PREVALENCE OF HEPATITIS B VIRUS INFECTION AND ASSOCIATED FACTORS AMONG FEMALE SEX WORKERS IN DAR ES SALAAM, TANZANIA

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By

Danstan Pascal Ngenzi

A Dissertation Submitted in (Partial) Fulfillments of the Requirement for the Degree of Master of Science (Applied Epidemiology) of

Muhimbili University of Health and Allied Science
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CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled: **''Prevalence of Hepatitis B Virus infection and associated factors among Female Sex Workers in Dar es Salaam, Tanzania'',** in (partial) fulfillment of the requirement for the degree of Masters of Science (Applied Epidemiology) of Muhimbili University of Health and Allied Sciences

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DECLARATION AND COPYRIGHT

I, **Dr. Danstan Pascal Ngenzi,** declare that this **dissertation** is my own original work and that it has not been presented and will not be presented to any other university for similar or any other degree award.

Signature……. **Date**……..

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DEDICATION

This dissertation is dedicated to my parents Mr. & Mrs. Pascal Ngenzi who made me to believe in Allah, hard work, and my wife Rosemary Mwamanda who missed my presence and care during the tender years of her life while away for this study.

ABSTRACT

Background: Hepatitis B virus (HBV) infection is a serious public health problem in sub-Saharan Africa among the most at risk groups such as Female sex workers (FSW). The modes of transmission are mainly by skin or mucosal exposure to infected blood and various body fluids including saliva, menstrual blood, vaginal and seminal fluid. Prevalence and associated factors for HBV infection among FSW in Dar es Salaam is not well established.

Objective: The study aimed to determine the prevalence of Hepatitis B Virus infection and associated factors among FSW in Dar es Salaam, Tanzania.

Methodology: A cross-sectional integrated biological and behavioral survey among FSW was conducted between September and December 2017 in Dar es Salaam. The survey utilized a Respondent Driven Sampling (RDS) approach to recruit FSW. Data on socio-demographic characteristics, risky sexual behaviors practices were collected using a structured questionnaire and blood was collected and tested for Hepatitis B surface Antigen (HBsAg). Data was analyzed using Respondent Driven Analysis Tool (RDSAT) together with STATA version 13 for windows. Logistic regression models were used to identify independent risk factors associated with HBV infection. All analyses were two – tailed, significance level was set at 5% level and adjusted for clustering.

Results: A total of 950 FSW with median age of 26 years and interquartile range 22-32 years were recruited. Prevalence of HBV was estimated at 2.9 % [95% CI: (1.9-4.4)]. Independent risk factors for HBV were age 35 years and above [AOR, 5.3, 95%CI: (1.4, 19.7)], having no alternative source of income besides sex work [AOR, 3.7, 95%CI: (1.2- 11.7)], obtaining clients through telephone or internet or agent [AOR, 11.3, 95%CI: (1.5-82.3)]; and meeting in Pub/ bar or nightclub or Guest house/ Hotel [AOR, 6.5, 95%CI: (1.2-34.1)].

Conclusion: Prevalence of HBV infection among FSW in Dar es Salaam was found to be 2.9%. Old age 35 years and above, having no alternative source of income besides sex work, negotiating sex through telephone or internet or agent, and meeting clients in Pub/bar /nightclubs/Guest house/Hotel were significantly associated with HBV infection.

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LIST OF ABBREVIATIONS

Anti-HBC	Anti-Hepatitis B Core Antigens
Anti-HBS	Anti-Hepatitis B Surface Antigen
CHB	Chronic Hepatitis B
DNA	Deoxyribonucleic Acid
FSW	Female Sex Workers
HBsAg	Hepatitis B Surface Antigen
HBV	Hepatitis B Virus
HCC	Hepatocellular Carcinoma
HIV	Human Immunodeficiency Virus
MUHAS	Muhimbili University of Health and Allied Science
NACP	National AIDS Control Program
PWID	People Who Inject Drugs
WHO	World Health Organization

DEFINITIONS OF TERMS

Equilibrium in respondent driven sampling is the point at which the sample characteristics no longer change as more individuals enter into the sample.

Female Sex Worker (FSW) was defined as a female who aged 15 years or and above (if less than 18 years subject must be an emancipated minor) and lived in Dar es Salaam (Residents) for the past three months and who may, at times or regularly, exchanged sexual intercourse (vaginal or anal) for money in the past month preceding the survey.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Hepatitis means the inflammation of the liver which is mostly caused by virus (1). Viral hepatitis is divided into different types such as hepatitis A, B, C, D, E, F and G. However, among the types, hepatitis B (HBV) is the most dangerous and fast killing infection (2). Hepatitis B infection is caused by an enveloped DNA hepatitis B virus (HBV) belonging to a family *Hepadnaviridae* which infect the liver and results into an acute or chronic infection (2,3). It is estimated that 2 billion people worldwide have been affected of which 257 million people have chronic hepatitis B infection (4) and 5 – 10% of these are in sub-Saharan Africa and East Asia (4,5). Those chronically infected may develop complications of liver cirrhosis and hepatocellular carcinoma (2). Globally, viral hepatitis contributes 1.34 million deaths, of which 66% are due to hepatitis B complications, 720,000 deaths are due to liver cirrhosis, and 470,000 hepatocellular carcinoma (4).

In order to respond to HBV endemicity, the World Health Organization (WHO) recommends screening and vaccination of people who are at higher risk of acquiring Hepatitis B infection including FSWs (6,7). To address this, in 2002 Tanzania adopted a formal vaccine for HBV only offered to infants as part of the country's vaccination program with the aim of reducing the number of new HBV infection among the new born (8).

The transmission of HBV is mainly by skin or mucosal exposure to infected blood and various body fluids including saliva, menstrual, vaginal and seminal fluid, which have all been implicated as vehicles of human transmission (4,9,10). Like other key population, Female Sex Workers (FSWs) are also identified as high risk group of acquiring HBV infection, as they are often in a poor position to negotiate safe sex because of social, economic, cultural and legal factors (11–14) .

Diagnosis of HBV infection is confirmed by demonstrating specific antibodies and or antigen in patient serum (15,16). Different laboratory technologies have been developed aiming at detecting and monitoring HBV infection including: Serological assays that detect the presence of either antigens or antibodies by using strip rapid test or Enzyme immunoassay (EIA) and also molecular technique which is polymerase chain reaction (PCR) (16).

Therefore, we conducted this study in Dar es Salaam the largest city with substantial number of FSW in Tanzania, aiming at determining the prevalence of HBsAg and associated factors HIV among FSW.

1.2 Statement of the problem

HBV infection is a serious problem in sub Saharan Africa. Tanzania is categorized as higher intermediate endemic region with an estimated prevalence of 4.2% in the general population (8). The FSWs population is among the group involved in risky sexual behavior practice. Risky sexual behavior practice is closely related to contact with infected blood and or body fluids which are vehicles of transmission of hepatitis B infection, hence exposing FSW to an array of blood borne diseases including HBV infection. Since HBV vaccination to adults including FSWs is not within the expanded program of immunization in Tanzania, FSWs are likely to be experiencing high transmission rate due to their high risk.

Furthermore, the HBV infection does not affect only herself but also her newborn incase she becomes pregnant, her sexual partner and health care workers incase proper precautions are not observed in providing health care (13).

Since 2002 a formal vaccine for HBV has only being offered to infants as part of the country's vaccination program in Tanzania (8), routine screening of HBV among FSW is not practiced in the country.

There is limited information on prevalence and possible factors associated with HBV infection among FSWs. Thus, there is a need to establish the prevalence and factors associated with Hepatitis B virus infection in this population.

1.3 Rationale of the study

This study has provided data on the magnitude and possible factors associated with HBV infection among FSWs in Dar ea Salaam and came out with recommendations for possible measures to be taken. The information can be used by various health programs to strengthen measures to be taken on infectious diseases to reduce the burden of HBV infection among FSW in Dar es Salaam and other parts in the country as a whole. Moreover, it has also created an insight to other researchers to find out on gaps identified.

1.4 Conceptual framework

The conceptual framework below (figure 1) is a modified health belief model adopted from Effectiveness of interventions for the prevention of HIV and other sexually transmitted infections in female sex workers in resource poor setting (17). It shows different predictors found in various studies to be associated with HBV infection. The concentration of this study was on socio and demographic, sexual history and sex work related factors, alcohol use while working, sexual risk behaviors and the outcome of interest HBV infection.

The demographic factors have been linked to the spread of HBV infection. Age could be directly related to increased exposure to HBV due to long period in sex work, thence more likely to come into contact with HBV infected person hence the transmission of the infection. The level of education determines the HBV as less educated are more likely to involve in sex work as the only source of income as compared to the educated that are likely to have other sources of income.

Sexual history and profile of sex work is linked to HBV infection as early sexual debut age their reproductive organ, age of starting selling and long duration of selling sex could be directly related to increased exposure to HBV due to long period in sex work, thence more likely to come into contact with HBV infected person hence the transmission of the infection. Making contact or place where sex is negotiated has a contribution in acquiring HBV infection, whereby sex negotiated in alcohol selling venues can result into unprotected sex and contacting clients through media reduce virtual assessment of client and may increase the

probability of forced unprotected sex and sexual violence thence high chances of contacting infected client.

Female sex workers commonly involve in sexual risky behaviors practices like drinking alcohol to lower inhibitions, in doing so these impair decision to use condom which leads to unprotected sex thus subjecting them to risks of acquiring HBV infection.

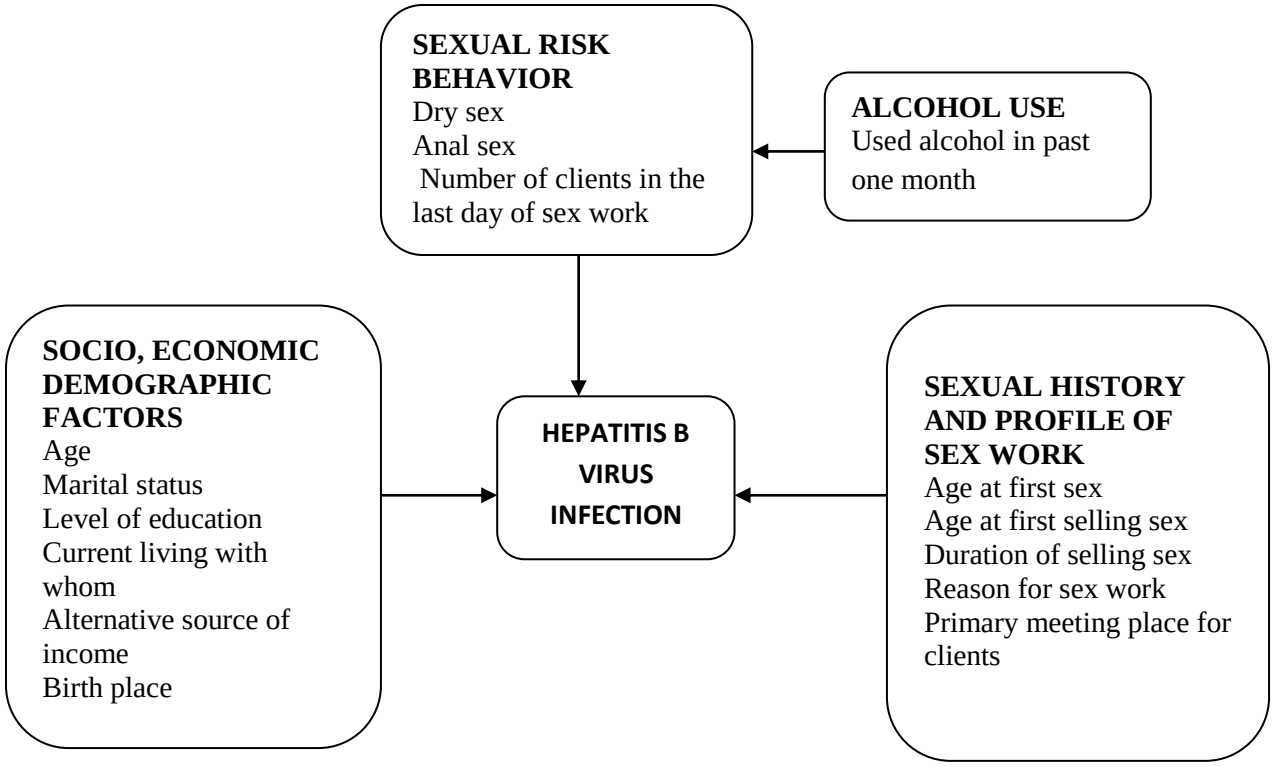

Figure 1 : The conceptual framework for factors associated with Hepatitis B infection among Female Sex Workers

1.5 Research Question

What is the prevalence of Hepatitis B Virus infection and associated factors among Female Sex Workers in Dar es Salaam, Tanzania?

1.6 Broad objective

The major objective of this study is to determine the prevalence of Hepatitis B Virus infection and associated factors among Female Sex Workers in Dar es Salaam, Tanzania.

1.7 Specific objectives

1. To determine the prevalence of Hepatitis B virus infection among FSW in Dar es Salaam.
2. To determine socio-demographic factors associated with hepatitis B Virus infection among Female Sex Workers in Dar es Salaam.
3. To determine sexual history and sex work related factors associated with hepatitis B Virus infection among Female Sex Workers in Dar es Salaam.
4. To determine sexual related risky behaviors practices associated with hepatitis B Virus infection among Female Sex Workers in Dar es Salaam.

CHAPTER TWO

2.0 LITERATURE REVIEW

The literature review is discussed under the following headings; prevalence of Hepatitis B among female sex workers, Socio - demographic factors, Sexual history and sex work related and sexual related risky behavior practices associated with HBV infection among FSWs.

2.1 Prevalence of Hepatitis B among Female Sex Workers

Due to the nature of their behavior, Female Sex Workers are considered to be at higher risk of acquiring HBV infection (10). There is little of reported prevalence of HBV infection among Female Sex Workers worldwide. However, studies conducted in Brazil estimated the prevalence of 17.1% and 9.3% in 2009/10 (12,18). While the prevalence in Afghanistan cities was 6.54% (19), study conducted in Ethiopia estimated the prevalence of 6% in 2015 (20); in the Republic of Congo prevalence was reported to be 4.2% in 2012 (11) while Rwanda in 2015 estimated prevalence of 2.5% (21).

Tanzania is reported to be one of the countries with high endemicity levels of HBV infection; which is defined as prevalence rate of equal to or greater than 8% (8), the prevalence ranges from 1.2% -9.8% among children and Hepatitis B & C Virus co infection in people who inject drugs respectively (22,23). However, the study done in Mwanza among Healthcare workers report the prevalence of 7% (5) and Manyahi et al found HBsAg to be 8% among pregnant women in Dar es Salaam (24). Prevalence of HBV infection among Female Sex Workers in Dar es Salaam 2010 was estimated to be 6.3% (10). These rates are partly from different population and substantial period of time has passed and may mask the endemic trends in this population of Female Sex Workers in Tanzania.

2.2 Socio - demographic factors associated with HBV infection among FSW

It has been observed that age of a person and age at the first sold sex could influence on the prevalence of sexual transmitted infections like HBV in different countries as in countries where there are adolescent HBV vaccination younger age are at low chance of acquiring HBV infection where as in areas with no vaccination program younger age are at higher risk due to biological factors like immature reproductive tracts and social factors that promote risky behaviors like involving in unprotected sex (24). The study conducted in Ethiopia found 31-35 years age group although not statistically significant, was associated with HBV (22); while in Rwanda age group 30-34 years was significantly associated with HBV (21); in Mexico the infection was found to be associate with age group 35-37 years (26) and in Brazil age more than 30 years (12).

There has been association between level of education, marital status and employment with HIV/HBV/STI, the majority of FSWs are from disadvantaged backgrounds, are poorly educated, divorced, and lack skills required for other types of formal or informal employment that promote risky behaviors like involving in unprotected sex (13). The study conducted in Brazil associated less educated female with HBV infection (12).

Evidence suggests that female with few alternative sources of income are less able to refuse a client who is unwilling to use a condom (27).

2.3 Sexual history and sex work related factors associated with HBV infection among FSWs

It is noted that there is a very narrow membrane between age of sex at start sold sex, duration of sex work and vulnerability to HIV/STI (28,29), age at first selling sex has direct association with HBV as study conducted in Goiania Brazil though not statistically significant associated age at first sexual intercourse at 18–30 with HBV (12).

Meeting place with clients can either be for negotiating sex with clients and sex carried elsewhere or at the site of negotiation. Generally, bars and other recreational venues, streets and hotels are most commonly identified, for example, sex may be negotiated in a bar but

occur at the sex worker's home while nightclub-based sex workers recounted having sex in the nightclub toilet or behind a building (30). Meeting in street may necessitate to move with their client to a private area and having sex in the car, sex taken place in the client's environment often exaggerate sex workers' vulnerability to violence or forced unprotected sex is often (31). The study conducted in Brazil found out that HBV infection is significantly associated with Meeting clients on the street (12,20).

2.4 Sexual related risky behavior practices associated with HBV infection among FSWs

It was noted that the risk for HIV/STI was lower among Sex Workers who use condoms consistently (32).

Although alcohol and other drugs are commonly used by FSW to lower inhibitions, it has been noted that there is great association of HIV/STI and alcohol intake and increase in unprotected sex (30). The study conducted in three Afghanistan cities associates HBV with using alcohol (19).

However, in Dar es Salaam factors associated with HBV infection among other population has been well reported (24,33). The relative contribution of the above mentioned factors among Tanzania FSWs was not known, thus, there was a need to study the associated factors in our setting in FSWs population.

CHAPTER THREE

3.0 PARENT IBBS AND CURRENT STUDY

3.1 Parent IBBS

3.1.1 Important terms

A. **Participants**. Participants are those persons who enrolled in the survey. Persons were participants during the time they were completing informed consent, the interview and/or the biological test.

B. **Recruiter.** Once a person completed the interview process and been given coupons with which to recruit peers, that person was referred to as a recruiter.

C. **Recruit.** When a person was recruited by a recruiter, but not yet enrolled in the survey (participant), that person was referred to as a recruit.

D. **Seed.** A participant recruited by survey staff, rather than a peer, who initiates recruitment chains.

E. **Recruitment Chain**. A recruitment chain was made up of all of the participants recruited from a seed. In RDS several waves of recruitment made up a recruitment chain.

F. **Wave**. Waves made up the recruitment chain. Each wave was made up of the recruits recruited by individuals who enrolled in the study. For example, a person recruited directly by a seed was in Wave #1. Persons recruited directly by participants enrolled in Wave #1 were members of Wave #2 and so on.

G. **Equilibrium.** Equilibrium was the point at which the sample characteristics no longer changed as more individuals entered into the sample. Equilibrium was also referred to as "convergence" and "stabilization".

H. **Female Sex Workers (FSW) was defined as a female** aged 18 years or and above (if less than 18 years subject must have been an emancipated minor) and lived in Dar es Salaam (Residents) for the past three months and who might, at times or regularly, exchanged sexual intercourse (vaginal or anal) for money in the past month preceding the survey.

3.1.2 Study Goals and Objectives

3.1.2.1 Overall objective:

To carry out routine surveillance in KPs populations in Dar es Salaam in order to understand the trends in HIV/STI sero-prevalence and risk behaviours among Female Sex Workers (FSW), injecting drug users (PWIDs) and men who have sex with men (MSM) in Dar es Salaam.

3.1.2.2 Specific objectives:

1. To monitor the sero-prevalence of HIV among FSW, PWIDs and MSM in Dar es Salaam.
2. To monitor sexual risk behaviours associated with HIV infection in the three sub-populations and document changes in behaviours over time.
3. To Assess KP cascade of Care in Dar es Salaam, Tanzania
4. To monitor non-injection and injection drug use behaviours in these three sub-populations and document change in behaviour over time.
5. To monitor STI treatment seeking behaviours in these three sub-populations and document changes over time in STI treatment seeking behaviours.
6. To estimate size of the three populations.
7. To assess the effectiveness of interventions implemented after the first round of surveillance in 2009 through uptake of access to services in these three sub-populations.

3.1.3 Methods and Materials

3.1.3.1 Study area

A study was conducted in Dar es Salaam, the largest city in Tanzania. The Dar es Salaam city in 2016 had a population of about 5 million people (34) .

3.1.3.2 Sample size and power estimations

Power and sample size estimates based on achieving desired precision around point estimates for HIV infection in FSWs. According to 2009 and 2013 estimates for Dar es Salaam, the prevalence of HIV infection was 32% among FSWs. Sample size was corrected for an expected design effect (DEFF) of 3, based on the median DEFF found for key variables in similar RDS surveys of MSM in South Africa and Uganda, survey sample size was 952 FSWs.

3.1.3.3 Inclusion criteria

- Female, age 15 years or above (if less than 18 years subject must have been an emancipated minor).
- Exchanged sexual intercourse (vaginal or anal) for money in the past months.
- Lived in Dar es Salaam for at least the past 3 months.
- Ability to understand and adequately provide informed consent.
- Recruits (i.e. non-seeds) must be in possession of valid recruitment coupon.

3.1.3.4 Exclusion Criteria

- The survey excluded participants who were Deaf/Dump

3.1.3.5 Sampling Technique

Respondent Driven Sampling (RDS), a chain referral method developed for the sampling of populations for which there is no available sampling frame to recruit participants was used to recruit participants. With RDS, members of the target population are asked to refer other members of the same population to participate, and an underlying mathematical model provides a theoretical basis for the estimation of population proportions and their variances through statistical adjustment. When certain assumptions are met, RDS will approach unbiased estimates of characteristics in the population under study.

3.1.3.6 Recruitment Process

There were two types of enrollees in the study who were FSWs: a) Initial survey participants recruited by project staff (known as seeds) and b) new survey participants subsequently recruited by previous survey participants.

a) *Recruitment of seeds:* Started by purposefully selecting seven seeds from contacts made by peer educators, peer educators contacts were kept in records by National Aids Control Program (NACP) who is experienced in working with FSWs population.
b) *Recruitment of participants*: Each seed was given three coded coupon with instruction to pass to other FSWs, their peers who accepted the invitation were then recruited and enrolled in the survey and were referred as first wave. Thereafter, completed the study, each was then provided three coupons to recruit their peers into the study. Successive waves of recruitment repeated until the sample size was reached.
c) *Multiplicity:* Duplication of respondents was avoided by staff through asking participants to self report if they have participated in the study; participants were allowed to participate one time only per study.

3.1.3.7 Coupons

Respondent Driven Sampling (RDS) recruitment strategy required Female Sex Worker (FSW) who fits the survey eligibility criteria was recruited into the study with a coupon. Each coupon was uniquely coded to link recruiters with recruits. Each participant's coupon number was also used to link the participant's consent form, questionnaire, test results, transport fee for recruiting peers and test voucher for receiving test results. The coupon had two parts that can be easily separated along a perforation. Both parts of the coupon had the same unique identification number printed on them. One part of the coupon served as the "recruitment coupon" which the recruiter uses to recruit her peers into the survey. The other part of the coupon served as the "payment coupon" and was kept by the recruiter to claim an incentive for having recruited her peers into the survey. The coupon identification numbers will be carefully recorded in a logbook.

3.1.3.8 Incentives

Participants (including seeds) received a primary incentive of 8,000 Tanzanian shillings for completing the interview based on information from the formative assessment and 4,000 Tanzanian shillings for providing biological specimens. They also received a secondary incentive of up to 4,000 Tanzania shillings for each peer they recruited. Information, education and communication (IEC) materials on HIV prevention including educational brochures and pamphlets were offered when presenting both primary and secondary incentives. They were also offered with hepatitis B vaccination if found to be Hepatitis B negative with follow-up to complete the series through referred health clinics.

3.1.3.9 Data collection tool

3.1.3.9.1 Questionnaires

After providing informed consent, respondents were administered face-to-face questionnaires (described in detail below) in Swahili by gender-matched interviewers. All questionnaires were translated from English to Swahili and then translated to English for validation. The questionnaires were pre-tested before implementation in the field to assure that language, cultural and peer norms are considered. All documents used for data collection were linked with the participant's coupon number. Each participant had to possess a coupon of participation.

1. **Surveillance assessment.** All participants were asked to complete an assessment about their demographic background, current and past drug use and sexual behaviors and HIV knowledge and risk perceptions and service utilization.

2. **Network questions.** Questions about the participant's network size and relationship and knowledge about her recruiter were included in the questionnaires. Each respondent had to provide a number of peers (persons in their social network of Sex Workers) who they personally know by name (street name, etc.) who they have seen during the eligibility recall period. For example, a network size question for FSWs was "How many other FSWs do you know, they know you, they have exchanged sex with money in the past one month, and you have seen them in the past 90 days and they live in your district? The network question was

directly tied to the eligibility criteria. No personal identifiers were collected and all information was linked to the participant's coupon number.

3.1.3.9.2 Biological sample collection

Following the face-to-face interview, participants who also consented to biological testing, received pre-test counseling for HIV, syphilis, and Hepatitis testing. Qualified/trained phlebotomists collected 7 mls of venous blood from participants using venipuncture. After the specimen was collected, the interviewer labeled the specimen container with the participant's coupon identification number, which served as the link between the specimen and the participant's completed questionnaires.

3.1.3.9.3 Specimen processing and testing

Specimen containers left upright on a test tube rack until the blood has clotted, Sera aliquoted on site by laboratory technicians and transported daily in cool boxes to NIMR laboratory, the central referral laboratory, for HIV, syphilis, and hepatitis testing.

Specimens tested using the national testing algorithm for HIV, syphilis, and hepatitis. For HIV infections, a serial algorithm will be used. Hepatitis B surface antigen was screened by using Murex HBsAg Version 3 test (Enzyme immunoassay for the detection of Hepatitis B Surface). Quality control was done by using both positive and negative controls simultaneously with test samples.

3.1.3.9.4 Data Management

Data were checked daily by the study team for completeness and consistence. All study data including behavioral data collection forms and laboratory information were kept in a confidential manner in locked cabinets behind locked doors at the NACP offices, electronic data kept on password protected computers at NACP offices.

3.2 Current Study

3.2.1 Study design

This was cross sectional study involving analysis of secondary data collected from the parent research study which was a cross-sectional integrated biological and behavioral survey among FSW conducted between September and December 2017. This study did not design an addendum to the parent research but formulated questions that could be answered by pre existing data.

3.3 Study Population

All FSW data originated from the 2017 IBBS study dataset.

3.4 Sampling procedure

FSW data with Hepatitis B Virus infection status were conveniently sampled.

3.5 Power calculations

The power calculations of the study was done using STATA 13 software in reference to the prevalence of Hepatitis B among Female Sex Workers in Dar es Salaam of 6.3% (10), sample size of 950 from the data available with HBV infection status in 2017 IBBS and 5% significance level. Using the above mentioned parameters, the estimated power for a one-sample proportion test was 99.89%. That is, a sample size of 950 FSW (which already exists) will achieve a 96.89% power to detect an absolute difference of 3.4% using a binomial test.

3.6 Inclusion and Exclusion criteria

3.6.1 Inclusion criteria

The study included all FSW data originated from the 2017 IBBS study in Dar es Salaam

3.6.2 Exclusion criteria

The study excluded FSW with no Hepatitis B Virus infection status

3.7 Study variables

3.7.1 Dependent variable

The hepatitis B virus infection was coded as“1” if tested positive and was coded as “0” if tested negative for the test.

3.7.2 Independent variables

The independent variables used of this analysis included;

Socio and economic-demographic characteristics

Age: Participant’s age in complete years were categorized as 15-24, 25-34 and 35-59

Marital status: Participant’s current marital status was grouped as Single, Married/cohabit and Divorced/separated/widowed.

Education level: Participants who did not attend primary school or primary drop out were categorizes as no formal education, those completed primary school or secondary school dropout were categorized as primary education while completed secondary school and completed or some college or university were categorized as secondary and above.

Alternative source of income: Participants with other alternative source of income to earn money, apart from sex work were categorized as “Yes” if mention at least one activity apart from sex work and “No” if no other alternative .

Birth place: Participants’ years of living in Dar es Salaam categorized as born and raised in Dar for all those responded to be born and raised in Dar and Born outside Dar for those who responded they have lived for a particular period of time.

Currently live with whom: Participants currently, living with who were categorized as living with Alone, Husband/boyfriend/family and Friends/other FSW.

Sexual history and sex work related characteristics:

Age at first sex: Participants exact age in years when had sexual intercourse for the first time were categorizes based on exact age below the median age at first sex and above the median age that is 9-17, 18-32 respectively.

Age at first selling sex: Participants age in years when selling sex for the first time categorized basing on exact age below the median age at first selling sex and above the median age that is 12-19 and 20-48

Reason for interring sex work: Participants choose one response on most important reason when started selling sex, were grouped basing on similarity of reasons as need money to help family or pay debt/ abandoned by family or husband or siblings, friends/family were doing it and like to do/pleasure.

Primary meeting place for clients: Participants primary place to meet clients grouped basing on the similarities of the places as Brothels/Private room, Pub/bar/Night club/Hotel/Guest house, Street and Telephone/internet/agent

Sexual risk behavior and Condom use:

Condom use during last sex with client: were categorized as "Yes" if used and "No" if not

Numbers of clients in the last day of sex work: Participants exact number of client were categorized in ≤ 1 and 2-16

Used alcohol in the past one month: were categorized as "Yes" if took any drink containing alcohol in the past one month and "No" if not.

3.8 Data Extraction

All dependent and independent variables were extracted from the data set using extraction form and compiled and cleaned in STATA 13

3.9 Data analysis

Data analysis for this study was done using RDSAT software package for analysis of RDS data (35) together with STATA version 13 for windows. Controlling selection probability for each participant, data were weighted according to network size by calculating weights as the inverse of participant's network size (35). To reduce clustering and ensure the whole sample of 950 is reflected in analysis, we multiplied the weight by the sample size and divided it by the sum of weights. Categorical variables were summarized by calculating proportions, means and standard deviations, median and inter-quartile range were used to summarize continuous variables.

To identify independent association of HBV infection and various risk factors, logistic regression model was built. All variables that had a p-value < 0.2 in the bivariate analysis were entered into the multivariable logistic regression models using backward elimination method. All analyses were two - tailed and level of significance level was set at 5% level.

3.10 Ethical Considerations

The primary IBBS ethical clearance was approved by Muhimbili University of Health and Allied Sciences Senate (Annex IV). Permission to use the database for my study has been granted by the Principal Investigator of the IBBS study (Annex III).

3.10.1 Waiver of informed consent

We requested for waiver of informed consent, because;

1. This study involves minimal to no risk to subjects. The only known risk to patients was the possible loss of confidentiality, which were guarded against by not granting access to data to unauthorized personnel. Also, the information in the records were de-identified.
2. The waiver did not adversely affect the rights and welfare of subjects because this study was non-interventional and did not affect the subject's rights for patient care and did not interfere in their welfare.
3. The research was not practically carried out without the waiver or alteration because in order to answer our research question, we had to view all the 950 Female Sex Workers

records for a retrospective data extraction. The waiver was requested because it was impractical to obtain consent for 950 Female Sex Workers since;

i) They were not seen by research staff on a regular basis.

ii) Long time had elapsed since data collection ended.

4. We were reviewing participant's records but not recording identifiers. We were not able to link subjects back to the study and therefore, we were not able to provide additional information.

The study was ethically cleared with waiver of informed consent approved by Muhimbili University of Health and Allied Sciences ethical committee (Annex 1I).

CHAPTER FOUR

4.0 RESULTS

4.1 Socio-demographic Characteristics

A total of 950 Female Sex Workers with median age of 26 years Inter-quarter range (IQR) 22-32 years were studied. Of these, nearly half of them 411 (43.2%) were younger 15- 24 years. The largest proportion 661 (69.6%); 652 (68.9%); 640 (67.4%) and 475 (50.1%) reported to have completed primary education level, sex work was their only source of income, were single and born in Dar es Salaam, respectively (Table 1).

Table 1: Socio-demographic characteristics of study FSWs in Dar es Salaam (n=950)

Characteristics	Number	Percentage
Age group		
15-24	411	43.3
25-34	339	35.7
35-59	200	21.0
Education level		
No formal education	135	14.2
Primary education	661	69.6
Secondary and above	154	16.2
Other source of income		
Yes	298	31.4
No	652	68.6
Marital status		
Single	640	67.4
Married partner	22	2.1
Separated/Divorced/Widowed	288	30.3
Birth place		
Born outside Dar	473	49.1
Born & raised in Dar	475	50.1
Currently living with		
Alone	367	38.6
Friends/ Other sex workers	201	21.2
Boyfriend/Husband/Family	382	40.2

4.2 Sexual history, sex work related and other risk behaviors for HBV

Age at first sexual debut varied from 9 to 32 years with a median age of 17 years (IQR 15-18 years). More than half 580 (61.0%) had their first sexual intercourse below the age between 9-17 years. Age at engagement in sex work ranged between 12 and 48 years, with a median age of 20 years (IQR 18-25) (Table2).

More than two third 661 (71.0%) of participants reported that they entered sex work as they needed money to help family or pay debt or abandoned by husband or family, 194 (20.8%) reported that sex work was due to peer groups and 76 (8.2%) responded that they like to do it.

Nearly two third 597 (63.9%) of respondents reported to meet their clients at Pub/bar or night club or Guest house/Hotel, whereas 165 (17.7%) they meet at Brothels or private room, 96 (10.3%) reported that street is the meeting place and very few 76 (8.1%) meet through telephone or internet or agent.

Number of clients on the last day of work was varied from 0 to 16 clients with a median of 3 clients (IQR 2-3). Majority 753 (79.3%) had sex with more than one client on the last day of work. More than two third 687 (72.3%) used condom with the last client. Majority 704 (74.1%) used alcohol in the past one month (Table 2).

Table 2: Distribution of Sexual history, Sex work related characteristics and other risk behavior of HBV among FSW in Dar es Salaam

Variable	Number	Percentage
Age first sex		
9-17	580	61.0
18-32	370	39.0
Age at first selling sex		
12-19	415	43.7
20-48	535	56.3
Duration of sold sex (years)		
<1	130	13.7
>=1	820	86.3
Reasons for entering sex work		
Need Money to help family/pay debt/Abandoned	661	71.0
Peers (Family/Friends)	194	20.8
Pleasure	76	8.2
Primary meeting place for clients		
Telephone/internet/agent	76	8.1
Street	96	10.3
Brothels/private room	165	17.7
Pub/bar/night club/Hotel/Guest house	597	63.9
Number of clients on last day of sex work		
0-1	197	20.7
2-16	753	79.3
Condom use with last client		
Yes	687	72.3
No	263	27.7
Drank alcohol past one month		
Yes	704	74.1
No	246	25.9
History of sexual abuse past one year		
Yes	311	32.7
No	639	67.3

4.3 Prevalence of HBV infection

The overall prevalence of HBV was 2.9% [95% CI (1.9-4.4)]. There was statistical significant difference between those who tested positive to those who tested negative to HBsAg with respect to age (Table 3).

Table 3: Prevalence of HBV infection among FSWs by socio-demographic characteristics in Dar es Salaam

Characteristics	N (%)	HBV (-ve)	HBV (+ve)	χ^2	p-Value
		n (%)*	n (%)*		
Age group					
15-24	411(47.9)	403 (98.3)	8 (1.7)	5.04	0.16
25-34	339(34.8)	326 (96.4)	13 (3.6)		
35-59	200(17.4)	191 (95.2)	9 (4.8)		
Education level					
No formal education	135(15.5)	127 (93.0)	8 (7.0)		
Primary education	661(68.3)	642 (97.7)	19 (2.3)	10.81	0.02
Secondary and above	154(16.2)	151 (98.7)	3 (1.3)		
Marital status					
Never married	640(70.4)	620 (97.1)	20 (2.9)	0.55	0.81
Married partner	22(1.9)	22 (100)	0(0)		
Separated/Divorced/Widowed	288(27.7)	278 (97.0)	10 (3.0)		
Alternative source of income					
Yes	298(30.2)	293 (98.4)	5 (1.6)	2.41	0.14
No	652(69.8)	627 (96.6)	25 (3.4)		
Time lived in Dar es Salaam					
Born outside Dar	473(52.8)	458 (97.5)	15 (2.5)	0.59	0.51
Born & raised in Dar	475(47.2)	460 (96.7)	15 (3.3)		
Currently living with					
Alone	367(37.2)	253 (97.1)	14 (2.9)	0.11	0.96
Boyfriend/Husband/Family	382(41.4)	371 (97.0)	11 (3.0)		
Friends/ Other sex workers	201(21.4)	196 (97.4)	5 (2.6)		

* Reported percentages are weighted for network size, χ^2 chi-squared test

There was statistical significant difference between FSWs who tested positive to FSW who tested negative to HBsAg with respect to taking drinks containing alcohol in the past one month (Table 4).

Table 4: Prevalence of HBV infection by sexual history, sex work related characteristics and other sexual risky sexual behaviors practice among FSWs in Dar es Salaam

Variable	N (%)	HBV(-ve)	HBV(+ve)	χ^2	p-Value
		n (%)*	n (%)*		
Age at first sex (years)					
9-17	580 (61.0)	564 (97.1)	16(2.9)	0.01	0.92
18-32	370 (39.0)	356(97.2)	14(2.8)		
Age at first selling sex					
12-19	415(43.7)	685 (97.8)	16 (2.2)	0.03	0.89
20-48	535 (56.3)	235 (94.9)	14 (5.1)		
Duration of sold sex (years)					
<1	130(13.7)	125(97.7)	5(2.3)	0.32	0.63
>=1	820(86.3)	795(97.0)	25(3.0)		
Reasons for entering sex work					
Need Money to help family/pay debt /abandoned by family or husband	661(71.0)	636 (96.7)	25 (3.3)	1.60	0.44
Peers	194(20.8)	190 (97.6)	4(2.4)		
Pleasure	76(8.2)	75 (99.0)	1 (1.0)		
Primary meeting place for clients					
Brothels/private room	165 (17.7)	161 (99.2)	4 (0.8)	4.35	0.16
Pub/bar/night club/Hotel/ Guest house	597 (63.9)	579 (96.8)	18 (3.2)		
Street	96 (10.3)	94 (98.5)	2 (1.5)		
Telephone/internet/agent	76 (8.1)	72 (95.3)	4 (4.7)		
Number of clients on last day of sex work					
0-1	197(20.7)	190(97.5)	7(2.5)	0.13	0.72
2-16	753(79.3)	730(97.0)	23(3.0)		
Condom use with last client					
Yes	687 (72.3)	663 (96.6)	24 (3.4)	2.24	0.13
No	263 (27.7)	257(98.4)	6 (1.6)		
Drink alcohol in the past one month					
Yes	704 (74.1)	681(96.4)	23 (3.6)	3.95	0.03
No	246 (25.9)	239 (98.7)	7 (1.3)		

* Reported percentages are weighted for network size, χ^2 chi-squared test

4.4 Socio-demographic factors associated with HBV infection among the FSW in Dar es Salaam

In the Logistic regression analysis, there was no socio-demographic characteristic that was significantly associated with HBV infection (Table 5). Although age, level of education and alternative source of income were not statistically significant, these factors were entered in multivariable logistic regression to control for confounding and effect modification and assess for the true association with HBV infection.

Table 5: Logistic regression of Socio-demographic factors associated with HBV infection among FSW in Dar es Salaam

		HBV Infection			
Characteristics	**Total**	**positive n (%*)**	**Negative n (%*)**	**COR[95% CI]**	**p Value**
Age group					
15-24	411	8 (1.7)	403 (98.3)	ref	
25-34	339	13 (3.6)	326 (96.4)	2.2[0.8,6.2]	0.133
35-59	200	9 (4.8)	191 (95.2)	2.9[0.9,9.5]	0.075
Education level					
No formal education	135	8 (7.0)	127 (93.0)	5.6[0.9,33.5]	0.06
Primary education	661	19 (2.3)	642 (97.7)	1.8[0.3,9.5]	0.5
Secondary and above	154	3 (1.3)	152 (98.7)	ref	
Marital status					
Single	640	20 (2.9)	620 (97.1)	ref	
Married partner	22	0(0)	22 (100)		
Ever married	288	10 (3.0)	278 (97.0)	2.2[0.7,6.4]	0.916
Alternative source of income					
Yes	298	5 (1.6)	293 (98.4)	ref	
No	652	25 (3.4)	627 (96.6)	1.0[0.4,2.6]	0.152
Birth place					
Outside Dar	473	15 (2.5)	458 (97.5)	ref	
Inside Dar	475	15 (3.3)	460 (96.7)	1.3[0.5,3.2]	0.509
Currently living with					
Alone	367	14 (2.9)	353 997.1)	1.1[0.3,4.3]	0.828
Friends/ Other sex workers	201	5 (2.6)	196 (97.4)	ref	
Boyfriend/Husband/Family	382	11 (3.0)	171 (97.0)	1.2[0.3,4.4]	0.799

COR; Crude Odds ratio for all variables in the table; p-value for COR

4.5 Sexual history, sex work related characteristics and other risk behaviors associated with HBV infection among the FSWs in Dar es Salaam

On bivariable analysis the Sexual history, sex work related characteristics and other risk behaviors that were significantly associated with HBV infection were negotiating sex through Telephone/Internet/Agent and drinking alcohol in the past one month. The odds of being HBV positive were six and half times higher [COR=6.5, 95% CI (1.1-36.2)] among those who negotiate sex through Telephone/Internet or Agent compared to those who meet primarily in Brothels or private rooms. Those who drank alcohol in the past one month were almost three times higher likelihood of being HBV infected [COR=2.9, (1.1-8.1)] compared to those who did not drink alcohol in the past one month (Table 6). Although the use of condom during last sex with last client was not statistically significant, this factor was also entered in multivariable logistic regression to control for confounding and effect modification and assess for the true association with HBV infection.

Table 6: Logistic regression of Sexual history, Sex work related and other risk behaviors for HBV among FSW in Dar es Salaam

	HBV Infection			
Variable	**Positive n (%*)**	**Negative n (%*)**	**COR[95%CI]**	**p Value**
Age first sex				
9-17	16 (2.9)	564 (97.1)	1.0[0.4,2.5]	0.916
18-32	14 (2.8)	356 (97.2)	ref	
Age at first selling sex				
12-19	12 (3.0)	403 (97.0)	1.1[0.4,2.6]	0.89
20-48	18 (2.8)	517 (97.2)	ref	
Duration of sold sex (years)				
<1	5 (2.2)	125 (97.8)	ref	
>=1	25 (3.0)	795 (97.0)	1.3[0.4,4.4]	0.626
Reasons for entering sex work				
Money to help family/pay debt				
Abandoned by husband or family	25 (3.3)	636 (96.7)	3.5[0.4,27.2]	0.233
Peers (Family/Friends)	4 (2.4)	192 (97.6)	2.5[0.3,23.4]	0.421
Pleasure	1 (1.9)	75 (98.1)	ref	
Primary meeting place for clients				
Pub/bar/night club/Hotel/Guest house	18 (3.2)	579 (96.8)	4.1[1.0,16.8]	0.051
Street	2(1.5)	94 (98.5)	1.9[0.3,14.0]	0.508
Telephone/internet/agent	4(4.7)	72 (95.3)	6.5[1.1,36.2]	0.034
Brothels/private room	4 (0.8)	161 (99.2)	ref	
Number of clients on last day of sex work				
0-1	7(2.5)	190 (97.5)	ref	
2-16	23(3.0)	730 (97.0)	1.2[0.4,3.3]	0.722
Condom use with last client				
Yes	24 (3.4)	663 (96.4)	2.1[0.8,5.9]	0.137
No	6 (1.6)	257 (98.4)	ref	
Drank alcohol past one month				
Yes	23 (3.6)	681 (96.4)	2.9[1.1,8.1]	0.034
No	7 (1.3)	239 (98.7)	ref	

COR; Crude Odds ratio for all variables in the table; p-value for COR

4.6 Independent factors associated with HBV infection among FSWs in Dar es Salaam

We examined for independent factors associated with HBV infection among FSWs in Dar es Salaam using multivariable logistic regression modeling. All factors with a p-value <0.2 in bivariate analysis were included in the final model.

Female aged 35 years and above had significantly higher odds (AOR= 5.3, 95%CI: 1.4, 19.7) of HBV infection as compared to those aged 15-24 years. Not having alternative source of income apart from sex work was associated with increased odds of being HBV positive (AOR, 3.7, 95%CI: 1.2, 11.7). The odds of prevalent HBV infection were 11.3 times higher among FSWs contacted via telephone or internet or agent compared to those contacted in the brothels or private rooms [AOR= 11.3, 95%CI: 1.5- 82.3]; six and half [AOR= 6.5, 95%CI: 1.2-34.1] of those met in Pub or Bar or Hotel or Guest house compared to those met in private room or brothels, respectively (Table 7).

The odds of prevalent of HBV infection were almost three times higher among FSWs who drank alcohol during the past one month preceding the survey [AOR= 2.9,95%CI: 0.9,-9.4] compared to those who reported not drinking alcohol. However, this estimate did not achieve statistical significant of 5% level in multivariable logistic analysis. Likewise, the odds of prevalent HBV infection were almost two and half times higher among FSWs who used condom with the last client had [AOR= 2.6, 95%CI: 0.9, 7.2)]. Moreover, the odds of prevalent HBV infection were almost four times higher among FSWs with no formal education [AOR= 4.3, 95%CI: 0.7, 24.8)] compared to those who had secondary or above education (Table 7).

Table 7: Logistic regression of independent factors associated with HBV infection among FSW in Dar es Salaam

Variable	HBV (+ve) n (%*)	COR[95% CI]	AOR[95%CI]	**p Value
Age group				
15-24	8 (1.7)	ref		
25-34	13 (3.6)	2.2(0.8-6.2)	2.5(0.9-7.3)	0.088
35-59	9 (4.8)	2.9(0.9-9.5)	5.2(1.4-19.8)	0.014
Education level				
No formal education	8 (7.0)	5.6(0.9,33.5)	4.3(0.7-24.8)	0.098
Primary education	19 (2.3)	1.8(0.3-9.5)	1.7(0.3-8.5)	0.536
Secondary and above	3 (1.3)	ref		
Alternative source of income				
No	25 (3.4)	1.0(0.4-2.6)	3.7(1.2-11.7)	0.027
Yes	5 (1.6)	ref		
Primary meeting place for clients				
Telephone/internet/agent	4 (4.7)	6.5(1.1-36.2)	11.3(1.5-82.3)	0.017
Pub/bar/night club/Hotel/Guest house	18 (3.2)	4.1(1.0-16.8)	6.5(1.2-34.1)	0.027
Street	2 (1.5)	1.9(0.3-14.0)	2.5(0.3-20.3)	0.308
Brothels/private room	4 (0.8)	ref		
Condom use with last client				
Yes	24 (3.4)	2.1(0.8-5.9)	2.1(0.7-5.7)	0.161
No	6 (1.6)	ref		
Drank alcohol past one month				
Yes	23 (3.6)	2.9(1.1-8.1)	2.9(0.9-9.4)	0.07
No	7 (1.3)	ref		

COR; Crude Odds ratio; AOR; Adjusted odds ratio for all variables in the table; **p-value for AOR, HBV (+ve); Hepatitis B Virus positive.

CHAPTER FIVE

5.0 DISCUSSION

In this study, we examined the prevalence of Hepatitis B virus infection and associated factors among Female Sex Workers in Dar es Salaam. We found the prevalence of HBV infection, the HBV infection rate is moderate high, significant risk factors for HBV at the age of 35 years or above, having no alternative source of income, negotiating sex through Telephone/Internet or Agents and meeting with clients in Pub/bar/Nightclub/Hotel/Guest house.

We found the prevalence of HBV the HBV infection rate is higher to general population in Dar es Salaam. Our finding is similar to what has been reported in other studies in neighboring countries on HBV prevalence among FSWs Republic of Congo 4.2% (11) and Rwanda (21). However, this estimate is almost two folds lower than what was reported among FSWs in another study within the country conducted seven years ago (10). Moreover, the prevalence reported for this population is lower than that previously reported among Female Sex Workers in Ethiopia (6%) (20), Mid west Brazil 9.3% (12) and Goiania Central Brazil 17.1% (18) . The differences in these estimates could partly be explained by a possible decrease in infection rates resulting from ongoing interventions which were targeting HIV compared to previous studies in Tanzania and elsewhere. Despite the differences, FSWs still require efforts in prevention of new HBV infection, care and treatment.

In this study those who contact their clients through telephone or internet/agent likewise meeting clients at Hotel, Pub/bar or Nightclub or Guest house had higher odds of being infected with HBV compared to those who meet in private room or brothels or Guest house. These findings are contrary with the study conducted in Brazil (12) which observed meeting with clients in street had no statistical significant association with the HBV infection. The observed variation could probably be attributed to the difference in study settings and the risk behaviors.

In this study, the odd of HBV prevalent was higher among Female aged 35 years and above as compared to those aged below 25 years. This finding is in contrast with the results previously reported in Rwanda which indicated that those between the age of 30-34 and in Nigeria 31-35 years were risk groups for HBV infection (21)(36). The observed difference could possibly attribute to difference in socio cultural and study settings.

Not having alternative source of income apart from sex work was associated with increased odds of being HBV infected. This finding could possibly suggest that, FSW who are desperately in need of money are more likely to accept unprotected sex for higher pay. They are also subjected to a mixture of risks like injecting drugs, group sex and having higher number of sexual partners for better income. The finding has limited number of literature to compare and contrast.

In this study the prevalence of HBV was higher for female with no formal education. However, this estimate did not achieve statistical significant of 5% level. This finding is contrary to the study conducted in Ethiopia which showed the association to be significant (20) the difference between our study and that in Ethiopia could be attributed partly with low power of the Ethiopia study which studied only 319 people, the study methodology of recruiting participants was simple random.

In this study the prevalence of HBV was higher for those who drunk in past one month. Alcohol use during sex work is associated with lower consistent condom use hence unprotected sex. Alcohol used by FSWs have been reported to be associated with lower sexual inhibitions, increase courage to approach clients hence impairs decision on the number of sexual partner to have sexual intercourse with. Albeit large adjusted odds ratio, this estimate in this study did not achieve statistical significant of 5% level. This study is not in agreement with the study conducted in Afghanistan cities (19) partly due to sampling in Afghanistan which was convenience sampling and very low power as recruited only 23 FSWs.

5.1 Limitation

Certain limitations were noted in this study. Firstly, the use of dataset with sensitive information which were collected through the use of face to face interview that might have subjected to social desirability bias; this was mitigated by the use of trained research assistants and assurance of confidentiality of study participants. Thus, we expect that participants provided genuine responses to the best of their knowledge. Secondly, the cross sectional nature of the study limits the ability to infer causality. However, our goal was not to establish causality and we have recommended for more rigorous epidemiological study to be conducted to establish cause and effect relations of possible risk factors. Thirdly, the low prevalence of HBV exposure limited the ability to identify meaningful and statistically significant differences between groups due to inadequate statistical power. Despite these limitations, the study has a potential to contribute greatly to the understanding of HBV prevalence and associated factors among FSWs in Dar es Salaam.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATION

6.1 Conclusion

Results of this study highlight the HBV infection of 2.9%. The age of 35 years or above, having no alternative source of income, negotiating sex through phone internet or through agent and meeting with clients at pub/bar/Night club or Hotel/Guest house, were independently associated with HBV infection among FSWs in Dar es Salaam.

6.2 Recommendations

The prevalence of HBV infection among FSWs necessitates a response to prevent a wider general population spread of HBV. Public health interventions like outreach for periodic screening and vaccination of those not yet infected with HBV need to be advocated. HBV infected FSWs need to be linked with care and treatment centers.

Outreach and communication should consider working with FSWs and potential FSWs clients, and owners or managers in the areas FSWs reported to meet their clients by providing knowledge and how to prevent them from HBV infection.

Given the cross sectional nature of this study we recommend further study on the subject among FSWs using more rigorous methods and design to establish cause and effect of possible risk factors.

REFERENCES

1. Almasi-Hashiani A, Ayubi E, Mansori K, Salehi-Vaziri M, Moradi Y, Gholamaliei B, et al. Prevalence of hepatitis B virus infection among Iranian high risk groups: a systematic review and meta-analysis. Gastroenterol Hepatol from bed to bench [Internet]. 2018;11(2):91–100.

2. Schweitzer A, Horn J, Mikolajczyk RT, Krause G, Ott JJ. Estimations of worldwide prevalence of chronic hepatitis B virus infection: A systematic review of data published between 1965 and 2013. Lancet [Internet]. 2015;386(10003):1546–55. Available from: http://dx.doi.org/10.1016/S0140-6736(15)61412-X. [Accessed on 21 June 2018]

3. Lavanchy D. Hepatitis B virus epidemiology, disease burden, treatment, and current and emerging prevention and control measures. J Viral Hepat. 2009;3(1):1–17.

4. World Health Organization. Global hepatitis report, 2017 [Internet]. Who. 2017. 62 p. Available from: http://www.who.int/hepatitis. [Accessed on 1 July 2018]

5. Mueller A, Stoetter L, Kalluvya S, Stich A, Majinge C, Weissbrich B, et al. Prevalence of hepatitis B virus infection among health care workers in a tertiary hospital in Tanzania. BMC Infect Dis [Internet]. 2015;15(1):1–9. Available from: http://dx.doi.org/10.1186/s12879-015-1129-z. [Accessed on 1 July 2018]

6. WHO. Combating hepatitis b and c to reach elimination by 2030 [Internet]. Switzerland; 2016. 20 p.

7. WHO. Global Health Sector Strategy on Viral hepatitis 2016–2021 [Internet]. Geneva 27 Switzerland; 2016. 56 p. Available from: http://www.who.int/hepatitis. [Accessed on 28 June 2018]

8. Kilonzo SB, Gunda DW, Mpondo BCT, Bakshi FA, Jaka H. Hepatitis B Virus Infection in Tanzania : Current Status and Challenges. J Trop Med [Internet]. 2018;2018:10. Available from: https://doi.org/10.1155/2018/4239646. [Accessed on 23 June 2018]

9. Naghavi M, Wang H, Lozano R, Davis A, Liang X, Zhou M, et al. Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990-2013: A systematic analysis for the Global Burden of Disease Study 2013. Lancet [Internet]. 2015;385(9963):117–71.

10. Kazaura MR, Kamazima SR. Reproductive Tract Infections among Female Sex Workers in Dar es Salaam, Tanzania. J HIV AIDS [Internet]. 2016;2(4):2–5. Available from: //dx.doi.org/10.16966/2380-5536.128. [Accessed on 17 August 2018]

11. Niama FR, Loukabou Bongolo NC, Mayengue PI, Mboussou FF, Kombo Bayonne ES, Kouckodila Nzingoula FM, et al. A study on HIV, Syphilis, and Hepatitis B and C virus infections among female sex workers in the Republic of Congo. Arch Public Heal. 2017;75(1):1–8.

12. Matos MA de, França DD da S, Carneiro MA dos S, Martins RMB, Kerr LRFS, Caetano KAA, et al. Viral hepatitis in female sex workers using the Respondent-Driven Sampling. Rev Saude Publica [Internet]. 2017;51(0):1–11.

13. Scorgie F, Chersich MF, Ntaganira I, Gerbase A, Lule F, Lo YR. Socio-demographic characteristics and behavioral risk factors of female sex workers in sub-Saharan Africa: A systematic review. AIDS Behav. 2012;16(4):920–33.

14. World Health Organization. Guidelines for the prevention, care and treatment of persons with chronic hepatitis B infection [Internet]. 2015. 166 p. Available from: http://www.who.int/hiv/topics/hepatitis/en/. [Accessed on 30 July 2018]

15. Longo’s DF and D. Harrison’s PRINCIPLES OF INTERNAL MEDICINE. 17th editi. Vol. 168. 2016. 2016 p.

16. World Health Organization (WHO). Guidelines on hepatitis b and c testing. February 2017. 2016. 155 p.

17. Shahmanesh M, Patel V, Mabey D, Cowan F. Effectiveness of interventions for the prevention of HIV and other sexually transmitted infections in female sex workers in resource poor setting: A systematic review. Trop Med Int Heal. 2008;13(5):659–79.

18. Puga MAM, Bandeira LM, Weis SMS, Fernandes FRP, Castro LS, Tanaka TSO, et al. High-risk behaviors for hepatitis B and C infections among female sex workers. Rev Soc Bras Med Trop. 2018;51(2):198–202.

19. Catherine S. Todd, Abdul Nasir, Mohammad R. Stanekzai, Christian T. Bautista, Boulos A. BotrosM, Paul T. Scott SAS and JT. HIV, hepatitis B, and hepatitis C prevalence and associated risk behaviors among female sex workers in three Afghan cities. (Special Issue: Progress in HIV research in the Middle East and North Africa: new study methods, results, and implications for prev. AIDS Behav. 2010;24(2):S69–75.

20. G. B, B. D, B. D, Y. B. Prevalence and factors associated with HIV and hepatitis B virus infections among female commercial sex workers in mekelle, Ethiopia: Cross sectional study. Int J Pharm Sci Res. 2015;6(1):135–46.

21. Mutagoma M, Nyirazinyoye L, Sebuhoro D, Riedel DJ, Ntaganira J. Syphilis and HIV prevalence and associated factors to their co-infection, hepatitis B and hepatitis C viruses prevalence among female sex workers in Rwanda. BMC Infect Dis. 2017;17(1):1–9.

22. Muro FJ, Fiorillo SP, Sakasaka P, Odhiambo C, Reddy EA, Cunningham CK, et al. Seroprevalence of hepatitis B and C viruses among children in Kilimanjaro Region, Tanzania. J Pediatric Infect Dis Soc. 2013;2(4):320–6.

23. Mohamed Z, Rwegasha J, Kim JU, Shimakawa Y, Poiteau L, Chevaliez S, et al. The hepatitis C cascade of care in people who inject drugs in Dar es Salaam, Tanzania. J Viral Hepat. 2018;0–2.

24. Manyahi J, Msigwa Y, Mhimbira F, Majigo M. High sero-prevalence of hepatitis B virus and human immunodeficiency virus infections among pregnant women attending antenatal clinic at Temeke municipal health facilities, Dar es Salaam, Tanzania: A cross sectional study. BMC Pregnancy Childbirth. 2017;17(1):1–6.

25. NACP. HIV Behavioral and Biological Surveillance Survey Among Female Sex Workers in Dar es Salaam , 2010 [Internet]. 2011. 1–64 p. Available from: http://ihi.eprints.org/2793/1/NACP_Report_on_the_HIV_FSW.pdf

26. L Juárez-Figueroa, F Uribe-Salas, C Conde-Glez MH-A, M Olamendi-Portugal, P Uribe-Zúñiga EC. Low prevalence of hepatitis B markers among Mexican female sex workers. Sex Transm Infect. 1998;74:448–50.

27. Campbell C, Mzaidume Z. Grassroots Participation, Peer Education, and HIV Prevention by Sex Workers in South Africa. Am J Public Heal 2001 Dec;91(12)1978-86. 2001;91(12).

28. Sobe F, Pe J. E PIDEMIOLOGY AND S OCIAL S CIENCE A Tale of Two Countries : HIV Among Core Groups in Togo. 2009;51(2):216–23.

29. Wang C, Hawes SE, Gaye A, Sow PS, Ndoye I, Manhart LE, et al. HIV prevalence, previous HIV testing, and condom use with clients and regular partners among Senegalese commercial sex workers. Sex Transm Infect. 2007;83(7):534–40.

30. Agha S, Nchima MC. Life-circumstances, working conditions and HIV risk among street and nightclub-based sex workers in Lusaka, Zambia. Cult Heal Sex. 2004;6(4):283–99.

31. Pauw I, Brener L. “You are just whores - You can’t be raped”: Barriers to safer sex practices among women street sex workers in Cape Town. Cult Heal Sex. 2003;5(6):465–81.

32. K.L. D, M.E. B, V.H. R, R.C. B, Y. H, M.L. W. Risk factors for HIV infection among sex workers in Johannesburg, South Africa. Int J STD AIDS. 2005;16(3):256–61.

33. Matee MIN, Magesa PM, Lyamuya EF. Seroprevalence of human immunodeficiency virus , hepatitis B and C viruses and syphilis infections among blood donors at the Muhimbili National Hospital in Dar Es Salaam , Tanzania. BMC Public Health. 2006;6:4–9.

34. National Bureau of Statistics Dar es Salaam, Tanzania and Office of Chief Government Statistician Z. 2012 POPULATION AND HOUSING CENSUS [Internet]. National Bureau of Statistics Dar es Salaam, Tanzania and Office of Chief Government Statistician, Zanzibar; 2013. 244 p. Available from: www.tzdpg.or.tz › water › WSDP › 2012_Census_General_Report [Accessed on 12 May 2018]

35. Volz E, Heckathorn DD. Probability Based Estimation Theory for Respondent Driven Sampling. J Off Stat. 2008;24(1):79–97.

36. Forbi JC, Onyemauwa N, Gyar SD, Oyeleye a. O, Entonu P, Agwale SM. High prevalence of hepatitis B virus among female sex workers in Nigeria. Rev Inst Med Trop Sao Paulo. 2008;50(4):219–21.

APPENDICES

Appendix I: Data Extraction Tool

Record id……..

SECTION A: Random Driven Sampling Networks

A.01. Number of FSWs ☐

SECTION B: Demographic Characteristics

B.01. Age ☐ **years**

B.02. School ☐

1. No school2. Incomplete Primary 3. Complete Primary 4. Incomplete Secondary 5. Complete secondary 6. More than Secondary 0. No response

B.03. Marital status ☐

1. Married/ living with partner 2. Divorced/ Separated /Widowed 3. Never married

0. No response

B.04. Duration of residence in Dar es Salaam ☐

If less than one year, enter 0, If 11/2 round up to 2, If born and raised in Dar, enter 96 If refuses to respond, enter 98

B.05. Person living with ☐

1. Boyfriend. 2. Husband. 3. with family. 4. with friends. 5. No fixed address. 6. Other Sex Workers 0. No response

B.06. Income

1. Employed by Government. 2. Employed in Private Company. 3. Self employed. 4. Student. 5. Petty trading. 6. No other income besides sex work. 0. No response.

SECTION C: Profile of Sex Work

C.01. Age first sold sex [ ] years

C.02. Clients 1

1. Pub/Bar [ ] 2. Nightclub [ ] 3. Private house [rented room] [ ]

4. Guest house [ ] Brothels [ ] Hotel [ ] n street

8. By telephone [ ] 9.Through agent [ ] 10.Internet/Apps

C.03. Reason for Sex Work

1. Need money to help family [ ] . Need money to pay a debt [ ] Was forced [ ]

4. Like to do it/ pleasure [ ] 5. Friends were doing it [ ] 6. Good income/added income [ ]

7. Abandoned by husband/family [ ] 8. Don't remember [ ] No response [ ]

SECTION D: Sexual history, Sexual Partner and Condom Use

D.01. First sex [ ] years

D.02.Last sex Condom use Yes [ ] No [ ] esponse [ ]

D.03. Drunk alcohol in the past one month Yes [ ] No [ ] o response [ ]

Section E: Laboratory Results

E.01. HBsAg 1. Positive [ ] 2.Negative [ ]

Appendix II: Informed Consent (English Version)

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES-DICTORATE OF RESEARCH & PUBLICATIONS

Introduction

Greetings, my name is …….... at the moment, we are carrying out a study on the prevalence of Human Immunodeficiency Virus (HIV) infection, Sexually Transmitted Infections (STIs), Reproductive tract infections (RTIs) and associated risk factors among female sex workers among female sex workers in Dar es Salaam.

Purpose of the study

This study aims to collect information on sexual behaviors and sex work related among female sex workers in Dar es Salaam. You are being asked to participate in this study as stake holder and a resident from the study site. We should be grateful if you are willing to participate by answering questions from the study.

Voluntary participation

Your participation in this study is strictly voluntary and that you are free to withdraw from the study at any time.

Interview

If you agree to participate in this study, You will sit with trained interviewer and you will be required to answer question that have been prepared for the study, you will be interviewed only once for approximately 30 to 45 minutes in private setting interview in order to obtain the intended information to inform policy maker on how to improve care to HIV, STI, and RTI among uninfected and infected Female Sex Workers.

Blood Sample Collection

Voluntarily you will be asked to donate 5mls of blood of venous blood from your upper arm after accomplishment of interview for HIV, syphilis, and hepatitis testing.

Provision of test results

You will receive test results at the study site on the same day. If you are HIV positive you will be referred actively for treatment to a KP friendly care and treatment center.

Storage of specimens for future biological testing

You will be asked to consent to storage and possible additional testing of blood specimens, the biological specimen and consent form will be linked to your coupon number.

Recruitment of other participants

After you complete the survey you will receive three recruitment coupons with which to recruit your peers into the survey.

Compensation

We will compensate 8000/-for time spent during the interview; and you will be compensated 4000/- for fair to bring each member of the chain; however your participation is highly appreciated**.**

Risks to participant

Some questions could potentially make you feel uncomfortable. You may refuse to answer any particular question and stop the interview at any time. Blood donation may be painful or you may not wish to be punctured. We do not expect any harm to happen to you because of participation in this study**.**

Benefits to participant

The benefits of participating in this survey are to know your HIV serostatus and to get referrals to care and treatment sites as needed. Regardless of HIV status, you will be provided information on behavior change and prevention regarding HIV transmission risks. If you will be HIV-positive patients you will be assisted to begin the process of disclosing your sero-status to the family members and referred for appropriate ART management, including treatment of opportunistic infections.

Rights to withdraw and alternatives

Your participation in this study is completely voluntary. If you choose not to participate in the study or if you decide to stop participating in the study you will not get any harm. You can stop participating in this study at any time, even if you have already given your consent. Refusal to participate or withdraw from the study will not involve penalty or loss of any benefit to which you otherwise entitled.

Confidentiality

I assure you that all the information collected from you will be kept confidential. Only people working in this research study will have the success to the information. We will ensure that any information included in your report does not identify you as respondent as we will not put your name or other identifying information on the records of the information you provide**.**

Dissemination of Findings and Publications

The results for this survey will be published in the Ministry of health, Community Development Gender, Elderly and Children report or any publication journal. Data will also be used to inform and engage MARP communities in taking ownership and responsibility regarding the prevention of HIV/AIDS among Female Sex Workers and their clients.

Who to contact

If you have any questions about or feel injured in this study, please don't hesitate to contact Neema Makyao, (Tel no: 0715-379816) and Dr. Elia John Mmbaga, the principal investigator of this study and lecturer at MUHAS P.O.BOX 65001 Dar es salaam (Tel no: 0785900101).

ID-NO: …… /……/…….

INFORMED CONSENT

Please Mark √ where applies

1. ☐ I have read/understood the contents in this form. My questions have been answered. I agree to participate in this study.
2. ☐ I understand my participation in this study is completely voluntary. I can stop participating in this study at any time, even if I have already given my consent. Refusal to participate or withdraw from the study will not involve penalty or loss of any benefit to which you otherwise entitled.

3. ☐I agree to Participate in this study.

4. ☐ I participate in this study through donation of blood for testing out of Human Immunodeficiency Virus (HIV) infection, and other Sexually Transmitted Infections (STIs), Reproductive tract infections (RTIs) and other tests.

5. ☐ I agree to donate blood for further other tests.

Signature of participant/Thumb if participant cannot read _____

Name of research assistant _____

Date of signed consent _____

B: Fomu ya Ridhaa

Utangulizi

Ninaitwa (taja jina). Ninashiriki katika utafiti kuhusu maambukizi ya virusivya UKIMWI na tabia hatarishi miongoni mwa wanawake wanaofanya biashara ya ngono Jijini Dar-es-Salaam. Kabla hatujaanza mahojiano ni muhimu nikueleze kuhusu utafiti huu na jinsi ya kushiriki. Ili uweze kuamua kushiriki au kutoshiriki. Unaruhusiwa kuuliza maswali wakati wowote wa maelezo yangu. Nitakupatia nakala ya maelezo haya.

Lengo la utafiti huuna washiriki

Lengo la utafiti huu ni kutambua hali na mwenendo wamaambukizi ya VVU na tabia hatarishi miongoni mwa wanawake wanaofanya biashara ya ngono. Tunahitaji kufahamu ukubwa watatizo la maambukizi ya VVU na magonjwa mengine yanayoenezwa kwa njia ya kujamiiana. Pia tunapenda kufahamu ni kwa kiasi gani wanawake hao wako katika hatari ya kuambukizwa VVU na magonjwa mengine ya kujamiiana. Matokeo ya utafiti yatawawezesha wanawake hao na jamii kutambua hali yao halisi ya maambukizi. Vilevile, utafiti utaisaidia serikali kubuni na kuendesha Huduma za afya na tiba kwa ajili ya wanawake hao na watejawao. Utafiti huu unaendeshwa na Wizara ya Afya na Ustawi wa Jamii pamoja ikishirikiana na Chuo Kikuu cha Afya na Sayansi Shirikishi cha Muhimbili. Wewe ni miongoni mwa wanawake takribani 900 waliochaguliwa kushiriki katika utafiti huu.

Hiari ya kushiriki

Ni muhimu sana wewe kushiriki katika utafiti huu Ila, ni hiari yako kuchagua kushiriki au kutokushiriki..

Nini kitatokea kama nikiamua kushiriki?

Nitakuomba utoe ridhaa yako yakushiriki. Ridhaa maana yake ni kwamba umekubali kushiriki katika utafiti huu bila kushurutishwa.

Mahojiano

Kama ukikubali kushiriki katika utafiti huu nitafanya mahojiano na wewe mahali pa faragha sana. Mahojiano yetu yatachukua kati ya dakika 30 na 45. Tutajadiliana kuhusu biashara ya ngono, matumizi ya kondomu pamoja na tabia hatarishi miongoni mwa wanawake wanofanya biashara. Unahiari ya kujibu au kutokujibu swali au maswal initakayokuuliza.

Kuchukuavipimo

Kwahiari yako, tutaomba kuchukua kiasi kidogo cha damu katika sehemu ya mkono kwa ajili ya vipimo vya VVU. Kabla huja chukuliwa damu, Mshauri Nasaha wetu atakupa ushauri kuhusu VVU na UKIMWI. Damu itachunguzwa VVU, kaswende na ugonjwa wa homa yaini. Mshauri nasaha wetu atakupatia majibu ya VVU hapohapo

Kuchukua majibu ya vipimo ni hiari yako mwenyewe. Kama ukigunduliwa kuwa una maambukizi ya VVU au ugonjwa wowote wa kujamiiana, watafiti watakupa ushauri nasahana kukuelekeza sehemu ya kwenda kupata Huduma pamoja na tiba.

Kuhifadhi vipimo vingine kwa ajili ya uchunguzi zaidi

Ukituruhusu, tutahifadhi vipimo vitakavyobaki kwenye maabara zetu. Baadaye tunaweza kuvifanyia uchunguzi zaidi kuhusia na namaambukizi ya VVU na magonjwa mengine. Jina lako halitaandikwa kwenye sampuli zitakazo hifadhiwa .Kwahiyo, hakutakuwa na uwezekano wa kuoanisha sampuli na wewe.

Kuwatambua washiriki wengine

Tutakuomba utusaidie kutafuta wanawake wengine kama wewe ili washiriki kwenye utafitihuu. Tutakupa kadi tatuambazo utawapa wanawake hao iliwajiunge na kushiriki katika utafiti huu. Tutakupatia maelezo zaidi kuhusu zoezi hili baadaye.

Kufika kituoni mara ya pili

Tutakuomba urudi kituoni baada ya kutambua na kuwaleta wana wake wenzako watatu. Siku hiyo, tutakuomba utupe tarifa kuhusu wanawake uliowapatia kadi za kushiriki katika utafiti huu.

Gharama za kushiriki

Hutatozwa gharama yoyote kwa ajili ya vipimo. Ila, sisi tutatoa shukrani ya TShs 8,000 kwa kukubali kwako kushiriki katika utafiti huu na gharama za usafiri. Utakapokuja mara ya pili tutatoa TShs. 4,000 kwa kila mwanamke utakayemtambua na akashiriki katika utafiti huu.

Madhara ya utafiti

Utafiti huu hauta kuwa na madhara yoyote kwako. Isipokuwa unaweza kuhisi maumivu kidogo wakati wa kutoa damu. Vilevile, baadhi ya maswali tutakayokuuliza ni nyeti na ya kiundani mno; yanayoweza kukufanya ujisikie vibaya kidogo. Watafiti utakaohojiana nao watatumia kila njia kukufanya ujisikie huru kujibu maswali na pia kuhakikisha kuwa tarifa zako zinabaki kuwa siri kati yao na wewe.

Faida za kushiriki katika utafiti huu

Ukishiriki katika utafiti huu utapata Huduma ya ushauri nasaha na vipimovya VVU na magonjwa ya kujamiiana bure. Pia utapewa maelezo kuhusu maambukizi ya VVU, UKIMWI, magonjwa mengine ya kujamiiana pamoja na matumizi sahihi ya kondomu. Iwapo unamaambukizi ya VVU utaelekezwa sehemu ya kwenda kupata Huduma za afya na tiba.

Kutunzasirizawashiriki

Ili kutunza siri ya taarifa utakazo tupatia, jina lako halitaandikwa popote .Mazungumzo yote pamoja na vipimo ni siri kati ya wataalam wetu na wewe tu. Vipimo vyote utakavyo chukuliwa vitatunzwa kwa namba maalum iliyopo kwenye kadi yako. Namba yako itasomwa na watafiti tuu na hawataweza kujua jina lako. Baada ya utafiti fomu hii namatokeo yote ya utafiti vitahifadhiwa ndani ya kabati maalum ambalo ni watafiti pekee watakao weza kuyafanyia kazi.

Matokeo ya utafiti yatafanyiwa nini

Matokeo ya utafiti yatatolewa katika ripoti ya Wizara ya Afyana Ustawi wa Jamii au katika jarida lingine lolote. Matokeo haya yataisaidia serikali kubuni na kuendesha mpango wa kuboresha Huduma za afya na kukinga maambukizi ya VVU miongoni mwa wanawake wanaofanya biashara ya ngono pamoja na wateja wao.

Jinsi ya kuwasilianana watafiti

Iwapo utakuwa na maswali kuhusu utafiti huu, haki zako kama mshiriki au duku duku lolote unaweza kuwasiliana na Neema Makyao kupitia namba ya simu 0715-379816. Vile vile nitakupatia anwani na namba ya simu ya Mtafiti Mkuu: Dkt. E. Mmbaga, Chuo Kikuu cha Afya na Sayansi Shirikishi Muhimbili, Dar-es-Salaam. Simu namba 0785900101.

Ninakushukuru kwa kunisikiliza. Naomba ridhaa yako kushiriki katika utafiti huu. Ukohuru kusitisha ushiriki wako wakati wowote hata bila kutoa sababu au maelezo yoyote. Ila, tafadhali ukumbuke kuwa **k**ushiriki kwako ni muhimu sana kufanikisha lengo la utafiti huu.

Namba ya utambulisho ya mshiriki……

Ridhaa ya kushiriki katika utafiti Kuhusu ukubwa wa tatizo la maambukizi ya VVU na magonjwa mengine yanayoenezwa kwa njia ya kujamiiana na tabia hatarishi miongoni mwa wanawake wanaofanya biashara ya ngono Jijini Dar-es-Salaam.

Tafadhali weka alama ya √ kwenye kisanduku

6. ☐ Nakubali kuwa nimesoma na kuelewa makubaliano haya kuhusiana na utafiti huu. Nimepata maelekezo ya kutosha na nimekuwa na muda wakutosha kuuliza maswali. Nimepewa na kala ya maelezo haya.

7. ☐ Ninaelewa kuwa ushiriki wangu ni wahiari na ninaweza kuacha kushiriki muda wowote bila kuathiri hali yangu kiafya au kisheria.

8. ☐ Ninakubali kushikiri katika utafiti huu.

9. ☐ Ninashiriki katika utafiti huu kwakutoa damu kwa ajili ya vipimo vya VVU, magonjwa mengine ya kujamiiana na vipimo vinginevyo.

10. ☐ Ninakubalikua cha sampuli zangu kwa ajili ya vipimo vingine zaidi.

Sahihi ya mshiriki……..*Tarehe*……..

(Muhimu: Kama mshiriki hawezi kuandika anaweza kuweka alama ya kidole gumba)

Jina la msaili.....Tarehe.....Sahihi.....

Appendix III: Approval of Ethical Clearance wwith waiver of informed cconsent

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES
OFFICE OF THE DIRECTOR OF POSTGRADUATE STUDIES

P.O. Box 65001
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Ref. No. DA.287/298/01A/

9th January, 2019

Dr. Danstan P. Ngenzi
MSc. Applied Epidemiology
MUHAS.

RE: APPROVAL OF ETHICAL CLEARANCE FOR A STUDY TITLED: "PREVALENCE OF HEPATITIS B VIRUS AND ASSOCIATED FACTORS AMONG FEMALE SEX WORKERS IN DAR ES SALAAM, TANZANIA 2017- (ETHICAL CLEARANCE WITH WAIVER OF INFOMRED CONSENT APPROVED)"

Reference is made to the above heading.

I am pleased to inform you that, the Chairman has, on behalf of the Senate, approved ethical clearance for the above-mentioned study. Hence you may proceed with the planned study.

The ethical clearance is valid for one year only, from 24th December, 2018 to 23rd December, 2019. In case you do not complete data analysis and dissertation report writing by 23rd December, 2019, you will have to apply for renewal of ethical clearance prior to the expiry date.

Dr. Emmanuel Balandya
ACTING: DIRECTOR OF POSTGRADUATE STUDIES

cc: Director of Research and Publications
cc: Dean, School of Public Health and Social Sciences, MUHAS

Appendix IV: Permission letter to use IBBS database.

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES
DEPARTMENT OF EPIDEMIOLOGY AND BIOSTATISTICS

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emmbaga@muhas.ac.tz

10th December, 2018

MUHAS Ethical Committee,
MUHAS.

Sir,

RE: PERMISSION TO USE DATA FORM A STERS DISSERTATION IN FAVOR OF DR. DANSTAN NGENZI

Reference is made to the above heading.

I hereby write to confirm that permission has been given to Dr. Danstan Ngenzi to use the recently completed Integrated Bio-Behavioral Survey (IBBS)data from female sex workers for secondary analysis as part of his master's dissertation.

Sincerely,

Elia John Mmbaga, *MD,Ph.D*

IBBS Principal Investigator and Candidate's Main Supervisor

Appendix V: **Primary IBBS project ethical clearance**

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES
OFFICE OF THE DIRECTOR OF RESEARCH AND PUBLICATIONS

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Ref. No. 2017-07-21/AEC/Vol.XII/ 76

21st July, 2017

Dr. Elia Mbaga
Department of Epidemiology & Biostatistics,
School of Public Health & Social Sciences,
MUHAS.

Re: Approval for Renewal of Ethical Clearance for a Study titled "Intergrated Bio-Behavioral Surveillance among Sex Workers, Injection Drug Users and Men who have sex with Men, Dar es salaam, Tanzania"

Reference is made to the above heading.

I am pleased to inform you that the Chairperson, has on behalf of the University Senate, approved renewal for ethical clearance of the above mentioned study, on recommendation of the Senate Research and Publications Committee meeting.

The validity of this ethical clearance is one year effective from 05th September, 2017 to 04th September, 2018. You will therefore be required to apply for renewal of ethical clearance on a yearly basis if the study is not completed at the end of this clearance.

You will also be expected to provide adverse events reports where applicable, six monthly progress report and final project upon completion of your study.

Dr. Frederick Mashili
Ag. CHAIRPERSON, SENATE RESEARCH AND PUBLICATIONS COMMITTEE