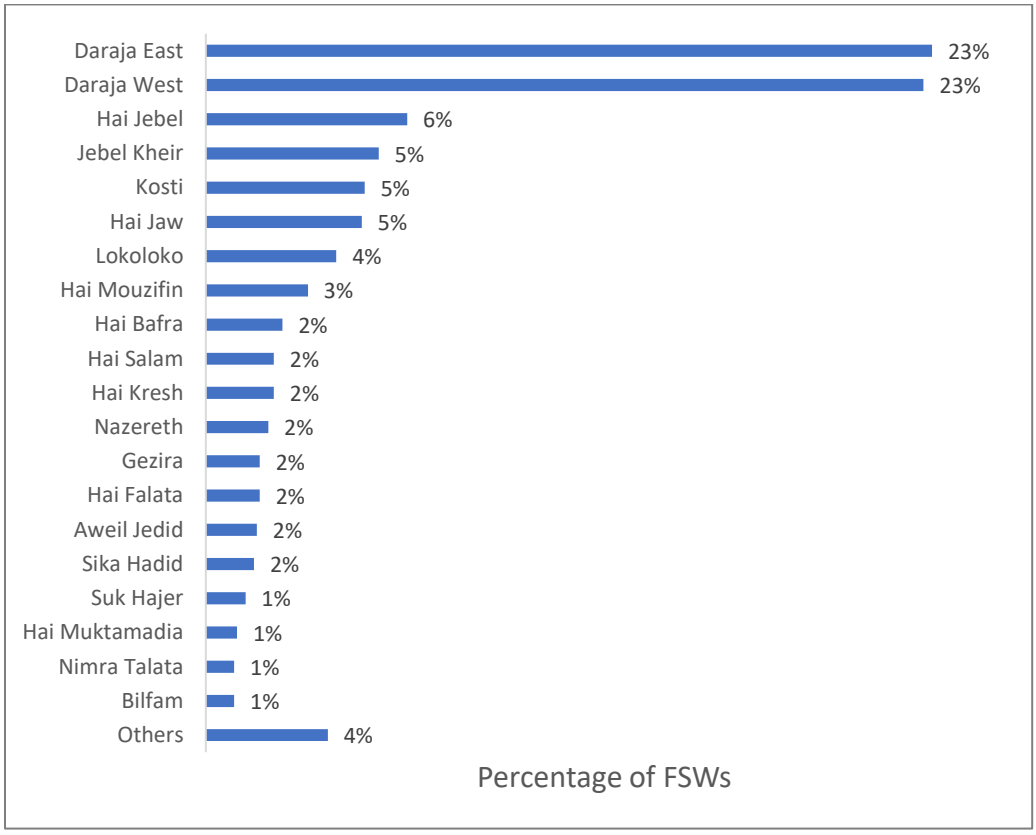
4.9.1.1 Distribution of locations where FSWs find their clients

The locations where FSWs met their clients were distributed throughout the town (Wau North and Wau South payams). The main locations were clustered around Wau stadium, Bilpham, Suk Jaw, Hai Salam, Jebel Kheir, and Lokoloko. The largest clusters were around Wau stadium and Suk Jaw. Younger and older FSWs were almost uniformly distributed across all the locations. HIV-positive FSWs were also distributed throughout Wau town with their numbers highest at locations with higher numbers of FSWs.

4.9.1.2 Analysis of FSW hotspots in Wau

Hotspot analysis was conducted in ArcGIS using Getis-Ord Gi. The analysis identified one statistically significant hotspot at 99% level of confidence and eight at 90% level of confidence. There were 24 coldspots at 90% level of confidence.

Figure 7. Distribution of sex work locations in Wau by neighborhood**



**Multiple responses allowed

Table 7. Initiation, duration, reason, and venues of sex work among FSWs in Wau

Variable	Frequency	Population proportion		
		%	(95% CI)	
Median [IQR] age at first exchange of sex			19 [17-24]	
Median [IQR] time engaged in sex work			3 years [2-6]	
Age at first exchange of sex	**659**			
Less than 15	33	4.7	3.0	6.3
15-19	337	52.9	47.3	58.6
20-24	148	22.1	18.3	26.0
25-29	87	11.8	7.4	16.2
30-34	37	5.8	3.8	7.8
35-39	13	2.2	0.6	3.8
40+	4	0.5	0.0	1.0
Time engaged in sex work	**659**			

Variable	Frequency	Population proportion		
		%	(95% CI)	
<1 year	41	7.1	4.7	9.6
1-4 years	400	61.0	56.1	65.9
5-9 years	151	21.7	17.7	25.6
10+ years	67	10.2	7.3	13.0
Venue where usually meet or find clients*	**679**			
Bar or club	124	17.1	13.9	20.4
Hotel	497	72.3	65.7	78.9
Street or park or other public places	62	9.7	5.2	14.2
Private home	236	38.7	31.8	45.7
Restaurant	41	5.3	3.8	6.9
Lodge	242	34.2	28.7	39.6
Others	22	2.6	0.0	5.3
Have agents that help FSW meet clients	**679**			
Yes	73	10.4	08.0	12.8
Type of agent	**73**			
Hotel manager	9	15.5	06.5	25.4
Lodge owner	9	9.3	0.0	18.5
Another sex worker	6	7.8	0.0	18.2
Family member	19	23.7	11.7	35.1
Friend	19	28.7	18.9	39.1
Others	12	16.8.0	6.6	27.1

***Multiple responses allowed**

4.10 Sexual behavior with male partners and clients

4.10.1 Sexual behavior with regular male sex partners and casual sex partners (non-paying), and condom use

The median number of male sex partners a FSW had in the last six months was 10 [IQR 5-80], and 10 [IQR 4-55] for partners who paid for sex. More than half (53%) of FSWs had at least one casual sex partner, median 1 [IQR 0-2], and 37% had used a condom the last time they had sex. Seventy percent indicated they could ask their main sex partner to use a condom if they wanted. Not being in possession of or having thought about a condom was the main reason FSWs did not use one with paying and non-paying partners (paying 42%, non-paying 52%), along with partner objection (paying 32%, non-paying 27%).

Figure 8. Frequency of condom use with casual and paying sex partners in the last six months

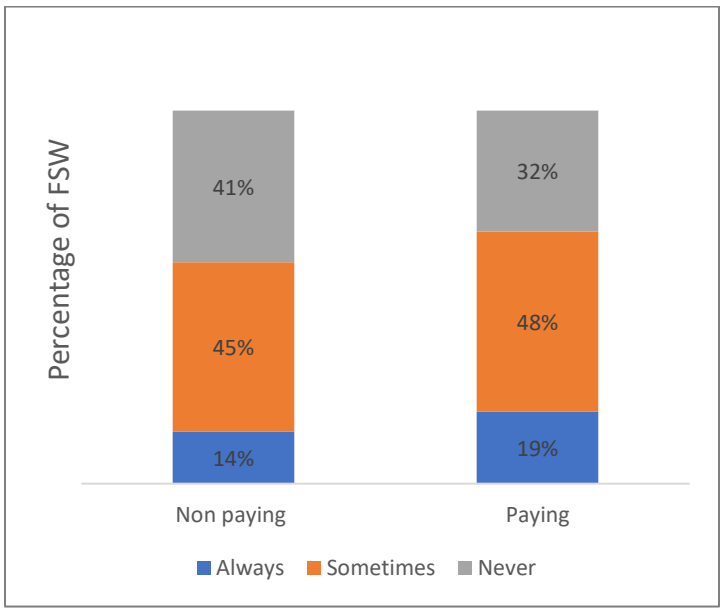


Figure 9. Distribution of condom use during last sex

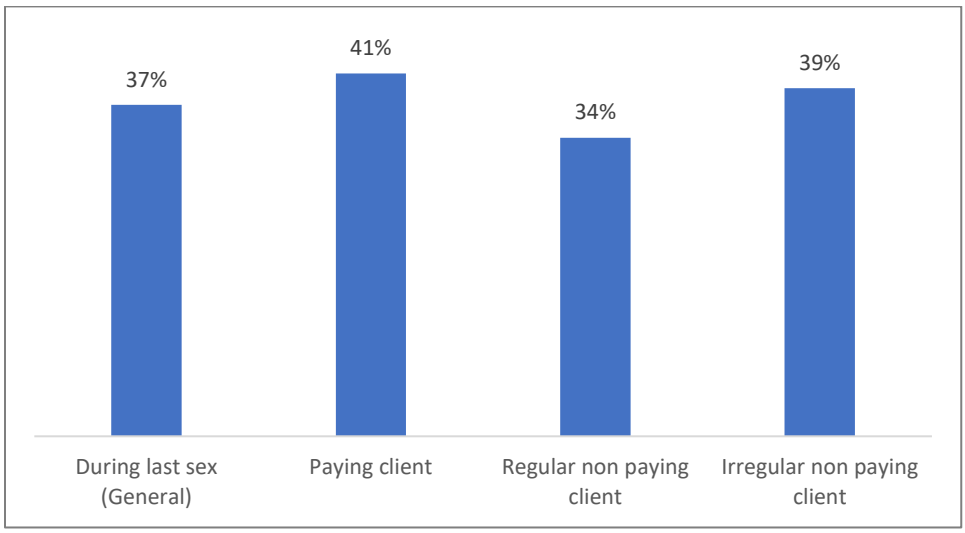


Table 8. Reasons for non-condom use during vaginal sex in the last 6 months

Variable	Frequency	Population proportion		
		%	(95% CI)	
Last non-paying partners	**95**			
Did not have one/I didn't think of it	50	52.4	31.2	73.4
Don't like them	12	10.5	0.0	23.8
Partner objected	22	27.3	17.5	38.4

Didn't feel at risk because it is in a regular relationship	5	3.7	0.0	14.4
Other	6	6.2	2.0	10.3
Last paying partners	**262**			
Did not have one/I didn't think of it	111	42.3	35.0	49.7
Don't like them	34	12.3	7.7	16.8
Partner objected	82	31.7	25.1	38.4
Didn't feel at risk because it is in a regular relationship	5	2.1	0.3	4.0
Drunk	11	4.0	1.6	6.4
Other	19	7.5	2.8	12.2

Table 9. Condom use at last sex and willingness to ask for condom use

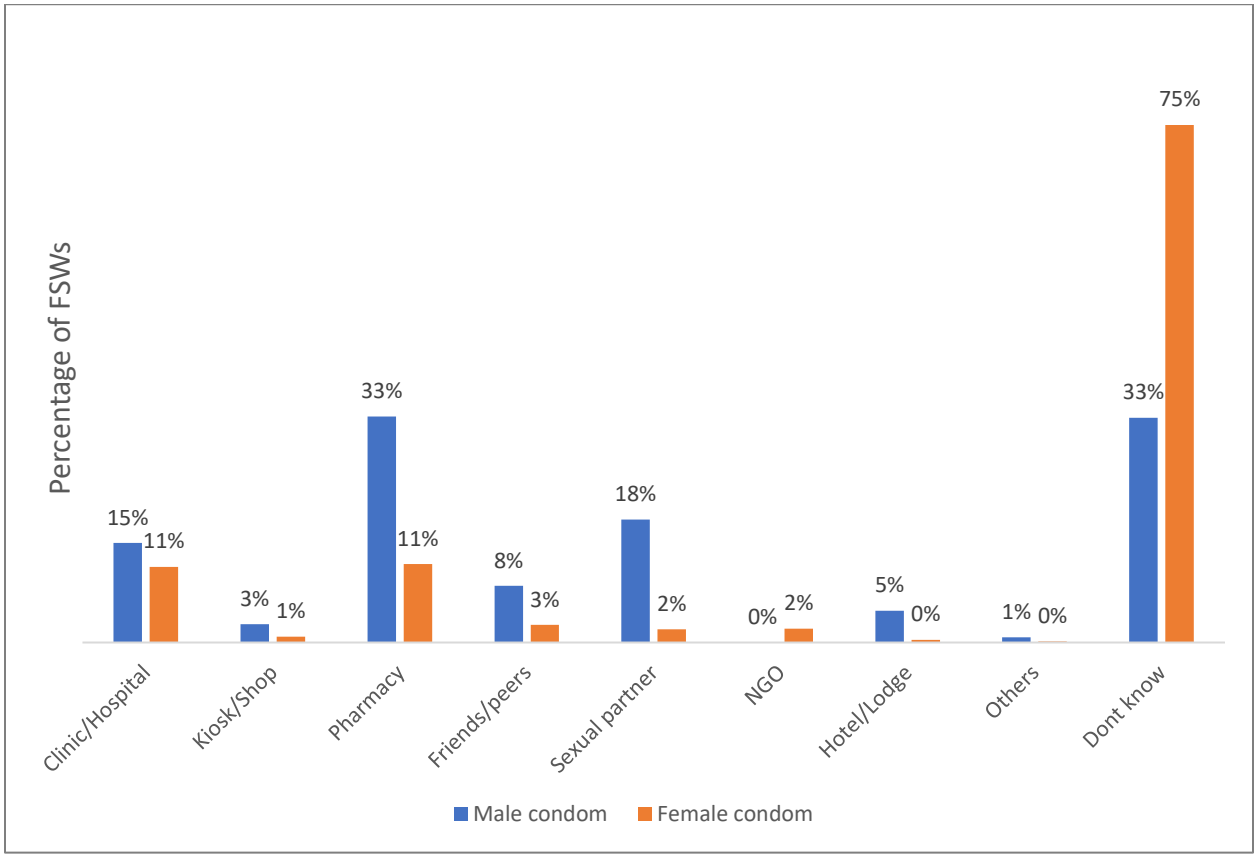
Variable	**Frequency**	**Population proportion**		
		%	**(95% CI)**	
Used condom during last sex with a client	**678**			
Yes	276	37.2	30.6	43.9
Used condom during last sex with cash client	**678**			
Yes	299	40.8	34.1	47.4
Frequency of condom use with cash client in the last 6 months	**178**			
Always	28	13.9	8.6	18.9
Sometimes	80	45.4	36.3	54.5
Never	70	40.7	31.3	50.5
Frequency of condom use with non-cash clients	**664**			
Always	157	19.3	14.9	23.7
Sometimes	313	48.3	41.6	54.9
Never	194	32.5	24.8	40.2
Can ask main sex partner to use condom if wanted	**603**			
Yes	434	69.63	63.44	75.74

4.11 Condoms and lubricants

4.11.1 Access to condoms, experience, and information on condom use

One-third (33%) of the FSWs in Wau didn't know where to obtain male condoms and up to three-quarters (75%) didn't know where to get female condoms. The main places FSWs knew where male condoms could be obtained were clinics/hospitals (15%), pharmacies (33%), and from a sexual partner (18%).

Figure 10. Distribution of where FSWs believe condoms can be obtained**



**Multiple responses allowed

More than one-quarter (27%) of FSWs had received free condoms in the last 12 months. Twenty-seven percent couldn't get a condom when needed because they didn't know where to get it. High cost (18%) and inconvenience (12%) were some of the reasons for not getting a condom.

Table 10. Access to condoms, experience, and information on condom use among FSWs

Variable	Frequency	Population proportion		
		%	(95% CI)	
Preferred brand of male condoms**	**679**			
Number One	110	15.5	12.3	18.7

Variable	Frequency	Population proportion		
		%	(95% CI)	
Trust	42	4.9	3.3	6.5
Lifeguard	80	11.5	8.6	14.3
Protector	22	3.7	1.8	5.5
UNFPA	93	13.1	10.3	16.0
White in color brand	54	7.4	5.3	9.6
Others	21	2.4	1.4	3.5
Received free condoms in the last 12 months	**662**			
Yes	193	26.9	22.5	31.2
Reasons couldn't get a condom in the last 12 months if wanted**	**679**			
Costs too much	122	17.9	14.5	21.2
Not convenient	64	11.5	8.4	14.7
Clinic does not provide them	14	2.2	1.0	3.3
Embarrassed to get condoms	13	2.4	0.6	4.1
Do not know where to get condoms	170	27.0	20.9	33.0
Condom not available	34	5.0	1.0	9.1
Others	36	6.3	1.5	11.0

**Multiple responses allowed

4.11.2 Lubricant access and use

Only 27% of the FSWs had received free lubricants in the last 12 months and only 42% had used lubricants during vaginal or anal sex in the last six months. Saliva as lubricant was used by 32% of the FSWs in the last six months followed by Vaseline, pomade, or other petroleum jelly products (22%). See Table 10.

Table 11. Lubricant access and use among FSWs

Variable	Frequency	Population proportion		
		%	(95% CI)	
Used lubricant during anal or vaginal sex in last 6 months	**659**			
Yes	279	41.7	36.6	46.8
Lubricant used during anal or vaginal sex in the last 6 months**	**279**			
Water-based lube, KY Jelly, Vendome	44	17.5	11.1	24.1
Saliva	91	32.5	26.2	38.8

Variable	Frequency	Population proportion		
		%	(95% CI)	
Vaseline, pomade or other petroleum jelly products	64	21.5	15.9	26.9
Body lotion, shea butter, or baby oil	50	17.0	11.6	22.3
Cooking oil, mayonnaise, butter, or margarine	44	14.3	9.0	19.4
Water	28	4.6	2.7	6.6
Soap	6	0.9	0.1	1.7
Others	3	1.0	0.0	2.0
Received free lubricants in the last 12 months	**679**			
Yes	27	3.3	2.1	4.6

**Multiple responses allowed

4.12 Shame, stigma, discrimination, and violence

4.12.1 Shame and stigma about sex work

Nearly half (46%) of FSWs felt ashamed of selling or exchanging sex for money, gifts, goods, or services; 46% of FSWs felt they had lost respect in the community and 39% thought less of themselves. Close to a quarter (24%) were afraid to seek health or social services, while 15% avoided such services.

Table 12. Shame and stigma about sex work among FSWs

Variable	Frequency	Population proportion		
		%	(95% CI)	
Lost respect in the community because of selling/exchanging sex for money, gifts, goods, or services	**674**			
Strongly agree	72	11.0	8.4	13.7
Agree	233	35.2	29.7	40.8
Disagree	357	51.0	45.0	57.0
Strongly disagree	12	2.8	0.9	4.6
Think less of myself because of selling/exchanging sex for money, gifts, goods, or services	**676**			
Strongly agree	18	2.7	1.4	4.1
Agree	241	36.1	29.5	42.7
Disagree	405	59.0	52.4	65.5
Strongly disagree	12	2.2	0.9	3.4

Variable	Frequency	Population proportion		
		%	(95% CI)	
Felt ashamed of self because of selling/exchanging sex for money, gifts, goods, or services	**678**			
Strongly agree	50	8.9	6.0	11.7
Agree	251	36.7	30.9	42.4
Disagree	364	52.6	47.0	58.2
Strongly disagree	13	1.9	0.9	2.9
Afraid to seek health or social services because of selling/exchanging sex for money, gifts, goods, or services	**678**			
Strongly agree	25	3.6	1.8	5.5
Agree	143	20.0	15.4	24.6
Disagree	498	74.8	70.0	79.6
Strongly disagree	12	1.6	0.8	2.5
Avoided seeking health or social services because of worry someone may learn that I sell/exchange sex for money, gifts, goods, or services	**678**			
Strongly agree	19	3.2	1.4	4.9
Agree	82	11.9	9.5	14.3
Disagree	550	81.0	77.8	84.3
Strongly disagree	27	3.9	2.4	5.4

4.12.2 Harassment and discrimination because of sex work

More than half (56%) of the FSWs in Wau had experienced verbal insults because of engaging in sex work and 26% had been blackmailed. Eleven percent felt health care providers increased costs of their procedures to FSWs. Sex work is illegal in South Sudan and women who engage in the sex business are at times stopped or arrested by uniformed officers. Fifteen percent of FSWs had been stopped and 15% arrested by uniformed officers. To avoid trouble with the officers, 13% of the FSWs gave either money (79%), sex (27%), or other things (2%). See Table 13.

Table 13. Harassment and Discrimination because of selling or exchanging sex among FSWs

Variable	Frequency	Population proportion		
		%	(95% CI)	
Felt health care providers increased the costs of a procedure for me because of selling/exchanging sex for money, gifts, goods, or services	**661**			
Strongly agree	13	1.2	0.5	1.8
Agree	62	10.0	7.4	12.5
Disagree	559	84.9	81.8	88.0
Strongly disagree	27	4.0	2.4	5.6
Verbally insulted, harassed and or threatened because of selling/exchanging sex for money, gifts, goods, or services	**677**			
Strongly agree	152	22.3	18.2	26.4
Agree	234	33.4	28.3	38.6
Disagree	286	43.4	37.5	49.3
Strongly disagree	5	0.8	0.1	1.6
Blackmailed by someone because of selling/exchanging sex for money, gifts, goods, or services	**679**			
Strongly agree	32	4.9	3.3	6.5
Agree	138	20.6	17.2	24.0
Disagree	496	72.7	68.7	76.6
Strongly disagree	13	1.8	0.5	3.2
Stopped by uniformed officer because of selling/exchanging sex for money, gifts, goods, or services	**678**			
Strongly agree	62	7.5	05.5	9.5
Agree	49	7.5	05.1	9.9
Disagree	567	85.0	81.9	88.1
Strongly disagree	0	0.0	0.0	0.0
Arrested because of selling/exchanging sex for money, gifts, goods, or services	**678**			
Strongly agree	54	6.9	4.9	8.9
Agree	53	8.5	6.2	10.9

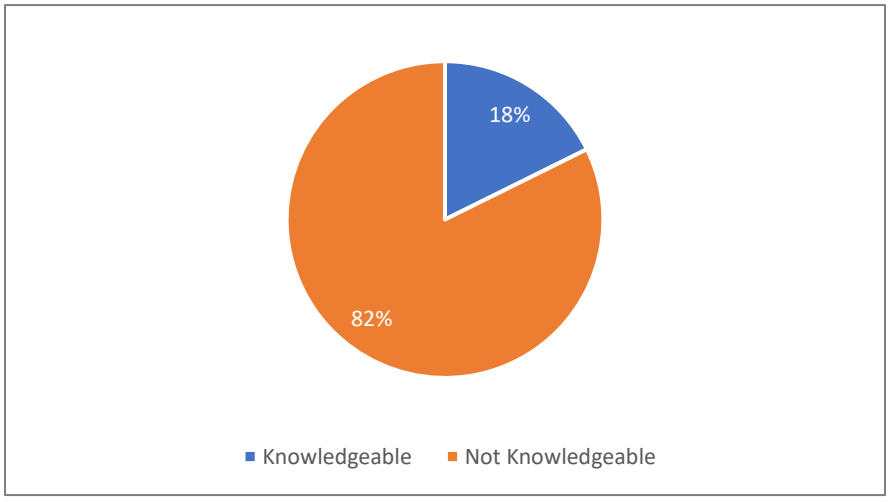
Variable	Frequency	Population proportion		
		%	(95% CI)	
Disagree	571	84.6	81.6	87.6
Strongly disagree	0	0.0	0.0	0.0
Gave something to the police to avoid trouble with them because of selling/exchanging sex for money, gifts, goods, or services	**679**			
Yes	99	12.5	9.7	15.3
Things given to uniformed officers to avoid trouble with them because of selling/exchanging sex for money, gifts, goods, or services**	**99**			
Money	80	79.1	70.6	87.2
Sex	24	26.6	17.8	36.2
Other	2	1.9	0.0	9.7

**Multiple responses allowed

4.13 HIV knowledge and perceptions

FSWs were asked a set of five true or false questions (Table 13) about ways of preventing HIV through sexual transmission and some of the major misconceptions. Those who answered all five questions correctly were considered to have comprehensive knowledge on HIV as per the UNAIDS definition. Only 18% of the FSWs had comprehensive knowledge about HIV.

Figure 11. Distribution of comprehensive knowledge on HIV



Almost all (96%) of the FSWs were unaware that anal sex poses the highest risks of HIV transmission when a condom is not used; instead more than half (55%) thought vaginal sex is what puts one at the highest risk. Only 38% and 41%, respectively, knew that being on treatment can reduce the risk of HIV transmission to a sexual partner or from mother-to-child.

Table 14. HIV knowledge and perceptions among FSWs

Variable	Frequency	Population proportion		
		%	(95% CI)	
Having only one HIV-negative sex partner with no other sex partners reduces chance of getting HIV	**679**			
Answered correctly (Yes)	391	56.7	51.5	62.0
Can a person reduce the risk of HIV by using condom each time they have sex	**679**			
Answered correctly (Yes)	488	69.7	64.1	75.3
Can a healthy-looking person have HIV	**679**			
Answered correctly (Yes)	433	64.6	59.3	69.8
Can a person get HIV from mosquito bites	**679**			
Answered correctly (No)	324	47.1	42.2	51.9
Can a person get HIV by sharing food with someone who is infected	**679**			
Answered correctly (No)	515	76.9	72.1	81.7
Comprehensive HIV knowledge (all 5 answered correctly)	**679**			
Knowledgeable	117	17.7	14.2	21.2
Not knowledgeable	562	82.3	78.8	85.8
Kind of sex that puts one most at risk if condom is not used	**679**			
Oral sex	31	3.9	2.4	5.3
Vaginal	366	54.9	49.4	60.4
Anal	32	4.5	3.0	6.0
Mutual masturbation	52	8.2	5.8	10.6
All the above equally	136	19.5	16.0	22.9
Don't know	62	9.0	5.0	13.0

Variable	Frequency	Population proportion		
		%	(95% CI)	
Can a person reduce the risk of HIV transmission by being on treatment	**678**			
Yes	267	37.7	32.1	43.3
Can HIV transmission from mother to infant be reduced by treating the mother	**678**			
Yes	300	40.9	35.6	46.3

4.14 Reproductive health

4.14.1 Pregnancy history and ANC services

Most of the FSWs had ever been pregnant (82%) and 8% of them were pregnant at the time of the survey. The median number of pregnancies was 3 [IQR1-5]. Twenty-six percent of the women had pregnancies that miscarried and 16% had aborted. Nineteen percent had last pregnancies that resulted in a live birth in the last 12 months. Among those whose last pregnancies resulted in live birth, 86% attended ANC and 87% were tested for HIV of which one percent tested positive. All those that tested HIV-positive were enrolled on ART and continued ART after delivery. Only 39% were tested for syphilis.

Figure 12. Distribution of key reproductive health indicators during last pregnancy

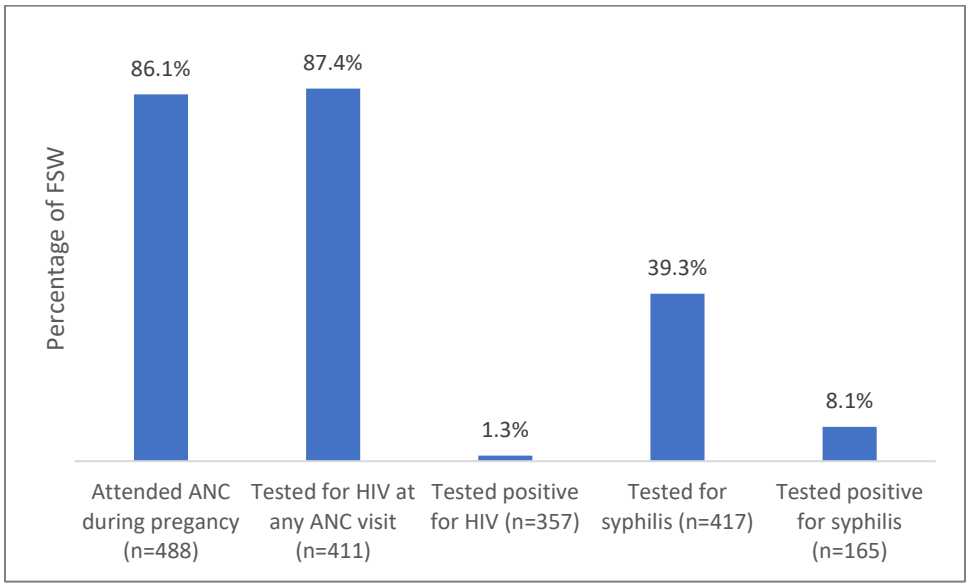


Table 15. Pregnancy history and use of ANC services

Variable	Frequency	Population proportion		
		%	(95% CI)	
Median [IQR] number of pregnancies	3 [1-5]			
Ever been pregnant	**678**			
Yes	565	81.7	75.2	88.2
Numbers of pregnancies	**679**			
0	113	18.3	11.8	24.8
1	147	22.8	18.5	27.0
2-4	270	38.2	32.2	44.3
5+	149	20.7	15.3	26.1
Ever had pregnancy that miscarried	**565**			
Yes	145	25.9	21.9	30.0
Ever had an abortion	**565**			
Yes	89	15.6	11.8	19.3
Currently pregnant	**546**			
Yes	43	8.0	5.7	10.3
Last pregnancy that resulted in live birth	**489**			
Within last 12 months	87	18.6	14.4	22.9
Between 12 months and 3 years	190	38.9	33.6	44.3
Longer than 3 years	212	42.5	36.3	48.6
Tested for HIV before last pregnancy	**485**			
Yes	336	69.0	64.1	73.8
HIV results of test before last pregnancy	**336**			
Positive	12	2.1	0.4	03.4
Negative	317	95.9	93.7	98.3
Inconclusive	3	0.8	0.0	1.8
Did not receive results	4	1.3	0.3	2.4
Attended ANC during last pregnancy	**488**			
Yes	417	86.1	82.9	89.2

Variable	Frequency	Population proportion		
		%	(95% CI)	
Tested for HIV during last pregnancy that resulted in live birth	**411**			
Yes	360	87.4	81.1	93.8
Results of HIV test during last pregnancy that resulted in a live birth	**357**			
Positive	9	1.3	0.5	1.9
Negative	348	98.7	98.1	99.5
Trimesters had HIV tests during last pregnancy that resulted in live birth.	**360**			
First trimester	182	48.4	42.0	54.4
Second trimester	267	75.1	68.6	81.7
Third trimester	196	57.9	51.8	64.5
In labor	32	9.4	5.0	13.9
Multiple response allowed				
Trimester when ART was initiated during last pregnancy that resulted in life birth	**11**			
First trimester	5	38.0	21.7	57.5
Second trimester	3	25.5	12.4	45.2
Third trimester	1	11.5	3.7	30.2
In labor	1	18.7	7.9	38.1
Before pregnancy	1	6.4	1.4	24.8
Continued ART after delivery	**12**			
Yes	12	100		
Tested for syphilis during last pregnancy	**417**			
Yes	165	39.3	32.6	46.1
Results of syphilis test during last pregnancy	**166**			
Positive	13	8.1	4.1	12.1
Negative	153	91.9	88.0	95.9
Received treatment for syphilis during last pregnancy	**13**			
Yes	13	100		

4.14.2 Family planning

More than two-thirds (68%) of non-pregnant FSWs were not trying to get pregnant at the time of the survey and yet 45% of them were not using any contraceptive method. Those using contraceptives mainly used injectable contraceptives (44%), pills (21%), condoms (16%), and implants (16%). Three percent used rhythm/ovulation cycle and less than one percent used other methods

Figure 13. Distribution of pregnancy status and those using any FP method

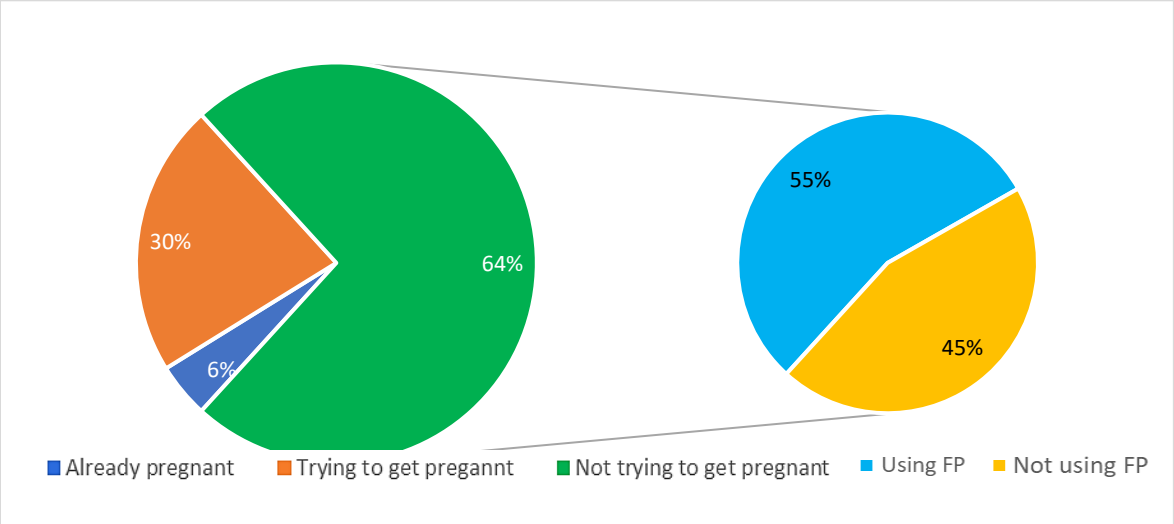


Table 16. Family planning

Variable	Frequency	Population proportion		
		%	(95% CI)	
Currently trying to get pregnant	**621**			
Yes	194	31.6	25.5	37.7
Using contraception methods	**424**			
Yes	238	54.9	49.2	60.5
Contraception methods being used	**237**			
Condoms	44	16.0	10.4	21.1
Pills	53	21.3	15.8	26.6
Injections	103	44.1	35.3	53.0
Implants	29	15.7	08.7	23.3
Rhythm/ovulation cycle	6	2.5	0.0	5.1
Others	2	0.4	0.2	0.5

Variable	Frequency	Population proportion		
		%	(95% CI)	
Most considered health problem	**669**			
HIV	447	66.5	60.7	72.2
STI	81	11.6	9.0	14.2
Family planning	57	9.1	6.5	11.8
Stress	33	5.2	1.1	9.4
Others	51	7.5	3.6	11.5

4.15 Access to HIV outreach services

4.15.1 Types of services provided/received

Only one-third (33%) of the FSWs had ever talked about HIV with a peer educator or an outreach worker, and only 13% had within the last three months. FSWs received mainly condoms (47%) and up to 35% didn't receive any items the last time they met a peer educator or outreach worker. The main service offered to FSWs by peer educators or outreach workers was HIV testing (65%).

Table 17. Access to HIV outreach services among FSWs

Variable	Frequency	Population proportion		
		%	(95% CI)	
Ever talked about HIV with a peer educator or outreach worker	**671**			
Yes	230	32.6	27.9	37.4
Last time peer educator/outreach worker talked to about HIV	**669**			
In the last 3 months	99	12.7	9.5	15.9
In the last 4-6 months	30	3.6	2.0	5.3
In the last 6-12 months	34	5.5	3.2	7.7
More than a year ago	57	9.4	6.4	12.3
Never	449	68.9	65.3	72.5
Things given last time met peer educator/outreach worker**	**230**			
Nothing	74	35.1	28.5	42.5
Male condoms	118	48.6	41.0	55.5
Medicines	10	4.4	0.0	9.9
Voucher for HIV testing	13	5.0	0.0	10.5
Information and education materials about HIV	29	12.6	6.7	18.5
Other	13	3.6	0.0	7.7

Variable	Frequency	Population proportion		
		%	(95% CI)	
Services received last time met peer educator/outreach worker	**230**			
Nothing	79	32.4	25.0	39.3
HIV testing	144	64.7	58.0	71.9
Training on condom use	13	6.4	1.1	11.9
Other	16	5.9	0.5	11.1
Organization the peer educator/outreach worker came from	**181**			
Alliance	5	2.6	0.3	4.9
IntraHealth	5	1.1	0.2	1.5
South Sudan Youth against AIDs	3	1.2	0.0	2.4
South Sudan Women's Effort to Fight AIDs	5	2.7	0.1	5.2
SPLA HIV Secretariat	1	0.3	0.0	0.6
World Vision	1	0.5	0.0	1.2
Comboni Hospital	4	2.5	0.3	4.6
IOM	8	3.3	1.1	5.1
UNFPA	7	2.6	0.0	4.7
Wau teaching hospital	80	45.7	39.0	52.9
Outreach workers (unknown)	19	13.1	7.7	19.1
Others	43	24.6	17.5	32.0

**Multiple responses allowed

4.16 HIV counselling and testing

4.16.1 Previous HIV testing and counselling

Three-quarters (66%) of the FSWs in Wau reported to have ever tested for HIV and 64% knew where to go for a test. Among those who reported to have tested, 69% tested at a health clinic, hospital or other health facility and 25% tested from mobile or outreach sites. Of those who tested, 3.7% reported testing HIV-positive. The reasons for not testing for HIV mainly included fear of positive results (16%), no money (18%), and no time (34%). Most women who previously tested sought testing because they were pregnant (45%) and some just wanted to know their status (33%). Only one in five (19.7%) of the FSWs had tested together with their most frequent sex partner.

Table 18. HIV counseling and testing among FSWs

Variable	Frequency	Population proportion		
		%	(95% CI)	
Know where to go if want to take HIV test	**679**			
Yes	441	63.7	57.8	69.5
Ever tested for HIV	**679**			
Yes	456	66.0	60.4	71.7
Results of last HIV test	456			
Positive	24	3.7	1.8	5.4
Reasons for not testing for HIV**	**137**			
Feel not at risk	10	5.9	0.0	12.6
Fear of positive results	23	16.4	8.4	24.4
No time	36	23.8	15.1	32.0
No money	22	18.1	9.2	27.3
Other	21	14.2	6.1	22.2
Place of last HIV test	**456**			
Testing and counseling center	8	1.6	0.6	2.6
Health clinic, hospital, or similar	320	69.1	63.2	74.9
Outreach/mobile testing	113	24.7	19.2	30.2
Other	15	4.6	1.9	7.5
Reasons for last HIV test	**466**			
Health care/outreach worker offered the test	49	11.1	7.9	14.5
Wanted to know status	167	32.9	26.7	38.8
Felt at risk or sick	27	6.0	3.6	8.3
Was pregnant	195	44.8	38.6	51.3
Other	28	5.2	3.0	7.2
Ever tested together with most frequent partner	**436**			
Yes	86	19.7	15.3	24.1
At last test told counselor that is FSW	**463**			
Yes	107	21.8	17.1	26.3

Variable	Frequency	Population proportion		
		%	(95% CI)	
Satisfied with how treated by counselor after disclosing that is FSW	**107**			
Yes	101	94.1	87.7	100

**Multiple responses allowed

4.16.2 HIV post-exposure prophylaxis (PEP)

Most FSWs (94%) had never heard about PEP. Twelve percent of the six percent that knew about PEP had ever taken it. Among those who had taken PEP, 40% took it in the last six months.

Table 19. HIV post-exposure prophylaxis

Variable	Frequency	Population proportion		
		%	(95% CI)	
Ever heard of PEP	**679**			
Yes	51	6.2	4.5	7.9
Ever taken PEP	**51**			
Yes	9	12.2	4.6	17.4
Taken PEP in the last 6 months	**9**			
Yes	4	40.1	12.5	67.7
Reasons for taking PEP in the last 6 months	**4**			
Had unprotected sex	1	32.9	0.0	74.6
Raped/forced to have sex	1	27.6	0.0	61.9
Condom burst	1	18.7	1.3	36.2
Just wanted to take	1	20.8	0.0	49.7

4.17 Experience of living with HIV

4.17.1 Access to support groups

Nearly half (49%) of those who reported to have tested HIV-positive had ever attended a support group for people living with HIV.

Table 20. Access to HIV support groups among FSWs

Variable	Frequency	Population proportion		
		%	(95% CI)	
Ever attended support group for PLHIV	**24**			
Yes	10	48.5	26.7	73.8

4.17.2 Access to care for HIV-positive FSWs

All (100%) of the HIV-positive FSWs received and were continuing to receive HIV medical care from a health care provider or a community health worker. Eighty-two percent had ever taken cotrimoxazole and all of those were still taking it at the time of the survey. About half (51%) had ever had a CD4 count test and 57% of those who had the test had it within the last six months.

Table 21. Access to care by FSWs including CD4 testing

Variable	Frequency	Population proportion		
		%	(95% CI)	
Received HIV medical care from a health care provider or community health worker	**24**			
Yes	24	100		
Currently get health care or checkups for HIV	**24**			
Yes	24	100		
Country where currently get health care or checkups	**24**			
South Sudan	22	94.1	93.1	96.4
Uganda	2	5.9	3.6	6.9
Place currently go to receive care for HIV	**22**			
Health clinic, hospital, or similar	21	98.4	97.7	100.9
Private facility	1	1.6	0.0	2.3
Ever taken cotrimoxazole	**24**			

Variable	Frequency	Population proportion		
		%	(95% CI)	
Yes	17	81.7	41.5	127.3
Currently taking cotrimoxazole	**17**			
Yes	17	100		
Ever had CD4 count test	**24**			
Yes	12	51.3	27.9	75.5
Last time tested for CD4 by a health care provider	**12**			
In the last 6 months	7	57.3	31.1	83.0
Between 7 and 12 months ago	2	24.9	2.9	50.8
More than 12 months ago	3	17.9	8.1	24.1

4.17.3 Treatment

All (100%) of the FSWs reporting to be HIV-positive had ever taken ARVs and all were still on ART. Only 26% had ever had a viral load test and 55% of those had it within the last 12 months. Adherence is a challenge for many of the FSWs on treatment; 39% had missed three or more doses of ARV in the past month. The majority (70%) of the FSWs who never had a viral load test cited unavailability of viral load testing.

Table 22. Access to ART by FSWs

Variable	Frequency	Population proportion		
		%	(95% CI)	
Ever taken ARVs	**24**			
Yes	24	100		
Number of years since start of ART	**24**			
Less than a year	5	18.7	6.6	29.9
1-4 years	12	53.2	28.1	79.9
5-9 years	4	19.8	0.0	50.9
10+ years	2	6.7	0.0	22.4
Not sure of when started	1	1.6	0.0	5.9
Currently taking ART	**24**			
Yes	24	100		
Ever missed 3 or more doses of ARVs in the past month	**24**			

Variable	Frequency	Population proportion		
		%	(95% CI)	
Yes	10	39.2	18.6	59.8
Ever had a viral load test	**24**			
Yes	6	26.4	9.4	43.3
Duration since last viral load test	**6**			
In the last 12 months	3	55.5	17.7	93.4
3 or more years ago	2	16.0	0.0	32.9
Don't know	1	28.4	0.0	65.4
Country where had last viral load test	**6**			
South Sudan	6	100		
Reasons for not testing viral load	**14**			
Too expensive	1	13.5	0.0	36.4
Not available	9	70.1	45.4	94.9
Not offered	1	3.0	1.3	4.7
Do not know about it	3	13.4	2.3	24.4

4.17.4 Access to tuberculosis (TB) services, screening, and treatment among HIV-positive FSWs

Only 28% of HIV-positive FSWs had been asked about TB symptoms at medical visits in the last 12 months and only 54% of those had been asked at every visit. Twenty-six percent of the FSWs had TB symptoms in the last 12 months of which 41% received a chest X-ray or sputum test.

Table 23. Access to TB services, screening, and treatment by FSWs

Variable	Frequency	Population proportion		
		%	(95% CI)	
Asked if had symptoms of TB at HIV medical care visit in the last 12 months	**24**			
Yes	7	28.1	11.1	45.0
Frequency of being asked about all four TB symptoms (night sweats, cough, fever, weight loss) in the last 12 months	**7**			
At every visit	4	54.4	17.9	90.9
On one visit	1	13.3	0.0	31.9
Don't know	2	32.3	0.0	68.8

Variable	Frequency	Population proportion		
		%	(95% CI)	
Experienced any of the TB symptoms in the last 12 months	**24**			
Yes	5	26.7	4.6	48.8
Received chest x-ray or sputum test for TB in past 12 months	**5**			
Yes	2	40.9	5.2	76.5
Asked if had TB symptoms during last visit to facility (HIV-negative)	**655**			
Yes	88	14.3	11.2	17.4

4.18 Sexually transmitted infections

4.18.1 STI symptoms

Nearly half (49%) of the women reported having abnormal discharge from the vagina in the last 12 months and more than half (59%) experienced pain in the vagina and or in the lower abdomen during and/or after sexual intercourse. One in four (25%) had sores or an ulcer near the vagina or anus and the same percentage was true for having had abnormal discharge from the anus in the last 12 months. More than half (55%) of those who had STI symptoms didn't seek health care services, with most of them citing no time (15%) and lack of money (22%) as reasons for not seeking health care. Twenty-nine percent of the FSWs were diagnosed with a STI by a health care provider in the last 12 months and 89% of those diagnosed treated. STI screening and treatment were provided for the survey participants. Ten percent had genital discharge, 1.6% genital ulcers, 24% lower abdominal pain, and 1% inguinal Bubo; all received treatment.

Table 24. Sexually transmitted infections (STIs)

Variable	Frequency	Population proportion		
		%	(95% CI)	
Know where to go for STI/sexual health check-ups	**679**			
Yes	259	38.7	33.4	44.1
Had abnormal discharge from vagina in the last 12 months	**679**			
Yes	332	48.9	43.2	54.6

Variable	Frequency	Population proportion		
		%	(95% CI)	
Experienced pain in the vagina and/or in the lower abdomen during and/or after sexual intercourse in the last 12 months	**679**			
Yes	403	59.1	53.1	65.1
Had an ulcer or sore on or near the vagina or anus in the last 12 months	**679**			
Yes	181	25.2	21.4	29.1
Had an abnormal discharge from the anus in the last 12 months	**679**			
Yes	172	24.6	20.2	29.1
Had an ulcer or sore on or near the anus in the last 12 months	**679**			
Yes	47	6.6	4.6	8.5
Sought health care services because of the STI symptoms	**446**			
Yes	215	45.2	40.2	50.1
Reasons for not testing for STI**	**231**			
Feel not at risk of STI	21	9.1	3.9	14.4
Fear of positive result	9	4.1	0.0	9.1
Confidentiality	9	3.3	0.0	7.0
No time	40	15.0	9.1	20.5
No money	52	21.6	15.3	27.7
Other	13	4.2	0.0	9.2
Diagnosed with STI by health care provider in the last 12 months	**644**			
Yes	195	29.2	23.8	34.6
Treated for STI infections	**238**			
Yes	210	89.1	83.1	95.2
Place had STI treatment**	**210**			
Public clinic/hospital	141	70.7	65.3	77.0
Private clinic/hospital	58	25.8	18.8	32.4
Pharmacy	10	4.1	0.0	8.7

Variable	Frequency	Population proportion		
		%	(95% CI)	
Other	4	1.2	0.0	3.0

**Multiple responses allowed

4.19 Physical violence, coercion, and abuse

4.19.1 Physical violence

Nearly one-quarter (24%) of the FSWs in Wau had ever experienced physical violence in their life and more than half (53%) of the violence was because of sex work. Sixty-one percent of the violence had occurred in the last 12 months with 61% due to selling or exchanging sex for money, goods, or services. Most (71%) of the FSWs who experienced physical violence did not report it. Women who reported physical violence reported it mainly to police or other security personnel. Non-reporting of physical violence was mainly attributed to lack of information on where to access the services (35%), cost of services (14%), discomfort (13%), and feeling no need for the services (14%).

Table 25. Physical violence among FSWs

Variable	Frequency	Population proportion		
		%		(95% CI)
Experienced physical violence in lifetime	**679**			
Yes	162	23.5	19.5	27.5
Reason for first violence is because of selling or exchanging sex	**162**			
Yes	85	52.5	43.7	61.4
Experience physical violence in the last 12 months	**162**			
Yes	96	61.2	51.5	71.0
Experienced physical violence because of selling sex	**96**			
Yes	60	61.2	51.3	71.1
Number of times experienced physical violence in the last 12 months	**162**			
Has never happened	66	39.6	31.6	47.5
Once	57	35.9	28.2	43.5
2-5 times	36	21.7	14.8	28.6
6-10 times	1	0.4	0.0	1.0
More than 10 times	2	2.5	0.0	5.0

Variable	Frequency	Population proportion		
		%		(95% CI)
Following physical violence sought professional help from**	**162**			
Did not try to seek help	114	70.9	63.8	78.0
Police or other security personnel	31	20.6	14.3	26.9
Other	14	6.8	0.7	12.4
Denied services by**	**45**			
Police or other security personnel	14	34.3	20.0	48.6
NGO or other local organization	26	51.1	36.2	65.9
Other	7	16.2	5.2	27.2
Reasons for not seeking professional services**	**114**			
Did not know what services were available/where to go	40	35.0	23.7	45.9
The services I needed were not available	5	4.1	0.5	7.7
Could not afford services	15	13.7	3.9	23.4
Uncomfortable accessing services	13	13.1	2.9	23.5
Did not feel the need for services	15	13.9	4.7	23.3
Other	21	20.2	11.4	29.1

****Multiple responses allowed

4.19.2 Sexual violence

Twenty-two percent of FSWs had experienced sexual violence in their life. The median age at first sexual violence was 19 years [IQR 17-24]. Nearly one in four (23%) of those who experienced sexual violence had experienced it more than once and 1% more than five times. Most of the sexual violence was because of selling or exchanging sex (84%). Paying sex partners were responsible for violence experienced by 54% of the FSWs, followed by non-paying sex partners (17%).

Table 26. Sexual violence

Variable	Frequency	Population proportion		
		%	(95% CI)	
Median [IQR] age at first sexual violence	**19 [17-24] years**			
Experienced sexual violence in lifetime	**672**			
Yes	154	22.1	18.5	25.8
Age at first sexual violence	**147**			

Variable	Frequency	Population proportion		
		%	(95% CI)	
Below 15 years	15	7.6	0.0	14.7
15-19 years	71	49.5	37.7	61.6
20-24 years	34	25.7	16.5	35.7
25-29 years	21	12.9	5.5	19.9
30+ years	6	4.2	0.0	8.9
Number of times had sexual violence in the last 12 months	**152**			
0	82	51.3	42.6	59.9
1	38	26.1	18.6	33.6
2-5 times	30	21.3	14.8	27.9
6-10 times	2	1.3	0.0	3.5
Think experienced sexual violence because of selling or exchanging sex	**69**			
Yes	57	83.7	75.8	91.5
Relationship to the sexual violence offender**	**75**			
Paying sex partner	41	54.0	40.5	67.5
Non-paying sex partner	12	17.1	8.6	25.7
Friend/acquaintance	9	7.8	2.5	13.1
Other	15	22.6	11.3	33.9

**Multiple responses allowed

4.20 Hypertension

One in four (25%) FSWs in Wau were pre-hypertensive and 7% hypertensive.

Figure 14. Hypertension among FSWs in Wau

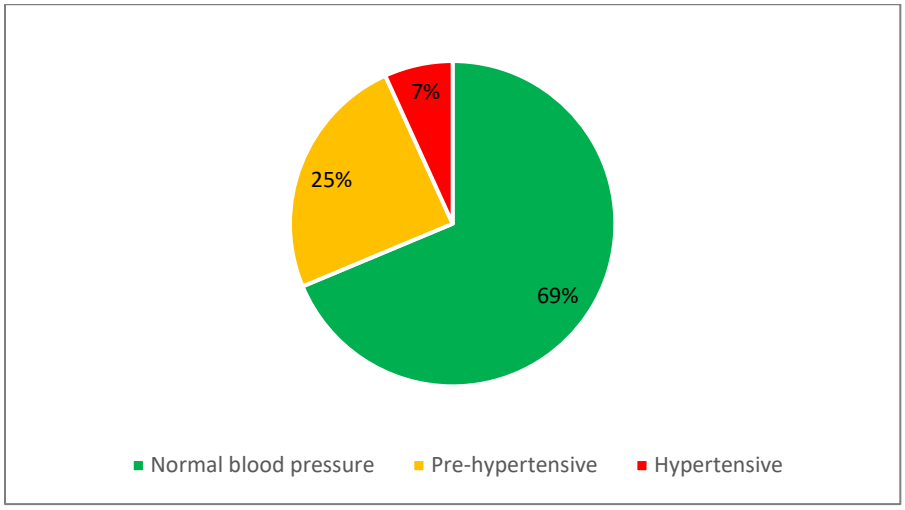


Table 27. Hypertension among FSWs in Wau

Variable	Frequency	Population proportion		
		%	(95% CI)	
Hypertension	**679**			
Pre-hypertensive	178	24.5	19.5	29.5
Hypertensive	50	6.8	4.7	8.9

4.21 HIV, syphilis, and hepatitis B prevalence

4.21.1 HIV prevalence

HIV prevalence among FSWs in Wau was estimated using the onsite HIV testing results using the MOH testing protocol. The prevalence was estimated at 6.7% and only 35% of the positives were aware of their status. All those who were aware of their positive status before the study were on treatment and 91% had their viral load suppressed. The suppression rate for all the positives (new positives + known positives) was at 65% with median CD4 of 416 [IQR 295-632]. Only 41% of the HIV-positive FSWs had CD4 above 500+.

Table 28. HIV prevalence and the UNAIDS 90-90-90 targets

Variable	Frequency	Population proportion		
		%	(95% CI)	
Estimated HIV prevalence	**679**			
Positive	52	6.7	4.1	9.4
Awareness of HIV positive status (1st 90)	**52**			
Aware	23	35.4	15.9	51.9

Variable	Frequency	Population proportion		
		%	(95% CI)	
On ART (2nd 90)	**23**			
Yes	23	100		
Viral load suppressed (3rd 90)	**23**			
Yes	19	91.3	76.4	100.0

Table 29. Viral load and CD4

Variable	Frequency	Population proportion		
		%	(95% CI)	
Viral load	**52**			
Suppressed (<1000 copies/ml)	37	65.0	44.2	83.9
Median [IQR] CD4	416 [295-632]			
CD4	**51**			
Below 200	6	9.0	0.0	16.9
200-349	10	24.9	4.6	46.6
350-499	12	25.0	12.2	38.4
500+	23	41.2	24.0	57.3

4.21.2 Syphilis and hepatitis B prevalence and co-infections

The prevalence of active syphilis among FSWs was at 2.6% (95% CI: 1.4, 3.9) and 3.5% had ever been infected with syphilis. The prevalence for hepatitis B was at 6.9% (95% CI: 3.6,10.3). Co-infections among the FSW were 0.5% with HIV and active syphilis infection, 0.3% infected with HIV and hepatitis B, and 0.2% with both active syphilis infection and hepatitis B. There were no FSWs co-infected with all three diseases.

Figure 15. HIV, active syphilis, and hepatitis B co-infection diagram

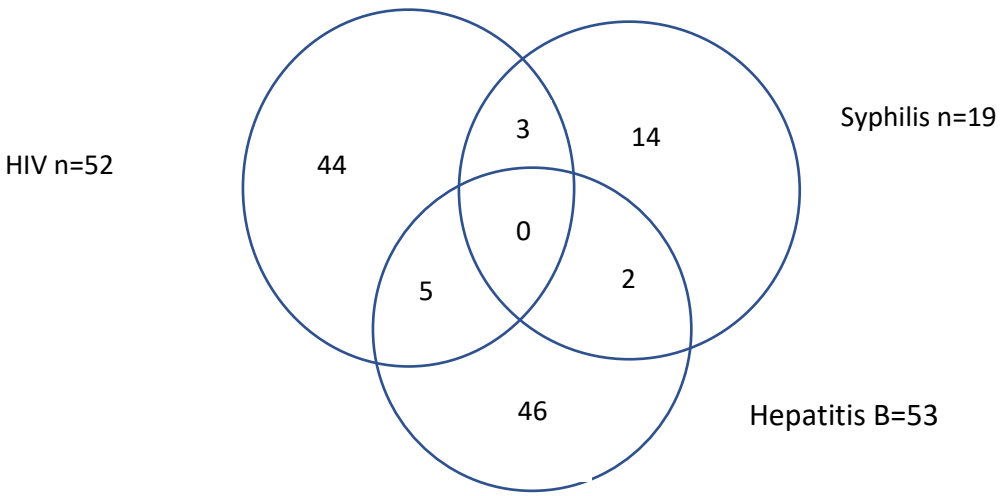


Table 30. Syphilis, Hepatitis B, and coinfections

Variable	Frequency	Population proportion		
		%	(95% CI)	
Active syphilis infection	**679**			
Yes	19	2.6	1.4	3.9
Ever infected with syphilis	**679**			
Yes	24	3.5	2.1	5.0
Hepatitis B positive				
Yes	53	6.9	3.6	10.3
Has both HIV and active syphilis infection	**679**			
Yes	3	0.5	0.0	1.1
Has both HIV and hepatitis B infection	**679**			
Yes	5	0.3	0.1	0.5
Has both active syphilis infection and hepatitis B	**679**			
Yes	2	0.2	0.0	0.4
Has HIV, active syphilis infection and hepatitis B	0			
Yes				

5.0 DISCUSSION

5.1 FSW population size

The population estimate of FSWs in Wau at 3,000 was much higher than the estimates available before the survey of less than 1,000. The survey was able to reach home-based sex workers (39%) and other hotspots that were not part of the previous estimates. In Wau generally, FSW mobility is limited, therefore making the FSW population more stable than in other locations like Juba and Nimule.

5.2 Socio-demographic characteristics of FSWs in Wau

Sex work in Wau is mainly dominated by young South Sudanese FSWs with a median age of 24 years. The political instability and economic hardship in South Sudan may be pushing young women to enter the sex business (Groenendiijk and Veldwijk, 2011). The low level of education for most of the FSWs puts them at a disadvantage for regular employment. Since the majority are either single or separated/divorced, and with no employment, sex work can be a tempting option. The high divorce/separation rate for the FSWs could be a result of early child marriage, which is widely practiced; South Sudan has the seventh highest incidence globally (WHO, 2013).

5.3 Sexual experience

Sexual debut for most of the FSWs happened when they were very young, and about half were paid for or given something in exchange for first sex, showing that many young women with no sexual experience can be lured into the sex business in Wao.

5.4 Knowledge of HIV and condom use

The FSWs' very low knowledge of HIV, coupled with low condom use and lack of awareness about the risk of anal sex, puts Wau's FSWs at high risk for HIV and STIs and their transmission to sex partners. For those using a condom, low access to lubricants as well as resorting to the use of saliva adds additional risk of condom failure since saliva can't provide proper lubrication.

5.5 Pregnancy and family planning

The low use of family planning methods exposes Wau's FSWs to unwanted pregnancies, which lead to a high rate of abortion (16%). Abortion is illegal in South Sudan; this implies women will end up using risky methods to end pregnancies that put their lives in danger. FSWs should be educated and encouraged to use condoms and other modern family planning methods to prevent unwanted pregnancies. Improving attendance at ANC services during pregnancy is also very important for sex workers because of their increased risk of HIV and other STIs.

5.6 Access to HIV services

Enrollment into care for the HIV-positive FSWs in Wau was very good, and all those enrolled were still receiving treatment at the time of the survey. However, few had ever had a viral load test. There is need for the ART sites to strengthen tracking of patients for viral load testing.

Screening for TB among HIV-positive FSWs was also low, yet TB is one of the most common causes of mortality among PLHIV (Straetemans et al., 2010). TB screening is even more urgent for FSWs given that they interact with many clients whose TB status may be unknown or not disclosed and often live in lodges that encourage crowding, which in itself is a risk factor for TB transmission. Screening for TB must be streamlined into all HIV services for FSWs.

5.7 HIV and hepatitis B prevalence

The estimated HIV prevalence among FSWs in Wau (6.7%) is much lower than estimated in Juba (38%, 2016) and Nimule (24%, 2017). However, there is risk of the prevalence in Wau going up given the low knowledge on HIV and inconsistent condom use. In the case of hepatitis B, government facilities do not provide vaccination for adults. Vaccination is only provided by private clinics at a fee not easily affordable by a majority of the population. This is likely to increase the infection rate among FSWs as well as the general population.

6.0 RECOMMENDATIONS

The prevalence of HIV among FSWs in Wau remains low but there is very high risk for it to increase drastically since most of the FSWs are young and with limited comprehensive knowledge of HIV. The MOH needs to urgently prioritize HIV prevention as part of comprehensive HIV interventions for the key populations in Wau to keep the infection rate low.

6.1 Knowledge of HIV status (1st 90)

The MOH and partners that support service delivery to FSWs should:

- Expand HIV education through FSW peers focusing on key HIV prevention messages.
- Increase and improve HIV testing services for FSWs through targeted outreach. Work with peers to ensure that home-based FSWs are reached/referred for testing either at hotspots or the nearest health facilities.

6.2 Promotion of condom and lubricant use

The MOH, with partners UNFPA and the IntraHealth USAID E2A project, should:

- Coordinate distribution of and access to free quality condoms
- Improve supply and distribution of lubricants to FSWs through programs that support key populations
- Improve access to free condoms by utilizing FSW peers to reach lodges, hotels, and brothels for distribution
- Provide education on condom use through FSW peers.

6.3 Access to HIV treatment (2nd 90) and care

- Partners providing testing through outreach services should provide active linkage to care for FSWs who test positive. More follow-up should be provided to reduce loss to follow-up.
- The MOH and partners should work with management of the referral facilities especially Wau teaching hospital ART clinic to ensure friendly HIV treatment and care is provided to FSWs including adherence to confidentiality to prevent stigmatization.

6.4 Other services

The MOH and partners that support service delivery to FSWs should:

- Include STI/TB screening and treatment in all HIV programs for FSWs
- Link all STI/TB-positive FSWs to treatment
- Promote family planning methods among FSWs
- Work with facilities providing treatment to FSWs to integrate GBV interventions and psychosocial support at clinics for FSWs who have been victims of GBV
- Integrate noncommunicable disease interventions such as hypertension screening and management in key population programs.

6.5 Viral load suppression (3rd 90)

The MOH and HIV partners should ensure that all clients on ART are followed up for viral load testing as per South Sudan's protocol. Clients with high viral load should be identified, and appropriate support provided, especially enhanced adherence counselling.

7.0 STUDY LIMITATIONS

- Exclusion criteria limited the participation of some of the FSWs who could not speak English, Juba Arabic, or Kiswahili.
- We were unable to reach FSWs who are Habash, and therefore none of this subpopulation was represented in the survey.
- Transport refund and time compensation caused some FSWs to give the coupons to either their friends or relatives so that they could benefit. However, the screening process was tight and that led to disqualification of some of the participants as ineligible.

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