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Prevalence of Hepatitis B surface antigen and KAP towards HBV infection, among pregnant women attending selected antenatal Clinics in Addis Ababa, Ethiopia

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Acronyms

AAU	Addis Ababa University
ANC	Antenatal Clinic
CDC	Center for Disease Control and Prevention
CHB	Chronic hepatitis B
CSA	Central Statistics agency
DHS	Demographic Health survey
DNA	Deoxyribonucleic Acid
EFY	Ethiopian Fiscal Year
EIA	Enzyme Immunoassay
ELISA	Enzyme Linked Immunosorbent Assay.
FMOH	Federal Ministry of Health
FSW	Female sex workers
HC	Health Center
HB	Hepatitis B
HBeAg	Hepatitis B envelope antigen
HBIG	Hepatitis B Virus immunoglobulin
HBsAg	Hepatitis B surface antigen
HBV	Hepatitis B virus
HCC	Hepatocellular carcinoma
HIV	Human immunodeficiency virus
KAP	Knowledge, Attitude and Practice
NND	Neonatal Deaths
RIA	Radio Immunoassay
RPM	Revolution Per Minute
SPSS	Statistical Package for the Social Sciences
USA	United States of America
VCT	Voluntary Counseling and Testing
WHO	World Health Organization

Operational Definitions

Attitude: complex interaction of beliefs, feelings, and values to respond in a manner towards hepatitis B virus.

Knowledge: information stored in memory assessed in terms of what the participants know about HBV

Practice: What the respondents actually practicing for prevention and control of HBV

Seroprevalence: The proportion of individuals with hepatitis B surface antigen positive status

Seropositive: The presence of hepatitis B surface antigen in the participants' serum

Seronegative: The absence of the hepatitis B surface antigen in the serum

Abstract

Background: Hepatitis B virus (HBV) is a highly contagious virus which is 50-100 times more infectious than HIV but have similar mode of transmission. Chronic HBV infection remains a major health threat. The prevalence of HBV infection among an antenatal population may be a reliable indicator of HBV prevalence rate in the general population. However, the knowledge, attitude, practice and the prevalence of HBV infection among pregnant women are not studied well in developing countries like Ethiopia.

Objective: To assess the magnitude of Hepatitis B surface antigen and level of knowledge, attitude practices related to Hepatitis B infection among pregnant women attending three Health Centers in Addis Ababa, Ethiopia.

Method: A cross sectional study was conducted from March to May 2014 among pregnant women attending selected Health Centers in Addis Ababa, Ethiopia. A total of 260 pregnant women were included in the study. Volunteer participants were asked to complete a questionnaire, and offered testing for HBsAg infection. The Health Centers were selected based on convenience sampling technique. The data was analyzed using SPSS version 16 software. Chi square test and odds ratios were used to determine association between dependent and independent variables. Levels of statistical significance were determined at P value < 0.05.

Result: Of the total of 254 screened pregnant women, 4.7% were positive for HBsAg. The highest prevalence (8.7%) was observed among 30-34 age groups, among self employed (6.7%), in those with primary education (7.6%), and those having three children (6.5%). However, there was no statistically significant association between the prevalence of HBsAg and socio demographic characteristics P > 0.05.

Out of 254 participants, 138(60.8%) were related the poor knowledge range. Poor knowledge were seen apparent in responses to questions relating to, 28.7% they have heard of a disease termed as hepatitis B, only 18.9 believed that HBV is viral disease, 12.2% know symptom of the Hepatitis B and 18.9% that transmission can occur from mother to child during pregnancy. Educated participant had more knowledge about the HBV and were reduce risk of HBV infected. [AOR=0.13; 95%CI, 0.04-0.52, P=0.004] and those with better knowledge were three times more likely to be tested for HBV [AOR=2.83; 95%CI, 1.3-6.1 P= 0.00]. Majority of the respondents 214 (84.3%) believe that they can never get infected with HBV, 11.8% stated that

they will go to traditional healer to get treated for HB. 125 (49.2%) agreed to consult a physician as their first choice of treatment as a good attitude towards the virus. The overall negative practice were 57.3%, 219 (86.2%) never had HBV screening and 248 (97.6%) stated a negative immunized status against HB and 239(94.1%) have never attended any health educational program on HB. But, 198 (79.0%) participants agreed that they will go for further investigation and treatment if they are infected with HB.

Conclusion: The prevalence rate of HBsAg was 4.7%. The overall good knowledge of the participants was 39.2%, low responses were seen attitude related questions and good practice was 42.7%. Although Hepatitis is recognized to be one of the major health problems, these findings indicate a lack of understanding about control and the prevention of HB. Therefore, public health measures must include regular health education.

Key Words: HBsAg, Seroprevalence, KAP, Pregnant women.

1. Introduction

1.1 Back ground

Hepatitis B Virus (HBV) is a partially double-stranded circular DNA virus of the class *Hepadnaviridae* family. The viral particle is 42 nm in size and consists of an outer lipoprotein coat [1]. According to the World Health Organization hepatitis B causes the world's most common liver infection. It is the most serious type of viral hepatitis and it can cause chronic liver disease and put people at high risk of death from cirrhosis of the liver and liver cancer [2, 3 4]. The virus is highly contagious, 50-100 times more infectious than HIV and its incubation period is from 6 weeks to 6 months [2]. Hepatitis B infection is a potentially life-threatening liver infection [3, 4].

The HBV is present in high concentration in blood, serum, saliva, semen, vaginal fluid and most body fluids [4]. Transmission of HBV results from exposure to infectious blood or body fluids, unprotected sexual contact, blood transfusion, reuse of contaminated needles and syringes, and vertical transmission from mother to child. Other high-risk adult populations include persons with multiple heterosexual partners, and healthcare workers without education. The risk of prenatal HBV transmission is greatest for infants born to women who are HBeAg positive [5]. There are three possible routes of transmission of HBV from infected mothers to infants: transplacental transmission of HBV in uterus, natal transmission during delivery and postnatal transmission during care of infant or through breast milk [6].

Among pregnant women, these illnesses can lead to coagulation defects, postpartum hemorrhage, organ failure and high maternal mortality and poor outcomes of their newborns such as still births, neonatal deaths (NND), acute and chronic liver disease and hepatocellular carcinoma (HCC). For all these reasons, the early intervention and prevention of these illnesses is a priority today and included in universal screening in antenatal visits and part of reproductive health programs [7].

The prevalence of HBV infection among antenatal population may be a reliable indicator of hepatitis B virus prevalence rate in the general population. Hence, screening antenatal women for HBsAg can give a reliable prevalence of the disease in a population and provide an avenue for preventing mother to child transmission of the virus [8].

Knowledge is usually assessed in order to see how far community knowledge corresponds to biomedical concepts. Typical questions include knowledge about Causes and symptoms of the illness under investigation. People reported knowledge which deviates from biomedical concepts is usually termed as 'beliefs'. Attitude has been defined as "a learned predisposition to think, feel and act in a particular way towards a given object or class of objects". As such, attitude is a product of a complex interaction of beliefs, feelings, and values. Practices in KAP surveys usually enquire about the use of preventive measures or different health care options. Normally, hypothetical questions are asked, therefore it hardly permits statements about actual practices, rather, it yields information on people's behaviors or on what they know should be done [9].

1.2 Statement of the problem

An estimated 2 billion people have been infected with the hepatitis B virus worldwide and more than 240 million people have chronic liver infections. More than 780 000 people die every year due to the acute or chronic consequences of hepatitis B with the presence of hepatitis B surface antigen (HBsAg) [4, 10]. Prevalence of the carriers in different areas of the world is various according to which, the regions of the world were divided into three separate groups; the first group includes the United States, Canada, Western Europe, Australia and New Zealand which are among the regions with low prevalence (0.1% to 2%). The second group includes Mediterranean countries, Japan, central Asia, Middle East and South America which are among the regions with moderate prevalence (2% to 8%) and finally the high prevalence regions (8% to 20%) including South Asia, China and Africa [11]. Like in several developing countries, Ethiopia is among the countries with high prevalence and almost 8.0– 8.2% of the pregnant women are Hepatitis B (HB) virus carriers [12].

Most infections occur during infancy and early childhood. Infection occurs commonly in all age groups, although the high rate of chronic infection is primarily maintained by transmission during infancy and early childhood [3]. The sexual transmission is the predominant route among adolescents in low prevalence and developed countries [4].

Worldwide, chronic hepatitis B (CHB) remains a major health threat; each year approximately 600,000 individuals die of complications such as acute liver failure, cirrhosis, and HCC. Therefore, prevention of prenatal transmission remains an important target in the struggle for global eradication of HBV infection. The prevalence of HBsAg positive pregnant individuals varies with geographic location and ethnicity; in the USA, HBsAg prevalence is 6% in Asian women, 1% in African-Americans, 0.6% in non-Hispanic whites and 0.1% in Hispanics. In endemic areas such as China and South East Asia, the prevalence may be as high as 10-20% [13].

Reports in 2010 have shown that, an estimated 35,000 acute hepatitis B infections occurred in the United States [14]. Among African countries, seroprevalence of HBsAg was reported at rates of 6.8% in central to 26% in Southern Sudan [15], 7.6% in Nigeria [16]. Among those African pregnant women in Nigeria the prevalence rate was 7.9% [16], in Burkina Faso 9.8% [17], Sudan 5.6% [18] and Ethiopia 5.3% [19].

According to Abebe et al, 1994, on a community-based seroepidemiological survey in Addis Ababa, 292 (6.2 %) were HBsAg positive out of the 4736 samples screened [20]. In another study conducted in Tigray a total of 578 blood donors were screened in 2003 and 6.2% of them were HBsAg positive [21]. According to a research conducted in Shashemene General Hospital in 2008, 5.7% of the total 384 VCT clients investigated were positive for HBsAg [22]. Also in Jimma in 2010, 2.1% of the total 6063 blood donors tested was positive for HBsAg [23]. In 2008, a study from rural hospital in Southern Ethiopia revealed that among 165 pregnant women 6.1 were Positive [24].

Prevention of prenatal or vertical transmission is a major goal. Worldwide, vertical transmission remains the most frequent route of infection, particularly in endemic areas where up to 20% of women of childbearing age may have HBV. These women constitute a reservoir for prenatal transmission, which is associated with a very high rate of chronicity. However, the maternal screening programs and universal vaccination in newborns with active and passive immune prophylaxis have dramatically reduced HBV transmission rates. But even with the use of appropriate prophylaxis with HBV immunoglobulin (HBIG) and HBV vaccination, a significant risk of vertical transmission remains, particularly in mothers with high viral loads and positive hepatitis B e antigen (HBeAg) status [25].

Knowledge, attitude, and practice (KAP) surveys are representative of a specific population to collect information on what is known, believed and done in relation to a particular topic, and the most frequently used study tool in health-seeking behavior research [26]. We suspect from our previous experience that the current state of affairs is attributable to inadequate awareness and knowledge of HBV transmission and prevention in general population. Therefore, we embarked on this study to evaluate the knowledge on HBV infection in pregnant, their attitude on the prevention of both vertical and horizontal transmission of HBV, and the use of prevention measures. We believe that our findings would have implications for other communities with similar socio-environmental characteristics as our study participant. Therefore, it is essential that the KAP status of pregnant women with respect to viral hepatitis were assessed by a standardized questionnaire. Such a questionnaire could be used as the best way to check the awareness, attitude and good practice toward HBV. In addition, it can be used by community programmers and policy makers of health-related issues in order to evaluate the requirements for educational programs and potentially necessary interventions.

1.3 Significant of the study

The frequency of HBV is high worldwide, and chronic hepatitis B infection remains a major health threat. Vertical transmission remains the most frequent route of infection, particularly in endemic areas where up to 20% of women of childbearing age may have HBV [25]. In addition to complications in the pregnant women, like coagulation defects, postpartum hemorrhage, organ failure and high maternal mortality, the illness can lead to poor outcomes of their newborns such as still births, neonatal deaths, acute and chronic liver disease and hepatocellular carcinoma [7]. Therefore, prevention of prenatal transmission remains an important target in the struggle for global eradication of HBV infection. Prevention is considered as one best way to safeguard populations' health. Prevention can also lead to decreased spread of HB virus thus reducing the chances of disease conduction. Prevention against HBsAg is proportional to KAP of the pregnant women and is reflective of the importance that is paid to health related issues by the society [26]. Thus, as we stated in the above several studies on epidemiology of viral hepatitis in pregnancy are available from Africa while limited data is available in Ethiopia, and KAP towards HB among pregnant women is also limited explored. The current study aimed to assess the prevalence of HBV, and knowledge, attitudes and practices of pregnant women towards HBV. Epidemiological data and KAP on HBV infection are important to program managers and health planners, to plan vaccination and other preventive strategies.

1.4 Literature review

A retrospective chart review was conducted on 10523 women during 1990–1993 in 4 urban areas in the United States to determine the seroprevalence of hepatitis B surface antigen in pregnant women. Among those, the prevalence in white non-Hispanics was 0.60%, black non-Hispanics 0.97%, Hispanics 0.14%, and Asians 5.79% [27].

In another study conducted in India in 2012, the rate of positivity for HBsAg among 500 asymptomatic pregnant women was 39 (7.8%). Most of the studied women were in the 2nd trimester of gestation 223 (44.6%), among those groups also the highest seropositivity rates were seen 26 (11.6%), while those in the 1st trimester had the least prevalence of 4 (3.66%) of the 109 screened. On the basis of age groups, the highest prevalence rate (12%) was found among 21-25 years age group. None were positive in the age groups 41-45. About 85% of the HBsAg positive subjects (33 of 39) had any one of the risk factors for hepatitis B infection. The predisposing factors showed that those who had previous history of abortion had the highest rate of 18%, followed by HBsAg positive mothers (15%) with history of jaundice and those who had blood transfusion (12.8%) [28].

A similar study that was conducted on Hepatitis B surface antigen among pregnant women in Nigeria by Ndako et al (2012) showed that, 31 (17.2%) out 180 were found to be positive for HBsAg. The highest prevalence of 11 (6.1%) was found among those aged 20-29. With regards to occupational distribution of volunteer subjects, a high prevalence of 12 (6.7%) was recorded among house wives, which shows a measure of significance compared to other women screened. Based on various risk factors, history of surgery and use of unsterilized sharp instruments showed 15 (8.3%) prevalence. However, women in their second trimester of pregnancy had a higher prevalence of 23 (12.8%) [29].

A cross-sectional study was conducted on pregnant Sudanese women in 2006. HBsAg was detected in 41 (5.6%) out of 728 women, but all of them were not aware of their condition. When assessing the risk factors, 141(19.3%), and 63 (8.8%) of the women gave history of jaundice and blood transfusion, respectively. Moreover, 69(9%) and 21(3%) had traditional scares and tattooing, respectively. One third of these women (231) had history of dental maneuvers [18].

Most of the published data in Ethiopia came from Blood donors and other population groups. A cross-sectional study was conducted on 6063 blood donors in 2010 of which 1261 (20.8%) were

females. The majority (91.6%) of donors were < 45years old. The overall prevalence rate of HBV infection as evidenced with positive serological test for HBsAg was 2.1% where seven (0.6%) of the 1261 females were having HBV infection. Analysis of HBV infection by age group showed highest prevalence in the age group 40-44 years and lowest among the age group of forty five years or more 13 of 509 (4.5%) and 3 of 509 (0.9%) respectively [30].

Another cross sectional study was conducted among blood donors in Jimma University teaching hospital in 2008 by Huruy et al. In this investigation the overall prevalence of HBsAg among apparently healthy blood donors was found be 24.2%. Most of the study subjects 40 (64.5%) had history of frequent medical injection of which 10 (25%) were positive for HBsAg. Donors with multiple sexual partners had high prevalence of HBsAg and it was found to be highly significantly associated with HBsAg [23].

Among the limited studies on pregnant women in Ethiopia, a cross-sectional study was conducted among pregnant women in Gondar in 2008. Of 209 mothers included in the study, 11 (5.3%) were found to be HBsAg positive. The mean age was 25.4 (± 6) and the majority of the pregnant women, 143 (68.4%), were between the age group of 16-28 years. Moreover, 206 (98.6%) of the study subjects were married. Almost all the participants reported exposure to at least one HBV infection risk factor; sharp materials were the leading one 195 (93.3%) followed by practice of tattoo for cosmetics 15 (7.2%), and blood transfusion 2 (1%). Among those participants, who were positive for HBsAg, the highest prevalence was seen in the age groups 16-22 (6/11), followed by 23-28 (4/11) but, none were reported in those aged 35-40 years [19].

Study was conducted in Gondar town, on 8-58 years female street dwellers in 2006. This study showed that, among the study participants, 110(27.2%) were females of whom 10% responded that they had been sexually abused. Of the 302 street dwellers examined 33 (10.9%) were found to be positive for HBsAg. The prevalence in females was significantly higher (28.9%) than the 8.3% prevalence in males [31].

Moreover, a community-based survey in Addis Ababa was conducted in 1994. Of the 4736 samples screened 292 (6.2%) were HBsAg positive. HBsAg prevalence was higher in males (9%) than females (5%). HBsAg prevalence showed a rise from 3.1% in 0–4 year olds to a peak at 9.2% in 30–34 year olds, and subsequent decline to about 5% in 35–49 year olds [20].

Epidemiological data and assessment of KAP on HBV infection are important to plan for appropriate preventive strategies including vaccination. A cross-sectional study of KAP among Healthy population was carried out in Pakistan in 2012. Out of 780 participants, 363 (46.5%) were females. The majority of the population, 763 (97.8%) have heard termed as HB, 449(57.6%) knew it affects liver function and 187(24%) knew transmission can occur from mother to child. Moreover, 622 (79.7%) were within the negative attitude believing that they can never get infected with HB; 308 (39.5%) respondents stated that they will be ashamed to get infected with HB. In addition, 203 (26.0%) agreed to consult a physician as their first choice of treatment and hence showed a positive attitude towards the disease. The majority, 252 (64.6%) believed that they could never become infected with hepatitis [9].

With regards to practice, 756 (96.9%) patients were within the bad practice range as they never went for HB screening and 674 (86.8%) stated a negative immunized status against HB. It was interesting to know that 634 (81.8%) never asked for a new syringe when required, whereas 344 (44.1%) showed good practice towards hepatitis prevention that they ask for screening of blood and blood products before transfusion. However, on the contrary majority of the study participants 635 (81.4%) revealed that they avoid meeting a person infected with HB. Majority 731 (93.7%) agreed that they will go for further investigation and treatment if they are infected with HB [9].

A similar study from India, by Sharma et al, assessed the knowledge, attitude and practices of 300 married women in the reproductive age group in the year 2004 regarding HBV infection. Out of a total of 300 women only 20% were aware of the mode of transmission and 50% of the women had misconceptions about mode of transmission like physical contact, fecal-oral route, hugging and shaking hands. Use of condoms and sterile needles were proposed by 20%, immunization with hepatitis vaccine by 60% and use of safe water by 80% of the women as preventive measures against HBV [32].

Another survey conducted on Knowledge about Hepatitis B Infection assessed in Pregnant Women in China, by Chan et al, 2008. It is noteworthy that between 27% and 75% of the studied subjects realized that HBV infection can be a lifelong condition, and 75% and 60% of them knew that HBV infection is associated with cirrhosis and liver cancer, respectively. Additionally, only about 11-14% the Chinese subjects surveyed thought that HBV could not be transmitted by

the sharing of eating utensils. Only 40-65% of surveyed subjects knew that HBV could be sexually transmitted but, they had a good knowledge that exposure to blood or blood products (65–90%) could allow HBV to spread from an infected person to susceptible individuals. The knowledge on prevention of HBV transmission was relatively good in that the majority of the respondents (62–95%) knew HBV transmission could be prevented by hepatitis B screening and vaccination [33].

Another cross sectional survey was undertaken among Chinese population, about their awareness and knowledge of hepatitis B infection and prevention, in 2012. As for knowledge on HBV, only 14% scored 17 points or more out of 20, and for the entire cohort, the mean score was 13.5±2.8. Over 80% of the respondents knew that HBV was transmitted via blood products, sharing of needles and not through hand shaking. Most of the respondents were aware that HBV vaccination can prevent HBV and not via balanced diet. Also, most of them knew that HBV is a risk factor for cirrhosis and liver cancer. However, 59% and 77% of them thought regular exercise and good hand hygiene can prevent HBV infection respectively [34].

In Europe, among French general population 9014 people were interviewed, about HB of which 96.1% declared having already heard of hepatitis B. Amongst these, 89.9% knew that HBV can be transmitted by needle-sharing while taking drugs, 79.1% declared that transmission can occur during pregnancy and 69.7% knew that transmission can occur during unprotected sexual intercourse. Women were more aware of the possibility of transmission during pregnancy than men (81.3% vs. 76.6%). The 18–30 year-old (74.6%) and 31–44 year-old (73.4%) populations were more aware of sexual transmission [35].

In Ethiopia, as far as our knowledge goes no published report is available regarding the knowledge, attitude and practice of pregnant women regarding HBV infection, though HBV prevalence rates ranging between 0.6% and 28.9% were reported in the limited study in pregnant women and women of reproductive age from different parts of the country as stated above [18, 19, 29, 30]. We believe, the magnitude of HBV prevalence in women of reproductive age group could shade some light regarding the problem in the pregnant women. This necessitates, identifying any misconceptions as well as knowledge and practice gaps so as to design appropriate interventions.

2. Objective of the study

2.1 General objective

To assess the magnitude of Hepatitis B surface antigen and level of knowledge, attitude practices related to Hepatitis B infection among pregnant women attending three Health Centers in Addis Ababa, Ethiopia.

2.2 Specific Objectives

- To determine the prevalence of Hepatitis B surface antigen among the study population.
- To assess knowledge, attitudes and practice regarding Hepatitis B surface antigen.

3. Material and Method

3.1 Study design

A cross sectional study was conducted among pregnant women attending antenatal Clinic in three selected Health Centers in Addis Ababa, Ethiopia.

3.2 Study Area

This study was conducted in three selected Health centers in Addis Ababa. Addis Ababa is the capital city of Ethiopia. It is geographically located at the center of the country. The altitude of the city ranges between 2000 and 3000 meters above sea level. Based on the 2005 (EFY) Health and Health Related indicators publication by FMOH Addis Ababa has 33 Hospitals, 28 Health Centers (HC) and 35 Health Posts. Based on the 2000 figure from the central Statistics agency (CSA) of Ethiopia, Addis Ababa has an estimated total population of 3,147,000 consisting of 1,511,000 men and 1,636,000 women. [36] Health facilities within the city are found in different sub cities. These health centers are found in Arada (Woreda 4 HC), Kirkos (Woreda 4 HC) and Lafto (Woreda 5 HC).

3.3 Study period

The study were conducted from March to May 20, 2014

3.4 Population

3.4.1 Source population

The source populations are all pregnant women who leave in Addis Ababa.

3.4.2 Study Population

All Pregnant women who were attending the selected antenatal care clinics in Addis Ababa during the study period.

3.5 Eligibility

3.5.1 Inclusion Criteria

All Pregnant women who were attending antenatal clinic in the selected health centers during the study period and who are volunteering and give informed consent

3.5.2 Exclusion Criteria

- Those women who are unable to communicate due to any problem

3.6 Sample Size

Sample size was calculated by taking overall Hepatitis B infection prevalence among pregnant women as 6.1 [24], 3.05% level of significance / margin of error this is because in the prevalence of the previous study is below 10% and above 90% we should take half of the P (6.1/2) [37]. This sample size was estimated using the formula for calculating sample size for cross sectional study of estimation a single Population proportion as described below.

$$N = \frac{Z\alpha/2^2 \, P\,(1-P)}{d^2}$$

The following assumptions were made during sample size calculation.

Z =Standard deviation of the normal distribution = 1.96 (confidence level at 95%)

P = prevalence 6.1 %(prevalence of HBsAg in serological survey in Ethiopia [24]

100-P = pregnant women who not exposed

d = Tolerable error / level of significance = 3.05%. [37]

X=10 % non respondent rate = 23.65

N=Minimum sample size

$$n = \frac{1.96^{\,2}\, 0.06\,(1-\,0.06)}{0.03^2} = 236.5$$

Sample size = n (Minimum sample size) + X (non respondent)

Sample size (N) = 236.5 + 23.65 = 260

Samples collected during the study was 260

3.7 Sampling procedure

In this study, three health centers were selected based on Simple random sampling with lottery method. These health centers are found in Arada (Woreda 4 HC), Kirkos (Woreda 4 HC) and (Lafto Woreda 5 HC). The study subjects were selected by using probability proportion to size sampling technique. Of these 60 (23.6%), 110 (43.7%) and 84 (33.1%) from each sub cities were recruited, respectively.

3.8 Study variables

3.8.1 Dependent variables

The prevalence of Hepatitis B surface Antigen, and Knowledge, Attitude and Practice towards Hepatitis B surface Antigen.

3.8.2 Independent variables

Socio demographic variables: Age, marital status, occupation, pregnancy states and educational status.

3.9 Measurement and data collection

3.9.1 Data collection

The data for the study were derived from serological testing and questionnaires. Socio demographic and KAP data were collected using a standard structured questionnaire by professional Nurses after having received a clear explanation of the objective of the study and having signed the informed consent from the participants using a standard consent form designed for this study and interviewed using a questionnaire. Actual data (blood sample and questionnaire) were collected from March-April; 2014, by starting from Kirkos Health center and then collected from all facilities in the same period.

3.9.2 Specimen collection and Processing

After obtaining informed consent, 5 ml of venous blood were collected in plane tubes under aseptic conditions from peripheral vein by experienced laboratory personnel from all consenting pregnant women consecutively. These tubes were labeled with unique identification number and processed at the time of collection. The blood samples taken from the individuals were centrifuged at 3000 revolution per minute (RPM) for at least 20 minutes at room temperature and the serum were separated and placed in nunc tubes kept frozen at -20^{o} c until to be transported from each Health Centers. Samples were transported from each HC by using an Ice box to Hema Diagnostic laboratory for testing. Hema diagnostic laboratory was found in Yeka sub-city kebele 09, it's the first locally accredited private laboratory in Ethiopia by Ethiopia National Accreditation Office.

3.10 Laboratory testing

All the serum samples were tested for HBsAg by using a gold standard method ELISA following standard operating procedures [38]; samples reactive for HBsAg were confirmed by the same method. Samples repeatedly positive were considered as positive. The subjects' positive for HBsAg were referred to the attending physician for further evaluation and treatment.

Principle of the test

The HBsAg EIA is a solid-phase simultaneous sandwich immunoassay, which employs monoclonal antibodies and polyclonal antibodies specific for HBsAg. Micro titers well are coated with monoclonal antibodies specific for HBsAg. A Serum specimen is added to the antibody coated micro titer wells together with Enzyme conjugated polyclonal antibodies. HBsAg, if present, will form an antibody-HBsAg-antibody-enzyme complex. The plate is then washed to remove unbound material. Finally, a solution of substrate is added to the wells and incubated. A blue color will develop in proportion to the amount of HBsAg present in the specimen. The enzyme-substrate reaction can be stopped and the result is visualized by naked eye or read by EIA plate reader for absorbance at the wavelength of 450 nm.

3.11 Quality Assurance

The questionnaire was first prepared in English and translated back to Amharic, translating back to English to ensure consistency of the questions. Pre-testing of 5% the questionnaire was done prior to the study. The clarity, understandability and flow of each question and the time to fill the questionnaire were assessed. Daily all the collected data was checked for completeness by the principal investigator. All the data were double entered to ensure the data quality

Quality control of serological test, Known positive and negative controls were run in parallel with test samples. All laboratory procedures were carried out following standard operating procedures (SOPs). The quality assurances of pre-analytical, analytical and post-analytical stages were applied.

Pre-analytical stage

Blood samples were collected aseptically from pregnant women and properly labeled by the patient identification number. The specimen was collected by the trained Laboratory personnel. The samples were centrifuged; the serum were evaluated and separated; appropriately and stored

until transported to the laboratory. The transported samples were stored at the optimum temperature until they were processed.

Analytical stage

The test was performed by trained laboratory personnel in Hema diagnosis laboratory with Huma reader and Washer (Human, Germany). The reagents and the test method were assessed with a known positive and negative control materials, the standard laboratory procedures were also followed and the results were checked by the supervisors.

Post-analytical stage

The results were recorded with the patients' identification number, in order to avoid the errors in the results of the test, repeatedly checked before reporting. The results were given to the health centers and each pregnant woman.

3.12 Statistical Analysis

Microsoft office Excel was used to enter data and SPSS version 16 software was used for data analysis. Chi square, Odds ratios and 95% confidence intervals were calculated to assess the presence and degree of association between independent and outcome variables. Logistic regression was used to identify associations between the independent and outcome variables and to identify and control for confounding variables. P values less than 0.05 was taken as statistically significant.

Knowledge was assessed by questions focusing on HBV etiology, sign and symptoms, transmission and treatment. Each response was scored as 'yes' or 'no'. The scoring range of the questionnaire was 1 to 18. A cutoff level $\leq$ 11 was considered as poor whereas > 11 was considered as adequate knowledge about HBV. Knowledge scores for individuals were calculated and summed up to give the total knowledge score. The cutoff value was taken from similar study in Pakistan [9].

Practices towards HBV were assessed by asking eight questions listed in Table 8. Each question was labeled with good or poor practice. A score of 1 was given to good while 0 was given to bad practice with a score range of 0 to 8. The scale classified practice as positive with score > 4 and negative $\leq$ 4. The cutoff value was taken from similar study in Pakistan [9].

3.13 Ethical Consideration

This study was done after getting ethical clearance from the Department Research and ethical review committee (DRERC) of Addis Ababa University, College of Health Science, Department of Medical Laboratory Science, and Addis Ababa Health Bureau. A letter was submitted to each Health Center to get permission to undergo the study. Information about the study was given to all pregnant women and assured about the confidentiality, protection and anonymity of data and it is only for research proposes. Written informed consent was obtained from all study participants. Study participants that were identified positive were referred to health centers for the management and for further investigations and follow-ups. In addition, all information that is necessary for the management and further investigation was given to the respective health institutions as well as to the participants. Information obtained at any course of the study was kept confidential.

4. Result

4.1 Socio-demographic characteristics

A total of 260 pregnant women were approached in three different antenatal clinics from Arada, Kirkos and Lafto sub cities and 254 were screened for HBsAg and asked about KAP towards Hepatitis B by using questionnaires. Out of a total 254 study participants, 60 (23.6%), 110 (43.7%) and 84 (33.1%) were from Arada health center, Kirkos health center and Lafto health center, respectively. The overall response rates were (97.7%). The majority 87 (34.3%) of the participants were found 25-29 age groups, followed by 20-24; 80 (31.5 %), with a mean age and SD of 26.6$\pm$ 2.86 years and age range between 16-40 years. Eighty six (34.0%) of the pregnant women had completed of secondary education. The majority of those participants were married 220 (86.6%). Eighty nine (35.3%) of the pregnant women were self employed. During the present survey most pregnant women were about to get their first child 103 (41.0%); while 13 (5.1%) of them were having four and above children during the study period. (Table: 1)

Table: 1 Socio demographic characteristics of pregnant women attending antenatal clinics in three Health centers in Addis Ababa, Ethiopia, June 2014.

Characteristics	Frequency	Percent (%)
Age (Years) (n=254)		
< 20	21	8.3
20-24	80	31.5
25-29	87	34.3
30-34	46	18.1
35-39	19	7.5
40 +	1	0.4
Marital status(n=254)		
Single	29	11.4
Married	220	86.6
Divorced	2	0.8
Widowed	3	1.2
Occupation (n=252)		
Self employed	89	35.3
Government employed	35	13.9
Private employed	80	31.7
Not employed	48	19.0
Education (n=253)		
No formal education	47	18.6
Primary education	79	31.2
High School	86	34.0
College level	41	16.2
Pregnancy States(n=251)		
First	103	41.0
Second	89	35.5
Third	46	18.3
Four & above	13	5.2

- Age mean (SD) of the participants were **26.6 (2.86)**

4.2 Prevalence of Hepatitis B Virus among pregnant women

When the prevalence rate of HBsAg was analyzed, out of the 254 pregnant women tested, 12 were positive for HBsAg giving an overall sero prevalence of 4.7%.

Among those married participants 11(4.3%) were positive (χ^2=7.03, P=0.071, df=3). When data was analyzed by age groups, the highest prevalence was seen in the age group 30-34 which is 4 (8.7 %) were positive; but the association of HBsAg and age group was not statistically significant (χ^2=2.93, P=0.71 ,df=5). Based on occupational status of the study populations, that high positivity was seen in self employed 6 (6.7%) followed by not employed 3(6.2%). Regarding educational level, Six (7.6%) of the study participants were positive from primary education. Three (6.5%) of the highest prevalence from those pregnant women that yield birth of three children; none were found positive in those having four and above children. The overall serological results were not statistically significantly associated with socio demographic characteristics. (Table: 2)

Table: 2 Seroprevalence of HBsAg in relation to socio demographic characteristics among pregnant women attending antenatal clinics in three Health centers in Addis Ababa, Ethiopia, June 2014.

Characteristics	N (%)	HBsAg result		χ^2 value	df	P value
		Pos Freq(%)	Neg Freq(%)			
Age (n=254)						
< 20	21 (8.3)	1 (4.8%)	20 (95.2%)	2.93	5	0.71
20-24	80 (31.5)	4 (5.0%)	76 (95.0%)			
25-29	87 (34.3)	3 (3.4%)	84 (96.6%)			
30-34	46 (18.1)	4 (8.7%)	42 (91.3%)			
35-39	19 (7.5)	0 (0%)	19 (100%)			
40 +	1 (0.4)	0 (0%)	1 (100%)			
Marital status(n=254)						
Single	29 (11.4)	0 (0%)	29 (100%)	7.03	3	0.071
Married	220 (86.6)	11 (5.0%)	209 (95.0%)			
Divorced	2 (0.8)	0 (0%)	2 (100%)			
Widowed	3 (1.2)	1 0.4%)	2 (66.7%)			
Occupation (n=252)						
Self employed	89 (35.0)	6 (6.7%)	83 (93.3%)	3.25	3	0.355
Gov't employed	35 (13.8)	2 (5.7%)	33 (94.3%)			
Private employed	80 (31.5)	1 (1.2%)	79 (98.8%)			
Not employed	48 (18.9)	3 (6.2%)	45 (93.8%)			
Education (n=253)						
No formal education	47 (18.5)	3 (6.4%)	44 (93.6%)	3.29	3	0.348
Primary education	79 (31.1)	6 (7.6%)	73 (92.4%)			
High School	86 (33.9)	2 (2.3%)	84 (97.7%)			
College level	41 (16.1)	1 (2.4%)	40 (97.6%)			
Pregnancy States(n=251)						
First	103 (40.6)	5 (4.9%)	98 (95.1%)	0.98	3	0.807
Second	89 (35.0)	4 (4.5%)	85 (95.5%)			
Third	46 (18.1)	3 (6.5%)	43 (93.5%)			
Four & above	13 (5.1)	0 (0%)	13 (100%)			

χ^2= chi-square value df=degree of freedom

4.3 Assessment of knowledge, Attitude and practices towards Hepatitis B virus

4.3.1 Assessment of knowledge towards HBV

Knowledge scores for individuals were calculated and summed up to give the total knowledge score. The cutoff value was taken from similar study in Pakistan [9]. Out of the 254 participants, 146 (60.8%) were within the poor knowledge range with the mean and SD level of 13.4± 4.03; whereas 94 (39.2%) showed adequate knowledge about HBV. According to our results poor knowledge was apparent in responses to etiology related questions. For example, only 28.7, 18.9 and 22.8% of the participants heard of a disease termed as hepatitis B, believed that HBV is viral disease and affected liver function respectively. While 25.7% knew Nausea, vomiting and loss of appetite are common symptom of Hepatitis B and 12.3% of the respondents said there is no symptom of the Hepatitis B in some of the patients, 18.9% respondents said that transmission can occur from mother to child during pregnancy, 16.1% of the respondents are aware that HBV vaccination can prevent HBV, 30.8% believed Hepatitis B can cause liver cancer and only 19.8% Hepatitis B can be transmitted by unsafe sex.

A good level of knowledge of HBV was seen based on some knowledge related questions like 57.5% of the participants heard about the disease Hepatitis, 89.9 and 89.4% responded that HBV is not transmitted by contaminated H_20 / food prepared by person suffering with the infections and no specific diet required for treatment, respectively (Table 3).

Table 3: Knowledge responses about HBV among pregnant women attending antenatal clinics in three Health centers in Addis Ababa, Ethiopia, June 2014

Knowledge items	Yes N (%)	No N (%)
Heard of a disease termed as Hepatitis	146 (57.5)	108 (42.5)
Heard of a disease termed as Hepatitis B	73 (28.7)	181 (71.3)
Hepatitis B is a viral disease	48 (18.9)	206 (81.1)
Hepatitis B can affect liver function	58 (22.8)	196 (77.2)
Hepatitis B can cause liver cancer	78 (30.8)	175 (69.2)
Hepatitis B can affect any age group	69 (27.2)	184 (72.7)
Jaundice is the common symptoms of Hepatitis B	132(52.0)	122 (48.0)
Nausea, vomiting and loss of appetite are common symptom of Hepatitis B	65 (25.7)	187 (74.2)
We can't see symptoms of the Hepatitis B in some of the patients	31 (12.3)	222 (87.7)
Hepatitis B can be transmitted by un sterilized syringe needle and Surgical instrument	43 (17.0)	210 (83.0)
Hepatitis B can be transmitted by contaminated Blood and Blood Product	54 (21.3)	200 (78.7)
Hepatitis B can be transmitted by blades of the barber /ear nose Pierces	48 (18.1)	208 (81.9)
Hepatitis B can be transmitted by unsafe sex	50 (19.8)	202 (80.2)
Hepatitis B can be transmitted by mother to child	48 (18.9)	206 (81.1)
Hepatitis B can be transmitted by contaminated H_20 / food Prepared by person suffering with the infections	37 (14.7)	214 (85.3)
Hepatitis B is curable / treatable	76 (30.0)	173 (68.4)
Hepatitis B can be self cured by body	24 (10.1)	213 (89.9)
Vaccination is available for Hepatitis B	41 (16.1)	213 (83.9)
Specific diet is required for treatment of Hepatitis B	25 (9.9)	227 (89.4)

Among those poor knowledge participants the prevalence of HB was positively association to those with good knowledge participants.

Inadequate knowledge is probably an important factor in HBV infection, the relationship between knowledge and HBV result is shown in Table 4. Those with poor knowledge about the virus are 3 times more likely to be infected with HBV [AOR=3.2 (0.6 - 9.6) P=0.16]. This is not statistically significant.

Table: 4 The relation between Knowledge output and serological results of pregnant women attending antenatal clinics in three Health centers in Addis Ababa, Ethiopia, June 2014

		Laboratory findings		COR 95% CI	P value	AOR 95% CI	P value
		Positive Fre (%)	Negative Fre (%)				
Knowledge outcome	**Good (40.5%)**	2 (2.1%)	92 (97.9%)	1		1	
	Poor (59.4%)	9 (6.5%)	129 (93.5%)	0.4 (0.1-1.6)	P=0.18	3.2 (0.6-9.6)	P=0.16

Educated participants had more knowledge about HBV (Table 5). This was evident when we compared primary educated to those uneducated where the primary had 5 times more knowledge about the virus, [AOR=5.3; 95% CI, 3.2 – 48.2 P=0.00].

Table: 5 Logistic regressions between Knowledge responses and socio demographic characteristics among pregnant women attending antenatal clinics in three Health centers in Addis Ababa, Ethiopia, June 2014.

Characteristics	Knowledge out c		COR 95% CI	P Value	AOR 95% CI	P value
	Poor N (%)	Good N (%)				
Age (n=240)						
< 20	5(4.9)	15(10.9)				
20-24	36(35.3)	41(27.7)	2.0 (5.6-7.2)	0.28		
25-29	39(38.2)	43(31.2)	1.36 (0.36-5.1)	0.65		
30-34	18(17.6)	24(17.4)	1.18 (0.28-4.9)	0.82		
35-39	4(3.9)	14(10.1)	0.88 (0.12-6.3)	0.90		
40 +	0(0)	1(0.7)		0.99		
Marital states(n=240)						
Single	11(10.8)	17(12.3)	1			
Married	91(89.2)	116(84.1)	1.51 (0.59-3.87)	0.39		
Divorced	0(0)	2(1.4)		0.99		
Widowed	0(0)	3(2.2)		0.99		
Occupation (n=238)						
Self emp.	41(40.2)	42(30.9)	1			
Gov't emp.	27(26.5)	6(4.4)	3.4 (1.-11.2)	0.04*		
Private emp.	20(19.6)	55(40.4)	9.3 (3.2-27.3)	0.46		
Not emp.	14(13.7)	33(24.3)	12.4 (3.2-48.2)	0.24		
Edu. (n=238)						
No formal edu.	4(4)	43(31.2)	1		1	
Primary edu.	25(24.8)	51(37.0)	3.39(1.12- 10.3)	0.03*	5.3 (3.2-48.2)	0.00*
High School	43(42.6)	35(25.4)	9.3 (3.2-27.3)	0.00*	3.66(1.26-10.6)	0.02*
College level	29(28.7)	9(6.5)	12.4 (3.2-48.2)	0.00*	1.34 (0.46-3.85)	0.59
Pregnancy States(n=237)						
First	38(38.4)	61(44.2)	1			
Second	43(43.3)	41(29.7)	1.79 (0.86-3.7)	0.11		
Third	15(15.2)	27(19.6)	0.98 (0.36-2.68)	0.97		
Four & above	3(3)	9(6.5)	2.48 (0.45-13.8)	0.29		

- * Statistically Significant P < 0.05

Participants were requested if they have done any HBV screening. As shown in Table 6, the majority especially who had poor knowledge responded negatively. Those with better knowledge were 3 times more likely to be tested for HBV [AOR=2.83; 95%CI, 1.3-6.1 P=0.01].

Table: 6 The relation between knowledge and HBV screening status of pregnant women attending antenatal clinics in three Health centers in Addis Ababa, Ethiopia, June 2014.

		Have you done screening for HB		COR 95% CI	P value	AOR 95% CI	P value
		Yes Fre (%)	No Fre (%)				
Knowledge outcome	**Good (40.5%)**	19(20.2%)	75 (78.8%)	1		1	
	Poor (59.4%)	12 (8.2%)	134(91.8%)	2.8 (1.3-6.2)	P=0.01	2.8 (1.3-6.2)	P=0.01

4.3.2 Assessment of attitude towards Hepatitis B

Attitude towards HB was assessed by asking eight questions as shown in Table 7. Each question was labeled with positive or negative attitude. The majority of the respondent 214 (84.6%) believed that they can never get infected with HBV and most of the study participants 214 (85.9%) were not checked about the serostatus of HBsAg. Thirty (11.8%) respondents stated that they will go to traditional healer if they get infected with HBV, 7 (2.8%) worried isolation from the society and 23 (9.1%) they don't mind if infected with Hepatitis B. Whereas, 125 (49.4%) agreed to consult a physician as their first choice of treatment and 175 (68.9%) of them will go to the health facility soon as realized the symptoms of Hepatitis B. Two hundred six (81.1%) of the respondent had no information about cost of either diagnosis or the treatment of HBV.

Table: 7 Attitude responses towards HBV among pregnant women attending antenatal clinics in three Health centers in Addis Ababa, Ethiopia, June 2014

Attitude Items	No.	%
Do you think you can get Hepatitis B?		
Yes *	39	15.4
No	214	84.6
What would be your reaction if you found that you have Hepatitis B?		
Fear *	37	14.6
I don't mind	23	9.1
Shame	16	6.3
Sadness	79	31.1
Go to health facility	95	37.4
Do you have check the status of Hepatitis B?		
Yes *	35	14.1
No	214	85.9
Who would you talk to about your illness?		
Physician	61	24.0
Spouse	112	44.1
Parents	45	17.7
Child	1	0.4
Other related friends	4	1.6
no one ×	31	12.2
What will you do if you think that you have symptoms of Hepatitis B?		
Go to health facility *	125	49.4
Go to Physician *	92	36.4
Will not go any where	6	2.4
Go to Traditional healer	30	11.8
If you had symptoms of Hepatitis B, at what stage you will go to the health facility?		
Own treatment fails	20	7.9
After 3-4 weeks of the appearance of symptoms	40	15.7
Soon as I realize the symptoms are of Hepatitis B *	175	68.9
Will not go to physician	18	7.1

How expensive do you think is the diagnosis and treatment of Hepatitis B?		
Free	**1**	**0.4**
Reasonable	6	2.4
Somewhat expensive	4	1.6
Expensive	37	14.6
Don't know ×	206	81.1
What worries you most if you will be diagnosed with Hepatitis B?		
Fear of death	65	25.6
Fear of disease spread to family	33	13.0
Cost of treatment	3	1.2
Isolation from the society ×	7	2.8
Nothing worried	143	56.3

* Positive attitude, × Negative attitude.

4.3.3 Assessment of practices towards Hepatitis B

Practices towards HBV were assessed by asking eight questions listed in Table 8. The overall practices of the participant were 57.3% for negative practice while 42.7% for positive practice, Majority of the respondents, 219 (86.2%) had never HB screening and 248 (97.6%) stated that not immunized against HB. One hundred forty one (56.6%), 145 (57.1%) and 151 (59.4%) never asked for a new syringe, screening of blood before transfusion and safe equipments for ear and nose piercing when required respectively, while most 222 (88.1%) agreed with they are not avoid meeting a person infected with HB. However, on the contrary majority of the study participants198 (79.0%) agreed that they will go for further investigation and treatment if they are infected with HB. In addition a highest number of respondents 239(94.1%) have never attended any educational program on HB. (Table 8) The mean and SD score for HB related practices were 0.43 ± 0.4 revealing poor practices among the study participants.

Table: 8 Practice responses related to HBV among pregnant women attending antenatal clinics in three Health centers in Addis Ababa, Ethiopia, June 2014.

Practice Items	Yes (1) N %	No (0) N %
Screening for Hepatitis B	35 (13.8%)	219(86.2%)
Vaccinated against Hepatitis B	6 (2.4%)	248(97.6%)
Ask for a new syringe before use	108 (43.4)	141 (56.6)
Ask for screening of blood before transfusion	109 (42.9)	145 (57.1)
Ask your hairdresser to change blade/or for safe equipments for ear and nose piercing	103 (40.6)	151 (59.4)
In case you are diagnosed with HB, would you go for further investigation and treatment	198 (79.0)	56 (22)
Avoid meeting Hepatitis B patients	30 (11.9)	222 (88.1)
Participated in health education program related to HB	15 (5.9)	239 (94.1)
Over all Practice	**106 (42.7)**	**142 (57.3)**

The relation between practice outcome and laboratory findings are summarized in Table 9. As shown in the table, five (4.7%) of those participants with negative practice towards the virus were seropositive for HBsAg, which was relatively higher percent when compared to having good practice. Those with good practice participants relatively less infected with HBV [AOR=0.89; 95%CI, 0.27 – 3.0 P=0.85]. The difference, however, did not reach statistically significant level.

Table 9: The relation between practice outcome and Laboratory findings about pregnant women attending antenatal clinics in three Health centers in Addis Ababa, Ethiopia, June 2014

		Laboratory findings		COR 95% CI	P value	AOR 95% CI	P value
		Positive Fre (%)	Negative Fre (%)				
Practice outcome	**Positive 106(42.7%)**	6 (4.2%)	136 (95.7%)	1		1	
	Negative 142(57.3%)	5 (4.7)	101 (95.3%)	0.89 (0.3-3.0)	P=0.8	0.89 (0.3-3.0)	P=0.8

Table 10: Logistic regression between Practice responses and socio demographic characteristics among pregnant women attending antenatal clinics in three Health centers in Addis Ababa, Ethiopia, June 2014.

Characteristics	Practice out came		COR 95% CI	P value	AOR 95% CI	P value
	Bad	Good				
Age (n=248)						
< 20	10(7)	11(10.4)				
20-24	44(31.0)	34(32.1)	0.75 (0.24-2.3)	0.61	0.75 (0.25-2.3)	0.6
25-29	52(36.6)	32(30.2)	0.68 (0.21-2.2)	0.53	0.69 (0.21-2.2)	0.5
30-34	28(19.7)	17(16.0)	0.56 (0.15-2.1)	0.39	0.57 (0.15-2.1)	0.3
35-39	8(5.6)	11(10.4)	0.58 (0.1-3.1)	0.52	0.58 (0.11-3.1)	0.5
40 +	0(0)	1(0.4)	0.22 (-)	1.0	-	1.0
Marital states(n=248)						
Single	18(12.7)	10(9.4)				
Married	124(87.3)	91(85.8)	1.3 (0.5-3.2)	0.59	1.2 (0.51-3.24)	0.5
Divorced	0(0)	2(1.9)	-			
Widowed	0(0)	2(2.8)	-			
Occupation (n=246)						
Self employed	55(39.3)	29(27.4)				
Gov't emp.	23(16.4)	11(10.4)	0.76 (0.26-2.2)	0.61	0.76 (0.26-2.2)	0.6
Private emp.	34(24.3)	46(43.4)	2.24 (1.09-4.6)	0.03*	2.24 (1.09-4.6)	0.02*
Not employed	28(20.0)	20(18.9)	1.19 (0.52-2.7)	0.68	1.19 (0.52-2.7)	0.6
Education (n=247)						
No formal edu.	13(9.2)	33(31.1)				
Primary edu.	46(32.9)	29(27.4)	0.21 (0.08-0.6)	0.00*	0.23 (0.08-0.6)	0.002*
High School	57(40.4)	29(27.4)	0.19 (0.07-0.5)	0.00*	0.19 (0.07-0.5)	0.00*
College level	25(17.7)	15()14.2	0.36 (0.11-1.2)	0.09	0.36 (0.11-1.2)	0.09
Pregnancy States(n=245)						
First	63(44.7)	37(35.6)				
Second	49(34.8)	38(36.5)	1.6 (0.79-3.26)	0.18	1.23 (0.51-3.2)	0.5
Third	21(14.9)	24(23.1)	1.9 (0.77-5.12)	0.16		
Four & above	8(5.7)	5(4.8)	0.39 (0.07-2.0)	0.26		

5. Discussion

In the present study, the prevalence of HBsAg among pregnant women was found to be 4.7%. The finding was slightly lower than reports from different part of the country; a study in Gondar revealed 5.3% prevalence while in Southern part of Ethiopia 6.1% among pregnant women [19, 24] and in the neighboring Sudan it was 5.6% [18]. The finding is consistent with the 5% prevalence reported in females of the large community based survey in Addis Ababa [20]. Another study from pregnant women in Nigeria also indicated a much higher prevalence of HBV, 17.2%, as compared to the present study [29]. Such discrepancy could be due to the differences in study design, socio-cultural environment, traditional operation, sexual practices and medical exposure and the difference in hepatitis epidemiology in these countries might explain these discrepancies.

Among those married participants 11(4.3%) were positive and one (0.4%) positive from widowed participants. No positive was detected in unmarried; these results highly contradicted with the same study conducted by Walle et al, 2008 from the Northern part of Ethiopia which is single participants were the highest prevalence [19]. In our case, when marital status was considered as a predisposing factor to HBV infection, it was not statistically significant (χ^2=7.03, P=0.07, df=3). (Table 2)

Those 30-34 age groups account the highest prevalence 4 (8.7 %) and the same high prevalence was seen in the same age group in Nigeria [3]. Disagreement shows among those age groups (21-25) from Bakthavatchalu S et al in India 2012 and Ndako J et al 2012 in Nigeria [28, 29]. Age is an important factor in epidemiology studies hence the age of acquiring infection was found to be a major determinant of the incidence of HBV but, in our study ages of the participants were not statistically significant (χ^2 =2.93, P=0.71, df=5). (Table 2)

Occupationally the highest prevalence was shown in self employed participants 6(7.5%) which almost identical distribution among those different occupational states (χ^2 =3.25, P=0.355, df =3). (Table 2) Educational attainment was also considered as a risk factor for hepatitis B virus transmission. Eighty one of the women studied had at least primary education. Those that attained up to secondary education comprised the middle of the subjects 127 (50.0%). Among 79 (31.1%) women with primary education, 6 (7.6%) tested positive to HBsAg, while only 2 (2.3%)

were positive among those with secondary education and 1(2.4%) at the college level. This was not statistically significant ($\chi^2 = 3.29$, P = 0.345, df = 3). (Table 2)

Among those pregnant who yield the third child were most likely the highest prevalence 3 (6.5%) followed by mothers who yield first child, these results shows the magnitude of mothers which probable to transfer viruses with their children through vertical transmission either during delivery, breast milk or during give care after delivery. The overall serological results were not statistically significant with socio demographic characteristics. (Table 2)

This study also aimed to evaluate the association between level of knowledge of HBV and its prevalence. As our results show, the highest prevalence was noted among those with poor knowledge of the virus 9 (6.2%) than in those with good knowledge 2(2.1%) [AOR=3.2 (0.6-9.6) P=0.16], though the difference did not to a statistically significant level. In this study, a total of 57.5% of the respondents heard of Hepatitis whereas in a study carried out by Haq et al (2012) in Pakistan quite large number of them heard of it (97.8%). This huge difference is also maintained in that 28.7% of our study participants versus 84.0% of the Pakistanis study participants have ever heard of the term HBV [9]. Only 30.8% of our study participants believed that hepatitis B can cause liver cancer; similarly, low level of knowledge was reported from Japan in 2013 which is 18.5% [39]. On the contrary, 87% of the study participants of Wah et al, 2012, from China believed that HBV can cause liver cancer [34].

According to our result measures against HBV depend on whether people know that hepatitis is a transmissible disease or not only 21.3% of the respondents know HBV were transmissible through blood and blood products, 19.8 % through unsafe sex and 18.9% from mother to child during pregnancy. This low level of knowledge of ways of HBV transmission calls for targeted health education in order to prevent and control the spread of the virus. These results highly contradicted with a study by Chan and colleagues, (2012) from China, who demonstrated quite high level of knowledge (82%) about the routes of transmission through blood and blood product. Moreover, 59% and 58% of their participants knew that HBV is transmitted through unsafe sex and from mother to child, respectively [33]. With regard to the knowledge of respondents about the prevention of HBV, 16.1% know vaccination available for Hepatitis B which was highly contradicted in Haq N etal Pakistan 76.7% [9]. The overall knowledge responses above HBV were highly contradicted from different literatures, possible reasons that

can be attributed to this difference of response are demographic variation of the study population, study location, as well as the study tool used for data collection and Previous public health exposure have been increasing the awareness of HBV infection.

The participants' ability to recognize symptoms of the virus was relatively good, almost half 48% were able to recognize jaundice as one of the symptoms of hepatitis B, a finding which contradicted with a finding by Eguchi et al (2013) in Japan who observed a lower (23.7%) ability of their participants in recognizing jaundice as one of the symptoms [39] . Inadequate knowledge is probably an important factor in HBV infection and 138 (60.8%) of the study participants were within the poor knowledge range. This is substantiated in this study, since those with better knowledge were more likely to be tested for HBV [AOR=2.8 (1.3-6.2) P=0.01].

In addition, majority 214 (84.3%) of the participants reported that they do not think they could get infected with Hepatitis B while 214(84.3%) were not checking their HBV status. This result is in line with a study by Haq etal in Pakistan who reported 79.7%, 96.9%, respectively [9]. Thirty one (12.2%) of our study participants preferred traditional therapies as treatment of choice until there is no improvement in the sign and symptoms of HB if infected with HBV. Consulting the physicians was sought as reported by only 61 (24.0%) of them, if they get infected with HBV; this result similar to what is reported by a study from Pakistan [9]. It is imperative to account that delay in seeking medical treatment for the infection by pregnant women results in further deterioration of the condition and can cause vertical transmission to her child. While horizontal spread of HBV infection remains an important means of transmission and vertical transmission probably accounted for the persistently high local prevalence of HBV infection.

Participants of the current study showed poor practice towards HB. Majority of the participants were not concerned about the safety measures which defiantly expose them to the danger of acquiring HB infection. Despite having no awareness regarding the availability of HB vaccines (83.9%) and not screening (86.2%), majority of the participants were not immunized against HB (97.6%). However, similar results were reported by Brouard etal in French study participants in 2013 but, in low magnitudes that is, in their study 67.8% were not screened and 43.9%were not vaccinated [35]. We believe cost was not a hindrance to the uptake of vaccination, as 81.1% of our respondents were not aware of how much the cost of vaccination is; only 14.6% of them expected the cost to be expensive, so we can conclude from the above results most of the study

participants are not vaccinated due to the lake of information about the availability of the vaccination.

The participants of the current study reported to have poor practices which were directly related to the knowledge and awareness regarding HB infection. This finding is not surprising since the majority reported that they have never been attending any health education program about hepatitis B (94.1%). On the other hand, an encouraging finding is that the majority (79%) of the respondents were answering positively to good practice questions in that they will go to further investigation and treatment if in case they become positive when screening. It is concluded that adequate knowledge can lead to positive attitude resulting in good practices. As we see from our results most of the respondents do not have enough knowledge, good attitude and good practice with regards to HBV. Planning of health education will be successful in increasing the awareness of pregnant mothers about HBV infection, also raising awareness of HBV status of the spouse or partners, and other family members.

6. Strengths & Limitation of the study

Strengths:-

- The findings of the study particularly the KAP of pregnant women about hepatitis B can be used as base line information for other researchers; it will initiate more studies on this subject
- There is high response rate, which is about 97.7%.

Limitation:-

- The study was conducted in three antenatal clinics and therefore results of the research may not be representative of the entire pregnant women of Addis Ababa.
- The risk factors of study participants were not included in the study.
- HBsAb test are not performed to screen out either vaccinated or previously exposed participants.
- All HBV markers were not done for the final diagnostics
- There is no any KAP document recorded among Ethiopian pregnant to compare our results; however it was possible to compare with KAP of pregnant women from other studies

7. Conclusion and Recommendation

Conclusion

- The prevalence of HBsAg was 4.7%;
- The high prevalence was seen among those aged 30-34 years (8.7%) and in primary level educated participants (7.6%). Also high prevalence was seen in self employed (6.7%). Mothers having more number of children three and above show highest prevalence.
- The overall knowledge of the participants was found to be poor and their attitude and practice were also limited. In this study, most pregnant women had poor knowledge about the etiology, symptom, transmission and prevention of hepatitis B. Moreover, most were not vaccinated due to lack of knowledge about the presence of HBV vaccine.
- In this study, the prevalence of HB was not associated with any one of socio demographic characteristics, suggesting that any effort to increase knowledge may improve individuals' negative attitudes towards HBV.
- Inadequate knowledge is probably an important factor in HBV infection, 138 (60.8%) of the study participants were within the poor knowledge, since those with better knowledge were more likely to be tested for HBV suggesting that they may be less likely to be infected, and if infected managed in time. According to these findings there is a lack of understanding of the basics of infection control and the prevention of transmission of HB.

Recommendation

Based on the findings of this study, the following recommendations are forwarded for future plan and implementation aiming at the community programmers and policy makers of health-related issues.

- ✓ Increase awareness on screening, vaccination must be introduced through health education during antenatal care follow up by the concerned bodies
- ✓ Further study should be done to identify the risk factors related to the HBV
- ✓ Extensive health education campaign should be provided to general population and especially to pregnant to increase their awareness towards hepatitis B infection

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9. List of annexes

I. Consent form (English version)

My name is Fikremariam Bayuh and I am MSc student in Medical Laboratory technology at AAU. I am doing a research entitled "Prevalence of HBsAg and KAP related to HBV infection among pregnant women attending selected antenatal Clinics in Addis Ababa, Ethiopia"

The objective of the study is to determine the prevalence of HBV and assess the Knowledge, attitude, Practice of pregnant women regarding HBV. If you agree to participate in the study, about 5 ml of blood will be collected from you or you will allow us to use the sample that you will give for your medical examination and you will be interviewed. During collection of blood, you may feel some discomfort, but this does not produce serious pain. All the data obtained will be kept strictly confidential by using only code numbers and locking the data, so that only study personnel will have access to the files. Samples will be coded and positive result will not be identified by names. There will be no costs to you as a result of taking part in this study and you are not asked to pay for the laboratory examination. I will give you the result and if your result is clinically significant, I will get you in contact with the physician for further diagnosis and treatment. Your participation is purely voluntary, and you are free to withdraw any time after you get involved in the study or you can also jump (decline) to answer some of the questions if you feel uncomfortable. Participation and not participation has no influence on the service you seek to get in the health facilities.

Participant's response: I am well informed of the study aims and procedures and that I am free to decline to be in this study, or to withdraw from it at any point and also to jump a question that feels me discomfort. He promised to give the result without cost. My decision as to whether or not to participate in this study will have no influence on my present or future medical service. My signature below indicates that I agree to participate in this study.

Signature of Person Obtaining Consent_____ date of signature_____

Subject's signature_____ date of signature_____

Principal Investigator Address: Fikremariam Bayuh : Department of Medical Laboratory Sciences, Collage of health sciences, Addis Ababa University, Addis Ababa, Ethiopia

E-mail: fikretsehay@gmail.com Tel.: +251911 16 88 66

II. Survey questionnaire (English version)

Questionnaire for "KAP and Serological test for HBsAg among pregnant women in different Health centers Addis Ababa, Ethiopia, 2013"

Interviewer Name _____ Questionnaire Number_____

Date of interview_____ Participant Code _____

Name of Health Centre_____ Pregnant registration number_____

S No	Questions	Response
100	**Socio-demographic information (Circle One answer)**	
101	Age (in years)	_____
102	Marital status?	a. Single b. Married c. Widowed d. Divorced
103	Education Level?	a. No formal education at all b. Primary education c. Secondary education d. College level
104	What is your occupational status?	a. Self employed b. Government employed c. Private employed d. Not employed
105	Pregnancy States?	a. First c. Third b. Second d. Four & above

200	Questions towards Knowledge on Hepatitis B	
201	Have you heard of a disease termed as Hepatitis?	1. Yes 2. No
202	Have you heard of a disease termed as Hepatitis B?	1. Yes 2.No
203	Is hepatitis B a viral disease?	1. Yes 2. No
204	Can hepatitis B affect liver function?	1. Yes 2. No
205	Can hepatitis B cause liver cancer?	1. Yes 2. No
206	Can hepatitis B affect any age group?	1. Yes 2. No
207	The early symptoms of Hepatitis B are some like cold & flu (fever, running nose, and cough)?	1. Yes 2. No
208	Jaundice is one of the common symptoms of Hepatitis B?	1. Yes 2. No
209	Are nausea, vomiting & loss of appetite common symptom of hepatitis B?	1. Yes 2. No
210	There no symptom of the Hepatitis B in some of the patients?	1. Yes 2. No
211	Can Hepatitis B transmitted by un sterilized syringe needle & surgical instrument?	1. Yes 2. No
212	Can Hepatitis B transmitted by contaminated Blood & Blood product?	1. Yes 2. No
213	Can Hepatitis B transmitted by blades of the barber /ear & nose pierces?	1. Yes 2. No
214	Can Hepatitis B transmitted by unsafe sex?	1. Yes 2. No
215	Can Hepatitis B transmitted by mother to child?	1. Yes 2. No
216	Can Hepatitis B transmitted by contaminated H_20 / food prepared by person suffering with the infections?	1. Yes 2. No
217	Is Hepatitis B curable / treatable?	1. Yes 2. No
218	Can Hepatitis B self cured by body?	1. Yes 2. No
219	Is vaccination available for Hepatitis B?	1. Yes 2. No
220	Is specific diet required for treatment of Hepatitis B?	1. Yes 2. No

300	Questions towards hepatitis B attitude	
301	Do you think you can get Hepatitis B?	1. Yes 2. No
302	What would be your reaction if you found that you have Hepatitis B?	1. Fear 3. Surprise 2. Shame 4. Sadness 5. Go to health facility
303	Do you have Hepatitis B?	1. Yes 2. No
304	Who would you talk to about your illness?	1. Physician 4. Child 2. Spouse 5. Other related 3. Parents 6. No one.
305	What will you do if you think that you have symptoms of Hepatitis B?	1. Go to health facility 2. Go to Physician 3. Will not go to any where 4. Go to Traditional healer
306	If you had symptoms of Hepatitis B, at what stage you will go to the health facility?	1. Own treatment fails 2. After 3-4 weeks of the appearance of symptoms 3. Soon as I realize the symptoms are of Hepatitis B 4. Will not go to physician
307	How expensive do you think is the diagnosis and treatment of Hepatitis B?	1. Free 2. Reasonable 3. Somewhat expensive 4. Expensive 5. Don't know
308	What worries you most if you will be diagnosed with Hepatitis B?	1. Fear of death 2. Fear of disease spread to family 3. Cost of treatment 4. Isolation from the society 5. Nothing worried

400	**Questions towards practices related to Hepatitis B**	
401	Have you done screening for Hepatitis B?	1. Yes 2. No
402	Have you got yourself vaccinated against Hepatitis B?	1. Yes 2.No
403	Do you ask for a new syringe before use?	1. Yes 2. No
404	Do you ask for screening of blood before transfusion?	1. Yes 2. No
405	Do you ask your barber to change blade/or for safe equipments for ear and nose piercing?	1. Yes 2. No
406	In case you are diagnosed with Hepatitis B, would you go for further investigation and treatment?	1. Yes 2. No
407	Do you avoid meeting Hepatitis B patients?	1. Yes 2. No
408	Have you ever participated in health education program related to Hepatitis B?	1. Yes 2. No
500	**Serology (Laboratory findings)**	1. Positive 2. Negative

III. Consent form (Amharic version)

የመረጃ መሰብሰቢያ መጠይቅ ፎርም (ቅፅ)

አዲስ አበባ ዩኒቨርሲቲ የላቦራቶሪ ት/ቤት

በጥናቱ ለሚሳተፉ ግለሰቦች የፈቃድ መጠየቂያና መቀበያ ፎርም፡፡

ፍቅረማርያም ባዩህ እባላለሁ፡፡

አዲስ አበባ ዩኒቨርሲቲ የህክምና ፋኩልቲ የላቦራቶሪ ሳይንስ የማስተርስ ዲግሪ ተማሪ ነኝ፡፡ ባሁኑ ሰዓት የጉበት (የወፍ) በሽታ የሚያመጣውን ሄፓታይተስ የተባለውን ቫይረስ ነፍሰ ጡር በሆኑ ሰዎች መካከል ያለውን ስርጭት፣ ሥዎች ያላቸውን እውቀት፣ አመለካከት፣የሚወስዱትን የመከላከያ መንገድ እና ተሞክሮ ለማወቅ ጥናት እያካሄድኩ ነው፡፡

<u>የጥናቱ ዓላማ</u>

በነፍሰጡሮች መካከል ያለውን የቫይረሱ ስርጭት ማወቅና፣ ሥዎች ስለቫይረሱ ያላቸውን እውቀት፣ አመለካከት፣ የሚወስዱትን የመከላከያ መንገድ እና ተሞክሮ ለማወቅ ጥናት እያካሄድኩ ነው፡፡

እርስዎ በጥናቱ ለመሳተፍ ፍቃደኛ ከሆኑ በኋላ መጠይቁ ይተባበሩናል፡፡ 5 ሚ.ሊት ደም ይሰጡናል ወይም ለሌላ ምርመራ የሰጡትን ደም እንድንጠቀም ይፈቅዱልናል፣ ደም በሚሰጡበት ሰዓት የተወሰነ የህመም ስሜት ይኖራል፡፡ ዳሩ ግን ምንም ዓይነት የከፋ ጉዳት አያደርስም፡፡ የሰጡት ማንኛውም መረጃ ሁሉ ሚስጥራዊነቱ የተጠበቀ ነው፡፡ በስም አይገለፅም በጥናቱ የሚሳተፍ ምንም ዓይነት ክፍያ አይከፈልም ምንም ዓይነት የሚያገኙት ገንዘብ አይኖርም፡፡ ነገር ግን የጉበት በሽታ የሚያመጣው ቫይረስ በደምዎ ካለ ወይም የምርመራ ውጤቱ ህክምና የሚያስፈልገው ከሆነ ተጨማሪ ምርመራ እና ህክምና እንዲያገኙ ከባለሙያ ጋር አገናኝዎታለሁ፡፡ በጥናቱ የሚሳተፉት ፈቃደኛ ከሆኑ ብቻ ነው፡፡ ስለዚህ መሳተፍ ከጀመሩ በኋላ ማቋረጥ ወይም መመለስ የማይፈልጉት ጥያቄ ካለ ይለፈኝ ማለት ሙሉ መብትዎ ነው፡፡ በጥናቱ መሳተፍ ወይም አለመሳተፍ በሚያገኙት አገልግሎት ላይ ምንም ዓይነት ጥቅምም ሆነ ጉዳት አይኖረውም፡፡

<u>የተሳታፊውን ፈቃድ መግለጫ</u>

ስለጥናቱ አላማና ሂደቶች በደንብ ተረድቻለሁ፣ እንዲሁም መሳተፍ ፣አለመሳተፍ፣ ከጀመሩ በኋላ ማቋረጥ ወይም መመለስ የማይፈልገው ጥያቄ ካለ ይለፈኝ ማለት እንደሚቻል፡፡ በጥናቱ መሳተፍ አለመሳተፍ በማገኘው አገልግሎት ላይ ምንም አይነት ጥቅምም ሆነ ጉዳት እንደሌለው እና በውጤቱ መሰረት ሀኪም ጋር እንደሚያገናኙን በመሳተፌም ምንም አይነት ክፍያ እንደማይሰጠኝ እና እኔም እንደማልከፍል ተገልፆልኛል፡፡

የጥናቱ አላማ ግልፅ ስለሆነልኝ ለመሳተፍ ተስማምቻለሁ፡፡ ፊርማዬንም እንደሚከተለው አስቀምጫለሁ፡

የጥናቱ ተሣታፊ ፊርማ _____ ቀን _____

ፍቃደኛነትን የጠየቀ ሰው ፊርማ _____ ቀን _____

የዋና ተመራማሪው አድራሻ፤

ፍቅረማርያም ባዩህ ፤ የሕክምና ላቦራቶሪ ቴክኖሎጂ ዲፓርትመንት፣ የጤና ሳይንስ ኮሌጅ፣ አዲስ አበባ ዩኒቨርሲቲ- አዲስ አበባ፣ ኢትዮጵያ

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IV. Survey questionnaire (Amharic version)

የመረጃ መሰብሰቢያ መጠይቅ ፎርም (ቅፅ)

አዲስ አበባ ዩኒቨርሲቲ የላቦራቶሪ ት/ቤት

በጥናቱ ተሳታፊ በሆኑ ግለሰቦች የሚሞላ ፎርም

የ ቃለ ማጠይቅ አድራጊው ስም _____የ ማጠይቅ ተ.ቁ _____

ማጠይቅ የ ተወሰደበት ቀን _____የ ተሳታፊው ቁጥር _____

የ ጠፍ ተቋሙ ስም _____የ ከትትል ማሳያ ቁጥር_____

ተ.ቁጥር	ጥያቄ	መልስ
100	**የግለሰቡ አካላዊ ማህበራዊ እና ኢኮኖሚያዊ ዝርዝር**	
101	ዕድሜ	_____
102	የጋብቻ ሁኔታ?	1. ያላገባ 3. የትዳር ጓደኛ የሞተበት 2. ያገባ 4. የተፋቱ
103	የትምህርት ሁኔታ?	1. ያልተማረ 2. የመጀመሪያ ደረጃ ት/ት ያጠናቀቀ 3. ሁለተኛ ደረጃ ት/ት ያጠናቀቀ 4. የኮሌጅ ተማሪ
104	ስራ?	1. የግል 3. የቤት እመቤት 2. የመንግስት 4. ሥራ አጥ
105	የእርግዝና ሁኔታ?	1. የመጀመሪያ 3. ሶስተኛ 2. ሁለተኛ 4. አራተኛ ና ከዚያበላይ

200	ስለ ሄፓታይተስ ቢ ቫይረስ ስላላቸው እውቀት የተዘጋጀ መጠይቅ	
201	ሄፓይታተስ ስለሚባል በሽታ ሰምተው ያውቃሉ?	1. አዎ 2. አላውቅም
202	ሄፓይታተስ ቢ ስለሚባል በሽታ ሰምተው ያውቃሉ?	1. አዎ 2. አላውቅም
203	ሄፓይታተስ ቢ በቫይረስ አማካኝነት የሚመጣ በሽታ ነው?	1. አዎ 2. አላውቅም
204	ሄፓይታተስ ቢ የጉበት ካንሰር ያመጣል?	1. አዎ 2. አላውቅም
205	ሄፓይታተስ ቢ የጉበትን ስራን ያስተጓጉላል?	1. አዎ 2. አላውቅም
206	ሄፓይታተስ ቢ ሁሉንም የእድሜ ክፍያ ያጠቃል?	1. አዎ 2. አላውቅም
207	በጉበት የተጠቃ ሰው በመጀመሪያ ከሚያሳያቸው ምልክቶች መካከል እንደ ብርድ ብርድ፣ ንፍጥ፣ ሳል፣ ጉንፋን የመሳሰሉት ይጠቀሳሉ?	1. አዎ 2. አላውቅም
208	የአይን ቢጫ መሆን አንዱና ዋነኛው የቫይረሱ ምልክት ነው?	1. አዎ 2. አላውቅም
209	ማቅለሽለሽ፣ ማስታወክ፣ የምግብ ፍላጎት መቀነስ በቫይረሱ ከተያዙ ሰዎች መካከል የሚታይ ምልክቶች ናቸው?	1. አዎ 2. አላውቅም
210	በቫይረሱ በተያዙ በአንዳንድ ሰዎች ላይ ምንም ዓይነት ምልክት ላይታይ ይችላል?	1. አዎ 2. አላውቅም
211	ሄፓይታተስ ቢ ቫይረስ በቆሸሹ ስሪንጅ ፣ መርፌ እንዲሁም ኦፕራሲዎን መሳሪያዎች ሊተላለፍ ይችላል?	1. አዎ 2. አላውቅም
212	ሄፓይታተስ ቢ ቫይረስ ደምና በደም ውስጥ ሊተላለፍ ይችላል?	1. አዎ 2. አላውቅም
213	ሄፓይታተስ ቢ ቫይረስ በምላጭ፡ የጆሮ ወይም ለአፍንጫ መብሻ በሚያገለግሉ መሳሪያዎች ሊተላለፍ ይችላል?	1. አዎ 2. አላውቅም
214	ሄፓይታተስ ቢ ቫይረስ ጥንቃቄ በጎደለው የግብረ ስራ ግንኙነት ሊተላለፍ ይችላል?	1. አዎ 2. አላውቅም
215	ሄፓይታተስ ቢ ቫይረስ ከእናት ወደ ልጅ እንደሚተላለፍ ያውቃሉ?	1. አዎ 2. አላውቅም
216	ሄፓይታተስ ቢ ቫይረስ በተበከለ ውሃ / በበሽታው በተያዘ ሰው በተዘጋጀ ምግብ ሊተላለፍ ይችላል?	1. አዎ 2. አላውቅም
217	ሄፓይታተስ ቢ ቫይረስ መታከም ወይም መዳን ይችላል?	1. አዎ 2. አላውቅም
218	ሄፓይታተስ ቢ ቫይረስ በራሱ የሚድን በሽታ ነው?	1. አዎ 2. አላውቅም
219	ለሄፓይታተስ ቢ ቫይረስ የተዘጋጀ ክትባት እንዳለ ያውቃሉ?	1. አዎ 2. አላውቅም
220	ለሄፓይታተስ ቢ ቫይረስ መድሀኒት የሚያገለግል የተለየ የምግብ ዓይነት አለ?	1. አዎ 2. አላውቅም

300	ስለ ሄፓታይተስ ቢ ቫይረስ ስለአለዎት አመለካከት የተዘጋጀ መጠይቅ	
301	በሄፓታይተስ ልያዝ እችላለሁ ብለው አስበው ያውቃሉ?	1. አውቃለሁ 2. አላውቅም
302	የሄፓይታተስ ቢ ቫይረስ በደም ውስጥ እንዳለ ቢነገርዎት የሚወስዱት እርምጃ?	1. መፍራት 4. ማዘን 2. ማፈር 5. ወደ ህክምና እሄዳለሁ 3. መደነቅ
303	የሄፓይታተስ ቢ ቫይረስ በደም ውስጥ እንዳለ አጋግጠው ያውቃሉ?	1. አውቃለሁ 2. አላውቅም
304	የሄፓይታተስ ቢ ቫይረስ በደም ውስጥ እንዳለ ቢነገርዎት ለማን ይነግራሉ?	1. ለሐኪም 5. ለጓደኛዎ 2. ለትዳር ጓደኛ 6. ለማንም 3. ለቤተሰብዎ አልነግርም 4. ለልጅዎ.
305	የሄፓይታተስ ቢ ቫይረስ የሚያዙ ሰዎች ከሚያሳዩት ምልክቶች መካከል ቢመለከቱ ምን ያደርጋሉ?	1. ወደ ጤና ተቋም እሄዳለሁ 2. ወደ ሀኪም 3. ወደ የትም አልሄድም 4. ወደባህል ህክምና እሄዳለሁ
306	የሄፓይታተስ ቢ ቫይረስ የሚያዙ ሰዎች ከሚያሳዩት ምልክቶች መካከል ቢመለከቱ በየትኛውም ደረጃ ላይ ወደ ህክምና ተቋም ይጓዛሉ?	1. ህክምና አልሰራ ሲል 2. ከ3-4 ሳምንት በኋላ 3. ወዲያውኑ 4. አልሄድም
307	የሄፓይታተስ ቢ ቫይረስ ምርመራ ወይም ህክምና ምን ያህል እንደሆነ ያውቃሉ?	1. ነፃ 4. ውድ 2. በቂ 5. አላውቅም 3. ትንሽ ውድ
308	የሄፓይታተስ ቢ ቫይረስ ምርመራ ለማድረግ የሚያስጨንቅዎት ነገር አለ?	1. ሞትን መፍራት 2. በሽታው ለቤተሰብዎ ማስተላለፍን መፍራት 3. ለህክምናው የሚወጣው ገንዘብ 4. ከህብረተሰቡ መገለል 5. የለም

400	በሽታውን ለመከላከል የሚወስዱት እርምጃ	
401	የሄፓታይተስ ቫይረስ ምርመራ አድርገው ያውቃሉ?	1. አዎ 2. አላውቅም
402	የሄፓታይተስ ቫይረስ ክትባት ወስደዋል ?	1. አዎ 2. አልወሰድኩም
403	መድሃኒት ሲሰጥዎ ወይም ደም ሲሰጡ አዲስ መርፌ እንዲጠቀሙ ጠይቀው ያውቃሉ?	1. አዎ 2. አላውቅም
404	ደም ቢለገስዎ ደሙ የተመረመረ መሆኑን ይጠይቃሉ?	1. አዎ 2. አላውቅም
405	ፀጉርዎን በሚሰሩበት ሰዓት ምላጭ የጆሮ ወይም የአፍንጫ መብሻ መሳሪያዎች አዲስ መሆኑን ይጠይቃሉ?	1. አዎ 2. አልጠይቅም
406	የሄፓታይተስ ምርመራ ሲያደርጉ ቢገኝብዎ ተጨማሪ ምርመራ ወይም ህክምና ያደርጋሉ?	1. አዎ 2. አላደርግም
407	በበሽታው ከተያዙ ሰዎች ጋር የሚኖርዎት ግንኙነትን ያቋርጣሉ?	1. አዎ 2. አላቋርጥም
408	ስለ ሄፓታይተስ ቢ ቫይረስ የሚሰጡ የጤና ትምህርት ወስደው ያውቃሉ?	1. አዎ 2. አላውቅም
500	**የደም ምርመራ ውጤት**	1. ፖዘቲብ 2. ነጋቲብ

V. Laboratory test Procedure

Standard Operation Procedure for ELISA

Introduction

HBsAg ELISA is used for the qualitative determination of HBsAg in human serum or plasma. This test is indicated for the screening of blood and blood products to be used for transfusion and an aid for the diagnosis of existing or previous hepatitis B infection.

HBsAg is one of the earliest markers that appear in the blood following infection with HBV. This infection of the liver is transmitted by sexual activity, blood borne exposure, mother - infant, and close personal contact. In the HBV infected people, the virus persists for the rest of their lives and can be passed on to others. Therefore Hepatitis B has become a global public health problem.

Principle of the test

The HBsAg EIA is a solid-phase simultaneous sandwich immunoassay, which employs monoclonal antibodies and polyclonal antibodies specific for HBsAg. Micro titers well are coated with monoclonal antibodies specific for HBsAg. A Serum specimen is added to the antibody coated micro titer wells together with Enzyme conjugated polyclonal antibodies. HBsAg, if present, will form an antibody-HBsAg-antibody-enzyme complex. The plate is then washed to remove unbound material. Finally, a solution of substrate is added to the wells and incubated. A blue color will develop in proportion to the amount of HBsAg present in the specimen. The enzyme-substrate reaction can be stopped and the result is visualized by naked eye or read by EIA plate reader for absorbance at the wavelength of 450 nm.

Reagents and Materials Required

Provided with the test kits:

1. Micro titer Well: 8x12 or 12x8, coated with monoclonal anti-HBs antibody
2. Negative Control: 0.5ml HBsAg negative serum.
3. Positive Control: 0.5ml HBsAg positive serum.
4. Conjugate- 1 diluent
5. Conjugate- 2 diluent

6. Wash Buffer Concentrate (20X): 50 ml, the buffer should be diluted 20 times with distilled water before use.
7. Substrate Buffer A: 25 ml Urea Peroxide
8. Substrate Solution B: 2.5 ml TMB solution
9. Stop Solution: 6 ml 2N Sulfuric Acid

Additional materials required but not provided:

1. Precision pipettes: 0.02, 0.05, 0.10, 0.15, 0.20, and 1.0 ml.
2. Disposable pipette tips.
3. Distilled water.
4. Incubator of maintaining 42±1°C
5. Absorbent paper or paper towel.
6. Micro titer plate or strip-well washer
7. Micro titer plate reader.

Specimen collection and preparation

No special preparation of the patient is required prior to blood collection. Blood should be collected by approved medical techniques. Remove serum or plasma from the clot or blood cells as soon as possible to avoid hemolytic. Grossly hemolytic, lipidic or turbid samples should not be used. Plasma samples containing EDTA, heparin or oxalate may interfere with test procedures and should be avoided. Specimen with extensive particulate should be clarified by centrifugation prior to use. Covered specimens may be stored for up to 48 hours at 2°-8°C prior to assaying. Specimens held for a longer time can be frozen at -20°C for mix prior to testing. Avoid repeated freeze thaw. At least, two wells of negative and positive controls each should be run in every assay.

Working wash buffer

Dilute the 20X wash buffer concentrate with deionized or distilled water 1:20. For example, 5 ml of wash buffer concentrate should be diluted to a total volume of 100ml with deionized or distilled water.

Assay procedure:

1. Dispense 100ul of Positive Control in 1 well, Low positive control in 3 wells, Negative Control in 4 wells. Add 100ul of serum or plasma samples into respective test wells
2. Incubate the covered plate for 30 minutes in micro plate incubator at (42.0 + 1.0 °C)
3. Add 50ul of working solution of Conjugate -1 in to each well. Mix and cover the plate and incubate 45 minute at (42.0±1.0)
4. Add 50ul of working solution of Conjugate -2 in to each well. Mix and cover the plate and incubate 45 minute at (42.0±1.0).
5. Wash each well 4 times by filling each well with diluted wash buffer, then inverting the plate vigorously to get all water out and blocking the rim of wells on absorbent paper for a few seconds.
6. Add 100ul of Substrate Solution in to each well. Keep the plate in the dark place during 20 minute at 18-24 37°C.
7. Add 150ul of Stopping Solution to each well to stop the color reaction.
8. Read O.D. at 450/620-680 nm with a plate reader.

Assay validity

EIA Plate Reader at 450 nm OD value of Positive Control should be between > 0.6 and average Negative control should be not greater than 0.12).

Interpretation of results

Positive: P/N value is equal to or greater than 2.1

Negative: P/N value is less than 2.1

$$\text{P/N value} = \frac{\text{OD value of specimen.}}{\text{Average OD value of Negative Control 0.05}}$$

Limitations of the procedure

1. The "EIA-HBsAg-0,01" assay and the international of results must be followed when testing serum, plasma for the presence of HBsAg, The user of this kit is advised to read the instruction for use carefully prior to conducting the test. In particular, the test procedure must be carefully followed for sample and reagent pipetting plate washing, and timing of the incubation steps.
2. A designation of reactive for HBsAg must not be based on the single reactive test results. Additional testing, such as confirmatory testing, is required to establish specify of any specimens reactive by the screening procedure.
3. All highly sensitive immunoassays have a potential for non-specify reactions which can lead to false positive results. The proportion of false positive result will depend on the sensitivity and specificity of the kit.
4. Negative results can occur if the quantity of marker present in the sample is too low for the detection limit of the assay, or if the marker which is detected is not present during the stage of disease in which a sample is collected.
5. Testing additional HBV markers is recommended for the final diagnostics of the infection.
6. A reactive HBsAg result does not exclude co-infection by another hepatitis virus.
7. The samples with hyper proteinaemia and hyper bilirubinaemia were not specially tested by "EIA-HBsAg-0, 01".
8. This assay was designed and validated for use with human plasma or serum from individual patient and donor specimens. Pooled specimens must not be used since the accuracy of their test result has not been validated.
9. Specimens containing red blood cells may give inconsistent results, and therefore must be centrifuged prior to testing.
10. Some specimens that have undergone multiple freeze-thaw cycles may result in erroneous or inconsistent test results.
11. Do not use heat-inactivated specimens.
12. All the reagents are for professional in vitro diagnostic use only [37].

VI. Curriculum Vitae of Adviser

ASTER TSEGAYE ABEBE (Mrs)

MSc, PhD

Contact Information

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Education and Training

PhD Immunology: University of Amsterdam, the Netherlands Dec 2004 Advanced Immunology Training: Leiden University Medical Center, the Netherlands Sep 2000

MSc in zoology: Addis Ababa University (AAU), Addis Ababa, Ethiopia July 1995

BSc in Biology (minor Chemistry): AAU, Addis Ababa, Ethiopia July 1987

SHORT TERM TRAININGS

Bioethics training organized by University of Gondar in collaboration with Ohio State University, July 2013, Gondar, Ethiopia

Global Health Leadership Conference/Training at Yale Global Health Leadership Institute, USA June 5-10, 2011

Advanced Hospital Management Seminar for Directors of Hospitals in Ethiopia. Oct 13-22, 2010, Madrid , Spain

Leadership Training organized by Leadership and Management capacity Building project, Nov 18-20, 2011, Adama, Ethiopia

Balanced score card training. January 19-23, 2011, by the college of Health Sciences, AAU Adama, Ethiopia

Leadership and communication skill training by Addis Ababa University (4 days) April 2011, Hawassa, Ethiopia

Interprofessional Teaching TOT: Medical Faculty Medical Education Unit and University of Toronto, Canada, March 9-13, 2009 (Part 1), Addis Ababa University Akaki Campus, Ethiopia (part 2 at AAU Medical faculty, 2010)

Effective Teaching workshop: JHPIEGO Sep, 2008, Bahir Dar, Ethiopia

Teaching-Learning workshop: Ethiopia Public Health Training Initiative (EPHTI) curriculum development and staff strengthening by the Carter Center (Atlanta and Addis Ababa), 28 July - 7 August, 2008, Ambo, Ethiopia

The 9th Third Country Regional Training Program on Blood Safety, organized by KEMRI under the Third Country training Program of JICA, 14 – 31 August, 2006, Nairobi, Kenya

Laboratory Management course organized by CDC, EHNRI & APHLA, July 17-21, 2006, Nazareth, Ethiopia

Training of Trainers (TOT) on Hematology and Clinical chemistry, May 22-June 2, 2006, Arusha, Tanzania

Operators training on Humastar 80 (Clinical chemistry analyzer for the ART program) by Human GmbH, Germany, 6-10 march 2006, organized by Mesroy International PLC. Addis Ababa, Ethiopia.

1st African workshop on "Detection of Antigen-specific T cells by Intracellular cytokine Staining (ICS)" March 6-12, 2005 Johannesburg, South Africa

Chemistry and Hematology Training workshop, January 10-18, 2005, Addis Ababa Ethiopia organized by ASCP, CDC, EHNRI.

Continuing Medical Education (CME)

-21st Century Medicine in Resource Constrained Settings. April 11-12, 2008, UNHCC, Addis Ababa, Ethiopia.

-Management of Deep Vein Thrombosis organized by UN Health care Center (UNHCC), 24 January, 2008

Professional Experience

More than twenty years of experience in routine clinical laboratory diagnostic services (Since Sep 1987)

Research in the field of Immunology/Hematology, HIV/AIDS and other infectious and non-infectious diseases

Teaching at the Medical Laboratory Technology School of Addis Ababa University

National Trainer of HIV/ART monitoring tests (in-service trainings)

Managing Laboratories, Directing Medical Laboratory School, and Leading the largest referral and teaching hospital in the country

International collaboration in research activities

Coordinating Trainings (including the African Regional Capacity Building Network for HIV care and treatment [ARCAN] training) and Research

Nationally, Medical Laboratory Science curriculum development and standardization.

Appointments

Chief Executive Officer: Tikur Anbessa (Black Lion) Specialized Hospital,

College of Health Sciences, AAU 2010- May2012

Director: School of Medical Laboratory Technology, AAU 2009 – 2010

Training & Research Coordinator: National HIV/AIDS Laboratory, EHNRI 2006 –2007

Laboratory Manager: Ethio-Netherlands AIDS Research Project (ENARP) including field site Laboratories 1997-2000

Head Hematology Laboratory: EHNRI 1995-1997(Jan)

Institutional Administrative Appointments (selected) (and Professional societies)

Chair, Graduate Program Audit committee of the College of Health Sciences, AAU Since Mar 2013

Advisory Committee member for the National Antimicrobial Resistance Prevention

and Containment Since Sept 2013

Secretary, Staff Recruitment and Academic Promotion Committee of CHS, AAU Since 2012

Institutional Research & Ethics Review Board member of the college of Health Sciences, AAU Since 2012

Budget council Addis Ababa University (AAU) 2011- Apr 2012

Procurement approval committee, College of Health Sciences, AAU 2011-June 2012

Management Council member college of Health sciences 2010-2012

Drug & Therapeutic Committee, Black Lion Hosp, AAU 2011-2012

Coordinator Medical Laboratory modular curriculum (8 Universities) with CDC/ASCP 2012

Procurement/Bid committee, School of Medicine AAU 2008-2010

Coordinator for standardizing Medical Laboratory Teaching in Ethiopia (8 universities) since 2008

National Medical Laboratory Science Curriculum Review committee (Chair) since 2008

Selected appointments in Professional Societies and Patient associations

Board member of Ethiopian Bioethics Initiative Network (ETHBIN) since Apr 2013

Board Member Cancer Care Ethiopia since 2013

Vise President for Association of Ethiopian Women in Science and Technology since Nov 2013

Board Member Ethiopian society of Chronic Myelocytic Leukemia since 2012

Vice Board chair of the Ethiopian Medical Laboratory Association 2008-2011

Treasurer of the Biological Society of Ethiopia 2006-2009

Vice chair, General Assembly of the Biological Society of Ethiopia 2009-2012

Professional Societies, Patient group Societies/Network membership

Biological Society of Ethiopia (BSE)

Ethiopian Public Health Association (EPHA, Life member)

Ethiopian Medical Laboratory Association (EMLA)

Ethiopian Bioethics Initiative Network (ETHBIN)

Ethiopian Hemophilia Society (EHS)

Ethiopian Chronic Myelocytic Leukemia patients association

National Podoconiosis Action Network (NaPAN) GA member

Cancer Care Ethiopia

Research & Publications

Peer Reviewed Scientific Articles

1. **A. Tsegaye**, Y. Mekonnen and S. Taticheff. **Types of Anaemia due to hookworm infection among the populations of Wolisso**. *Ethiop. J. Health Dev*. 1999; 13 (1):39-45.

2. **A. Tsegaye**, T. Mesele, T. Tilahun, E. Hailu, T. Sahlu, R. Doorly, A.L. Fontanet and T.F. Rinke de Wit. **Immuno-haematological Reference Ranges for Adult Ethiopians**. *Clin Diag Lab Immunol*. 1999; 6 (3): 410-414.

3. T. Sahlu, E. Kassa, T. Agonafir, **A. Tsegaye,** T.F. Rinke de Wit, H. Gebremariam, R. Doorly, I. Spijkerman, H. Yeneneh, R.A. Coutinho and A.L. Fontanet. **Sexual behaviors, perception of risk of HIV infection, and factors associated with attending HIV post-test counselling in Ethiopia.** *AIDS* 1999; 13 (10): 1263-1272.

4. M.D. Hazenberg, S.A. Otto, James W.T. Cohen-Stuart, M.C.M. Verschuren, J. C.C. Borleffs, C.A.B. Boucher, R.A. Coutinho, J.M.A. Lange, T.F. Rinke de Wit, **A. Tsegaye**, J.J.M.van Dongen, D. Hamann, R.J. de Boer and F. Miedema. **Increased cell division But not Thymic dysfunction rapidly affects the TREC content of the Naive T cell population in HIV-1 Infection.** *Nature Med*. 2000; 6(8) 1036-42.

5. M. Aklilu, T. Messele, **A. Tsegaye,** T. Birru, D.H/ Mariam, B. van Benthem, R. Coutinho, T.F. Rinke de Wit and A.L. Fontanet. **Factors associated with HIV-1 infection among sex workers of Addis Ababa, Ethiopia.** *AIDS* 2001; 15:87-96.

6. A. Kassu, **A. Tsegaye**, B. Petros, D. Wolday, E. Hailu, T. Tilahun, B. Hailu, M.T.L Roos, A.L. Fontanet, D. Hamann and T.F. Rinke de Wit. **Distribution of Lymphocyte Subsets in Healthy Human Immunodeficiency Virus-Negative Adult Ethiopians from Two Geographic locales**. *Clin Diagn Lab Immunol* 2001; 8:1171-1176.

7. H. Meles, D. Wolday, A. Fontanet, **A. Tsegaye**, T. Tilahun, M. Aklilu, E. Sanders and T.F. Rinke de Wit. **Indeterminate Human Immunodeficiency virus Western blot profiles in Ethiopians with discordant screening assay results**. *Clin Diagn Lab Immunol* 2002; 9 (1):160-163.

8. W. Mihret, T.F. Rinke de Wit, B. Petros, Y. Mekonnen, **A. Tsegaye**, D. Wolday, A. Beyene, M. Aklilu, E. Sanders, A.L. Fontanet. **Herpes simplex virus type 2 seropositivity among urban adults in Africa : results from cross-sectional surveys in Addis ababa, Ethiopia**. *Sex Transm Dis* 2002 ; 29(3) :175-181.

9. T. Sahlu, T. Rinke de Wit, **A. Tsegaye**, Y. Mekonnen, A. Beyene, B. Hailu, R. Coutinho, A. Fontanet. **Low incidence of syphilis among factory workers in Ethiopia: effect of an intervention based on education and counselling.** *Sex Transm Infect* 2002; 78:123-126.

10. **A. Tsegaye**, T. Rinke de Wit, Y. Mekonnen, A. Beyene, M. Aklilu, T. Messele, A. Abebe, R. Coutinho, E. Sanders, A.L. Fontanet. **Decline in prevalence of HIV-1**

infection and syphilis among young women attending antenatal care clinics in Addis Ababa, Ethiopia: results from sentinel surveillance, 1995-2001. *J Acquir Immune Defic Syndr*. 2002; 30(3):359-362.

11. D. Wolday, **A. Tsegaye**, T. Messele. **Low Absolute CD4 Counts in Ethiopians**. *Ethiop Med J 2002*;40 (suppl 1):11-16.

12. T. Rinke de Wit, **A. Tsegaye**, D. Wolday, B. Hailu, M. Aklilu, E. Sanders, M. Hagos, A. Kliphuis, G. Pollakis, A. Krol, R. Geskus, F. Miedema, J. Goudsmit, R. Coutinho, A.L. Fontanet. **Primary HIV-1 Subtype C Infection in Ehiopia**. *J Acquir Immune Defic Syndr*. 2002; 30(5):463-470.

13. Y. Mekonnen, E. Sanders, M. Aklilu, **A. Tsegaye**, T.F. Rinke de Wit, A. Schaap, D. Wolday, R. Geskus, R.A. Coutinho and A.L. Fontanet. **Evidence of changes in sexual behaviours among male factory workers in Ethiopia**. *AIDS* 2003; 17:223-31.

14. A. Kassu, **A. Tsegaye**, D. Wolday, B. Petros, M. Aklilu, E.J. Sanders, A. L. Fontanet, D. van Baarle, D. Hamann, T.F. Rinke de Wit. **Role of incidental and/or cured intestinal parasitic infections on profile of CD4+ and CD8+ T-cell subsets and activation status in HIV-1 infected and uninfected adult Ethiopians.** *Clin Exp Immunol* 2003; 132:132(1):113-119.

15. **A. Tsegaye**, D. Wolday, S. Otto, B. Petros, T. Assefa, T. Alebachew, E. Hailu, F. Adugna, W. Measho, W. Dorigo, A.L. Fontanet, D. van Baarle, and F. Miedema. **Immunophenotyping of blood lymphocytes at birth, during childhood and adulthood in HIV-1 uninfected Ethiopians**. *Clin Immonol* 2003; **109**, 338-346.

16. van Baarle D, **Tsegaye A,** Miedema F, Akbar A. **Significance of senescence for virus-specific memory T cell responses: rapid ageing during chronic stimulation of the immune system.** Immunol Lett. 2005; 97(1):19-29.

17. C. Abuye, **A. Tsegaye**, C. E. West, P. Versloot,3 E. J. Sanders, D. Wolday, D. Hamann, T. F. Rinke de Wit, and A. L. Fontanet. **Determinants of CD4 Counts Among HIV-Negative Ethiopians: Role of Body Mass Index, Gender, Cigarette Smoking, Khat *(Catha Edulis*) Chewing, and Possibly Altitude?** *Journal of Clinical Immunology* 2005; 25(2) 127-133.

18. **A. Tsegaye,** L. Ran, D Wolday, B Petros, NM Nanlohy, H Meles, M Girma, E Hailu, J Borghans, F Miedema, D van Baarle. **Stable pattern of HIV-1 subtype C Gag-specific T cell responses coincides with slow rate of CD4 T cell decline in HIV-infected Ethiopians**. *AIDS* 2007; 21(3):369-372.

19. **A. Tsegaye**, Ran L, Wolday D, Petros B, Dorigo W, Piriou E, Messele T, Sanders E, Tilahun T, Eshetu D, Schuitemaker H, Coutinho RA, Miedema F, Borghans J, van Baarle D. **HIV-1 Subtype C Gag-Specific T-Cell Responses in Relation to Human Leukocyte Antigens in a Diverse Population of HIV-Infected Ethiopians.** *J Acquir Immune Defic Syndr.* 2007.

20. Ayele W, Mekonnen Y, Messele T, Mengistu Y, **Tsegaye A**, Bakker M, Berkhout B, Dorigo-Zetsma W, Wolday D, Goudsmit J, Coutinho R, de Baar M, Paxton WA, Pollakis G.

Differences in HIV type 1 RNA plasma load profile of closely related cocirculating Ethiopian subtype C strains: C and C'. *AIDS Res Hum Retroviruses*. 2010 Jul;26(7):805-13.

21. Ligidi T, Gebre-Selassie S, **Tsegaye A.** The **immunological status of newly diagnosed tuberculosis patients co-infected with human immunodeficiency virus-1 in Adama Hospital, Ethiopia.** *Ethiop Med J.* 2011; 49(2):75-83.

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23. Wale F, Kebede N, **Tsegaye A,** Kassa T. **Seroprevalence and risk factors for Toxoplasmosis in HIV infected and non-infected individuals in Bahir Dar, Northwest Ethiopia.** Parasites & Vectors 2013, 6:15

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25. Bethelihem Newayeselassie, **Aster Tsegaye**, Beyene Petros. ***Determination of CD4+ T cells using different systems: evaluation of different systems of CD4+ T cell percentage determination using standard Flow cytometer for Pediatric HIV management.***

26. Fonjungo PN, Kebede Y, Arneson W, Tefera D, Yimer K, Kinde S, Alem M, Cheneke W, Mitiku H, Tadesse E, **Tsegaye A,** Kenyon T. . Preservice laboratory education strengthening enhances sustainable laboratory workforce in Ethiopia. Hum Resour Health. 2013;11(1):56

27.Misganaw Birhaneselassie, Asaye Birhanu, Amha Gebremedhin, **Aster Tsegaye.** ***How useful are complete blood count and reticulocyte reports to clinicians in Addis Ababa hospitals, Ethiopia?*** BMC Hematology 2013; *in press*

28. Yoseph Cherinet, Alem Berihu, Addisu Bekele, Sibhatu Biadgilign, Biniyam Taye, **Aster Tsegaye**. Trend of HIV Prevalence Among Pregnant Women Attending Antenatal Care Unit of Bishoftu Hospital, Ethiopia. Ethiop Med J, 2013;51(3):

Research Abstracts/Presentations

> 40 original research presentations at national & international meetings

Award/Recognition

Best Scientific paper presentation awards (as PI and supervisor of awarded BSc/MSc/PhD students)

Best Researcher of the year 2013 award by the College of Health Sciences of Addis Ababa University (as PI June 2013)

Ethiopian Medical Association (EMA) annual conferences 2004 and 2013 (**Two awards as PI**)

EMA annual conference 2009 (1 scientific paper by a BSc student; served as supervisor)

EMA annual conference 2010 (2 scientific papers by MSc student and staff; as supervisor)

EMA annual conference 2012 (1 scientific paper; served as supervisor)

Tore Godal Award by AHRI (2 scientific works in 2012; served as supervisor)

8th Annual Conference of TB Research Advisory Committee of Federal Ministry of Health Ethiopia, Mar 2013 (1 scientific paper; served as supervisor)

Tore Godal Award by AHRI in 2013 (1 scientific paper; served as supervisor)

Certificates of appreciation

Outstanding dedication and contribution to Excellence in Medical Laboratory Science Profession. By the Ethiopian Medical Laboratory Association (EMLA), August 2008.

Outstanding performance in relation to HIV/AIDS education quality improvement, By JHPIEGO Ethiopia, March 2010

Certificate of Appreciation and recognition of support to the Ethiopian Chronic Myelogenous Leukemia patients association, June 02, 2013

Valuable contribution as Trainer of FACSCalibur ™ Clinical CD4 Good Laboratory Practice Course, conducted at EHNRI 18-22 December 2006, By Becton Dickinson (BD) East Africa and EHNRI.

Valuable contribution as Coordinator and Trainer of the "Training of Trainers (TOT) Course on Hematology, Clinical Chemistry and CD4" By EHNRI, November 2006.

Editorial Activities involvement

Peer Reviewer:

Ethiopian Medical Laboratory Association Abstract book

Ethiopian Journal of Health Development

Ethiopian Medical Journal

Ethiopian Journal of Biomedical Sciences

National Ethical Review board proposals

International Journals:

BMC Research Note (2012)

Env Science J (2013)

Education:

Teaching

Hematology I (4 credit hour)

Hematology II (4 credit hour)

Basic Immunology (3 credit hours)

Advanced Immunology (3 credit hour)

Advanced Hematological Techniques (2 credit hour)

Professional Ethics (Medical Laboratory) 1 credit hour Practicum II (3 credit hours)

Examiner

MSc, PhD seminar papers and thesis (several seminar papers, MSc thesis in different universities in the country)

Mentoring Activities

Research Advisor (Masters and PhD)

1. About 30 MSc thesis and 12 ongoing

2. PhD advising (5 ongoing)

3. About 20 BSc student's projects

Other Voluntary Health Education activities:

Awareness about HIV to various groups: students, Addis Ababa Federal Police forces, HIV patient care givers, Netherland Embassy Ethiopian staff, Coca Cola factory workers, Student HIV/AIDS clubs, Gov & Non Gov organizations' staff (1998-2004)

Information about HIV/AIDS in English and Amharic in the ***Ethio-Football Sports Magazine*** (Ed. Alem Assefa), Lucy Private LTD company, Nov 2000, vol 2, No 1, pp 47-49

About Hemophilia (voluntary service to the Ethiopian Hemophilia Society): ***booklet published with a support from Fed MOH and St Paul Hospital, April 2013***

Language and computer skill

English

Amharic (local language)

Word processing (word), database management (Access), and graphics (power point, Excel, Sigma plot), statistics (STATA, Excel, SPSS)

References

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4. Dr Arnaud Fontanet, MD, DrPH (Ex-Programme Manager of the Ethio-Netherlands AIDS Research Project, ENARP)

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VII. Problems prioritizing criteria table

Problem/ Topic	Criteria							
	R	**A**	**F**	**P**	**APPL**	**U**	**E**	**T**
1.	**5**	**5**	**5**	**5**	**5**	**3**	**5**	**33***
2.	**3**	**4**	**3**	**2**	**3**	**4**	**5**	**24**
3.	**4**	**4**	**4**	**3**	**3**	**4**	**4**	**26**
4.	**5**	**4**	**5**	**3**	**3**	**3**	**3**	**26**
5.	**5**	**4**	**5**	**3**	**3**	**3**	**4**	**28**

1. Knowledge, attitude, Practice and prevalence of HBsAg among Pregnant women in selected antenatal Clinic in Addis Ababa Ethiopia.
2. Knowledge, attitude, risk behavior on HBsAg and willingness to taking HBsAg vaccine among Laboratory Professions in Addis Ababa Ethiopia
3. Knowledge, attitude, risk behavior and Magnitude on MDR (Multi Drug Resistance) TB among TB Patients & Peoples who are expected to TB Positive in Selected Health Centers Addis Ababa Ethiopia
4. Knowledge, attitude, risk behavior and Magnitude on TB among Peoples working at public area in Addis Ababa Ethiopia.
5. Assessment of Document & Records/Purchasing & inventory practice in Federal Hospitals (or either of any) at Addis Ababa Ethiopia

NB.

P- Political acceptance PPC- Problem prioritizing criteria

APPL- Applicable R- Relevance

U- Urgent A- Avoid duplication

E- Ethical acceptance F- Feasibility

T- Total

Deceleration

I the undersigned, declare that this is my original work and has not been presented for a degree in this our other university and all sources of material used for this thesis have been acknowledged.

Name:- Fikremariam Bayuh (MSC student)

Signature _____ Date _____

This thesis has been submitted with my approval as university advisor.

Fatuma Hassen (BSc, MPH)

Signature _____ Date _____

Aster Tsegaye (PhD)

Signature _____ Date _____

Kassu Desta (MSc, PhD, fellow)

Signature _____ Date _____

Place: Addis Ababa University

Date of submission: June 2014.