

**Addis Ababa University College of Health Sciences, School of  
Nursing and Midwifery, Department of Nursing Postgraduate  
program**

**Prevalence of Hepatitis B Virus and Associated Factors Among  
Commercial Sex Workers in Dessie City, Ethiopia, 2018**

**BY: - Selamawit Wondale (BSc.N)**

**June, 2018  
Addis Ababa**

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**BY: - Selamawit Wondale (BSc.N)**

**Advisors: - Niguse Tadele (Assistant professor, MSc)  
Nete Tofik (Msc)**

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## **APPROVAL BY THE BOARD OF EXAMINATION**

This thesis by Selamawit Wondale is accepted in its present form by the board of examiners as satisfying thesis requirement for the degree of masters in Adult Health Nursing.

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## ABBREVIATIONS

CHB	Chronic Hepatitis B
CI	Confidence interval
CSWs	Commercial Sex Workers
FMOH	Federal Ministry of Health
FSWs	Female sex workers
HBcAg	Hepatitis B core antigen
HBeAg	Hepatitis B e antigen
HBsAg	Hepatitis B surface antigen
HBV	Hepatitis B virus
HCC	Hepatocellular carcinoma
HCV	Hepatitis C virus
LMICs	Low- and middle-income countries
MSM	Men who have sex with men
OR	Odds ratio
PWID	People who inject drugs
SPSS	Statistical Package for Social Science
STIs	Sexually transmitted infections

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## ABSTRACT

**Background:** Commercial sex workers are risk population for HBV infection and key or core populations for hepatitis B virus transmission. Even though, most international guidelines recommend that several high-risk groups like sex workers be screened for HBsAg, sex workers have never been the target of Hepatitis B virus screening program in Ethiopia. **Objective:** The aim of this study was to assess the prevalence and associated factors of hepatitis B virus infection among commercial sex workers in Dessie City, Amhara Region, Ethiopia 2018. **Methods:** A community based cross sectional study was conducted from March 1<sup>st</sup> to April 1<sup>st</sup> 2018 in Dessie City, Amhara Region, Ethiopia. The sample size was determined using a single population proportion formula. A total of 247 Commercial sex workers recruited for the study. Simple random sampling method was used to select participants from the existing registered data. Data was collected after obtaining an informed and written consent from each study participants. Blood specimens from study participants was collected under aseptic technique and tested for HBsAg using Rapid diagnostic test (RDT) which have 99% sensitivity and specificity. Statistical analysis was performed using SPSS version 24. **Result:** Among the 230 study participants, 130(56.5%) of the study participants works in Hotel, club, bar or restaurant and the mean age of the respondents was 26.5 (SD± 6.093) years. Of the total participants undergone laboratory test for hepatitis B virus, the overall prevalence of hepatitis B virus among commercial sex workers was 17.4% (95% CI: 12.6, 22.2). In this study having children or dependent, number of clients per week, age at first sex and vaginal discharge with a foul smell were a significant predictor of hepatitis B. There is no statically significant relationship between use of shared sharp materials, alcoholic drink before sex, history of blood transfusion, duration in sex work and charge per client. **Conclusion and recommendation:** The prevalence of hepatitis B virus among commercial sex workers in this study was high (17.4%) when compared to the general population. Hepatitis B among commercial sex workers is highly associated with sexual factors and emphasis should be given for commercial sex workers.

**Key word:** Hepatitis B; Female sex workers; High risk groups; Prevalence; Associated factors.

# 1. INTRODUCTION

## 1.1. Background

Hepatitis B virus infection is one of the most serious infections and is a major public health problem, accountable for more than 300,000 cases of liver cancer every year, and causes 82% of liver cancer globally (1, 2).

Hepatitis B infection is caused by the hepatitis B virus (HBV), an enveloped DNA virus that infects the liver (3). The virus circulates in serum as a 42-nm, double-shelled particle, with an outer envelope component of hepatitis B surface antigen (HBsAg) and an inner nucleocapsid component of hepatitis B core antigen (HBcAg). HBeAg, unlike HBsAg and HBcAg, is not particulate, but rather is detectable as a soluble protein in serum (2-4).

Hepatitis B virus causes both acute and chronic infection. Acute hepatitis B is usually a self-limiting disease marked by acute inflammation and hepatocellular necrosis (3, 4). Chronic hepatitis B (CHB) is defined as persistent HBV infection (the presence of detectable HBsAg in the blood or serum for longer than six months), with or without associated active viral replication and evidence of hepatocellular injury and inflammation (2).

Hepatitis B virus spread almost in all body secretions and excretions. However, only blood and body fluids including saliva, menstrual, semen and vaginal fluids represent a risk of transmission. The main ways of transmission are perinatal transmission and sexual intercourse. Sexual contact, includes both vaginal and anal intercourse (5). HBV transmission may occur particularly in person with multiple sex partners or contact with sex workers. The risk of transmission is increased in the presence of other sexually transmitted infections (3, 6).

According to World Health Organization (WHO) certain populations are well recognized to be at high risk of acquisition and transmission of HBV. These include people living with HIV, people who inject drug (PWID), men who have sex with men (MSM), sex workers, children born to HBsAg-positive mothers, especially if they did not receive timely infant vaccination, and other family members, sexual partners and close household contacts of those with HBV infection; and health-care workers (3).

Commercial Sex Workers (CSWs) are considered to be at high risk for transmission and acquisition of HBV (3). This is due to exposure to multiple sexual partners and barriers to the negotiation of consistent condom use. Also, the context they live and work in, making them

vulnerable to sexually transmitted infections (STIs) including HBV infection. In addition, they can in turn infect numerous people (1, 3, 7).

WHO strongly recommends focused risk-based testing in populations with high-risk behavior or exposure to HBV infection. Therefore sex workers should be prioritized for testing in all epidemic settings of HBV infection (3).

Preventing hepatitis B infection through vaccination embraces target groups for catch-up vaccination as well as other preventive strategies. These includes vaccination of persons at risk of acquiring HBV infection, such as persons with multiple sex partners and sex workers (3, 5, 8).

Although many countries administer hepatitis B vaccine starting at birth and this strategy has been effective in reducing the incidence and prevalence of hepatitis B in most endemic regions over the past few decades, it will not have a large impact on the rates of end-stage liver disease or HCC for those born before the introduction of universal infant immunization (9, 10).

In Ethiopia, where Hepatitis B is endemic with an average prevalence of 10.8 % (11), there is lack of a coordinated and systematic national response to hepatitis B infection. Federal Ministry of Health (FMOH) revealed that viral hepatitis has been recognized as a public health agenda for a long time. Currently, the FMOH organized a national taskforce and started working on the development of strategic documents and treatment guidelines following the global momentum and international resolutions. Ethiopian hepatitis B prevention strategy, provided as a component of a pentavalent vaccine, has been in place since 2007 and had actively tried to implement a program for screening health care staff and providing them hepatitis B vaccine, although with limited success due to budget constraints (12).

Hepatitis B screening services are not widely available in Ethiopia especially for high risk groups such as persons with multiple sex partners and sex workers, also there are limited source of information about HBV infection prevalence among CSWs and there is no clear policy adopted by Ethiopian Ministry of Health that helps to control such infection transmission from female sex workers.

## 1.2. Statement of the problem

Globally, viral hepatitis caused 1.34 million deaths in 2015. From 2000 to 2015 scaled-up interventions led to a decrease in mortality from HIV/AIDS, tuberculosis and malaria. In contrast, mortality due to viral hepatitis is increasing from 1.10 million deaths in 2000 to 1.34 million deaths in 2015 (an increase of 22%). Of these deaths, 96% were the result of complications of HBV (10).

HBV infection is a major global health problem, WHO estimates that in 2015, 257 million persons, or 3.5% of the population, were living with HBV infection in the world (10). Recent Global Burden of Disease estimates indicate a high morbidity and mortality attributable to chronic HBV (13).

The major complications of hepatitis B infection are cirrhosis and hepatocellular carcinoma (HCC). Overall, HBV accounts for around 45% of cases of HCC and 30% of cirrhosis, with much higher proportions in low and middle-income countries (LMICs). HBV infection also causes a significant economic burden in terms of years of life lost from liver disease in high-income settings as well as LMICs, and accounts for 5–10% of liver transplants (10).

In Africa, HBV and hepatitis C virus (HCV) infections are highly endemic and responsible for 80% of cirrhosis and HCC cases, with HBV being the main cause of end-stage liver disease. HBV is also a recognized oncogenic virus that confers a higher risk of developing HCC (2). According to WHO, HBV infection affects more than 5% of the local population in Sub-Saharan Africa and more than 8% in West Africa, reaching up to 15% in some areas (13, 14)

Accurate data in Africa including Ethiopia on the burden of cirrhosis related to hepatitis B are hampered by the lack of high-quality tools to assess chronic liver disease, inadequate disease surveillance, and poor resources for proper data collection and management. Recent estimates show that, with 1.4 million attributed deaths in 2010 (15).

Low-income countries like Ethiopia have a higher burden of HBV infection, but limited availability of testing and treatment. The prevalence and incidence of HBV infection are 7.4 and 9.2 times higher, respectively, in low-income countries than in high-income countries. However, the proportion of diagnosed individuals decreases from 18% in high income countries to 0.8% in low-income countries. Among those diagnosed, the proportion accessing treatment also decreases from 14% in high-income countries to 9% in low-income countries (10).

Even though, most international guidelines recommend that several high-risk groups like sex workers be screened for HBsAg, sex workers have never been the target of HBV screening program in Ethiopia. Although there is STI screening and management services in the study area, still the magnitude of HBV and associated factors are not clearly identified and documented particularly on high risk groups especially female sex workers.

Besides, there is limited researches conducted on issue throughout the country, yet those studies also reflected hepatitis B prevalence among very small portion of the target groups on hot spot areas. Furthermore, there is no any study conduct in the study area. Therefore, this study will try to explore the degree of HBV and their determinant factors among female sex workers in Dessie city.

### 1.3. Significance of the Study

Hepatitis B virus is a major public health problem and commercial sex workers are risk population for HBV infection and key (core) populations for HBV transmission. Although there is STI screening and management services for CSWs in the study area, there is no specifically HBV screening services for CSWs.

Screening test will be help full for both HBsAg positive and negative participants to know their status. Those HBsAg Positive participants will be further benefited from initiation of linkage to health care institutions for further diagnosis and treatment.

The result of this study will provide useful information for governmental and nongovernmental organizations working on Commercial sex workers target project for further intervention and prevention of HBV. Nurses will also use the result of this study to improve the promotive and preventive care for HBV risk populations.

Furthermore, since there is no study conducted in the study area, the study will be used as a baseline data for other researchers who might want to conduct a study on related topic.

## 1.4. Literature Review

### 1.4.1. Prevalence of hepatitis B among commercial sex workers

Worldwide, there are an estimated over 240 million chronically HBV infected persons, particularly in LMICs. It is predominantly a problem in resource-limited countries and its prevalence varies markedly in different geographic areas of the world, as well as in different population subgroups. Overall, almost half of the global population lives in areas of high endemicity. The prevalence of chronic HBV infection worldwide could be categorized as high (>8%), intermediate (2-8%) and low endemicity (<2%)(10, 13, 14).

In 2015, the global prevalence of HBV infection in the general population was 3.5%. Among those born before the hepatitis B vaccine became available, the proportion of persons living with chronic HBV infection remains high. Prevalence was the highest in the African (6.1%) and Western Pacific regions (6.2%) (10).

Commercial sex works are highly associated with HBV infection in different regions of the world. Also, they can transmit to other. In different studies, 51.6% of female sex workers were positive for HBV tests (1, 16, 17).

Findings from community based cross sectional study on HIV, hepatitis B and C, and syphilis prevalence and coinfection among sex workers in Southern Brazil, Prevalence of hepatitis B (HBV) was 23.1%(18). Similar study in Goiânia, Brazil on Viral hepatitis in female sex workers (FSWs) out of 402 FSWs the prevalence of hepatitis B virus was 17.1% (19).

In a multi-centric cross-sectional study conducted to know the prevalence of sexually transmitted diseases among FSW, MSM and TG across Tamil Nadu, India the prevalence of HBsAg among FSWs was 2.3% (20). The Integrated Bio-Behavioral Survey (IBBS) conducted in Syria, the prevalence of HBV was 5.3% (21). Similarly, a study done in Nepal on Syphilis and Hepatitis B Co-infection among HIV-Infected, Sex-Trafficked Women and Girls, shows prevalence of HBV was 3.8% (22).

A study on HIV, hepatitis B, and hepatitis C prevalence and associated risk behaviors among female sex workers in three Afghan cities HBV was the most common prevalent infection, with 6.54%. A study conducted in Tehran, Iran shows that among 161 consenting participants, 1.2% of participants were infected with HBV (23). A systematic review and meta-analysis in China on

prevalence of viral hepatitis and sexually transmissible infections among female sex workers the seroprevalence of active hepatitis B was 10.7 % (95 % CI 7.3–15.5 %) (17).

A cross sectional study in Hong Kong concluded that the prevalence of hepatitis B surface antigen, among the participating female sex workers (FSW) was 8.5% (16). Prevalence of Hepatitis B among Female Sex Workers in Nagpur Region showed that among a total of 200 samples of female sex workers, seropositivity rate of HBV was 1.5% (24).

A study in Africa on HIV, Syphilis, and Hepatitis Band C virus infections among female sex workers in the Republic of Congo, the prevalence of HBV was 4.20% (25). Similarly, a cross-sectional study conducted among female sex workers (FSWs) in Rwanda in 2015 showed that the prevalence of HBV was 2.5% (95% CI:1.8–3.2) (26).

In Ethiopia study on prevalence and factors associated with HIV and hepatitis B virus infections among female commercial sex workers in Mekelle showed, from a total of 319 participants the prevalence of HBV was 6% (27).

#### **1.4.2. Factors associated with hepatitis B virus among CSWs**

Female sex workers are exposed to various behaviors that present risk of acquiring hepatitis B, due to the lack of immunization schedule, sexual precocity, multiple sex partners, lack of use of condom, and habit of sharing sharp objects. The vulnerability hepatitis B viruses, in the FSW group is primarily the consequence of a high number of sexual partners and a high frequency of unprotected sex. Indeed, several previous studies have shown an association between STI prevalence among FSWs and inconsistent condom use as the main risk factor for hepatitis B infection. It has also been found that FSWs have a higher risk of contracting STIs from their non-paying partners or fixed partner than from their clients (8, 28).

In a study done among female sex workers in Teresina-PI, northeastern Brazil risk practices for hepatitis B infection were related to the early onset of sexual activity [16 (minimum age = 10 years; maximum age = 23 years)], multiple partners with up to 17 clients per week, lack of use of condom, shared sharps and reported no vaccine against hepatitis B (8).

Finding from a study conducted in Nepal, those who were HIV positive were 30 times more likely to be infected with hepatitis B than those who were HIV negative. (9.1% vs. 1.4%, respectively; OR 30.0) (22). In a multi-centric cross-sectional study conducted to know the prevalence of

sexually transmitted diseases among FSW, MSM and TG across Tamil Nadu, most of the HBsAg positive cases were in the age-group of 20 to 25 years (20).

A study conducted on prevalence and risk factors of sexually transmitted infections in female sex workers in Hong Kong revealed that alcohol consumption, place of origin, higher education level, having multiple partners, and being a non-smoker were risk factors of HBV among FSWs (16).

Another study in Goiânia, Brazil, being older (> 40 years), being single (OR=3.80) having a history of blood transfusion (OR= 3.16), use of cocaine, (OR= 4.54), and ignoring the symptoms of sexually transmitted infections like burning pain during urination (OR=2.57) and genital ulcers/sores (OR=3.47) were positively associated with hepatitis B virus infection ( $p < 0.05$ ) (19).

Study in three Afghan cities the multivariable analysis showed,  $\geq 12$  clients monthly (OR= 3.14, 95% CI), ever using alcohol (OR= 2.61, 95% CI), provision of anal sex (OR= 2.41, 95% CI), and having children (OR= 2.12, 95% CI) were independently associated with HBV infection (23).

Factors that were described to lead a relatively higher prevalence of hepatitis B in Rwanda included low socio-economic status and having more than 5 years of duration in sex work (26). In Congo, prevalence of hepatitis B was significantly higher for FSWs living in the city of Pointe-Noire COR = 6.61 [2.21–19.75;  $p = 0.0007$ ) also having children, age, using alcohol, practicing mobile prostitution and at least 12 clients monthly have been shown to be among the significant risk factors for HBV infection among female sex workers (25).

Study on prevalence and factors associated with HIV and HBV infections among female commercial sex workers in Mekelle, work place of sex workers, inconsistent condom utilization, having sex with male who used injectable and use of drug including injectable or oral drug by the sex workers were significantly associated with HBV. HBV was 5.1 times more in FCSWs who did not utilize condom consistently. Those FCSWs who had sex with male who used injectable drug were 5.2 times more positive than the referent groups. Likewise, commercial sex workers who used injectable or oral drugs were 5.2 times more positive (OR= 5.2, 95% CI: 2.0, 13.6) than those who did not use injectable or oral drugs. In this study age of respondents, both educational status and educational level, place of birth, having dependents, number of years in sex work, income, history of condom breakage, having steady partner, type of sexual practice, sex during menses, history of genital ulcer, history of STI, alcohol consumption, sexual abuse, number of clients per day and presence of HIV were not associated with HBV (27).

### 1.4.3. Conceptual frame work

This conceptual framework has been developed after reviewing different literatures (8, 19, 25-27). The diagram shows the effect of independent variables which are socio– demographic factors, sexual history and behavioural factors on the dependent variable HBV.

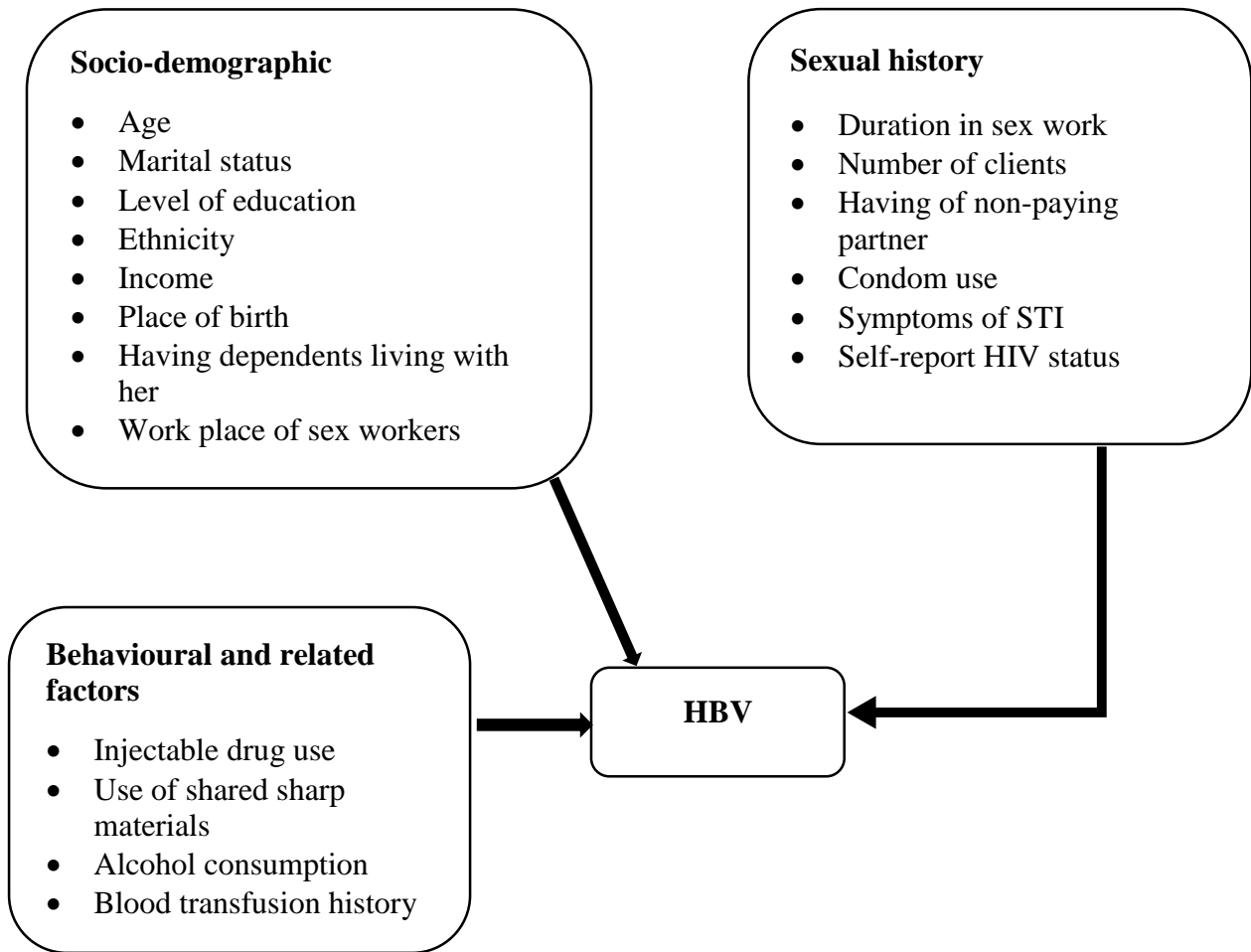


Figure 1: Conceptual frame work that shows the relation between HBV and associated factors among CSWs in Dessie city, Ethiopia, 2018

## **2. OBJECTIVES**

### **2.1. General Objectives**

- ✓ The main objective of this study is to assess the prevalence of HBV infection and factors associated among commercial sex workers in Dessie city, Ethiopia, 2018.

### **2.2. Specific Objectives**

- ✓ To determine the prevalence of hepatitis B virus among commercial sex workers in Dessie city, Ethiopia, 2018.
- ✓ To identify factors associated with Hepatitis B virus among commercial sex workers in Dessie city, Ethiopia, 2018.

### **3. METHODS and MATERIALS**

#### **3.1. Study area**

The study was conducted in Dessie City, Amhara Region, Northeastern Ethiopia. Dessie is the capital city of south Wollo zone and is located in the North eastern part of Ethiopia, at approximately 401 km far from the capital city, Addis Ababa and 480 Km far from Bahirdar, which is the capital city of Amhara regional state. It is one of the three biggest cities in Amhara regional state which is comparable with Bahirdar and Gondar. It serves as center of commercial and main route of transportation to northern Ethiopia. The city has a massive migration of work forces from various Woredas of south Wollo zone, Afar and Tigray region. Based on DKT Ethiopia report on Sex Workers Population Size Estimation in Seventeen Towns of Ethiopia 2013, Dessie is among the cities which has the highest female sex work population (29).

Dessie city Employee and social affairs office 2017 data indicated there were 1659 CSWs in the city. Among this 950 were venue based, 256 were street based, 349 were home based and the remaining 104 were working in Khat house, shisha house etc. (30). There are a number of governmental and Nongovernmental organization that undertake commercial sex workers target projects in Dessie city. Beza posterity development organization is one of nongovernmental organization which work closely with commercial sex works through MULU MARPS project funded by USAID. The projects focus on education, condom distribution, early diagnosis STIs and referral and ART drug reuptake.

#### **3.2. Study design and period**

A community based cross sectional study was conducted from March 1<sup>st</sup> to April 1<sup>st</sup> 2018.

#### **3.3. Source population**

All CSWs registered in Dessie city.

#### **3.4. Study population**

Selected commercial sex workers registered in Dessie city Employees and social affairs office.

#### **3.5. Inclusion and exclusion criteria**

##### **3.5.1. Inclusion Criteria**

- ✓ All female commercial sex workers age greater than or equal to 18 years old.
- ✓ Female commercial sex workers who are volunteer to participate in this study.

##### **3.5.2. Exclusion criteria**

- ✓ Those female sex workers who have mental or physical illness that limit them from interview
- ✓ Those selected female sex workers who are not available during the study period

### 3.6. Study variables

#### 3.6.1. Dependent Variable

Prevalence of hepatitis B virus

#### 3.6.2. Independent variable

- Socio-demographic characteristics
  - ✓ Age
  - ✓ Marital status
  - ✓ Level of education
  - ✓ Ethnicity
  - ✓ Income
  - ✓ Having dependents living with her
  - ✓ Work place of sex workers
- Behavioural and related factors
  - ✓ Injectable drug use
  - ✓ Use of shared sharp materials
  - ✓ Alcohol consumption
  - ✓ Blood transfusion history
- Sexual history
  - ✓ Duration in sex work
  - ✓ Number of clients
  - ✓ Having of non-paying partner
  - ✓ Symptoms of STI
  - ✓ Condom use
  - ✓ Self-report HIV status

### 3.7. Operational definition

**Commercial sex workers:** - consenting female who regularly or occasionally receive money or goods in exchange for sexual services.

### **3.8. Sample size determination**

Sample size was calculated for both the first and the second objective using Epi Info version 7. For the first objective the sample size was calculated using a single population proportion formula considering the following assumptions: standard normal distribution with confidence interval (CI) of 95% ( $Z=1.96$ ), absolute precision or tolerable margin of error ( $d=0.05$ ), and anticipated proportion of FSWs positive for HBV = 6% ( $P$ ) taken from the study conducted in Mekelle. Finally, 15% non-response rate was added; so, the final sample size was 96.

The maximum sample size was obtained for the second objective. Work place of CSWs were significantly associated factor for HBV exposure according to the study conducted in Makelle on CSWs(27). Therefore, by considering the following assumptions: standard normal distribution with confidence interval (CI) of 95%, absolute precision or tolerable margin of error ( $d=0.05$ ), ratio of open door CSWs to street CSWs is 1 and percent of open door CSWs exposed to HBV 95% the sample size was 214. Finally, by adding 15% non-response rate, the final sample size was 247.

### **3.9. sampling procedure**

Participants of the study were selected using simple random sampling techniques since there is registered data of female sex workers with their contact address in Dessie city employee and social affairs office.

### **3.10. Data collection procedures**

The selected study participants were contacted by Employees and social affairs office of Dessie city and they were asked for their consent to share their contacts to the principal investigator. Then the PI contacted volunteer study participants and invite them to come to Beza posterity development organization which was used as data collection site for both the interview and HBsAg test. After obtaining an informed and written consent, data was collected from the study participants on a one-to-one basis in a private room. Blood specimens from study participants was collected under aseptic technique and tested for HBsAg. One BSc nurse and one BSc laboratory technician, who have an experience on HBV test, participated on the data collection process. Each completed questionnaire was linked to its corresponding blood specimen through a unique study identification code.

### **3.11. Data collection tools**

World health organization Bio-behavioural Survey guideline, standardized structured questioner was used to collect the data (31). The questionnaire includes the following measures on: socio-demographic (such as age, level of education...), behavioral and related variable (such as Iv drug use, use of shared sharp materials...) and sexual history (duration in sex work, condom use...).

Blood specimens from study participants was collected under aseptic technique and tested for HBsAg using Rapid diagnostic test (RDT) which have 99% sensitivity specificity (32).

### **3.12. Data quality assurance**

Intensive training on the overall activity of the data collection and HBsAg test was given for the data collectors for one day. The questioner was examined by senior experts to the area of study for content validity and pretest was done among 10% of the sample size of CSWs at Kombolcha town to know the how much time it takes for the interview and to check the clarity of sentence. Unclear sentence found during expert evaluation and pretest, was corrected and revision was made into the final version of the data collection format. To maintain consistency of the tool the questioner was first changed from English to Amharic then back to English. For HBsAg test, all the necessary tool kits were checked for their expiry date. Quality control for the test strips was done using known positive and negative sample from Amhara regional laboratory, Dessie Branch. The cold chain of the specimens was always maintained. Data collection process was supervised, and each questionnaire was checked for completeness by the supervisor on a daily basis.

### **3.13. Data processing and analysis**

The completed questionnaire and serological test results was recorded in duplicate using the EpiData version 3 software and was exported to SPSS version 24. Descriptive statistics was done to identify the distribution of sociodemographic characteristics of the study participants. Bivariate and multi variable logistic regression and odds ratio with 95% confidence interval was used to identify the associated factors with HBV. Variables with p-value ( $\leq 0.05$ ) was used as the cut-off point and independent variables with p-value  $\leq 0.05$  in bivariate logistic analysis was fitted in to multi variable logistic regression to identify independently associated factors in the final model.

### **3.14. Ethical consideration**

Ethical clearance was obtained from Addis Ababa University School of Nursing and Midwifery ethical review board. A formal letter was given and permission was obtained from Dessie health office and from local authorities. After a detail explanation of the purpose of the study, verbal and

written consent was obtained from each study participants. Participants who refused to participate in the study were not forced to participate. Those study participants who have positive HBsAg test result were linked to the respective health care service for further diagnosis and treatments.

### **3.15. Dissemination of the result**

The result of this study will be submitted to Addis Ababa University College of Health sciences, School of nursing and midwifery and it will be disseminated to Dessie health office and other stakeholders. Furthermore, the paper will be presented on workshops and seminars. Finally, the manuscript will be submitted to scientific journals for publication.

## 4. RESULT

### 4.1. Socio demographic characteristics of the study participants

From a total of 247 participants recruited, 230 participated in the study while 17 unwilling to participate in the study, yielding the response rate of 93.1%. Among the 230 study participants, the mean age of the respondents was 26.5 (SD± 6.093) years. More than half of the respondents, 134 (58.3%) were followers of orthodox Christianity, 62(27%) were Muslim and 34(14.8%) were protestants. The predominant ethnic group was Amhara 104(45.2%). Majority of the respondents 142(61.7%) received less than 450 ETB per client, 130(56.5%) of the study participants works in Hotel, club, bar or restaurant (see table 1).

Table 1: The socio-demographic characteristics of CSWs in Dessie city in 2018 (n=230)

<b>Variables</b>	<b>Frequency (n=230)</b>	<b>Percent (%)</b>
<b>Age (Mean=26.5 (SD± 6.093))</b>		
18-24	92	40
25-29	80	34.8
30-34	30	13
>35	28	12.2
<b>Ethnicity</b>		
Amhara	104	45.2
Tigray	50	21.7
Oromo	44	19.2
Wolayita	24	10.4
Afar	8	3.5
<b>Religion</b>		
Orthodox	134	58.3
Muslim	62	27
Protestant	34	14.8
<b>Educational status</b>		
Unable to read and write	18	7.8
Able to read and write	36	15.7
Primary	104	45.2
Secondary	60	26.1
Diploma	12	5.2
<b>Place of birth</b>		
Urban	118	51.3
Rural	112	48.7
<b>Having dependents/children</b>		
No	78	33.9
Yes	152	66.1
<b>Marital status</b>		
Single	98	42.6
Married	14	6.1
Divorced	98	42.6
Widowed	20	8.7
<b>Charge per Client</b>		
≤450 ETB	110	47.8
>450 ETB	120	52.2
<b>Work place for sex work</b>		
Brothel, guesthouse	48	20.9
Hotel, club, bar, restaurant	130	56.5
Street, park, or other public place	52	22.6
<b>Other source of income</b>		
No	166	72.2
Yes	64	27.8

Abbreviation: ETB Ethiopian Birr

#### 4.2. Behavioural and related characteristics of participants

Among 230 study participants, 32(13.9%) had a history of blood transfusion. 24 (10.4%) of the study participants used injectable drugs. Table 2 below reveal all details about the behavioural and related characteristics of study participants.

Table 2: Behavioural and related characteristics of CSWs in Dessie city in 2018 (n=230)

<b>Variables</b>	<b>Frequency(n=230)</b>	<b>Percent (%)</b>
<b>Have you ever take alcoholic drinks</b>		
Yes	230	100
<b>Alcoholic drinks before sex</b>		
Sometimes	148	64.3
Always	82	35.7
<b>Injectable drug use</b>		
No	206	89.6
Yes	24	10.4
<b>Blood transfusion history</b>		
No	198	86.1
Yes	32	13.9
<b>Use of shared sharp materials</b>		
No	162	70.4
Yes	68	29.6

#### 4.3. Sexual history of participants

Out of the total participants, 78(33.9%) have been in sex work for less than 5 years. Majority of the study participants 150(56.2%) had more than 5 clients per week. and 197(85.7%) mentioned they usually use condoms during sexual intercourse. (Table 3)

Table 3: Sexual history of CSWs in Dessie city in 2018(n=230)

<b>Variables</b>	<b>Frequency(n=230)</b>	<b>Percent (%)</b>
<b>Age at first sex</b>		
≤18 years	50	21.7
>18 years	180	78.3
<b>Duration in sex work</b>		
≤5 years	78	33.9
>5 years	152	66.1
<b>Having of non-paying partner</b>		
No	100	43.5
Yes	130	56.5
<b>Condom use with non-paying partner</b>		
No	66	28.7
Yes	64	27.8
<b>Frequency of condom use with non-paying partner</b>		
Sometimes	28	12.2
Frequently	6	2.6
Always	30	13.0
<b>History of condom breakage with paying partner</b>		
No	14	6.1
Yes	50	21.7
<b>Condom use with paying partner</b>		
Yes	230	100
<b>Frequency of condom use with paying partner</b>		
Sometimes	12	5.2
Frequently	21	9.1
Always	197	85.7
<b>History of condom breakage with paying partner</b>		
No	52	22.6
Yes	178	77.4
<b>Total number of sexual partners per week</b>		
≤5 person	80	34.8
>5 person	150	65.2
<b>Discharge from vagina in the last 12 months</b>		
No	184	80
Yes	46	20
<b>Ulcer/sore in genital area in the last 12 months</b>		
No	192	83.5
Yes	38	16.5
<b>Lower abdominal pain in the last 12 months</b>		
No	200	87
Yes	30	13
<b>Tasted for HIV before</b>		
No	64	27.8
Yes	166	72.2
<b>Result of HIV test</b>		
Positive	20	8.7
Negative	146	63.5

#### 4.4. The prevalence of HBV

Of the total participants undergone laboratory test for HBV, the overall prevalence of HBV among CSWs was 17.4% (95% CI: 12.6, 22.2). (See fig. 2)

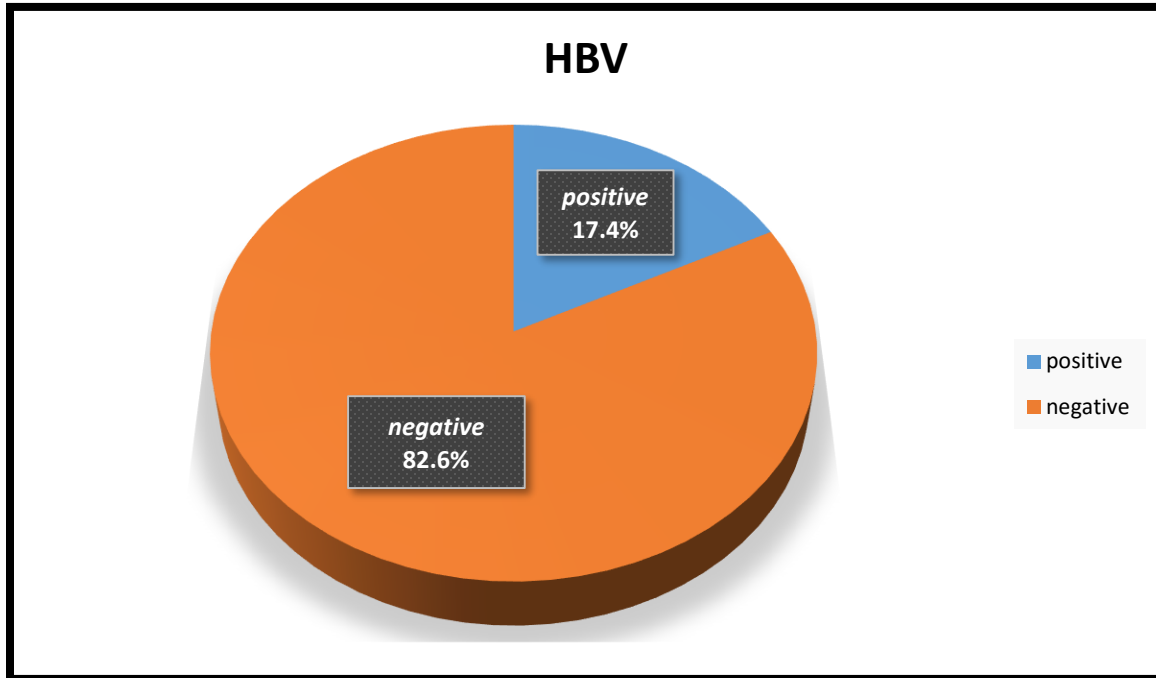


Figure 2: prevalence of HBV among CSWs in Dessie city in 2018 (n=230)

#### 4.5. Factors associated with HBV

In Bivariate logistic regression, HBV was significantly related with having children/dependents, alcoholic drinks before sex, history of blood transfusion, duration in sex work, age at first sex, charge per client, number of clients per week, use of shared sharp material and having thick yellowish/greenish vaginal discharge with a foul smell in the last 12 months. The covariates age, place of birth, marital status, educational level, ethnicity, workplace of sex workers, condom use, HIV status, having non-paying partner, self-report HIV status and injectable drug use were not statistically significant at 5% significance level.

In multi variable logistic regression, having children or dependent, number of clients per week, age at first sex and vaginal discharge with a foul smell were a significant predictor of HBV. There is no statically significant relationship between use of shared sharp materials, alcoholic drink before sex, history of blood transfusion, duration in sex work and charge per client.

The odds ratio for the variable number of client (sexual partner) per week shows HBV were 2.5 times higher  $P= 0.047$  [AOR= 2.556, (95% CI: 1.014-6.447)] for sex workers who have more than 5 clients (sexual partner) per week when compared to those who have less. Participants who had children or dependents were 3 times  $P=0.035$  [AOR=3.009, (95% CI:1.078-8.399)] more odds to be positive compared with those who don't have and early initiation of sexual intercourse (before the age of 18) was positively associated with HBV  $P = 0.035$  [AOR=2.577, (95% CI:1.067-6.219)]. Participants who have a thick yellowish/greenish vaginal discharge with a foul smell in the last 12 months were 3 times  $P= 0.022$  [AOR=3.044, (95% CI: 1.176-7.879)] more odds to be positive than who don't have. (see table 4).

Table 4: Covariates associated with HBV among CSWs in Dessie city, 2018 (n=230)

Variables	<b>HBV</b>		<b>OR (95% CI)</b>	
	Yes	No	COR	AOR
<b>Having children/ dependents</b>				
Yes	34	118	3.458 (1.383-8.642)	3.009(1.078-8.399) *
No	6	72	1	1
<b>use of shared sharp material</b>				
Yes	20	48	2.958 (1.468-5.963)	1.957(0.829-4.620)
No	20	142	1	1
<b>Alcoholic drinks before sex</b>				
Always	20	62	2.065(1.035-4.116)	2.010(0.906-4.460)
Sometimes	20	128	1	1
<b>History of blood transfusion</b>				
Yes	10	22	2.545(1.096-5.910)	1.634(0.572-4.666)
No	30	168	1	1
<b>Duration in sex work</b>				
>5 years	32	120	2.333(1.019-5.345)	2.253(0.844-6.014)
≤5 years	8	70	1	1
<b>Age at first sex</b>				
≤18 years	14	36	2.303(1.094-4.848)	2.577(1.067-6.219) *
>18 years	26	154	1	1
<b>Charge per Client</b>				
≤450ETB	26	84	2.344(1.152-4.767)	2.031(0.906-4.557)
>450ETB	14	106	1	1
<b>Number of clients per week</b>				
>5 person	32	118	2.441(1.066-5.588)	2.556(1.014-6.447) *
≤5 person	8	72	1	1
<b>Discharge from vagina</b>				
Yes	14	32	2.659(1.253-5.643)	3.044(1.176-7.879) *
No	26	158	1	1

Abbreviation: ETB Ethiopian Birr

\*statistically significant at P< 0.05

## 5. DISCUSSION

Viral hepatitis is an international public health challenge, comparable to other major communicable diseases, including HIV, tuberculosis and malaria. Despite the significant burden it places on communities across all global regions, hepatitis has been largely ignored as a health and development priority until recently (33). Sex workers belongs to high-risk populations, such as PWID and persons in prisons or closed settings. They are at increased risk of sexual transmission of HBV. The main aim of this study was to assess the prevalence of hepatitis B virus among commercial sex workers in Dessie city.

This study revealed that the prevalence of HBV among commercial sex workers in Dessie city was 17.4% (95% CI: 12.6, 22.2). Similar findings were reported on international studies conducted in Goiânia, Brazil (17.1%) and Shanghai, China(12.3%) (19, 34). On the other hand, the current study finding was higher than the finding of studies done in Tehran, Iran on HIV, HCV, HBV, HSV, and syphilis prevalence among female sex workers the prevalence of HBV was 1.2%, Rwanda among female sex workers (2.5%), and on prevalence of HBV among commercial sex workers in Mekelle (6%) (26, 27, 35) and lower than the studies done on HIV, hepatitis B and C, and syphilis prevalence and coinfection among sex workers in Southern Brazil (23.1%) (18). The prevalence of HBV reported from the studies conducted in three Afghan cities among female sex workers, in the Republic of Congo among female sex workers, in Nagpur Region among female sex workers, in Tamil Nadu, India among a special study group and The Integrated Bio-Behavioral Survey (IBBS) in Syria were 6.54%, 4.2%, 1.5%, 2.8% and 5.3% respectively (17, 20, 21, 23-25). This variation of findings across various studies might be due to diagnostic tools and reporting biases, differences in socio economic environments. Prevalence estimates also are likely to be influenced by stigma and discrimination.

Compared to general population, it can be assumed that CSWs are more likely to have STIs including HBV. Comparing this study results with the general population, the prevalence of HBV was higher (10.8 % vs 17.4%) (12).

Also, the observed prevalence of CSWs in Dessie city was higher than other population groups. Studies done among pregnant women indicated the prevalence of HBV was 6.9% in Deder Hospital, Eastern Ethiopia, 5.5% in Tigray, 7.8% in southern Ethiopia, and 6% in Addis Ababa (36-39). Other studies conducted in Adama, Gondar, Jimma, Addis Ababa and Tigray among blood donors the of prevalence HBV was 5.91%, 4.05%, 3.87%, 3.75%, 3.7% respectively (40).

Prevalence of hepatitis B virus infection among military personnel at Bahir Dar Armed Forces General Hospital, was 4.2% (41). The higher magnitude in the current study might be because of their risky behaviors experienced by this group. Several factors can explain the much higher prevalence of HBV among the CSWs in this study than in the general population. First, CSWs are at high risk for HBV due to large numbers of sex partners, unsafe working conditions and barriers to the negotiation of consistent condom use. Moreover, sex workers often have little control over these factors because of social marginalization and criminalized work environments. Alcohol, drug use and violence in some settings may further exacerbate their vulnerability and risk. Furthermore, although members of the general population also engage in frequent risky behaviors like vaginal sex without condoms, their chance of having STIs including HBV-infected partner is much lower than that of members of key populations or that of CSWs.

Unlike the study done in Mekelle, having children or dependents was significantly associated with HBV [AOR=3.009, (1.078,8.399)]. Similar relation was reported in study conducted in Afghanistan (23). The observed association among HBV and having dependents or children might be due to economic factors. In order to fulfil the basic need or financial need for their child or family they might engage in riskier behaviors. The other reason could be due to poor practices of infection prevention control during abortion and related activities like home delivery. As it is mentioned in the above they have financial problem thus, they may deliver at home with contaminated equipment.

This study found a positive association between HBV and early initiation of sexual intercourse. Study subjects who started sex early (less than 18 years) were 2.5 times more odds to be positive as compared with those who did not [AOR=2.577, (1.067,6.219)]. This study finding is similar with the study done among female sex workers in Teresina-PI, northeastern Brazil (27) The possible reasons may be Early onset of sexual intercourse represents an increased risk for sexually transmitted infections.

In agreement with WHO, 2014 Prevention and Treatment of HIV and other Sexually Transmitted Infections for Sex Workers in Low- and Middle-income Countries and studies result from Teresina-PI, Northeastern Brazil, India and Afghanistan (7, 8, 23, 42), this study indicated number of clients (>5 clients (sexual partner) per week) significantly associated with HBV [AOR= 2.556, (1.014,6.447)] The possible explanation may be multiple clients produce greater vulnerability to risks for low adherence to the use of condoms in all sexual relations. Also, clients of sex workers

may practice risky behaviors like injectable drug use etc., thus increase the risk of acquiring STIs including hepatitis B virus.

Studies indicated that symptoms of STI were predictors of exposure to HBV (19, 20, 35). Consistently, result of this study reflected the odds of Participants who have STI symptoms which is a thick yellowish/greenish vaginal discharge with a foul smell in the last 12 months were 3 times to be positive as compared with participants who don't have [AOR=3.044, (1.176,7.879)]. The most common causes of vaginal discharge are *Neisseria gonorrhoea*, *Chlamydia trachomatis* and *Trichomonas vaginalis*. These infections can cause inflammation and ulcer around the genital area. Thus, it may increase the risk of becoming infected with HBV.

In this study charge per client, educational status, history of blood transfusion, using shared sharp materials, duration in sex work, alcohol consumption and having nonpaying partner had not statically significant association with HBV as other studies done in Teresina-PI, Northeastern Brazil among sex workers, in three Afghan cities among female sex workers, in Mekelle among commercial sex workers and in Tehran, Iran among female sex workers found out (8, 23, 27, 35).

## **6. STRENGTH AND LIMITATIONS**

### **6.1. Strength**

The Strengths of the study were use of World health organization Bio-behavioural Survey guideline, standardized structured questioner, HBV test was done using RDT with 99% sensitivity and specificity, high response rate and since there is limited study conducted in the area, it can contribute a lot as baseline information for future studies.

### **6.2. Limitation**

Limitations first, though HBsAg RDT have excellent sensitivity and specificity, these tests cannot detect very recent infections. The other limitation is self-reports of sexual behaviors can over or underestimate the chances of HBV positivity. Moreover, this cross-sectional study was unable to identify the specific timing and relationships between HBV and participants' responses.

## **7. CONCLUSION AND RECOMMENDATION**

### **7.1. Conclusion**

The prevalence of HBV among CSWs in in this study was high (17.4%) when compared to the general population and in other subgroups like blood donors and pregnant women. HBV had statistically significant association with having children or dependents, number of clients per week, early onset of sexual intercourse and symptom of STI which is a thick yellowish/greenish vaginal discharge with a foul smell in the last 12 months. Hence HBV is highly associated with sexual factors.

Socio-demographic and behavioural factors like charge per client, educational status, history of blood transfusion, using shared sharp materials, duration in sex work, alcohol consumption and having nonpaying partner were not associated with HBV in this study.

### **7.2. Recommendation**

Based on this study finding the following recommendation are given.

#### **1. Policy, strategies, program management**

- ✓ Since this finding indicate HBV infection is more prevalent among CSWs, efforts by both governmental and non-governmental organizations should be made to give emphasis for CSWs.

#### **2. Interventions**

- ✓ Provide early diagnosis and treatment of STIs for CSWs.
- ✓ Educate the community on risk of early onset of sexual intercourse.
- ✓ Provide economic support and other income generating works for those who have children or dependents.
- ✓ Educate CSWs on risky sexual behaviors.

#### **3. Researcher**

- ✓ Further research should be done on larger sample size and with different study design.

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## ANNEX

### I. Participant's information sheet and consent form

#### Participant's Information Sheet

Greeting: Good morning/afternoon

My name is \_\_\_\_\_ I am working on behalf of research conducted by Selamawit Wondale student of Addis Ababa University, School of Allied health science. I would like to ask few questions which take around 10 minutes. Your genuine responses that you are going to give are very important to identify problems related to Hepatitis B and design programs. You are selected purposefully to be participant of this study if you give me consent after you have understood the following information sheet:

**Title of the study:** Prevalence of Hepatitis B Virus and Factors Associated Among Female Sex Workers in Dessie City, Ethiopia, 2018

**Back ground of the study:** Hepatitis B infection is caused by the hepatitis B virus, an enveloped DNA virus that infects the liver and causes hepatocellular necrosis and inflammation. The main ways of transmission are perinatal transmission and sexual intercourse.

**Objective of the study:** To assess the prevalence of HBV infection and factors associated among female sex workers in Dessie city, Ethiopia, 2018

**Benefit of the study:** If you are positive for HBV during investigation, opportunities for management will be arranged and you will be followed.

**Risk of the study:** While you are participating, you are likely to have some risks. The risks associated with this study could be some discomforts and pain during testing procedure. However, these things do not produce serious pain and if in case any problem arises during and following testing procedure, we will offer you necessary medical interventions until you fully recover.

**Rights of participants:** Participating and not participation in the study is the full rights of participants and you can ask any question which is not clear for you. You do not have to answer any questions that you do not want to answer and you may end this interview at any time you want to.

**Confidentiality:** I am going to ask you some very personal questions that some people find difficult to answer. Your answers are completely confidential. Your name will not be written on this form and will never be used in connection with any of the information you tell me.

**Consent Form**

I have read this form or it has been read to me in the language I comprehend and understand all conditions stated above. Are you willing to participate in this study?

- 1.No (Say Thank you)
- 2. Yes → participant’s signature .....

Continue your interview

I certify that the nature and purpose, the potential benefits and possible risks associated with participating in this study have been explained to the volunteer.

\_\_\_\_\_  
Signature of interviewer

\_\_\_\_\_  
Date

If you have any question concerning the study you can ask with the following address

**Name of principal investigator:** Selamawit Wondale

**Address:** Cell phone: 0911086507;

E-mail: [seliwondalr@gmail.com](mailto:seliwondalr@gmail.com)

**Name of institution:** Addis Ababa University, School of Allied health science

**Address:** AA, Ethiopia

## IDENTIFICATION SECTION

**Important instruction:** The identification section has to be filled up for all the respondents approached for an interview. That means even in case of refusal, incomplete interview or non-availability of respondents the identification page must be filled.

001	Questionnaire code	_____
002	Interviewer's name	
003	Date of interview (DD/MM/YY E.C)	
004	Time of interview (Local Time)	
005	Result Code Completed .....1 Partially Completed .....2 Refused.....3 Respondent not available.....4	_____
006	Supervisor name	

## II. English version questionnaire

### Part 1 : Socio-demographic characteristics of the participants

Q.No.	Question	Choices
101	How old are you? (Age in years)	_____
102	What is your ethnicity?	1. Amhara 2. Tigrie 3. Afar 4. Oromo 5. Others ( <b>specify</b> )_____
103	What is your religion?	1. Orthodox 2. Muslim 3. Protestant 4. Catholic 5. Others ( <b>specify</b> )_____
104	What is your educational level?	1. Unable to read and write 2. Read and write 3. Primary 4. Secondary 5. Diploma 6. Degree and Above
105	Place of birth	1. Urban 2. Rural
106	How many children or relatives do you have currently living with you that you are responsible for?	1. _____ 2. None
107	What is your current marital status?	1. Single, never married 2. Married 3. Separated/ divorced 4. Widowed
108	What is the approximate amount you earn per sex act?	_____birr _____
109	Where do you usually meet or find clients?	1. Brothel, guesthouse, 2. Hotel, club, bar, restaurant 3. Street, park, other public places

		4. Other
110	Do you have any other source of income?	1. Yes 2. No

### Part 2: Behavioural factors

Q.No.	Question	Choices
201	Have you ever take alcoholic drinks like beer, tej, wine, tella, or areki?	1. Yes 2. No
202	How often do you take alcoholic drinks before having sex with your clients /partners?	1. Never 2. Sometimes 3. Frequently 4. Always
203	Have you injected any drug without a doctor's prescription?	1. Yes 2. No
204	Do you have any history of blood transfusion?	1. Yes 2. No
205	Have you ever used shared sharp materials?	1. Yes 2. No

### Part 3: Sexual history

Q.No.	Question	Choices
301	How old were you when you had your first sex? (age in years)	_____
302	How long have you been in sex work?	_____
Condom use, Number and Type of Partners		
303	Do you have Non-paying regular partners? <b>Non-paying regular partners:</b> Regular partners who did not pay any money to have sex with you <b>(include spouse, Live-in sexual partners)</b>	1. Yes 2. No
304	If yes for question number 304, Do you generally use condom with your non-paying regular partner?	1. Yes 2. No

305	If yes for question number 305, with what frequency did you use condoms?	1. Never 2. Sometimes 3. Frequently 4. Always
306	Have you ever experienced condom breakage with non-paying regular partners?	1. Yes 2. No
Condom use with paying clients		
307	Do you generally use condom with your paying clients? <b>Paying clients:</b> Partners with whom you had sex in exchange of money	1. Yes 2. No
308	If yes for question number 308, with what frequency did you use condoms?	1. Never 2. Sometimes 3. Frequently 4. Always
309	Have you ever experienced condom breakage with paying clients?	1. Yes 2. No
310	In total, with how many different sexual partners have you had sex during the last seven days (one week)?	1. _____ (number in last 7 days) 2. Cannot remember/no response
Symptoms of STI and HIV status		
311	Have you had a thick yellowish/greenish discharge with a foul smell from your vagina in the last 12 months?	1. Yes 2. No
312	Have you had an ulcer/sore in your genital area during the last 12 months?	1. Yes 2. No
313	Have you had lower abdominal pain in the last 12 months?	1. Yes 2. No
314	Have you tested for HIV before now?	1. Yes 2. No
315	If yes, what was the result?	1. Positive

		2. Negative
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<b>Test result</b>	
<b>HBsAg test result</b>	<b>1. Negative</b> <b>2. Positive</b>

**THANK YOU**

I have finished my interview



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<b>Test result</b>	
<b>HBsAg test result</b>	<b>1. Negative</b> <b>2. Positive</b>

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