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PRE-EXPOSURE PROPHYLAXIS INITIATION AND ADHERENCE IN FEMALE SEX WORKERS, NEW AFRICA HOUSE CLINIC IN HARARE,2020-2021

BY

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Abstract

Prevention is key in keeping female sex workers (FSW) protected from Human Immunodeficiency Virus (HIV). Pre-Exposure Prophylaxis (PrEP) offers additional safety for populations who are at substantial risk of acquiring HIV. Recent studies have shown that FSW are among the key and vulnerable populations at most risk of contracting HIV infection. The purpose of this secondary data analysis was to determine factors associated with the female sex workers decision to initiate and adhere to PrEP medication up to the end of the cycle. Between June 2020 and December 2021, New Africa House Clinic recruited 5323 individuals and of these 1285 were FSW in the electronic medical records system-BAHMNI. Logistic Regression analysis was used to determine the predictor variables associated with the FSW' decision to initiate and adhere to PrEP. After adjusting for all other independent variables, the probability that FSW in the age group 20-24 were adherent to PrEP medication was 1.7 times higher compared to age category 18-19 (95% CI: 0.7-4.2) though not statistically significant. The Wald test showed statistically significant association with adherence to PrEP only in the 40-44 years age groups (p=0.022). Married FSW were 6.7% less likely to adhere to PrEP medication compared to single FSW (95%CI: 0.4–2.5). For FSW who were divorced, the probability was 15.6% less than the single FSW (95%CI: 0.5–1.3) and for widowed, the probability was 6.7 times more than the single FSW (95%CI: 1.0–46.4). The Wald test also showed statistically significant association with adhering to PrEP only in the two marital statuses, cohabiting (p=0.028) and separated (p=0.032). Participants referred from an index patient (p<0.001) and other partner organizations (p=0.034) had a negative association with adherence to PrEP medication. FSW not in a sero-discordant relationship were 9.6 times more likely to adhere to PrEP compared to those in a sero-discordant relationship (95% CI: 1.6-56.1). Those without a history of sexual abuse or gender-based violence were 4.5 times more likely to adhere to PrEP compared to those with the history of sexual abuse or gender-based violence (95% CI: 1.1 - 19.2). Decision to PrEP initiation in FSW was due to the knowledge of risk - being sexually active, inconsistent condom use and having multiple sexual partners. The study showed that older female sex workers are less likely to adhere to PrEP medication as well as those in sero- discordant relationship where not adherent to PrEP. Steps of the PrEP care continuum may be improved through targeted support where FSW are operating in the community including peer-based interventions and safe space groups where they can meet regularly. Learning from the decision-making process, and PrEP adherence and continuation experiences of these FSW can help inform programme adaptations and improvements to support wider uptake among highly vulnerable populations, both in PSH clinics and other contexts.

Key Words: Female Sex Worker; Human immunodeficiency virus infection; Key populations; Prevention of HIV; PrEP continuation and adherence

Declaration

I declare that the work in this dissertation is my own with the exception of citations of other authors that are indicated as such in this document. The work has never been submitted, nor will it ever be submitted to another university for the award of a degree.

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Dedication

This work is dedicated to my late Mother, Tabeth Mwanjira. You remain an inspiration through the priceless memories you left me.

Thank you, Mama!

List of Acronyms and Abbreviations

AIDS	Acquired Immune-Deficiency Virus
ART	Antiretroviral Treatment
AGYW	Adolescence Girls and Young Women
AUREC	Africa University Research and Ethics Committee
CESHHAR	Centre for Sexual Health and HIV/AIDS Research
CDC	Center for Disease Control
FSW	Female Sex Worker
HIV	Human Immuno-deficiency Virus
MSM	Men having Sex with Men
MoHCC	Ministry of Health and Child Care
NAC	National AIDS Council
NAH	New Africa House clinic
NGO	Non-Governmental Organization
PEPFAR	President's Emergency Plan for AIDS Relief
PrEP	Pre-Exposure Prophylaxis
PSI	Population Services International
STI	Sexually transmitted infections
TDF/FTC	Tenofovir & Emtricitabine
USAID	United States Agency for International Development
UNAIDS	United Nations Programme on HIV and AIDS
WHO	World Health Organisation
ZIMPHIA	Zimbabwe Population-based HIV Impact Assessment

Definition of Key Terms

Pre-exposure Prophylaxis:	Is a daily pill used as a preventative measure among HIV high risk populations or groups in reducing the spread and effect of HIV.
Client:	Any person soliciting for and getting sexual services from the female sex workers
Sero-conversion:	A change from a HIV sero-negative to a HIV seropositive
Key population:	Are defined groups who, due to specific higher-risk behaviours, are at increased risk of HIV irrespective of the epidemic type or local context
Prevention:	Action taken to decrease the chance of getting a disease or condition.
BAHMNI:	An open-source Electronic Medical Record (EMR) governed by the Bahmni Coalition

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CHAPTER 1 INTRODUCTION

1.1 Introduction

The number of new HIV infections and AIDS-related deaths in Zimbabwe were approximately 40 000 and 20 000 respectively by end of 2019 (UNAIDS, 2019). The UNAIDS report further pointed that Zimbabwe is among countries with high HIV prevalence in the Sub-Saharan African region, with 1.4 million people (12.8%) living with HIV (UNAIDS, 2019). ZIMPHIA (2020) reported that the annual incidence of HIV among adults aged 15 and older in Zimbabwe stands at 0.4%, corresponding to approximately 31,000 new cases of HIV per year among adults. This therefore was reflective of the HIV prevalence rates among adults which was 12.9% in 2019, corresponding to approximately 1,225,000 adults living with HIV in Zimbabwe.

UNAIDS (2019) report also reflected that the high HIV prevalence in Zimbabwe can be attributed to unprotected heterosexual sex which accounts for 55% of all new HIV infections in the country. Accordingly, HIV prevalence rates are generally high among the key and vulnerable populations especially with the adolescent girls and young women (AGYW), female sex workers (FSW), transgender (TG), and men who have sex with men (MSM) are at higher risk of HIV infection (Avert, 2019). Therefore, it was observed that there is a need for the country to further strengthen the HIV prevention programs to meet the 95-95-95 targets by 2030.

However, in order to achieve the 95-95-95 targets by 2030 the country has been implored to ensure an effective and efficient implementation process of the Pre-exposure prophylaxis (PrEP) which is an HIV prevention option which involves the administration of antiretroviral drugs to an uninfected person before potential HIV exposure to reduce the risk of infection (Center for Disease Control, 2020). The administration can be in the form of a pill taken by mouth, or a gel applied to the vagina or rectum.

As a way to improve on the administration effort the World Health Organization (WHO), has also recommended Truvada which is a combination of tenofovir disoproxil fumarate (TDF) and emtricitabine (FTC) for PrEP use in combination with other HIV prevention strategies that include condoms and voluntary medical male circumcision (Center for Disease Control, 2020). However, for PrEP to be effective there is a need to understand factors associated with PrEP usage and adherence particularly among female sex workers.

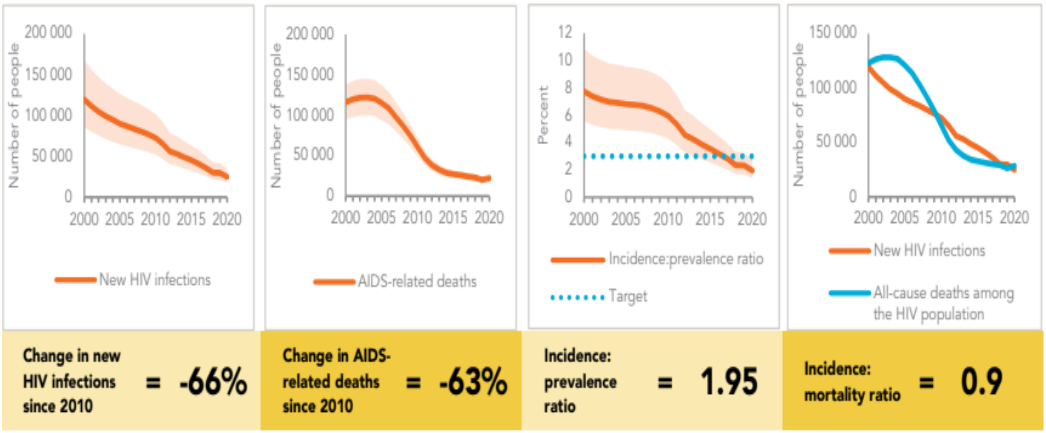
1.2 Background to the study

Clinical trials that were carried out by Center for Disease Control (CDC) in 2020 presented that PrEP offers additional safety for populations who are at substantial risk of acquiring HIV. Substantial risk can be defined as a population group with an HIV incidence greater than 3 per 100 person-years in the absence of PrEP measured among key and vulnerable populations (Naswa & Marfatia, 2011; UNAIDS, 2019). As such recent studies have shown that FSW, MSM, and AGYW are among the key and vulnerable populations at most risk of contracting HIV

infection. Studies by UNAIDS, (2019) have shown that PrEP medication has been scaled up to cover a wide population or group with more effort extend beyond key populations and other vulnerable groups in the community. Kayesu, et al., (2020) reflected that countries in sub-Saharan Africa particularly South Africa, Lesotho, and Zambia have widened the demographic base by targeting adolescents girls and young women for PrEP medication.

Statistics recorded in Zimbabwe from 2018 have highlighted those 19 000 women became infected with HIV, compared to 14 000 men (UNAIDS, 2019). Similar findings were also recorded by the Ministry of Health and Child Care with a further disaggregation by the key population group which showed that in 2018, 40% of FSW and 31% of MSM were living with HIV (MoHCC, 2018). This has been mainly attributed to coercive and non-consensual sex, rape, and unprotected sexual activities and the illegality of homosexual acts in Zimbabwe (Cáceres et al., 2015).

The endemic transition statistics in HIV and AIDS since year 2000 for Zimbabwe are illustrated in Figure 1 below. Although the absolute numbers in terms of new HIV infections and AIDS-related deaths have been very high, the trend has been negative. This indicates that measures being put in place to deal with HIV prevention are significantly reducing the spread of the scourge. Some of the measures in use include voluntary male circumcision, condoms, and awareness campaigns on abstinence.



Source: UNAIDS, (2021)

Figure 1 Endemic Transition Metrics

Gaps have been noticed from the legislative and policy stand of view as the country is yet to ratify or draft laws and policies aimed at reducing the spread of HIV and AIDS. Figure 1 above has shown the sharp decline in HIV infections from 2010-2020 with the implementation of PrEP. However, questions remain on the levels of adherence among key populations with new HIV infections been recorded.

However, some of the laws and policies in use are illustrated in Table 1 below.

Table 1 Policies and laws for reducing HIV and AIDS spread

Laws and Policies	Status
Laws criminalizing the transmission of nondisclosure of or exposure to HIV transmission	Yes
Criminalization of sex work among consenting adults	Any criminalization or punitive regulation of sex work
Criminalization of same-sex sexual acts	Yes, imprisonment (up to 14 years)
Drug use or possession for personal use is an offense	Drug use or consumption is specified as a criminal offense
Criminalization of transgender people	Neither criminalized nor prosecuted
Parental consent for adolescents to access HIV testing	Yes, for adolescents younger than 16 years
Mandatory HIV testing for marriage, work or residence permits or for certain groups	No

Female Sex Workers are generally considered as one of the key population groups that can be difficult to reach however, with the emergency of safe spaces where the groups can meet education on PrEP has been made easy. More so several issues have been raised on the need of make sure that the importance of PrEP usage cascade to key populations as well as FSW. It was therefore important to determine factors associated with the female sex workers' decision to initiate PrEP or to discontinue using medication before the end of the cycle. This will help the Ministry of Health and Child Care to come up with mitigatory strategies to address the currently existing gaps and challenges in the implementation of PrEP intervention programs among female sex workers.

1.3 Statement of the problem

Population Services International (PSI) program data has shown that non-adherence to PrEP among female sex workers stood at 50.7%, in June 2020 within all the new start centers in Zimbabwe except the 19.7% recorded at New Africa House clinic in Harare. PSI program data has shown that the majority of patients that were initiated on PrEP recorded 100% adherence within the first month of intake while the level of adherence reduced from the third month onwards with adherence levels to PrEP falling to a relatively low rate of 55%.

Data from the Ministry of Health and Child Care in collaboration with the Zimbabwe National Family Planning Council (ZNFPC) and the Clinton Health Access Initiative Inc. (CHAI) has also shown a relative decrease in PrEP adherence from the initial months of

inception (Gombe et al., 2020). It was therefore important to understand the female sex workers' PrEP usage and factors influencing PrEP initiation, adherence and continuation.

1.4 Research Objectives

1.4.1 Main objectives

To determine factors influencing PrEP initiation, adherence and continuation among female sex workers at New Africa House clinic, Harare for the period June 2020 to December 2021.

1.4.1.1 Specific Objectives

The study was guided by the following specific objectives:

i. To determine factors influencing PrEP initiation among female sex workers at New Africa House clinic, Harare for the period June 2020 to December 2021.
ii. To identify factors associated with PrEP adherence among female sex workers at New Africa House clinic, Harare for the period June 2020 to December 2021.
iii. To determine factors influencing PrEP continuation among female sex workers at New Africa House clinic, Harare for the period June 2020 to December 2021.

1.5 Research questions

i. What are factors influencing PrEP initiation among female sex workers at New Africa House clinic, Harare for the period June 2020 to December 2021?
ii. What factors are associated with PrEP adherence among female sex workers at New Africa House clinic, Harare for the period June 2020 to December 2021?
iii. What are factors influencing PrEP continuation among female sex workers at New Africa House clinic, Harare for the period June 2020 to December 2021?

1.6 Significance of the study

Pre-Exposure Prophylaxis was rolled out in Zimbabwe in 2016 as one of the HIV prevention methods however, there was limited information on factors associated with a decision to initiate PrEP and discontinuation before the end of the PrEP medication cycle among female sex workers who are at substantial risk of HIV infection. This study intended to provide evidence to the Ministry of Health and Child Care (MoHCC) to understand the currently existing gaps and challenges in the implementation of PrEP intervention programs among female sex workers.

The various partners for the Ministry of Health and Child Care include the Zimbabwe National Behaviour Change Programme, Population Services International-Zimbabwe, Determined, Resilient, Empowered, AIDS-free, Mentored, and Safe (DREAMS) Initiative that supports AGYW, the Centre for Sexual Health, HIV and AIDS Research (CeSHHAR), Pangaea Zimbabwe Aids Trust (PZAT) and the Gays and Lesbians Zimbabwe (GALZ) were targeted implementing partners to action recommendations to address the identified gaps to disrupt HIV causal pathways amongst FSW.

1.7 Delimitation of the study

The study was focused on PrEP initiation and adherence in female sex workers, from the period June 2020 and December 2021 in Harare central district. The study only targeted FSW on PrEP receiving treatment for HIV prevention from the New Africa House clinic in Harare, an integrated HIV services center which is one of the pioneers to offer PrEP in Zimbabwe.

1.8 Limitation of the study

The study took place during the COVID-19 restrictions implementation, where accessibility challenges into the study site were registered with only a limited number of people allowed at the facility at a given time. To mitigate this limitation, the researcher excluded the use of face-to-face engagement hence the study opted for the use of PrEP routinely collected primary data for secondary analysis. The researcher conducted a data cleaning exercise on the data to increase the validity and reliability of the data. However, one of the major concerns was that when the data was collected, it might have not been collected for purposes of this research and some variables of importance may have been missed.

CHAPTER 2 REVIEW OF RELATED LITERATURE

2.1 Introduction

The chapter dealt with the review of related literature on PrEP initiation and adherence in female sex workers. The chapter investigated the theoretical framework, the global PrEP trends, prevalence among key populations, and related themes that resonated with the given study objectives. Zimbabwe is among the countries with high HIV prevalence and the number of new HIV infections among the key and vulnerable population (KVP) is high. Continued interrelated intake of PrEP has proved effective in reducing the spread and emergency of new HIV infections. Current routine data indicate low adherence to PrEP medication (Gombe et al., 2020).

FSW encounter barriers to PrEP use, new users struggle with integrating daily PrEP use into routine practice (Skovdal, 2019), which can be adversely influenced by family and peers' negative opinions and the confusing of PrEP for ART (Eakle, et al., 2017). However, the effectiveness of PrEP is related to regular daily dosage, hence understanding the reasons associated with the different rates at which female sex workers can adhere to PrEP can therefore draw out the challenges associated with both uptake and adherence. Lack of PrEP adherence may lead to HIV resistance strains to FTC or TDF (Sidebottom et al., 2018).

2.2 The Fundamental Cause Theoretical Framework

The study adopted the fundamental cause theoretical (FCT) framework developed by (Phelan, Link, and Tehranifar, 2010). The theoretical framework builds on a string of the socio-ecological model which brings out factors that may influence PrEP uptake and

adherence among FSW. The FCT framework holds that access to both information and knowledge can influence one's decision that may affect his/her health. However, Phelan, Link, and Tehranifar, (2010) debated that factors that may influence PrEP uptake and adherence especially among FSW can be correlated to socio-economic factors and the health care support provided. Accordingly, Med (2020) suggests that attitudes among sex workers towards the use of PrEP were tied to interventions that occur at the individual, social, and structural level, respectively.

The fundamental cause theoretical framework points out that the social cost of PrEP for example concerns around stigma, gossip, rumors, and discrimination influence PrEP uptake and adherence. The theory further points out that education is one of the potential means through which to increase adherence to PrEP. Med (2020) notes that some high-yield facilitators for PrEP adherence include educational and motivational interventions, social support, and making sure healthcare packages are guaranteed. The fundamental cause theoretical framework notes that lifestyle factors, such as substance use, can affect PrEP adherence, hence helps in understanding how the lifestyle of FSW can affect PrEP adherence. Daily intake as to PrEP can be affected by individual behavior and attitude when using PrEP, posing inconvenience for the user.

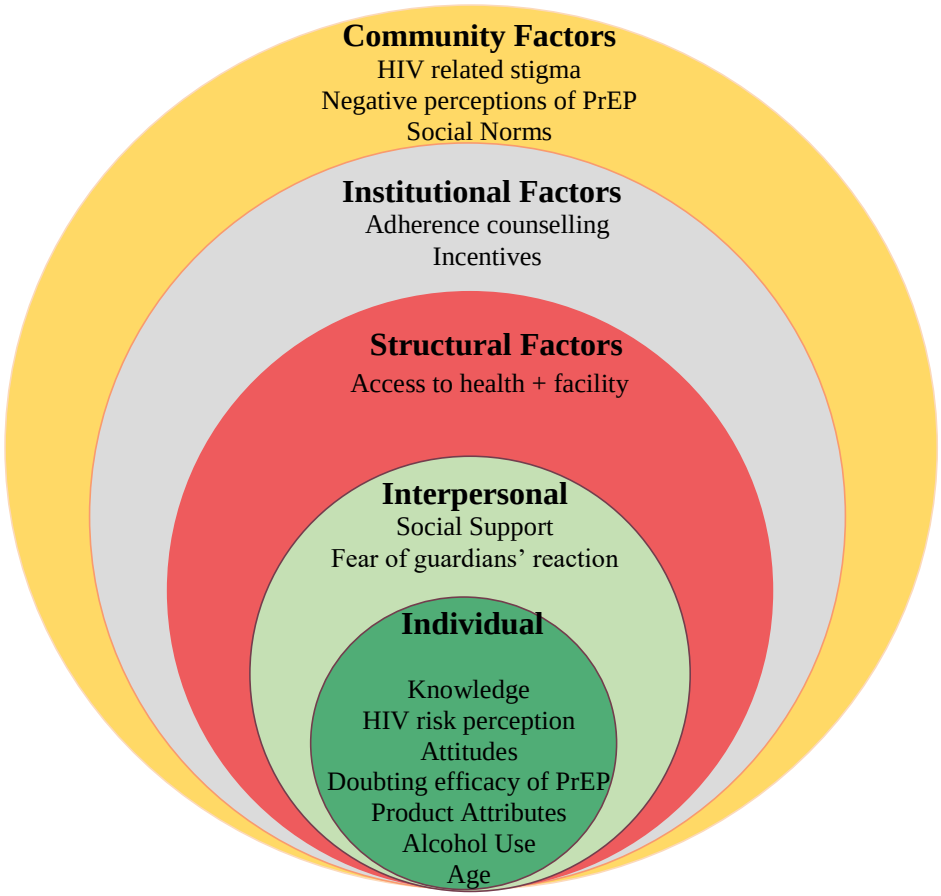


Figure 2 2 Factors influencing PrEP uptake and adherence among FSW at each level of the socio-ecological model

2.2.1 Individual level factors

Several factors have been pointed out as key barriers or facilitators to PrEP adherence and continuum. Studies in Southern Africa by Muhumuza, Ssemata, Kakande, Ahmed, Atujuna & Nomvuyo (2021) have shown that education on PrEP is fundamental in ensuring effective usage and adherence among patients and control groups. Med (2020) notes that PrEP education promotes and motivates to good health with individuals that have undergone through PrEP education showing rather more positive signs of adherence as compared to groups without any information or knowledge about PrEP. Similar views

were also raised by Muwonge, Nmabi, & Kibuuka (2022) as they highlighted that information sharing and effective awareness campaigns on PrEP usage, adherence and uptake are key for the effective administration of the drug.

Med (2020) pointed out that poor knowledge of PrEP leads to inconsistencies to uptake among patients which may contribute to a higher number of seroconverts. Evidence from literature has also shown that most people on PrEP cast doubts about its effectiveness contributing to most stopping the pill just after PrEP initiation. Doubting the efficacy of PrEP in preventing HIV negatively impacted adherence for some participants (Kayesu, Mayanja, Nakirijja, Machira, Price, Seeley & Siu, 2022). They further noted that doubts tend to be associated with the belief that HIV is an incurable disease hence the fact that medication can prevent its spread is seen as a misconception.

Gallagher, (2020) notes that withdrawal of PrEP just after initiation seems to have contributed to the emergence of new HIV infections. Reports by UNAIDS have shown an increase in new HIV infections among seroconverts (UNAIDS, 2020). In the same light, Muhumuza, et al., (2021) highlighted that one of the major barriers to PrEP uptake, adherence and continuum has a direct relationship to fears of side effects. Several factors associated with side effects have been raised contributing to the discontinuation and withdrawal of PrEP. In their studies in Uganda, Zimbabwe and South Africa Muhumuza et al., (2021) pointed that fears associated to PrEP intake have been greatly contributed to by information gained from discussion in communities as well the myths and misconceptions drawn from internet and other sources.

As such, Kayesu, Mayanja, Nakirijja, Machira, Price, Seeley & Siu (2022) noted that effective information dissemination of PrEP can therefore dilute the myths and misconceptions that build the fear and anxiety to PrEP uptake.

2.2.2 Interpersonal factors

Societal influence act as either a facilitator or barrier to health outcomes. A growing body of literature has highlighted the importance of community influence towards achieving positive health outcomes. Kayesu, et al., (2022) points out that stigma from peers, partners, and family members related to PrEP can contribute to discontinuation and non-adherence. It has been highlighted that most communities associate PrEP uptake with ART hence the association contributed to the lower uptake among key populations. Majority of FSW and MSM tend to refrain from taking PrEP because of the association of PrEP with antiretroviral drugs and HIV-related stigma (Kayesu, et al., 2022). This therefore acts as one of the key barriers to uptake as PrEP is linked to the daily tablets to people living with HIV.

Similar findings were also raised by Owens, Hubach, Williams, Voorheis, Lester, Reece, & Dodge as they noted that taking medication, especially daily, can be mistaken for taking ARVs for treatment rather than for prevention therefore contributing to most people not taking the PrEP.

HIV related stigma discouraged PrEP uptake among some AGYW. Muhumuza, et al., (2021) reported that people in communities believe that PrEP is a form of HIV treatment and as such PrEP users were HIV positive. As such most have reported being labelled by friends or others in the community as HIV positive, discouraging from continued use of

PrEP. Given the nature of work, study findings in Kenya and Uganda have shown that PrEP uptake among FSW is generally low and most of the FSW could not disclose the use of PrEP to their partners with the fear of being suspected of infidelity and the assumption that there are HIV positive.

2.2.3 Structural factors

Health workers attitude and perspectives can be linked to factors that can positively or negatively affect PrEP uptake, adherence and continuum. Pinto, Berringer, Melendez, & Mmeje, (2018) points out the need to have trained medical health practitioners to lead counselling and distribution of PrEP medication. In their studies they further pointed out that the lack of training in PrEP provision and negative attitudes toward PrEP can influence health worker perspectives, prejudicial beliefs and PrEP provision (Pinto, et al., 2018). Other studies have shown that cost and access are major barriers for PrEP uptake among other populations (Pérez-Figueroa, Kapadia, Barton, Eddy, & Halkitis, 2015; Young et al., 2014).

Making pill access and pickup points more reachable will make PrEP more widely available and can help to mitigate concerns of failing to reach for the pills when needed.

It also emerged from literature that among patients that discontinued PrEP use, challenges of access were pointed out as major barriers. Pinto, et al., (2018) points out that access to PrEP proves essential and reducing the travel distance to pick up the pill makes it easily accessible and improves on both its uptake and adherence.

2.2.4 Institutional level factors

Institutional level factors such as adherence counselling from health workers and support tools and incentives provided all served as facilitators to uptake and adherence to PrEP. Adherence counselling helped some participants to overcome barriers of side effects and HIV related stigma. Other studies have also highlighted the importance of adherence counselling in overcoming such barriers. Poor access to the health facility due to migration and living in distant locations acted as a barrier to uptake. Some participants tend to miss refills or stop using PrEP because they lived far and could not afford transport costs to the health facility. Accessibility concerns have also been reported among young people in Uganda and among a high-risk population in Zimbabwe.

With the advent of COVID 19 most institutions were closed, and this has a bearing on the uptake and adherence to PrEP. WHO, (2022) reported a sharp decline on PrEP uptake from 2020 to 2021 with most governments implementing restrictive measures on movement and number of patients allowed at medical facilities. UNAIDS reports on the closure of most clinics and hospitals which also affected access of PrEP with PrEP users forced to travel distances to major hospitals and clinics. Pinto, et al., (2018) further pointed out that with the increase in travel distances PrEP users are likely to discontinue as they don't what to incur any cost which likely feeds on their stringent budget.

Similar views were also raised by Muhumuza, et al., (2021) as they noted that PrEP uptake and adherence seems to be affected when the pill has a cost involved, in that PrEP users do not see the need of continuing for months and the need to cover for payments.

2.2.5 Community level factors

Exposure to health information proves fundamental to ensuring positive health outcomes, as such when communities are not well versed with any intervention the level of uptake seems to be low. In this regard Kayesu et al., (2022) highlighted that community affects PrEP uptake and adherence from different angles which are mostly centered on social norms, the general perceptions of PrEP, and the stigma related to HIV. Similar views were also raised by UNAIDS (2020) as they reported on the low uptake of PrEP in most southern African countries due to community influence with those taking PrEP been associated of having HIV. More so, Kayesu et al., (2022) described that the level of stigma seems to be high among sero discordant partners with most non adherers found in the group with the fear of being labeled or stigmatized as one who is HIV positive.

Fisher, Fried, Desmond, Macapagal, & Mustanski, (2017) highlighted that barriers to PrEP uptake and adherence can emanate from community level, where the community tend to spread misconceptions about PrEP. In their studies among the transgender and key populations in Peru and Kenya it was discovered that stigmatization for being transgender act as a barrier for the group in accessing PrEP. They further pointed out that given the multiple vulnerabilities with key populations has affected levels to PrEP adherence and uptake. Molina et al., (2017) explained that community perceptions on the side effects of PrEP discourage individual to fully follow the entire PrEP course as prescribed. As such to ensuring PrEP adherence and continuum scholars have recommended the need to provide adequate and relevant information to communities on the importance and effectiveness of PrEP use.

2.3 PrEP Care Continuum

Daily intake to PrEP use can be a challenge given frequent travels and unpredictable FSW work schedules which may therefore act obstacles towards adherence. Similar views have been raised in research as it has been indicated that the extreme poverty and material insecurity that typically drives sex work in sub-Saharan Africa may render HIV prevention and PrEP adherence a lower priority than meeting basic needs (e.g., food, shelter) for many women (UNAIDS, 2020). PrEP continuum of care highlights the standard package and steps to be employed by service providers and adhered to by PrEP clients (FSW) to ensure HIV prevention as illustrated in figure 3 below.

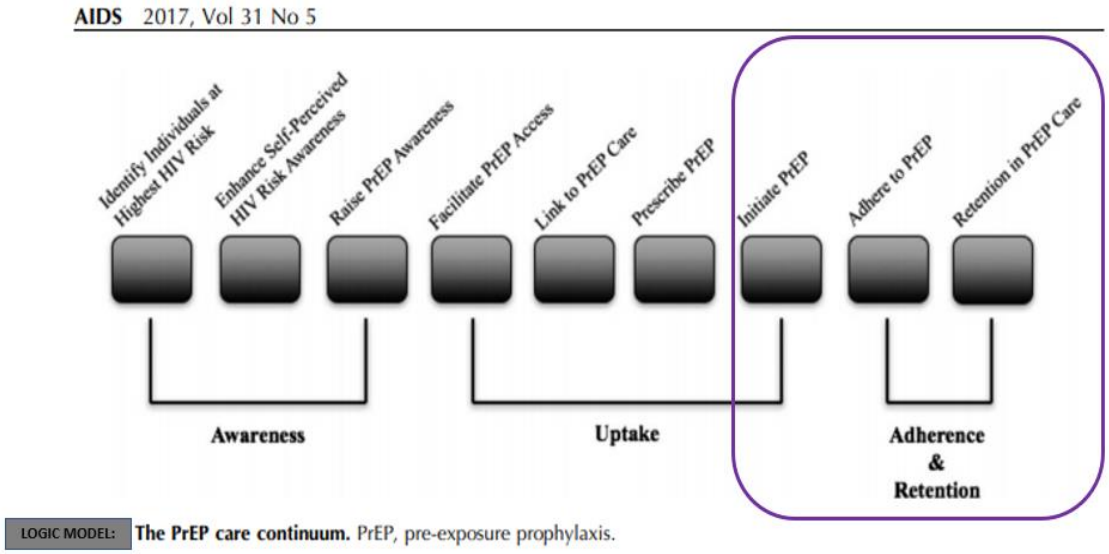


Figure 3 PrEP Care Continuum

Evidence from UNAIDS (2020) has shown the need to ensure effective awareness campaigns to improve PrEP uptake as well as PrEP adherence is key. Support from WHO (2020) has shown that PrEP continuum was generally high in regions were effective campaigns have been made. The WHO studies in Uganda and Kenya have shown a relative high percent of Prep continuum with much credit given due to the effective

campaign systems. Ramphele (2016) alluded that in areas with key populations or at high risk of HIV infection have been sidelined over the years with little or no information and access to PrEP. However, Kayesu et al., (2022) argued that in regions and countries were PrEP continuation is high, they have effective follow up systems and procedures. In the same line effective information dissemination has also proved to have improved PrEP uptake among key populations.

Other studies have also shown that awareness campaigns without effective education and information dissemination among PrEP users will not improve the levels of adherence. Non-adherence has been highly linked with fragmented systems that roll out single initiatives rather than a compound system which ensures all procedures are followed.

Samuel (2018) suggested that making use of the different PrEP continuum models institutions and health care facilities can therefore respond to some of the gaps raised by further cascading PrEP implementation according to the needs of the district or city. In his study in United States of America (Samuel 2018) figured out that PrEP implementation has the potential to reduce HIV disparities to a greater extent as well as dealing with some key barriers on both PrEP uptake and adherence.

Accordingly, the UNAIDS (2020) propounded that to reduce disparities surrounding PrEP initiation, uptake and adherence there is need to ensure that interventions target each PrEP continuum step including the concentration on PrEP awareness, access, adherence and retention.

2.4 Global PrEP uptake trends

Samuels (2020), notes that UNAIDS had set key target goals for 2020 to reach at least three million people taking oral PrEP globally as a way to help reduce the number of annual new HIV infections. As such key populations, such as men who have sex with men (MSM), female sex workers, and people who inject drugs, were prioritized. Hilie et al., (2020) further pointed that having such set targets was to ensure 90% of key populations, adolescent girls and young women in key locations, would be taking PrEP by 2020.

However, gaps still remain as the set targets or goals were yet to be achieved by the end of 2020, only 928,750 people had started taking PrEP worldwide which is less than half of all sex workers and approximately a third of MSM (UNAIDS, 2020). Samuel (2020) highlighted that failure to achieve the set goals can also be attributed to the number of countries that have initiated PrEP intake as of 2020, only ten countries have had more than 25,000 initiations which was generally lower than expected.

However, PrEP initiations have significantly increased in 2020, where over 300,000 new people started taking PrEP, despite the coronavirus pandemic (Samuel, 2020). This was the highest upsurge in PrEP initiations since PrEP was approved. Studies in South Africa, Lesotho and Zambia have shown an increase in the use of local clinic to ensure that PrEP users had easy access with limited travels. As such (Samuel, 2020) highlights on the increase of PrEP initiates during the pandemic. Moreover, UNAIDS, 2020 also recorded the disruption of PrEP with most health facilities closing and little attention given to those on PrEP medication given the severity of the pandemic.

PrEP initiations have improved in Sub-Saharan Africa with 56% which also proved to be the highest number of PrEP initiations globally (UNAIDS "AIDSinfo," 2020). Several countries ensured that KP were initiated on PrEP by end of year 2020 in Sub-Saharan Africa, with South Africa recording (101,007), Kenya (82,886), and Zambia (72,309) were at the forefront (UNAIDS "AIDSinfo," 2020). There has been a substantial increase from just around 4000 initiations in 2016 to over half a million in 2020, largely due to the US President's Emergency Plan for AIDS Relief (PEPFAR) funding and strong national commitments to improving PrEP access and uptake (Gallagher, 2020).

Support on the implementation of PrEP from key partners and organizations such as PEPFAR helped to reduce HIV incidence among persons at substantial risk for infection, including female sex workers, men who have sex with men (MSM), and transgender women (Gallagher, 2020). Nine of the eleven countries that had the most initiations in 2016 also had the most initiations in their regions in 2020 (Samuel, 2020). Strong national commitment to PrEP scale-up, adopting national PrEP policies and guidelines, setting ambitious PrEP targets, allocating sufficient resources, and having a key PrEP country coordinator is crucial in the implementation of PrEP programmes (Eakle et al., 2018). Additionally, countries that have put tailored PrEP programmes in place, offering it to populations at the highest risk of HIV acquisition, alongside provision for the general population, have been most successful (Gallagher, 2020).

2.5 Zimbabwe PrEP prevalence and key populations

Recent studies have shown that FSW, MSM, and AGYW are among the key and vulnerable populations at more risk of contracting HIV infection. In 2018, 19 000 women became infected with HIV in Zimbabwe, compared to 14 000 men (AIDS data, 2019). Young women aged 15–24 years account for 9,000 new infections compared to 4,200 young men in the same age group (Gombe et al., 2020). In his studies (Gombe et al., 2020) explained the importance of PrEP education among key populations in Zimbabwe as the number of PrEP initiates increased from 2010 to 2020.

They further highlighted that improved education of PrEP usage among key populations will therefore improve level to PrEP continuum and adherence among the key populations (Gombe et al., 2020). The feasibility of oral PrEP implementation in Zimbabwe has been proven in ongoing and completed demonstration projects and clinical trials. By the end of 2017, a total of 3073 clients were initiated on PrEP in Zimbabwe. Ninety percent of the clients initiated on PrEP were women, with the majority of them in the 25–49 years age group. The majority (52%) of the clients initiated on PrEP were FSW (Gwavava, 2018). However, evidence from different sources of literature has also pointed on the general decrease in PrEP use among key populations.

Besides issues to do with access and availability most individuals seem to discontinue PrEP usage given the long periods of uptake which stretch from 1 to 6 months or more (Gwavava, 2018). Similar views were also raised by (Mudzviti et al., 2020) as he alluded that PrEP discontinuation among female sex workers tends to increase with the number of months on the medications as the majority feel there are no longer at risk.

2.6 Men who have sex with men

Legislative and policy issues seem to act as main barriers towards PrEP access and use. Several factors have been raised in literature with key restrictive policies contributing to the low uptake of PrEP. In Zimbabwe, it is illegal for men to have sex with men (MSM), which makes it difficult for MSM to go and seek health services from health facilities for fear of stigmatization. As a result, many do not know their HIV status hence increasing the risk to the spread and emergency of new HIV infections. Avert (2019) presented that 31% of men who have sex with men in Zimbabwe are living with HIV.

In line with the 1st 90 and 2nd 90 of the HIV cascade targets, MSM was at 50%-77% by end of 2018 and these are serious gaps towards the 90-90-90 targets, and data for the viral suppression was not available during the time of this report writing (3rd 90) (Avert, 2019). MSM receives support from the Gays and Lesbians Zimbabwe (GALZ), PSI-Zimbabwe, Hand of Hope amongst other implementing partners, however, this group is continuously under threat from the government since MSM is considered illegal in the country. There is a need to scale up and improve sustained, comprehensive, and effective HIV prevention efforts targeting MSM.

2.7 Adolescent girls and young women

In 2015, 17% of young women (aged 15-19) in Zimbabwe reported having had sex with a man 10 years older in the past 12 months. Intergenerational relationships (with older partners) are thought to be one of the main drivers of new HIV infections in young women. Older partners are more likely to determine condom use and are also more likely to have

HIV than women's younger peers (ZDHS, 2016). The (AIDS data, 2019) has also shown in 2018 report, that there were an estimated 9 000 new infections among young women, more than double the number of new infections among young men (4,200).

In Zimbabwe, only 42% of young women and 47% of young men have comprehensive knowledge about HIV, limiting their ability to take control of their sexual health (UNAIDS, 2019). It is therefore important to focus HIV prevention efforts on adolescents as they are at high risk of acquiring HIV and transmitting HIV to others. Factors that make young women more vulnerable than men to acquiring HIV during sex include biology; having sex with older men who are more likely to be infected and low consistent condom use rates. Despite this greater vulnerability, women have few options to reduce the acquisition of HIV and PrEP could be the solution.

2.8 Female sex workers

Sex work is illegal and stigmatized in Zimbabwe and female sex workers are at high risk of HIV (Fearon E et al, 2019). Female sex workers are 26 times more likely to acquire HIV compared to women in general population (UNAIDS, 2021). 9% of all HIV infections in the world occur within this population (Baral. S et al, 2012). It has been reported that in 2017, Zimbabwe had approximately 44,500 female sex workers, and of these, 40% were living with HIV (MOHCC Report, 2017) (AIDS data, 2019). A total of 20 000 (50%) are in Harare and Bulawayo (Cowan et al., 2019). Sex workers' vulnerability to HIV is exacerbated by police intimidation, harassment, and arrest (UNAIDS, 2019). This creates fear that stops sex workers from accessing health services.

In 2016, the Centre for Sexual Health, HIV and AIDS Research (CeSHHAR) found that 20% of female sex workers in Zimbabwe had experienced violence from the police in the past year (Busza et al., 2017). The possession of condoms is often used as proof of sex work, and in the past, many sex workers have been arrested or had their condoms confiscated. This heightens their risk of HIV, hampering their ability to negotiate condom use (Kardas-Nelson, 2012).

A study by Nhamo et al, 2022 identified two broad themes that motivate female sex workers to initiate pre- exposure prophylaxis for HIV prevention in Zimbabwe. These factors were intrinsic and extrinsic motivators. These two broad themes were then subdivided into several sub-themes. These sub-themes under intrinsic motivation were Self- protection from HIV infection and condoms bursting. The six sub-themes identified as external motivators were occupational risk associated with sex work, increased chance of offering unprotected sex, the need to take care of the children, positive encouragement from peers, prior participation in HIV prevention programmes and Gender Based Violence.

In a study in Uganda on PrEP acceptability and initiation among women engaged in sex work (Witte. S et al, 2022), the authors concluded that despite promoting the use of PrEP, many FSW are reluctant to use it. This challenge in prevention practice indicates the failure in PrEP prevention cascade. The findings of the study pointed to the importance of family and peer support in destigmatizing sex work and PrEP use for women. Another study by Wanyama J, 2022 also concluded that high proportion of FSW were retained on PrEP and considered PrEP as dependable in protecting against HIV in cases of condom breaks or unprotected sex.

Several studies have found that alcohol affects the negotiating power of safer sex among FSW (Fearon. E et al, 2019). Condom use also differs by partner type and the amount of money the client is willing to pay as well as the strength of relationship with clients. Although FSW have expressed high interest in using PrEP once introduced to it, there is limited evidence on factors influencing PrEP adherence among FSW specifically.

Pre-exposure prophylaxis (PrEP) can become a female-controlled HIV prevention method for FSW and others who are unable to negotiate condom use (Mudzviti et al., 2020). Although it is well established that effective PrEP could provide an additional safety net to sexually active persons at risk (Desai et al., 2017), limited data are available in Zimbabwe regarding the barriers to uptake and in particular factors that influence adherence and continuation of PrEP use amongst FSW. Consistent use of PrEP as well as consistent and correct use of condoms are the two tools that HIV-negative FSW could use to reduce their risk of acquiring HIV.

2.9 Combination Prevention

Combination HIV prevention is an approach that seeks to achieve maximum impact on preventing new HIV infections by combining biomedical, socio-behavioural, and structural interventions that are human-rights-based and evidence-informed. The combination prevention package includes condoms, lubricants, STI management, screening and management of intimate partner violence, sexual and reproductive health services, and HIV services, including counselling and testing, HIV management, ART,

PEP, and PrEP. Condoms remain the only available tool for triple protection against HIV, other STIs, and unintended pregnancy.

Evidence from extensive research among discordant couples, in which one partner is infected with HIV and the other is not, shows that correct and consistent condom use significantly reduces the risk of HIV transmission both from men to women and from women to men. Condom promotion for female sex workers has had a substantial impact in many epidemics, hence, increased condom use has been found to contribute to reductions in HIV incidence. Among men who have sex with men, condom use has been shown to reduce HIV transmission during anal intercourse, and the use of condom-compatible lubricants reduces condom failure.

2.10 Oral Pre-Exposure Prophylaxis

PrEP is defined by the WHO as the use of antiretroviral drugs by HIV-negative people before potential exposure to HIV to prevent HIV acquisition (Naswa&Marfatia, 2011) (UNAIDS, 2019). Oral PrEP is an evidence-based HIV risk-reduction intervention to be offered to all people at substantial risk of acquiring HIV. The WHO defines substantial risk as a population group with an HIV incidence greater than 3 per 100 person-years in the absence of PrEP. Defining who should be offered PrEP requires a country to balance the risk of HIV exposure, the risk of adverse events, and available resources (Naswa&Marfatia, 2011) (UNAIDS, 2019).

In Zimbabwe, PrEP was included in the 2016 National Guidelines for Antiretroviral Therapy for the Prevention and Treatment of HIV (Gombe et al., 2020). The current HIV prevention strategy in Zimbabwe lists priority populations for PrEP as being adolescent girls and young women, sex workers, men who have sex with men, prisoners, truck drivers, sero-discordant couples, transgender people, and women in relationships with men of unknown status (Kaufman et al., 2016).

In 2018, 4900 people in Zimbabwe were accessing PrEP (UNAIDS, 2019). Initially, PrEP was offered through the DREAMS partnership and hence young women and girls have been the main beneficiaries (Government of Zimbabwe, 2015). The key challenges for implementing PrEP in Zimbabwe were related to funding, identifying and agreeing on target populations and areas, and navigating existing limitations within health systems concerning HIV services. Below is a flow diagram for the Oral PrEP cascade.

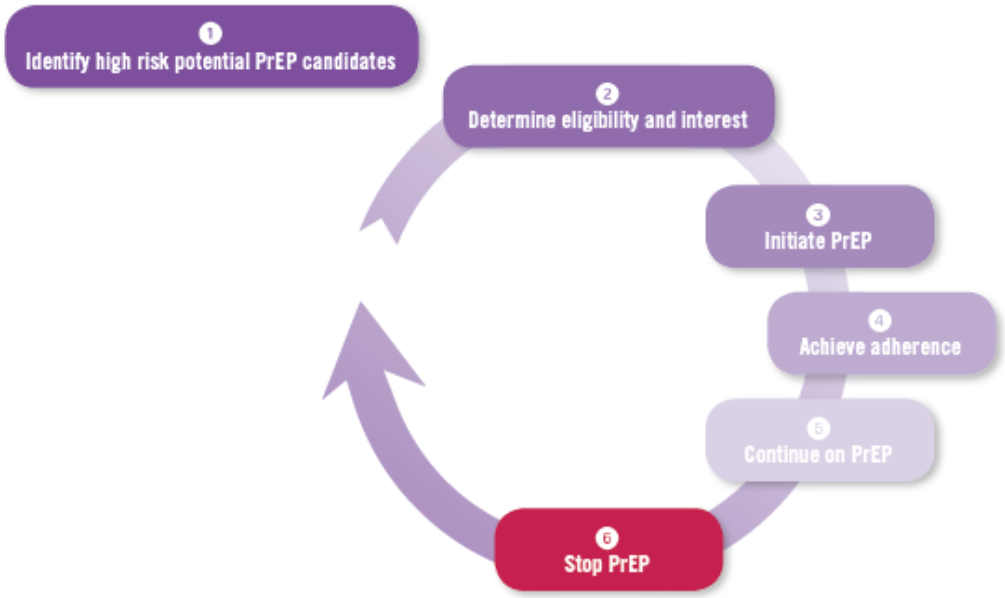


Figure 4 Steps in the oral PrEP cascade to be considered for monitoring and evaluation
Source: Adapted from WHO Guidelines (WHO, 2018)

2.11 Events driven PrEP

Pre-Exposure Prophylaxis (PrEP) has been considered as one of the highly effective methods/measures in reducing the risk for HIV infection among men who have sex with men (MSM) and has been viewed as an important impact in slowing down the HIV epidemic. Over the years WHO has also considered the administration of what is termed events-driven PrEP among MSM as a prevention package against HIV (WHO, 2020). Event-driven PrEP (ED-PrEP) for men who have sex with men consists of the use of a double dose (two pills, which serves as the loading dose) of TDF/FTC (or TDF/3TC) between two and 24 hours in advance of sex; then, a third pill 24 hours after the first two pills, and a fourth pill 48 hours after the first two pills (WHO, 2020).

Studies conducted in France and Canada has shown an 86% relative reduction in the risk of HIV among MSM on ED-PrEP as compared to those on a single dose (Molina, 2019). WHO (2020) also raised similar views as they pointed out that findings from the open-label extension of IPERGAY showed a reduction in HIV incidence close to 97% among MSM on ED-PrEP. Empirical evidence has presented that sexually active MSM can stay protected when one uses ED-PrEP each day even when one stops two days after the sexual act.

Several advantages have been tabled out as benefits of ED-PrEP in MSM. WHO (2020) pointed out that ED-PrEP doses provide choice and convenience for MSM as they may be at high HIV risk for a brief period. ED-PrEP has also been considered as an option for MSM who can anticipate, plan, or delay their sex events thereby reducing the pill burden. However, insufficient evidence is available among women, transgender women, and men who have vaginal and/or anal sex with women.

2.12 Summary

The chapter presented views related to literature on PrEP adherence among key population groups. Views raised in literature have shown the early adherence to most PrEP patients from the initial months with adherence levels decreasing with the number of months as one is on PrEP. Both PrEP adherence and PrEP continuation are directly linked to access of both information and knowledge that can influence one's decision that may affect his/her health.

CHAPTER 3 METHODOLOGY

3.1 Introduction

This chapter specifies the methodology and procedures for collecting and analyzing the required data to realize the research objectives. This chapter discusses the research design, population, and sampling used for collecting information for the study. The chapter also discusses data collection, data extraction procedure as well as analysis and organization of data. Finally, ethical considerations applied in this study are also described in this chapter. Since the study intended to gain insights on PrEP initiation and adherence in female sex workers, the overall nature of the study was composed of a quantitative research design.

3.2 Study design

Kothari & Garg, (2014) defines study design as a framework of methods and techniques used by a researcher to combine various components of a research in a reasonably logical manner so that the research problem is efficiently handled. Yin (2017), states that the research design is the logical sequence that connects the empirical data to the research questions and the final conclusions. Creswell & Clark, (2011) concurs and asserts that the research design is a plan, structure, and strategy of investigations to obtain answers to the research questions.

This study used a secondary data analysis study design. Secondary data analysis is analysis of data that was collected by someone else for another primary purpose. The utilization of this existing data provides a viable option for researchers who may have limited time and resources. Secondary analysis is an empirical exercise that applies the

same basic research principles as studies utilizing primary data and has steps to be followed just as any research method (Johnston, M. P. 2014).

3.3 Study setting

The study was conducted at New Africa House (NAH) clinic which is a franchise run by a non-governmental organization (NGO), Population Services International (PSI) Zimbabwe New Start center in Harare. The clinic is located in the Harare central business district and offers integrated HIV and sexual and reproductive health (SRH) services across Harare metropolitan province. The clinic is also a referral center catering for key populations and the general public.

3.4 Study population

Literature defines a population as a complete set of people with a defined set of characteristics (Banerjee &Suprakash Chaudhury, 2010). Therefore, from an epidemiological perspective, a population is defined by time, place, and person. Therefore, the study population consisted of female sex workers (FSW) aged 18 years and above who ever took PrEP at New Africa House clinic. The population of the study was drawn from the PSI Bahmni electronic medical records system data of FSW who took PrEP at NAH clinic.

3.4.1 Inclusion criteria

The inclusion criteria describe the main characteristics of the population of interest (Majid, 2018). Hence all FSW aged 18 years and above with complete information were included in the study.

3.4.2 Exclusion criteria

Any client who was below 18 years of age for the period under review was excluded from the study.

3.5 Sampling

A sample is a subset of the population and sampling is the process of selecting participants for the study (Banerjee &Suprakash Chaudhury, 2010). Of the eight PSI network franchise clinics, purposive sampling was used to select the study facility. The sampling technique took the facility with the largest cohort of FSW who took PrEP from June 2020 to December 2021. A purposive selection denotes the method of selecting a number of groups of units in such a way that selected groups' together yield as nearly as possible the same average or proportion as the totality with respect to those characteristics which are already a matter of statistical knowledge (Rai & Thapa, 2015).

3.5.1 Sample size and sampling procedures

For sample size, all the female sex workers with complete information who presented at NAH clinic between June 2020 and December 2021 were included to ensure sufficient power. In the above referred period, PSI recruited 5323 individuals and of these 1285

were female sex workers with complete information in the BAHMNI electronic medical records system. PSI operates in eight facilities, and of these New Africa House clinic was the purposely selected facility for the study.

3.6 Study variables

3.6.1 Outcome variables

The outcome of interest was adherence to PrEP defined as the use of PrEP only during periods of risk exposure such that it leads to effective protection against HIV acquisition. The response variable was coded “1” for someone who was adhering to PrEP and “0” for someone who was not adhering.

3.6.2 Independent variables

The predictor variables that were used in the study were age, marital status, level of education, employment status, referral source, sexually active in high prevalence KP category, consistent condom use in the last 6 months, has sex partner who is a KP, treated STIs in past 6 months, has taken PEP in the past 6 months, used emergency contraceptives in past 6 months, in a sero-discordant relationship, has sexual partner with unknown HIV status, injects drugs, has other chronic illness, taking other medication, has more than one sexual partner, knows non-regular partner HIV status, has history of sexual abuse or GBV, and condom burst in the last 3 months.

3.7 Data management

All potential data of interest were extracted from Bahmni to excel for cleaning. This is a password protected database with limited access. Only personnel with authorized credentials are allowed access to the database. A new file was transferred from excel to STATA 12.0 without altering the original data file. Categorical variables were recorded by creating dummy variables. A dummy variable is an artificial variable designed for representing some characteristic with two or more distinct categories. It assumes the value 0 or 1, to indicate the absence or presence of an effect that may be expected to alter the outcome.

When using logistic regression analysis, STATA treats all independent variables as numerical. Dummy variables therefore enable the regression algorithm into correctly analyzing attribute variables.

3.8 Data analysis and Organisation

Statistical data analysis was done using STATA 12.0 which is more suitable and simpler for research and analysis. Summary statistics were expressed as a number (%) for categorical variables, mean (s.d) or medians (IQR) depending on the distribution of the data tested using the Shapiro Wilk's test. Bivariate analysis was performed using the Chi-square test. The alpha level was set at of $p<0.05$. Multiple logistic regression analysis (MLRA) was conducted to identify any association between the independent variables and the dependent variable. The adjusted odds ratios were used for ease of comparison. Odds ratio of 1 means that the exposure is not associated with the disease. If the odds ratio

is greater than 1, it means that exposure might be a risk factor for the outcome and when it is less than 1 it means that exposure might be a protective factor against the outcome.

3.9 Dissemination of Results

The findings from the study will be disseminated through oral presentations to Population Services International Zimbabwe now operating under it's local NGO, Population Solutions for Health (PSH), conferences, and workshops as well as journal publications.

3.10 Ethical considerations

Data was treated as confidential and was used for this study only. All personal identifiable information was excluded from the extract. The researcher is aware of the sensitive nature of the study and shall maintain confidentiality and anonymity of records. Before initial contact with the respondents, the researcher sought approval from the Africa University Research Ethics Committee (AUREC) to conduct research. From the university, a letter granting permission to do field work was granted. The researcher sort for and was granted authorization from the PSI Zimbabwe management for use of the secondary data for the study. The research proposal was also presented to the Africa University Research Ethics Committee (AUREC) for approval and the researcher was granted permission (Approval Number: Ref: AU 2336/22).

The researcher also explained the purpose of the study to the administrative authorities at the New Africa House clinic. Good clinical practice and research ethics principles were followed during all stages of the study.

Due to the design of both the study and survey there are no foreseeable risks associated with either the institution or individual participation in this study. In carrying out the research process, it was important to protect human rights and privacy of respondents from being disobeyed by the researchers. The researcher gave assurances that no coercion would be used in selection of participants profiles.

3.11 Summary

The chapter presented the methodology for the study. Presented in detail were the research design, population, sample, and sampling procedures. The chapter also made a presentation on the validity and reliability of the data, ethical considerations, and data analysis procedures. Figure 4 below summarizes the chapter.

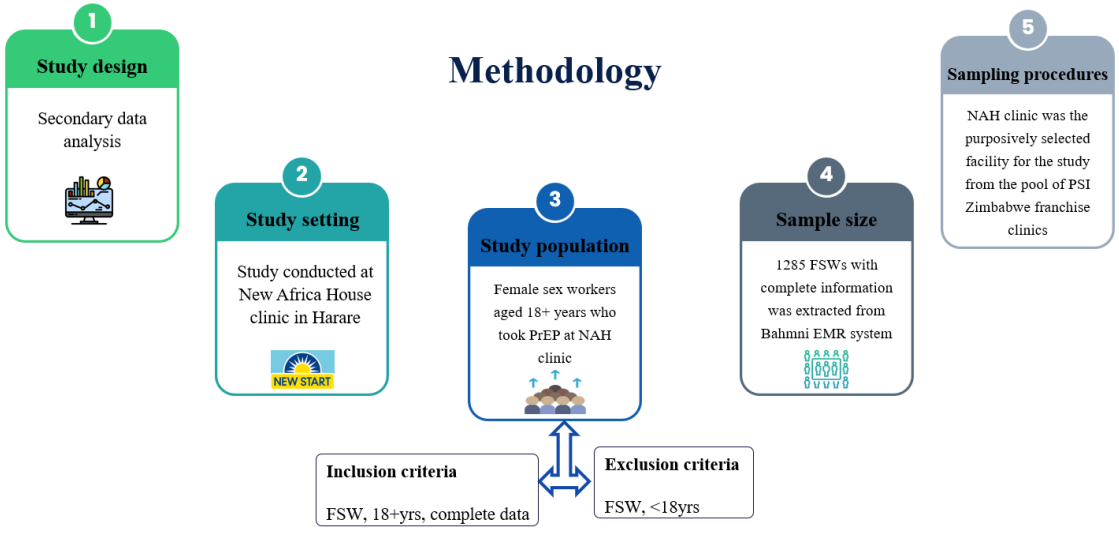


Figure 4: Methodology Summary

CHAPTER 4 DATA PRESENTATION, ANALYSIS, AND INTERPRETATION

4.1 Introduction

In this chapter, the researcher presents the statistical outputs to fulfill the aim and objectives of the study. Descriptive statistics on socio-demographic characteristics of the study participants will be presented. The researcher also exhibits the results of analytical statistics done in the form of tables and graphs. Results are also interpreted to give meaning to the outcomes of the statistical analyses.

4.2. Data presentation and analysis

4.2.1. Demographic characteristics of participants

A total of 1285 female sex workers (FSW) participated in this study. All the participants recruited in the study were from the urban setting. In terms of age distribution, majority of the study participants were in the age group 25-29 years [median =29, IQR= 34-24] with a frequency of 328 (25.5%) followed by the 20-24 years and 30-34 years with frequencies of 286 (22.3%) and 276 (21.5%), respectively. In total, 829 (64.5%) of the participants were recruited at a static clinic (NAH) and 456 (35.5%) were from the outreach programmes.

With regard to the level of education among the participants, 1173 (91.3%) had reached secondary education 89 (6.9%) and 22 (1.7%) reached primary and tertiary education respectively. Of all the participants recruited in this study, 468 (36.4%) were single, 41 (3.2%) were married, 115 (9.0%) were cohabiting, 226 (17.6%) separated, 11 (0.9%) were widowed and 424 (33.0%) were divorced.

The majority, 1274 (99.1%) of the study participants reported ever being tested for HIV and only 11 (0.9%) had never been tested for HIV. With respect to employment status, 730 (56.8%) of the study participants were not formally employed and 324 (25.2%) were self-employed. The rest of the participants were employed in different disciplines which range from general worker (1.3%), trained professionals (2.0%) and students (0.5%) as shown in table 3 below.

Table 2 Demographic characteristics of participants (N = 1285)

Variable	n (%)
Age [median (IQR)]	29 (34-24)
Age Group	
18-19	76 (5.9)
20-24	286 (22.3)
25-29	328 (25.5)
30-34	276 (21.5)
35-39	181 (14.1)
40-44	105 (8.2)
45-49	25 (2.0)
50+	8 (0.6)
Marital status	
Single	468 (36.4)
Married	41 (3.2)
Cohabiting	115 (9.0)
Separated	226 (17.6)
Divorced	424 (33.0)
Widowed	11 (0.9)
Level of education	
None	1 (0.1)
Primary	89 (6.9)
Secondary	1173 (91.3)
Tertiary	22 (1.7)
Site type	
Outreach	456 (35.5)
Static	829 (64.5)
Occupation	
Unemployed	730 (56.8)
General worker	17 (1.3)
Housewife	2 (0.2)
Transport business	180 (14.0)
Self employed	324 (25.2)
Student	6 (0.5)
Trained professional	26 (2.0)

4.2.2. Factors influencing initiation on PrEP medication

It has emerged from the study that one of the primary reasons for initiating PrEP was related to perceived risk associated with the FSW sexual activity and the type of partners one is engaging in sexual activity with. Thus, study findings have shown that at the screening stage, the majority of the participants, 1279 (99.5%) were sexually active. Study findings have presented the general understanding from FSW as the majority of them were initiated on PrEP as the group is sexually active.

One can therefore note that FSW understood the importance of PrEP as a mitigation measure to the further spread and emergence of new HIV infections. It also emerged from the study findings that FSW are well aware of the HIV combined prevention measure as the majority of them are already initiated on PrEP and also using other HIV prevention measures. However, study findings as shown in table 4 below over 1162 (90.4%) of the FSW reported to be not using condoms consistently during sexual intercourse hence the reason why the majority of them have decided to initiate PrEP medication.

Moreover, 1116 (86.9%) reported being sexually active in high key population as such influencing the decision to be on PrEP medication as a measure to reduce the risk and the spread of HIV. The desire to contain and to reduce the spread of HIV has been highlighted by the increase in the number of individuals on PrEP medication. Study findings have shown that 880 (68.5%) of the FSW had a sexual partner who was a KP hence the same group has reported the need for PrEP as a measure to reduce risk of HIV.

Similar findings were also drawn among the sero-discordant couples with 16 (1.3%) of the female sex workers stated being in a sero-discordant relationship and as a way to

safeguard the relationship and stop the emergency of new HIV infections the majority of the FSW in sero-discordant relationships have a reason that influenced them to initiate PrEP medication. Those who stated injecting drugs as a reason were 29 (2.3%). The other reasons that influenced the decision to initiate PrEP were partner having more than one sexual partner 970 (75.5%) and having partner with unknown HIV status 434 (33.8%) as shown in table 3 below.

Table 3 Reasons for initiating PrEP

Variable	n (%)
Reasons for starting PrEP:	
Participant is sexually active	1279 (99.5)
Sexually active in high KP category	1116 (86.9)
Participant has more than one sexual partner	970 (75.5)
Participant has partner with unknown HIV status	434 (33.8)
Participant doesn't use condoms consistently	1162 (90.4)
Participant has a KP sexual partner	880 (68.5)
Participant is in a sero-discordant relationship	16 (1.3)
Participant injects drugs	29 (2.3)

4.2.3. Factors associated with adherence to PrEP medication

Study findings have shown that the majority of the participants were in the age group 25-29 years with a relative frequency of 193 (15.0%) among those who adhere to PrEP medication. Adherence to PrEP has been directly linked with one marital status, age, and level of education. As shown in table 4 below, the majority of the female sex workers that were not married tend to adhere to PrEP more as compared to the elderly and married group. With the significant level of 95 the study findings have shown with the P value of 0.01 that there is a direct relationship between PrEP adherence with age.

Adherence level among the FSW has been driven by their personal desires to stop the spread of HIV as well as reducing the risk of infections. The level of peer influence can

be seen as one factor that has promoted adherence among the younger FSW as compared to the elderly as they easily encourage each other on the frequent visit and uptake of the medication. Study findings have shown that among the FSW, those that were married seemed to have a challenge with only the majority of them not adherent to PrEP medication as compared to the singles that at 270 (21.0%) adhere to PrEP.

It also emerged from the study that level of education had a direct influence on PrEP adherence, as the majority of the participants 649 (50.5%) who attained secondary education proved to be among most of those who were adherent to PrEP. 535 (41.6%) were referred from the Infection, Prevention and Control (IPC) agents as shown with table 5 below. However, study findings show that there is no relationship between the level of education and PrEP adherence ($p=0.429$).

Results from Pearson's Chi-square test showed that marital status, age, employment status, referral source, sexually active in high prevalence key population category, has sex partner who is a key population, in a sero-discordant relationship, taking other medication, has history of sexual abuse or GBV and condom burst in the last 3 months ($p<0.05$) had statistically significant association with adherence to PrEP medication. However, all the variables with $p<0.25$ were included in the multivariate analysis. The non-adherence rate to PrEP among female sex workers was 45.2% (95% CI: 0.4 - 0.5).

Table 4 Socio-demographic factors associated with adherence to PrEP medication among female sex workers at NAH clinic

	Adherent to PrEP		
Variable	**Yes**	**No**	**P-value**
Age	**n (%)**	**n (%)**	
18-19	38 (3.0)	38 (3.0)	
20-24	180 (14.0)	106 (8.3)	
25-29	193 (15.0)	135 (10.5)	
30-34	145 (11.3)	131 (10.2)	< 0.001
35-39	96 (7.5)	85 (6.6)	
40-44	33 (2.6)	72 (5.6)	
45-49	16 (1.3)	9 (0.7)	
50+	3 (0.2)	5 (0.4)	
Marital status			
Single	270 (21.0)	198 (15.4)	
Married	19 (1.5)	22 (1.7)	
Cohabiting	75 (5.8)	40 (3.1)	
Separated	138 (10.7)	88 (6.9)	< 0.001
Widowed	5 (0.4)	6 (0.5)	
Divorced	197 (15.3)	227 (17.7)	
Level of education			
Primary	44 (3.4)	45 (3.5)	
Secondary	649 (50.5)	524 (40.8)	0.429
Tertiary	10 (0.8)	12 (0.9)	
None	0 (0.0)	1 (0.1)	
Employment status			
Unemployed	416 (32.4)	314 (24.4)	
General worker	8 (0.6)	9 (0.7)	
Housewife	1 (0.1)	1 (0.1)	
Transport Business	118 (9.2)	62 (4.8)	0.001
Self employed	144 (11.2)	180 (14.0)	
Student	2 (0.2)	4 (0.3)	
Trained professional	15 (1.2)	11 (0.9)	
Referral source			
IPC agent	535 (41.6)	363 (28.3)	
Self-referred	52 (4.1)	78 (6.1)	
Index patient	13 (1.0)	29 (2.3)	0.001
Community health worker	86 (6.7)	82 (6.4)	
Partner organizations	3 (0.2)	5 (0.4)	
GALZ	4 (0.3)	1 (0.1)	
Partner conduct	7 (0.5)	8 (0.6)	
Family/friend	4 (0.3)	15 (1.2)	
Sexually active in high prevalence KP category			
Yes	592 (46.1)	524 (40.8)	0.001
No	112 (8.7)	57 (4.4)	
Consistent condom uses in the last 6 months			
Yes	59 (4.6)	64 (5.0)	0.11

No	645 (50.2)	517 (40.2)	
Has sex partner who is a KP			
Yes	499 (38.8)	381 (29.7)	0.042
No	205 (16.0)	200 (15.6)	
Treated STIs in past 6 months			
Yes	146 (11.4)	107 (8.3)	0.297
No	558 (43.4)	474 (36.9)	
Has taken PEP in past 6 months			
Yes	3 (0.2)	7 (0.5)	0.114
No	701 (54.6)	574 (44.7)	
Used emergency contraceptives in past 6 months			
Yes	22 (1.7)	13 (1.0)	0.331
No	682 (53.1)	568 (44.2)	
In sero-discordant relationship			
Yes	2 (0.2)	14 (1.1)	0.001
No	702 (54.6)	567 (44.1)	
Has sexual partner with unknown HIV status			
Yes	253 (19.7)	181 (14.1)	0.071
No	451 (35.1)	400 (31.1)	
Participant injects drugs			
Yes	18 (1.4)	11 (0.9)	0.425
No	686 (53.4)	570 (44.4)	
Has other chronic illness			
Yes	21 (1.6)	8 (0.6)	0.054
No	683 (53.2)	573 (44.6)	
Taking other medication			
Yes	166 (12.9)	88 (6.9)	< 0.001
No	538 (41.9)	493 (38.4)	
Has more than one sexual partner			
Yes	521 (40.5)	449 (34.9)	0.174
No	183 (14.2)	132 (10.3)	
Know non-regular partner HIV status			
Yes	6 (0.5)	12 (0.9)	0.066
No	698 (54.3)	569 (44.3)	
Has history of sexual abuse or GBV			
Yes	23 (1.8)	8 (0.6)	0.028
No	681 (53.0)	573 (44.6)	
Condom burst in last 3 months			
Yes	12 (0.9)	89 (6.9)	< 0.001
No	692 (53.9)	492 (38.3)	

More importantly the study findings established that whilst PrEP adherence was common among female sex workers, most of them were taking other medication to compliment PrEP medication. Study findings have also shown the probability of female sex workers on PrEP also taking other medication. One can therefore note that adherence to PrEP was more apparent among individuals taking other medication as a preventive measure against HIV.

It is also imperative to pinpoint that, female sex workers seem to have doubts on the effectiveness PrEP alone as a restrictive measure against the emergence of new HIV infection hence the need to use a combined preventative measure to HIV.

Thus, one can note that not all female sex workers are adhering to PrEP with the majority citing doubts on the effectiveness and efficiency of PrEP uptake and adherence. This can therefore account to the low levels of PrEP continuation among active female sex workers, Table 4 above has shown that those who were sexually active in high prevalence key populations category were 592 (46.1%) among those with PrEP adherence and those who had sex partner who is a KP were 499 (38.8%). Such findings have shown the need by female sex worker to initiate into PrEP. Given the high-level risk among individuals in a relationship while in a key population group female sex workers have taken the initiative and enrolled into PrEP medication.

With regard to condom use during sexual intercourse, 59 (4.6%) among those with PrEP adherence reported consistency condom use in the last six months. Only 2 (0.2%) of those with PrEP adherence were in a sero-discordant relationship. Among the participants with PrEP adherence, 253 (19.7%) had sexual partner with unknown HIV status, 18 (1.4%)

were injecting drugs, 21 (1.6%) had other chronic illnesses, 166 (12.9%) were taking other medications and 12 (0.9%) reported a condom bursting during sexual intercourse in the last 3 months.

4.2.4 Multivariate analysis of factors associated with adherence to PrEP medication

With reference to age (table 5), the odds that participants in the age group 20-24 were adherent to PrEP medication were 1.7 times higher than those in the age category 18-19 (95% CI: 0.7-4.2) though not statistically significant. The odds of adhering to PrEP medication in the age category 25-29, were 1.2 (95% CI: 0.5–2.8), those in the age category 30-34, the odds were 0.9 (95% CI: 0.4–2.2), for the 35-39 years age group, the odds were 0.7 (95% CI: 0.3–1.7), 0.3 (95% CI: 0.1–0.9), 0.8 (95% CI: 0.2–3.4) and 0.2 (95% CI: 0.0–1.4) for those in the age groups 40-44 years, 44-49 years and 50+ years respectively.

The Wald test showed statistically significant association with adherence to PrEP only in the 40-44 years age groups (p=0.022). The data showed a general decrease in PrEP adherence with increase in age. The 20-24 years age group had the highest odds of adhering to PrEP and the 50+ age group had the lowest.

With regard to the marital status, the married female sex workers were 6.7% less likely to adhere to PrEP medication compared to single FSW (95% CI: 0.4–2.5). For FSW who were divorced, the probability was 15.6% less than the single FSW (95% CI: 0.5–1.3) and for the widowed, the probability was 6.7 times more than the single FSW (95% CI: 1.0–46.4). The Wald test also showed statistically significant association with adhering to

PrEP only in the two marital statuses; cohabiting (AOR= 2.3, 95% CI: 1.1–4.8, p= 0.028) and the separated (AOR = 1.8, 95% CI: 1.1–3.0, p= 0.032).

Adherence to PrEP was positively associated with employment category; transport business (AOR = 1.9, 95% CI: 1.0-3.4, p=0.039) and negatively with those self-employed (AOR = 0.6, 95% CI: 0.4-0.9, p=0.016). Participants who were referred from the index patient (AOR = 0.1, 95% CI: 0.0-0.3, p<0.05) and other partner organizations (AOR = 0.2, 95% CI: 0.0-0.9, p=0.034) had a negative association with adherence to PrEP medication. Female sex workers who were not sexually active in high prevalence key population category were 2.9 times more likely to adhere to PrEP medication than those in sexually active in high prevalence key population category (95% CI: 1.6-5.2).

Those who reported not experiencing condom bursting during sexual intercourse in the past 3 months (AOR= 0.1, 95% CI: 0.0-0.1, p<0.05), those without a key population sex partner (AOR= 0.6, 95% CI: 0.4- 0.9, p=0.020) and those who did not know their non-regular partner's HIV status (AOR= 0.3, 95% CI: 0.1-1.0, p=0.045) were negatively associated with adherence to PrEP medication. Female sex workers who were not in a sero-discordant relationship were 9.6 times more likely to adhere to PrEP compared to those who were in a sero-discordant relationship (95% CI: 1.6-56.1).

Those without a history of sexual abuse or gender-based violence were 4.5 times more likely to adhere to PrEP compared to those with the history of sexual abuse or gender-based violence (95% CI: 1.1 - 19.2). Those who were not taking other medication were 2.0 times more likely to adhere to PrEP compared to those taking other medications (95% CI: 1.2- 3.3).

Table 5 Multivariate analysis of factors associated with adherence to PrEP medication among female sex workers at NAH clinic

	Unadjusted		Unadjusted	
	OR	**95% CI**	**OR**	**95% CI**
Age:				
18-19	1.0		1.0	
20-24	1.7	1.0 - 2.8	1.7	0.7 - 4.2
25-29	1.4	0.9 - 2.4	1.2	0.5 – 2.8
30-34	1.1	0.7 - 1.8	0.9	0.4 – 2.2
35-39	1.1	0.7 - 1.9	0.7	0.3 – 1.7
40-44	0.5	0.2 - 0.8	**0.3**	0.1 – 0.8
45-49	1.8	0.7 - 4.5	0.9	0.2 – 3.4
50+	0.6	0.1 - 2.7	0.2	0.0 – 1.4
Marital status:				
Single	1.0		1.0	
Married	0.6	0.3 - 1.2	0.9	0.3 – 2.5
Divorced	0.6	0.5 - 0.8	0.8	0.5 – 1.3
Cohabiting	1.4	0.9 - 2.1	**2.3**	1.1 – 4.8
Separated	1.2	0.8 - 1.6	**1.8**	1.1 – 3.0
Widowed	0.6	0.2 - 2.0	6.7	1.0 -46.3
Employment status:				
Unemployed	1.0		1.0	
General worker	0.7	0.3 - 1.8	1.0	0.2 - 4.0
Housewife	0.8	0.0 - 12.1	1.0	0.0 -47.8
Other radiology	1.4	1.0 - 2.0	**1.9**	1.0 - 3.4
Self employed	0.6	0.5 - 0.8	**0.6**	0.4 - 0.9
Student	0.4	0.1 - 2.1	0.4	0.0 -11.7
Trained professional	1.0	0.5 - 2.3	1.0	0.31 - 3.1
Referral source:				
IPC agent	1.000		1.000	
Self-referred	0.452	0.311 - 0.658	0.558	0.306 - 1.017
Index patient	0.304	0.156 - 0.593	**0.130**	0.059 - 0.289
Community health worker	0.712	0.511 - 0.990	0.735	0.431 - 1.254
Other partner organisation	0.407	0.097 - 1.714	**0.146**	0.025 - 0.866
Partner conduct	0.594	0.213 - 1.652	1.152	0.214 - 6.191
Family/friend	0.181	0.060 -0.550	0.979	0.163 - 5.876
Sexually active in high prevalence KP category:				
Yes	1.0		1.0	
No	1.7	1.2 - 2.4	**2.9**	1.6 - 5.2
Condom burst in the last 3 months:				
Yes	1.0		1.0	
No	0.1	0.1 - 0.2	**0.0**	0.0 - 0.1
Has KP sex partner:				
Yes	1.0		1.0	

OR=Odds Ratio, CI = Confidence Interval

No	0.8	0.6 - 1.0	**0.6**	0.4 - 0.9
In a sero-discordant relationship:				
Yes	1.0		1.0	
No	8.7	2.0 - 38.3	**9.6**	1.6 -56.1
Has sexual partner with unknown HIV status:				
Yes	1.0		1.0	
No	0.8	0.6 - 1.0	0.7	0.5 - 1.0
Has history of sexual abuse or GBV:				
Yes	1.0		1.0	
No	2.4	1.0 - 5.4	**4.5**	1.1 -19.1
Taking other medication:				
Yes	1.0		1.0	
No	1.7	1.3 - 2.3	**2.0**	1.2 - 3.3
Has more than one sexual partner:				
Yes	1.0		1.0	
No	------	------	0.6	0.4 - 1.0
Knows non-regular partner HIV status:				
Yes	1.0		1.0	
No	0.4	0.2 - 1.1	**0.3**	0.1 - 1.0

4.2.5 Factors influencing PrEP continuation

Study findings have also shown that even among those people who initially express interest to start taking PrEP, long term adherence can remain poor. PrEP adherence is reported to be affected by demographic characteristics (age, gender, level of education, marital status), side effects, fear of stigma associated with use of anti-retroviral (ARV) drugs and negative attitudes from health workers, patient health literacy to mention just a few. Almost all the age groups had the continuation rate highest at 2-3 months.

However, these continuation rates by age showed a general decreasing trend with an increase in age from the age group 25-29 years to 45-49 years and there was no continuation from 50 years and above. Even at 1month, the continuation rates showed a general decrease with increase in age. The continuation rates at 4-6 months were almost

the same in the age groups 18-19 years to 20-24 years and similarly in the age groups 25-29 years to 40-44 years as shown in figure 5 below.

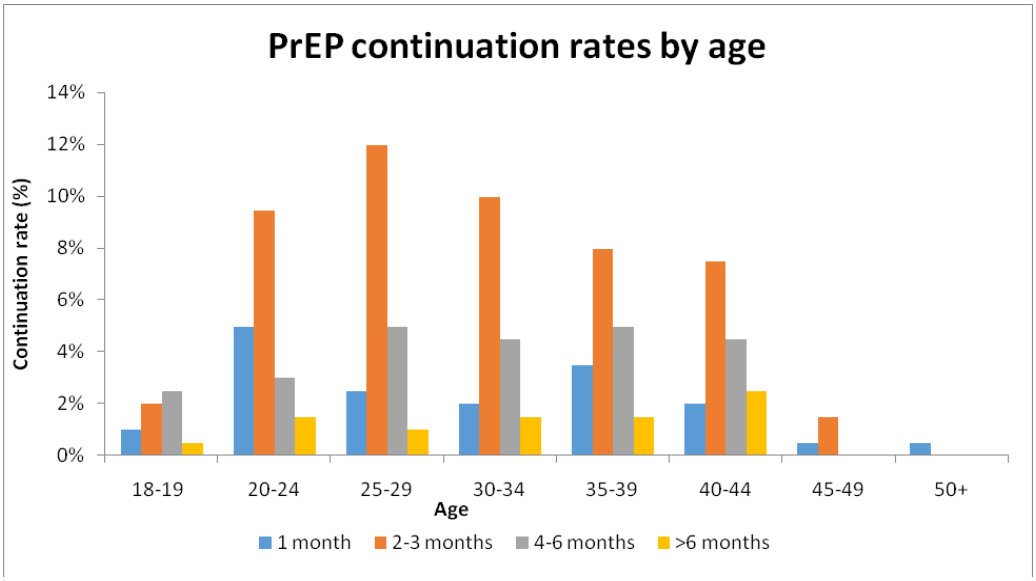


Figure 5 PrEP continuation rates by age

The continuation rates showed a general decrease with an increase in continuation duration. The majority of the participants (46.6%) came back to collect the 3 months' supply after initiation, 29.2% came back to collect 2 months' supply, 23.9% came back for one month supply as shown in the figure 6 below.

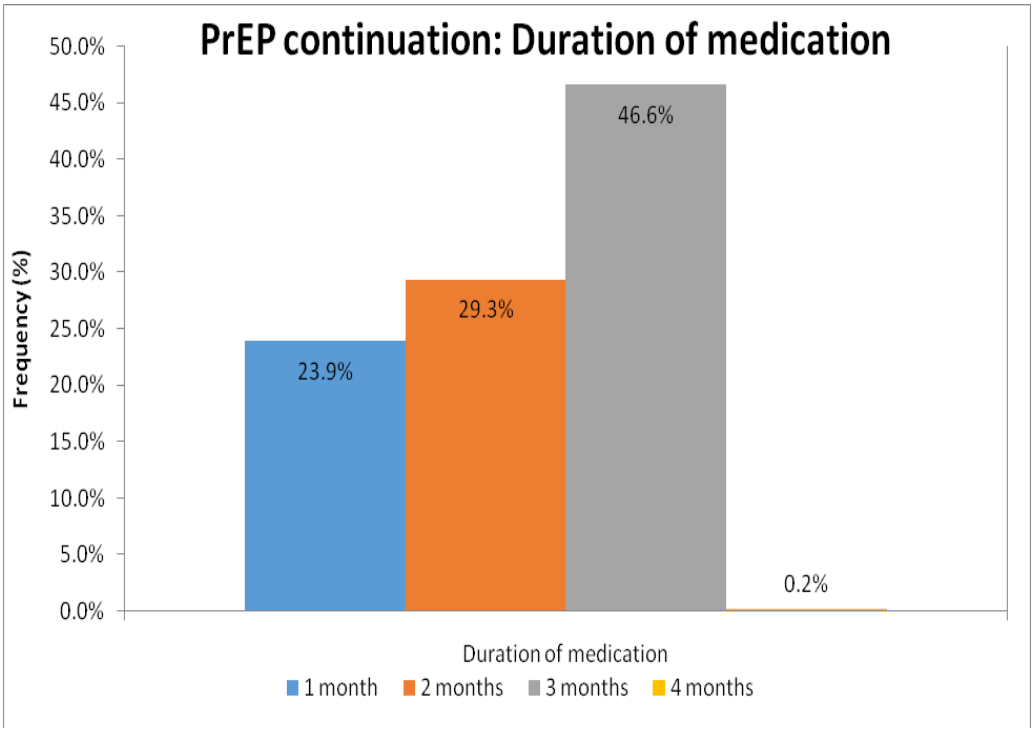


Figure 6 PrEP continuation: Duration of medication

Study findings as shown in figure 6 above have shown an increase in PrEP continuation with the duration of medication. Sharp increase to PrEP continuation can be credited to female sex workers developing comfort to PrEP medication and uptake. It has emerged from the study that as the number of months increases on PrEP, the majority of the PrEP users are most unlikely to discontinue from the medication. However, evidence from figure 6 has presented an abrupt decline in PrEP continuum after 3 months which is most likely to be associated with the doubts and suspicions to PrEP effectiveness.

4.3 Discussion and Interpretation

The study showed that PrEP initiation among the key populations has been greatly influenced by the different levels of risks and the level of sexual activity. The results are in line with previous studies in Uganda, Kenya and South Africa as most of the female

sex workers highlighted the need to take up PrEP given the high-level risks involved (Mudzviti et al., 2020). In addition, a study by Muhumuza (2020) in Uganda, Zimbabwe and South Africa found out that PrEP initiation is directly related with the level of information among key populations. It was revealed that individuals on PrEP have the ability to choose times and procedure and schedules to follow ensuring PrEP effectiveness. More so, the desire to contain and to reduce the spread of HIV has been highlighted as a key factor towards the increase in the number of female sex workers on PrEP medication.

Study findings have also shown that the reason behind PrEP initiation among FSW was centered on the involvement of multiple sexual partners. Evidence from literature has shown that having multiple sexual partners has the likelihood to spread new HIV infections. Hence the initiation to PrEP by female sex workers was seen as a positive preventative measure. Study results have also presented that PrEP initiation seemed to be low within the first months but among the individual that had been initiated they was a great possibility of continuing.

It also emerged from the study findings that PrEP initiation was high among sex workers during the COVID-19 pandemic. Similar views were also raised by UNAIDS (2020) and WHO (2022) as they alluded that with the advent of COVID 19 most institutions were closed, and this has a bearing on the uptake and adherence to PrEP. WHO, (2022) reported a sharp decline on PrEP uptake from 2020 to 2021 with most governments implementing restrictive measures on movement and number of patients allowed at medical facilities. UNAIDS reports on the closure of most clinics and hospitals which also affected access of PrEP with PrEP users forced to travel distances to major hospitals and clinics.

In addition, the study noted that several barriers exit that contribute to PrEP non-adherence among female sex workers. In particular, individual agency has been highlighted as one key factor that has promoted PrEP adherence. Thus, study findings have shown that the level of education has a bearing on the level of PrEP adherence as individuals that have attained higher levels of education are most likely to adhere to PrEP. This is consistent with the study findings by Muhumuza, et al., (2021) who observed that education on PrEP is fundamental in improving PrEP adherence key populations.

Accordingly, Med (2020) noted that PrEP education promotes and motivates to good health outcomes among individuals contributing to rather more positive signs of adherence as compared to groups without any information or knowledge. According to Muwonge, Nmabi, & Kibuuka (2022) as they highlighted that information sharing and effective awareness campaigns on PrEP usage, adherence and uptake are key for the effective administration of the drug.

The study also revealed that whilst PrEP adherence was common among female sex workers, majority of the female sex workers are following the HIV combined prevention measure to compliment PrEP medication. Study findings have also shown the probability of female sex workers on PrEP also taking other medication. According to views raised in literature, combination HIV prevention is an approach that seeks to achieve maximum impact on preventing new HIV infections by combining biomedical, socio-behavioural, and structural interventions.

The results from the study also showed that combination prevention package includes condoms, lubricants, STI management, screening and management of intimate partner

violence, sexual and reproductive health services, and HIV services, including counselling and testing, HIV management, ART, PEP, and PrEP. Condoms remain the only available tool for triple protection against HIV and other STIs. Hence female sex workers using the HIV combined prevention measure tend to be more adherent to PrEP medication. Study results have also shown that adherence to PrEP was more apparent among individuals taking other medication as a preventive measure to HIV.

It also emerged from the study findings female sex workers seem to have doubts on the effectiveness PrEP alone as a restrictive measure against HIV variance hence the need to use a combined preventative measure to HIV. Condom promotion for female sex workers has had a substantial impact in many epidemics, hence, increased condom use has been found to contribute to reductions in HIV incidence.

It has emerged from the study that PrEP continuum can be directly influenced by age as study findings have presented that the youth are less likely to adhere and continue using PrEP over a long period as compared to the elderly. Muwonge, Nmabi, & Kibuuka (2022) highlighted that the fear of stigma by peers and the community, contributes to the discontinuation of PrEP among the youth. Accordingly, study findings have proved that The majority of the youth are most likely to be initiated on PrEP with most of them also continuing on PrEP uptake. The study findings have shown that PrEP continuation is relatively high among the younger FSW, although initiation seems to be very low there is a likelihood of the majority continuing with the treatment.

4.4 Summary

In summary, an analysis of FSW at NAH clinic showed that the predictor variables; age (40-44), marital status (cohabiting, separated), employment status (transport business, self-employed), referral source (index patient, other partner organizations), those in sexually active key population groups, those who experienced condom burst, has key population partner, has sexual partner with unknown HIV status, in a sero-discordant relationship, has history of sexual abuse or GBV, taking other medication were statistically and significantly associated with PrEP adherence.

CHAPTER 5 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

In this chapter, the researcher gives a summary of the study processes and findings. He discusses whether study objectives were met by the study findings while giving any conclusions to the findings. The researcher will go on to give recommendations to the policy makers and the organization, PSI Zimbabwe on how best to assist the FSW in view of the outcomes of the study. Lastly, areas for further study will be suggested in this chapter.

5.2 Discussion

5.2.1 PrEP initiation enablers in female sex workers

This study examined PrEP initiation and adherence among female sex workers (FSW) receiving routine HIV treatment and care at New Africa House (NAH) in Zimbabwe which is among countries with high HIV prevalence in the Sub-Saharan African region, with 1.4 million people (12.8%) living with HIV in 2019 (UNAIDS, 2019). According to the ZIMPHIA 2020 reported that the annual incidence of HIV among adults aged 15 and older in Zimbabwe was 0.38%, corresponding to approximately 31,000 new cases of HIV per year among adults. Adherence to PrEP medication among the populations with high risk of acquiring HIV is very important to decrease the HIV incidence.

Study findings have shown that one of the primary reasons for initiating PrEP was related to perceived risk associated with the FSW sexual activity with the majority of the participants (99.5%) that were sexually active at screening stage initiated to PrEP. More so among the (99.5%) group (90.4%) reported that not using condoms consistently during sexual intercourse hence influencing their decision to initiate PrEP medication. Study findings resonated with the views raised in literature as (Samuel, 2020) points out that PrEP initiations among FSW significantly increased with over 300,000 new people started taking PrEP. Such significant improvements have been associated with the improved knowledge and awareness campaigns as well as the need by FSW to reduce the risk and spread of HIV. Views in literature by Kayesu, et al., (2022); Muhumuza, et al., (2021) and Med (2020) highlighted that effective information dissemination reduces the spread of myths and misconceptions that may contribute to lower uptake and adherence to PrEP.

As such effective awareness campaigns and information dissemination on PrEP has greatly contributed to the significant increase to PrEP uptake and initiation among FSW. More so, study findings have shown that FSW stated being in a sero-discordant relationship as a reason that influenced them to initiate PrEP medication. Med (2020) further highlighted that high-yield facilitators for PrEP adherence include educational and motivational interventions, social support, and making sure healthcare packages are guaranteed. Similar views were also raised by Muwonge, et al., (2022) as they highlighted that information sharing and effective awareness campaigns on PrEP usage, adherence and uptake are key for the effective administration of the drug.

A study by Pillay et al, 2020 in South Africa concluded that the primary reasons for initiating oral PrEP were all related to perceived risk associated with sexual activity. In that study, 23.9% of the study participants had multiple sexual partners, this proportion is 3 times less than the one in our study (75.5%). The use of condoms during sexual intercourse is one method for the prevention of HIV transmission. In our study, 90.4% of the participants reported not using condoms consistently pointing out that only 9.6% uses this barrier method consistently. This proportion is almost 3 times the proportion reported by Pillay et al, 2020 where 3.5% of FSW reported having clients who do not want to use condoms.

Consistent with other evidence, our results suggest that understanding the risk associated with sexual activity is the first step to PrEP initiation. Participants in this study associated risk due to sexual activity with being involved in sex work, having multiple partners, and engaging with partners who could be HIV positive. Finding ways to empower more women especially the FSW to perceive their own risk more accurately, even though it may change frequently, is of paramount importance for sustained HIV prevention. The finding that only 1.3% of clients who participated in study were initiated on PrEP because they were in a sero-discordant relationship and only 2.3% were initiated because of injecting drug, suggests that more attention is still needed for PrEP promotion especially among the key populations.

5.2.2 PrEP adherence and continuation in FSW

We observed a relatively high adherence to PrEP, (54.8%). This finding means that out of 100 FSW taking PrEP, about 55 of them adhere well. This high adherence prevalence

could be because the FSW initiated on PrEP were at high risk for HIV infection, and hence used PrEP for protection. Similar findings were raised in literature as it was highlighted that PrEP adherence can be influenced by age with most youths adhering to the medication (Muwonge et al, 2022).

Study findings also concurred with the views raised by UNAIDS, (2020) as it pointed that PrEP adherence is generally high among the unmarried as compared to those married or in a relationship. Adherence level among the adolescent group have been driven by their personal desires to stop the spread of HIV as well as reducing the risk of infections. The level of peer influence can be seen as one factor that has promoted adherence among the youth as compared to the elderly as they easily encourage each other on the frequent visit and uptake of the medication. Study findings have shown that among the adolescent group those that were married seemed to have a challenge with only the majority of them not adherent to PrEP medication as compared to the singles that at 270 (21.0%) who adhere to PrEP.

It also emerged from the study that level of education had a direct influence to PrEP adherence, as the majority of the participants 649 (50.5%) who attained secondary education proved to be among most of those who were adherent to PrEP 535 (41.6%) similar views were also raised by the Infection, Prevention and Control (IPC) agents as shows that those that have attained higher levels of education are more likely to adhere to PrEP medication. Med (2020) also notes that some high-yield facilitators for PrEP

adherence include educational and motivational interventions, social support, and making sure healthcare packages are guaranteed.

Data from the Ministry of Health and Child Care in collaboration with the Zimbabwe National Family Planning Council (ZNFPC) and the Clinton Health Access Initiative Inc. (CHAI) has also shown a relative decrease in PrEP adherence from the initial months of inception (Gombe et al., 2020).

This decrease is further substantiated by the programme data from PSI which showed that non-adherence to PrEP among female sex workers stood at 50.7%, in June 2020. In this study non-adherence to PrEP among female sex workers was 45.2%. This concurred with the views raised in literature as both WHO (2022) & UNAIDS (2022) reported on the sharp decrease of PrEP uptake and adherence due to the COVID-19 pandemic as governments implemented restrictive measures on movement with some clinic forced to close contributing to the inaccessibility of PrEP.

This therefore showed that structural factors affect the accessibility of PrEP as well as directly linked with the decrease to health outcomes. However, it also emerged from literature that Daily intake as to PrEP can be affected by individual behavior and attitude when using PrEP, posing inconvenience for the user.

The study findings have shown that given the high mobility among FSW there is a likelihood of most discontinuing PrEP use as well non-adherence. As such given the daily intake to PrEP highly mobile FSW access to PrEP proved to be a challenge and unpredictable FSW work schedules which may therefore act obstacles towards adherence.

Similar views have been raised in research as it has been indicated that the extreme poverty and material insecurity that typically drives sex work in sub-Saharan Africa may render HIV prevention and PrEP adherence a lower priority than meeting basic needs (e.g., food, shelter) for many women (UNAIDS, 2020).

Study findings have also presented that PrEP uptake and adherence also varied with age. The age group that had a statistically significant association with adherence to PrEP was the 40-44 years age groups (AOR=0.3; 95% CI: 0.1–0.9; p = 0.022). However, the findings showed a general decrease in PrEP adherence with increase in age. The 20-24 years age group had the highest odds of adherence to PrEP and the 50+ age group had the lowest. Similar views were also raised Kayesu, et al., (2022) as they pointed that uptake and adherence to PrEP can be affected by age as older FSW are not interested in taking the pill with the fear of being associated as immoral.

More so, lower PrEP uptake was also associated with the fear of community perceptions hence FSW fail to disclose that there are on PrEP with the fear of being stigmatized contributing to the majority not taking the pill at all. These findings suggest that the older female sex workers are the less likely to adhere to PrEP medication. There is need for health education targeting these older age groups on the importance of adherence to PrEP medication.

The sexually active age bands, 20-24 years and the 25-29 years are most adherent groups to PrEP. These are the age groups that are more experimental and perhaps spend more time engaging in sex work than the older women, but for all women, strengthening peer-based education and social norms may increase adherence. An article by Gwavava, 2018 reported that by the end of 2017 a total of 3073 clients were initiated on PrEP in

Zimbabwe. 90% of the clients initiated on PrEP were women, with the majority of them in the 25–49 years age group. In this study, the 25-49 years age group constituted 71.2% of all the FSW initiated on PrEP in the period June 2020 to December 2021. Muhumuza, et al., (2021) concur with the results as they highlighted that peers tend to draw each other in support of positive health outcomes with most adolescents taking PrEP when peers are also taking or doing the same.

According to the results of our study, adherence to PrEP has also been found to be higher among female sex workers without consistent condom use with their clients (50.2%) compared to those who consistently use condoms with their clients (4.6%). This finding is commendable since PrEP is used as a method of HIV prevention in combination, or as a back-up method in case condom use has failed. In this regard, the healthcare providers need to hammer more on the need for the female sex workers to adhere to PrEP well if they cannot use condoms with their clients.

FSW in a socially approved marital union showed results that were opposing in terms of association with PrEP adherence. Cohabiting female sex workers were 2.3 times more likely to adhere to PrEP (95% CI: 1.1–4.8) and the married had an AOR (0.9) which was close to the null (single FSW). These findings suggest that FSW who are cohabiting are taking PrEP adherence more seriously than the married FSW. This could also support the notion that married FSW do not want to take PrEP as it is seen as ART. Views raised in literature have also presented the likelihood of married FSW having a higher non-adherence percentage rate to PrEP with the fear of them losing their relationship and the

fear of divorce. Kayesu, et al., (2022) points out that stigma from peers, partners, and family members related to PrEP can contribute to discontinuation and non-adherence.

A study by Skovdal, 2019 showed that FSW encounter barriers to PrEP use, new users struggle with integrating daily PrEP use into routine practice, and Eakle, et al., 2017 argue that these practices can be adversely influenced by family and peers' negative opinions and the confusing of PrEP for ART. Similar findings were also raised by Owens, Hubach, Williams, Voorheis, Lester, Reece, & Dodge as they noted that taking medication, especially daily, can be mistaken for taking ARVs for treatment rather than for prevention therefore contributing to most people not taking the PrEP. Witte et al in 2022 also found that higher perceived social support from one's family was associated with higher willingness to use PrEP. However, the findings of this study showed that only 1.5% of the referrals for initiating PrEP were coming from family and friends.

The proportion of FSW who experienced sexual abuse or violence in this study was 0.5% and this was 40 times less than the 2016 proportion reported by CeSHHAR that 20% of female sex workers in Zimbabwe had experienced violence from the police in the past year (Busza et al., 2017). In the past the possession of condoms was often used as proof of sex work, and many sex workers were being arrested or had their condoms confiscated. However, this notion has since changed as FSW are now getting more education on condom use.

However regardless of efforts made on condom use education, in this study only 22.3% of the FSW reported using condoms every time they have sex which in turn may reduce

the chance of FSW using PrEP as a combination prevention method for HIV transmission. This heightens their risk of HIV transmission, hampering the efforts made by the government and partner organization to reduce HIV incidence.

PrEP is also meant to prevent sero-conversion in discordant couples. In countries with high HIV transmission among sero-discordant couples, daily oral PrEP (specifically tenofovir or the combination of tenofovir and emtricitabine) may be considered as a possible additional intervention for the uninfected partner. In this study the FSW who were not in a sero-discordant relationship were 9.6 times more likely to adhere to PrEP compared to those in a sero-discordant relationship. This is an unusual finding as one would expect those in a sero-discordant relationship to be more adherent to PrEP as they are at higher risk of acquiring HIV.

To stay safe and prevent contracting HIV from an infected partner, taking PrEP regularly is important. In this research we found that many people are doing well in taking their medication in the first, second and third months but when it comes to the fourth month people are no longer taking their PrEP. These factors put FSW at greater risk of contracting and being infected with HIV. MoHCC and partner organizations should have programs targeting the continuation of PrEP beyond 3 months. There is also a need to strengthen PrEP continuation among the older FSW

5.3 Conclusions

Decision to PrEP initiation in FSW was due to the knowledge of risk - being sexually active, inconsistent condom use and having multiple sexual partners. The study also showed that the older female sex workers are less likely to adhere to PrEP medication as well as those in sero- discordant relationship are not adherent to PrEP. The effectiveness

of PrEP at the individual and facility level depends on good adherence, which may be affected in circumstances when it is necessary to conceal the use of PrEP.

Steps of the PrEP care continuum may be improved through targeted support where FSW are operating in community including peer-based interventions and safe space groups where they can meet regularly. Learning from the decision-making process, and PrEP adherence and continuation experiences of these FSW can help inform programme adaptations and improvements to support wider uptake among highly vulnerable populations, both in PSH clinics and other contexts. Combinations of community-led behavioral and biomedical interventions such as the use of PrEP can significantly reduce HIV transmission amongst female sex workers, but an enabling and supportive environment is needed.

5.4 Implications

Findings from this study do proffer suggestions for the promotion and awareness on PrEP uptake, initiation and adherence among FSW. In particular, participating age groups showed vital signs in the different levels of adherence to PrEP hence the need to further cascade PrEP education across all age groups. Hence a thorough understanding of the FSW PrEP initiation and adherence remains essential.

The socio-ecological model provides various levels that act as barrier to effective health outcomes as well as adherence to PrEP from an individual, interpersonal, structural, institutional and community level. Hence the need to take a more effective approach from the theoretical lens of the socio-ecological theory to design measure to effectively implement and initiate PrEP among key populations. More so, using the theoretical lens it is imperative to draw key barriers that exist across key populations particularly among

FSW on factors that contribute to the non-adherence to PrEP. The study findings suggest that individual and interpersonal factors may be the major barriers contributing to non-adherence to PrEP.

Studies with FSW have also presented that stigma from the community significantly affects willingness to continue using PrEP. Therefore, the need to improve PrEP awareness is critical in efforts to increase PrEP uptake. PrEP awareness campaigns should not only be geared towards widespread awareness but should target relevant messages to the needs of young people so as to capture their attention.

The study also explored how PrEP use affected normative behaviour in this population regarding sexual practices such as having multiple sexual partners and condom use and we found that FSW generally felt safe using PrEP, believing that they had protection against HIV. This appeared to have both positive and negative influences, with some increasing their risky sexual behaviour and others reducing it. This is consistent with findings from the United States among at-risk women in which PrEP reportedly made people less worried about HIV, and another among MSM which found that approximately half the participants adopted risk reduction strategies after starting PrEP, while the other half did not alter their behaviours.

A major contribution of this study to the body of knowledge is that it highlighted the potential factors and challenges that affect the PrEP continuum among key population groups. This information may then be used to develop programmes and implementation measures to serve as guides towards PrEP initiation, follow-ups, awareness campaigns

and the overall dissemination of information among key populations. This study intended to provide evidence to the Ministry of Health and Child Care (MoHCC) to understand the currently existing gaps and challenges in the implementation of PrEP intervention programs among female sex workers.

5.5 Recommendations

The researcher proposes the following recommendation around PrEP initiation and adherence among female sex workers:

There is need for follow up to ensure close monitoring of all individuals on PrEP to encourage on PrEP adherence and reduce possibilities of discontinuing by at risk FSW and sero-conversion by NAH clinic and MoHCC KP Coordinator by July 2023.

There is need for health education targeting older age groups of FSW and those in marriage on the importance of adherence to PrEP medication by NAH, MoHCC, CeSHHAR, and PZAT by July 2023.

To set up an implementing partners coordinated platforms inclusive of social groups to provide safe spaces for FSW to strengthen Health Education and Promotion by the MoHCC Key Populations Coordinator, CeSHHAR, Magamba Network Trust, and Population Solutions for Health by August 2023.

It also emerged from the study the need to further enhance awareness campaigns among key populations as ways to increase and improve PrEP continuation. Study findings have

shown lower PrEP awareness among female sex worker hence contributing to lower prevalence rates to HIV.

Study findings have also shown that structural and institutional barriers tend to influence the levels of both PrEP initiation and adherence hence the need to capacitate health care professionals as well as improve service of the health care facility so as to make PrEP more accessible.

Study findings have also shown that PrEP adherence is relatively low among the adolescent group hence the need to ensure that PrEP education is further cascaded to all age groups. The study therefore recommends effective education systems that can be further cascaded across districts and clinics. The study also recommends the establishment of new delivery models which enable the provision of PrEP to marginalized communities and groups to reduce the stigma associated with the use of PrEP medication.

Study findings have presented the need to improve steps of the PrEP care continuum may through targeted support where female sex workers operating in community are included and involved peer-based intervention groups which act as safe space for discussion, education and regularly meetings.

5.6 Suggestions for Further Research

This study confirmed that there is poor PrEP adherence in female sex workers. There is need to further understand dynamics on PrEP uptake and adherence among the other key and vulnerable populations such as MSM, trans-gender and AGYW.

Furthermore, the study did not give specifics in terms of how the FSW are stopping and restarting/ re-initiating PrEP and recommend further study on cycling and safe stopping of PrEP for KPs on high risk of HIV transmission.

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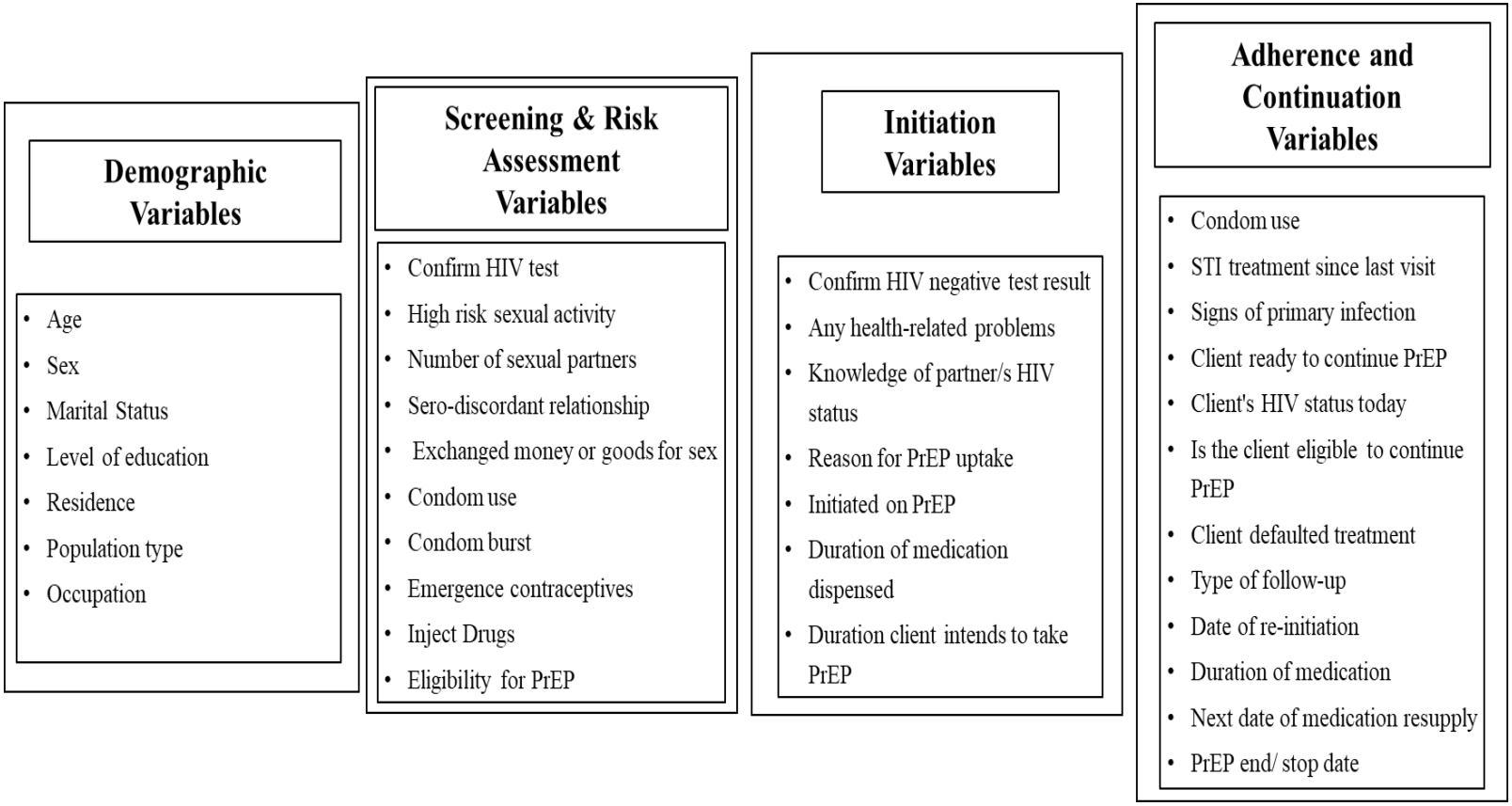
Appendices

Appendix A: Bahmni metabase forms theme structure



Appendix B: Bahmni Metabase Extract Questions

Form1: Demographic variables	patient id	Patient Identifier	Client Resident	Site Type	Level Education	Gender	Marital Status	Occupation	Location Name	Population	birthdate	age																								
Form 2: Screening & Risk Assessment Variables	patient id	PrEP Screening Date	prep st form facility	prep st form site type	PrEP Screening District	prep st form setting	Is the client HIV negative	prep st Date Tested (Recent)	Is the Client Sexually Active	Is the client sexually active in a high prevalence Key Population	If Yes Specify Population Group	has the client had vaginal or anal intercourse	how many sexual partners did you have vaginal sex with	in the past 6 months did you use condoms consistently	does the client have a sex partner with one or	if yes then specify2	in the last 6 months has the client been treat	in the last 6 months have you taken post expos	in the last 6 months have you used emergency c	in the last 6 months have you had sex while un	are you in a sero discordant relationship	if yes then specify3	do you have a partners of unknown status who r	do you inject drugs	is the client eligible for prep	if yes then specify4	has the client been referred for prep	reason s for not referring the client	client offered prep	client accepted prep						
Fgorm 3:PrEP Initiation Variables	patient id	prep init form have you had an hiv test in the past 1 week	prep_init_form_have_you_been_diagnosed_of_any_chronic_illness	prep_init_form_are_you_or_your_partner_using_any_contraceptives	prep_init_form_are_you_taking_any_drugs_or_medications	prep_init_form_are_you_on_ARVS	prep_init_form_are_you_sexually_active	prep_init_form_are_you_married_or_in_a_stable_relationship_	prep_init_form_do_you_know_your_partner_s_hiv_status	prep_init_form_is_your_partner_on_art	prep_init_form_do_you_know_your_partner_s_adherence_to_art	prep_init_form_do_you_use_condoms_every_time_you_have_sex_w	prep_init_form_have_you_had_any_other_sexual_partners_in_th	prep_init_form_do_you_have_more_than_1_sexual_partner	prep_init_form_do_you_know_your_non_regular_partner_s_hiv_status	prep_init_form_specify_hiv_status_of_partner	prep_init_form_do_you_use_condoms_every_time_you_have_sex_w_1	prep_init_form_have_you_been_treated_for_an_sti_in_the_last	prep_init_form_have_you_exchanged_sex_for_money_goods_or_se	prep_init_form_do_you_have_a_history_of_sexual_abuse_gender	prep_init_form_have_you_used_emergency_contraception	prep_init_form_have_you_used_pep_in_the_last_6_months	prep_init_form_what_was_the_reason_for_taking_pep	prep_init_form_are_you_single_or_not_in_a_stable_relationship	prep_init_form_have_you_had_a_condom_burst_in_the_last_3_mo	prep_init_form_if_yes_for_condom_burst_how_many_times	prep_init_form_have_you_had_sex_whilst_indoxicated_with_alcohol	prep_init_form_do_you_inject_drugs	prep_init_form_any_signs_of_primary_infection	prep_init_form_what_is_the_client_s_hiv_status_today	prep_init_form_are_you_ready_to_start_prep	prep_init_form_is_the_client_eligible_to_take_prep	prep_init_form_was_client_initiated_on_prep	prep_init_form_date_client_initiated_on_prep	prep_init_form_duration_of_medication	prep_init_form_duration_client_intends_to_take_prep
Form 4: Adherence & Continuation Variables	patient id		prep_cont_form_do_you_have_any_heath_related_problems_today	prep_cont_form_are_you_using_any_other_medications	prep_cont_form_do_you_know_your_partner_s_hiv_status	prep_cont_form_is_your_partner_on_art	prep_cont_form_do_you_know_your_partner_s_viral_load	prep_cont_form_are_you_using_condoms_every_time_you_are_hav	prep_cont_form_have_you_had_a_condom_burst_since_the_last_v	prep_cont_form_have_you_been_treated_for_an_sti_since_the_l	prep_cont_form_have_you_had_sex_whilst_indoxicated_with_alc	prep_cont_form_have_you_exchanged_sex_for_money_goods_or_se	prep_cont_form_have_you_been_sexually_abused_or_had_gender_	prep_cont_form_have_you_used_emergency_contraception_since_	prep_cont_form_does_the_client_have_any_sings_of_primary_in	prep_cont_form_are_you_ready_to_continue_prep	prep_cont_form_what_is_the_client_s_hiv_status_today	prep_cont_form_is_the_client_eligible_to_continue_prep	prep_cont_form_date_of_reinitiation	prep_cont_form_type_of_follow_up	prep_cont_form_duration_of_medication	prep_cont_form_next_date_of_medication_resupply	prep_cont_form_prep_end_date													

Appendix C: AUREC Approval

Investing in Africa's future

AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE (AUREC)

P.O. Box 1320 Mutare, Zimbabwe, Off Nyanga Road, Old Mutare-Tel (+263-20) 60075/60026/61611 Fax: (+263 20) 61785 website: www.africau.edu

Ref: AU2336/22 25 October, 2022

TIDINGS TARISAI MASOKA
C/O CHANS
Africa University
Box 1320
MUTARE

RE: PREP INITIATION AND ADHERENCE IN FEMALE SEX WORKERS, NEW AFRICA HOUSE CLINIC, HARARE DISTRICT; 2022

Thank you for the above titled proposal that you submitted to the Africa University Research Ethics Committee for review. Please be advised that AUREC has reviewed and approved your application to conduct the above research.

The approval is based on the following.

a) Research proposal

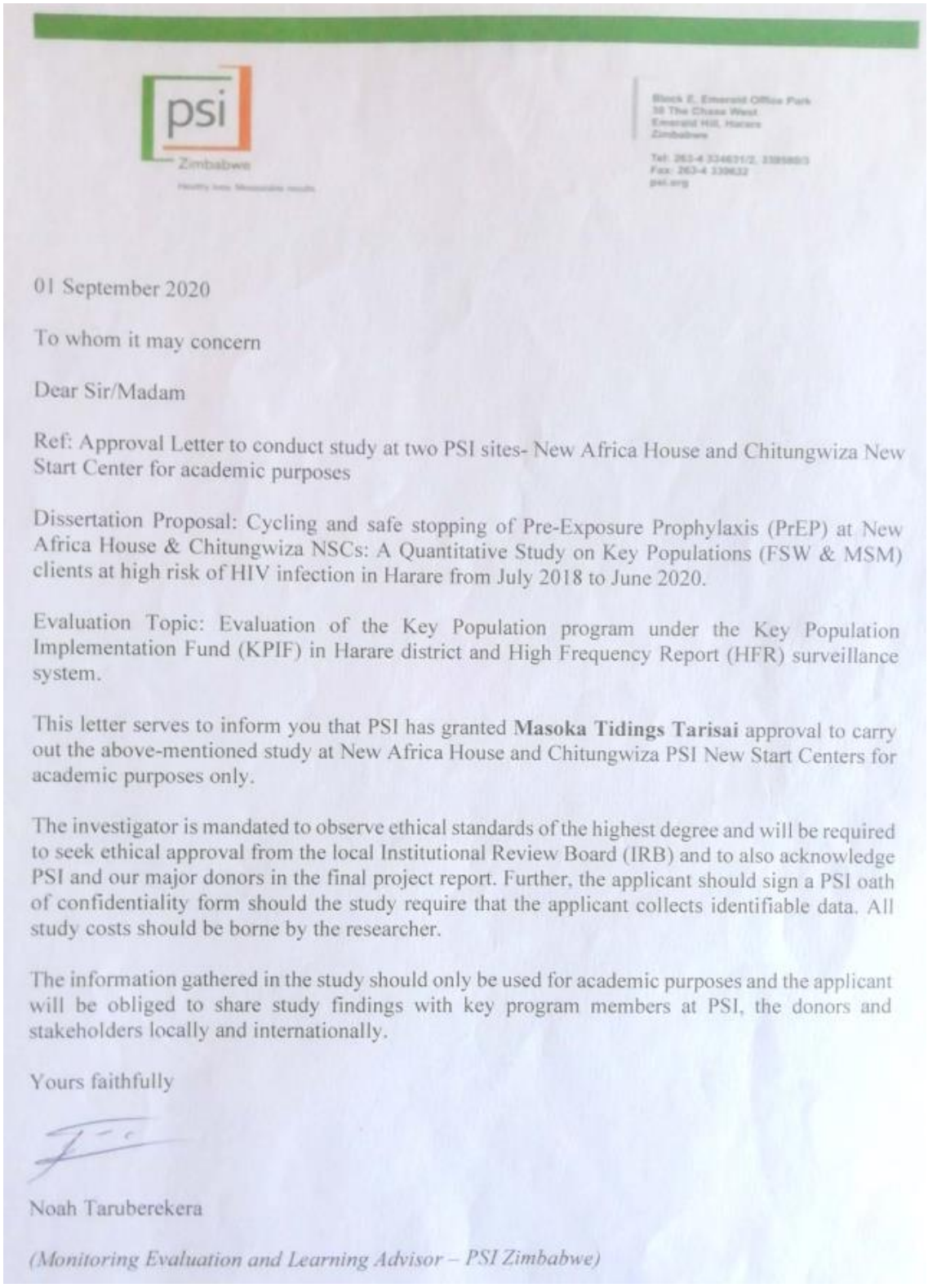
- **APPROVAL NUMBER** AUREC 2336/22
  This number should be used on all correspondences, consent forms, and appropriate documents.
- **AUREC MEETING DATE** NA
- **APPROVAL DATE** October 25, 2022
- **EXPIRATION DATE** October 25, 2023
- **TYPE OF MEETING** Expedited
  After the expiration date this research may only continue upon renewal. For purposes of renewal, a progress report on a standard AUREC form should be submitted a month before expiration date.
- **SERIOUS ADVERSE EVENTS** All serious problems having to do with subject safety must be reported to AUREC within 3 working days on standard AUREC form.
- **MODIFICATIONS** Prior AUREC approval is required before implementing any changes in the proposal (including changes in the consent documents)
- **TERMINATION OF STUDY** Upon termination of the study a report has to be submitted to AUREC.

AFRICA UNIVERSITY
RESEARCH ETHICS COMMITTEE (AUREC)
APPROVED
P.O. BOX 1320, MUTARE, ZIMBABWE

Yours Faithfully

MARY CHINZOU
ASSISTANT RESEARCH OFFICER: FOR CHAIRPERSON
AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE

Appendix D: PSI Zimbabwe Study Approval Letter



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01 September 2020

To whom it may concern

Dear Sir/Madam

Ref: Approval Letter to conduct study at two PSI sites- New Africa House and Chitungwiza New Start Center for academic purposes

Dissertation Proposal: Cycling and safe stopping of Pre-Exposure Prophylaxis (PrEP) at New Africa House & Chitungwiza NSCs: A Quantitative Study on Key Populations (FSW & MSM) clients at high risk of HIV infection in Harare from July 2018 to June 2020.

Evaluation Topic: Evaluation of the Key Population program under the Key Population Implementation Fund (KPIF) in Harare district and High Frequency Report (HFR) surveillance system.

This letter serves to inform you that PSI has granted **Masoka Tidings Tarisai** approval to carry out the above-mentioned study at New Africa House and Chitungwiza PSI New Start Centers for academic purposes only.

The investigator is mandated to observe ethical standards of the highest degree and will be required to seek ethical approval from the local Institutional Review Board (IRB) and to also acknowledge PSI and our major donors in the final project report. Further, the applicant should sign a PSI oath of confidentiality form should the study require that the applicant collects identifiable data. All study costs should be borne by the researcher.

The information gathered in the study should only be used for academic purposes and the applicant will be obliged to share study findings with key program members at PSI, the donors and stakeholders locally and internationally.

Yours faithfully

Noah Taruberekera

(Monitoring Evaluation and Learning Advisor – PSI Zimbabwe)