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Y- CHROMOSOME IN FEMALE SEX WORKERS AS A BIOMARKER OF RECENT VAGINAL SEX AND CONDOM USE WITH MALE PARTNERS IN ZIMBABWE, A MIXED METHODS STUDY

BY

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Abstract

Self-reported data on condom use is questionable and is subject to recall, and social desirability biases. Biomarkers of semen were used to validate self-reported condom use. A secondary data analysis of findings from a respondent driven sampling survey was conducted in 22 sites in Zimbabwe. The secondary data analysis reviewed the outcomes of Y-chromosome testing in female sex workers reporting no condomless sex. Data was collected using a biobehavioral questionnaire investigating sociodemographic data, sexual behavior, experience with HIV testing, PrEP and ART use and common mental disorders. In addition, face to face in-depth interviews were conducted to explore current condom use and identification of facilitators and barriers to use by female sex workers in Zimbabwe. Predictors of condom use were computed using logistic regression analysis in Stata Version 14. Overall, 4444 FSWs took part in the respondent driven sampling survey. About 903 (80%) self-reported consistent condom use, two participants had missing information and were dropped from the analysis. 3541/4444 (80%) self-reported condomless sex. After adjusting for those reporting condom use but with evidence of condomless sex, the number increased to 90%. Of the 901 who reported no condomless sex, 434 (48%) tested positive to Y chromosome DNA. Marital status was a key predictor of Y chromosome among participants testing positive to Y chromosome. Determinants of condom use were years in sex worker, partner type, partner HIV status. Barriers to consistent condom use include partner type, financial empowerment, and refusal to use condoms by partners citing interference with pleasure. To reduce the burden of protection on the female sex worker, the researcher recommends increased male involvement in female sex worker programs. Other recommendations are a combined intervention targeting multiple barriers to condoms use

Keywords: Female sex workers; Yc-DNA, condom use, underreporting

Declaration Page

I declare that this dissertation is my original work except where sources have been cited and acknowledged. The work has never been submitted and will not be submitted to any other university for the award of a degree.

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Main Supervisor's full name	Signature (11/05/2022)

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Dedication Page

I dedicate my dissertation work to my children, Paidamoyo and Shammah. A special feeling of gratitude goes to my late husband, Samuel whose words of support and encouragement when he was still alive will always be ringing in my ears.

List of Acronyms and Abbreviations

CeSHHAR	-	Centre for Sexual Health and HIV/AIDS Research
CMD	-	Common Mental Disorders
FSW	-	Female Sex Worker
HIV	-	Human Immunodeficiency Virus
KP	-	Key Populations
MSM	-	Centers for Disease Control and Prevention
RDS	-	Respondent Driven Sampling
STI	-	Sexually Transmitted Infection
UNAIDS	-	United Nations
Yc-DNA	-	Y chromosome deoxyribonucleic acid
WHO	-	World Health Organization

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CHAPTER 1: INTRODUCTION

1.1 Introduction

Understanding HIV burden, risk factors and coverage of prevention and treatment services is important for HIV epidemic control and biobehavioural surveys (BBS) are essential elements of national HIV strategy and surveillance (WHO, 2017). BBS are important for monitoring trends in targeted populations' HIV risk perception, determinants of risks, and access to prevention and treatment services. Key populations at substantial risk of HIV include female sex workers (FSW), male sex workers (MSW), men who have sex with men (MSM), transgender women (TG) and people who inject drugs (PWID).

Key populations account for half of all new HIV infections. (UNAIDS, 2021) reports that key populations accounts for 65% of HIV infections globally; 93% of new HIV infections outside of sub-Saharan Africa and 39% of new HIV infections in sub-Saharan Africa. An estimated 30% of all HIV infections globally are estimated to be directly or indirectly linked to either male, female, or transgender sex work, demonstrating the importance of sex workers in BBS (WHO, 2017). (Mbita, Mwanamsangu, Plotkin, Casalini, & Shao, 2020) highlighted that globally FSWs were 13.5 times more likely to be living with HIV than women in the general population in 2011, while HIV prevalence among FSWs in sub-Saharan Africa averaged 36.9%. In Zimbabwe, while HIV prevalence has declined among women

aged 15–49 from 14 % to 12.9%, the latest behavioural and biological surveillance survey found an estimated HIV prevalence among FSWs of 57%, (Hontelez, 2020). Key factors in the spread of the HIV epidemic among FSWs are stigma and marginalization, suboptimal access to health services, including information and high prevalence of other sexually transmitted infections (STIs), inconsistent condom use with multiple partners and criminalization of sex work. Overall, the elevated risk for HIV transmission and acquisition among FSWs is primarily related to frequent exposure to infection via multiple sex partners while not consistently using condoms; high HIV prevalence among sexual networks and inferior access to quality health care compared to individuals in the general population, (WHO, 2017: i). Correct and consistent condom use is one prevention strategy aimed at FSWs that has proved to be effective in slowing the spread of HIV as well as reducing the transmission of STIs, (Jie W, 2012). However, HIV policies and programmes can only be effective if they are informed by accurate measures of HIV prevalence and incidence among FSWs, changes in their HIV-related risk behaviours, the extent to which they access, and use proven and high impact prevention and treatment services.

Understanding the transmission dynamics of HIV among FSWs and evaluating programmatic interventions designed to contain its spread, are dependent on accurate sexual behavioural data. However, sexual activity cannot be directly observed, and research must rely on self-reports, which are often subject to recall bias, question misinterpretation and social desirability bias. Condom use is subject to overreporting, especially in settings where they are aggressively promoted. Y- chromosome is a biomarker that can validate self-reports and help diminish the impact of reporting biases.

This study sought to assess sociodemographic, behavioural, and psychosocial factors associated with consistent condom use among female sex workers in Zimbabwe through secondary data analyses and qualitative research. The study was aimed at reviewing the outcomes of Yc-DNA testing and their implication on consistent condom use among FSWs in Zimbabwe.

To be able to design interventions that address factors fuelling the risk for HIV and barriers to consistent condom use among FSWs, it is important to have quantitative and qualitative information on the target population and condom use correlates. In this study the researcher analysed secondary data collected by the Centre for Sexual Health and HIV/AIDS Research (CeSHHAR) Zimbabwe through a respondent driven sampling (RDS) survey. The survey was part of an impact evaluation of a microplanning intervention that was implemented over two years. Results from the secondary data analysis were then used to inform the design of a qualitative component that was conducted to provide an in-depth understanding of facilitators and barriers to consistent condom use among FSWs in Zimbabwe.

1.2 Background of the study

HIV continues to be a major global public health crisis, with 79.3 million people having been infected with the virus, and 36.3 million people estimated to have succumbed to the disease since its first discovery, more than four decades ago, (UNAIDS, 2021). Despite this, considerable progress has been made in controlling the epidemic and expanding access to antiretroviral therapy (ART). As of 30 June

2021, 28.2 million were accessing ART, (ibid). However, this progress will be limited if unmet needs for key populations remain.

Key populations (KP) are defined as those groups of people, who due to specific high-risk behaviours are at increased risk of HIV, irrespective of the epidemic type or local context, (PAHO, 2022). KP who include FSWs and their clients, men who have sex with men (MSM), transgender people, and people who inject drugs bear the greatest burden of HIV globally. Key populations and their clients or intimate partners account for half of all new HIV infections globally. (UNAIDS, 2021) reports that key populations accounts for 65% of HIV infections globally; 93% of new HIV infections outside of sub-Saharan Africa; 39% of new HIV infections in sub-Saharan Africa. Of particular importance are FSWs, who according to (Mbita, Mwanamsangu, Plotkin, Casalini, & Shao, 2020) were 13.5 times more likely to be living with HIV than women in the general population in 2011, while HIV prevalence among FSWs in sub-Saharan Africa averaged 36.9%. In Zimbabwe, while HIV prevalence has declined among women aged 15–49 from 14 % to 12.9%, the latest behavioural and biological surveillance survey found an estimated HIV prevalence among FSWs of 57%, (Hontelez, 2020).

The vulnerability of FSWs to HIV is increased by legal and social issues related to their behaviours, for example the criminalisation of sexual work and sexual orientation. Yet, these groups of people are critical to the dynamics of HIV transmission, and its prevention. Furthermore, key factors in the spread of the HIV epidemic among FSWs are stigma and marginalisation, suboptimal access to health services, including information, high prevalence of other sexually transmitted

infections (STIs), and high-risk sexual behaviours such as unprotected sexual intercourse with multiple partners. According to (Dulli et al, 2019) multiple sexual partners and low/inconsistent condom use increases not only the vulnerability of HIV and STIs among FSWs, but increases the risk of other sexual reproductive health problems such as unintended pregnancies and unsafe abortions.

For the general FSWs population, condom use remains a crucial strategy for protection between multiple partners. Condom use has been a major focus for HIV and STI FSW targetted prevention interventions and indeed many studies have registered high success rates. (Crosby, 2012) highlighted that correct and consistent use of condoms provides an important level of protection against HIV and other STIs and promotion of condom use should be augmented by an effort to promote their correct use. FSWs have new (partners for only one night) and regular and permanent partners (long-term intimate relationships) where condom use is a concern. According to (Huang, Yu, Jia, Wang, & Yang, 2020), the prevalence of condom use with regular and new partners was only 55% and 66%, respectively, among Chinese MSM, resulting in the spread of HIV among this vulnerable population. Correct and consistent condom use is one prevention program aimed at FSWs that has proved to be effective in slowing the spread of HIV as well as reducing the transmission of STIs, (Jie, et al., 2012). Most condom promotion interventions are designed based on studies that rely on self-reported data for estimations of sexual behaviour and risk for HIV transmission.

According to (Penrose, 2014) self-reported condom use, and frequency of coitus can be influenced by lack of understanding and interpreting questions being asked, social

desirability bias, recall bias, overreporting or underreporting. He added that in a cross-sectional study of 910 women in Zimbabwe, only 52% of participants who tested positive for prostate-specific antigen (PSA) in vaginal swabs reported unprotected sex during the previous two days. Furthermore, the differences between responses generated by audio computer assisted self-interview (ACASI) technology and face to face interviews on unprotected sexual intercourse were statistically insignificant (Minnis et al, 2009).

Understanding the transmission dynamics of HIV among FSWs and evaluating programmatic interventions designed to contain its spread, are dependent on accurate sexual behavioural data. Condom use is subject to overreporting, especially in settings where they are aggressively promoted. Y-chromosome is a biomarker for condomless sex that is used to validate self-reports and help diminish the impact of reporting biases in research with FSWs. The detection of Y-chromosome deoxyribonucleic acid (Yc-DNA) in women's vaginal tract is normally associated with recent unprotected sex with a male partner (Malagón, 2018). A Yc-DNA is a sex chromosome normally present in male epithelial cells which is released into the vaginal tract during sexual intercourse. Yc-DNA quantification, also known as nucleic acid quantification, is done to determine the average concentration of DNA in a sample. Yc detected in the vaginal tracts, up to 15 days after a woman has had unprotected vaginal intercourse and are rarely detected in women who consistently and correctly use condoms or are abstaining from sex (ibid). As such studies exploring sexual behaviour will need to be accompanied by semen biomarkers to improve our understanding of sexual behaviour.

1.3 Statement of the Problem

Despite increased access to HIV treatment and prevention options, globally, an estimated 1.8 million people became newly infected with HIV in 2017 (Roberts, Hawes, Bousso Bao, Ndiaye, & Gueye, 2020). HIV prevalence is particularly high among FSWs, whereby their risk of acquiring HIV is twenty-six times higher than women in the general population. To reduce the burden of HIV infection among FSWs, the World Health Organisation (WHO) advocates for condom use, as one of the most effective interventions for epidemic control among FSW. According to (WHO, 2016) correct and consistent use of condoms by FSWs and their clients can reduce sexual transmission of STIs including HIV by up to 98%.

Despite the known benefits of condom use, there are still limitations to its uptake, correct and consistent use among FSWs. Barriers to uptake include condom availability or costs, client preference, ability to charge more for condomless sex, gender-based violence and power imbalances (WHO, 2016). Unprotected sex between sex workers and their clients is one of the behaviours that is associated with the highest risk of HIV infection, leading to high positivity rates. No studies have been done on context specific determinants of condom use and the Yc DNA validation among FSWs in Zimbabwe, despite this information being critical for implementation of the national STI and HIV prevention programmes.

1.4 Objectives of the Study

The objective of this study was to review the outcomes of Yc testing on FSWs reporting consistent condom.

The specific objectives of this study were:

a. To validate self-reports of unprotected sex among FSWs using Yc-DNA testing
b. To determine determinants of Yc-DNA presence in FSWs who report consistent condom use in Zimbabwe
c. To determine determinants of condom, use among FSWs in Zimbabwe
d. To explore facilitators and barriers to consistent condom use among FSWs in Zimbabwe

1.5 Research Questions

a. What are the determinants of condom use among FSWs in Zimbabwe?

b. What are the determinants of Yc-DNA presence among FSWs who report consistent condom use

c. What are the facilitators and barriers to consistent condom use among FSWs in Zimbabwe?

1.6 Significance of the study

The design and evaluation of effective interventions for HIV and other STIs for FSWs require accurate representation of risk behaviours and linkage to their transmission. However, there are challenges associated with gathering accurate data hence most of these studies rely on self-reported data as the primary outcome measure. This study represents a unique approach to the broad topic of condom use in the context of HIV epidemiology in high-risk populations. Understanding determinants of condom use in relation to FSWs is critical for evidence-based HIV and STI prevention programming for KPs.

1.7 Limitations

Overall, there is limited literature on the linkages between condom use and Yc-DNA outcomes and reasons for underreporting unprotected sex. Secondary data analysis, qualitative data collection and analysis were all done by one researcher. Although, combining qualitative and quantitative data was aimed at triangulating findings, it is findings might have been affected by researcher biases. The researcher was constantly aware of the potential for these biases, and tried to be observant, taking notes during data collection and taking time after each interview to reflect on the process.

1.8 Delimitations

The study was limited to FSWs who took part in the RDS survey that was implemented in twenty sites across the country. The qualitative component was limited to FSWs that reported condom use, yet they tested positive to Yc-DNA

1.9: Chapter Summary

In summary, FSWs continue to bear the greatest burden of HIV compared to women in the general population. The vulnerability of FSWs is exacerbated by multiple sexual partnering amid poor condom use. Although, condom promotion is one of the key pillars of HIV prevention among high-risk groups, its uptake and consistent use has remained sub-optimal. Barriers to consistent and correct use of condoms include power dynamics between FSWs and their clients. However, there remain a dearth of information on the sources of underreporting unprotected sex as well as determinants of condom use hence this study will provide the much-needed evidence for effective HIV programming among FSWs.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The effectiveness of condoms in preventing STIs and HIV transmission has been demonstrated in both laboratory and epidemiologic studies. The effectiveness of condoms in preventing HIV and STI transmission is based on its physical properties whereby latex prevents the passing through of even the smallest disease-causing agents. However, the effectiveness of the condoms is difficult to quantify as it depends on unobservable and unverified behavior. Incorrect and inconsistent use removes the protective effect of condom as it can lead to condom breakages or slippages. Correct and consistent use entails using condoms throughout the entire sex act (from the onset of sexual contact to finish (when the man ejaculates). However, there are barriers to correct and consistent use of condoms.

This chapter investigates the literature on the determinants of condom use including previous studies and reports produced over the years on determinants of condom use among FSWs. The general topics covered under this chapter include condom use among FSWs, validation of behavioral questionnaires with biological biomarkers and barriers to consistent condom use among FSWs.

2.2 Theoretical Framework

This study is based on the Health Belief Model (HBM) shown in Figure 2.1 below.

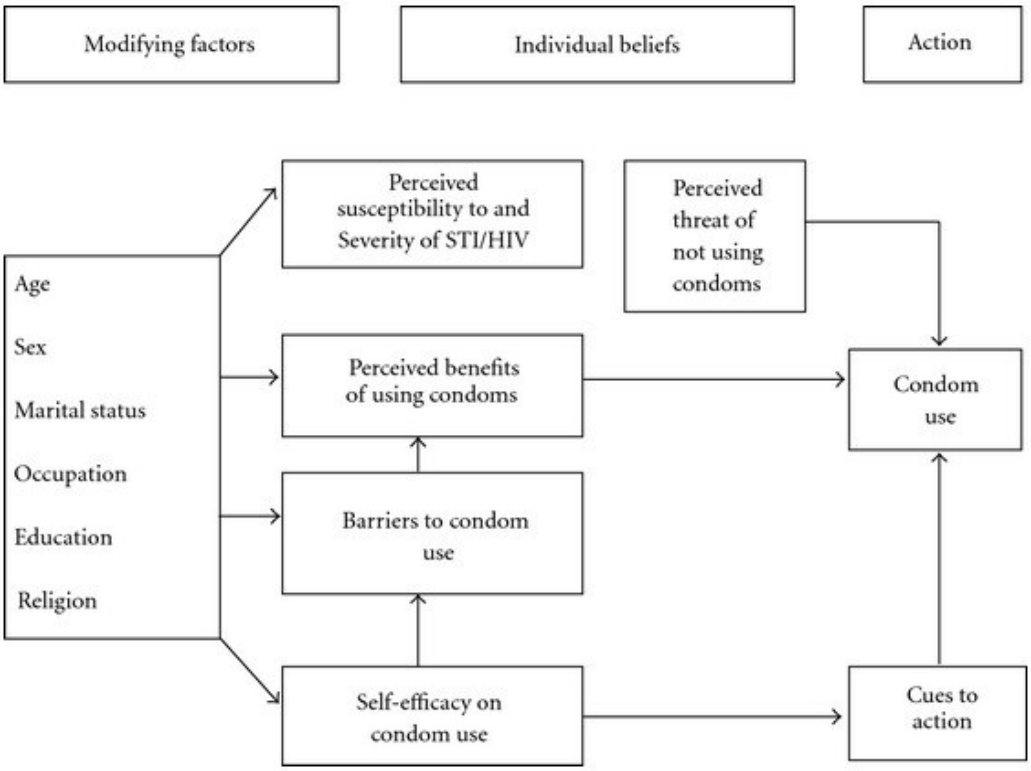

Figure 2.1 The Health Belief Model

Source: (Katikiro & Njau, 2012)

The HBM is a theoretical model, which was developed in the 1950s by social psychologists and was conceptualized by Rosenstock. According to Rosenstock, the model is used to explain how the individual psychological course impacts on behaviour change and its maintenance and the effectiveness of this on public health interventions. The HBM builds on five pillars which are: (1) perceived threats: the beliefs related to perceived susceptibility and perceived severity of poor health outcomes. (2) Perceived benefits: the belief related to rewards and gain after adopting certain behaviours. (3) Perceived barriers: the belief related to barriers and loss after adopting certain behaviours. (4) Cues to action: external and internal cues that can trigger specific health related behaviours. (5) Self-efficacy: confidence in certain behaviours maintenance even in adverse situations (Huang et al, 2020:2).

According to (Abraham & Sheeran, 2015), there are certain beliefs that can make behaviour more or less attractive and this will result in expectancy whereby an individual will weigh the benefits or disadvantages of certain behaviours. For example, before adopting a certain behaviour an individual will evaluate the chances of getting infected by a certain disease, and then the consequences of that disease. Additionally, the individual will evalute the benefits and costs of preventing the disease. These are the beliefs that shape certain health related behavours. The HBM helped in understanding how FSWs perceive their susceptibilty to contracting HIV as a high risk group; the severity of contracting HIV (sickness and failure to work and provide for their children); the costs of condom use and finally the barriers to consistent condom use. Then there are also cues to action which activate behaviour. Cues to action are triggers that will result in the adoption of desired behavior and these could be health promotion activities. Still on sex workers, cues to action are condom promotion interventions.

2.3 Relevance of the theoretical model to the study

The HBM has been applied to other studies to understand key beliefs that shape the adoption of health related behaviours, for example those studies that explain smoking and condom use, (Huang, Yu, Jia, Wang, & Yang, 2020); (Moore, Kimble, & Minick, 2010); (Bender & Elise, 2005). However, a limited number of studies based on the HBM have been done to examine determinants of condom use among FSWs in Zimbabwe. The HBM could be applied to FSWs and help in understanding the relationship between reported condom use and actual condom use through analysing the of the Yc-DNA. Furthermore, the HBM can help in explaining the complex

relationship between multiple levels of determinant factors of condom use with clients among FSWs in Zimbabwe.

FSWs are at increased risk of HIV due to multiple non-regular sexual partners and frequent sexual exposure. (Warner, Stone, Macakuso, Buehler, & Austin, 2006) highlighted those male and female condoms are highly recommended for key populations for the prevention of sexually transmitted infections including HIV/AIDS. If effectively use, condoms prevent contact with semen and infected skin on the head of the penis with vaginal, oral, and anal discharges and this mechanical barrier can provide between 80-98% protection against HIV transmission in discordant couples. However, self-reporting on condom use is often biased by overreporting and underreporting. (Gallo, Steiner, Hobbs, & Warner, 2013), highlighted that in a microbicide study done in Cameroon, former female participants qualitatively interviewed acknowledged having misreported in the original trial.

In another study of women attending STI and other clinics in the United States, rates of biomarker detection (PSA, Yc-DNA, or semenogelin) ranged from 6% of women who reported no sex to 56% of women who reported condom use for all sex acts within the biomarker's window of detection. However, the presence of biomarkers might be a result of condom misuse or condom failure and not necessarily unprotected sex.

In a Partners Pre-Exposure Prophylaxis (PrEP) Study at Kenyatta National Hospital in Nairobi, Kenya of the 125 women enrolled in the study 124 were evaluated for PSA and 10.5% tested positive to the PSA despite reporting 100% condom use. In

the HPTN 035 study, Y chromosome detected in 33% of women reporting 100% condom use. Not much has been done to systematically analyse characteristics of women reporting 100% condom use but with evidence of unprotected sex.

According to (Crosby, 2012) condom breakage, slippage, incorrect and inconsistent use, is equivalent to non-condom use. As such in a prospective study of clinic attendees 13% incidence of chlamydia and gonorrhoea was found among people reporting consistent condom use but also reporting at least one incorrect use, while on the other hand no incidences were recorded among women reporting consistent condom use. In another study aimed at determining whether consistent condom use was protective against chlamydia, gonorrhoea, and trichomonas vaginalis, 929 people were recruited to the study, screened for STIs at the beginning of the study and had further tests conducted at three and six months of follow-up. Participants reported a total of 14,970 penile-vaginal sex events, 64% of which involved the use of a condom and about 24% of sex acts with a condom involved an error or problem leading to 118 STIs diagnosed during follow-up.

Although several studies have been done showing stark discrepancies between reported survey and evidence from biomarker, yet there is a dearth of literature on studies that were done specifically done on FSWs to show determinants of condom use based on the discrepancies between biomarkers and reported behaviours. This study builds on existing literature by combining qualitative and quantitative data with the quantification of Yc DNA, as a biological biomarker for related behaviour.

2.4 Determinants of condom use

A study done by (Gallo, Steiner, Hobbs, & Warner, 2013) in Kenya showed that some of the predictors of condom use include alcohol use, partner type and coital frequency. According to (Gallo, et al 2013) alcohol use during sex negatively affected consistent condom use while coital frequency was associated with condom use with other partners only. In another study, done with FSWs in Savannakhet, Lao PDR, determinants of consistent condom use included condom availability (94); condom use was 97% with regular partners and 60% with non-regular partners (Andrews, Faxelid, Sychaerun, & Phrasisombath, 2015). However, this study was conducted with a much younger population, mean age was 21 (range 15–40) and 23% were between 15 and 18 years, which makes it difficult to generalise findings in different contexts and with much older FSWs, hence the need for additional studies to understand determinants of condom use among FSWs. Furthermore, few qualitative studies have been done to fully understand nuances around condom use among FSWs.

CHAPTER 3 METHODOLOGY

3.1 Introduction

This chapter covers the research design, population and sampling procedures, data collection methods and data analysis procedures. The chapter further discusses methods that were used to improve rigor, through strategies for maximizing the reliability and validity of analysis.

3.2 The Research Design and its appropriateness

Data was collected using a mixed method approach. According to (Creswell, 2009) mixed method research, also known as integrating, synthesis, quantitative and qualitative, multi-method and mixed methodology has recently gained momentum, thus is less popular than either quantitative or qualitative research.

Creswell (2009) defined mixed-method research as an approach to inquiry that combines both qualitative and quantitative approaches. A more comprehensive definition was offered by (Tashakkori and Creswell, 2007:6) when they stated that "mixed methods is research in which the investigator collects and analyses data, integrates the findings, and draws inferences using both qualitative and quantitative approaches or methods in a single study or program of inquiry". As highlighted above, mixed method is still evolving hence there is no single definition.

Mixed methods research is an approach to knowledge (theory and practice) that attempts to consider multiple viewpoints, perspectives, positions, and standpoints (always including the standpoints of qualitative and quantitative research), with the key word being *integration,* (Johnson, Onwuegbuzie & Turner, 2007). Mixed

methods research is influenced by both quantitative and qualitative worldviews and its main purpose is to combine the strengths of each strategy of inquiry to produce a research design that is stronger than either qualitative or quantitative research. Creswell (2009) further highlights that mixed methods research is aimed at maximising the strengths of each method while at the same neutralising its weaknesses.

The mixed-method approach to research originated in 1959 when it was used in a study conducted by Campbell and Fisk, (cited in Tashakkori, 2007). The study was aimed at exploring the validity of psychological traits. The study gave birth to more research studies either combining interviews (qualitative) and surveys (quantitative) approaches leading to triangulation (Tashakkori, 2007). This is the process of seeking validity from gathering data using a variety of methods and finding convergence.

While mixed method research has gained momentum because of its advantages, the main drawbacks associated with this methodology include the need for extensive data collection, it is time intensive and resource intense (in terms of both financial resources and research expertise) than either a quantitative or a qualitative research approach. Nevertheless, this approach was more relevant for this exploratory and descriptive study as it provided the much-needed context to understand limitations of condom use among FSWs. The synthesis of the two components was done at the interpretation of the findings.

3.2.1 Secondary data analysis

The first part of the study was a secondary analysis of data that was collected through a RDS survey with FSW. The study was conducted by the Centre for Sexual Health and HIV/AIDS Research (CeSHHAR) Zimbabwe, in collaboration with the Ministry of Health and Child Care.

(Johnston, 2014) defined secondary data analysis as the use of existing data to answer different questions from those the original research was intended to answer. Already, there are vast amounts of data that has already been collected and not analysed, hence an opportunity to use this to provide answers to other issues. The most crucial step in secondary data analysis is to find a fit between the new research questions and the existing data. In this study, the research questions fit well with that of the original study since both studies focused on condom use among FSWs and the use of biomarkers in validating self-reported sexual behaviour.

The researcher was part of the research team that collected the survey data and following discussions with principal investigators, and a review of the protocol for this study, it was noted that it was not necessary to do another study as the collected data would help in answering the research questions, a decision was made to utilize existing survey data to find the answers to different research questions than were asked in the original research.

3.2.1.1 What was the purpose of the original study?

Centre for Sexual Health HIV and AIDS Research Zimbabwe (CeSHHAR) implemented an intervention targeting FSWs with HIV prevention and care services using a peer-based community mobilisation approach for twenty-four months. The study was entitled "Differentiated Prevention and Care to Support the Virtual Elimination of risk of acquisition and or transmission of HIV among Sex Workers in Southern Africa," AMETHIST (Adapted Microplanning: Eliminating Transmissible HIV in Sex Transactions. The study was conducted from September-December 2021.

The overall aim of this study as highlighted in the protocol was 'to strengthen social networks, cohesion and community empowerment among FSWs to increase uptake and adherence to prevention and treatment to levels that will lead to the virtual elimination of HIV transmission attributable to sex work in a way that is cost-effective and translatable.' The programme was anchored on the provision of differentiated HIV care programme by peer educators through the promotion and provision of long-acting reversible contraception, community mobilisation, HIV care/ART support, PrEP initiation, condom distribution, syndromic management of STIs and real-time electronic data collection. The impact of the programme was measured in an RDS survey which was conducted after twenty-four months of study implementation.

3.2.1.2 Qualitative study

The qualitative component was conducted after an analysis of the secondary data. Findings from the behavioural data and Yc-DNA tests were used to inform the design of the qualitative sub-study.

3.3 Study setting and rationale for selection

The study was implemented in twenty-two sites across Zimbabwe (11 intervention sites and eleven control sites). Intervention sites were Birchenough Bridge, Chipinge, Chinhoyi, Hwange, Kariba, Lupane, Gwanda, Ngundu, Rusape, Murewa and Zvishavane while the control sites were Checheche, Chiredzi, Chivhu, Bindura, Gokwe, Juru, Kwekwe, Kadoma, Magunje, Marondera, and Victoria Falls. The sites were randomly selected 1:1 from all CeSHHAR clinics to represent different typologies found in each site: (rural vs urban; holiday resort towns, highway corridors).

The exploratory qualitative study was conducted in two sites, Marondera (a control site and Rusape (an intervention site). These were purposively selected considering the number of FSWs that had male DNA following the Yc analysis. Compared to other sites, these two sites had the highest number of eligible participants: Marondera (N=24) and Rusape (N=20). Below is a map of the AMETHIST study sites:

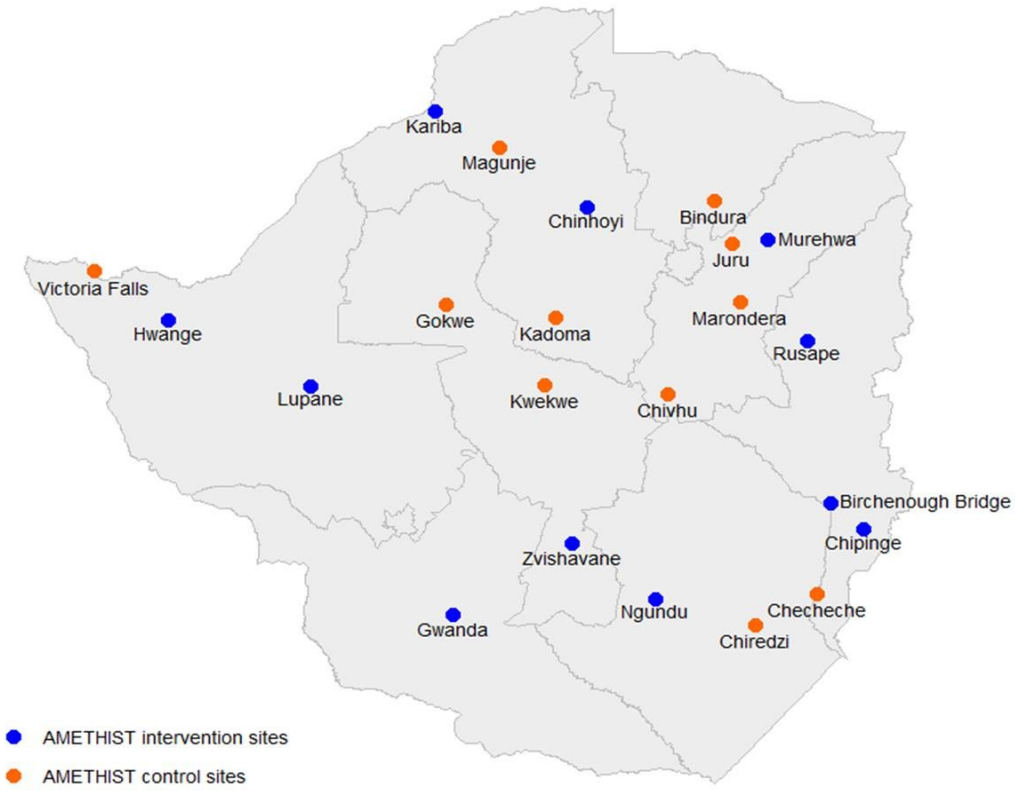

Figure 3.1 : AMETHIST Trial Sites

3.4 Population and Sampling

The study population included in the RDS survey were FSWs residing in study sites. The study had a sample size of 200 FSWs per site (N=4444) selected through peer selection. The population for the sub-study were all FSWs that had reported no condomless sex in the behavioural questionnaire but had evidence of condomless sex in the Yc-DNA test. Marondera had 24/53 FSWs that had reported no condomless sex, yet they had evidence of Yc-DNA. Rusape had 20/63 that had evidence of having unprotected sex despite reporting no condomless sex. A total of 14 FSWs, (n=7) from each site were purposively selected to participate in the sub-study.

3.4.1 Inclusion and exclusion criteria

Inclusion criteria: Participants were eligible for participating in the RDS survey if they were ≥ 18 years of age; had engaged in sex for money or gifts in the last 30 days; had stayed in the study site for 30 days or more and were willing and able to provide written consent.

Participants were eligible to participate in the sub-study if they participated in the RDS survey and had evidence of male DNA following the Yc-DNA analysis.

Exclusion criteria: participants were excluded from the RDS if they were <18 or below; were not willing to give informed consent; had not engaged in sex work in the last 30 days and had stayed in the study sites for less than 30 days. Participants were excluded from participating in the sub-study if they had reported no condomless sex and had no evidence of male DNA.

3.5 Data collection instruments

Data was collected through a self-administered questionnaire, laboratory tests and in-depth interviews guided by a topic guide.

a) All participants completed a self-administered questionnaire on a tablet using audio computer assisted survey instrument (ACASI). The questionnaire was divided into domains and collected information on sociodemographic data, sexual history and behavior, substance abuse, mental health, knowledge of condoms and their accessibility and use, exposure to HIV/AIDS prevention services.

b) All participants were asked to provide a finger-prick blood sample for HIV and syphilis testing. Furthermore, participants were asked to provide a vaginal

swab for gonorrhoea, chlamydia, and trichomonas vaginalis testing at a local laboratory. Participants who indicated that they always using condoms were asked to provide a second vaginal swab for Y chromosome testing, which was a biomarker for condomless sex. Total DNA was extracted using the QIAamp DNA Investigator kit (Qiagen, Hilden, Germany). The extracted DNA was subjected to quantification using the Quantifiler Trio DNA Quantification kit, (Thermo Fisher Scientific, Waltham, Massachusetts, USA).

c) Open-ended in-depth interviews were conducted with 14 FSWs drawn from two sites, Marondera and Rusape. The interviews were guided by a topic guide which explored the following factors: current condom use, environmental factors affecting condom use and determinants of condom use.

3.5.1 Procedures for the RDS survey

An RDS is a type of snowball sampling that is used for analysing characteristics of hidden or hard-to-reach populations ranging from FSWs, MSM, injecting drug users and children who are homeless. It relies on multiple waves of peer-to-peer recruitment and statistical adjustments to try and approximate random sampling.

The RDS survey had two components; (a) a behavioural questionnaire which collected information on sociodemographic data, sexual history and behaviour, substance abuse, mental health, knowledge of condoms and their accessibility and use, exposure to HIV/AIDS prevention services; (b) collection of several biomarkers to validate different domains that were explored in the questionnaire. One of these biomarkers was Yc-DNA test, which was used to validate questions about consistent use of condoms. The study had a set of questions (Table 3) that were used to determine whether a participant consistently used condoms and was therefore

eligible for the Yc- DNA test. This study was nested within that trial and was aimed at reviewing the outcomes of Yc-DNA tests to evaluate the validity of self-reported data and understand determinants of condom use among FSWs in Zimbabwe.

The researcher was granted permission to access the raw data set and all supporting documentation which enabled her to perform her analyses. As a student, the researcher had no budget to conduct research of this magnitude, but the availability and access to the high-quality dataset meant that the researcher could still be able to answer the research questions using a larger sample which is more representative of the FSW population and whose findings are more generalisable. Furthermore, findings from this survey have not been analysed before, hence they presented an opportunity to build capacity for empirical research.

The process included an analysis of data from all study participants and those that had indicated consistent condom use and were therefore eligible for Yc-DNA testing. This was followed by open-ended in-depth interviews. The interviews were guided by a topic guide which explored the following factors: current condom use, environmental factors affecting condom use and determinants of condom use.

3.6 Data Collection Procedures

The study began by identifying seeds. completed study procedures, and each received two coupons which they used to recruit participants from their networks for Wave 1. The recruits for Wave 1 participated in the study and each received two coupons for recruiting participants for Wave 2. This referral chain went on until we reached a sample size of 4444 women. Each participant received two incentives- $5

for completing study procedures and $2 for each peer successfully recruited. Successful recruitment was defined as completing all study procedures-completing a survey questionnaire and biological procedures for biomarkers.

In the qualitative sub-study, the interviewer introduced herself and the study then sought written informed consent before the discussion. Face to face or online discussions were conducted with FSWs and these were guided by a topic guide. The topic guide explored socio-demographic data as well as general sexual behaviour and current condom use practices. All the IDIs were facilitated by one researcher who was also attentive to non-verbal communication. The researcher would take notes of any important aspects which helped in the analysis. IDIs were recorded and transcribed verbatim. The discussions lasted an average of 20 minutes.

3.7 Analysis and Organization of Data

Quantitative data were analysed using STATA v.14 (STATA Corp 2002; College Station, Texas, USA). Descriptive statistics was used to describe the study population. Logistic regression was used on associated factors of condom use. The logistic regression was used to assess correlates of consistent condom use and presence of male DNA to control for confounders. Consistent condom use with all sexual partners during the past 14 days was used as the dependent variable and age, time in sex work, having regular partners, education level, marital status, mental health, violence, sexual violence, and substance abuse we used as the independent variables.

All qualitative interviews were transcribed verbatim, translated into English, and imported into Nvivo Pro 11, a software package for the management, retrieval, and

analysis of qualitative data. During transcriptions, all identifiers were removed to ensure confidentiality of research participants. Interview transcripts were deidentified and assigned new study numbers that were not linked to their study identity numbers in the main trial. Interview transcripts were backed on cloud storage, using Dropbox. IDIs were analysed using thematic analysis, a flexible qualitative methodology that can be used with a variety of epistemologies, approaches, and analysis methods, (Lindsay-Smith, 2018).

A deductive approach was used to inform thematic content analysis of the transcribed data. This was then used to create a narrative description of key regularities and patterns that were emerging from the data. Themes and explanations were derived from a set of concepts informed by themes in the topic guide as well as patterns emerging from quantitative data analysis. Thematic content analysis was relevant for this study as it helped to answer salient issues surrounding condom use among FSWs. It allowed the researcher to do a summary and organise views and experiences as voiced by FSWs. Analytic vigour in the analysis was ensured through triangulation of comparing the emerging themes with handwritten notes taken during data collection.

3.8 Ethical considerations

Ethical approval to conduct the main survey was granted by the Medical Research Council of Zimbabwe and the London School of Tropical Medicine. Ethical approval to do the qualitative component was granted by Africa University Research Ethics Committee. All participants provided informed consent to partake in the RDS survey and prior to taking part in the in-depth interviews.

3.9 Chapter Summary

A mixed-method explanatory study was done to understand sources of underreporting unprotected sex and determinants of condom use. The study was preceded by analysis of secondary data collected during an impact evaluation assessment. The impact evaluation was conducted in the form of an RDS survey, and this was conducted in 22 sites across the country between September-December 2021. Following the secondary data analysis, a qualitative study was conducted in two sites purposively selected from the 22 sites. The qualitative study was done between February-March 2022. A sample of fourteen FSWs were selected for in-depth interviews aimed at understanding facilitators and barriers to condom use. All the participants taking part in the qualitative study provided informed consent prior to their participation in the study. All collected data was kept confidentially and will be used for academic purposes only.

CHAPTER 4 DATA PRESENTATION AND ANALYSIS

4.1 Introduction

This chapter focuses on data analysis and the presentation of the study findings. The study uses frequency and percentages, chi-square to measure association of dependent and independent variables and logistic regression analysis to draw conclusions on associations.

4.2. Results from the secondary data analysis

4.2.1 Sociodemographic Characteristics of Survey Participants

The sociodemographic characteristics of all the participants are shown in Table 4.1. The median age of the participants was 31 (range 25-38). The median years in sex work was 7 years (range 4-14). Educational levels varied with the majority (73.1%) having completed secondary school education and the rest had primary/none or tertiary education. Most of the participants were either divorced or separated (55.5%).

Table 4.1: Sociodemographic characteristics of the participants

Characteristics Total (overall)	Frequency n/N	Percentages (%)
Age (years)		
18-19	205/4444	5.4
20-24	822/4444	19.4
25-29	895/4444	19.9
30-39	1599/4444	35.3
≥40	923/4444	20.0
Highest level of education		
None	114/4439	2.7
Primary	1005/4439	23.3
Secondary	3184/4439	71.3
Tertiary	136/4439	2.7
Marital status		
Never married	1100/4444	25.5
Married	250/4444	5.9
Divorced/separated	2504/4444	55.5
Widowed	590/4444	13.1
Age started sex work (years)		
<18	**779/4444**	**17.9**
18-19	795/4444	18.2
20-24	1334/4444	29.3
25-29	866/4444	19.1
≥30	670/4444	15.5
Duration in sex work (years)		
<3	701/4444	17.6
3-5	1031/4444	23.3
6-9	932/4444	20.8
10-19	1257/4444	27.3
≥20	523/4444	11.1
Number of clients in the previous week		
0	137/4444	3.3
1-5	2492/4444	58.5
6-10	1188/4444	25.4
11-15	283/4444	5.7
≥16	344/4444	7.1
Currently has a steady partner		
No	1560/4444	34.6
Yes	2884/4444	65.4

4.2.2 Self-reported condom use

After the Yc-DNA validation, shown in Figure 4.1, a total of 3541/4444 (80%) self-reported having unprotected sex. While (903) 20% of the women answered "*Yes*" to the following question "*In the past two weeks, did you use a condom every time you had vagina sex*? and were therefore eligible for Yc-DNA test, 434 (48%) were positive for Yc-DNA. Male DNA quantification ranged from 0.01-103.24 ml. Therefore, women reporting no condomless sex had a higher odd ratio (OR:2.07) of positivity to Yc-DNA. Two had missing results and were dropped from the analysis hence n=901 instead of 903.

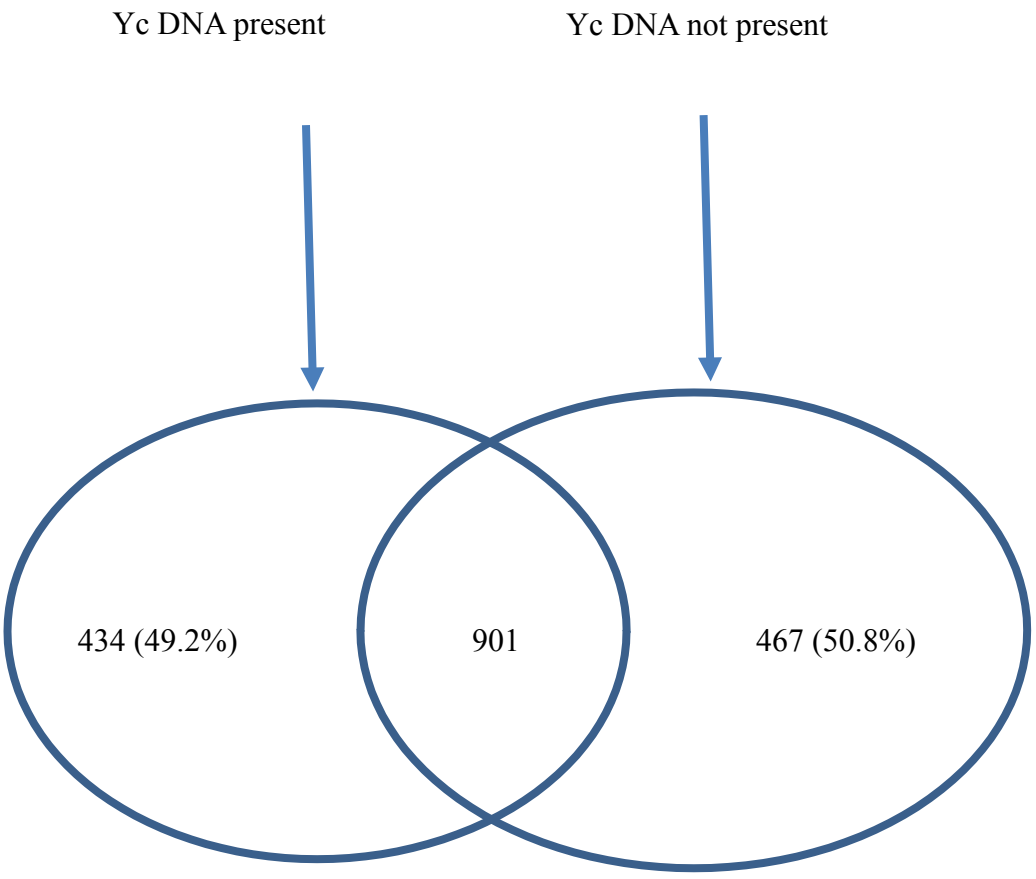

Figure 4.1 validation of the Yc-DNA test

4.2.3 Determinants of Yc-DNA

The correlates of Yc-DNA in a vaginal sample are shown in Table 4.2 below. There was a strong association between marital status and Yc-DNA presence (p-value 0.01). The analysis observed no statistically significant difference between FSWs misreporting condom use yet have Yc-DNA present and those accurately reporting condom use with no Yc-DNA presence. There was no significant association between age (p-value 0.54); educational level (p-value 0.16); years in sex work (p-value 0.38); HIV result (p-value 0.58); PrEP initiation (p-value 0.8); presence of common mental disorders (CMD) (p-value 0.18); permanent partner (p-value 0.57); experience violence (p-value 0.97) and substance use (0.68) and the presence of Yc DNA in vaginal sample.

Table 4.2: Predictors of Yc-DNA

	Y chromo absent n/N (%)	**Y chromo present n/N (%)**	**p-value**
Age			
<25 years	82/467 (17.6)	83/434 (19.1)	0.54
25 + years	385/467 (82.4)	351/434 (80.9)	
Marital status			
Never married	119/467 (25.5)	94/434 (21.7)	0.01
Married	13/467 (2.8)	17/434 (3.9)	
Divorced/separated	246/467 (52.7)	268/434 (61.7)	
Widowed	89/467 (19.0)	55/434 (12.7)	
Educational level			
Never attended school	10/467 (2.1)	10/434 (2.3)	0.16
Primary	95/467 (20.4)	88/434 (20.3)	
Secondary	362/467 (77.5)	330/434 (76.0)	
Tertiary	0	5/434 (1.2	
Do not know	0	1/434 (0.2)	
Years in sex work			
0 to 5 years	159/467 (34.0)	160/434 (36.9)	0.38
6+ years	308/467 (66.0)	274/434 (63.1)	
HIV result			
Negative	240/467 (51.4)	231/434 (53.2)	0.58
Positive	227/467 (48.6)	203/434 (46.8)	
Are you currently on PrEP?			

No	199/255 (78.0)	190/242 (78.5)	0.9
Yes	56/255 (22.0)	52/242 (21.5)	
Mental health			
No CMD	233/467 (49.9)	197/434 (45.4)	0.18
CMD yes	234/467 (50.1)	237/434 (54.6)	
Permanent/steady sexual partner			
No	224/467 (48.0)	200/434 (46.1)	0.57
Yes	243/467 (52.0)	234/434 (53.9)	
Experience violence			
No	293/467 (63.8)	277/434 (63.8)	0.97
Yes	169/467 (36.2)	157/434 (36.2)	
Substance use (AUDIT)			
Minimal risk	318/467(68.1)	290/434 (66.8)	0.68
Moderate risk	95/467 (20.3)	98/434 (22.6)	
Severe risk	54/467(11.6)	46/434 (10.6)	

4.2.4 Determinants of consistent condom use

For the determinants of condom use the analysis was done on the whole study population in comparison to FSWs reporting no condomless sex and having no evidence of condomless sex. Restricting the analysis to FSWs reporting no condomless sex would have limited the associations. Furthermore, the analysis on the entire population enabled the researcher to compare identical groups of women, thereby controlling for confounding factors.

Results of the bivariable and multivariate analysis showed that eight factors were associated with consistent condom use with all sex partners: age, marital status, years in sex work, mental health, permanent/steady partner, experiences of violence, mental health, partner HIV status (Table 4.3). These factors remained significant predictors in the multivariable analysis. Older FSWs were 44% less likely to have done condomless sex compared to those <25 years of age (p value <0.01), (OR/CI 0.56 (0.47-0.76). married FSW were 2.46 times (OR/CI 1.11-5.42) likely to do condomless sex compared to those who were never married; divorced/separated were

1.10 (OR/CI 0.84-1.46) times more likely to have done condomless sex compared to the never married ones and the widowed were 30% (OR/CI 0.49-1.00) less likely to have condomless sex compared to the never married FSWs.

FSWs who had >6years in sex work were 30% (p value <0.01; OR/CI (0.55-0.90) less likely to have done condomless sex compared to those <6 years in sex work. HIV negative FSWs were 21% (0.79 OR/CI 0.62-1.00) less likely to do condomless sex compared to HIV positive FSWs. FSWs with common mental disorders (CMD) were 1.65 times likely to do condomless sex compared to those without CMD (OR/CI 1.31-2.09). FSWs with permanent partners were 1.82 (OR/CI 1.69 (1.34-2.14) times more likely to do condomless sex compared to those who had no permanent partner. FSW who had experienced violence were 1.70 (p value <0.01; OR/CI 1.70 (1.34-2.17) times likely to do condomless sex compared to those who had never experienced violence. FSWs who had medium risk in substance abuse were 1.04 (OR/CI 1.04 (0.76-1.41) times more likely to do condomless sex compared to those with minimal risk and those with severe risk were in substance abuse were 1.49 (1.49 OR/CI (1.02-2.15) times more likely to do condomless sex compared to those who had minimal risk. FSWs with HIV positive clients were 6% (0.94 (0.67-1.32) less likely to do condomless sex compared to those with HIV negative steady partners. FSWs who did not know the HIV status of their steady partners were 2% less likely to do condomless sex compared to those with HIV negative steady partners. FSWs who did not have steady partners were 64% less likely to do condomless sex compared to those with HIV negative steady partners.

Table 4.3: Determinants of condom use

	No Condomless sex n/N (%)	Condomless sex n/N (%)	p-value	OR (CI)
Age				
<25 years	82/469 (16.4)	945/3975 (25.7)	<0.01	
25 + years	387/469 (83.6)	3030/3975 (74.3)		0.56 (0.47-0.76)
Marital status				
Never married	120/469 (26.4)	980/3975 (25.4)	<0.01	
Married	13/469 (2.6)	237/3975 (6.2)	0.08	2.46(1.11-5.42)
Divorced/separated	246/469 (52.5)	2258/3975 (55.9)	0.322	1.10 (0.84-1.46)
Widowed	90/469 (18.5)	500/3975 (12.5)	0.01	0.70 (0.49-1.00)
Educational level				
Never attended school	10/469 (2.0)	104/3975 (2.8)	0.4	
Primary	95/469 (21.1)	910/3975 (23.5)		
Secondary	364/469 (76.9)	2916/3975 (72.7)		
Tertiary	0	40/3975 (0.9)		
Do not know	0	5/3975 (0.1)		
Years in sex work				
0 to 5 years	159/469 (33.4)	1573/3975 (41.6)	<0.01	
6+ years	310/469 (66.6)	2402/3975 (58.4)		0.70(0.55-0.90)
HIV result				
Negative	241/469 (49.2)	2150/3974 (54.5)	0.05	0.79(0.62-1.00)
Positive	228/469 (50.8)	1824/3974 (45.5)		
Are you currently on PrEP?				
No	200/256 (78.0)	1718/2312 (75.7)	0.5	
Yes	56/256 (22.0)	594/2312 (24.3)		
Mental health				
No CMD	233/469 (51.1)	1507/3975 (38.8)	<0.01	
CMD yes	236/469 (48.9)	2468/3975 (61.2)		1.65 (1.31-2.09)
Permanent/steady sexual partner				

No	225/469 (45.9)	1335/3975 (33.4)	<0.01	
Yes	244/469 (54.1)	2640/3975 (66.6)		1.69 (1.34-2.14)
Experience violence				
No	299/469 (67.2)	2141/3975 (54.7)	<0.01	
Yes	170/469 (32.8)	1834/3975 (45.3)		1.70 (1.34-2.17)
Substance use (AUDIT)				
Minimal risk	319/469 (69.5)	2486/3975 (65.5)	0.11	
Moderate risk	96/469 (19.3)	799/3975 (18.8)		1.04 (0.76-1.41)
Severe risk	54/469 (11.2)	690/3975 (15.7)		1.49 (1.02-2.15)
What is the HIV status of your steady partner?				
Negative	158/469 (34.4)	1655/3975 (40.7)	0.01	
Positive	82/469 (18.8)	840/3975 (21.0)		0.94 (0.67-1.32)
I do not know	126/469 (24.9)	1089/3975 (28.9)		0.98(0.73-1.32)
l do not have a steady partner	103/469 (21.9)	391/3975 (9.4)		0.36 (0.26-0.51)

4.3 Facilitators and barriers to consistent condom use

Background characteristics

A total of 14 FSWs were interviewed to explore nuances around condom use among FSWs. Participants' mean age was 27 years (range 18–48). One participant was married; the remaining had an average of two steady partners who were staying in different towns. None of the participants were staying with their partners, including the married woman, all partners were staying in different towns. About 85 % (12/14) highlighted that their partners have other partners. All the participants had attained secondary education and had children. A total of thirteen participants had worked as FSWs for more than 4 years and only one had one year experience. All, 93% had access to condoms all the time; one participant prefers buying condoms and

sometimes she does not have them when shops are closed. All participants knew how to use condoms correctly. All the participants in Rusape got their clients from the truck stop. Other places included the street, the highway and home visits. In Marondera, all the participants got their clients from bars. Some were also seeing clients at home but after hooking up in the bars.

Types of partners

All the participants had three distinct types of partners: (i) new (ii) regular and (iii) permanent partners. New partners are those partners whom they meet and have sex with soon after. Condoms are always used with new sexual partners.

Regular partners are those whom they have sex regularly with and normally they get paid just before the sexual act. Regular partners could be from the same community/locality or town. They can also be people who regularly pass through their towns on business, but they always hook up for sex before proceeding with their journey. However, there is a certain level of trust between FSWs and their regular partners hence they can have sex for fun (without getting paid) or on credit. Condoms are not used always.

Permanent/steady partners are those people whom they have an intimate relationship with. These could be husbands, fiancés, or steady boyfriends. Permanent partners do not always pay for sex. Although the relationship is transactional, permanent partners can pay rentals, buy groceries, or send their children to school. Condoms are never used with permanent partners.

4.3.1 Facilitators to condom use

Participants discussed a range of factors associated with consistent condom use and these were acceptability of the condom as an effective method of HIV and STI prevention, having other sources of income, condom availability, and accessibility and perceived awareness of partner's HIV status.

At the individual level, permutations of narratives describing fear of getting infected with HIV and STIs as the major reasons why FSWs always strive to use condoms. For participants already infected and living with HIV, they showed internalized fear of getting new variants of HIV and in addition STIs that will complicate an already compromised immune systems. As one participant highlighted,

> "*I always try to use condoms to avoid picking things I will not be able to deal with. I once did that and ended up testing positive to HIV." (FSW 1, Rusape).*

Despite blaming herself for getting infected with HIV, the participant indicated that she is responsible for her health going forward, hence the effort to always use condoms with all her partners. However, she might have slipped once, with her permanent partner which could explain the presence of Yc-DNA in her sample during the RDS survey. HIV negative FSWs highlighted fear of getting infected with HIV and STIs as the major facilitator to condom use.

Furthermore, FSWs showed high levels of being empowered because they are knowledgeable about the risks associated with sex work as an occupation and how they can protect themselves. A checklist with fourteen statements was developed to assess participant's knowledge about the correct use of condoms. All the participants answered '**True**" to all the statements asking about correct use of condoms. In

addition, condoms are central to sexual negotiations with clients, particularly when dealing with new clients. As one participant said, "*I will never agree to unprotected sex with a new partner*." (*FSW 3, Marondera*).

This participant expressed appreciation of valuable lessons received from community-based peer educators on benefits of condom use and strategies for successfully negotiating for condom use.

Condom availability was mentioned as a facilitator to condom use. All except one participant highlighted that condom are always available at CeSHHAR clinics as well as from community-based peer educators. Furthermore, condoms are always available in bars and nightspots where FSWs get their clients from, although at a nominal fee.

However, when asked about consistent condom use, participants respond to using condoms always as subconsciously they will be thinking about the new partners. This is what they report as consistent condom use.

In another narrative the participant said,

> *"I am married, and my husband is not aware that I am a sex worker. Of course, I am always using condoms because I always try to use them when having sex with other men*", (FSW 3, Rusape)

However, condoms are rarely used with permanent/steady boyfriends. As one participant highlighted. Although all the participants self-identified as sex workers, they separated business or their work from personal lives. It is when doing business that condoms are part of the narrative, and this is what is reported as consistent condoms which is clearly separate from personal lives when condoms are not even part of the discussions.

"I always use condoms with new partners; sometimes I use condoms with regular partners. Unavailability of condoms will not stop me from having sex with a regular partner. However, condoms are not even part of the discussion with my boyfriend. He does not suspect that I am a sex worker and introducing condoms will introduce issues of mistrust in the relationship. I do not want to jeopardize my relationship as I am planning on getting married." (FSW, 7, Marondera)

Financial empowerment is another facilitator to consistent condom use. FSWs engaged in other sources of income generating activities, e.g., formally employed and vendors were more empowered to demand safe sex compared to those sorely dependent on sex work.

Perceived knowledge of a partner's HIV status is another facilitator to consistent condom use. Participants highlighted refusal to have unprotected sexual intercourse with a partner suspected to be HIV positive. None of the participants mentioned couple HIV testing and counselling or HIV self-testing as verification methods used to conclude on partner's HIV status.

There are some men, whom you can see that they are HIV positive just by looking at them. I will never unprotected sex with someone whom I can tell is not feeling well (FSW, 3 Marondera)

4.3.2 Barriers to consistent condom use

Interpersonal barriers to consistent condom use including unequal power dynamics were also identified as a barrier to condom use. Male condom remains the available barrier method. Consistent condom use depends on the partner's willingness to corporate and use the method. However, partner refusal to use condoms is related to

perceived interference with sexual pleasure. Although participants expressed ability to introduce condom use, actual use is outside their control. Relying on the clients for sustenance disempowers them from demanding and refusing sex if a partner refuses to use a condom. Therefore, poverty remains another barrier to consistent condom use among FSWs, and sole reliance on sex work for sustenance reduces the ability of participants' ability to demand condom use and refuse engagement in risky transactional sex.

> *"If I had money, I would not be doing this. Sometimes you need money to pay rentals or buy food and the man is not willing to use a condom. He is even prepared to pay you more because unprotected sex pays more than protected sex. You have no option but to agree to having unprotected sex because he is the one who has the money," (FSW 6, Rusape)*.

In all the discussions participants highlighted that when arguing for condom use, they are not explicit about the reasons why they should be use them. The discussions skirt around fear that they do not know what the client has but never an acknowledgement that the participants are having sex with multiple sexual partners hence their clients are at risk of contracting STIs including HIV. This ambiguity around why protection should be used gives men room to refuse condom use. Interwoven with this is the notion of individual versus community level responsibility towards one's protection.

"*If I ask you to use a condom and you refuse, I would have done my part. I will not force you to use one." (FSW, 10, Marondera)*

Another barrier to consistent condom use was substance abuse. As highlighted by one participant "sometimes you will be so drunk you will not even know what will be happening and you end up having unprotected sex.

In another interview a FSW indicated that she only uses condoms when she is doing business but does not use them when she wants to enjoy sex.

CHAPTER 5 DISCUSSION OF RESULTS AND CONCLUSION

5.1 Introduction

This chapter is a summary of study findings and a discussion on whether research objectives were met, and the conclusions based on the findings. The chapter will conclude with recommendations to policy makers, researchers, FSWs and programme implementers and suggest areas of further study to scientifically investigate reasons for underreporting and barriers to condom use among FSWs.

5.2 Validation of condom use in FSWs

The study findings confirmed what has always been suspected in terms of condom use among FSWs, with 10% self-reported and validated condom use. We found elevated levels of condomless sex among FSWs in Zimbabwe. Despite 20% of the participants reporting consistent condom use, only 10% had evidence of no condomless sex. About 48.17% (434/901) of those women reporting consistent condom use had Yc-DNA in their vaginal samples.

The use of Yc- DNA is therefore important for validating self-reports as most of these will be inaccurate. Self-reporting on condom use might provide inaccurate estimates on the effectiveness of condom interventions. This finding is supported by (Giguère, et al., 2019) who did a similar study in Benin and found out that prevalence of unprotected sex according to self-reports was 25.8%; 32.0% according

to Prostate-Specific Antigen (PSA) test and 44.3% according to the Yc-DNA. However, there is a gap on the reasons influencing underreporting of condomless sex which need to be investigated further. Findings from the in-depth interviews did not tease out the reasons for underreporting unprotected sex. Moreover, there was some anecdotal evidence that reporting condom use is associated with new paying clients only and this is what FSWs are subconsciously referring to when reporting consistent condom use. These highlights problematic issues in the design of questions exploring condom use, in particular the understandability and clarity of the questions.

In some studies, underreporting sexual behaviour was a result of social desirability bias, (Giguère, et al., 2019). All the participants indicated that they had been exposed to CeSHHAR programs where they were getting condoms either from community-based peer educators, static or outreach clinics. All the participants knew how to use condoms, were aware that the nature of their work exposes them to HIV and STI and condoms are the only method that can protect them from getting infected. Furthermore, they are getting this information from CeSHHAR whether they are from an intervention or control community. Therefore, reporting condomless sex might have raised fears that they would be judged. Similar findings were also reported by (Giguère, et al., 2019).

Underreporting unprotected sex could also have been influenced by the recall period. The measure for condomless sex was whether a participant had used a condom every time she had sex in the past two weeks. Further analysis is required to investigate the quantities of the DNA in a sample to determine the actual number of days a person might have been exposed before the collection of the sample. In a study with FSWs

by (Malagón, 2018), women who self-reported always using condoms had 50-fold lower levels of Yc-DNA compared to women who reported no condom use. These findings suggest there could be other ways through which Yc-DNA might have been introduced into the vaginal tract other than through unprotected sex. These could be either through unnoticed condom breakage, slippage, or partial use. In our study, there was no evidence of false positive following rigorous quality control, yet we cannot completely rule out the possibility of sources of Yc-DNA other than through unprotected sex.

5.3 Predictors of condom use

The study findings help in explaining why FSWs continue to be disproportionately affected by HIV. Furthermore, the findings help in explaining why most new infections remain concentrated in this population. However, the findings were shocking, given the effectiveness of condom use in preventing HIV transmission and acquisition among populations with high partner exchange. Furthermore, the findings were discouraging, given the huge investments made over the years in demand creation and improving access and availability of condoms.

In this study, 90 % of FSWs were not using condoms consistently. Studies in other settings have highlighted similar findings whereby condom use is determined by intimacy between FSWs and their partners, with less condom use in more intimate relationships, (Andrews, Faxelid, Sychaerun, & Phrasisombath, 2015). In this study, FSWs showed reluctance to discuss condoms with permanent/steady partners and being wary of being accused of infidelity. This is despite having partners that have other partners. What is even more worrisome is the knowledge of existence of other

partners, yet men refuse to use condoms. These findings highlight the need of appropriate messaging tailormade for the needs of intimate partners and other type of partners.

Consistent condoms use depends on the support of the partner. It is even worrisome that male partners who refuse to use condoms have other known partners. Other factors contributing to inconsistent condom use were gendered power dynamics. Despite being empowered to demand and negotiate for safer sex, reliance on male client's financial support disempowers FSWs from demanding safe sex, thereby reducing the frequency of unsafe sexual encounters. Study findings echo comparable results from other studies that have shown a significant impact of women's reliance on men for survival on their ability to successfully negotiate for condom use, (Langen, 2005). In the same study, women that have experienced violence, married women, women with older partners all faced similar challenges in negotiating for safe sex. While these findings are from a study that was done with women from the general population, these can be generalised to FSWs as they face similar challenges as women.

5.3. Conclusion

Findings from this study showed high levels of underreporting of sexual behavior by FSWs. Study findings shows the need to treat self-reported data on sexual behavior with. Underreporting seems to be affected by social desirability bias, despite the use of ACASI to address these potential biases. Question misinterpretation also seem to contribute to underreporting condom use in research. The detection of Yc-DNA shows the value of validating reporting on sexual behavioral. However, there is need for further research on the disparities between reported and actual sexual behavior.

Although FSWs are knowledgeable about risky sexual practices attached to the nature of their job, this has not translated to meaningful condom use. Barriers to condom use include gender dynamics. The intersection between economic and relationship factors remains a barrier to condom use, hence the need for interventions that address condom use barriers and improve economic independence of FSWs.

FSWs admitted to using condoms consistently with new partners, inconsistent condom uses with regular partners and no condom use with permanent partners. This highlights the need for appropriate messaging tailormade for the different partners. Other variables that seem to affect consistent condom use are marital status, years in sex work, alcohol abuse and CMD, suggesting need for multiple combinations targeting different aspects influencing unsafe sexual practices.

5.4 Recommendations

The researcher recommends the following recommendations to improve the eradication of HIV transmission related to sex work and ultimately improve the health outcomes for FSWs.

There is need to identify remaining gaps with regards to barriers to condom use. The researcher recommends a multisectoral approach between policy makers and researchers to identify persistent barriers to condom use. There is need for intensified scientific investigations into remaining barriers to condom use and creative ways of addressing these barriers.

The Ministry of Health and Child and investors to invest financially in the development of dual protection methods. While condoms are effective in STI and HIV prevention, they do not address other sexual needs for female sex workers, for example family planning and safe conception. These issues remain critical for the success of condom use, hence the need to invest in the development of combined methods offering dual protection against HIV, STIs and family planning. Furthermore, condoms offer short-term protection, yet they are influenced by alcohol use. This calls for the need to develop a method that can be used ahead of a sexual encounter when FSWs are still aware of their protection needs.

The researcher recommends that programme implementers under the guidance of the Ministry of Health and Child Care to revive demand creation for both male and female condoms. Over the years, condom demand creation has been waning, yet our findings suggests that condom there is need to bring these back on the agenda.

The researcher recommends condom availability and accessibility in all places where transactional sex is likely to take place. Furthermore, the researcher recommends the creation of highway corridors offering condoms. Currently condoms are available in entertainment places, grocery stores, clinics, yet a significant number of these have sex in trucks where there are unlikely to use protection.

The researcher recommends the Ministry of Women Affairs, and Gender Empowerment to consider income generating programmes for FSWs. These will reduce FSWs' overdependence on men for survival.

The researcher recommends male involvement in targeted interventions for FSWs. Involving male clients of FSWs in HIV prevention programmes will reduce the burden of protection on the FSWs while increasing shared responsibility for health.

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Annexures

1.1 Informed Consent Form, English

AFRICA UNIVERSITY
(A United Methodist-Related Institution)

INFORMED CONSENT GUIDE

Version: 1.0

Date: 1 December 2021

STUDY TITLE: REVIEWING THE OUTCOMES OF Y CHROMOSOME TESTING IN FEMALE SEX WORKERS IN ZIMBABWE

(FOCUS GROUP DISCUSSIONS/IN-DEPTH INTERVIEWS)

Principal Investigator: Memory Makamba

Phone number(s): 0772551220

INTRODUCTION

My name is Memory Makamba. I am a final year (Master's in Public Health) student from Africa University. I am carrying out a study which seeks to explore more about the outcomes of tests that were done to show the presence of Y chromosome testing among female sex workers in Zimbabwe.

PURPOSE OF THE STUDY:

You are being asked to participate in a research study where we contact you and invite you to participate in a group discussion along with other 8-11 participants. A total of 4 group discussions will be held with female sex workers. Twelve (12) of you may be selected for one-on-one in-depth interviews after the FGDs to discuss more on the same questions. The purpose of the study is to understand more about condom use among female sex workers. You were selected for the study because you are a female sex worker who took part in a respondent driven sampling survey that was completed recently, and you were tested for the presence of Y chromosome.

PROCEDURES AND DURATION

If you decide to participate you will be interviewed in a one-on-one discussion or you will be asked to join about 8-11 female sex in a focus group discussion.

The study is being led by Memory Makamba, a student at the Africa University, Faculty of Health Sciences. You are being asked to participate along with fifty-six female sex workers from Juru, Murehwa, Marondera and Rusape. You have been selected to take part in this study because you can provide written informed consent to take part. If you decide not to take part, your access to regular care at any clinic or your relationship with Africa University will not be affected. Memory Makamba will facilitate discussions and interviews. The information that you provide will help us to improve health services for female sex workers. It is important for us to have accurate information so that we can understand how programmes for sex workers can be properly designed to meet their needs. It is important that we capture everything that we discuss, so that your views will not be misrepresented. As such we are seeking permission to record the discussion. If you do not want to answer any

question during the discussion, you are free to indicate this to the researcher. This discussion should last 45 minutes – 1 hour.

RISKS AND DISCOMFORTS

The risks of participating in this study are minimal. However, it is possible that you may feel uncomfortable with some of the questions we will ask you. You can choose to skip questions or to stop participating in the discussions if you feel uncomfortable. The discussions will be held in private in a closed room. Though we take these precautions, someone might know of your participation in the study and assume that you are HIV infected or you are a sex worker. This could affect your social or business relationships in the community.

BENEFITS AND/OR COMPENSATION

There are no direct benefits to you for participating in this study. We are hoping that findings from this study will be used to design HIV prevention programs for female sex workers However, since participating in this study will take you away from your home and work, we will reimburse you for transport costs. We will also provide you with refreshments during the discussion.

CONFIDENTIALITY

Your personal details will not appear on the recording of the discussion or on any study-related documents. You will be assigned a study participant identity number which will be used to identify the tape that has your voice. All study records and audio recordings will be kept in a secure room in locked filing cabinets and separate from any information that identifies you personally (such as this consent form), with

access limited to the researcher. Interview audio recordings will be downloaded onto a password protected computer and the original file will be deleted from the audio recorder. Your name will not be used in any reports or publications that may arise from this study.

Your details may be requested by individuals if required by the law. Information may also be given to regulatory authorities should they wish to see it for their regulatory duties. The bodies regulating this study are the Africa University Research Ethics Committee.

VOLUNTARY PARTICIPATION

Participation in this study is voluntary. If you decide not to participate in this study, your decision will not affect your future relationship with Africa University or Centre for Sexual Health and HIV/AIDS Research Zimbabwe If you chose to participate, you are free to withdraw your consent and to discontinue participation without penalty.

OFFER TO ANSWER QUESTIONS

Before you sign this form, please ask any questions on any aspect of this study that is unclear to you. You may take as much time as necessary to think it over.

AUTHORISATION

If you have decided to participate in this study, please sign this form in the space provide below as an indication that you have read and understood the information provided above and have agreed to participate.

---------- ----------

Name of Research Participant (please print) Date

Signature of Research Participant or legally authorised representative

If you have any questions concerning this study or consent form beyond those answered by the researcher including questions about the research, your rights as a research participant, or if you feel that you have been treated unfairly and would like to talk to someone other than the researcher, please feel free to contact the Africa University Research Ethics Committee on telephone (020) 60075 or 60026 extension 1156 email aurec@africau.edu

Name of Researcher ----------

1.2 Informed Consent Form, Shona

AFRICA UNIVERSITY
(A United Methodist-Related Institution)

GWARO RETENDERANO

Version: 1.0

Date: 1 December 2021

MUSORO WEONGORORO: TSVAGURUDZO YEKUNZWISISA ZVAKABUDA MUONGORORO YE Y CHROMOSOME MUMADZIMAI ANORARAMA NKUTENGESA BONDE MUZIMBABWE

(HURUKURO MURI MUBOKA/HURUKURO MUMWE NEMUMWE)

Mukuru wetsvagurudzo: Memory Makamba

Nhamba dzerunhare(s): 0772551220

MUSORO

Zita rangu ndinonzi Memory Makamba. Ndiri mugore rekupedzisira (Master's in Public Health) pachikoro chikuru cheAfrica University. Ndiri kuita ongororo yakanangana nekunzwisisa zvakabuda muongororo yehuvepo kwembeu yababa munhengo yesikarudzi mumadzimai anorarama nekutengesa bonde muZimbabwe.

CHINANGWA CHETSVAKURUDZO

Muri kukumbirwa kupinda mutsvakurudzo, yatichakubatai nekukukokai kupinda muhurukuro muri muboka (FGD) pamwechete nevamwe vanhu vasere kusvika gumi nerimwe (8-11). Pamwechete mapoka mana (4) achaitwa nemadzimai anorarama nekutengesa bonde. Mushure mehurukuro muri muboka, vanhu vanokwana gumi nevaviri (12) vachasarudzwa kupinda muhurukuro vari vega nemushandi wechirongwa mushure mehurukuro muri muboka pananenge vachikurukura pamusoro pemibvunzo mimwe chete. Chinangwa cheongororo ino ndechekunzwisisa zvizere maererano nekushandiswa kwemakondomu nemadzimai anorarama nekutengesa bonde. Masarudzwa kupinda muongororo ino nekuti muri mudzimai anoraram nekutengesa bonde akapinda muongororo yerespondent driven sampling survey iyo ichangobva kuitwa uye makaongororwa huvepo hwehurume munhengo yenyu yesikarudzi.

ZVICHAITWA UYE NGUVA YAZVICHATORA

Kana mukasarudza kupinda muongororo muchakurukurwa nemi muri penyu mega kana kuti muchakumbirwa kubatana nemamwe madzimai masere kusvika gumi nemumwe muhurukuro inoitwa muri muboka.

Ongororo ino iri kutungamirirwa naMemory Makamba, anodzidza pachikoro chikuru chedzidzo cheAfrica University, Faculty of Health Sciences. Muri kukumbirwa pamwe chete nemamwe madzimai anorarama nekutengesa bonde makumi mashanu nematanhatu (56) maJuru, Murehwa, Marondera neRusape. Masarudzwa kupinda muongororo ino nekuti munokwanisa kupa mvumo yekupinda. Kana mukasarudza kusapinda, mawaniro amagara muchingoita zvirongwa zvehutano chero pane chipatara chipi zvacho kana hukama hwenyu neAfrica University hauzokanganisike. hu Hurukuro idzi dzichatungamirirwa naMemory Makamba. Umbowo hwamunotipa

huchabatsira kuvandudza zvirongwa zvehutano zvemadzimai anorarama nekutengesa bonde. Zvakakosha kuti isu tive nehumbowo hwakakwana kuti tizive kuti zvirongwa zvevanhu vanotengesa bonde zvingagadzirwa sei zvinoenderana nezvavanoda. Zvakakosha kuti tinzwe zvese zvatichakurukura kuitira kuti pfungwa dzenyu dzinzwikwe sematauriro amaita. Nekudaro tichakumbirawo kutapa hurukuro yedu. Kana musingadi kupindura chero mubvunzo makasunguka kuudza muzvinaongororo. Hurukuro idzi dzinofanira kutora nguva iri pakati pemaminetsi makumi mana nemashanu kusvika awa rimwe chete (45 minutes to 1 hour)

NJODZI UYE KUSAGADZIKANA

Pane mukana mudiki wekusangana nengozi. Zvisinei, munogona kusagadzikana nemimwe mibvunzo yatichakubvunzai. Munogona kuramba kudaira mimwe mibvunzo kana kuregedza kuita hurukuro kana musisina kugadzikana. Hurukuro ichaitirwa pakahwandika, muimba yakavharwa. Chero zvazvo tatora matanho aya, zvinogona kuitika kuti vamwe vanhu vafungidzire kana kuziva kuti mapinda mutsvakurudzo vobva vafunga kuti mune HIV, kana kuti munorarama nekutengesa bonde. Izvi zvinogona kukanganisa kufambidzana kwenyu nevamwe vanhu vemunharaunda kana vekubasa munharaunda.

MUKOHWO KANA MUBHADHARO

Hapana kubhadhara kwamuchaita kupinda mutsvakurudzo ino. Tiri kuvimba kuti zvichabuda muongororo ino zvichbatsira kugadzira zvirongwa zvekudzivirira

kubatira HIV kumadzimai anorarama nekutegesa bonde. Zvisinei, sezvo kupinda kwenyu muongororo kuchikubvisai kumba nekubasa kwenyu, muchadzorerwa mari yenyu yamunenge mashandisa pakufambisa. Tichakupaiwo zvekare zvinwiwa panguva yatinenge tichiita hurukuro.

KUCHENGETEDZA TSINDIKIDZO

Zita renyu harizonyorwa muhurukuro inenge yatapwa kana mamwe magwaro anechekuita nemi. Muchapihwa nhamba isingazokunongedzei nezita renyu ichanyorwa pafaera repachitapamazwi. Magwaro ese ane chekuita nmi nehurukuro dzinenge dzatapwa zvichachengetedzwa muimba yakavandika, mumakabati anokiiwa uye pakasiyana neruzivo runogona kuita kuti muzivikanwe segwaro retenderano rino) panongosvikwa nemuongorori uno chete. Hurukuro yakatapwa ichiswa pakombiyuta yakachengetedzwa nepasiwedhi, faera repachitapamazwi robva radzimwa. Zita renyu harizoshandiswi mumagwaro achabuda muongororo ino. Pane dzimwe nguva magwaro enyu angangoongororwa nevanoona nezvetsvakurudzo dzehutano hwevanhu kana vachida kuongorora maringe nebasa ravo rekuona mafambiro anoitwa tsvakurudzo. Ongororo ino iri kuongororwa ne Africa University Research Ethics Committee.

KUPINDA MUTSVAKURUDZO ZVISINA KUMANIKIDZWA

Kupinda mutsvakurudzo ino hakumanikidzwe. Sarudzo yenyu haikanganise hukama hwenyu neAfrica University kana Centre for Sexual Health and HIV/AIDS Research. Kana mukasarudza kuPinda, makasununguka kubuda pane ipi chero nguva pasina kurasikirwa nezvinhu.

KUPINDURA MIBVUNZO

Musati masaina bepa rino, bvunzai mibvunzo yamungangova nayo pamusoro petsvakurudzo ino yamunodavira kuti hamuna kunyatsonzwisa. Munogona kutora nguva chero yamunoda kufunga maererano nezvazvo.

KUPA MVUMO

Kana mukasarudza kupinda muongororo ino, ndapota nyorai siginecha yenyu pasi sechiratidzo chekuti maveenga uye manzwisisa ruzivo rwamapiwa uye mabvuma kupinda mutsvakurudzo.

---------- ----------

Zita reari kupinda muongororo (nyorai nemavara makuru) Dheti

Sainecha yeari kupinda muongororo kana anomumiririra zviri pamutemo

Kana muine mibvunzo maererano netsvakurudzo kana gwaro iri inopfuura iyo yatapindura, kusanganisira mibvunzo iri maererano neongororo ino kana kodzero dzenyu semunhu azvipira kupinda muongororo, kana kuti muchinzwa kuti hamuna kubatwa zvakanaka muchida kutaura nemumwe munhu asiri mushandi wetsvakurudzo, ndapota sunungukai kutaura neveAfrica University Research Ethics

Committee panhamba dzerunhare (020) 60075 kana 60026 extension 1156 email aurec@africau.edu

Zita reari kuita ongororo ----------

1.4 Topic Guide: In-depth Interviews with FSWs

Introduction: thank you for taking time to talk to me. My name is Memory Makamba, a student from Africa University. We would like to hear more about your views on condom use among female sex workers. Your views will be important for designing HIV prevention interventions that are relevant to the needs for sex workers. Do you have any questions before we proceed?

Background

1. Could you please tell me about yourself? Probes
    a. Age. How long have you been staying here? Whom do you stay with?
    b. How long have you been working as a sex worker?
    c. Current occupational status.
    d. Where do you get your clients? Type of clients/sex partners

Knowledge about condoms

2. What do you know about condoms? Where did you get that information?
    a. Is there anything else you wish you knew about condoms?

Experience with condom use

3. Can you please tell me more about your experiences with condom use? Where do you get the condoms? What important aspects do you consider before using a condom?
4. Under what circumstances do you/ would you not use condom? Why? Reasons for engaging in unprotected sex
    a. When and how is it decided that a condom will be used? What negotiation occurs?
    b. Do you feel you are able to negotiate condom use all the time? Is it easy, difficult? Why?
    c. From where do/did you obtain your protection?
    d. Whose responsibility is it to protect?
    e. Are there any barriers to obtaining condoms? What? How are they overcome?
5. What is your understanding of correct and consistent use of condoms?

Outcomes of Y chromosome testing

6. During the time of the survey, did you ever have sex without a condom? What happened? If yes, what could be some of the reasons why you reported using condoms all the time?
7. Have you had experience with condom slippage or breakage? If yes, what happened? At which stage did you realise that you were no longer using a condom?
8. What are the major barriers to condom use?

1.5 Topic guide, FGD with Female Sex Workers

Introduction: thank you for taking time to talk to me. My name is Memory Makamba, a student from Africa University. We would like to hear more about your views on condom use among female sex workers. Your views will be important for designing HIV prevention interventions that are relevant to the needs for sex workers. Do you have any questions before we proceed?

Background

1. What type of female sex workers do we have here?
2. Who are your different sexual partners?

Knowledge about condoms

3. Where do you get information about condoms? Probes: clinics, peer educators, role of media?
4. Are there any other people/places that you have found useful in finding out about safe sex?
5. Where do you get condoms? Probes: all the various places in the community and outside the community; peer educators
6. Do you feel that the information you have about condoms is adequate? Are there any gaps or anything you would like to find out more about?

Condom use

7. Do you always use protection with all your sexual partners?

a. How do you decide on condom use?

b. In what proportion of episodes of sex have you used condoms?

c. Under what circumstances do you/ would you not use condoms? Why? Reasons for engaging in unprotected sex

d. When and how is it decided that condoms will be used? What negotiation occurs? Do you feel you are able to negotiate the use of condoms? Is it easy, difficult? Why? From where do/did you obtain your protection? Whose responsibility is it to protect? Are there any barriers to obtaining condoms? What? How are they overcome?

e. Have you ever had experiences with condom slippage and breakages? At which stage do you realise that you have had an experience with the condom? How do you proceed?

f. Have you always used condoms throughout the years? Why? Why not?

8. What is your understanding of correct and consistent use of condoms? At which stage do you normally put on a condom

    a. Are there instances when you had sex without a condom? What happened? Were you aware that you were not using a condom?

Outcomes of Y chromosome testing

9. During the time of the survey, did you ever have sex without a condom? What happened? If yes, what could be some of the reasons why you reported using condoms all the time?