

SAINT PAUL'S HOSPITAL MILLENNIUM MEDICAL COLLEGE
DEPARTMENT OF PUBLIC HEALTH



SERO-PREVALENCE AND ASSOCIATED FACTORS OF
HEPATITIS B VIRUS INFECTION AMONG PREGNANT WOMEN
ATTENDING ANTI-NATAL CARE SERVICE IN ADDIS ABABA,
ETHIOPIA, 2017: A HOSPITAL BASED CROSS SECTIONAL
STUDY

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Sero-prevalence and associated factors of hepatitis B virus infection among pregnant women attending Anti- natal care service in Addis Ababa, Ethiopia 2017: a hospital based cross sectional study.

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Acronyms and Abbreviations

A.A	Addis Ababa
A/K	Akaki Kality
AF	Absolute frequency
ANC	Anti-Natal Care
AOR	Adjusted Odds Ratio
AUC	Area under the curve
ELISA	Enzyme Linked Immuno Sorbent Assay
EPHI	Ethiopian Public Health Institute
ETB	Ethiopian Birr
HBIG	Hepatitis B Immuno Globulin G
HD	Health Department
HF	Health Facility
HIV	Human Immunodeficiency Virus
HBV	Hepatitis B Virus
HBsAg	Hepatitis B Surface Antigen
HCV	Hepatitis C Virus
HMIS	Health Management Information System
IQR	Inter quartile range
NGO	Non-Governmental Organization
LBW	Low Birth Weight
-2LL	-2 log likely hood
MOR	Matched Odds Ratio
MCT	Measure of central tendency
MTCT	Mother to Child Transmission

P-P plot	Probability - probability plot
PPRoM	Preterm Premature Rapture of Membrane
RF	Relative Frequency
ROC	Receiver Operating Characteristics
SD	Standard Deviation
SPHMMC	Saint Paul's Hospital Millennium Medical College
SRS	Simple random sampling
SyRS	Systematic random sampling
STI	Sexually Transmitted Infections
WHO	World Health Organization
WoHO	Woreda Health Office

Abstract

Background: about 2 billion people have been exposed to Hepatitis B Virus of which 360 million becomes chronic carriers with 780,000 deaths annually. Its infection in pregnancy is associated with direct effect on pregnancy and potential viral transmission from mother to newborn. The anti-natal care coverage of Addis Ababa was estimated at >100% in the last three years. Despite this the focus given to the disease is weak, moreover very little is known on prevalence of HBV infection and their associated factors among pregnant women.

Objectives: to determine the prevalence and associated factors of Hepatitis B infection among pregnant women attending antenatal care in Addis Ababa City, Ethiopia.

Methods: an institution based cross-sectional study was conducted in four hospitals of the city administration between Oct 28, 2017-Dec 8, 2017. A total of 566 pregnant women selected using systematic random sampling technique. A pre tested structured questionnaire was used to assess variables by face to face interview. Hepatitis B surface antigen (HBsAg) was detected using an enzyme linked immuno sorbent assay (ELISA). Data were entered into Epi-info and transported to SPSS. Descriptive statistics was performed for all variables. Bi-variable and multivariate logistic regression were performed to test the COR & the AOR respectively. Multi-collinearity was checked. Variables with P-value ≤ 0.2 in the bivariate entered in to multi-variable analysis. Multivariate P-value of ≤ 0.05 was considered significant.

Result: Overall, 34(6.08%) were positive for HBsAg. Previous history of induced abortion (AOR = 2.3(1.08-5.07)), scarification (AOR = 2.48(1.08-5.69)), multiple life time sexual partner (AOR=2.59(1.1-5.9)), lower family income (AOR=2.6(1.2-5.7)), Age ≥ 30 (AOR= 2.3(1.1-4.9)), house hold contact with cases (AOR=2.44(1.03-5.8)) and history of STD (2.3(1.1-4.9)) were significantly associated with HBV infection.

Conclusions & recommendations: Endemicity was intermediate. Multiple sexual partners, history of STD, body scarification, induced abortion, age ≥ 30 , contact with liver diseases patient and lower income were the major associated factors. Giving health information, prevent unwanted pregnancy, improve safe abortion care, controlling STI, avoiding body tattooing and empowering women are important.

1. Introduction

1.1. Back ground

Hepatitis B virus (HBV) infection is one of the most important infectious disease throughout the world particularly in developing countries (1,2). About 2 billion people have been exposed to HBV of which 360 million becomes lifelong carriers(3). Annually 780,000 estimated deaths are occurred due to HBV- related liver disease including chronic hepatitis, cirrhosis and hepatocellular carcinoma, which is the six leading cause of death globally(4) Hepatitis B virus causes both acute and chronic hepatitis. The global prevalence of chronic HBV infection is clustered as high ($\geq 8\%$), intermediate (2-7%) and low ($< 2\%$)(5). Thus, Ethiopia belongs to the high prevalence category. Chronic active hepatitis B virus infection results in cirrhosis and hepatocellular carcinoma(6).

The impact of HBV is Africa in which 65 million lifelong infected individuals resides though the prevalence ranging from less than 8 to more than 20 in some countries. Sub Saharan Africa also represents the second-largest epidemic of chronic HBV carriers after Asia, totaling 50 million individuals around 15 % of global chronic carriers (7). Though there were limited studies done on the issue in Addis Ababa in general, two pilot studies in two hospitals of Addis Ababa showed a prevalence of 6.05% in one and 3.0% in another studies (8,9).

The prevalence of miscarriage was higher among HBV carriers 9.36% Vs 5.70% $P < 0.001$ (2). Mother to child transmission (MTCT) is reduced to 5- 10% if infant gets proper prophylaxis but despite active and passive immuno prophylaxis 8-30% of infant born to highly veremic mother still becomes infected with HBV (6). Being infected with HBV was associated with preterm birth AOR 1.4 ($p=0.001$), Low birth weight 1.39 $P= 0.009$, Preterm premature rupture of membrane 13.2%- 8% $P < 0.02$, congenital anomalies AOR 1.55 $P= 0.01$ and the chance of becoming chronic carriers for infected fetus is 95%. If an exposed infant only uses HBV vaccine it has 26-36% of risk of developing HBV while Hepatitis B Immuno Globulin reduce the risk to 15-20% but if we use it the HBV vaccine with HBIG the risk reduced to 5-10%. Greater than 60% of MTCT occurred at term (10). Therefore, the prevention of vertical transmission of HBV is very important.

1.2. Statement of the problem

The secret killer hepatitis B, though a chief danger to health in the country, is yet to catch the interest of health institutions, policy makers, the general public and decision makers in Addis Ababa city administration. The city administration has a total population of 3,433,999 female's account for 1806,284 (52.6%) with expected pregnancy of 80,013 mothers in the year 2017. The health service coverage is > 100%. There are 13 hospitals & 94 functional health centers providing health services. Anti natal care(ANC) coverage of the city is estimated at >100% according to city administration health bureau report and 96.8% with 2016 demographic health survey estimation(11).

Despite this high anti natal service coverage the availing of test kits and materials for hepatitis B virus infection was ignored in almost all of the health facilities more over no incorporation of HBV reports in the health management information system (HMIS) data flow. There are very limited studies that have examined the level of the HBV in the city administration with its associated factors. Studies using limited area population in two hospital in the city administration showed prevalence of hepatitis B virus infection among pregnant women was around 6.05% in one and 3.0% in the other study irrespective of residency regions (8,9). However information related to associated factors are scares.

Many health institutions attempt to improve the situation through the training of professionals, ordering HBV-vaccination for infected mothers, and expanding health education however; these efforts are not based on systematic evidence into prevalence and associated risk factors. Determining the prevalence and associated factors of Hepatitis B infection among pregnant women attending antenatal clinics in Addis Ababa city administration and planning on it becomes a crucial issue. There for this study is intended to contribute in bridging the information gap in the area.

1.3. Significance of the study:

Unlike the previous studies the whole areas of the city were included in the sampling process and increased the number of health facilities included. This study gives its emphasis of conducting hepatitis B virus burden to pregnant mothers, hoping that pregnant mothers, do have, an increased susceptibility to many infection, the pregnancy may induce minor infection of liver to a clinical case. At least testing and managing pregnant mothers could reduce the transmission of HBV from the mother to her fetus or child. In doing so we can protect the evil effect of HBV

infections from the mother and the coming (children) generation with a single intervention implementing today.

Since the prevalence of HBV infection in the city in all of the previous studies in the area were less than 10% so that to implement a factor association analysis a large amount of sample size has to be considered. Therefore it is more advantageous to increase the precision higher than what were used by previous studies (0.05 to 0.03). By doing so the statistical limitations of the study will be improved with this study since it will incorporate larger sample size.

Since the local status and associated factors of these diseases and prevention activities in the city administration were under estimated; this study will help in bridging the information gaps in the area. This may lead us to ignite the activities of share holders to increase funding for HBV awareness, research and other related activities. Finally the study aimed at presenting the findings and recommending based on findings. In addition the study may be used as a base line to conduct future researches in the area.

2. Literature Review

2.1. Prevalence of HBV infection

The prevalence of HBV in pregnancy varies with socioeconomic development of nations. A study done in USA showed a prevalence of 0.4% (10), Beijing 5.72% (12), Central china 1.61% (13), India 4.6% (14) in one and (8-10 %) in other study (6) and 1.56% in Iran (15). In Africa the prevalence of HBV infection is among the top in the globe. Different studies showed the prevalence as 9.7% in the Buea Health District of cameron (16) and in other study at Tokombore (far north region of Cameroon it was 20.4% (17), Nigeria 8.3% (18) and 6.6% in southern Nigeria (19) and 8.3% at Temeke municipal health facilities , Dar es Salaam , Tanzania (20). It was also presented in other African countries in magnitude like; 8.2% in the Lao People ' s Democratic Republic (21), 4.8% in Johannesburg, South Africa (22), 9.7% in other study in south Africa (23) , western cap pregnant women 3.4% (24), Malawi HIV positive pregnant women 8.7%(25) and in other study of Malawi 5% (26) and Raki Uganda 41% (27).

In Ethiopia the prevalence of HBV in pregnant women and in the general population varies within regions. The prevalence among pregnant women was estimated to be around 6.9% in Deder , Eastern Ethiopia (28), 2.5% in Northern-Ethiopia (29), 3.8% among pregnant women at ANC clinics in Bahir Dar (30) and 4.4% among maternity ward attendees of Felege Hiwot Referral Hospital, northwest Ethiopia (31).

In addition there was an estimation of HBV prevalence as of 7.4% in the general population in a study done in Goba south-eastern Ethiopia(32), 4.3% in Arba Minch Hospital , South Ethiopia (33), 6.05% among delivering mother (8) and 3.0% in other study among pregnant women of Addis-Ababa (9). Surprisingly the limited studies on co-infection of HBV and HIV in Ethiopia also showed that a sero prevalence of 2.6% in Goba (32), 1.26% in Bahir Dar (30), 0.74% southern Ethiopia (34) and 0.9%, AA (9).

2.2. Associated factors for HBV infection

2.2.1. Socio-demographic associated factors for HBV infection

Socio demographic characteristics are the most usual determinant factor in the development of disease causation as evidenced by different studies in the world. Different studies demonstrated the existences of differences in level of infection for HBV like; sexually active and most working

groups were affected i.e 34.93% in 21-30 years and 23.83% in the age group 31-40 having an adjusted odds ratio of 1.82 and being barber had high percentage AOR=3.41 (35).

A similar study in Iran in Beheshti Hospital of Kashan , Isfahan 2015 identified uneducated cases have an odds of 2 times than the odds of the educated group (15), age groups less than 30 AOR(4.65) times the odds of the lower groups in the Buea Health District of Cameroon 2014 (16). In addition the age group less than 30 years of old and low level of education $\chi^2= 6.52$ $p= 0.028$ were the criticized risk factors for HBV infection as proposed by the results of a study in Southwestern Nigeria 2015 (18) in one and age group 19-33 years has an AOR of 2.05 increased parity, farmer women 29.1% and none or low level of education has an AOR of 2.04 were the most observed risk factors to HBV infection in another studies of Nigeria (19).

The idea was emphasized with points predicted by different studies for example in Dar es Salaam , Tanzania being employed and student were protective AOR 0.35 (.13-0.95), age >35years, primary and lower education (12.5%) $p<0.05$, married /cohabit women and unemployed $p< 0.05$ were associated significantly (20) and lower education in Western Cape , South Africa 2013 (24) and being older age >30 Uganda (27) were also associated socio demographic factors.

The limited researches in Ethiopia informed us that there is a general community risk though majority of the researches focus on urban settlers. Being health care worker pregnant women 37.5% , being single 20% and widowed (14.3%) in Deder Eastern Ethiopia (28), lower education $p< 0.001$, divorced marital status 18.2% $p=0.009$, age group 15-17 years $p= 0.02$ in Bahir Dar northern-Ethiopia (29) and no formal education AOR 3.68(1.27- 10.68 $p< 0.05$) in southern Ethiopia (34) were among the points revealed to have an association with the outcome variable.

2.2.2. Knowledge associated factors for HBV infection

The odds of exposure to lower knowledge level to sexually transmitted infection in cases is 7.24 times the odds of none cases and in another study high awareness will reduce the infection rate by 0.19 times Guangxi-china (36). Understanding the nature and prevention activities of HBV infection reduced the level of Hepatitis infection by 0.25 times the groups with low knowledge (10). There is a significant positive correlation between, knowledge towards HBV infection, and attitude ($r=0.539$), knowledge and practice ($r= 0.001$) and attitude and practice ($r=0.46$) concerning hepatitis B prevention activities (37).

The odds of low level of awareness is 2.17 times more than the high level understanding in developing hepatitis B infection as presented by a study done in southern regions of Nigeria (19). Low knowledge to HBV infection and no formal education has an adjusted odds ratio of 3.68 times in causing Hepatitis B Virus infection (34).

2.2.3. Sexual, behavioral and cultural practice associated factor to HBV infection

The sexual, behavioral and cultural practices of individuals are the major predisposing factors to hepatitis B and HIV virus infection world-wide. This was evidenced by studies like the Iran Beheshti Hospital of Kashan , Isfahan, maternal first degree family history of Hepatitis infection AOR 2.48(1.45-5.48) and skin tattooing were associated with developing HBV infection (15). Homosexual drug users, house hold members and sexual partners with HBV infection, clients and staffs in mental illness, extended travel to high endemic area were also observed in work report of the epidemiology and prevention of hepatitis B virus infection Korea 2011 (38).

Current HIV infection was associated with HBV infection AOR=22.53(4.76-106 p<.0001) (17), age at first sexual intercourse AOR 2.63(1.44- 4.81) and number of life time sexual partners AOR 2.26(1.22- 4.17) in the Fako division of Southwest Cameroon (39), multiple sexual partner AOR 3.99 p= 0.026, early age at sexual debut AOR 11.996 p= 0.022, and contact history $X^2=3.905$ p= 0.048, high parity, polygamy and previous attack of STI were the most predominant factor to HBV infection in Southwestern Nigeria (18). Being HIV positive was risky P<0.05 (20) and history of STI 59.5% p= 0.019 in Rakia, Uganda were presented as having statistical association between HBV infection and the above explanatory variables (27).

Another study in Deder, Eastern Ethiopia also revealed that history of nose piercing AOR 9.1(1.36-61.79) and history of multiple sexual partner AOR 16.8(1.3- 89.06) were found to be causal (28). More over history of STI attack 20% p= 0.001, student sexual partner 2.9% p= 0.007, alcohol users 9.5% vs. 1.6% p= 0.01 in Bahir Dar north-Ethiopia (29) and body tattooing AOR 5.7(1.24-22.19) in other study in Bahir Dar city , Northwest Ethiopia also claimed to be risky (30). A similar research in Goba suggested that ear piercing 5.1% and multiple sexual partner 13.3% were the observed associated factors for HBV (32).

Having multiple sexual partners AOR 7.189(1.039-49.755) in Arbaminch pregnant women attending routine antenatal care in Arba Minch Hospital , South Ethiopia 2016 (33) and house hold contact AOR 4.104 (1.276- 13.201) p= 0.011, multiple sexual exposure AOR 5.041 (1.58-

16.076 $p=0.006$), and delivery at TBA AOR 7.2(1.95- 86.129) $p=0.024$ in Northern Ethiopia were also showed to be associated (31). On top of that tattooing in 18.2% and history of multiple sexual partners 14.5% of confirmed cases in southern Ethiopia (34) and 60.8% of participants had multiple exposure factor (ear piercing, tribal marks, abortion multiple sexual partner etc) in one study in Addis (8). Another study in Addis Ababa also identified having tattooing were associated with developing the illness AOR 7.72 (1.185- 50.28) $p=0.033$ (9).

2.2.4. Invasive procedures for HBV infection

HBV had a significant association with having history of, blood transfusion, injection, reuse of syringe and surgical procedures according to a study done in Pakistani Punjab on the status of Hepatitis B virus infection among different sex and age groups (35). Patients in hemo- dialysis were associated with having HBV infection than patients without hemo-dialysis as the findings of a study in Korea on epidemiology and prevention of hepatitis B virus infection(38). In addition having history of blood transfusion had AOR of 12.59(1.46-108.89) times the odds of cases without history of blood transfusion as presented by a study on the prevalence, infectivity and correlates of hepatitis B virus infection among pregnant women in a rural district of the Far North Region of Cameroon (17). Still Blood transfusion AOR=2.3(1.1-4.6) and induced abortion AOR=2.2(1.3-3.6) were also found to have an association with HBV infection in Nigeria (40).

History of previous abortion AOR=10.9(2.2-53.9) and history of surgical procedure AOR=12.8(1.68-97.06) were found to be associated with HBV infection as pointed out in the study of condition of Hepatitis B virus infections and associated factors among pregnant women attending antenatal care clinic at Deder Hospital , Eastern Ethiopia (28). HBV infection was found to be associated with blood transfusion AOR of 3.7(1.02-14.84) and AOR of 11.1 (2.64-46.88) with history of major surgery (30). History of tooth extraction and history of abortion were also significantly associated with having HBV infection according to a study in Goba general hospital (32).

Individuals with HBV infection had an odd of exposure to abortion 7.77(1.54-39.3) times the odds of exposure for participants free of HBV infection as presented in another study on the level of seroprevalence and predictors of Hepatitis B Virus infection among pregnant women attending routine antenatal care in Arba Minch Hospital (33). History of dental procedure (AOR=4.104) was also identified to have medical associated to HBV infection (31). Prior exposure to major surgical procedure and induced abortion were among the major activities

common to HBV infected pregnant women as revealed by a hospital-based cross-sectional study done in southern Ethiopia on seroprevalence and associated risk factors of hepatitis B virus among pregnant women attending Awassa referral hospital (34). Moreover History of abortion AOR=19(2.78-130.3) and history of major surgery AOR 9.84 (1.39-69.6) were associated with HBV infection (9).

2.3. Conceptual frame work

2.3.1. Conceptual frame work for studying Hepatitis B virus infection associated factors

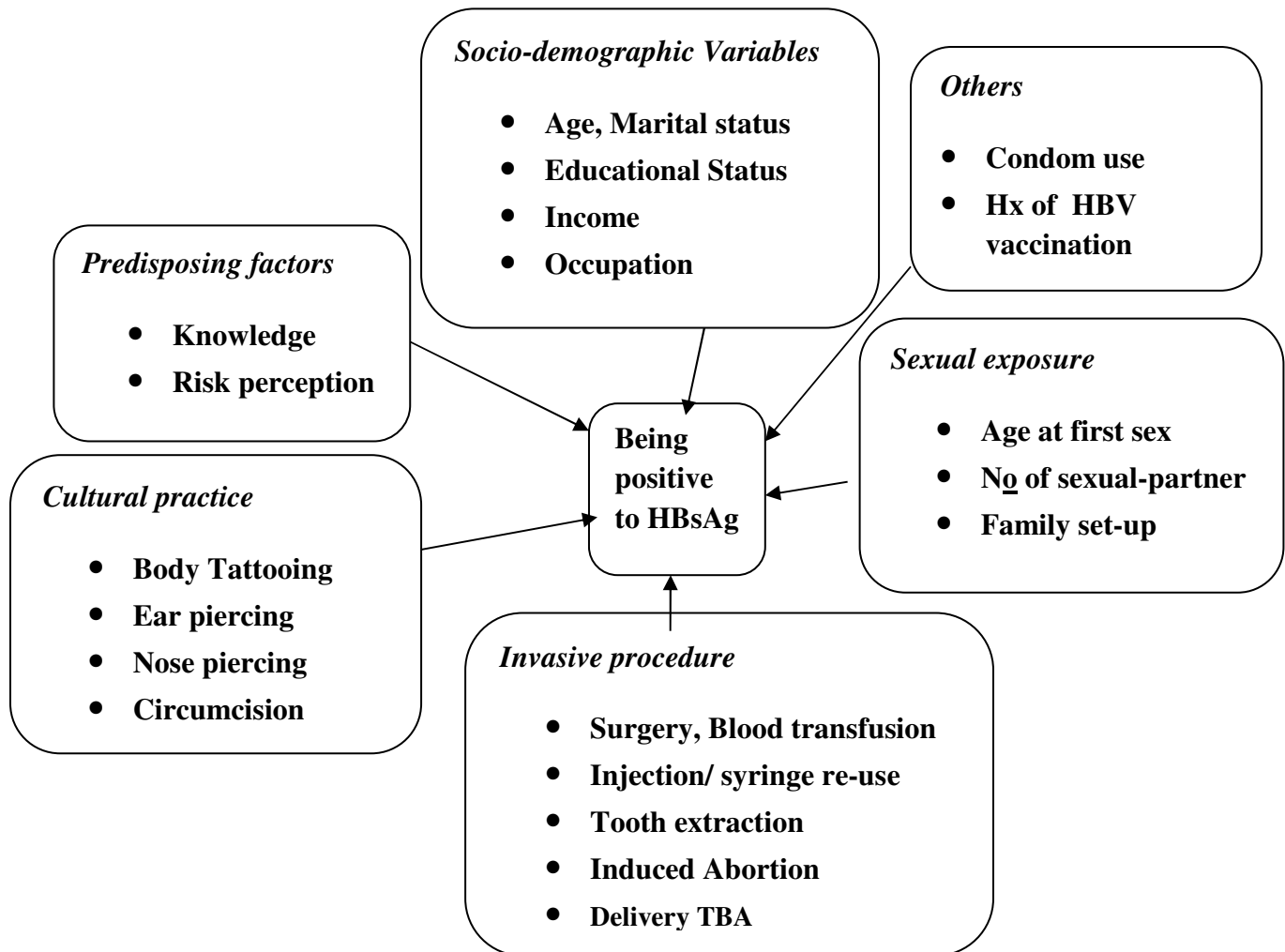


Figure1: Conceptual frame-work to assess associated factors towards hepatitis B infections among pregnant women attending ANC in Addis Ababa, Ethiopia-2017

3. Objectives

3.1. General objective:

Determine the prevalence and associated factors of Hepatitis B infection among pregnant women attending antenatal care clinics in hospitals of Addis Ababa, Ethiopia, 2017

3.2. Specific objectives:

- To assess the sero prevalence of Hepatitis B virus infection among pregnant women in Addis Ababa city administration, Ethiopia, 2017
- To investigate factors associated with Hepatitis B virus infection among pregnant women in the city administration

4. Methods and Subjects

4.1. Study Area:

The study was conducted in Addis Ababa city administration, the capital city of the country (Ethiopia). It has 10 sub cities. The population is expected to be 3,433,999 and females account 1,806,284 (52.6%). In the city administration there are 13 hospitals and 94 functional health centers delivering maternal health services. The ANC coverage of the city administration was >100% according to the Addis Ababa city administration health bureau report and 96.8% according to EDHS 2016. No data related to HBV was found in regional HMIS reportings.

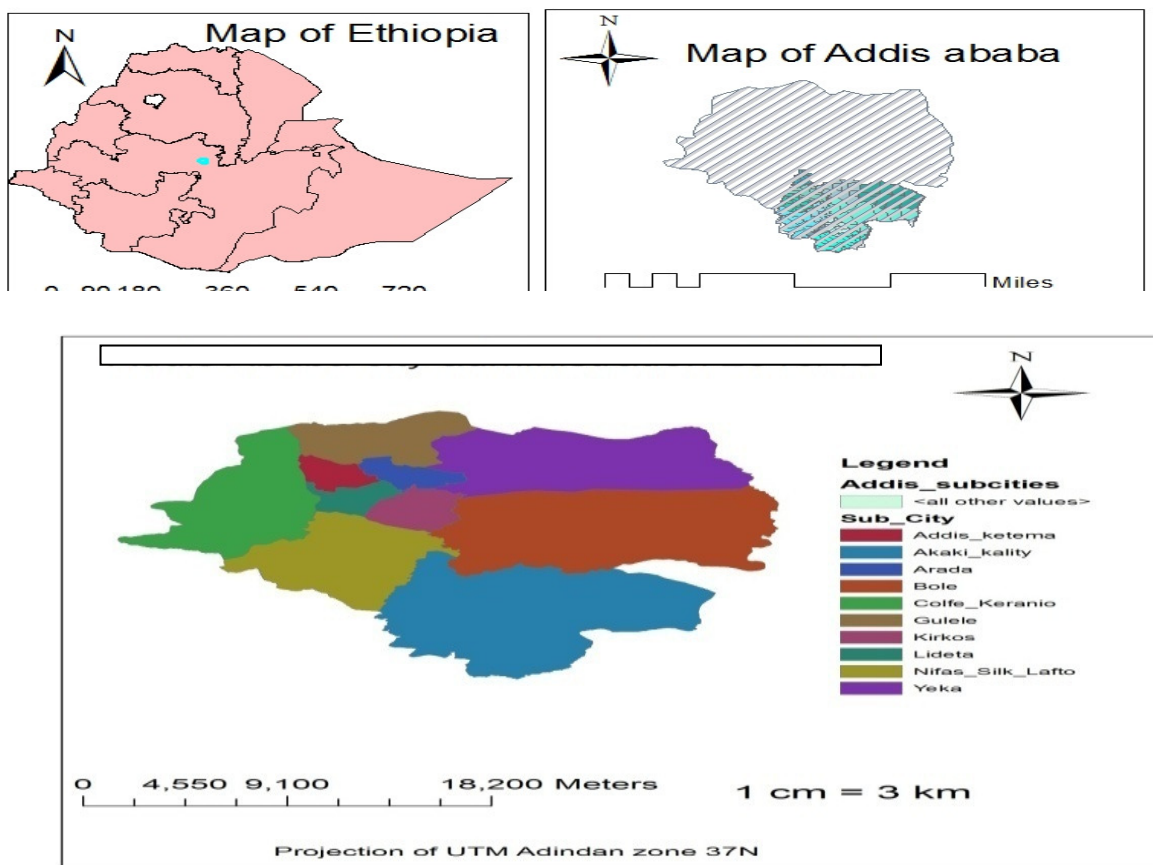


Figure 2: Map of Addis Ababa City Administration 2017 from projection of UTM Adindan Zone 37N

4.2. Study Period:

The study was conducted from 28 Oct 2017 to 8 Dec 2017

4.3. Study design:

A facility based cross-sectional study design was conducted

4.4. Source Populations:

All pregnant women who followed anti natal care service in the hospitals' of Addis Ababa city administration.

4.5. Study population:

All pregnant women who follow anti natal care service in the selected hospitals' of Addis Ababa city administration during the study period.

4.6. Sampling Units

The sampling units (the unit of selection in the sampling process) were; hospitals in the selection of facilities and individual (ANC service attending mothers)

4.7. Study subjects:

Study subjects were those pregnant women who were actually selected and agreed to participate in the study.

4.8. Inclusion-Exclusion criterion

4.8.1. Inclusion:

Pregnant women who were using ANC services in the selected health facilities during the data collection period were included in the study.

4.8.2. Exclusion criteria:

Pregnant women who have severe mental illness and those pregnant women who visited the selected health facilities for reasons other than ANC were excluded.

4.9. Sample size determination:

The sample size was computed for both specific objectives separately. First for the first specific objectives using population proportion formula for cross sectional studies, $n = Z^2 P (1-P)/d^2$. Where: z = Z score for 95% confidence interval (1.96), p = 6.1%, d = tolerable error = 3%, total sample size of 246 (9). For the second specific objective the sample size was computed as in (Table 1).

Table 1: Sample size computation in the assessment of prevalence and associated factors of HBV infection among pregnant women in Addis Ababa city administration, Ethiopia 2017

Variable	% of HBV in unexposed (P2)	% of HBV in exposed (p1)	CL	Power	Total
Hx of surgical procedure, Addis Ababa AOR=9.8(1.4-69.6) ((9))	1.15	28.2	95%	80%	66
Hx of body tattooing, Addis Ababa, AOR=7.7 (1.18-50.3) ((9))	2.5	16.98	95%	80%	156
Previous H _x of induced abortion, Addis Ababa, AOR=19 (2.78-130.4) ((9))	1.8	22.2	95%	80%	96

Since the sample size of the first objective was higher than all the rest sample sizes I considered it as the comprehensive sample size of the study. So the minimum sample size was the sample size after adding a fifteen percent non-response rate and a design effect of two becomes 566. The response rate was considered higher because of some sensitive issues, cost of diagnosis and urgency of results needed than the routine request.

4.10. Sampling Procedure:

Multi-stage sampling procedure was used to select the health facilities [HFs] and individual respondents for the study. At the first stage of sampling 30% of all the Hospitals that do have anti- natal care services were selected using simple random sampling techniques. Secondly the selection of respondents at the HF level using the systematic sampling techniques. For each of the selected facilities, a calculated sample size was allocated in proportion to their past three months, ANC service attendants. All selected HFs were visited by the field team during working days. Each time a facility was visited, respondents were recruited by systematic sampling, as and when the pregnant women arrived for their scheduled ANC services.

Pregnant women who were arrived earlier than the research team were prompted to participate in the sampling process after going through their ANC schedule if they had had some time to spare. This was done to ensure that every pregnant woman who attended the facility for ANC services at the time of this study was given opportunity to participate in the study. This recruitment procedure was performed until the required sample size for that facility was met, if not, subsequent visits were made until the quota for that facility was exhausted.

At the ANC level in each health facility, the study protocol was clearly explained to the expectant mothers in the Amharic language and/or in a local dialect for those who do not understand the Amharic language. At the individual level, their voluntary participation in the study was required and only those who agreed to participate were recruited.

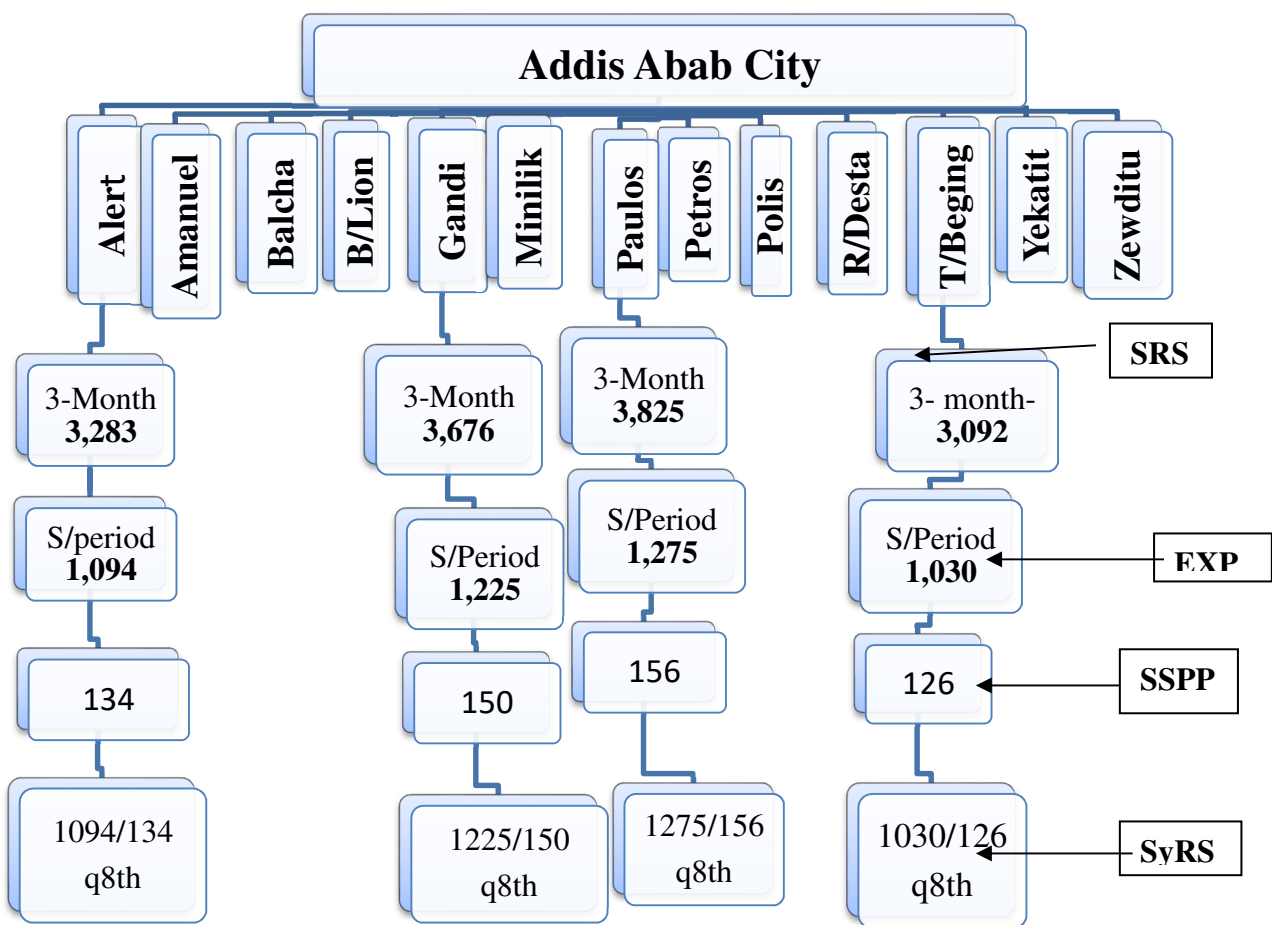


Figure 3 Sampling procedures in the study of prevalence and associated factors of HBV infection among pregnant women attending ANC service in Addis Ababa, Ethiopia 2017

Where **SSR**- simple random sampling, **SySR**- Systematic random sampling, **EXP**- expected number of ANC service users during the data collection period (one months), **SSPP**- sample size proportional to the level of population and **q^{8th}**- every **8th** client was selected after a random selection of starting points from the first eight clients in each facility at the first day of data collection.

4.11. Data collection procedure:

Data collectors were recruited from the same facility in which actual data was collected. One Health officer and seven BSC midwives were used. They were trained on the purpose of the study, the methodology, socio-cultural norms and questionnaire administering techniques. A pretesting of the questionnaire was done at Zewditu Memorial hospital before the main data collection started and possible correction was considered. The study used a pre tested structured questionnaire to collect the information on socio-demographic and other explanatory variables by face to face interview. Moreover 3ml of blood was expected to be drawn by simple vein puncture for HBsAg tests as a routine procedure. In addition antenatal card's of expectant woman was also checked and assessed to confirm the information provided. The pre and post test counseling was also not undermined.

Laboratory investigation:

Detection of HBsAg: the presence of hepatitis B surface antigens (HBsAg) in serum was detected using enzyme linked immuno sorbent assay (EILSA) test kit (according to the manufacturers' instruction). The quality of the laboratory results of samples was cross checked with 28(5%) of similar samples from clients by a different laboratory technologist at Akaki health Center in addition to delivering a standard operational procedure for respective hospitals.

HIV screening: HIV infection among pregnant women was determined by anti-HIV antibody test (rapid test currently used in national algorithm for Ethiopia) by the data collectors.

4.12. Descriptions of variables:

4.12.1. Dependent Variable

- HBsAg test result status (Negative / Positive)

4.12.2. Independent Variables

- Back ground variables / notorious ‘confounders’/: (socio-demographic characteristics like age at last birthday, grade attended, marital status, religion, main occupation, average monthly family income per member, history of HBV or HIV illness contacts etc).
- History of having tribal marks, body tattooing, tooth extraction, surgery, induced abortion, immunization history, blood transfusion, ear piercing, circumcision and unsafe injection.
- Age at first sexual intercourse, parity, gravidity, no of life time sexual partner, site of previous deliveries, knowledge of HBV, STI history and family set up.

4.13. Operational definitions:

A positive case of HBV infection: a client whose serum HBsAg test result is reactive to ELISA.

Knowledge of HBV infection and prevention methods are operationalized as follows after asking twenty one knowledge questions for the disease if a respondent gets (16):

- [0 to 4] correct answers were inadequate,
- [5 to 10] correct answers were intermediate, and
- Greater than or equal to 11 correct answers were adequate and acceptable.

Economic status was proposed to be categorized in to normal (moderate if it lies within middle 95%), Lower (if lies in the lower 5%) and high (lies in the upper 5%) after the pre-test, or even after data collection. However since the monthly income was not normally distributed it was categorized as the lower quartile, the above upper quartile and as the middle.

4.14. Data Processing and Analysis:

The data was checked in the field to ensure that all the information have been properly collected and recorded. Before and during data processing, however, the information was checked again for completeness and internal consistency. Checking for a questionnaire which has not been filled in completely (missing Data) was done for all questionnaires and was managed accordingly. Finally the data was sorted, checked, categorized, coded and summarized. After the data was entered using EPI info version 7.2, exported to SPSS version 21 and was verified before actual data analysis.

In the univariate analysis frequencies, mean, median, standard deviation quartiles ranges were computed. Normality tests like skewness, Kolmogorov- simonov or Shapiro, histogram, box

pot, p-p plot & Q-Q plots were also utilized. In the bivariate analysis binary logistic regression to compute the crude association between each independent and the dependent variable was done. P-value of 0.20 and below in the crude association was used as criteria to included in to multi variable analysis. Multi collinearity and interaction terms were checked. Multi-variable logistic regression was used to assess for the adjusted association. For ward variable selection criteria was utilized. Finally the significance level for the study was determined based on the assumption of 95% C.I and a p-value less than 0 .05 and medical interpretations were given accordingly.

The knowledge of hepatitis B was assessed by determining how many participants had correct responses to the questions on knowledge of hepatitis B. Each knowledge question was scored as zero (0) for incorrectly or “Don’t know” responses, while correct responses were scored one (1). A knowledge summary score for the 21 questions asked was calculated from the total of correct answers. Participants with scores over 11/21 were denoted knowledgeable. Data are presented using tables.

4.15. Ethical consideration:

Ethical clearances were obtained from the ethical review committee of Saint Paul’s millennium medical college, department of public health and Addis Ababa city administration Health bureau’s IRB. Official permission was requested from health facility managements. At the individual level, informed consent was sought. The rationale of the study, procedure and patient right was explained to all respondents in a language they understood and only those who agreed and signed or thumb-printed the consent forms to participate was included in the study. Information was kept confidentially and the specimen collected was used only to the objectives of the study. Intervention managements were recommended for each patient according to the result and the national protocol.

4.16. Pre-testing the methodology

A pre test was done to test and incase to revise the method and system before commencing the actual data collection. The method was checked on twenty eight (5%) pregnant women in Zewditu Memorial Hospital. The reactions of the respondents to the research procedures (acceptability of the method, acceptability of the question and willingness of the respondents), the data collection tools (reliability of the tools, time needed to complete the interview and observation) were tested. Weather there is a need to revise the question (for sequencing, wording of questions, space for answers is enough, to categorize or to make closed question in to open-

ended), is there a need to adjust the coding system were also cross assessed. The sampling procedures were also checked to determine the practical process of selecting participants and the time needed to locate individuals to be included in the study. The procedures for data processing and analysis were also checked.

4.17. Dissemination of Results:

The results of the study is going to delivered to Addis Ababa city administration health bureau, Saint Paul's Hospital Millennium Medical College, respective hospitals and Ethiopian Public Health Institute both in hard and soft copies just at the end of the research period.

5. Result

5.1. Socio demographic & reproductive characteristics of study participants

Data were collected among 559 participants making a response rate of 98.7%. The median age of the study subjects was 26.0 years (IQR =6) with majority of them falling in the 25-29years age categories. This age category constituted 222(39.7%) of the total pregnant women and the lowest number (0.7%) of pregnant women was in the 40–44 years age category.

Majority of the subjects were married (92.7%) and 524(93.7%) were in a monogamous relationship, followed by single (3.0%). Of participants, 56(10.0%) did not attend formal education, with more than quarter of them 161(28.8%) having tertiary-level education and about 185 (33.1%) of them were employed in the formal sector while 272(48.7%) were unemployed. Nulli-parous respondents constitute the majority with 228(40.8%) of the participants, around three-fourth of them 404(72.3%) were in their third trimester (>28 completed weeks) (table 2).

Table 2: Socio-demographic and reproductive characteristics of pregnant women studied in the selected hospitals of Addis Ababa, October 30-December 8/2017.

Variable	Category	Number	Percent
Age (Years)	15-19	16	2.9
	20-24	164	29.3
	25-29	222	39.7
	30-34	100	17.9
	35-39	53	9.5
	40-44	4	0.7
Marital Status	Married	518	92.7
	Divorced/separated	23	4.1
	Widowed	1	0.2
	Single	17	3.0
Educational Status	Informal	75	13.4
	Elementary	141	25.2
	Secondary	182	32.6
	College & above	161	28.8
Occupation	Employed(Gov'l /Private)	185	33.1
	Self Employed	102	18.2
	Unemployed	272	48.7
Average monthly Income (Birr)	Low(<=3000)	172	30.8
	Medium(3001-6500)	323	57.8
	Higher(>6500)	64	11.4
Gestational weeks	First Trimester(<14 weeks)	29	5.2
	Second Trimester[14-28 weeks]	126	22.5
	Third Trimester(>28 weeks)	404	72.3
Parity	0	228	40.8
	1-2	150	26.8
	3 and above	181	32.4
Family set up	Poly	7	1.3
	Mono	524	93.7
	Other	28	5.0

NB-<= less than or equal to, > greater than,

5.2. Description of other factors of HBV infection

Concerning the sexual history and practice of participants around half 312(55.8%) of subjects had had at least two life time sexual partners. Twenty two percent of mothers complain of repeated attacks of sexually transmitted infections in their life time. Body scarification was observed on 69(12.3%) of participants. Moreover 128(22.9%) experienced at least one induced abortion in their life time. The mean score of participants were 4.38 with a standard deviation of 6.15. One hundred twenty eight (22.9%) participants had a knowledge summary score ≥ 11 and

were denoted knowledgeable for HBV. Of participants 7% have positive HIV test result & 12.3% reported having a contact with patients having unspecified liver diseases (table 3).

Table 3 : Sexual, behavioral, cultural practice and knowledge related factors among participants in health facilities of Addis Ababa, Ethiopia 2017

Variable description	Category	Frequency	Percent
Age at first sexual intercourse	Less than 18 years	97	17.4
	Greater than 18 Years	462	82.6
Number of sexual partners in the last 12 months	Only one	552	98.75
	More than one	7	1.25
Number of life time sexual partner	Only one	247	44.2
	Two to three	247	44.2
	Four & above	65	11.6
Circumcision history	Yes	102	18.2
	No	457	81.8
Previous history of induced abortion	Yes	128	22.9
	No	431	77.1
Previous history of recurrent Sexually transmitted infections	Yes	123	22.0
	No	436	78.0
Body scarification	Yes	69	12.3
	No	490	87.7
Ear-piercing	Yes	554	99.1
	No	5	0.9
Nose-piercing	Yes	42	7.5
	No	517	92.5
Heard of HBV	Yes	220	39.4
	No	339	60.6
Knowledge Score	Less than five	361	64.6
	[5—11)	70	12.5
	≥ 11	128	22.9
History of previous surgery	Yes	88	15.7
	No	471	84.3
Previous blood transfusion	Yes	18	3.2
	No	541	96.8
Previous hospitalization	Yes	150	26.8
	No	409	73.2
Previous Dental procedure	Yes	127	22.7
	No	432	77.3
Participants past HIV test result	Yes	39	7.0
	No	520	93.0

Table 3 continued

History of contact with liver disease patients	Yes	69	12.3
	No	490	87.7
Source of information for HBV (Multiple response) (220)	Mass Media	53	24.9
	Health professional	183	83.2
	Reading Materials	7	0.03
	Schools	12	0.05
	Public Conversation	3	0.01

5.3: Sero prevalence and associated factors of HBV infections (Bivariate)

A total of 34 out of 559 respondents' sample had serological evidence of infection with viral hepatitis which was detected to be positive for HBsAg. This gives a sero-prevalence of 6.08%. Twenty seven of the twenty eight quality controlling samples were tested and only one sample becomes reactive. These quality controlling test results and the recorded results of the hospital were found to be similar for all except one unrecorded test results at hospital level.

No crude association was observed between participants' socio demographic characteristics and HBV infection except age and average family income. HBsAg sero-positivity was detected in most of age categories except for 15–19 and 40–44 years old. The highest age-specific prevalence was identified in the age group 35–39. Generally the age specific attack rate increases with age. Moreover age group 30 and above were 3.12 times more likely to be reactive to HBsAg than the age groups less than 30 years ($P=0.001$). The crude odds of having HBsAg positive test for women having lower monthly family income (<3000 Ethiopian birr/month) were, 2.7 times more likely than women having greater gain with a 5% CI at $P=0.005$.

However the general knowledge score of participants did not show any significance association between HBV infection and knowledge level ($P=0.180$). Age at first sexual intercourse was not found statistically significant with HBsAg result COR (1.79), ($P=0.152$). The odds of having a positive serum HBsAg are 3.85 times greater for women exposed to body scarification than for those pregnant women without such exposure at a 5% significance level ($P=0.001$). But it is 4.8(1.97-9.22) times more likely to find prior exposure to multiple sexual partner (≥ 3) among pregnant women experiencing a positive HBsAg result than among pregnant women experiencing a negative serum HBsAg result which was statistically significant at 5% level of significance ($P=0.000$).

A pregnant woman exposed to either repeated admission and/or injection is 2.28(1.13-4.6) times more likely to be infected with HBV than pregnant woman who is not exposed.

Table 4: Bivariate analyses of factors associated with HBV infection in the study participants, Addis Ababa 2017.

Variables	Category	HBsAg (N & %)		COR (95% C.I)	P-value
		Positive (34)	Negative (525)		
Income	(<=3000ETB)	18(52.9)	154(29.3)	2.7(1.35-5.4)	0.005*
	(>3000ETB)	16(47.1)	371(70.7)	1.0	
Marital Status	Married	31(91.2)	487(92.8)	1.0	0.89
	Divorced/Separated	2(5.9)	22(4.2)	1.43(0.32-6.35)	0.64
	Never Married	1(2.9)	16(3.0)	0.98(0.13-7.65)	0.98
Education	1 ⁰ & Lower	15(44.1)	201(38.3)	1.27(0.6-2.56)	0.456
	2 ⁰ & above	19(55.9)	324(61.7)	1.0	
Occupation	Employed	14(41.2)	273(52.0)	1.0	.224
	Unemployed	20(58.8)	252(48.0)	1.55(0.77-3.1)	
Gravidity	Prim-gravid	9(26.5)	155(29.5)	1.0	.705
	Multi-gravid	25(73.5)	370(70.5)	1.16(.53-2.5)	
Parity	0	15(44.1)	213(40.6)	1.0	.245
	1	5(14.7)	145(27.6)	1.19(0.56-2.5)	
	>2	14(41.2)	167(31.8)	0.49(0.17-1.4)	
Gestational weeks	(<14)	2(5.9)	27(5.1)	1.0	.587
	[14-28]	10(29.4)	116(22.1)	1.16(0.24-5.6)	.850
	(>28)	22(64.7)	382(72.8)	0.78(0.17-3.48)	.742
Age Category	<30 years	16(47.1)	386(73.5)	1.0	.001*
	>=30 years	18(52.9)	139(26.5)	3.12(1.55-6.29)	
Heard of HBV	Yes	20(41.2)	200(39.2)	1.0	.019
	No	14(58.8)	325(61.9)	.43(.21-.87)	
Knowledge level	Poor(<11points)	23(67.6)	408(77.7)	0.60(.084-1.3)	.180*
	Good(>=11)	11(32.3)	117(22.3)	1.0	
Age at 1 st Sex-Intercourse	<= 18 Years	9(26.5)	88(16.8)	1.79(0.81-3.9)	.152
	>18 Years	25(73.5)	437(83.2)	1.0	
Scarification	Yes	11(32.3)	58(11.1)	3.85(1.78-8.3)	.001*
	No	23(67.6)	467(88.9)	1.0	
Ear-Piercing	Yes	1(2.9)	521(99.2)	0.25(0.03-2.3)	.225
	No	33(97.3)	4(0.8)	1.0	

Table 4- Continued

Variables	Category	HBsAg (N & %)		COR (95% C.I)	P-value
		Positive	Negative		
Nose-Piercing	Yes	2(5.9)	40(7.6)	0.76(0.17-3.3)	.711
	No	32(94.1)	485(92.4)	1.0	
Circumcision	Yes	9(26.5)	93(17.7)	1.67(0.76-3.7)	.204
	No	25(73.5)	432(82.3)	1.0	
12-Months' Sexual Partner	One	34(100.0)	518(86.7)	1.0	
	>One	0(0.0)	7(13.3)	0.000(.000)	.999
Life-Time Sexual Partner	<=3	22(64.7)	472(89.9)	1.0	
	>3	12(35.3)	53(10.1)	4.8(2.3-9.10.4)	.000*
Ever Used Condom	Yes	7(20.6)	160(30.5)	1.0	
	No	27(79.4)	365(69.5)	1.69(0.72-3.9)	.227
Frequency of use(n=167)	Consistent	1(14.3)	43(27.9)	1.0	.470
	Inconsistent	6(85.7)	117(73.1)	2.2(0.26-18.8)	
Hx Surgery	Yes	6(17.6)	82(8.0)	1.16(0.46-2.9)	.753
	No	28(82.4)	483(92.0)	1.0	
Hx Blood-transfusion	Yes	1(2.9)	17(3.2)	0.91(0.12-7.0)	.924
	No	33(97.1)	508(96.8)	1.0	
Hx Admission /Repeated-Injection	Yes	15(44.1)	135(25.7)	2.28(1.13-4.6)	.022*
	No	19(55.9)	390(74.3)	1.0	
Dental Procedures	Yes	8(23.5)	119(22.7)	1.05(0.46-2.4)	.907
	No	26(76.5)	406(77.3)	1.0	
Hx Induced Abortion	Yes	13(38.2)	114(21.7)	2.5(1.24-5.15)	.011*
	No	21(61.8)	411(78.3)	1.0	
Hx STD	Yes	17(50.0)	106(20.2)	3.9(1.9-8.0)	.000*
	No	17(50.0)	419(79.8)	1.0	
Mother's-HIV Status	Negative	31(91.2)	489(93.2)	1.0	
	Positive	3(8.8)	36(6.8)	1.31(0.38-4.5)	.664
Partners HIV result(437)	Negative	23(95.8)	393(95.2)	1.0	
	Positive	1(4.2)	20(4.8)	.85(.11-6.6)	.880
Partners HBV result (83)	Negative	4(44.4)	68(91.9)	1.0	
	Positive	5(55.6)	6(8.1)	14.2(2.9-67.2)	.001
Contact-HBV Patients	Yes	10(29.4)	59(11.2)	3.29(1.5-7.2)	.003*
	No	24(70.6)	466(88.8)	1.0	
Vaccination Status	Yes	0(0.0)	23(4.4)	NA	
	No	34(100.0)	502(95.6)		
Site Of delivery	No	15(44.1)	215(41.0)	1.0	.037
	H/Facility	15(44.1)	294(56.0)	0.73(0.35-1.5)	.405
	Home	4(11.8)	16(3.0)	3.58(1.06-12.1)	.039

NB. COR-crude odds ratio, N-number, NA-not applicable, 1.0-reference category

This was statistically significant $P=.022$. It was 2.5(1.24-5.15) times more likely to find prior exposure to induced abortion among pregnant women with positive hepatitis B Virus infections than the non-infected mothers $P=.011$. While 10(1.8%) have positive test result with positive contact history with hepatitis patients. The odds of having a positive test result were 3.29 times for participants with positive family contact history than for those with no such exposure and it was statistically significant ($P=.003$) at 5% level of significance (Table 4 above).

5.4. Associated factors to HBV infection (Multi-Variable)

The variables (age, history of household contact, knowledge level, history of sexually transmitted infection, scarification, history of repeated admission, history induced abortion, income level and history of multiple sexual exposures) were found to be associated with HBV infection in the Bivariate analysis. They were entered into the multivariate logistic regression model. In the final model, all except knowledge level and history of admission were found to be significant predictors of HBV infection ($P < 0.05$) (Table 5).

Among the 156 participants in the age category of greater than or equal to 30, seventeen (10.9%) developed the illness as compared to 4.2% in the comparator group. This indicates that the odds of being infected with hepatitis B Virus infection are 2.35 times greater for women aged greater than or equal to years than for those with lower ages ($P=0.025$). Among all participants 77.1% got a knowledge score of less than 11 of which 5.3% were found reactive to HBsAg compared to 8.6% in their counter parts. While the knowledge about HBV level ($P=.668$), and prior history of repeated admission /injection/ ($P=.376$) were found to be not statistically significant at 5% level of significance (Table 5).

In relation to body scarification, 12.3% of the study subjects responded that they had previous history body scarification, of which, 15.9% were found to be positive for HBsAg. Statistically significant association was observed between previous history body scarification and HBV infection ($P = 0.031$). Those who had body scarification were 2.5(1.1-5.7) times more likely to have infection with HBV than their counterparts. In case of past exposure to sexually transmitted illness around 22.0% of participants responded having positive history with a HBsAg reactive result in 13.8% as compared to 3.9% in others. The odds of being infected with the suspected disease was increased by a multiplicative point of 2.3 in the group to sexually transmitted illness and it was statistically significant ($P=.034$) (Table 5).

Thirty-eight percent of pregnant mothers earn average family monthly income less than 3000 ETB of which 10.5% were positive. This group had a higher chance of having the disease with an odds factor of 2.6 & P=.015. Pregnant women who had previous history of house hold contact were 12.3%, of which 14.5% were positive for HBsAg. Statistically significant association was detected between having previous contact with members of the house hold with liver disease (P = 0.042). Pregnant women who had previous history of house hold contact were 2.4 times more likely to have infection with HBV than those without previous history of house hold contact (AOR = 2.4(1.03-5.8) (Table 5).

Table 5: Association of explanatory variables and hepatitis B virus infection among pregnant women attending antenatal care at Addis Ababa, Ethiopia 2017

Variables	Category	HBV Status N (%)		COR (95% C.I)	AOR (95% C.I)	P- Value
		Negative (525)	Positive (34)			
Age classification	< 30 years	386(73.5)	16(47.1)	1.0	1.0	.025*
	>= 30 years	139(26.5)	18(52.9)	3.12(1.5-6.29)	2.35(1.1-4.9)	
Induced Abortion	Yes	114(21.7)	14(41.2)	2.5(1.2-5.2)	2.3(1.08-5.07)	.030*
	No	411(78.3)	20(58.8)	1.0	1.0	
History of House hold Contac	Yes	59(11.2)	10(29.4)	3.3(1.5-7.2)	2.4(1.03-5.8)	.042*
	No	466(88.8)	24(70.6)	1.0	1.0	
Admission	Yes	135(25.7)	13(38.2)	1.79(.87-3.67)	1.4(.645-3.20)	.376
	No	390(74.3)	21(61.8)	1.0	1.0	
Scarification	Yes	58(10.0)	11(32.3)	3.85(1.78-8.3)	2.48(1.1-5.7)	.031*
	No	467(90.0)	23(67.7)	1.0	1.0	
History of STD	Yes	106(20.2)	17(50.0)	3.95(1.9-8.0)	2.31(1.06-4.9)	.034*
	No	419(79.8)	17(50.0)	1.0	1.0	
Average Family Income	<= 3000 ETB	154(29.3)	18(52.9)	2.71(1.3-5.4)	2.6(1.2-5.6)	.015*
	>3000 ETB	371(70.7)	16(47.1)	1.0	1.0	
Knowledge Level	Poor(<11)	408(77.7)	23(67.6)	0.6(0.84-1.3)	0.8(.34-1.9)	.668
	Good(>=11)	117(22.3)	11(32.4)	1.0	1.0	
Life Time Sex- part.	<3	472(89.9)	22(64.7)	4.8(2.3-10.3)	2.59(1.1-5.9)	.025*
	>=3	53(10.1)	12(35.3)	1.0	1.0	

NB- COR-crude odds ratio, N-number, AOR-adjusted odds ratio, 1.0-reference & *-significant

6. Discussion

A hospital-based cross sectional study was carried out at the antenatal clinic of hospitals in Addis Ababa Ethiopia. Five hundred and sixty six pregnant women were recruited, their serum analyzed for Hepatitis B surface antigen, while socio demographic characteristics and risk factors for HBV infection was assessed with pretested questionnaires. The overall sero-prevalence of HBsAg among pregnant women attending anti-natal care in Addis Ababa was 6.08% (95% CI: 4.1-8.06). In accordance to WHO interpretation, the finding grades the study setting as an area with moderate HBV disease endemicity(5). The observed status of the infection indicates that there is a great risk of transmission of HBV infection from mother to child unless proper intervention has been implemented. The prevalence was higher among pregnant mothers who have history of multiple sexual partner, scarification, had history of sexually transmitted illness, had aborted previously, with history of household contact and from the lower socio-economic class. Unsafe sexual practice and improper use of unsterilized sharp instruments are the key way of transmission of HBV among women of the childbearing age.

The Sero-prevalence of HBsAg among pregnant women attending ANC care in hospitals of Addis Ababa was comparable with a study done in, Trunesh Beijing hospital, Addis Ababa (8), southern Nigeria (6.6%) (19). In contrast to our study the highest prevalence was reported from Asia (8-10%) (15), Uganda (41.0%) (27), Tanzania (8.3%) (20), Malawi (8.7%) (25) Nigeria (8.3%) (18) and far north Cameroon (20.4%) (17) from abroad and Deder eastern Ethiopia(6.9%) (28) and abortion care seeking mothers (7%) in Bair Bar (29). On the other hand, the lowest prevalence was reported from western cape South Africa (3.5%) (24) and (3.8%) ANC mothers in Bahir-Dar (30), Felege Hiwot hospital (4.4%) (31) and Arbaminch (4.3%) (33) and saint Paul's hospital in Addis Ababa (3.0%) (9).

The observed variations could be attributable to population, socio-demographic, technology, development and geographical differences with the other countries' result. When we came to the Ethiopian situation the observed variation could be due to strictly the period and population characteristics differences expressed with the factors identified in these researches. Our study was performed in highly populated urban setting compared to previous studies in Addis Ababa and other towns of Ethiopia. Moreover, the difference might be due to procedural difference, the level of consciousness, cultural and behavioral differences for the possible risk factors of HBV infection.

The prevalence of HBV infection was observed to be increased with age. The odds of being in the age category ≥ 30 years were two-fold in cases than non cases ($P=0.025$). The finding goes with the findings in Pakistan Punjab AOR (1.82) (35), Tanzania $P=0.01$ (20) and Uganda age greater than 30 years (27) while it doesn't go with the studies in Cameroon AOR (4.65) (16), Nigeria 2.05 (19) in which lower age's were at higher risk than the higher age participants.

The sexual, behavioral and cultural practices of individuals are the major predisposing factors to hepatitis B and HIV virus infection. While the odds of having Hepatitis B Virus infection was two and half times more likely among mothers having multiple life time sexual partners than those with single sexual partner $P=0.025$. This point is in agreement with the points presented at Cameroon AOR 2.26 (39), Southern Nigeria AOR (3.99) (18), Deder- Ethiopia AOR 16.8 (28), Arbaminch-Ethiopia AOR (7.19) (33) and an AOR of 5.04 North Ethiopia (31).

The prevalence of HBsAg positive result was significantly higher in pregnant women who were having history of recurrent sexually transmitted infection compared to those who were not. Meaning the odds of having the disease are 2.3 times greater for pregnant women exposed to recurrent sexually transmitted infections than who were not and it was statistically significant $P=0.017$ at 5% level of significance. The situation matches with the findings of Rakia-Uganda AOR (1.46) (27) and History of STI Bahir Dar-Ethiopia ($P=0.001$) (29). In this paper having history of (body tattooing / Scarification) was significantly associated with having HBV infection (HBsAg +), the study goes in line with the findings in Addis Ababa AOR (7.72) (9), Bahir Dar AOR (5.07)(30).

In this work a statistical significant association was observed between past exposure to induced abortion and having hepatitis B virus infection. The finding goes in line with the findings of Nigeria AOR (2.2) (40), Deder-Ethiopia AOR (10.9) (28), Arbaminch AOR (7.77) (33) and Addis Ababa AOR 19 (9). On the other hand history of family or and sexual contact with patients having liver disease do have an adjusted association with hepatitis B virus infection status more than two and half fold. The finding was in line with the point of Iran AOR (2.48) (15), Southern Nigeria AOR (3.905) (18) and Northern Ethiopia AOR (4.11) (31).

7. Conclusions and recommendation

7.1. Conclusion

The result of this study brings to light the moderate infectivity rate of Hepatitis B virus infection among pregnant women of child bearing age in Addis Ababa. In our study, predictors of HBV infection include multiple life time sexual partners, lower family income, induced abortion, scarification, age ≥ 30 years, history of contact and history of sexually transmitted diseases. Although repeated admission/ injection/, dental procedures, circumcision, early sexual debut, lost their significance on multiple regression analysis; they were associated with increased prevalence of HBV infection in this study as demonstrated in the bivariate analysis.

Blood transfusion, past surgical history, body piercing with sharp objects, gravidity, parity, occupation, education, marital status and inconsistent use of condoms were not. If pregnant women are left undiagnosed and unmanaged, the future burden of the disease for health care resources and society will be substantial. The moderate prevalence of women positive HBsAg in the study population suggests that perinatal transmission of HBV might be the major mode of HBV transmission in this area in one aspect and the presence of association with greater number of sexual partners, history of STD, body scarification, induced abortion and unemployment were still the major aggravating factor for the community.

7.2. Recommendations

- Health facility leaders should facilitate conditions to make the HBV infection screening as part of routine care at ANC service.
- Health facility leaders are supposed to develop plan to work with the risky sexual, behavioral and cultural practices in their respective catchment.
- Health workers should emphasize health information on safer sex to women of child bearing age to interrupt the transmission.
- Health workers need to consider high index of suspicion in pregnant women with multiple sexual partner, history of recurrent STD, having body tattooing and history of induced abortion. This category of women should be referred to facility with HBV screening access.

- The City administration health bureau has to support further studies to assess thoroughly the burden and determinants of MTCT of HBV in this setting
- Health workers should be conscious using sterilized materials and sites for safe abortion care.
- The city administration has to work on women empowerment /employment/
- Molecular characterization and detection of the other HBV markers should be conducted to determine the exact prevalence of HBV in future study.

8. Strength and limitation of the study

8.1. Strength of the study

- ❖ It tries to cover greater sample sizes & areas than previous local studies
- ❖ Responses were cross checked with different previous medical records of the participants.
- ❖ The HBsAg results of study subjects were also been checked by taking a random sample of 5% of cases

8.2. Limitation of the study

- ❖ Under reporting of high risk behavior by some participants (this kind of misclassification would lead to findings towards the null hypothesis).
- ❖ The study was facility based this might have a selection bias (may not be representative) to pregnant mothers who were not seeking ANC at health facilities).

9. References

- [1.] Almashhrawi AA, Ahmed KT, Rahman RN, Hammoud GM, Ibdah JA, Almashhrawi AA, et al. Liver diseases in pregnancy: Diseases not unique to pregnancy. *World J Gastroenterol*. 2013;19(43):7630–8.
- [2.] Cui A, Cheng X, Shao J, Li H, Wang X, Shen Y, et al. Maternal hepatitis B virus carrier status and pregnancy outcomes : a prospective cohort study. *BMC Pregnancy Childbirth* [Internet]. 2016;16(87):1–8. Available from: <http://dx.doi.org/10.1186/s12884-016-0884-1>
- [3.] World health organination. Hepatitis B vaccines. *Wkly Epidemiol Record*. Vol. 40. 2009. 405-20 p.
- [4.] WHO. Hepatitis B Available at: <http://www.who.int/mediacentre/factsheets/fs204/en/>. 2014;
- [5.] World Health Organization. Guidelines for the prevention, care and treatment of persons with chronic hepatitis b infection. 2015. 1-100 p.
- [6.] Kumar M, Singh T, Sinha S. Chronic Hepatitis B Virus Infection and Pregnancy. *J Clin Exp Hepatol* [Internet]. 2012;2(4):366–81. Available from: <http://dx.doi.org/10.1016/j.jceh.2012.09.001>
- [7.] Kramvis A KM. Epidemiology of hepatitis B virus in Africa, its genotypes and clinical associations of genotypes. *Hepatol Res*. 2010;37:9–19.
- [8.] Tegegne D, Desta K, Tegbaru B, Tilahun T. Seroprevalence and transmission of Hepatitis B virus among delivering women and their new born in selected health facilities , Addis Ababa , Ethiopia : a cross sectional study. *BMC Res Notes* [Internet]. 2014;7(1):1–7. Available from: BMC Research Notes
- [9.] Desalegn Z, Wassie L, Beyene HB, Mihret A, Ebstie YA. Hepatitis B and human immunodeficiency virus co   infection among pregnant women in resource   limited high endemic setting , Addis Ababa , Ethiopia : implications for prevention and control measures. *Eur J Med Res*. 2016;21(16):1–7.
- [10.] JC Dunkelberg¹, EMF Berkley², KW Thiel³ and KL. Hepatitis B and C in pregnancy: a review and recommendations for care. *PMC- HHS public Access*. 2016;34(12):882–91.

- [11.] Agency E central statistical. FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA Demographic and Health Survey key indicators. 2016. 1-50 p.
- [12.] Xu S, Wang Q, Zhang W, Qiu Z, Cui J. Seroprevalence of the Hepatitis B , Hepatitis C , and Human Immunodeficiency Viruses and Treponema pallidum at the Beijing General Hospital from 2010 to 2014 : A Cross- Sectional Study. PLoS One. 2015;10(1371):1–11.
- [13.] Su H, Zhang Y, Xu D, Wang B, Zhang L, Li D, et al. Occult Hepatitis B Virus Infection in Anti-HBs-Positive Infants Born to HBsAg-Positive Mothers in China. PLoS One. 2013;8(8):1–7.
- [14.] Vidya Mave, MD, MPH, TM1, 2, Dileep Kadam, MD3, Aarti Kinikar, MD3, Nikhil Gupte, PhD1, 2, Debika Bhattacharya M. Impact of Maternal Hepatitis B Virus Coinfection on Mother-to- Child Transmission of Human Immunodeficiency Virus. NIH public Access. 2015;15(6):347–54.
- [15.] Afzali H, Heravi MM. Prevalence of Hepatitis B Surface Antigen in Pregnant Women in Beheshti Hospital of Kashan , Isfahan. Iran Red Crescent Med J. 2015;17(7):22–6.
- [16.] Frambo AAB, Atashili J, Fon PN, Ndumbe PM. Prevalence of HBsAg and knowledge about hepatitis B in pregnancy in the Buea Health District , Cameroon : a cross-sectional study. BMC Res Notes. 2014;7(1):1–7.
- [17.] Noubiap JJN, Nansseu JRN, Ndoula ST, Bigna JJR. Prevalence , infectivity and correlates of hepatitis B virus infection among pregnant women in a rural district of the Far North Region of Cameroon. BMC Public Health. 2015;15(454):1–7.
- [18.] Chinenye Gloria Anaedobe1,&, Adeola Fowotade2, Chukwuma Ewean Omoruyi3 RAB. Prevalence, socio-demographic features and risk factors of Hepatitis B virus infection among pregnant women in Southwestern Nigeria. Pan Afr Med J. 2015;20(406):1–11.
- [19.] T DUB. Hepatitis B surface antigenemia (HBsAg) among pregnant women in southern Nigeria <http://dx.doi.org/10.4314/ahs.v13i4.39>. African Heal Sci. 2013;13(4):1139–43.
- [20.] Manyahi J, Msigwa Y, Mhimbira F, Majigo M. High sero-prevalence of hepatitis B virus and human immunodeficiency virus infections among pregnant women attending antenatal clinic at Temeke municipal health facilities , Dar es Salaam , Tanzania : a cross

- sectional study. *BMC Pregnancy Childbirth*. 2017;17(109):1–6.
- [21.] Black AP, Nouanthong P, Nanthavong N, Souvannaso C, Vilivong K, Jutavijittum P, et al. Hepatitis B virus in the Lao People ' s Democratic Republic : a cross sectional serosurvey in different cohorts. *BMC Infect Dis*. 2014;14(457):1–7.
- [22.] Cynthia Firnhabera,*, Raquel Vianab, Anne Reynekea, Doreen Schultzea BM, Mhairi Maskewa, Adrian Di Biscegliec, Patrick MacPhaila, Ian Sannea and MK. Occult hepatitis B virus infection in patients with isolated core antibody and HIV co-infection in an urban clinic in Johannesburg, South Africa. *Int J Infect Dis*. 2011;13(4):488–92.
- [23.] Matthews PC, Beloukas A, Malik A, Carlson JM, Jooste P, Ogwu A, et al. Prevalence and Characteristics of Hepatitis B Virus (HBV) Coinfection among HIV-Positive Women in South Africa and Botswana. *PLOS*. 2015;1–11.
- [24.] Andersson MI, Maponga TG, Ijaz S, Barnes J, Theron GB, Meredith SA, et al. The epidemiology of hepatitis B virus infection in HIV-infected and HIV-uninfected pregnant women in the Western Cape , South Africa & Vaccine (www.elsevier.com/locate/vaccine) [Internet]. 2013;31(47):5579–84. Available from: <http://dx.doi.org/10.1016/j.vaccine.2013.08.028>
- [25.] Andreotti M, Pirillo MF, Liotta G, Jere H, Maulidi M, Sagno J, et al. The impact of HBV or HCV infection in a cohort of HIV-infected pregnant women receiving a nevirapine-based antiretroviral regimen in Malawi. *BMC Infect Dis* [Internet]. 2014;14(1):1–8. Available from: *BMC Infectious Diseases*
- [26.] Chasela CS, Kourtis AP, Wall P, Drobeniuc J, Caroline C, Thai H, et al. Hepatitis B virus infection among HIV-infected pregnant women in Malawi and transmission to infants. *J Hepatol*. 2015;60(3):508–14.
- [27.] Reynolds SJ, Thomas DL. Hepatitis B virus and sexual behavior in Rakai, Uganda. *J Med Virol*. 2012;83(5):796–800.
- [28.] Umare A, Seyoum B, Gobena T, Mariyam TH. Hepatitis B Virus Infections and Associated Factors among Pregnant Women Attending Antenatal Care Clinic at Deder Hospital , Eastern Ethiopia. *PLoS One*. 2016;10(1371):1–11.

- [29.] Mulu W, Zenebe Y, Abera B, Yimer M, Hailu T. Prevalence of human immunodeficiency virus and hepatitis B virus infections in young women seeking abortion care in Ethiopia : a cross - sectional study. BMC Public Health [Internet]. 2016;16(996):4–10. Available from: <http://dx.doi.org/10.1186/s12889-016-3658-9>
- [30.] Zenebe Y, Mulu W, Yimer M, Abera B. Sero-prevalence and risk factors of hepatitis B virus and human immunodeficiency virus infection among pregnant women in Bahir Dar city , Northwest Ethiopia : a cross sectional study. BMC Infect Dis [Internet]. 2014;14(1):1–7. Available from: BMC Infectious Diseases
- [31.] Molla S, Munshea A, Nibret E. Seroprevalence of hepatitis B surface antigen and anti HCV antibody and its associated risk factors among pregnant women attending maternity ward of Felege Hiwot Referral Hospital , northwest Ethiopia : a cross-sectional study. Virol J [Internet]. 2015;12(204):1–9. Available from: <http://dx.doi.org/10.1186/s12985-015-0437-7>
- [32.] Erena AN, Tefera TB. Prevalence of hepatitis B surface antigen (HBsAg) and its risk factors among individuals visiting. BMC Res Notes. 2014;7(883):1–5.
- [33.] Yohanes T, Zerdo Z, Chufamo N. Seroprevalence and Predictors of Hepatitis B Virus Infection among Pregnant Women Attending Routine Antenatal Care in Arba Minch Hospital , South Ethiopia. Hindawi Publ Corp Hepat Res Treat. 2016;1–7.
- [34.] Metaferia Y, Dessie W, Ali I, Amsalu A. Seroprevalence and associated risk factors of hepatitis B virus among pregnant women in southern Ethiopia : a hospital-based cross-sectional study. 2016;1–7.
- [35.] Khan F, Shams S, Qureshi ID, Israr M, Khan H. Hepatitis B virus infection among different sex and age groups in Pakistani Punjab. Virol J [Internet]. 2011;8(1):225. Available from: <http://www.virologyj.com/content/8/1/225>
- [36.] Zhu B, Bu J, Huang P, Zhou Z, Yin Y, Chen. Epidemiology of Sexually Transmitted Infections , HIV , and Related High-Risk Behaviors among Female Sex Workers in Guangxi Autonomous Region , China. Jpn J Infect Dis. 2012;65:75–8.
- [37.] Afihene MY, Duduyemi BM, Khatib M. Knowledge , attitude and practices concerning

- Hepatitis B infection , among healthcare workers in Bantama , Ghana : a cross sectional study. *Int J Community Med public Heal Public Heal*. 2015;2(3):244–53.
- [38.] Kwon SY, Lee CH. Epidemiology and prevention of hepatitis B virus infection. *Korean J Hepatol*. 2011;17(1):87–95.
- [39.] Shevell L, Meriki HD, Cho-ngwa F, Fuller C. Epidemiology of human immunodeficiency virus-1 and hepatitis B virus co-infection and risk factors for acquiring these infections in the Fako division of Southwest Cameroon. *BMC Public Health* [Internet]. 2015;15(1066):1–9. Available from: <http://dx.doi.org/10.1186/s12889-015-2386-x>
- [40.] Oke O, Musa ZA, Ekama SO, Ohwodo H, Agahowa E, Gbajabiamilla T, et al. Sero-prevalence and factors associated with Hepatitis B and C co-infection in pregnant Nigerian women living with HIV Infection. *Pan Afr Med J*. 2014;17(197):1–8.
- [41.] Navabakhsh B, Mehrabi N, Estakhri A, Mohamadnejad M. Hepatitis B Virus Infection during Pregnancy : Transmission and Prevention. *Middle East J Dig Dis*. 2011;3(2):92–102.
- [42.] Zampino R, Boemio A, Sagnelli C, Alessio L, Adinolfi LE, Sagnelli E, et al. Hepatitis B virus burden in developing countries. *World J Gastroenterol*. 2015;21(42):11941–53.

10. Annex 1:

Study information sheets,

Title of the research project: sero-prevalence and associated factors of HBV among pregnant women attending anti natal care in public hospitals of Addis Ababa city administration 2017

Name of Principal investigator: Dereje Merrie Seifu (BSC).

Study focus Area: Infectious Disease

Name of the organization: St. Paul's Hospital millennium Medical College, Department of Public Health.

Total Cost of the project: It cost thirty thousand five hundred ninety nine (**30,599.10**) ETB

Name of sponsor: St. Paul's Hospital millennium Medical College, Department of Public Health.

Introduction: This information sheet and consent form is prepared for the selected study areas (St. Paul's Hospital Millennium medical college, Alert Hospital, Gandhi Memorial hospital, Zewditu Memorial, Tirunesh Beijing Hospital and to Addis Ababa City Administration Health Bureau. The aim of the form is to make the above concerned offices clear about the purpose of the research work, data collection procedures and get permission to undertake the research.

Purpose of the research project: was to determine the prevalence and associated factors of Hepatitis B infection among pregnant women attending antenatal care clinics in Addis Ababa city administration, Ethiopia, 2017

Procedure: A client was selected using systematic sampling techniques from the ANC attendants of the specific Hospitals the information was provided to the client and data were collected using a pre tested semi-structured questionnaires and a blood sample of 5ml was drawn and tested in the laboratory. Moreover the records of the clients' were checked for consistencies.

Risk and/or Discomfort: there were no any major risks anticipated in the procedure but clients may feel some psychological discomfort for Confidentiality of information, fear of needle prick, fear of being positive result and cost of treatment if in case positive test result.

Benefits and loss: The participant got explanations and discussion about the nature, mode of transmission and control measures of the disease. In addition what to do in case of having positive test result. No loss was in forced in the health service usage of non-volunteers.

However participating in the research have an indirect benefit for any one because it provided the necessary information on the status and factors associated of the disease so that the policy

makers and program planners will use it in preparing evidence based plan to promote, prevent manage and control the disease.

Confidentiality: To keep the confidentiality of clients' information the data was collected by properly trained data collectors. The information collected was kept strictly confidential and information reviewed about the patients by this study is stored in a file, without name i.e. Investigators use number codes to the record during the review. The data gathered were not accessible to anyone except the principal investigator. No descriptions of personal identifiers were used in the recording and result phase too. Finally the collected data were not used for purposes other than the research plan.

Person to contact: This research project proposal was reviewed and approved by the institutional review board of Department of public health, St. Paulo's Hospital Millennium Medical College and Addis Ababa City-Administration health bureau. If in case you want to know more information about the research and its undertakings, you can contact us through the address below.

Kinfe Wachima (BSc, MHA) SPHMMC, a principal Advisor, Tell.0911423937

Getachew Tilahun (BSc, GMPH) SPHMMC, secondary advisor, Tell.11733157

Dereje Merrie Seifu (BSs) Akaki Kality Sub City Health Office, Saris Health Center, Principal Investigator Tell 0911535220/ email sdmerrie@gmail.com

Permission: Lastly but not least, respective bodies were kindly requested to permit and forward it's permission to concerned body in its organization so that the research team can get cooperation from the data clerks and other responsible bodies in place.

Consent Form (English Version)

My name is _____. I belong to the research team studying the sero prevalence of hepatitis B virus infections and determinant factors among pregnant women who attended ANC clinics in selected public health facilities in Addis Ababa city administration. The study is being conducted by a resident student of field epidemiology (Dereje Merrie Seifu) at the School of Public Health in St. Paul's Specialized Hospital Millennium Medical College.

The objective of this study is to determine the sero prevalence of HBV infection among pregnant women and associated factors. I kindly ask you to participate in this study and give me genuine answers for my queries. Your participation in this study is greatly helpful in identifying the status and risk factors in this area. The interview will take about 30 minutes and 5ml blood specimen will be collected from your upper arm with a needle brick and tested for HIV and HBV infections. Your name will not be written in this form and will never be used or mentioned in the report either. You will not get payment because of your participation in this study and will not lose any service rendered by health service providers.

All information given by you will be kept confidential and no one except the research team members will have access to the information. Your participation is completely voluntary and you are not obligated to answer any question you are not willing to respond. If you feel any discomfort with the question, it is your right to drop it at any time you want. You may even decide not to engage in this study from the very beginning. I hope I have clarified the purposes of the study. If you have any question you can ask me now or you may ask the principal investigator, Dereje Merrie, whose telephone is 0911535220 or email: sdmerrie@gmail.com

Are you willing to participate in this study?

1. Yes..... Continue to the next page
2. No..... Skip to the next participant

Signature of interviewer-----

Date of data collection-----/-----/-----

(Signature of interviewer certifying that informed consent has been given verbally by respondent).

10.1. Questionnaires (English Version)

Saint Paul's Hospital Millennium Medical College department of Public Health questionnaire to Sero-prevalence and associated factors of hepatitis B virus infection among pregnant women in Addis Ababa city administration, Ethiopia 2017: a cross sectional study

001 Questionnaire ID -----

002 Addresses: Sub city administration ----- Woreda ----- Health Facility-----

House No. -----. Phone number -----

Part I. Socio demographic characteristics of pregnant women in Addis Ababa, 2017			
No	Question	Response and Coding	Skip to
101	How old are you at your last birth day?	-----	
102	What is your current marital status?	Divorced ----- 1 Married ----- 2 Separated ----- 3 Never married -- 4 Widowed ----- 5	
103	What is your Educational Status?	Illiterate ----- 1 Read and write-----2 Primary level-----3 Secondary level----4 College and above-----5	
104	What is your main occupation?	Employed ----- 1 Unemployed ---- 6 House wife ----- 2 Merchant ----- 3 Private work ----- 4 Student ----- 5 Other (Specify) -----99	
105	What is your households' average monthly income?	-----	
106	What is your Family Setup?	Poly gamous -----1 Mono- gamous -- 2 Other (specify) ---- 99	
107	What is your Gravidity?	Primi-gravida ----- 1 Gravida II-----II Multi – gravida – 2	
108	What is your Parity?	Null- parity ----- 1 Multi- parity ----- 2	
109	What is your gestational week?	-----	
Part II. Knowledge of Respondents About HBV infections			
201	Did you heard about Liver disease?	Yes ----- 1 No ----- 2	If No go to -203
202	What was the source of information? (multiple response possible)	Mass Media -----1 Health facility -----2 School or and Reading Material ----- 3 Other (specify) ----99	
203	Did you heard about	Yes ----- 1	If No go

	Hepatitis B?	No ----- 2	to -301
204	What was the source of information? (multiple response possible)	Mass Media -----1 Health facility -----2 School ----- 3 Reading Material-- 4 Other (specify) ----99	
205	Is hepatitis B a virus?	Yes -----1 No -----2 I don't know ---3	
206	Can hepatitis B infection affect liver?	Yes -----1 No -----2 I don't know ---3	
207	Can HBV infection transmitted by unsterilized needle and sharp instruments?	Yes -----1 No -----2 I don't know ---3	
208	Can Hepatitis transmitted by infected blood and blood product?	Yes -----1 No -----2 I don't know ---3	
209	Can hepatitis transmitted by un safe sex?	Yes -----1 No -----2 I don't know ---3	
210	Can kissing transmit Hepatitis B infection?	Yes -----1 No -----2 I don't know ---3	
211	Can an infected pregnant mother transmit HBV to her fetus?	Yes -----1 No -----2 I don't know ---3	
212	Can a new born be infected after birth?	Yes -----1 No -----2 I don't know ---3	
213	Is there a possibility for an infected person to symptom free?	Yes -----1 No -----2 I don't know ---3	
214	Can HBV affect any person?	Yes -----1 No -----2 I don't know ---3	
215	Is HBV more infectious than HIV/AIDS?	Yes -----1 No -----2 I don't know ---3	
216	Can an infected person remain infected for life?	Yes -----1 No -----2 I don't know ---3	
217	Is hepatitis B curable?	Yes -----1 No -----2 I don't know ---3	
218	Is hepatitis B infection preventable?	Yes -----1 No -----2 I don't know ---3	If No go to -301
219	How do you prevent it? (Optional)	Using Condom ---- 1 Safe injection --- 2 Avoiding scarification – 3 Other (Specify) ----- 99	
220	Can hepatitis B is prevented by vaccination?	Yes -----1 No -----2 I don't know ---3	
Part III. Activity Related Risk factors			
301	Have you ever had history of Blood transfusion?	Yes -----1 No ----- 2	

302	Have you ever had history of surgery?	Yes -----1 No ----- 2	
303	Have you ever had history of tooth extraction?	Yes -----1 No ----- 2	
304	Have you ever had history of admission?	Yes -----1 No ----- 2	
305	Have you ever had history of scarification?	Yes -----1 No ----- 2	
306	Have you ever had history of body tattooing?	Yes -----1 No ----- 2	
307	Have you ever had history of Ear piercing?	Yes -----1 No ----- 2	
308	Have you ever had history of Nose piercing?	Yes -----1 No ----- 2	
309	Have you ever had history of Circumcision?	Yes -----1 No ----- 2	
310	Have you ever had history of induced Abortion?	Yes -----1 No ----- 2	
311	At what age did you first had sexual intercourse?	< =18 years of age – 1 >18 years of age --- 2	
312	How many people in total have you ever had sexual inter course in the past 12 month?	< 3----- 1 3- 6 ----- 2 >7 ----- 3	
313	How many people in total have you ever had sexual inter course in your life time?	< 5 ----- 1 5- 10 -----2 >10 ----- 3	
314	Have you ever used condom during your sexual intercourse?	Yes -----1 No ----- 2	If No go to -317
315	How often did you use condom?	Consistent --- 1 Inconsistent – 0	
316	Had you had history of STI	Yes -----1 No ----- 2	
317	Had you checked for HBV?	Yes -----1 No ----- 2	If No go to -319
318	What was your test Result?	Negative-----1 Positive ----2 I don't know -3	

319	Do you know the HBV test result of your partner?	Yes -----1 No ----- 2	If No go to 321
320	If yes what was it	Negative -----1 Positive -----2	
321	Current HBV test Result	Negative -----1 Positive -----2	
322	Had you checked for HIV?	Yes -----1 No ----- 2	If No 324
323	What was your test Result?	Negative-----1 Positive ----2 I don't know -3	
324	Current HIV test Result	Negative -----1 Positive -----2	
325	Do you know the HIV test result of your partner?	Yes -----1 No ----- 2	If No - 327
326	If yes what was it	Negative -----1 Positive -----2	
327	Did/Do/ you had/have/ history of contact with anyone having liver disease	Yes -----1 No ----- 2	
328	Did/Do/ you had/have/ history of contact with anyone having HIV infection	Yes -----1 No ----- 2	
329	Are you vaccinated for HBV?	Yes -----1 No ----- 2	If No - 331
330	If yes Number of dose	-----	
331	Site of previous Delivery/deliveries	No delivery --1 Health facility - 2 Home delivery --3	

I Thank You Very Much!

10.2. ቃለ መጠይቅ የአማርኛ ትርጓሜ

ቅዱስ ጳውሎስ ሆስፒታል ሜሌኒየም ሜዲካል ኮሌጅ የህብረተሰብ ጤና ዲፓርትመንት የጉበት በሽታ ደረጃና ተዛማጅ ጉዳዮችን ለማጥናት የተዘጋጀ መጠይቅ አዲስ አበባ ከተማ አስተዳደር 2010 ዓ.ም።

የጥናቱ መረጃ ገጽ

ሥሜ ----- ይባላል። የጉበት በሽታ ደረጃና ተዛማጅ ጉዳዮችን የእርግዝና ክትትል በሚደርጉ እርገዝ እናቶች ላይ የሚያጠናው ቡድን አባል ነኝ። ጥናቱ የሚካሄደው የቅዱስ ጳውሎስ ሆስፒታል ሜሌኒየም ሜዲካል ኮሌጅ የህብረተሰብ ጤና ዲፓርትመንት የፊልድ ኢፒዴሚዮሎጂ ረዚደንት በሆኑት በአቶ ደረጃ መሬ ሴይፉ ሲሆን አላማውም የጉበት በሽታ ያለበትን ደረጃ እና ተዛማጅ ምክኒያቶችን ማወቅ ይሆናል። በትህተና የምጠይቅዎ ነገር የዚህ ጥናት ተሳታፊ እንዲሆኑና ተገቢውን መልስ እንዲሰጡኝ ነው። የእርሶ ተሳትፎ ለጥናቱ ውጤት እጅግ አስፈላጊ ነው። ጥናቱ ወደ 30 ደቂቃ ብቻ ይወስዳል። ሥምዎ በዚህ ፎርም ላይ አይሞላም በሪፖርቱም አይገለጽም። በዚህ ጥናት ላይ በመሳተፍዎ የሚከፈለዎት ባለመሳተፍዎ የሚያጡት ምንም ነገር የለም።

የሚሰጡኝ መረጃ በሙሉ በጥንቃቄ የሚያዝ ሲሆን ከጥናቱ አባላት ውጪ ማንም ሊያገኘው አይችልም። ተሳትፎዎ ፍጹም በፈቃደኝነት ላይ የተሞረከዘ ሲሆን የትኛውንም ጥያቄ እንዲመልሱ አይገደዱም። ያለተመቸዎት ጥያቄ ካለ በፈለጉት ጊዜ ማቋረጥ ይችላሉ። ከነጮራሾችን በዚህ ትናት ውስጥ ያለመሳተፍ ይችላሉ። የጥናቱን አላማ በሚገባ የገለጽኩለዎት ይመስለኛል። ምናልባት ጥያቄ ካለዎት አሁን ሊጠይቁኝ ይችላሉ ወይም ዋነኛ የጥናቱን ባለቤት አቶ ደረጃን በ ስልክ ቁጥር 09-11-53-52-20 / በኢሜል አድራሻቸው sdmerrie@gmail.com ማግኘትም ይችላሉ።

በጥናቱ ለመሳተፍ ፈቃደኛ ነኝ ----- ወደሚቀጥለው ገጽ ተሻገር

በጥናቱ ለመሳተፍ ፈቃደኛ አይደለሁም ----- ወደሚቀጥለው ተሳታፊ ተሻገር

የመረጃ ሰብሳቢው ፊርማ ----- መረጃው የተስበሰበበት ቀን -----

የመረጃ ሰብሳቢው ፊርማ ሙሉ የቃል ፈቃደኝነት ተሳታፊዎች መስጠታቸውን ያረጋግጣል።

ቅዱስ ጳውሎስ ሆስፒታል ሜሌኒየም ሜዲካል ኮሌጅ የህብረተሰብ ጤና ዲፓርትመንት የጉበት በሽታ ደረጃና ተዛማጅ ጉዳዮችን ለማጥናት የተዘጋጀ መጠይቅ

001 መለያ ቁጥር -----

002 አድራሻ ክ/ ከተማ----- ወረዳ----- ጤና ድርጅት-----

የቤት ቁጥር. -----. ሥልክ ቁጥር -----

ክፍል I. ገላጭ ጥያቄዎች			
ተ/ቁ	ጥያቄ	አማራጭ መልሶችና መለያ አሰጣጥ	እለፍ
101	እደሜዎት/ሽ በሙሉ አመት ስንት ነው?	-----	
102	የጋብቻ ሁኔታ?	ተፋትቻለሁ-----1 ያገባ----- 2 ተለያይቻለሁ-----3 ያላገባች -- 4 ባል የሞተባት----- 5	
103	የትምህርት ደረጃሽ ምንድን ነው?	አልተማረኩም-----1 ማንበብና መጻፍ----2 አንደኛ ደረጃ ---- 3 ሁለተኛ ደረጃ -----4 ኮሌጅና ከዚያ በላይ---5	
104	ዋናው ስራሽ ምንድን ነው?	ተቀጣሪ -----1 የቤት እመቤት---2 ነጋዴ ----- 3 የግል ስራ ----- 4 ተማሪ---- 5 ስራ የለኝም ----6 ሌላ (ይገለጽ)-----99	
105	በአማካኝ የቤተሰባችሁ የወር ገብ በሰው ሲለካ ስነት ይሆናል?	-----	
106	የቤተሰብ አመሰራረትሽ አንዴት ነው?	ከአንድ በላይ-----1 አንድ ብቻ--2 ሌላ (ይገለጽ)----- 99	
107	ስንተኛ እርግዝናሽ ነው?	የመጀመሪያዬ----1 ከአንድ በላይ----2	
108	ሥንቴ ወልደሻል?	ምንም-----1 አንዴ-----2 ከአንዴ በላይ ----- 3	
109	የሥንት ወር እርጉዝ ነሽ	-----	
ክፍል II. የጉበት በሽታ እውቀትን የሚለኩ			
201	ስለ ጉበት በሽታ ሰምተሽ ታውቂያለሽ?	አዎ----1 አይደለም---2	ካልሆነ 203
202	መረጃውን ያገኘሽው ከየት ነበር?	ከብዙሃን መገናኛ-----1 ከጤና ባለሙያ-----2 ከትምህርት ቤት እና የተለዩ ነገሮችን በማንበብ-- -----3 ሌላ (ይገለጽ)-----99	
203	ስለ ሄፓታይተስ ቢ ሰምተሽ ታውቂያለሽ?	አዎ----1 አይደለም---2	ካልሆነ 301
204	መረጃውን ያገኘሽው ከየት ነው?	ከብዙሃን መገናኛ-----1	

		ከጤና ባለሙያ-----2 ከትምህርት ቤት-----3 የተለዩ ነገሮችን በማንበብ-- 4 ሌላ (ይገለጽ)-----99	
205	ሄፓታይተስ ቢ ሽይረስ ነው?	አዎ-----1 አይደለም-----2 አላውቅም----3	
206	ሄፓታይተስ ቢ ጉበት ላይ ችግር ያመጣ ይሆን?	አዎ-----1 አይደለም-----2 አላውቅም----3	
207	ሄፓታይተስ ቢ በሽታ ባልተቀቀለ መርፌና ስለታማ በሆኑ ነገሮች ይተላለፋል?	አዎ-----1 አይደለም-----2 አላውቅም----3	
208	ሄፓታይተስ ቢ በሽታ በደምና የደም ተዋጾ በሆኑ ነገሮች ይተላለፋል?	አዎ-----1 አይደለም-----2 አላውቅም----3	
209	ሄፓታይተስ ቢ በሽታ ጥንቃቄ በጎደለው የግብረ ስጋ ግንኙነት ይተላለፋል?	አዎ-----1 አይደለም-----2 አላውቅም----3	
210	ሄፓታይተስ ቢ በሽታ በመሳሳም ይተላለፋል?	አዎ-----1 አይደለም-----2 አላውቅም----3	
211	ሄፓታይተስ ቢ በሽታ የተበከለች እናት ወደ ልጇ ታስተላልፋለች?	አዎ-----1 አይደለም-----2 አላውቅም----3	
212	ህጻን ከተወለደ በኋላ በጉበት በሽታ ሊበከል ይችላል?	አዎ-----1 አይደለም-----2 አላውቅም----3	
213	በጉበት በሽታ የተበከለ ሰው ምልክቱን ሳያሳይ ሊኖር ይችላል?	አዎ-----1 አይደለም-----2 አላውቅም----3	
214	የጉበት በሽታ ማንኛውንም ሰው ሊያጠቃ ይችላል?	አዎ-----1 አይደለም-----2 አላውቅም----3	
215	የጉበት በሽታ ከኤች አይቪ የበለጠ ተላላፊ ነው?	አዎ-----1 አይደለም-----2 አላውቅም----3	
216	በጉበት በሽታ የተጠቃ ሰው በሽታውን እድሜ ልኩን ሊያስተላልፍ ይችላል?	አዎ-----1 አይደለም-----2 አላውቅም----3	
217	የጉበት በሽታ የሚድን ነው?	አዎ-----1 አይደለም-----2 አላውቅም----3	
218	የጉበት በሽታ ብክለት መከላከል የሚቻል ነው?	አዎ-----1 አይደለም-----2 አላውቅም----3	ካልሆነ 301
219	የጉበት በሽታ ብክለትን እንዴት መከላከል ይቻላል? (ብዙ መምረጥ ይቻላል)	ኮንዶም መጠቀም ---- 1 ነጹህ የመረፈ መጠቀም ---2 ያለመነቀስ - 3 ሌላ ካለ ይገለጽ ----- 99	
220	የጉበት በሽታ በክትባት መከላከል ይቻላል?	አዎ-----1 አይደለም-----2 አላውቅም----3	
ክፍል III. ተግባር ተኮር ጥያቄዎች			
301	ከዚህ ቀደም ደም ወስደሽ/ተቀብለሽ ታውቂያለሽ?	አዎ----1 አይደለም---2	

302	ከዚህ ቀደም ቀዶ ጥገና ተደርጎልኝ ታውቂያለሽ?	አዎ----1 አይደለም---2	
303	ከዚህ ቀደም ደም ጥርስ ተነቅሎልኝ ታውቂያለሽ?	አዎ----1 አይደለም---2	
304	ከዚህ ቀደም ሆስፒታል ተኝተኝ ታውቂያለሽ??	አዎ----1 አይደለም---2	
305	ከዚህ ቀደም ቆዳሽ ላይ ምልክት አሰርተኝ ታውቂያለሽ??	አዎ----1 አይደለም---2	
306	ሰውነትሽ ላይ ተነቅሰኝ ታውቂያለሽ?	አዎ----1 አይደለም---2	
307	ጆሮሽን ተበስተኝ ታውቂያለሽ?	አዎ----1 አይደለም---2	
308	አፍንጫሽን ተበስተኝ ታውቂያለሽ?	አዎ----1 አይደለም---2	
309	ተገርዘኝ ታውቂያለሽ?	አዎ----1 አይደለም---2	
310	ጽንሰ አቋርጠኝ ታውቂያለሽ?	አዎ----1 አይደለም---2	
311	የመጀመሪያ የግብረ ስጋ ግንኙነት የደረሰው በስንት አመትሽ ነበር?	< =18 አመት – 1 >18 አመት --- 2	
312	ባለፉት 12 ወራት ውስጥ ከምን ያህል ሰው ጋር የግብረ ስጋ ግንኙነት ፈጽመሻል?	< 3----- 1 3-6 ----- 2 >7 ----- 3	
313	በእድሜዎት ከምን ያህል ሰው ጋር የግብረ ስጋ ግንኙነት ፈጽመሻል?	< 5 -----1 5-10 -----2 >10 ----- 3	
314	በግብረስጋ ግንኙነት ጊዜ ከነዶም ተጠቅመሽ ታውቂያለሽ?	አዎ----1 አይደለም---2	ካልሆነ 316
315	ምን ያህል ጊዜ ትጠቀሚ ነበር?	ሁሌም --- 1 አልፎ አልፎ - 2	
316	ተደጋጋሚ የአባላዘር በሽታ ታመሽ ታውቂያለሽ?	አዎ----1 አይደለም---2	
317	የጉበት በሽታ ምርመራ አድርገኝ ታውቂያለሽ?	አዎ----1 አይደለም---2	ካልሆነ 319
318	ውጤቱ ምን ነበር?	ነጻ -----1 የተጠቃ-----2 አላውቅም -----3	
319	የተጉዳኞን የጉበት በሽታ ሁኔታ ታውቂያለሽ?	አዎ----1 አይደለም---2	ካልሆነ 321
320	ከወቅሽ ውጤቱ ምን ነበር	ከህመሙ ነጻ -----1 በህመሙ የተጠቃ -----2	
321	የአሁን የጉበት የደም ምርመራ ውጤት	ከህመሙ ነጻ -----1 በህመሙ የተጠቃ -----2	
322	የኤች አይ ቪ ምርመራ አድርገኝ ታውቂያለሽ?	አዎ----1 አይደለም---2	ካልሆነ 324
323	ውጤቱ ምን ነበር?	ነጻ -----1 የተጠቃ -----2	
324	የተጉዳኞን የኤችአይቪ በሽታ ሁኔታ ታውቂያለሽ?	አዎ----1 አይደለም---2	ካልሆነ 326
325	ውጤቱ ምን ነበር?	ነጻ -----1 የተጠቃ -----2	
326	የአሁን የኤች አይቪ የደም ምርመራ ውጤት	ነጻ -----1 የተጠቃ -----2	
327	በጉበት በሽታ ታማሚ ከሆነ ሰው ጋር ንክኪ ኖሮዎት ያውቃል?	አዎ----1 አይደለም---2	
328	ከኤችአይቪ ታማሚ ጋር ግንኙነት ኖሮዎት ያውቃል?	አዎ----1 አይደለም---2	

329	የጉበት በሽታ ክትባት ወስደው ያውቃሉ?	አዎ----1 አይደለም---2	ካልሆነ 330
330	ከወሰዱ ስንት ዶዝ ወስደዋል?	-----	
330	ከዚህ ቀደም የት ነበር የወለዱት?	ወልጄ አለውቅም -----1 ጤና ድርጅት -- 2 ቤት -----3	

በጣም አመሰግናለሁ!

10.3. SOP of the sample

STANDARD OPERATING PROCEDURE FOR HEPATITIS B SURFACE ANTIGEN (HBsAg) TEST ONLY FOR THIS STUDY PERIOD NOVEMBER 2017

Purpose For the qualitative detection of antibodies to hepatitis B virus in human Serum or Plasma to test for HBsAg.

Abbreviations HBsAg= hepatitis B surface antigen.

Materials	Equipment
	1. Centrifuge
	2. Test tube rack
	3. Timer

Supplies
1. Disposable gloves
2. HBsAg antibody test cassettes
3. Sample diluents (4ml) if applicable
4. Test tube
5. Syringe
6. 70% alcohol

Sample	Sample type	Amount required	Transport and Storage	Stability
	Serum or plasma	0.2-2ml	2-8 °C	within one week
			-20 °C	For longer period

Safety 1. Wear gloves during the entire testing process

Precautions 2. Do not use a pipette by mouth. Do not eat or smoke while handling specimens.

3. Clean and disinfect all spills of specimens or reagents using a suitable disinfectant

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4. Decontaminate and dispose of all specimens, reagents, and other potentially contaminated materials as if they were infectious wastes.
 5. The test is sensitive to humidity and the temperature
 6. Run the test immediately after removing the test strip from the foil pouch.
 7. Bring all reagents to room temperature (20 °C). The tests should be performed at the room temperature.
 8. Do not use the test cassette if the pouch is damaged or the seal is broken. Contact to the supplier when this is happened.
 9. The test is for In vitro diagnostic use only.
 10. Handle all specimens as if they contain infectious agents. When the assay procedure is completed, dispose of specimens carefully after autoclaving for at least one hour. Alternatively, treat with a 0.5 or 1% solution of Sodium hypochlorite for one hour before disposal.
 11. Wear protective clothing (laboratory coats and disposable gloves) when assaying samples.
 12. Do not eat, drink or smoke in areas where specimens and kit reagents are handled.
 13. Avoid contact between hands and eyes or nose during specimen collection and testing.
-

Quality Control To ensure assay validity, a procedural control bar is incorporated in the assay device and is seen in the window labelled “CONTROL”

Control	Stability	Frequency	Preparation (y/n)
Positive and negative sera	2-8 °C	Daily	N
	-20 °C	For longer period	

Note: Known positive and negative control samples are used from national blood bank.

Procedure	Step	Action

1	Remove a test strip from a foil pouch, and place it on a flat surface.
2	Label the test device with patient identification number.
3	Add 3 to 4 drops (120- 160µl) of serum or plasma sample in test tube.
4	Holding the strip vertically, dip the strip into the specimen tube up to the maximum line.
5	Interpret the test result at <u>15 to 20</u> minutes at room temperature. The results can be seen within 2-3 minutes with strong positive samples.

NB: Refer to manufacturer insert instructions.

Result	Negative: One pink line appears in control line, showing the test has been carried
Interpretation	out correctly. There will be no line in test region.
	Positive: In addition to a pink colored control line, a distinct pink colored band will also appear in the test region.
	Invalid: A total absence of color in both regions is an indication of procedure error and/or that the test reagent has deteriorated. The test should be repeated using a new strip.

Principle	A test strip immersed in serum or plasma specimen. As the test sample flows through the sample pad, the labeled antibody-dye conjugate binds to HBsAg forming an antibody-antigen complex. The pad is in contact with a chromatographic test strip which contains a region of immobilized polyclonal anti-HBsAg antibody in the test line. The antibody-antigen complex moves by capillary action along the strip forming a line of immobilized complex by the zone of antibody in the test line, indicating the presence of HBsAg in the sample (pink line). If no antigen is present, the test line will remain clear. The appearance of a pink line in the control line shows that the test has been carried out correctly.
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Limitation: A negative result not precludes the possibility of infection with HBV.

Clinical Utility

1. Hepatitis B virus infection is a complex virus which can produce a variety of clinical situations. It can produce subclinical or clinical acute hepatitis and it can go on to chronic hepatitis. This latter event is more common when infection occurs at a very young age and is therefore more frequent in areas of the world where the disease is highly prevalent and maternal-fetal spread is common.
2. Chronic hepatitis infection can produce a range of sequelae, from very little liver damage to chronic hepatitis varying from mild to more severe or even cirrhosis with all its complications. Hepato-cellular carcinoma is a risk of long-standing chronic hepatitis B infections.

This disease can now be prevented by vaccinating all at-risk persons. There is also some new data suggesting that suitable patients with chronic hepatitis B with significant liver damage and ongoing viral replication may benefit from treatment with interferon. Trials of other anti-viral (e.g., lamivudine) are ongoing and appear to have promising results without significant side effects.

I thank you!

11. Declaration (Assurance of Investigator)

I the undersigned student, declare that this research result work is my original work in partial fulfillment of the requirement for the master's degree of public health in field Epidemiology.

Name: Dereje Merrie Seifu

Signature: _____

Place: Saint Paul's Hospital Millennium Medical College

Date of Submission: March 26, 2018

The research result work has been submitted for examination with my approval as a university advisor.

Name of Principal advisor: Mr. Kinife Wachima (MPH)

Signature: _____ Date _____

Name of Co-advisor: Mr. Aman Yesuf (MPH- Ass-Prof of Epidemiology)

Signature: _____ Date _____