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# Enablers of and barriers to ART adherence among female sex workers in mid-western Uganda: a qualitative study

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## Abstract

**Introduction** Female sex workers (FSWs) in Uganda experience numerous barriers to antiretroviral therapy (ART) adherence. We used the planned behavior theory to help explore the enablers and barriers to ART adherence among FSWs. Understanding the barriers to ART adherence may help contribute to the development of interventions to improve ART adherence among the FSWs.

**Materials and methods** A descriptive qualitative study was conducted in Fort portal City. We conducted 30 in-depth interviews among FSWs who had been taking ART for at least six months. Furthermore, six key informant interviews were conducted with healthcare workers and leaders of the FSWs initiative. Data collection lasted for two months. Thematic deductive analysis was applied to analyse the data through the lens of the theory of planned behavior.

**Findings** The attitudes, subjective norms, and perceived behavioral control influenced adherence to ART. Positive attitudes including perceived benefits of ART, and experiencing positive outcomes from taking ART were seen to enable its adherence. Subjective norms such as social support, disclosure of HIV status, seeing others take ART, and aspirations of longer life enabled ART adherence. Taking ART in the morning, responsive and respectful healthcare workers, and availability of food/basic needs facilitated compliance with ART adherence. Negative attitudes such as misconceptions and fear of side effects hindered ART adherence. Social disapproval of sex work and or HIV, lack of social support, gender-based violence, non-disclosure, stigma, and abandonment hindered the use of ART among FSWs. Socio-economic constraints (e.g., food scarcity), and occupation-related factors (substance use, incarceration, busy and predictable schedules, and abrupt migrations) were the additional barriers to ART adherence.

**Conclusion** ART adherence among FSWs was influenced by attitudes, subjective norms, and perceived behavioral control. Addressing these barriers in ART adherence through targeted interventions could facilitate ART adherence and improve health outcomes among FSWs.

**Keywords** Adherence, ART, Female sex workers, Uganda

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## Background

In Uganda, the prevalence of HIV was estimated at 5.1% of which about 1.4 million people were living with HIV in 2022[1]. In addition, about 20,000 AIDS-related deaths were recorded in 2022[1]. The antiretroviral therapy (ART) coverage in Uganda was about 89%[1]. Female sex workers (FSWs) have a higher burden of HIV than the general population [2]. In Uganda, the prevalence of HIV in FSWs was estimated at 37%[1]. FSWs were 13.5 times more likely to be living with HIV compared to the general population[2].

Despite having a higher burden of HIV, studies have shown that FSWs have poorer treatment outcomes and engagement in HIV care and treatment than the general population[3, 4]. A scoping review highlighted that 50–90% of FSWs globally do not adhere to ART [5]. The poor adherence to ART among FSWs leads to worse treatment outcomes than the general population[3]. In sub-Saharan Africa, FSWs had lower CD4 counts, poorer viral load suppression, and higher mortality rates than the general population[3]. Poor adherence to ART and failure to achieve viral suppression negatively affects preventive measures to reduce the transmission of HIV[3].

In Uganda, FSWs face unique challenges including violence, rape, stigma, and discrimination that may hinder ART adherence [6]. FSWs experience numerous barriers to ART adherence[7]. Adherence to ART was negatively influenced by intrapersonal factors, interpersonal factors, and wider societal factors [5]. Social determinants of health including lack of knowledge about the importance of ART, poverty, distance from ART clinics, and stigma promote poor adherence among FSWs[5, 7]. At the individual level, substance abuse, side effects, knowledge and beliefs, and old age negatively affect ART adherence[5, 7]. Interpersonal relationships including lack of social support and intimate partner violence have been shown to result in poor adherence among FSWs [5]. In contrast, adequate social support, user-friendly healthcare services, food security, and awareness of the benefits of ART enable ART adherence among FSWs [5, 8–10]. Limited studies in Uganda have explored ART adherence among key populations like the FSWs [11–13]. Therefore, this study was conducted to help fill this knowledge gap regarding the enablers of and barriers to ART adherence among FSWs. The theory of planned behavior was used to help map out and provide a comprehensive understanding of the enablers and barriers of ART among FSWs [14]. Understanding barriers to and facilitators of ART adherence will enable policymakers/public health practitioners to formulate interventions to improve ART adherence among FSWs. The study was conducted in Fort Portal City, which is one of the cities in Uganda with the highest prevalence of HIV, estimated at 17.8% in the general population and 44% among FSWs [1, 6].

### Theoretical framework

Enablers of and barriers to adherence to ART were based on the theory of planned behavior[14]. The theory of planned behavior posits that behavior (e.g., adherence to ART) is determined by behavioral intention (e.g., adherence to ART)[14]. Behavioral intention is determined by attitudes, subjective norms, and perceived control [14]. Attitudes, the positive or negative appraisals of a certain behavior, are derived from behavioral beliefs (e.g., misconceptions of side effects or ART or liking of ART) and the evaluation of outcomes (seeing improvements such as weight gain or stopping because of the initial side effects)[14]. Subjective norms relate to other people's approval or disapproval of a particular behavior[14]. Subjective norms are influenced by normative beliefs (what others approve or like) and the motivation to comply with certain behaviors[14]. Perceived behavioral control describes the perceived ability of individuals to perform a certain behavior[14]. Perceived behavioral control is shaped by control and empowerment beliefs which may occur from appropriate scheduling, the availability of food, and the healthcare system[14].

## Methods

### Study design and setting

We used a descriptive qualitative study to explore the factors influencing adherence to ART[15]. The study was conducted in Fort Portal City, which is located in western Uganda. Fort Portal City has informal urban settlements with poor housing structures and limited access to basic services. Fort Portal City has more than 135,000 people[16].

### Study population and sampling strategy

The participants who were recruited in the study were women aged 18 years and above who self-identified as FSWs. FSWs were eligible if they were on ART for at least 6 months from the time of initiating ART. FSWs were initially identified and recruited using the focal person in the Kabarole Women's Health Support Initiative. The initiative was established to support FSWs in accessing treatment and legal and social support. The initiative provided detailed information on FSWs in the area. After the first female sex worker was recruited, snowball sampling was used to identify subsequent sex workers. FSWs were recruited from different places including brothels, streets, and hotspots to achieve maximum sampling variation.

In addition, we recruited healthcare providers and peer leaders from the Kabarole Women's Health Support

Initiative as key informants. The peer leaders of the initiative, who were also FSWs and on ART, were responsible for providing legal, financial, and administrative support to FSWs including ensuring the proper welfare of FSWs. As key informants, the leadership experience of peer leaders including their overall awareness of the barriers that FSWs face in ART adherence served to provide a comprehensive understanding of ART adherence among FSWs. Healthcare workers, who were involved in providing ART to FSWs, were recruited as key informants to provide etic perspectives especially those related to ART access and adherence. The key informants were eligible if they had worked with FSWs for at least six months.

The study participants were recruited until data saturation was reached[17]. Data saturation was reached when no new information was collected. Data saturation was reached after 36 interviews with the FSWs and the key informants.

#### In-depth interviews

We conducted 30 in-depth interviews (IDIs) with FSWs to gain their perspective on their experiences with ART adherence. An interviewer guide was used to explore interpersonal, intrapersonal, occupational, and structural factors that facilitate and hinder ART adherence among FSWs. The intrapersonal factors included experiences, acceptability, beliefs, misconceptions, the role of side effects and stigma in adhering to ART. The interpersonal factors involved relationships, social networks, stigma, social support, and intimate partner violence. The occupational-related factors included exploring barriers and enablers to ART adherence at work including the work schedules and substance abuse. Structural factors included food security, challenges accessing ART drugs in health facilities and societal stigma from HIV and sex work. The questions explored enablers of and barriers to ART adherence at home and work, including reasons why FSWs fail to adhere to ART. The questions in the interview guide were derived from findings in the literature[5].

The interviews were conducted in a safe and private place to protect the privacy and confidentiality of the participants. These places were selected by FSWs to maintain the data collector's reflexivity in the process of data collection. Individual interviews were scheduled with the FSWs upon acceptance to be interviewed in a safe and private place. The study authors (DA & BN), who were nurses, conducted interviews alongside a counsellor. The in-depth interviews were conducted in the participants' local language and lasted about 20–60 min. Data collection lasted for two months. The qualitative interviews were audio-recorded using digital audio recorders after informed consent was obtained.

#### Key informant interviews

We conducted six key informant interviews (KIIs) of which three of which were with healthcare workers from Fort Portal Regional Referral Hospital and three of which were with the peer leaders in the Kabarole Women's Health Initiative. The KIIs were conducted in their respective places of work. The interview guide used for KIIs explored the intrapersonal, interpersonal, occupational, and structural factors that facilitated or hindered ART adherence among the FSWs. The questions were related to barriers in ART adherence at the places of work and at home, the role of beliefs, misconceptions, stigma, sex work, and structural factors in hindering or facilitating ART adherence among FSWs. The key informant's experience working with FSWs and their awareness of the overall barriers faced by FSWs with ART adherence served to provide rich insight and perspective regarding the enablers and barriers to ART adherence among FSWs.

#### Data analysis and rigor of the study

The audio recordings were transcribed verbatim, while the authors (DA and BN) translated the transcripts from Rutoro and Luganda to English. Deductive thematic analysis was chosen for analysing the data[18]. The six steps of thematic analysis were followed starting with the identification of the codes that were used to develop themes [18]. The transcripts were read for several times to gain an understanding of the data[19]. After the transcripts were read, codes were manually identified which was followed by searching, revision, reviewing, and refining of the final themes[19]. Finally, the results were described in a comprehensive analysis report[19]. The rigor of the study was maintained through triangulation and a thick description of the study setting. Triangulation involved the use of both key informant interviews and IDIs, the use of multiple interviewers, and the use of two people to analyze the data. JE and BN analyzed the transcripts collectively while disagreements in the interpretation of the data were resolved unanimously.

#### Ethical consideration

Ethical approval was obtained from the AIDS Support Organization (TASO) Research Ethics Committee (REC number 2024-339). The study was conducted in accordance with the principles of the Declaration of Helsinki and the guidelines of the local research ethics committees. The study observed the principles of justice, non-maleficence, beneficence, and respect for the human right to dignity. Written informed consent was obtained from all participants before data collection.

The participants received a modest compensation for their participation in the study.

## Results

### Socio-demographic characteristics of study participants

We conducted 30 in-depth interviews among FSWs. The majority (701%) of FSWs had been on ART for more than five years, whereas 69% of them had been sex workers for more than five years (Table 1).

### Barriers to ART adherence among FSWs

The barriers to ART adherence among the FSWs included behavioral beliefs (misconceptions and beliefs), evaluation of outcomes (experiencing side effects), normative beliefs (lack of social support, nondisclosure, and stigma), motivation to comply (self-hate/harm), and control of beliefs (busy and abrupt schedules, healthcare system factors and socioeconomic barriers) (Table 2).

### Theme 1: negative appraisal of ART (e.g., misconceptions, religious beliefs and fears of side effects)

FSWs reported misconceptions, religious beliefs, and fears of side effects that hindered continued adherence to ART. The misconceptions included concerns that ART would cause weight gain which would interfere with their desired body shapes and ultimately their line of work. The drugs were perceived to cause a loss of libido which would also negatively impact their business. One of the participants stated that,

> *"They fear taking the tablets due to side effects, [are] tired [and have) beliefs such as making the stomach big." (25-year-old Female sex worker).*

One key informant said,

> *"Some of their friends are not on drugs and they give them bad advice e.g., loss of libido if you take the drugs" (Key informant).*

The key informants reported that the misconceptions were derived from cultural and religious beliefs which discouraged them from taking ART medication. Key informants reported that religious beliefs discouraged adherence to ART since everyone was thought to receive divine healing from all their sicknesses and therefore did not need to continue taking ART medication. They also reported that such religious beliefs caused some of the FSWs who started taking ART to stop taking their medications because they that believed they were miraculously cured. One key informant mentioned that,

> *"...some religions dissuade them from taking drugs and to remain with the Holy Spirit that can cure them. So, this affects adherence or continuation of drugs" (Key informant).*

### Theme 2: lack of social support

FSWs reported failure to adhere to ART medication because of lacking social support. The lack of social support was in the form of parental abandonment, gender-based violence from intimate partners, and external and internalized stigma. Some of the FSWs abandoned treatment because of stigma from friends who ostracised

**Table 1** Description of the FSWs

| Variable | Frequency | Percentage |
|---|---|---|
| Age (n = 30) | | |
| 20–29 | 15 | 50 |
| 30–47 | 15 | 50 |
| Religion (n = 26) | | |
| Christian | 21 | 80.8 |
| Muslim | 5 | 19.2 |
| Duration of ART (n = 28) | | |
| < 5 years | 8 | 28.6 |
| ≥ 5 years | 20 | 71.4 |
| Duration of sex work(n = 29) | | |
| < 5 years | 9 | 31.0 |
| ≥ 5 years | 20 | 69.0 |

**Table 2** Theory of planned behavior conceptualization of the barriers to ART adherence among FSWs

| Conceptual domain | Conceptual subdomain | Barriers |
|---|---|---|
| Attitudes | Behavioral beliefs | Negative appraisal of ART (e.g., misconceptions, religious beliefs and fears of side effects) |
| | Evaluation of outcomes | |
| Subjective norms | Normative beliefs | Lack of social support (e.g., parental abandonment, stigma, and gender-based violence)<br>Nondisclosure of HIV status |
| | Motivation to comply | Self-hate/self-harm |
| Perceived behavioral control | Control beliefs and power | Sex work-related factors (unpredictable & busy schedules, imprisonment, and substance use)<br>Healthcare system factors (long distance, rude healthcare workers, lack of privacy, and stigma)<br>Socioeconomic constraints (food scarcity and lack of transport to health facilities) |

them because of their HIV status and their occupation as sex workers.

> *" Stigma from friends and relatives. If they come to know that they are positive and are taking drugs, they tend to hide their medications or visit a faraway health center for drugs, hence incurring more costs in transport. At their homes, some face stigma from their neighbors and relatives" (Key informant).*
> *"Fear to be seen is still common to some members and that's why they opt to go to distant health centers away from home" (25-year-old female sex worker).*
> *"Yes, if a man beats you can leave the drugs because you don't have peace you just leave but most of the girls have part time men who also may not know the HIV status so the girls have to hide or else, they can be beaten." (21-year-old female sex worker).*

Some of FSWs were abandoned by their parents and relatives because of their HIV status and occupation as sex workers. Ultimately, this led to a lack of access to basic needs (e.g., food), self-hating, and stress, which in turn forced FSWs to give up taking their medications.

> *"Yes, some of them hate themselves and some report suicidal tendencies, especially emanating from their customers. Customers beat them, rape them or pay them little of what they bargained with and this makes them sad. Of course, if they were abused, they will not take their medications the following morning because of stress and depression." (Key informant).*
> *"I missed because the lodge where I stay, they were demanding money from me. I stopped taking my medications and I started feeling resentment towards my parents for having abandoned me. Therefore, I stopped taking the medications. (21-year-old female sex worker).*
> *"Sometimes they get violent if they don't cooperate with boyfriends and this makes them not take their drugs" (40-year-old female sex worker).*

#### Theme 3: nondisclosure of HIV status

Nondisclosure of HIV status to spouses, family members, and close friends was also reported as a significant barrier to ART adherence. Some FSWs do not disclose their HIV status to their friends and relatives because they are afraid of being stigmatized. FSWs forgot to take or pick up their medications because of the overwhelming work pressure and failure to disclose their HIV status which left them with no one to remind them. FSWs who did not disclose their HIV status to their boyfriends failed to receive social support including financial support to pay for transport costs to the health facility. Nondisclosure made it difficult for the FSWs to take their medicines leading to delays, missing, and ultimately abandoning their medicines. Missing or delays in taking medicines were common when the partner, friend, or family member had visited them or when the FSWs had travelled to a new place.

> *"Others, don't reveal their disease to their partners at home. Therefore, you find that they are not at liberty to take their drugs freely and this affects their adherence or becomes a challenge." (Key informant).*
> *"If they have some boyfriends and are not informed about taking ART, they can end up fighting but most of these girls lack support such as what to eat if they don't work [and] get customers." (26-year-old female sex worker).*

#### Theme 4: sex work-related factors (unpredictable, busy, imprisonment, and substance abuse)

Sex work-related factors affect the perceived ability of FSWs to adhere to ART medications. Most of the FSWs noted that they had very busy work schedules that sometimes forced them to forget to take their medications in time, or even to have no time to go for refill in the health facilities. The busy work schedules were characterized by the unpredictable nature of the work and abrupt calls from their clients. The FSWs usually fail to balance their work and the need to take medications on time results in delays in taking medications.

> *"Yes, some miss taking the drugs especially if they get an abrupt call for business and others go to different places of work and may end up missing those drugs if not taken" (Key informant).*
> *"If the customer takes me away and does not release me until the following day I may delay or miss taking the pill soon" (27-year-old female sex worker).*

Almost all FSWs reported using substances such as alcohol, cigarettes, and other substances e.g. shisha. Substance abuse was commonly used for warmth during cold nights and for removing shyness enabling them to be confident during sex work. Intoxication and the hangover following substance abuse caused them to forget to either take their medications or go for a refill after heavy drinking.

> *" The work environment is very rough for FSWs. They are forced to take alcohol or to smoke any type of drug so that they take away boredom (shyness) and this leaves them forgetting about their drugs." (Key informant).*

Sex work is illegal in Uganda. Consequently, FSWs are sometimes arrested and imprisoned for their work. The imprisonment affected ART adherence causing FSWs miss or stop taking ART during imprisonment.

*"You suffer sometimes, the police also put you in prison with no one to bring you food. You can even spend a week…. remember when they take you to prison you don't have the drugs so all that time will be without medications." (28-year-old female sex worker).*

#### Theme 5: healthcare system barriers to adherence

The ability to adhere to ART was affected by several healthcare system barriers. Although all the FSWs noted that the healthcare workers treated them nicely and respectfully in the health facilities, the key informants observed that some FSWs failed to adhere to ART because of rudeness and inconsiderate treatment from the healthcare workers. This discouraged FSWs from continuing to seek healthcare support from such facilities.

*"We usually interact with our FSWs and they tell us that some health workers are rude to them and this affects their social statuses for instance some are psychologically depressed by the time they go for drugs because they slept outside and when the health workers do not understand the problem they go through and this affects the way they are treated." (Key informant).*

Some participants also reported that lack of privacy when dealing with FSWs as they seek healthcare services acts as a barrier to their adherence to ART. Clients tend to avoid refilling their drugs when there is no privacy in health facilities. FSWs feared being seen by their relatives, friends, or clients while seeking care.

*"Another point is lack of privacy in some health facilities where all patients on ART are put in the open space increasing stigma in such places and being seen by clients or other neighbors." (Key informant and a female sex worker).*

Some key informants also reported that some healthcare workers stigmatized and undermined FSWs upon realizing that they are sex workers. This made FSWs reluctant to open up and to continue seeking healthcare services hence hindering access to and adherence to ART.

*"Poor attitudes of health workers once they know that you do not look normal or you are a female sex worker. It becomes worse if you have defaulted. This creates fear or shame among other FSWs as everyone will know that you are a sex worker." (Key informant and a female sex worker).*

Poor adherence to ART was related to high patient volume, long queues, and long waiting times. The long waiting time discourages FSWs who always want quick services so as to catch up with sleep or rest during the day after working throughout the night, but also fear being seen in the ART clinic. Delays in obtaining services were perceived to lead to poor ART adherence among FSWs.

*"Long waiting hours at the health facility have been discouraging for FSWs. They say you have to wait for a long time due to congestion yet you want to go and sleep because the whole night there was no sleeping." (Key informant and a female sex worker).*

#### Theme 6: socioeconomic constraints

FSWs and key informants perceived socioeconomic constraints as one of the major barriers to ART adherence. Socioeconomic constraints such as a lack of money for transport and basic needs such as food were often cited as the major reasons for the poor adherence among FSWs. The lack of basic needs was seen to cause depression and self-harm which clouded their judgement of the need to continue taking ART. A lack of money for transport costs affected access to ART, whereas a lack of food made it difficult to take ART drugs on an empty stomach.

*"I missed yes like one month in the last 3 months because I did not have money and I did not have some food to eat because I would go to the street and the men use me and don't pay me. "(28-year-old-female sex worker).*

*"Women normally don't take ART when they don't have food, because the tablets make them drowsy, and if they fail to get money [from sex work] termed as bad lack they won't take ART." (34-year-old female sex worker).*

### Enablers of ART adherence among FSWs

ART adherence was facilitated by positive attitudes (positive appraisal), evaluation outcomes (healthy aspirations), normative beliefs, and perceived behavioral control (e.g., healthcare system-related factors, adequate counselling, and favourable scheduling) (Table 3).

#### Theme 1: behavioral beliefs and evaluation of outcomes

The majority of the FSWs had positive attitudes towards ART. FSWs perceived ART as lifesavers that could improve their overall health and well-being. Some of the FSWs continued to adhere to ART because of the positive

**Table 3** Theory of planned behavior conceptualization of the enablers of ART adherence

| Conceptual domain | Conceptual subdomain | Enablers |
|---|---|---|
| Attitude | Behavioral beliefs | Positive appraisal of the benefits of taking ART |
| | Evaluation of outcomes | Anticipated and experiencing positive outcomes from taking ART (e.g., weight gain, reduced hospitalization) |
| Subjective norms | Normative beliefs | Social and peer support in ART adherence<br>Disclosure of HIV status<br>Seeing others take the medicine |
| | Motivation to comply | Aspirations for a healthy and longer life |
| Perceived behavioral control | Control beliefs and power | Appropriate and favorable schedules (e.g., taking in the morning)<br>Healthcare system factors (respectful healthcare workers, and adequate counselling)<br>Socioeconomic factors (e.g., availability of food, transport costs) |

outcomes, such as weight gain following HIV-related weight loss, improved immunity, and reduced hospitalisation. These positive beliefs were attributed to extensive counselling from the healthcare worker's alongside adequate social support.

*"Yes, ART is important because any time you can get different infections if it's not taken." (34-year-old female sex worker)*
*"It is good to take the drugs daily without missing to avoid weakening the body which can result in diseases" (34-year-old female sex worker)*

**Theme 2: normative beliefs (social support and disclosure)**
FSWs adhered to ART because most people were also taking ART. FSWs were motivated to adhere to ART after seeing others adhering to ART and looking healthier. Positive testimonies from friends fostered ART adherence among FSWs. FSWs adhered more to ART when they interacted with their colleagues and discovered the benefits of adhering to ARTs.

*"Some girls are taking drugs and you can't tell that this one is on ART as nothing is affecting them", (20-year-old female sex worker).*

The normative beliefs were also related to adequate social support from friends and relatives. Adequate social support enhanced adherence because friends and relatives helped to remind FSWs to always take their medications and refill them if they had forgotten. Friends and relatives also provided emotional and financial support regarding taking ART. Likewise, FSWs who disclosed their HIV status were more likely to adhere to ART. This is because of the ensuing freedom which made them to be more likely to be accepted and subsequently receive social support.

*"We do encourage each other to take the pills well so that we don't fall sick" (29-year-old-female sex worker).*

*"I have my sister who reminds me. Health workers encourage us not to become annoyed, and to take our drugs daily." (34-year-old female sex worker).*

**Theme 3: motivation to comply with ART adherence (aspirations for a healthy and longer life)**
FSWs were motivated to comply and adhere strictly to ART because they desired positive health outcomes. FSWs religiously adhered to ART because of healthy aspirations to live longer and have a healthier life. Aspirations for longer lives were driven by transcendental goals to be able to live long enough to take care of their children.

*"Because I want my life I don't want to die. I have seen my friends die because of not taking drugs for the whole year so when we bury them, we fear to die when we come back" (28-year-old female sex worker).*
*"It's important [ART adherence] because I have to maintain my health. To keep myself healthy be able to take care of my children grow when I am alive." (27-year-old female sex worker).*

**Theme 4: healthcare system factors (e.g., respectful healthcare workers and adequate counselling)**
The perceived ability to adhere to ART (perceived behavioral control) was related to respectful healthcare workers and adequate counselling. The majority of the FSWs observed that healthcare workers were welcoming, nice, and respectful of them. Some of the healthcare workers provided adequate privacy and reminded them of their next refill, whereas some even brought their ART drugs to their homes when they failed to come to the health facility. Healthcare workers and focal persons had mechanisms to identify FSWs in health facilities which helped them prioritise FSWs. This reduced the long waiting times and the likelihood of FSWs being seen in the health facility. FSWs provided adequate guidance and counselling to FSWs which helped clarify their myths,

misunderstandings, and negative beliefs towards ART. Ultimately, respectful care and adequate counselling promoted good adherence practices among FSWs.

> *"We are taking our drugs. Now, health workers are treating us very well. Initially, they used to ask us many questions but now it's ok and we have our focal persons at the hospital and peers who help us receive our drugs." (36-year-old female sex worker).*
> *"Our nurses are good. They always remind us to come back and take our drugs, even when you miss a day, they give you a call, alternatively, they can give the medicines to our friends and they pick for us." (21-year-old Female sex worker).*

#### Theme 5: appropriate and favourable scheduling

Appropriate and favorable scheduling enabled FSWs to adhere to ART. FSWs who were adhering to ART had a specific and convenient time at which they took ART. The FSWs, therefore, were less likely to forget to take or refill their medication because the time for taking ART was now part of their everyday routine. However, the FSWs who did not have a specific time found it difficult to take medication and were more likely to miss taking their drugs. Most FSWs reported morning hours as the most convenient time for them to take medication as it would not interfere with their work in the evening.

> *"None because I have to make an appropriate time for the drugs before going to work. I take my drugs when I am still at home. They [clients] don't know that I take drugs." (27-year-old female sex worker).*
> *"... sometimes, I do take local brew but it does not stop me from taking my drugs because I take the drugs in the morning" (28-year old female sex worker)*

#### Theme 6: socioeconomic factors (e.g., availability of food)

While socio-economic constraints hindered access to and adherence to ART, FSWs noted that availability of food and near health facilities enabled ART adherence. The association of the FSWs and the hospitals supported those who had challenges with food scarcity. Some of the FSWs were within a walkable distance from the health facilities which made it possible for them to access ART without needing to pay for transport costs.

> *"I walk to the hospital to get my medications. It is walkable, it's nearby. When I don't have transport, I can walk, and when I don't have money and feel hungry some nurses give us tea and we appreciate them for that gesture and we drink..... even nurses can use their transport to look for you and give you your medicine, some health institutions.... give us support of food when we don't have money" (28-year-old female sex worker).*

## Discussion

We used the theory of planned behavior to explore enablers and barriers to ART adherence among FSWs. Overall, experiencing good health outcomes following ART adherence motivated FSWs to continue with ART adherence. Subjective norms such as social and peer support, disclosure of HIV status, seeing others take ART, aspirations to live longer, and perceived behavioral control related to appropriate scheduling of taking medications, responsive health system factors, and social welfare enabled ART adherence. Barriers to ART adherence emanated from poor attitudes, subjective norms, and perceived behavioral control. Our findings are consistent with studies from similar settings in sub-Saharan Africa[4, 6, 8, 20]. Addressing the barriers to ART adherence among key populations may reduce the incidence of HIV infections and the AIDS-related mortalities contributing to the attainment of the Sustainable Development Goals[21].

FSWs face numerous challenges including busy schedules, substance abuse, incarceration, the unpredictability of business, and a perceived lack of control which affects ART adherence. Our findings were consistent with previous studies that reported occupational-related factors as the major barriers to ART adherence among key populations such as FSWs[5, 13, 20, 22]. The inevitable use of substances to enhance and remedy the demands of sex work indicates how FSWs make trade-offs to continue using substances and stop adhering to ART[5]. FSWs stopped using ART because substance use was perceived to interact with ART[13]. In our study, FSWs forgot to take their ART drugs because of intoxication with substances. FSWs resolved to take their ART drugs in the morning to avoid interruptions in taking ART drugs. This appropriate scheduling or timing of ART can resolve problems related to substance abuse, forgetfulness, fear of being seen taking ART at work, and unpredictable work schedules. Counselling programmes need to emphasize the importance of appropriate scheduling such as taking ART in the morning to ameliorate the unpredictability and demands of sex work.

Subjective norms especially social support and peer approval enabled FSWs to adhere to ART [10]. Social support, in the form of reminders to promptly refill and take their ART drugs on time, financial and emotional support, peer approval, and seeing others take ART, was perceived to provide an incentive for prompt ART adherence. Our study was consistent with previous studies that

highlighted the importance of social and peer support in ART adherence[5, 22]. In our study, receiving social and peer support was predicated on the disclosure of HIV status. Failure to disclose HIV status was perceived to result in missing or poor adherence to ART as it removed the support system[10]. However, some FSWs who disclosed their HIV status faced internal and external stigma, abandonment and seclusion, and gender-based violence, which affected their ability to adhere to ART drugs[23]. Previous studies have reported the role of a lack of social support in hindering ART adherence among FSWs[22, 24]. Although disclosure of HIV status is critical in enabling FSWs to receive social support, considerate disclosure is needed to reduce the resulting stigma.

FSWs face numerous social disparities and inequalities that affect their ability to adhere to ART[5]. Consistent with previous studies[8, 20], socioeconomic constraints such as a scarcity of food, and concerns for other basic needs such as rent, and transport fares to the hospital interfered with access to and adherence to ART drugs. Stress from failure to access basic needs compounds stressful sex work and results in missing or complete abandonment of ART medications[24]. Previous studies have suggested the need to provide cash incentives for sex workers to enable them to afford proper nutrition and adhere to ART[3]. In Tanzania, the distribution of ART in the community instead of the facility increased ART adherence among FSWs[25]. Community-based models of ART distribution may address concerns related to a lack of transport fares, distant facilities, and long waiting times in facilities that may hinder ART adherence[9, 25].

FSWs were motivated to comply and adhere to ART because of aspirations for positive outcomes such as good health and longer life, findings that are consistent with those of other studies[26]. Although some FSWs had misconceptions surrounding ART, the majority adhered to ART because of the perceived need to promote good health and maintain strong immunity. A positive appraisal of ART underscores the critical role of counselling in enabling FSWs to have a proper understanding of the benefits of ART, but also to dispel religious, cultural, and social misconceptions surrounding ART. The transcendental aspirations to live long enough to take care of their children highlight inherent opportunities that could be emphasized during counselling to promote ART adherence.

Previous studies have underscored healthcare system constraints such as long waiting times, lack of privacy, stigma, and the rudeness of healthcare workers as deterrents to ART adherence [3, 22, 24]. Although healthcare system constraints were reported among key informants, almost all the FSWs in our study reported that healthcare system constraints were not a major concern to them. In contrast, FSWs noted that the healthcare workers were respectful and responsive to them which facilitated their adherence to ART. The discrepancy between the key informants' perceptions of the mistreatment of FSWs and their experience of respectful care may be related to the lack of empowerment and the widespread prevalence of stigma which may have resulted in the normalization of the mistreatment in health facilities [27, 28]. In Tanzania, despite being mistreated, women rated care in health facilities more positively [27]. Nevertheless, FSWs' experience of respectful care while seeking ART services may highlight a major shift in the provision of ART services to key populations and suggest the successful development of tailor-made interventions to meet the unique needs of FSWs [26].

The study findings should be interpreted in light of its inherent strengths and weaknesses. The use of a theory, number of interviews, and the multiple perspectives (FSWs and the key informants) highlight the strengths of the study. However, the study's focus on FSWs makes it difficult to generalize it to other populations. The interview guide was not piloted and the questions in the guide were not constructed in line with the theory of planned behavior.

## Conclusion

Our study revealed that attitudes, subjective norms, and perceived behavioral control that influence ART adherence. Social support, disclosure, aspirations for longer life, respectful and responsive healthcare workers, knowledge of the benefits of ART, appropriate scheduling and availability of food facilitated ART adherence. The major barriers to ART were a lack of social support, nondisclosure, stigma and discrimination, food scarcity, and occupational-related factors. This study provides insights into barriers to ART adherence among the key population of FSWs which if well addressed can mitigate poor adherence and its consequences. Strengthening counselling services, peer support, and community outreach can be critical in addressing the barriers to ART adherence.

### Abbreviations

| | |
|---|---|
| ART | Antiretroviral therapy |
| FSWs | Female sex workers |
| IDI | In-depth interviews |
| REC | Research and Ethics Committee |

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### Author contributions

DFA, BN and MM conceptualized and designed, collected data and wrote the manuscript, JA, PI, EK collected the data and revised the manuscript, AM, EJ, GW and PA analyzed the data and revised the manuscript, JR supervised the study and reviewed the Manuscript.

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**Availability of data and materials**
No datasets were generated or analysed during the current study.

## Declarations

**Ethics approval and consent to participate**
Ethical approval was sought from the AIDS Support Organization Research Ethics Committee (TASO-REC) approval number 2024-339. All participants provided written informed consent before the data collection; The study was done based on the ethical principles of Helsinki.

**Consent for publication**
Not applicable.

**Competing interests**
The authors declare no competing interests.

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## Publisher's Note