PREVALENCE OF HEPATITIS B VIRUS INFECTION AND ASSOCIATED FACTORS AMONG HIV POSITIVE ADULTS ATTENDING ART CLINIC AT HAWASSA REFERRAL HOSPITAL, SNNPR, ETHIOPIA

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Abstract

Background: Hepatitis B and HIV infections are serious global public health problems. Persons with HIV infections are disproportionately affected by viral hepatitis. Among the estimated 40 million persons infected with HIV worldwide, an estimated 2–4 million (5%-15%) have chronic hepatitis B virus. This co-infection is common due to shared transmission routes of the agents. In Ethiopia, even though, HBV infection is more common in HIV infected individuals and has impact on the clinical progress of the disease, only little is known about the distribution as well as factors associated with the infection.

Objective: The objective of the study was to assess the prevalence of hepatitis B infection and associated factors among HIV positive adults attending ART clinic at Hawassa University Referral Hospital, Hawassa, Southern Ethiopia.

Methods and Materials: A Hospital based cross-sectional study design was used. The study was conducted from April 2 to May 2, 2014 in Hawassa university referral hospital. Samples were taken consecutively to get the calculated sample size of 358 adults living with HIV. Pretested interviewer administered structured questionnaire was implemented. Data were analyzed using16.0. To identify factors two stages were followed. In the first stage tests of association of each independent variable was done. In the second stage those tests that resulted at most P- value of 0.2 were entered in to multivariate logistic regression. Variables that showed significant association were identified on the basis of OR and declared at p-values < 0.05.

Result: Among the sample of 348 HIV positive adults, 128 (36.8 %) were males and 220 (63.2%) were females with mean (±SD) age of 33.2(±9.1) years. Hepatitis B surface antigen was detected in 24 (6.9 %) of individuals. The prevalence of HBV infection was 17(7.7%) among females and 7 (5.5%) among males. About 66% of study participants have poor knowledge regarding etiology, sign and symptoms, transmission, treatment and management of Hepatitis B. History of surgical procedure [AOR= 4.6: 95% CI, 1.8-11.6]and previous opportunistic infection [AOR=5.2: 95% CI, 1.1-23.2]were significantly associated with presence of HBsAg.

Conclusion and recommendation: The prevalence of HBsAg was found to be intermediate in HIV positive adults and majority of them had poor knowledge about the disease. we recommend, provision of routine screening and vaccination service together with accurate information on risk factors such as opportunistic infection and surgical procedure for transmission of HBV.

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Acronyms

AIDS - Acquired Immuno Deficiency syndrome

ART - Anti Retroviral Treatment

CD - Compact Disc

CDC - Communicable Disease Control

DNA - Diribo Nucleic Acid

ELISA - Enzyme Linked Immuno Sorbent Assay

HAART - Highly Active Antiretroviral Therapy

HIV - Human Immuno deficiency Virus

HBV - Hepatitis B Virus

HCV - Hepatitis B Virus

HBSAg - Hepatitis B Surface Antigen

IFNa - Interferon-Alpha

KAP - Knowledge Attitude and Practice

MSM – Men Sex with Men

NGO - Non Governmental Organization

OPI- Opportunistic Infection

PLHIV - People Living With HIV

RNA - Ribonucleic Acid

SNNPR - South Nations Nationalities and Peoples Region

SPSS - Statistical Package for Social Science

STD - Sexually Transmitted Diseases

STI - Sexually Transmitted Infections

VCT - Volunteer Counselling and Testing

WHO - World Health Organization

Chapter one: Introduction

1.1. Back ground information

Viral hepatitis is one of the most common diseases worldwide. This disease is characterized by inflammation of liver and in many cases permanent damage to liver tissue. Most common types of hepatitis are hepatitis A, B, C, D, E and G (1). Hepatitis B is the most serious type of viral hepatitis, which can lead to chronic liver disease and put people at high risk of death from cirrhosis of the liver and liver cancer (2). It is a DNA virus replicates in hepatocytes and damage the liver by immune response to the virus (3).

When first infected, a person can develop an "acute" infection, which can range in severity from a very mild illness with few or no symptoms to a serious condition requiring hospitalization. Acute Hepatitis B refers to the first 6 months after someone is exposed to the Hepatitis B virus. Some people are able to fight the infection and clear the virus. For others, the infection remains and leads to a "chronic," or lifelong, illness. Chronic Hepatitis B refers to the illness that occurs when the Hepatitis B virus remains in a person's body (4).

The virus is transmitted vertically at birth, horizontally through unprotected sex, sharing of injecting equipment and close contact between infants and neonates. Transmission through unscreened blood products is another route of transmission since blood remains infectious for several weeks even when dried (4, 5). HCV can also cause chronic liver diseases and is transmitted in the same ways as hepatitis B, although mother to infant and sexual transmissions are less common (4).

Hepatitis B is avoidable with a readily available and efficacious vaccine (6). Among the groups for whom CDC recommends vaccination against hepatitis B are persons who have or are at risk for HIV infection, including MSM; persons who inject drugs; susceptible sex partners of infected persons; persons with multiple sex partners; anyone with a sexually transmitted infection (STI); and health care and public safety workers exposed to blood on the job (7).

To stop injecting drugs, to stop sharing toothbrushes, razors, or other personal items that may come into contact with another person's blood, not getting tattoos or body piercings from an unlicensed facility or in an informal setting, using condoms consistently and correctly, limiting

the number of sex partners, and getting treatment for other STIs are additional preventive measures for HBV infection (7).

The diagnosis of HBV infection is generally made using results of serological tests, although clinical chemistry, analysis of liver enzymes and histological techniques is also useful (8). Upon HBV infection, HBV antigens and antibodies otherwise known as HBV markers are produced by the patient and can be found in patient serum (9). HBsAg is HBV marker that sheds into the patient's blood and is the first serological marker of infection to appear (10).

For the treatment of chronic HBV infection two classes of antiretroviral agents are approved. These are the nucleoside analogues; Lamivudine, Telbivudine and Entecavir and the acyclic nucleotide analogues; Adefovir and Tenofovir which directly inhibit HBV DNA replication. Additionally, interferon -based therapies which modulate host immune response as well as viral replication are approved (11).

Hepatitis B and HIV infections are serious global public health problems. Many of the countries with high HIV burden are also affected by high prevalence of hepatitis B infection, leading to frequent HIV/HBV co-infection (12).

Evidences indicated that HIV positive individuals are more likely to be chronic carrier and have a higher HBV replication rate than HIV negative individuals. In addition, it is evident that immuno-suppression brought about by HIV infection may cause re-activation or re-infection in those previously exposed to HBV. Furthermore HIV infection exacerbates liver disease in HBV co-infected individuals and there is an even greater risk of liver disease when HIV and HBV co-infected patients are treated with HAART (13). It has been observed that HBV/HIV co infection leads to increased morbidity and mortality as compared to HIV or HBV mono-infections (14).

An estimated two billion people around the globe have been contaminated with hepatitis B virus. Persons with HIV infections are disproportionately affected by viral hepatitis. Among the estimated 40 million persons infected with HIV worldwide, an estimated 2–4 million (5%-15%) have chronic HBV (7,15). The co-infection was reported as high as 10–20% in countries where HBV infection is either endemic or intermediate to high HBV cases (14). Even though, HBV and HIV have common routes of transmission and endemic areas, HBV is about 100 times more

infectious. Consequently, in some settings up to two thirds of all HIV-infected people have a blood marker of past or present HBV infection (16, 17).

A community based sero-epidemiological survey of Addis Ababa, Ethiopia has shown a 7% sero-prevalence for HBsAg (18). Other hospital-based studies in the country conducted in St Paul's General Specialized Hospital and Shashemene General Hospital documented HBsAg prevalence from 3.9% to 14% among HIV positive individuals (19, 20).

Myths and misinformation about modes of HBV transmission have resulted in widespread discrimination against chronically infected persons in some endemic countries (4).

Some people in the general public are more prone to contracting hepatitis B than others e.g. drug users or injectors, people who pierce or tattoo their bodies and unprotected sex engaged in by adolescents due to their lack of knowledge about sexual negotiation and safe sex practices (21). Since HIV and HBV share common mechanism of transmission, PLHIV are more likely to contract these risky practices which will make them exposed to HBV infection by the time they are exposed to HIV (13, 22).

1.2 Statement of the problem

Hepatitis B virus is next to tobacco as a known individual carcinogen and is the 10th leading cause of death around the world (23). Many of the countries that are affected by hepatitis B are also affected by a high HIV burden, leading to frequent HIV/HBV co infection (24).

Even though, morbidity and mortality have decreased greatly in HIV-infected individuals, since the introduction of highly active antiretroviral treatment (HAART); the management of other non HIV associated chronic diseases in HIV patients has become increasingly important. HBV infection is an emerging concern in the clinical management of patients because of increased mortality, accelerated hepatic disease progression, and the frequent hepatotoxicity caused by anti-retroviral therapy. In these regard HBV co infection with HIV is becoming a major challenge (25).

Some people in the general public are more prone to contracting hepatitis B than others e.g. drug users or injectors, people who pierce or tattoo their bodies and unprotected sex engaged in by adolescents due to their lack of knowledge about sexual negotiation and safe sex practices (21). In addition in sub-Saharan Africa, unscreened donated blood, unsafe therapeutic practices, including the use of inadequately sterilized needles and medical instruments are the major routes of HBV transmission apart from sexual exposure (13). PLHIV are more likely to contract these risky practices which will make them exposed to HBV infection by the time they are exposed to HIV (13, 22).

Thus, PLHIV are disproportionately affected with viral hepatitis mainly due to sharing of same route of transmission by the infectious agents. Among the estimated 40 million persons infected with HIV worldwide, an estimated 2–4 million (5%-15%) have chronic HBV (15). The co-infection was reported as high as 10–20% in countries where HBV infection is either endemic or intermediate to high HBV cases (14).

Ethiopia being one of the countries most hit by HIV infection (prevalence of 2.1%) and also found in a region classified as high endemic area for HBV; the likelihood of HBV/HIV co infection is highly anticipated (26).

However, in Africa in general and in Ethiopia in particular, information on the magnitude of HBV positivity at different risk groups including people living with HIV/AIDS is scarce. Even little emphasis is given for viral hepatitis co infections in HIV patients in Ethiopia and recent ART guidelines do not recommend routine screening test for HBV (20, 26).

Prevalence of hepatitis B virus infections has been studied in some parts of Ethiopia. Hospital based studies in the country conducted at St Paul's General Specialized Hospital and Shashemene General Hospital documented HBsAg prevalence from 3.9% to 14% among HIV positive individuals. But the distribution of the virus and associated socio-demographic, behavioural, clinical and knowledge related factors were not explored at large in this community group (19, 20).

Because of the significant burden and clinical impact of HBV in HIV-infected individuals, understanding of the epidemiologic trends, exposure proportions and associated risk factors have paramount importance to undertake effective prevention measures (27).

Therefore this study tried to elaborate sero-prevalence of HBV infection and it associated risk factors among adult peoples living with HIV who are attending at ART clinic of Hawassa University Referral Hospital.

Chapter two: Literature Review

2.1. Literature Review

HIV/HBV co-infection

Both human immunodeficiency virus (HIV) and hepatitis B virus (HBV) are transmitted through sexual and percutaneous routes; thus, coinfection with both viruses is common (28). Viral hepatitis progresses faster among persons with HIV, and persons who are infected with both viruses experience greater liver related health problems than those who do not have HIV infection(7). The consequences of co-infection, including increased liver-related morbidity and mortality, increased hepatitis B viral replication, immune reconstitution to HBV in the setting of antiretroviral therapy, and hepatotoxicity from antiretroviral drugs, are especially important in regions with expanding antiretroviral programs (*24*).

Prevalence of HBV

Global prevalence of HBV

Worldwide, HBV is the leading cause of chronic liver disease and a leading cause of death, accounting for up to half of all cases of cirrhosis and hepatocellular carcinoma. Of the 2 billion people who have been infected with HBV, an estimated 400 million people have chronic infection, with the majority of cases occurring in regions of Asia and Africa (29,30).

The WHO has demarcated the world according to chronic hepatitis B prevalence into three major blocks which include high, intermediate and low prevalence. High prevalence areas have a prevalence of chronic hepatitis B infection that is equal to or greater than eight (8%) made up of countries from North America, South America, Sub-Saharan Africa and most Asian countries. Intermediate prevalence areas have a prevalence rate which ranges between 2% and 7% and include countries from South America, North Africa, Western Europe, Eastern Europe and the Indian subcontinent. Low prevalence areas are estimated to have a prevalence of chronic infection less than (2%) which includes most of the North American countries, Australia and most of Western Europe including the United Kingdom (UK) (31).

Prevalence of HBV in Africa

Africa has the second largest number of chronic carriers after Asia and is considered a region of high endemicity. The exact burden of hepatitis B in Africa is difficult to assess due to inaccurate records and under-reporting, but between 70 and 95% of the adult population show evidence of past exposure to HBV infection and the estimated HBsAg seroprevalence ranges from 6-20% (32).

Although both sexes are equally exposed to HBV, HBsAg carriage is higher in sub-Saharan Africa males. However, this is not unique to the region, as it is seen in most other countries as well. Male: female ratios in the region range from 1.5:1 to 4:1 (33,34).

Prevalence of HBV in Ethiopia

Ethiopian national hepatitis study showed that 10.8% of young males from all regions of the country were positive for HBsAg (35). Another study done in Ethiopia has shown an overall HBsAg prevalence of 6.2% (36). A community based sero-epidemiological survey of Addis Ababa, Ethiopia has shown a 7% sero-prevalence of HBsAg, higher in males than females (18).

Prevalence of HBV among PLHIV

Approximately 10% of the HIV-infected population worldwide is infected with hepatitis B. This figure may approach 20% in Southeast Asia and 5% in North America and Western Europe (7.).

The prevalence of HBV/HIV co infection based on the study done in Tehran, Iran was 13.4% and 6.3% in India (37, 38).

According to the study conducted on the prevalence of HBV and HCV among HIV1 infected peoples in Kenya, 6% of HBV/HIV co infection was observed. Other similar studies in different African countries showed, HBV/HIV co infections prevalence of 5.6% and Malawi, 4.9% in Rwanda. HBV/HIV co-infection prevalence of 11.4% was observed based on the study conducted on Nigerian cohort of HIV-infected individuals (39-42).

Among HIV-infected persons, 3.9% were sero-positive for HBsAg, according to the study conducted among blood donors in Ethiopia (43). Another study done in Addis Ababa found that:

the prevalence of HB/HIV co-infection in VCT clients was 5.7% (13). A study conducted in Debretabor hospital shows 6.1% prevalence of HBV/HIV co-infection (44). Based on the Seroprevalence study conducted among HIV positive individuals and blood donors at Gondar University Teaching Hospital , 5.6% and 7.1% of HBV/HIV co-infection were observed respectively (45, 46). The prevalence of HBsAg was found in 20% Israel immigrants from Ethiopia among HIV infected patients and 10.9 % in Gondor city among street dwellers (47, 48).

Factors associated with HBV infection

Socio demographic factors and HBV infection

A study conducted in China shows gender (male), significantly contributes to HBV infection (49). Study on antiretroviral treated patients in Thailand reviled that; male sex had 3.1 times greater risk of chronic hepatitis than females (50). Similar study in Iran showed that HBV co-infection rates were significantly higher in HIV positive men than women (37).

Low prevalence of HBsAg was found among an urban HIV-infected population in similar study at South Africa (51).

The study conducted at Debretabor hospital, reported those out of the total study participants 59.2% were females. According to this study, none of the socio demographic factors were significantly associated with HBV infection (44).

In a study conducted at Gondar teaching hospital, a significantly higher prevalence of HIV-HBV co-infection was observed in males (9.4%) compared to females (3.4%). Although statistically not significant, higher (8.3%) prevalence of HIV-HBV co-infection was observed in the age group between 40–49 years. Individuals who were widowed (9.8%) and those who had better educational status (certificate, diploma and above) (10.3%) showed none significantly higher HIV-HBV positive rate. The prevalence of HIV-HBV co-infection in urban and rural residences was 5.3% and 5.0% respectively (46).

Knowledge related factors and HBV infection among PLHIV

Published information's on knowledge towards HBV among peoples living with HIV are spares. But there are very few studies that are conducted on healthy population, patient porter's, health care workers and university students on their knowledge regarding HBV.

Based on the responses on transmission modes of HBV on the study done among healthy population in Pakistan showed 39.1, 10.1, 33.3, 37.9 and 33.3% of the study participants knew that HBV can be transmitted by Un-sterilized syringes, needles and surgical instruments, Unsafe sex, Mother to chilled, Contaminated blood and blood products and Blades of the barber/ear and nose piercing or tattooing instrument respectively. In addition 82.3 and 81.4% of participants in this study knew that jaundice is one the symptoms in hepatitis B infection and the absence of symptoms in some patients respectively (54).

According to the results from a study conducted among adolescents in Ghana, 41, 25 and 66% of the studied participants knew HB can be transmitted by Un-sterilized syringes, needles, barber/ear and nose piercing or tattooing instrument and contaminated blood and blood products respectively, while 41 and 76 of them knew that hepatitis B can cause liver cancer and affect any age group respectively (53).

Regarding knowledge on presence of vaccine for HBV, 42.7 and 61.0% of the participants new HB is vaccine preventable disease in the studies conducted at Egypt and among adolescents in Gahanna respectively (52, 53).

The mean (±SD) knowledge score on questions regarding etiology, sign and symptoms, transmission, treatment and management of Hepatitis B from the study conducted among healthy population of Pakistan 8.74$\pm$2.7 (54).

Clinical factors and HBV infection among PLHIV

A study conducted in China shows history of surgical operation and being unvaccinated are associated to HBV infection among participants aged 15-59 years. History of blood transfusions is also a greatest risk factor for HBV infection among adults who are more than 59 years old (49).

Based on the findings from a study conducted in South Africa, PLHIV and positive for HBsAg had a lower mean CD4 count than those negative (312 versus 358 cells/mm^3) (51).

According to a cross sectional study conducted at Debretabor Hospital, surgical history, is significantly associated with HBsAg status. In addition the study reviled higher proportion of HBsAg among peoples with history of OPI and the difference was statistically significant (44).

In a study conducted at Gondar teaching hospital the mean CD4 count of HIV mono-infection was 288cells/mm3, however, in HIV-HBV co-infections, the mean CD4 count were 250 cells/ mm3 and there were no statistically significant association (46).

Behavioural factors and HBV infection among PLHIV

A study conducted in British showed that intravenous drug use and tattoos were significant association with HBV infection (55).

The study in South Africa identified an association between heavy alcohol use and HBsAg positivity (51).

Based on the results from a cross sectional study conducted in Gahanna the disturbing risk factors for HBV infection are mostly sexual misconduct, tattooing, body-piercing and inject able drug use (53*)*.

The study on HIV, HBV and HCV infection in Nigeria shows that history of alcohol consumption is significantly associated with HBV (56).

According to a cross sectional study conducted at Debretabor Hospital, multiple sexual partners have higher chance of acquiring HBV infection than those who were not exposed (44).

2.2 Conceptual framework

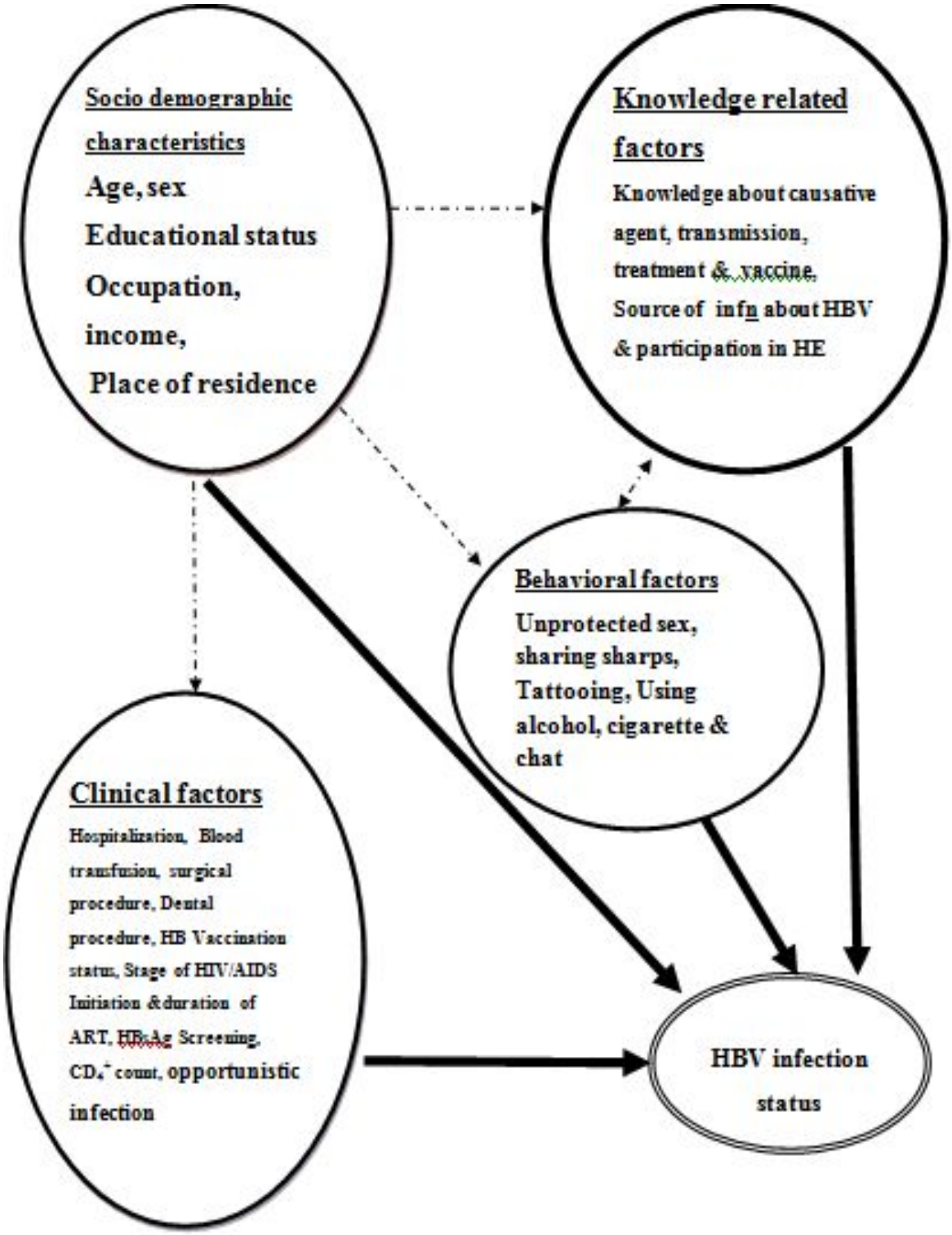

Figure 1: Conceptual frame work on prevalence of HBV and associated factors among PLHIV, developed after reviewing literatures

2.3 Significance of the study

Because of the significant burden of HBV infection among PLHIV, which is mainly due to sharing of same route of transmission by the infectious agents and its clinical impacts, including, increased liver related health problems and drug or immune-mediated liver injury during antiretroviral treatments, understanding the distribution of the infection as well as its risk factors is crucial to take a preventive measure against the spread of the infection with sound evidence.

In Ethiopia, even though, HBV infection is more common in HIV infected individuals and has impact on the clinical progress of the disease, distribution of the infection and its risk factors among these population groups were not well addressed.

Therefore this study assessed the prevalence HBV infection and associated factors among adult peoples living with HIV. The finding of the study contributes in filling the gap. Moreover, understanding factors associated with HBV infection among these population group is important for designing appropriate health programs in order to reduce the spread of the infection.

Chapter three: Objectives

3.1. General Objectives

- To assess the prevalence of Hepatitis B virus and associated factors among HIV positive adults attending ART clinic at Hawassa University Referral Hospital, Hawassa, southern Ethiopia, 2014.

3.2. Specific Objectives

- To determine the prevalence of hepatitis B virus infection among adults living with HIV.
- To identify factors associated with hepatitis B virus infection among adults living with HIV.

Chapter Four: Methods and Materials

4.1. Study area and period

This study was conducted in Hawassa University Referral Hospital, Hawassa town, the capital of Southern Nation Nationalities People's Regional state located 270 km from Addis Ababa. The town is administratively divided into 20 kebeles and has a total population of 341,649.

The hospital gives different clinical services for millions of inhabitants from SNNPR and Oromia region. Based on the clients registration logbook a total of 6,190 clients are enrolled in ART clinic of the hospital (57).

The study was conducted from April 2 to May 2, 2014.

4.2. Study design

A Hospital based cross-sectional study design was used.

4.3. Population

4.3.1. Source population

All adults living with HIV who ever enrolled in Hawassa university referral hospitals ART clinic during the study period.

4.3.2. Study population

All adults living with HIV, who visit Hawassa university referral hospital ART clinic during the study period and fulfill the inclusion criteria.

4.4. Sample size determination

To determine the sample size single population proportion formula was used with the following assumptions: Based on the study conducted on HIV positive individuals in Gondar teaching hospital, 8.3% prevalence of HIV-HBV co-infection was observed (46).

Accordingly, the required sample size (n) is estimated with a confidence level of 95% and 3% degree of precision using the formula:

$$n=\frac{z^2\ p(1-p)}{d^2}$$

d=0.03 (margin of error)

$Z_{\alpha/2}$= Standard normal distribution curve value at 95% Confidence level (1.96)

P=0.083

$$n=\frac{(1.96)^2 0.083(1-0.083)}{(0.03)^2}=325$$

As a contingency for non responses 10 % is added to the sample size. Thus the sample size is:

n = 358

4.5. Sampling technique and Procedure

Consecutive adults living with HIV who were attending ART clinic at Hawassa University Referral Hospital during the data collection period were included in the study after obtaining verbal consent from the client. Data collection was continued up to the end of the data collection period.

4.6. Inclusion and Exclusion criteria

4.6.1. Inclusion criteria

PLHIV who are enrolled in Hawassa university referral hospital ART clinic, age ≥ 18 years and available at the time of data collection were included.

4.6.2. Exclusion criteria

Seriously ill individuals and those revisit the clinic after once selected as study subject were excluded.

4.7. Study variables

4.7.1. Dependent variables

- HBV infection status

4.7.2. Independent variables

- Socio demographic and economic variables:- age, sex, educational status, occupation, income and place of residence
- Knowledge related variables
    - Knowledge about causative agent/disease, transmission, presence of treatment and vaccine
    - Source of information about HBV
    - Participating in HE programs
- Clinical factors
    - Hospitalization
    - Blood transfusion
    - Surgical procedure
    - Dental procedure
    - CD4+ count
    - WHO Stage of HIV/AIDS
    - Initiation of ART
    - Duration of ART
    - HB Vaccination status
    - Previous HBV Screening
    - Opportunistic infection
- Behaviour related factors

- Unprotected sex
- Sharing sharp instruments
- Tattooing

4.8. Data collection instruments and technique

An interview with pretested structured questionnaire having open and closed ended questions adapted from similar survey reviews that have been carried out inside and outside the country (*44, 53, 54)* was used for data collection after translated to Amharic. The Amharic version is translated back to English by other person who knows both languages to check for any inconsistencies or distortions in the meaning.

Three nurses and tow lab technicians were recruited for data collection and training was given by the principal investigator. The nurses interviewed the study subjects while the lab technicians collect blood sample and perform the laboratory test for HBsAg as per the manufacturer's instruction (Annex IV) (58).

4.8.1. Blood sample collection and testing

Three milliliters of venues blood was collected from each patient with standard operational procedure (Annex III). Serum was separated by centrifugation at 3000 r/min for 5 min after the blood has been clotted. The serum was tested for HBsAg by Wondfo one step HBsAg test strip according to the manufacturer's manual (Annex IV). This test strip has sensitivity and specificity of 96.2% and 99.3% respectively (58, 60).

4.9. Data processing and analysis

Data was entered into Epi Data version 3.1 then exported to SPSS version 16.0 for analysis. Summary statistics such as frequencies and percentages were computed. Bivariate analysis was conducted primarily to check association of each variable with the dependent variable. To control for possible effect of confounding, variables found to have association with the dependent variable at P-value of 0.2 were entered in to multivariate logistic regression model. The variables which had significant association with p-value less than 0.05 in the multivariate logistic regression were considered to be independent factors. The model was diagnosed by

Hosmer and Lemeshow goodness of fit tests. The results were presented using tables, charts and graphs.

4.10. Data quality control

To ensure quality of data, the questionnaire was Pre-tested at Adare district hospital on 5 %(18) HIV infected individuals. Possible restructuring and adjustment on the questions were made after pretest. Orientation was given for data collectors and laboratory personnel. The data collection process was supervised and the collected data were reviewed and checked for completeness by the principal investigator. Standardized operational procedures and manufacturer's instructions were strictly followed. Known positive and negative samples confirmed by ELISA technique were used in each test procedures for HBV testing kit and each test kit also had internal control system.

4.11. Ethical Consideration

The study was carried out after getting approval from the ethical clearance committee of Jimma University, college of Public Health and Medical sciences. Letter of cooperation was taken from the Department of Epidemiology and Biostatics and from Hawassa university referral hospital. Each respondent was informed about the objective of the study and a written consent was obtained. Confidentiality was kept at each step of data collection and processing. In addition, positive HBsAg test results of the study participants were communicated with their physician for farther investigation and better management of the patients.

4.12. Dissemination of Research finding

Findings of the study will be submitted to Jimma University, college of public health and medical science, department of epidemiology. The report will also also be submitted to Hawassa university referral hospital, town Health office, Regional Health Bureau and different NGOs working on HIV/AIDS in the area. In addition possible efforts will be made to present the findings in different professional meetings/ conferences and the manuscript will be sent for publication.

4.13. Operational definition and definition of terms

- **CD4 cell count**- the average numbers of CD4 cell count of an individual for the period of time in follow up calculated by adding all counts in patients follow up chart and divide by the number of counts (44).
- **Correct and Consistent Use of Condoms-** The use of condoms from start to finish with each encounter of sexual intercourse. Correct condom use should include using a new condom in each sexual intercourse; putting on the condom as soon as erection occurs and before any sexual contact ; and withdrawing from the partner immediately after ejaculation.
- **Duration on ART-** The total number of months an HIV positive individual on ART being followed after starting ART
- **HBV infection status -** was defined by a positive or negative result for HBsAg using wondfo one step HBsAg test strip.
- **Hepatitis B surface antigen (HBsAg) -** The outer envelope surface protein of the HBV. Testing positive for this antigen indicates that the patient is either newly infected, or is a carrier.
- **HIV/HBV Co-infection-** is infection with both human immune deficiency virus and hepatitis B virus.
- **Knowledge** - In this study knowledge about HBV prevention and control will be measured using 20 questions with the most appropriate response for each question based on the current literature. Each correct answer scored 1, and the wrong answer or "I don't know" scored 0, thus the knowledge score was scaled from 0 to 20. A person scoring a total of 10 and less will be taken as having poor knowledge and those scoring 11 and above had good knowledge regarding HBV **(53**).
- **Multi sexual partner-** is a person who has more than one sexual partner simultaneously.
- **Pre –ART individuals-** HIV infected individuals who are in Pre-ART follow up
- **Tattooing-** is an ineradicable mark or figure fixed up on the body by insertion of pigment under the skin or production of scars
- **Unprotected sex-** Refers to Penetrative vaginal sex without using condom consistently with any partner other than a regular partner for the last 12 month.

- **WHO Stage of HIV/AIDS -** Clinical stages of an HIV infected individual defined by the WHO./ **Stage I:** HIV disease is asymptomatic and not categorized as ADS, **Stage II:** include minor mucocutaneous manifestations and recurrent upper respiratory tract infections, **Stage III:** includes unexplained chronic diarrhea for longer than a month, severe bacterial infections and pulmonary tuberculosis and **Stage IV:** includes toxoplasmosis of the brain, candidiasis of the esophagus, trachea, bronchi or lungs and Kaposi's sarcoma; these diseases are used as indicators of AIDS.

Chapter five: Result

5.1 Socio-Demographic and Economic Characteristics of the study subjects

From 358 HIV positive adults contacted, 348(97.2%) of them were included in the analysis, while 10 participants were excluded from analysis due to incompleteness of data from patient card and insufficient blood sample obtained.

Majority, 220 (63.2%) of the respondents were females, age ranged 25-34 years (52.9%) with mean age of 33.2 years and urban residents (92.5%) (Table1).

Concerning their marital status, 56 (16.1%) were single 165 (47.4%) married, 52 (14.9%) divorced, 11 (3.2%) separated and 64 (18.4%) widows. With respect to educational 51.4% had secondary school and above (Table 1).

Seventy six (21.8%) reported to have average monthly income of less than 500 birr and 60.1% more than 1000 birr. A small number of respondents (n = 16, 4.6%) have ever attended any educational program on hepatitis (Table 1).

With respect to occupation, 13.2%, 14.1%, 1.4%, 3.7% and 3.4% were factory workers, office workers, health workers, teachers and drivers respectively. One hundred thirty two (38.0%) of the study participants were merchants (20.1%), farmers (3.1%) and daily labourers (14.6%) (Figure2).

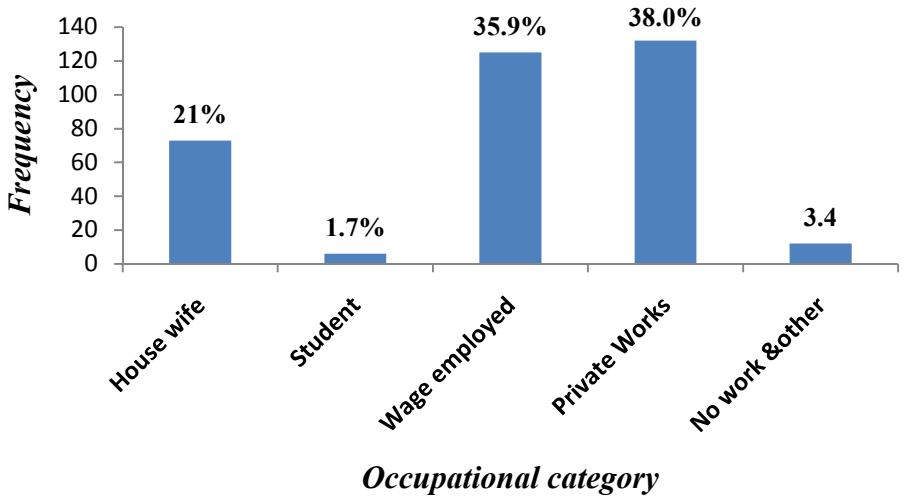

Figure 2: Occupational category of study participants attending ART clinic at Hawassa university referral hospital, Hawassa, South Ethiopia, 2014

Table 1: Socio-demographic and Economic Characteristics of Respondents attending ART clinic at Hawassa University Referral Hospital, Hawassa, South Ethiopia, 2014

Characteristics	*Frequency*	*Present (%)*
Sex		
Female	220	63.2
Male	128	36.8
Age (Year)		
18- 24	40	11.5
25- 34	184	52.9
35- 44	92	26.4
≥45	32	9.2
Place of Residence		
Urban	322	92.5
Rural	26	7.5
Educational Level		
Illiterate	45	12.9
Elementary (≤8 grade)	122	35.1
Secondary (9-12grade)	115	33.1
Higher education	66	18.9
Marital Status		
Single	56	16.1
Married	165	47.4
Separated & Divorced	63	18.1
Widowed	64	18.4
Average Monthly Income(ETB)		
≤500	76	21.8
501-999	63	18.1
≥1000	209	60.1

5.2 Knowledge of the respondents regarding HBV

Each knowledge questions on Hepatitis B etiology, sign and symptoms, transmission, treatment and management was coded as 'Yes', 'No' or 'I don't know' with scores ranging from 0 to 20. A cut off score of ≤ 11 was considered as poor whereas > 11 was considered as adequate knowledge about HB. Knowledge scores for individuals were calculated and summed up to give the total knowledge score. The mean (±SD) score of correct answer was 7.7(±5.2). Accordingly, 231 (66.4 %) of the respondents were having the poor knowledge on HB (Fig. 3).

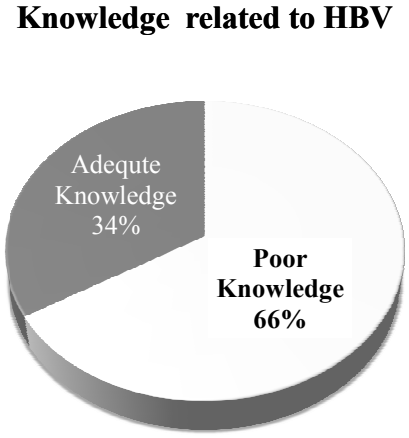

Figure 3: Proportion of hepatitis B related knowledge status of study participants attending ART clinic at Hawassa University Referral Hospital, Hawassa, South Ethiopia, 2014

Regarding general awareness about hepatitis, 294(84.5%) and 27(7.8%), of the participants ever heard about liver disease and HBV respectively, while, 98(28.2%) and 228(65.5%) of them knew that HB is a viral disease and it can affect liver function (Table 2).

On modes of transmission of HBV, 248 (71.3%), 262(75.3%) and 253(72.7%) of participants did not know that HBV can be transmitted by Un-sterilized syringes, needles and surgical instruments, Unsafe sex and from mother to chilled respectively. In addition, transmission of Hepatitis B virus due to contaminated blood and blood products, blades of the barber/ear and nose piercing or tattooing instrument and contaminated food and drink was not known among , 226(64.9%), 294(84.5%) and 247(71%) of participants respectively (Table 2).

Two hundred fifty five (73.3%) of the participants knew jaundice is one of the sign and symptom of HBV infection, while 227(65.2%) of them knew that there may not be symptoms in some patients infected with HBV (Table 2).

Two hundred forty nine (71.6%) of the respondents knew that HB is curable disease and only 55(15.8%) knew HBV is vaccine preventable disease. Regarding sources of information about hepatitis and liver disease, 46.3% of the participants heard about liver disease from families, friends and neighbours (Table 2).

Table 2: Hepatitis B knowledge related item responses of study participants attending ART clinic at Hawassa University Referral Hospital, Hawassa, South Ethiopia, 2014

Knowledge items	***Yes No (%)***	***No/I don't know No (%)***
General awareness		
Ever heard about liver disease	294(84.5)	54(15.5)
Ever heard about HB	27(7.8)	312(92.2)
HB is viral disease	98(28.2)	250(71.8)
HB can affect liver function	228(65.5)	128(34.5)
HB can cause liver cancer	138(39.7)	210(60.3)
HB can affect any age group	227(65.2)	121(34.8)
Mode of transmission		
Un-sterilized syringes, needles and surgical instruments	100(28.7)	248 (71.3)
Unsafe sex	86(24.7)	262(75.3)
Mother to chilled	95(27.3)	253(72.7)
Contaminated blood and blood products	122(35.1)	226(64.9)
Blades of the barber/ear and nose piercing or tattooing instrument	54(15.5)	294(84.5)
Food and water	101(29)	247(71)
Sign and symptoms		
Fever, running nose, and cough	61(17.5)	287(82.5)
Jaundice	255(73.3)	93(26.7)
Nausea, vomiting and loss of appetite	147(41.7)	203(58.3)
No symptom in some patients	227(65.2)	121(34.8)
Treatment		
Hepatitis B curable/treatable	249 (71.6)	99(28.4)
HB be self-cured by the body	22(6.3)	326(93.7)
HB T_x require specific diet	115(33.0)	233(67.0)
Vaccination is available for HB	55(15.8)	293(84.2)
Participation in health education program about HB	16(4.6)	332(95.4)

5.3 Clinical characteristics of the respondents

Among the participants, 139 (39.9 %), 19 (5.5%), 49(14.0%) and 162 (46.6 %), have history of hospital admission, blood transfusion, surgical procedure and dental procedure respectively.

Among the 285 (81.9%) patients started ART, 23(8.1%), 18(6.3%), 31(10.9%),78(27.4%), and 135(47.4%), were on treatment for less than six months, 6 to 12 months, 13 to 24 months, 25 to 48 months and more than 48 months respectively (Table 3).

The mean (SD) CD_4^+ count was 415 (195) cells/mm3. Altogether, 109 (31.3%) and 104 (29.9%) had CD4+ T cell count between 200-350 cell/mm3 and 351-499 cells/mm3, respectively (Table 3).

None of the study participants were vaccinated for HBV and only 3(0.9%) of them were screened previously (Table 3).

Table 3: Clinical history of study participants attending ART clinic at Hawassa University Referral Hospital, Hawassa, South Ethiopia, 2014

Characteristics	Frequency	Percent (%)
Hospital admission		
Yes	139	39.9
No	209	60.1
Blood transfusion		
Yes	19	5.5
No	329	94.5
History of surgical procedure		
Yes	49	14.1
No	299	85.9
History of dental procedures		
Yes	162	46.6
No	186	53.4
Initiation of ART		
Yes	285	81.9
No	63	18.1
WHO stage of HV/AIDS		
1st	89	25.6
2^{nd}	133	38.2
3^{rd}	102	29.3
4^{th}	24	6.9
HB previous screening history		
Yes	3	0.9
No	345	99.1
Previous opportunistic infections		
Yes	249	71.5
No	99	28.5
Mean CD_4^+ count		
<200cells/mm3	39	11.2
200-350 cells/mm3	109	31.3
351-499 cells/mm3	104	29.9
>500 cells/mm3	96	27.6

According to the WHO AIDS clinical staging criteria, 25.6%, 38.2%, 29.3% and 6.9% of the patients were classified as stage I, stage II, stage III and stage IV, respectively. A total of 249 (71.5%) patients reported history of opportunistic infection (Figure 5).

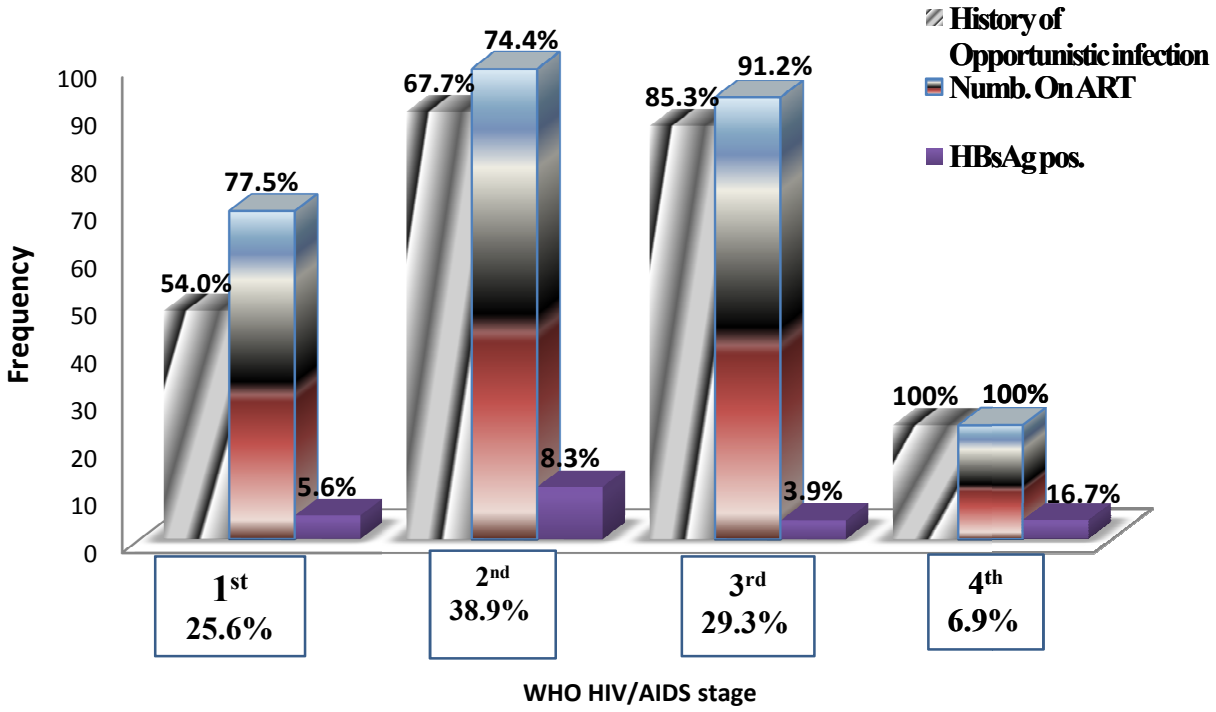

Figure 4: Distribution of clinical histories regarding OI, initiation of ART and HBsAg status in the four WHO stages of HIV/AIDS among the study participants attending ART clinic at Hawassa University Referral Hospital, Hawassa, south Ethiopia, 2014

5.4 Personal behaviours and practices

Seventy six (21.8%) participants have tattoos on their body and 164(47.1%) share sharp instruments. On the other hand, 196(56.6%), 98(28.2%) and 57(16.4%) has been drinking alcohol, chewing chat and smoking cigarette at least ones in their life time respectively.

One hundred sixty seven (48.0%) participants were having multi sexual partners. Majority (82.2%) of them contracted HIV by sexual intercourse and 32(9.2%) didn't know how they get HIV (Table4).

Table 4: Practices of study participants attending ART clinic at Hawassa University Referral Hospital, Hawassa, South Ethiopia, 2014

Practice	*Frequency*	*Percent*
Had tattoos		
Yes	76	21.8
No	272	78.2
Share sharp materials		
Yes	168	48.3
No	180	51.7
Alcohol drinking		
Never	151	43.4
Rarely	70	20.1
Sometimes	121	34.8
Daily	6	1.7
Chat chewing		
Never	245	70.4
Rarely	72	20.7
Sometimes	25	7.2
Chew Daily	6	1.7
Cigarette smoking		
Never	291	83.6
Rarely	42	12.1
Sometimes	3	0.9
Daily	12	3.4
Had multi sexual partner		
Yes	167	48.0
No	181	52.0
How do you contract HIV		
Sexual intercourse	286	82.2
From parents	4	1.1
I don't know	32	9.2
**Other	26	7.5

NB: ** – includes human bite, accident and while giving care for HIV positive family member

5.5 Seroprevalence of HBV among the study participants

The prevalence of HBsAg was found to be 24 (6.9 %); 17(7.7%) in females and 7 (5.5%) in males. With respect to age, the prevalence of HBsAg was 3 (7.5%) in age group 18-24, 15 (8.2%) in group 25- 34 and 6(4.8%) for the age group ≥ 35 years. All of the participants with HBsAg positive results live in urban areas (Table5).

With marital status, the prevalence of HBsAg was 12.3% in singles, 7.2% in married, 2.0 % among divorced and 6.2% among widowed participants. Illiterate had a prevalence of 12.8% while; among those with primary and secondary schools the rate was 5.7% and 9.6% respectively (Table5).

Table 5: Prevalence of hepatitis B surface antigen among the study participants attending ART clinic at Hawassa University Referral Hospital, Hawassa, South Ethiopia, 2014

Variables	*HBsAg screening result*	
	Negative (%)	*Positive (%)*
Sex		
Male	121(94.5)	7(5.5)
Female	203(93.3)	17(7.7)
Age interval		
18-24	37(92.5)	3(7.5)
25-34	169(91.8)	15(8.2)
≥35	118(95.2)	6(4.8)
Educational Level		
Illiterate	41(91.1)	4(6.7)
Elementary school(≤8 grade)	115(94.3)	7(5.7)
Secondary and above	168(92.8)	13(7.2)
Marital Status		
Single	50(89.3)	6(10.7)
Married	155(93.9)	10(6.1)
Widowed	60(93.8)	4(6.2)
Separated& Divorced	59(93.7)	4(6.3)
Avg Monthly Income(ETB)		
≤500	74(97.4)	2(2.6)
501-999	57(90.5)	6(9.5)
≥1000	193(92.3)	16(7.7)

5.6 Factors associated with HBV infection among the study participants

Bivariate logistic regression analysis was done using enter method to identify factors for the multiple logistic regression. In the analysis, average family income, WHO stage of HIV/AIDS, surgical history, previous history of opportunistic infection and sharing of sharp instruments were selected for the multiple logistic regression analysis based on their p- value of ≤ 0.2 (Table6).

Table 6: Predictors of hepatitis B virus infection from the binary logistic regression analysis, among PLHIV attending ART clinic at Hawassa University Referral Hospital, Hawassa, South Ethiopia, 2014

Variables	*HBsAg screening result*		*Crude OR(95%CI)*	*P- value*
	Negative (%)	*Positive (%)*		
Sex				
Male	121(94.5)	7(5.5)	1	
Female	203(92.3)	17(7.7)	1.448(0.58-3.59)	0.42
Age interval				
18-24	37(92.5)	3(7.5)	1	
25-34	169(91.8)	15(8.2)	1.09(0.30-3.97)	0.89
≥35	118(95.2)	6(4.8)	0.63(0.15-2.63)	0.52
Educational Level				
Illiterate	41(91.1)	4(6.7)	1	
Elementary school (≤8 grd)	115(94.3)	7(5.7)	0.62(0.17-2.24)	0.47
Secondary& above	168(92.8)	13(7.2)	0.79(0.24-2.55)	0.69
Marital Status				
Single	50(89.3)	6(10.7)	1	
Married	155(93.9)	10(6.1)	0.53(0.18-1.55)	0.25
Widowed	60(93.8)	4(6.2)	0.55(0.14-2.07)	0.38
Separated& Divorced	59(93.7)	4(6.3)	0.56 (0.15-2.11)	0.39
Avg. Monthly Income(ETB)				
≤500	74(97.4)	2(2.6)	1	
501-999	57(90.5)	6(9.5)	3.89(0.75-20.02)	0.10*
≥1000	193(92.3)	16(7.7)	3.06(0.68-13.66)	0.14*
Knowledge on HBV				
Adequate	110(94.0)	7(6.0)	1	
Poor	214(92.6)	17(7.9)	1.25(0.50-3.10)	0.63
Hospital admission				
Yes	127(91.4)	12(8.6)	1.5(0.6-3.5)	0.30
No	197(94.3)	12(5.7)	1	
Surgical history				
Yes	40(81.6)	9(18.4)	4.2(1.7-10.3)	<0.001*
No	284(95.0)	15(5.0)	1	

Blood transfusion				
Yes	18(94.7)	1(5.3)	1	
No	306(93.0)	23(7.0)	1.35(0.17-10.59)	0.77
Dental procedure				
Yes	153(94.4)	9(5.6)	1	
No	171991.9)	15(8.1)	1.49(0.63-3.50)	0.36
Experience of ART				
Yes	267(93.7)	18(6.3)	0.64(0.24-1.68)	0.36
No	57(90.5)	6(9.5)	1	
Duration on ART				
≤2years	127(94.1)	8(5.9)	1	
>2 years	197(92.5)	16(7.5)	1.28(0.53-3.10)	0.57
WHO stage of HIV/AIDS				
1^{st}	84(94.4)	5(5.6)	1.4(0.3-5.6)	0.58
2^{nd}	122(91.7)	11(8.3)	2.2(0.6-7.1)	0.18*
4^{th}	20(83.3)	4(16.7)	4.9(1.1-21.2)	0.03*
3^{rd}	98(96.1)	4(3.9)	1	
Mean CD_4^+ count				
<200cells/mm3	36(92.3)	3(7.7)	1	
200-350 cells/mm3	103(94.5)	6(5.5)	0.69(0.16-2.96)	0.62
351-499 cells/mm3	97(93.3)	7(6.7)	0.86(0.21-3.53)	0.84
>500 cells/mm3	88(91.7)	8(8.3)	1.09(0.27-4.34)	0.9
Opportunistic infection				
Yes	227(91.2)	22(8.8)	4.7(1.08-20.38)	0.039*
No	97(98.0)	2(2.0)	1	
Tattoos				
Yes	70(92.1)	6(7.9)	1	
No	254(93.4)	18(6.6)	0.82(0.31-2.16)	0.69
Sharing sharp instruments				
Yes	153(91.1)	15(8.9)	1.86(0.79-4.37)	0.15*
No	171(95.0)	9(5.0)	1	
Alcohol drinking				
Have never drank	140(92.7)	11(7.3)	1	
Have drinking habit	184(93.4)	13(6.6)	0.89(0.39-2.06)	0.80
Chat chewing				
Have never chewed	227(92.7)	18(7.3)	0.78(0.30-2.02)	0.61
Have chewing habit	97(94.2)	6(5.8)	1	
Multi sexual partner				
Yes	167	12(7.2)	1	
No	181	12(6.6)	0.91(0.40-2.10)	0.83
Get HIV by				
Sexually	265(92.7)	21(7.3)	0.64(0.18-2.22)	0.48
All other	59(95.2)	3(4.8)	1	

N.B*= candidate variables for multiple logistic regression /P-value ≤ 0.2/

Multivariate analysis was done by using backward stepwise method. In the analysis previous history of surgical procedures and history of opportunistic infections were significantly associated with HBV infection.

Multivariate analysis revealed that, those who have previous history of surgical procedure were 4.6 times more likely to be contaminated with HBV than who did not [AOR= 4.6: 95% CI, 1.8-11.6] and those with previous opportunistic infection were about 5 times more likely to show HBV surface antigen marker than who did not [AOR=5.2: 95% CI, 1.1-23.2] (Table7).

Table 7: Risk factors associated with Hepatitis B surface antigen from the multiple logistic regression analysis, among HIV positive adults attending ART clinic at Hawassa University Referral Hospital, 2014

Variables	*HBsAg screening result*		COR (95% CI)	AOR (95% CI)
	Negative No (%)	*Positive No (%)*		
Avg Monthly Income(ETB)				
≤500	74(97.4)	2(2.6)	1	1
501-999	57(90.5)	6(9.5)	3.9(0.75-20.02)	3.0(0.5-16.4)
≥1000	193(92.3)	16(7.7)	3.0(0.68-13.66)	2.8(0.6-13.1)
Surgical history				
Yes	40(81.6)	9(18.4)	4.2(1.7-10.3)	4.6(1.8-11.6)*
No	284(95.0)	15(5.0)	1	1
Opportunistic infection				
Yes	227(91.2)	22(8.8)	4.7(1.08-20.38)	5.2(1.1-23.2)*
No	97(98.0)	2(2.0)	1	1
Sharing sharp instruments				
Yes	153(91.1)	15(9.9)	1.8(0.79-4.37)	1.6(0.7-4.1)
No	171(95.0)	9(5.0)	1	1

N.B*= significant at P-value 0.05

Hosmer and Lemeshow goodness of fit tests = 0.9

Chapter six: Discussion

In this study an attempt has been made to assess prevalence of hepatitis B virus infection and associated factors among HIV positive adults attending ART clinic at Hawassa University Referral Hospital. Surveys related to hepatitis B which were done previously would help in comparing the findings of this study.

In this study, the prevalence of HBsAg was 6.9%. This result is in line with HBsAg prevalence documented from the study conducted in India (6.3%). Other similar studies among HIV positive individuals showed that, HBV/HIV co infection prevalence of 5.6% in Malawi, 4.9% in Rwanda and 6% in Kenya which is consistent with the findings of this study (38-41).

HBsAg prevalence from this study is also in agreement with previous studies conducted among HIV positive adults in Ethiopia. Studies at Debretabor Hospital and at Gondar University Teaching Hospital, showed 6.1% and 5.6% HBV/HIV co-infection respectively (44, 45).

However, the prevalence of HBsAg was found lower compared to HBV/HIV co-infection prevalence of 13.4% in Tehran, Iran, 11.4% among Nigerian HIV-infected individuals and 12.2 % among similar population in Gambia (37, 42, 59). Similarly, it is also lower than the 14.0% reported in Shashemene, 20% HIV positive immigrants of Israel from Ethiopia and 10.9 % at Gondar (20, 47, 48). The discrepancy might be due to the difference in the diagnostic methods followed in which these studies used ELISA technique, whereas in our study serological test was applied.

In contrast the prevalence of HBV in this study was higher when compared to the 2.4% and 4.1% prevalence reported from Uganda and Rwanda respectively as well as 3.9% HBsAg prevalence in Addis Ababa (41, 43). This difference might be due to accessibility of information about mode of transmission and prevention as it can be seen from proportion of participants with poor knowledge score in this study.

This study showed that none of the socio demographic characteristics has significant statistical association with HBsAg screening status. In contrast studies conducted in China, Thailand and Iran shows gender (male), significantly contributes to HBV infection (37, 49,50). The difference might be due to presence of high risk groups of males such as intravenous drug users in these countries, but in Ethiopia this exposure is assumed to be rare.

Unlike the result from this study, prevalence of HBsAg was found to be lower among urban HIV-infected population in similar study at South Africa (51). This difference might be due to low proportion of the rural residents in this study.

Although statistically not significant, higher (8.2%) prevalence of HIV-HBV co-infection was observed in the age group between 25-34 years. In addition single marital status (10.7%), illiterates (8.9%) and who had educational status of secondary schools (9.6%) showed none significantly higher HIV-HBV positive rate.

In this study those who have previous history of surgical procedure were about 5 times more likely to be contaminated with HBV than who did not [AOR= 4.6: 95% CI, 1.8-11.6]. This result is in line with the results of the studies conducted in Ethiopia at Debretabor hospital and in China which showed significant association between HBsAg and history of surgical procedure (44, 49).

Regarding history of opportunistic infection, those with previous history of opportunistic infection were about 5 times more likely to be positive for HBV surface antigen marker than who did not [AOR=5.2: 95% CI, 1.1-23.2]. This result is also in agreement with the previous study at Debretabor hospital (44). The association might be due to the fact that HIV/HBV co-infected individuals have weak immunity than those with HIV mono- infected individuals which will make them more prone to opportunistic infection. In addition wounds due to opportunistic infections may increase the chance of infection (51).

The mean CD_4^+ count of HIV mono-infected adults and HIV-HBV co-infected adults has no significant statistical association with hepatitis B infection. This result is in line with the findings of the study at Gondar teaching Hospital (46).

A study conducted in British showed that intravenous drug use was significant association with HBV infection, but this result was not in agreement with the findings from our study (55). The difference might be due to presence of high risk groups of males such as intravenous drug users in these countries, but in Ethiopia this exposure is assumed to be rare.

A study conducted in China showed vaccination status has association with HBV infection among participants aged 15-59 (49). In this study none of the participants were vaccinated for HBV, which could be due to very low HB vaccination coverage in Ethiopia.

According to a cross sectional study conducted at Debretabor Hospital, those having multiple sexual partners had higher chance of acquiring HBV infection than those who were not exposed (44). But in this study multiple sexual partners has no significant association with chance of acquiring HBV infection.

Strength and Limitation of the study

Strength of the study

Laboratory test for HBsAg was done at Hawassa university referral hospital laboratory by strictly following the manufacturer instruction. Known positive and negative controls were done for each newly opened pack of the test kits.

Limitations of the study

Social desirability bias might have influenced responses to questions regarding practices of HBV transmission and prevention.

Farther more, because the study is restricted only to adult people attending ART clinic of Hawassa University Referral Hospital it will have a potential to deny those who are not enrolled at the facility.

In this study a small sample size were used due to shortage of resources and time for data collection.

In addition since, HBV DNA was not detected by polymerase chain reaction due to unavailability of resources, which may increase the prevalence of HBV in this study as it would allow early diagnosis of these infections before surface antigen of HBV were detectable in serum.

Chapter seven: Conclusion

The prevalence of HBsAg was found to be intermediate in HIV positive adults at Hawassa university referral hospital.

Previous history of opportunistic infection and history of surgical procedures were statistically significantly associated with hepatitis B infection.

In this study a large proportion of HIV positive adults had poor knowledge on mode of transmission, sign and symptom, prevention and treatment of hepatitis B viral infection. In addition to this poor awareness very low proportion of individuals in this study area was participated in health education programs about hepatitis. Screening and vaccination practices are still very low in the study area.

Chapter eight: Recommendation

Prevalence of 6.9% indicates an intermediate proportion of hepatitis B infection among HIV positive individuals in this area.

Therefore: based on the finding the following recommendations were forwarded

For Health sectors

- As patients at the chronic inactive Hepatitis B carrier state are the first candidates for treatment, especially in situations when there is a significant level of HBV replication, routine screening should be incorporated in the national ART guidelines.
- All HIV positive individuals should be screened and HBsAg negative ones get vaccinated.
- Health institutions giving HIV related service should provide information on risk factors for hepatitis B infection, like presence of opportunistic infection.

For researchers

- Further studies with large sample size should be conducted in different population groups in the form of long term follow up analyses to determine the different factors associated with HIV/HBV co-infection

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ANNEX I: Questionnaire

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Participants Socio demographic, Behaviour, Clinical and Knowledge related study questionnaire against hepatitis B virus infection among people living with HIV in Hawassa university referral hospital

Confidentiality and verbal Consent

My name is _____ I am working as data collector in study conducted by Jimma University College of Public Health and Medical science, department of Epidemiology and Biostatics. I am interviewing ART clinic clients of Hawassa university referral hospital on factors associated with hepatitis B virus infection in order to collect information necessary for developing appropriate strategies to prevent the infection and its outcome, so that, people like you will be protected from HBV infection . To attain this purpose you're honest and genuine participation by responding to my questions and willing to give blood sample for laboratory diagnosis of HBV is very important and highly appreciable.

I expect the interview will take about 20-30 minutes. You do not need to provide your name; the information collected through this interview will not be included in your clinical record, unless you are willing for your laboratory result to be told for your doctor. If you prefer not to respond to all questions or responding to some of the questions are your right and you can stop the interview at any time. Your decision will not affect in any way the services you are receiving at the hospital/clinic.

Please be assured that all the information gathered will be kept strictly confidential.

Are you willing to participate in our study?

Yes_____ Signature of the respondent _____

NO _____Thank you anyway. Have a nice day.

Date of interview: -----/---------/-----. Time interview began: Hours: Minutes _____

Time interview finished: Hours: Minutes _____Interviewer initials_____

Contact address of principal investigator:

Name: Fanul Belayneh mob. 0912020945

Respondent code _____

S. NO	Section I: Socio Demographic and Economic characteristics		Remark &/ Escape
	Questions	**Responses**	
1.1	How old are you?	Age in years ____	
1.2	Sex	1. Female 2. Male	
1.3	Place of residence	1. Urban 2. Rural	
1.4	What is your level education?	1.Illiterate 2. Primary 3. Secondary 4. Technical not leading to secondary degree 5. Preparatory 6. Universities 7. Postgraduate studies 8. Does not know/not respond	
1.5	What is your current marital status?	1. Single 2. Married 3. Divorce 4. Separated 5. Widowed	
1.6	What is your Occupation?	1. Student 2. Farmer 3. Merchant 4. Factery worker 5. Health worker 6. Teacher 7. Daily labourer 8. House wife 9. Commercial sex worker 10. Office worker	

		11. Driver 12. No work 13. 0thers, specify _____	
1.7	How much is your monthly family income?	_____/Eth.Birr/	
	Section II: Knowledge related questions on Hepatitis B		
2.1	Have you ever heard of a disease termed as Hepatitis/ liver disease?	1.Yes 2.No	
2.2	Have you ever heard of a disease termed as Hepatitis B?	1.Yes 2.No	
2.3	If yes for Q2.1 &/or Q2.2, What is your source of information about hepatitis B?	1. News papers and magazines 2. Health workers 3. Family 4. Friends 5. Neighbours 6. TV 7. Radio 8. Internet 9. Religious leaders/teachers 10. HB information leaflets, brochures, posters etc 11. Others, specify _____	
2.4	Is Hepatitis B a viral disease?	1.Yes 2.No 3.Not Know	
2.5	A liver disease caused by Hepatitis B can affect liver function.	1.Yes 2.No 3.Not Know	
2.6	Can Hepatitis B cause liver Cancer?	1.Yes 2.No 3.Not Know	
2.7	Can Hepatitis B cause liver disease affect any age group?	1.Yes 2.No	

		3.Not Know	
2.8	Can liver disease caused by Hepatitis B be transmitted by un-sterilized syringes, needles and surgical instruments?	1.Yes 2.No 3.Not Know	
2.9	Can liver disease caused by Hepatitis B be transmitted by unsafe sex?	1.Yes 2.No 3.Not Know	
2.10	Can liver disease caused by Hepatitis B be transmitted from mother to chilled?	1.Yes 2.No 3.Not Know	
2.11	Can liver disease caused by Hepatitis B be transmitted by contaminated blood and blood products?	1.Yes 2.No 3.Not Know	
2.12	Can liver disease caused by Hepatitis B be transmitted by using blades of the barber/ear and nose piercing or tattooing instrument?	1.Yes 2.No 3.Not Know	
2.13	Can liver disease caused by hepatitis B be transmitted by food and water contaminated by person infected with the disease	1.Yes 2.No 3.Not Know	
2.14	Any other mode of transmission for Hepatitis B	_____	
2.15	The early symptoms of liver disease caused by Hepatitis B are same like cold and flu (fever, running nose, and cough).	1.Yes 2.No 3.Not Know	
2.16	Jaundice is one of the common symptoms of liver disease caused by HB?	1.Yes 2.No 3.Not Know	
2.17	Are nausea, vomiting and loss of appetite common symptom of liver disease caused by Hepatitis B?	1.Yes 2.No 3.Not Know	

2.18	Any other symptoms of Hepatitis B?	_____	
2.19	Is there no symptom of the liver disease caused by Hepatitis B in some of the patients?	1.Yes 2.No 3.Not Know	
2.20	Is liver disease caused by Hepatitis B curable/treatable?	1.Yes 2.No 3.Not Know	
2.21	Can liver disease caused by Hepatitis B be self-cured by the body?	1.Yes 2.No 3.Not Know	
2.22	Is specific diet is required for the treatment of liver disease caused by Hepatitis B?	1.Yes 2.No 3.Don't Know	
2.23	Is vaccination available for liver disease caused by Hepatitis B?	1.Yes 2.No 3.Not Know	
2.24	Have you ever Participated in HE programs about liver disease caused by HBV?	1.Yes 2.No	
	Section III: Clinical related questions		
3.1	Have you ever been hospitalized?	1.Yes 2.No	
3.2	Have you ever been transfused blood or blood products?	1.Yes 2.No	
3.3	Have you ever had history of surgical procedure?	1.Yes 2.No	
3.4	Have you ever had history of dental procedures?	1.Yes 2.No	
3.5	Have you started taking ART?	1.Yes 2.No	If No escape to Q. 3.8

3.6	If Yes for Q 3.5, for how long have you been taking the treatment?	----------/in months/	Observed from patient card
3.7	WHO stage of HV/AIDS	1st 2nd 3rd 4th	Observed from patient card
3.8	Have you taken vaccination for hepatitis B?	1.Yes 2.No	
3.9	Have you done screening for Hepatitis B?	1.Yes 2.No	
3.10	Do you had Previous opportunistic infections?(Example:- tuberclosis,Diarrhea,Herpes zoster)	1.Yes 2.No	Observed from patient card
	Section IV: Behaviour related questions		
4.1	Have you had tattoos?	1.Yes 2.No	If No escape to Q. 4.3
4.2	If yes for Q 4.1, what type of tattooing?	1.Traditional 2.Moderen	
4.3	Have you ever share sharp materials?	1.Yes 2.No	
4.4	Have you ever used injectable drugs?	1.Yes 2.No	
4.5	Do you drink alcoholic beverages, like Teji, Tella, Beer, Arake, & the likes?	1. Have never drank 2. I have tried once or twice 3. I drink from time to time 4. I drink Daily	If Never drank escape to Q. 4.7
4.6	During the past 30 days, on how many days have you had at least one drink of alcohol	_____N0 days	
4.7	Do you chew chat?	1. Have never chewed 2. I have tried once or	If Never chewed

		twice 3. I chew from time to time 4. I chew Daily	escape to Q. 4.9
4.8	During the past 30 days, on how many days did you chew chat?	_____N0 days	
4.9	Do you smoke cigarettes?	1. Have never smoke 2. I have tried once or twice 3. I smoke from time to time 4. I smoke Daily	If Never smoke escape to Q. 4.7
4.10	During the past 30 days, on how many days did you smoke cigarettes?	_____N0 days	
4.11	Have you ever had multi sexual partner?	1.Yes 2.No	
4.12	If yes for Q 4.11, did you use condom?	1.Yes 2.No	
4.13	If yes to question Q 4.12, how frequently did you use condom?	1.Rarely 2.Occasionally 3.Always (consistently)	
4.14	How does HIV transmitted to you?	1. Sexual intercourse 2. From parents 3. Intravenous drug use 4. I don't know 5. Other _____	

Thank you!

Annex II: Venous blood collection procedure

1. Introduce yourself and identify the patient
2. Explain the procedure to the patient
3. Wash hands and wear gloves
4. Prepare materials (syringes, needles, test tubes etc.)
5. Prepare the patient and apply tourniquet
6. Disinfect the draw site
7. Collect 5ml of blood with either vacutainer tubes or syringe and needle
8. Exit the pain, apply pressure and check the patient.
9. Discard the needle in safety box
10. Label the specimen in each tube
11. Allow the specimen for 30minutes (to facilitate clotting) and centrifuge with medium speed for 5minutes
12. Separate serum from the blood by Pasteur pipette
13. Perform lab. Test according to the manufacturers manual and store the remaining serum at -20 oc .

Annex III: HBsAg test procedures

1. Remove the test device from the foil pouch and palace it on a flat dray surface.
2. Label the test device with respondent code from the test tube label.
3. Add 3 to 4 drops (120µl to 160µl) serum specimen into a test tube.
4. Holding the strip vertically, carefully dip it into the specimen. Do not immerse the strip past to the maximum line.
5. Interpret the result at 15 to 20 minutes.

Interpretation of HBsAg test results

Negative for HBsAg: The presence of only one purple color band (on the control line) within the result window indicates negative result.

Positive for HBsAg: The presences of tow color bands (on the control and test lines) within the result window indicate positive result.

NB: do not interpret the result after 30 minutes (58).

Annex IV: Laboratory data collection format

Code number	HBsAg test result Pos./ Neg.	Mean CD_4^+ count	Opportunistic infection	WHO HIV/AIDS stage	Remark

Annex V: Amharic version of information sheet, consent form and Questionnaire

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ስለ ጥናቱ መረጃ እና የተሳትፎ ፍቃድ መጠየቂያ ቅጽ

ስሜ _____ ይባላል፡፡ እኔ በጅማ ዩኒቨርሲቲ በህብረተሰብ ጤናና በህክምና ሳይንስ የኢፒዲሞሎጂ የትምህርት ክፍል ተመራቂ ተማሪ በሆኑት በአቶ ፋኑኤል በላይነህ እየተሰራ ባለው የሁለተኛ ዲግሪ የመመረቂያ ጥናት ላይ መረጃ ሰብሳቢ ነኝ፡፡ የምጠይቀው በሀዋሳ ዩኒቨርሲቲ ሪፈራል ሆስፒታል የጸረ ኤችአየቪ ክሊኒክ ደንበኞችን ሲሆን፤ ይህ መጠይቅ የተሳታፊዎችን ማህበራዊ ጉዳዮችን፤ ባህሪያቸውን፤ የህክምናና በጉበተ በሽታ ዙሪያ ያላቸውን እውቀት የሚዳስሱ ጥያቄዎችን በአራት ክፍሎች ያካትታል፡፡

አላማው፡- እኛ የምናጠናው ኤች አይቪ በደማቸው ባለባቸው ሰዎች ላይ የሔፓታይተስ ቢ ቫይረስ ስርጭትንና ተያያዥ ምክኒያቶቻቸውን ነው፡፡ ይህ ሔፓታይተስ ቢ ቫይረስ ኤች አይቪ ባለባቸው ሰዎች ላይ የኤች አይቪን ወደ ኤድስነት መቀየር ከማፋጠኑም በላይ በፀረ ኤች አይቪ መድሃኒት ምክንያት የሚመጣውን የጉበት ችግርም ያባብሳል፣ የፀረ ኤች አይቪ መድሃኒት የሚጨምረውን የ$CD4^{+}$ መጠንንም በፍጥነት እንዳይጨምር እንቅፋት ይሆናል

ተሳትፎ፡- የጥናቱ አባላት እርሶና ሌሎችን በፍቃደኝነት በጥናቱ እንድትሳተፉ እንጠይቆታለን፣ ከእርስዎ የሚጠበቀው ከአምስት እስከ አስር ደቂቃ የሚፈጁ መጠይቆችን መመለስና ሶስት ሚሊ ሊትር ደም መስጠት ነው፡፡ የሚሰጡት ደም የሚሰበሰበው ከብክለት በጸዳ መንገድ ነው::ከዚህ ጥናት ባሻገር ልላ የደም ምርመራ በሀኪም ከታዘዘሎት፤ ሁላት ግዜ እንዳይወጉ የደም ናሙናው አንድ ላይ ይወሰድሎታል፡፡ በጥናቱ ተሳትፈው የሄፓታይተስ ቢ ቫይረስ በሰውነትዎ ውስጥ ቢገኝ ፍቃደኝነቶን ጠይቀን አስፈላጊውን ህክምና እንዲያገኙ ለሀኪምዎ እናሳውቃለን፡፡

በጥናቱ ውስጥ ከእርስዎ የምናገኛቸው ማንኛውንም መረጃ ሚስጥራዊነቱ የተጠበቀ ነው፣ በጥናቱ ውስጥ የምንጠቀመው የሚስጥር የፀረ ኤች አይቪ መድሃኒት መጠቀሚያ ቁጥርዎን በመሆኑ እርስዎን የሚገልጽ ምንም አይነት መለያ አይኖርም የእርስዎን ማንነትም በጥናቱ ውጤት ላይም ይሁን በማንኛውም ሁኔታ አይገለጽም::

በጥናቱ ያለመሳተፍ መብት፡- በዚህ ጥናት መሳተፍ የእርስዎን ሙሉ ፈቃድ እንደ መጠየቁ መጠን በማንኛውም ጊዜ በጥናቱአ ለመሳተፍ መብትዎ የተጠበቀ ነው፣ በጥናቱ አለመሳተፍ በህይወትዎ የሚያመጣው ምንም አይነት ጫና የለም፣

ጌታዬ/እመቤቴ ስለ ጥናቱ ጥያቄ አለዎ? በጥናቱ ለመሳተፍ ፍቃደኛ ነዎት? ከተስማሙ የፍቃድ ማረጋገጫ ቅጹን ይሙሉልን፣

አዎ ☐ አይ ☐

የተሳታፊው ፊርማ _____ ቀን _____

የፍቃድ ተቀባይ ስም አቶ/ወ/ሮ/ወ/ት_____ ፊርማ_____

ጥናቱነ የሚያካሂደው ሰው ስም፤ ፋኑኤል በላይነህ ስልክ፤ 0912020945

የተሰታፊው የሚስጥር ቁጥር _____

ተ.ቁ	ክፍል አንድ ፡ ስነ-ማህበራዊና ኢኮኖሚያዊ ጥያቄዎች		
	ጥያቄ	መልስ	ማጣሪያና የሚዘለል
1.1	እድሜ	____አመት	
1.2	ፆታ	1.ሴት 2. ወንድ	
1.3	የመኖሪያ ቦታዎ	1.ከተማ 2. ገጠር	
1.4	የትምህርት ደረጃ	1.ያልተማረ 2. አንደኛ ደረጃ 3. ሁለተኛ ደረጃ 4. ቴክኒክና ሞያ 5. መሰናዶ 6. ዩኒቨርሲቲ 7. ሁለተኛ ዲግሪ 8. አላቀውም	
1.5	የጋብቻ ሁኔታ	1. ያላገባ 2. ያገባ 3.የተፋታ 4. የተለያየ/ለየብቻ የሚኖር 5. የትዳር አጋሩ የሞተበት	
1.6	ስራ	1. ተማሪ 2. ገበሬ 3. ነጋዴ 4. የድርጅት/ፋብሪካ ሰራተኛ 5. ጤና ባለሞያ 6. አስተማሪ 7. የቀን ሰራተኛ 8. የቤት እመቤት 9. ሴተኛ አዳሪ 10. ቢሮ ሰራተኛ 11. ሹፌር 12. ስራ አጥ 13. ሌላ / ግለፁ/ _____	
1.7	የቤተሰቦ ወራዊ ገቢ ምን ያክል ነው?	_____/ብር/	
	ክፍል ሁለተ፡ በሄፓታይተስ በሽታ ዙሪያ ያላቸውን እውቀት የሚዳስሱ ጥያቄዎች		

2.1	የጉበት/ የወፍ በሽታ ሲባል ሰምተው ያውቃሉ?	1.አዎ 2. አይ	
2.2	ሄፓታይተስ ቢ ስለሚባል የጉበት በሽታ/በሽታ አምጪ ተዋሲያን/ ሰምተው ያውቃሉ?	1.አዎ 2. አይ	
2.3	ለ ጥያቄ 2.1 እና/ ወይም 2.2 መልሶ አዎ ከሆነ፤ የመረጃዎ ምንጭ ምነድነው? አይ ብለው ለመላሱ ወደ ጥያቄ 2.4 ይሂዱ፡፡	1. ጋዜጣና መፅሄት 2. ጤና ባለሞያ 3. ቤተሰብ 4. ጓደኛ 5. ጎረቤት 6. ቴሌዝዥን 7. ሬዲዮ 8. ድህረ ገፅ 9. የሓይማኖት መሪዎች 10. በራሪ ወረቀቶች 11. ሌላ/ ግለፁ/ _____	
ከዚህ በታች ለተዘረዘሩ ጥያቄዎች አዎ ፤ አይ ወይም አላቀው በማለት ይመልሱ፡፡/ እስከ ጥ.ቁ 2.15/			
2.4	የጉበት በሽታ በቫይረስ ሊመጣ ይችላል፡፡	1.አዎ 2. አይ 3. አላቀውም	
2.5	የጉበት በሽታ አምጪ ተዋሲያን የጉበታችንን ስራ ሊያውኩ ይችላሉ?	1.አዎ 2. አይ 3. አላውቀውም	
2.6	የጉበት በሽታ አምጪ ተዋሲያን የጉበት ካንሰር ሊያመጡ ይችላሉ፡፡	1.አዎ 2. አይ 3. አላቀውም	
2.7	የጉበት በሽታ አምጪ ተዋሲያን ማንኛውንም የእድሜ ክልል ሊያጠቁ ይችላሉ::	1.አዎ 2. አይ 3. አላቀውም	
2.8	ያልተጸዱ መርፌዎች፤ ሲሪንጆችና የቀዶጥገና መሳሪያዎች የጉበት በሽታ ሊያስተላልፉ ይችላሉ፡፡	1.አዎ 2. አይ 3. አላቀውም	
2.9	ልቅ የግብረ ስጋ ግንኙነት የጉበት በሽታ ሊያስተላልፍ ይችላል፡፡	1.አዎ 2. አይ 3. አላቀውም	
2.10	የጉበት በሽታ ከናት ወደ ልጅ ሊተላለፍ ይችላል፡፡	1.አዎ 2. አይ 3. አላቀውም	
2.11	የጉበት በሽታ በተበከለ ደምና የደም ውጤቶች ሊተላለፍ ይችላል፡፡	1.አዎ 2. አይ	

		3. አላቀውም	
2.12	የፀጉር ቤት ምላጮች፤ የጆሮና የአፍንጫ ሙበሻና የንቅሳት መሳሪያዎች የጉበት በሽታ ሊያስተላልፉ ይችላሉ፡፡	1.አዎ 2. አይ 3. አላቀውም	
2.13	በበሽታው በተጠቃ ሰው የተበከለ ምግብና መጠጥ የጉበት በሽታ ሊያስታላልፍ ይችላል ፡፡	1.አዎ 2. አይ 3. አላቀውም	
2.14	የሚጨምሩት የጉበት በሽታ አምጪ ተዋሲያን የሚተላለፉባቸው መንገዶች ካሉ ይግለፁልን፡፡	_____	
2.15	ትኩሳት ፤ ሳልና ከአፍንጫ የሚወጣ ፈሳሽ የጉበት በሽታ የመጀመሪያ ምልክቶች ናቸው፡፡	1.አዎ 2. አይ 3. አላውቅም	
2.16	የቆዳና የአይን ከለር ቢጫ መሆን የጉበት በሽታ ምልክቶች ናቸው፡፡	1.አዎ 2. አይ 3. አላውቅም	
2.17	ማቅለሽለሽ ፤ ማስታወክና የምግብ ፍላጎት መቀነስ የጉበት በሽታ ምልክቶች ናቸው፡፡	1.አዎ 2. አይ 3. አላውቅም	
2.18	የሚጨምሩት የጉበት በሽታ ምልክቶች ካሉ ይግለፁልን፡፡	_____	
2.19	የበሽታው ምልክቶች በአንድ አንድ ሀሙማን ላይ ላይታዩ ይችላሉ::	1.አዎ 2. አይ 3. አላቀውም	
2.20	በተዋሲያን /በሄፓታይተስ ቢ/ የሚመጣ የጉበት በሽታ ህክምና አለው/ ይድናል::	1.አዎ 2. አይ 3. አላቀውም	
2.21	በተዋሲያን /በሄፓታይተስ ቢ/ የሚመጣ የጉበት በሽታ በሰውነታችን በሽታ መከላከል አቅም ሊድን ይችላል፡፡	1.አዎ 2. አይ 3. አላቀውም	
2.22	በተዋሲያን /በሄፓታይተስ ቢ/ የሚመጣ የጉበት በሽታ ህክምና ስንከታተል የተለየ የምግብ ስረአት መከተል ይኖርብናል::	1.አዎ 2. አይ 3. አላቀውም	

2.23	በተዋሲያን/በሄፓታይተስ ቢ/ የሚመጣ የጉበት በሽታ ክትባት አለው::	1.አዎ 2. አይ 3. አላቀውም	
2.24	ስለ ጉበት በሽታ/ሄፓታይተስ ቢ/ የጤና ትምህርት ወስደው ያውቃሉ?	1.አዎ 2. አይ	
	ክፍል ሶስተ ፡ የህክምና ሁኔታን የሚዳስሱ ጥያቄዎች		
3.1	ሆስፒታል ታመው ተኝተው ያውቃሉ?	1.አዎ 2. አይ	
3.2	ደም ተለግሰው / ወስደው/ ያውቃሉ?	1.አዎ 2. አይ	
3.3	ቀዶ ጥገና ተሰርቶሎት ያውቃል?	1.አዎ 2. አይ	
3.4	የጥርስ ህክምና/ ለምሳል፤ ማስነቀል/ አሰርታው ያውቃል?	1.አዎ 2. አይ	
3.5	የፀረ ኤችአይቪ መድሃኒት/ ART/ መውሰድ ጀምረዋል?	1.አዎ 2. አይ	አይ ወደ 3.8
3.6	ለ ጥያቄ 3.5 መልሶ አዎ ከሆነ፤ ለምን ያህል ግዜ የፀረ ኤችአይቪ መድሃኒት/ ART/ □ሰዱ?	----------/ወራት/	ከመዝገብ ላይ የሚጣራ
3.7	የአለም ጤና ጥበቃ ድርጅት የHV/AIDS ደረጃ	1st 2nd 3rd 4th	ከመዝገብ ላይ የሚወሰድ
3.8	የሄፓታይተስ ቢ ክትባት ወስደዋል?	1.አዎ 2. አይ	
3.9	የሄፓታይተስ ቢ ምርመራ አድርገው ያውቃሉ?	1.አዎ 2. አይ	
3.10	ምቹ ግዜ ጠባቂ በሽታዎች፤ ለምሳሌ፡- በአፍ እና በቆዳ ላይ የሚታዩ የፈንገስ በሽታዎች ፤ የሆድ እቃና የአንጀት መታዎክ ፤ ተቅማጥ ፤ ቲቢ፤ አልማዝ ባለጭራ አሞት ያውቃል?	1.አዎ 2. አይ	ከመዝገብ ላይ የሚጣራ
	ክፍል አራት፡ ለሄፓታይተስ ቢ የሚያጋልጡ ድርጊቶችን የሚመለከቱ ጥያቄዎች		
4.1	ሰውነቶት ላይ ንቅሳት አሰርተው ያውቃሉ?	1.አዎ 2. አይ	
4.2	ለ ጥያቄ ቁ. 4.1 መልሶ አዎ ከሆነ፤ ምን አይነት ቦታ ነው ያሰሩት?	1. ባህላዊ 2. ዘመናዊ	
4.3	ስለት ያለው መሳሪያ ቢጋራ ተጠቅመው ያውቃሉ?	1.አዎ 2. አይ	
4.4	በመርፌ የሚወሰድ አደንዛዥ እፅ ተጠቅመው ያውቃሉ?	1.አዎ 2. አይ	
4.5	የአልኮል መጠጥ ይጠጣሉ (አልኮልነት ያላቸው እንደ፤ ጠጅ፤ ጠላ፤ ቢራ፤ አረቄና የመሳሰሉት)?	1. ጠጥቼ አላውቅም 2. አነድ ወይም ሁለት ግዜ ጠጥቼ አቃለሁ 3. አንድ አንድ ግዜ እጠጣለሁ 4. በየቀኑ እጠጣለሁ	መልሱ ነ ወይም 2 ከሆነ ወደ ጥ. ቁ 4.7 ይዝለሉ

4.6	ባለፉት 30 ቀናት ውስጥ ለምን ያክል ቀናት ጠጥተዋል?	_____ቀናት	
4.7	ጫት ይቅማሉ?	1. ቅሜ አላውቅም 2. አነድ ወይም ሁለት ግዜ ቅሜ አቃለሁ 3. አንድ አንድ ግዜ እቅመቀለሁ 4. በየቀኑ እቅማለሁ	መልሱ 1 ወይም 2 ከሆነ ወደ ጥ. ቁ 4.9 ይዝለሉ
4.8	ባለፉት 30 ቀናት ውስጥ ለምን ያክል ቀናት ጫት ቅመዋል?	_____ቀናት	
4.9	ሲጋራ ያጨሳሉ?	1. አጭሼ አላውቅም 2. አነድ ወይም ሁለት ግዜ አጭሼ አቃለሁ 3. አንድ አንድ ግዜ አጨሳለሁ 4. በየቀኑ አጭሳለሁ	መልሱ 1 ወይም 2 ከሆነ ወደ ጥ. ቁ 4.11 ይዝለሉ
4.10	ባለፉት 30 ቀናት ውስጥ ለምን ያክል ቀናት አጭሰዋል?	_____ቀናት	
4.11	ከአንድ በላይ የወሲብ አጋር ኖሮት ያውቃል/ አሎት?	1.አዎ 2. አይ	አይ ወደ 4.14
4.12	ለ ጥያቄ ቁ. 4.11 መልሶ አዎ ከሆነ፤ ኮንዶም ይጠቀማሉ?	1.አዎ 2. አይ	
4.13	ለ ጥያቄ ቁ. 4.12 መልሶ አዎ ከሆነ፤ ኮንዶም በምን ያክል ግዜ ይጠቀማሉ?	1. አልፎ አልፎ/ በትንሹ/ 2. አንድ አነዴ/ በአጋጣሚ/ 3. ሁሌ	
4.14	ኤች አይቪ በምን መንገድ ለይዞት ቻለ?	1. በግብረስጋ ግንኙነት 2. ከቤተሰብ 3. በከንድ የሚወሰዱ እጾችን በመጠቀም 4. አላውቅም 5. ልላ/ ግለፁ/_____	

እጅግ በጣም እናመሰግናለን!