A PROSPECTIVE CROSS- SECTIONAL STUDY ON THE PREVALENCE AND RISK FACTORS OF HEPATITIS B VIRUS INFECTION AMONG PATIENTS ADMITTED TO JIMMA UNIVERSTY SPECIALIZED HOSPITAL, JIMMA ,OROMIA REGION, ETHIOPIA.

BY: TEWODROS GEBRU, MD

A SENIOR PAPER TO BE SUBMITTED TO THE DEPARTMENT OF INTERNAL MEDICINE, COLLEGE OF HEALTH SCIENCES, JIMMA UNIVERSTY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS OF SPECIALTY IN INTERNAL MEDICINE.

A PROSPECTIVE CROSS- SECTIONAL STUDY ON THE PREVALENCE AND RISK FACTORS OF HEPATITIS B VIRUS INFECTION AMONG PATIENTS ADMITTED TO JIMMA UNIVERSTY SPECIALIZED HOSPITAL, JIMMA ,OROMIA REGION, ETHIOPIA.

By: T**ewodros Gebru, MD**

Advisors:

Dr. Leja Hamza [MD, Internist]

Prof.Kifle Woldemicheal [MD, MPH]

ABSTRACT

Background: Viral hepatitis is a systemic infection predominantly affecting the liver. It is estimated that about 2 billion people are infected with HBV worldwide; of which more than 350 million have chronic HBV, and 1. 2 million die from chronic hepatitis, cirrhosis and hepatocellular carcinoma. The prevalence of Hepatitis B virus and risk factors among admitted patients has not been well studied in Jimma University.

Objective: To determine prevalence and risk factors of hepatitis B virus infection among patients admitted to JUSH.

Method: A cross-sectional study was conducted on 345 patients by using structured questionnaire with laboratory investigation

Systematic Random sampling was used as a sampling technique. Serum hepatitis B surface antigen investigation was done for the assessment of hepatitis B infection. Data was entered into computer and analyzed using SPSS version 20.0 computer software. Associations between independent and dependent variables were assessed using multivariate logistic regression analyses. Odds ratio (OR) and 95% confidence interval (CI) were used as measure of the strength of association. Data was presented with frequency tables.

Results: The mean age was 42.5±16.94 years with M: F ratio 1.85:1. Eighteen (5.2%) of patients were HBsAg positive. Having Chronic liver disease and illicit drugs use were statistically significantly associated with hepatitis B infection (OR =75.25 95% CI, (13.513–419.112), and (OR =30.56 95% CI, (1.890–494.238), respectively. The common co morbidity were HIV and Diabetic mellitus each accounting 17(4.9%) patients. Two hundred eighty nine (83.4%) patients had history of Circumcision. Of these, 279 (96.5%) were at home.

Conclusions: The prevalence of hepatitis B infection was 18(5.2%). Chronic liver disease and illicit drugs use were statistically significantly associated with hepatitis B infection.

Keywords: Hepatitis B, HBsAg, Prevalence, Risk factors, Jimma, Ethiopia

.

Acknowledgement

I would like to acknowledge Jimma University for giving me this chance to conduct this study. My sincere and deepest gratitude goes to my advisors Prof.Kifle Woldemicheal and Dr. Leja Hamza for their persistent support during the proposal writing as well as the final paper writing.

Table of contents

Content **Page**

List of tables and Figures:

Page

CHAPTER ONE

1. INTRODUCTION

1.1 Background

Viral hepatitis is a systemic infection predominantly affecting the liver. It is most often caused by viruses that are hepatotropic (hepatitis A, B, C, D, and E). Other viral infections may also occasionally affect the liver. Whereas hepatitis A and E are self-limiting, infection with hepatitis C and to a lesser extent hepatitis B usually becomes chronic. Hepatitis B Virus (HBV) infection and its sequel (cirrhosis and liver cancer) are major global health problems (1).

Once thought to be unique among viruses, HBV is now recognized as one of a family of animal viruses, hepadnaviruses (hepatotropic DNA viruses), and is classified as hepadnaviruses type 1(2).

HBV-related liver injury is largely caused by immune-mediated mechanisms, mediated via cytotoxic T-lymphocyte lysis of infected hepatocytes (3). The precise pathogenic mechanisms responsible for the HBV-associated acute and chronic necroinflammatory liver disease and the viral and/or host determinants of disease severity have only recently been established. The immune response of the host to HBV-related antigens is important in determining the outcome of acute HBV infection. The strength of the host's immune response is crucial for clearing the virus, but this simultaneously causes liver injury (i.e., a form of "hepatitis" manifested by a rise in transaminases occurs before clearance of the virus can be achieved). Those who become chronically infected are unable to sustain an immune response to HBV and thus undergo intermittent episodes of hepatocytes destruction (hepatitis) (3). It is estimated that about 2 billion people are infected with HBV worldwide; of which more than 350 million have chronic HBV, and 1. 2 million die from chronic hepatitis, cirrhosis and hepatocellular carcinoma (4). Hepatitis B virus infection is a serious problem in Ethiopia and the total infection rate with HBV is 79% with about 2.4 million adult carriers of HBS Ag (5).

1.2 Statement of the problem

Hepatitis B virus (HBV) infection is one of the major diseases of mankind that has shown to cause serious public health problem. It is estimated that about 2 billion people are infected with HBV worldwide; of which more than 350 million have chronic HBV, and 1. 2 million die from chronic hepatitis, cirrhosis and hepatocellular carcinoma (4). In the Western world, HBV is usually an adult-acquired disease with a prevalence ranging from 0.2% to 1% of the population, and is responsible for less than 10% of chronic liver disease. In Asia, Africa, and the Middle East, chronic hepatitis B (CH-B) is acquired at birth or early in life, has a prevalence of 5%–20%, and is among the leading causes of death in those regions. At least 20%–30% of those carriers will die of complications of chronic liver disease, including cirrhosis and hepatocellular carcinoma (HCC) (5).

The risk of developing chronic HBV infection after acute exposure ranges from 1% to 5% for adults, and is greater than 90% for infants born to infected mothers who are positive for HBeAg. WHO places CH-B in the top 10 causes of death worldwide (5).

US based study of New England health care databases found that patients with CHB accounted for an average of $40 512 in costs over 2 years for health care services and medication. In a 1995 US study that stratified costs by stage of liver disease, annual costs were estimated at $4175 for a patient with compensated cirrhosis, $22 072 for a patient with decompensated cirrhosis, and $19 589 for a patient with HCC. The cost of liver transplantation is higher still, estimated at $89 07(6).

Acute sporadic and epidemic viral hepatitis are common worldwide, mostly in developing Countries including Ethiopia, and account for high morbidity and mortality. Hepatitis B virus infection is a serious problem in Ethiopia and the total infection rate with HBV is 79% with about 2.4 million adult carriers of HBS Ag. Among top ten leading of deaths at Jimma University hospital a chronic hepatitis accounts 5.7 % (7). Many researchers have investigated prevalence rates of HBV infections in various groups (blood donors, health care workers, medical waste handlers, and others), however the studies conducted in Ethiopia on admitted patient and clinically diagnosis patient are limited to a few case series.

Chapter Two

2.1 Literature Review

Hepatitis is a systemic infection affecting the liver predominantly. Almost all cases of acute viral hepatitis are caused by one of five viral agents: hepatitis A, B, C, D and E Virus. The hepatitis B virus replicates in liver cells (2).

The incubation period of hepatitis B is 4 to 12weeks. The hepatic cell damage result from humeral and cellular immune response directed against the virus-induced membrane antigens (HBs, HBc) on the surface of the infected hepatocytes (2, 14): 0.5–1% of those infected experience a fulminant, often lethal, hepatitis. In 80–90% of cases the infection runs a benign course with complete recovery and elimination of the HBV from the body. A chronic infection develops in 5–10 %(14).

The hepatitis B surface antigen in serum is the first seromarker to indicate active HBV infection, either acute or chronic. Detection of HBsAg in the serum of an individual indicates that the person is currently infected with the virus. Detection in the serum of hepatitis B e antigen (HBeAg), a soluble protein in the inner core of the virus, correlates with the presence of virus in large amounts and is associated with greater infectivity(2).

Currently, there are four recognized modes of transmission: From mother to child at birth (perinatal), by contact with an infected person (horizontal), sexual contact and parenteral (blood-to-blood) exposure to blood or other infected fluid (14). There is considerable variation between areas, countries and continents as to the age at which most transmission takes place. Patients receiving multiple transfusions or dialysis are high risk group. Another high-risk group includes all healthcare workers with regular blood contact. Addicts who inject drugs with needles are also obviously exposed to a very high level of risk (15). The commonest predisposing factors are needle injection, barber shaving and patients presented with past history of surgery among patient admitted for ocular treatment at a tertiary eye care centre in Sindh Pakistan (16). Other study shows Patients who have minor procedures without any recommended protocol or precautionary-use of syringes and drip needles, without proper sterilization, are common among patient admitted to surgical ward in Pakistan (17).

HBV is estimated that more than 2 billion people in the world have been infected with it (18). Of

these, approximately 360 -400 million are chronically infected and at risk of serious illness and

death from cirrhosis and hepatocellular carcinoma (9, 18). At least 65 million of all chronically infected individuals live in Africa (18). In the Western world, HBV is usually an adult-acquired disease with a prevalence ranging from 0.2% to 1% of the population, and is responsible for less than 10% of chronic liver disease. In Asia, Africa, and the Middle East, chronic hepatitis B (CH-B) is acquired at birth or early in life, has a prevalence of 5%–20%, and is among the leading causes of death in those regions. At least 20%–30% of those carriers will die of complications of chronic liver disease, including cirrhosis and hepatocellular carcinoma (HCC) (3).

The endemicity of HBV infection varies greatly worldwide and is influenced primarily by the predominant age at which infection occurs. The prevalence of chronic HBV infection varies geographically, from high (>8%), intermediate (2-7%) to low (<2%) prevalence.

Hepatitis B is highly endemic in developing regions with large population such as South East Asia, China, sub-Saharan Africa and the Amazon Basin, where at least 8% of the population are HBV chronic carrier (18). Approximately 45% of the global populations live in areas of high chronic HBV prevalence (6). In these areas, 70–90% of the population generally has serological evidence of previous HBV infection. Almost all infections occur during either the perinatal period or early in childhood which accounts for the high rates of chronic HBV infection in these populations. Chronic infection with HBV is strongly associated with HCC, and areas with a high endemicity of chronic HBV infection have the highest death rates from this neoplasm (19).

Hepatitis B is moderately endemic in part of Eastern and Southern Europe, the Middle East, Japan, and part of South America (18). Between 10–60% of the population have evidence of infection, and 2-7% is chronic carriers. Acute disease related to HBV is common in these areas because many infections occur in adolescents and adults; however, the high rates of chronic infection are maintained mostly by infections occurring in infants and children. In these areas, mixed patterns of transmission exist, including infant, early childhood and adult transmission.

The endemicity of HBV is low in most developed areas, such as North America, Northern and Western Europe and Australia. In these regions, HBV infects 5–7% of the population, and only 0.5–2% of the population is chronic carriers (18, 19). In these areas, most HBV infections occur in adolescents and young adults in relatively well-defined high-risk groups.

HBV in Africa covers all of Sub-Saharan Africa and Algeria. Africa has the second largest number of chronic carriers after Asia and is considered a region of high endemicity (20). There

are approximately 50 million chronic carriers of hepatitis B virus (HBV) in Africa, with a 25% mortality risk (21).70 and 95% of the adult population show evidence of past exposure to HBV infection and the estimated HBsAg seroprevalence ranges from 6-20%(16).Western Africa has the highest rates of endemicity within Africa with as many as 95% of the adult population displaying markers of past HBV exposure. The prevalence rate in Gambia and Senegal are about 15%, with age-specific prevalence as high as 20% in 10- to 20-year olds. Not surprisingly, this region also has one of the world's highest rates of HCC. In Gambia, HCC is the most common cancer among men and the second most common cancer among women (20).

Hepatitis B virus infection is a serious problem in Ethiopia and the total infection rate with HBV is 79% with about 2.4 million adult carriers of HBS Ag. Among top ten leading of deaths at Jimma University hospital a chronic hepatitis accounts 5.7 % (7). A nationwide sero-epidemiological study of hepatitis B markers prevalence was conducted in Ethiopia on 5,270 young males from all regions of the country. Overall prevalence rates were 10.8% for HBsAg and 73.3% for "at least one marker positive"; a remarkable geographical and ethnic variability of marker prevalence was observed, reflecting the wide differences existing in Ethiopia in socio-cultural environment and activities such as tribal practices and traditional surgery. Sexual practices and medical exposure also play some role as determinants of hepatitis B marker prevalence in Ethiopia (22).

A community-based survey done in Addis Ababa, Ethiopia was conducted in 1994 showed that HBsAg prevalence was 7% (95% CI 6–8), higher in males (9%; 7–10) than females (5%; 4–6). HBeAg prevalence in HBsAg positives was 23% (18–29), and less than 1% of women of childbearing age were HBeAg positive. Overall HBV seroprevalence (any marker), rose steadily with age to over 70% in 40–49 year olds, indicating significant childhood and adult transmission(23).

Screening sera of all male donors appearing at the blood bank of a regional hospital in Northwest Ethiopia (Gondar) in 1994 (n=1022) and 1995 (n=1164), for HBsAg was carried out on 549 consecutive sera. The crude sero-prevalence of HBsAg was 14.4 %(25).

Significantly high prevalence of HBsAg was observed among individuals who had history of invasive procedures, like tooth extraction, abortion and ear piercing; history of hospital admission, history of unsafe inject and HIV positives (4).

5

Only history of invasive procedures and chronic liver disease showed association with HBsAg sero-positivity (1).

2:2 Significance of the study

Viral hepatitis especially hepatitis B is major public health problem in all parts of the world(27).This type of study will generate baseline data for further larger study on the prevalence and risk factors of HBV infection among admitted patients. Recommendation will be disseminated to policy makers to awaken on the Significance of the problem and take appropriate action.

2.3 Conceptual Framework

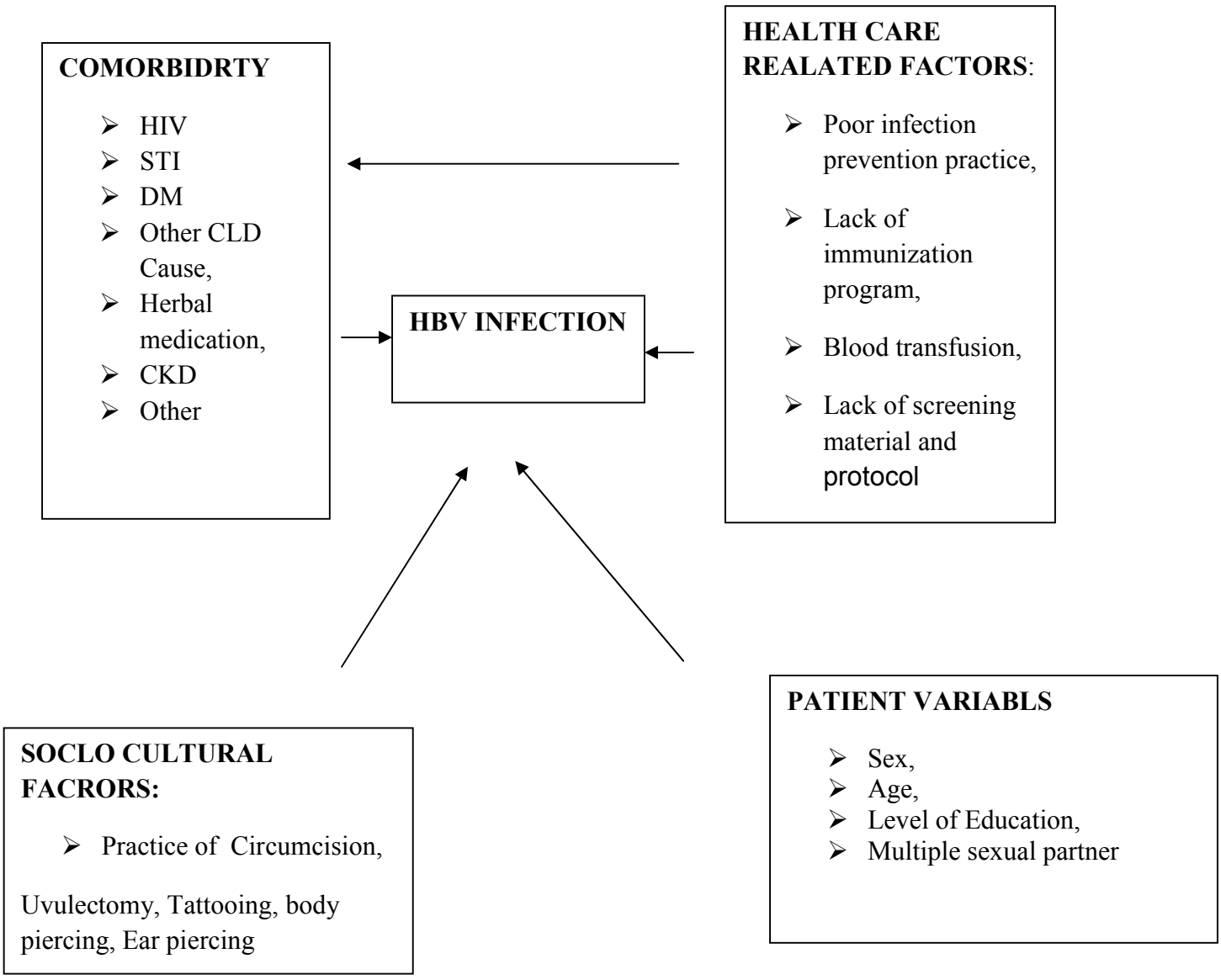

Figure .1 Conceptual frame work for factors associated for prevalence of HBV infection

Chapter Three

3. Objectives

3.1 General Objective

To determine the prevalence and risk factors for hepatitis B virus infection among adult patients admitted to JUSH, Southwest Ethiopia from November 2014 to April 2015.

3.2 Specific Objectives

To determine HBV sero-prevalence among adult patients admitted to JUSH.

To determine HBV sero-prevalence and their association with co morbidities among patients admitted to JUSH.

To determine factors associated with HBV infection among patients admitted to JUSH

Chapter Four

4. Subjects and Methods

4.1 Study Area

The study was conducted at Jimma University specialized hospital (JUSH), located in Jimma town in Oromia Regional State, southwest of Ethiopia. JUSH is the only referral teaching hospital in this region of the country. It provides specialized health services with catchment area of 15 million populations (26).

4.2 Study period

The study was conducted from October 2014 to July 2015**.**

4.3 Study design

A hospital based prospective cross-sectional study was conducted at JUSH.

4.4 Population

4.4.1 Source population

Adult Patients who were visiting JUSH for health evaluation during data collection period were the source population.

4.4.2 Study population

Adult Patients who were admitted to JUSH wards (Internal medicine, Surgery, Ophthalmology and Psychiatry side) who fulfill the inclusion criteria were the study population.

4.5 Inclusion and exclusion criteria

4.5.1 Inclusion Criteria

Patients who are 18 yrs of age and above admitted to JUSH wards (Internal medicine, Surgery, Ophthalmology and Psychiatry side) during the study period were included in the study.

4.5.2 Exclusion criteria

Patients who were readmitted during the study period and included in the previous admissions were planned to be omitted, but no patients were readmitted during the study period.

4.6 Sample size and sampling technique

4.6.1 Sample size

The sample size was calculated using a formula for estimation of a single population proportion taking prevalence of hepatitis B infection among admitted patients to the wards to be p=50%(prevalence not known) , margin of error 5%, and using 95% confidence level.

The sample size was calculated using the formula

$n= (Z\alpha/2)^2 P (1-P) / d^2$

$= (1.96)^2 0.5 (1-.5) /0.05^2$

= 384

P = prevalence of HBV; 50%.

$Z\alpha/2$ = standard normal variable at 95% confidence level (1.96).

d= precision (tolerable margin of error) = 0.05

From the admission/discharge record data, the total number of patients admitted to wards in the year of 2006 E.C over 6 month (November to April) were 3410 in the four department: 1079(31.6 %) in Internal medicine, 1258(36.8 %) in Surgery, 873(25.6 %)in Ophthalmology and 200(5.8 %) in Psychiatry side. We did not include patients admitted to Gynecology-Obstetrics' Department to control sex bias in the study population.

Since the source population is less than 10,000, the final sample size was calculated using a formula for finite population correction as follows.

nf = n/{1+(n/N)}, where

= 384/ {1+ (384/3410},

=345.

A total of 345 patients were included in the study.

4.6.2 Sampling technique

Convenient sampling technique was used for all patients consecutively admitted to JUSH. The total sample size distributed among different departments using the previous year pattern of admission, 110(31.6 %) were in Internal medicine, 127(36.8 %) in Surgery, 88(25.6 %) in Ophthalmology and 20(5.8 %) in Psychiatry ward.

4.7 Measurements

4.7.1Variables

4.7.1.1 Dependent Variables Hepatitis B infection

4.7.1.2 Independent variables

Socio-demographic characteristics

Age, sex, Religion, Occupation, Level of education, marital status, Ethnicity, Residency.

Co morbidities

HIV, STI, DM, CLD, CKD

Risk factors for HBV infection

- Blood transfusion history
- Delivery by TBA
- Abortion
- History of surgical procedure
- Uvulectomy
- Ear/nose piercing
- Circumcision
- Contact with jaundiced patients
- Dental Extraction
- Tattooing
- Family history of hepatitis B infection
- Shaving
- Multiple sexual partners
- Vaccination states
- Illicit drug use with unsafe injection

4.7.2 Data collection process

Data was collected by one medical resident, two BSC nurses and one laboratory technician after training of 2 days on the research objectives and the data collection tools.

The principal investigator was supervising the data collection.

4.8 Data collection instrument

Data was collected using a structured questionnaire and laboratory investigation of serum HBsAg. Five ml of venous blood was collected at spot by the ward nurses and within 5 minutes transported to laboratory where Laboratory-technician left blood for 30 minutes to facilitate clotting. Then the clotted bloods were centrifuged to separate the serum from blood. The serum was used for HBsAg screening using Rapid Hepatitis B surface Antigen Test (Dipstick). Data collection was done by interviewing the patient with appropriate language.

4.9 Data processing and analysis

Each day, the completeness and consistency of data collected by each data collectors were checked and the data were compiled. Each laboratory investigation was attached with the data collection format. The collected data was placed in a locked cabinet to keep confidentiality. Then, the collected data was organized, coded, entered in to a computer and analyzed using SPSS version 20.0. It was organized and summarized in terms of frequencies and the result of the study was presented in a descriptive measure such as tables and graph. Independent variables were assessed for association with dependent variables using multivariate logistic regression analyses. Odds ratio (OR) and 95% confidence interval (CI) were used as measure of the strength of association.

4.10 Data quality assurance

Pre test on 10 % of patients were done to assess the quality of the test.

The completeness, consistency, and accuracy of the data were checked every day by the principal investigator and assistance were given for data collectors. SOPS were followed during laboratory analysis.

4.11 Ethical consideration

Ethical clearance was obtained from the Institutional Review Board (IRB) of College of health sciences, Jimma University. Written consent was obtained from all participants. All information obtained from the patients' card records and interview was kept anonymous. Findings during the study were revealed to the patient and managing physician if helpful for patient treatment.

4.12 Limitations of the study

The 95% confidence intervals (CI) were wide for the statistically associated variables; this show small sample size.

4.13 Operational Definition

Delivery by TBA: when the delivery is conducted by untrained person out of health facility.

Illicit drug use: use of parenteral and recreational drug with unsafe injection.

Unsafe injection: when the injection given with unsterilized syringe including reuse of the needle

Abortion: termination of pregnancy before 20 weeks outside health facility with or without health professionals

Shaving: when someone share sharp material for shaving

Multiple sexual partner: having sexual intercourse with more than one sexual partner

STI: if a person having sexually transmitted infection including pervious history

Chapter Five

Results

There were a total of 345 patients who participated in the study. The response rate was 100%.

Socio-demographic characteristics

The mean age of the patients in the study was 42.5 years with a standard deviation of 16.94 years. Two hundred twenty six (65.5%) of patients were male with male to female ratio1.84:1. Two hundred forty six (71.3%) patients were married and 63 (18.3%) were single. Hundred seventy three patients (50.1%) and 174 (50.1%) were illiterates, and farmers respectively. Most of the patients were living in rural area 241(69.9%), Muslim 245(71%) religion followers, and Oromo language speakers 249(72.2%) (See table 1).

Table1. The prevalence of HBsAg with socio-demographic characteristics among patient admitted to JUSH from November 2014 to April 2015

Socio-demographic characteristics		**Sero-status for HBV**			
		Positive result		**Negative result**	
		Frequency	**Percentage**	**Frequency**	**Percentage**
Gender	Male	14	4.1%	212	61.4%
	Female	4	1.2%	115	33.3%
Age	10-19	1	0.3%	10	2.9%
	20-29	6	1.7%	76	22%
	30-39	4	1.2%	63	18.3%
	40-49	4	1.2%	62	18%
	50-59	2	0.6%	53	15.4%
	≥60	1	0.3%	63	18.3%
Marital status	Married	13	3.8%	233	67.5%
	Single	4	1.2%	59	17.1%
	Divorced	0	0.0%	12	3.5%
	Widow	1	0.3%	18	5.2%
	Separated	0	0.0%	5	1.4%
Residence	Urban	3	0.9%	101	29.3%
	Rural	15	4.3%	226	65.5%
Religion	Orthotics	2	0.6%	74	21.4%
	Muslim	14	4.1%	231	67%
	Protestant	2	0.6%	22	6.4%
Educational status	Illiterate	10	2.9%	163	47.2%
	Can write and read	2	0.6%	33	9.6%
	Grade 1-4	2	0.6%	37	10.7%
	Grade 5-8	1	0.3%	42	12.2%
	Grade 9-10	1	0.3%	20	5.8%
	Grade 11-12	0	0.0%	10	2.9%
	College or university	2	0.6%	22	6.4%

Ethnicity	Oromo	13	3.8%	236	68.4%
	Amhara	2	0.6%	31	9%
	Tigrae	1	0.3%	9	2.6%
	Yeme	1	0.3%	10	2.9%
	Other*	1	0.3%	41	11.8%

*=Gurage, Dawro, Slite, Kulo, and Welayta **=Jobless and Retired

HBV Infection Prevalence

Out of 345 patients who participated in the study, 18 (5.2%) had positive result for hepatitis B surface antigen, of these 14(4.1%) were male. The highest prevalence was in the department of internal medicine with 9(2.6%). Whereas the lowest prevalence was in the department of Psychiatry with 1(0.3%) (See figure 2).

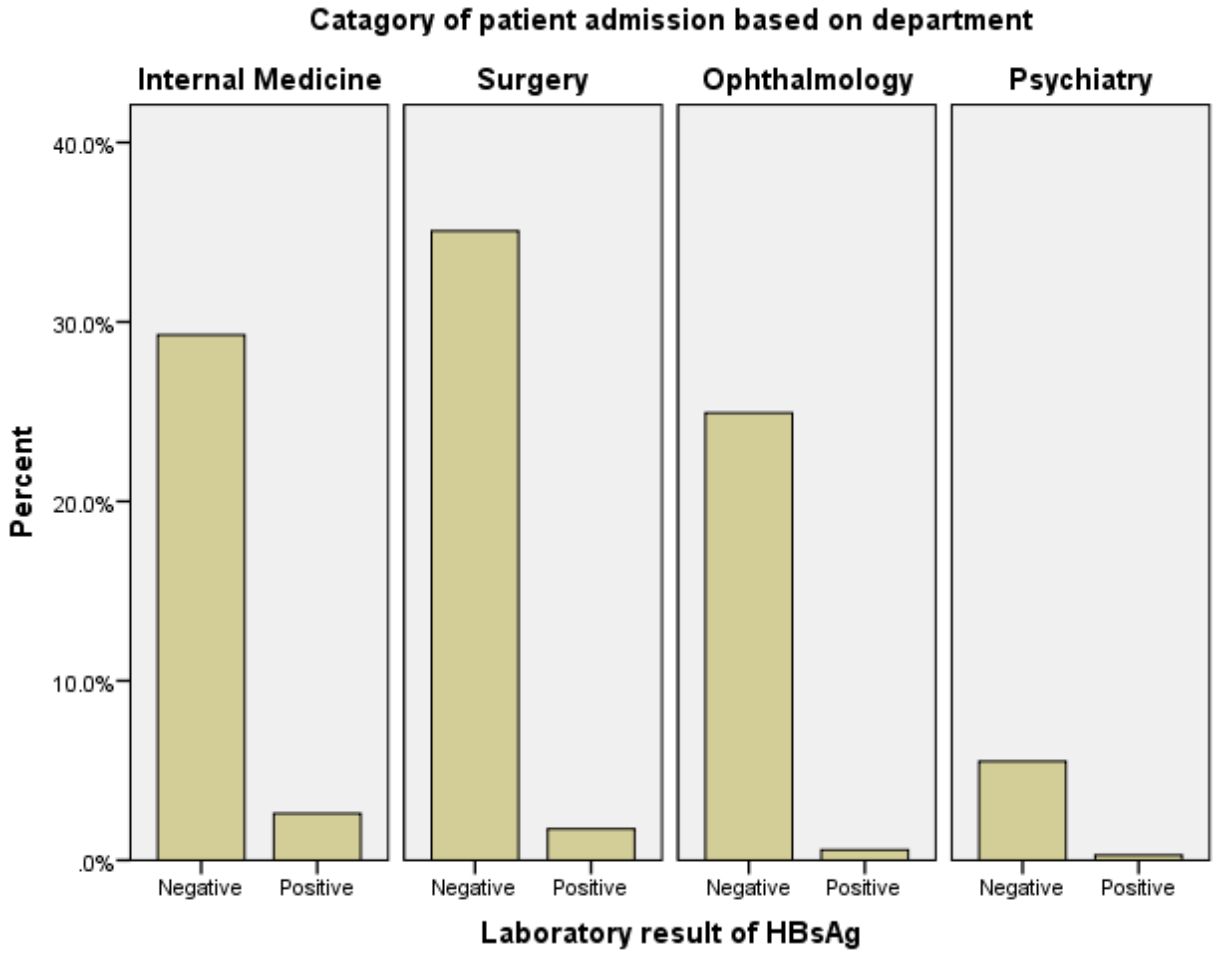

Figure 2 .The prevalence of HBsAg among patients admitted at different departments of JUSH from November 2014 to April 2015

Co morbidity in HBV Infections

The commonest co morbidities were HIV and Diabetic mellitus that accounted 17 (4.9%) for each of them, out of this 2(0.6) of HIV positive patients were HBsAg positive. Of the 345 subjects who participated in the study, 9 (2.6%) had CLD as co morbidity and out of this 6(1.8%)

were HBsAg positive (OR=95% CI, 75.25 (13.51—419.112), *P*=.000). Ten (2.9%) patients had CKD as co morbidity, out of this 1(10%) had HBsAg positive. The Bivariate analysis shows that hepatitis B infection is aggravating factor for chronic liver disease. It is 75 times higher for chronic liver disease compared to Human Immuno-Deficient syndrome, Sexually Transmitted infection, DM, and CKD. (SeeTable2).

Table2. Bivariate association of co morbidity with HBV infection among patient admitted to JUSH from November 2014 to April 2015

Co morbidity	Sero-status for HBV					
	Positive result		Negative result		Total (%)	OR(95%,CI) value
	Frequency	Percentage	Frequency	Percentage		
CLD	6	1.7%	3	0.9%	9(2.6%)	75.25 (13.51-419.112)
HIV(Sero-reactive)	2	10.6%	15	4.3%	17(4.9%)	2.25(0.326-15.62)
STI	0	0.0%	15	4.3%	15(4.3%)	
DM	0	0.0%	17	4.9%	17(4.9%)	
CKD	1	03.%	9	2.6%	10(2.9%)	0.362(-0.007-17.938)

Risk Factors Associated with HBV Infections

From 345 subjects that participated in the study, 79(22.89%) had previous history of admissions to hospitals. Of these, 2(0.6%) were HBsAg positive. Two hundred eighty nine (83.8%) had history of circumcision. Out of 279(96.5%) circumcised at home and 10(3.4%) at hospital, 14 (4.8%) and 1(0.3%) were HBsAg positive respectively. Among 86 (24.9%) who had ear

piercing, 2(0.6%) were HBsAg positive. From all patients, 46(13.33%) had Uvulectomy and out of this 2(0.6%) were HBsAg positive. Thirty-three (9.6%) patients had tattooing practice on the body, out of this one person (0.3%) had HBsAg positive. Eighty seven (25.2%) patients had dental extraction at home, out of this 4(1.2%) were HBsAg positive.

Forty two (12.2%) patients had dental extraction at health facility, out of this 3(0.9%) persons had HBsAg positive (OR=0.359 95%, CI (0.068—1.920). Fifty two (15.1%) patients had shaving, out of this 3(0.9%) were HBsAg positive. Sixty-four (18.6%) patients had history of delivery by TBA, out of this 2(0.6%) were HBsAg positive. Out of 21 (6.1%) patients who had history of abortion 2(0.6%) were HBsAg positive. Twenty two (6.4 %%) patients had blood transfusion, out of this 2(0.6%) (OR=0.713 95%, CI (0.041—2.828) (P=0.713) were HBsAg

positive. Out of 67 (19.4%) patients who had multiple sexual partner, 4(1.2%) were HBsAg positive. Three (0.9%) had illicit drug use, out of this 2(0.6%) (OR =30.56 95%, CI, (1.890–473.34), *P*=0.016) were HBsAg positive. Based on multivariate analysis, only illicit drug use is statistically significantly associated with hepatitis B infection (see Table 3).

Table3. Multivariate association of different variables with HBV infection among patient admitted to JUSH from November 2014 to April 2015

Risk factors	**HBsAg result**					
	Positive result		**Negative result**		**Total (%)**	**OR(95%,CI) value**
	Frequency	**Percentage**	**Frequency**	**Percentage**		

Community acquired	Tattooing on body	1	0.3%	32	9.3%	33(9.6%)	4.576(0.229-91.291)
	Ear piercing	2	0.6%	84	24.3%	89(24.9%)	3.446(0.310-38.331)
	Uvulectomy	2	0.6%	44	12.8%	46(13.3%)	0.642(0.106-3.910)
	Shaving in barbershop***	3	0.9%	49	14.2%	52(15.1%)	0.945(0.126-7.100)
	Contact with jaundiced patient	0	0.0%	7	2%	7(2%)	
	Circumcision at home	14	4.8%	279	91.7%	289 (96.5%)	0.640(0.106-3.910)
	Dental extraction at home	4	1.2%	83	24.1%	87(25.2%)	0.771(0.169-3.540)
Hospital acquired	Hospitalization	2	0.6%	78	22.6%	80(23.2%)	17(1.61-249.83)
	Blood transfusion	2	0.6%	20	5.8%	22(6.4%)	0.713(0.041-2.828)
	Dental extraction at health facility	3	0.9%	39	11.3%	42(12.2%)	0.361(0.068-1.920)
	Surgical procedure	3	0.9%	59	917.1%	62(18%)	0.150(0.017-1.346)
Behavioral acquired	Delivery by TBA**	2	0.6%	62	18%	64(18.6%)	0.903(0.123-6.627)
	Abortion**	2	0.6%	19	5.5%	21(6.1%)	5.261(0.698-39.69)
	Illicit drug use	2	0.6%	1	0.3%	3(0.9%)	30.56(1.89-494.23)
	Multiple sexual partner	4	1.2%	63	18.3%	67(19.4%)	0.692(0-110-4.352)
Hepatitis B vaccination status	Vaccinated	0	0.0%	10	2.9%	10(2.9%)	

= concerning female *= concerning male

CHAPTER SIX

Discussion

Three hundred forty five study subjects participated in this study from November 2014 to April 2015. Of these, two hundred twenty six (65.5%) of patients were males. The mean ages of the

patients were 42.5 years with a standard deviation of 16.94 years. Most of the patients, 82(23.7%), were within 20-29 years age group. A study done at Woldiya hospital (2014) on diabetic patients reported 33.4 as mean age (1). Study done at Shashemene hospital (2011) on patients came for VCT, most of the study subjects belonged to 30-39 years of age. This age difference may arise from different in study subject, because our research mainly done on patients admitted to hospital, but study at Shashemene hospital was on VCT and Woldiya on diabetic patients.

From all patients, 18(5.2%) had positive hepatitis B surface antigen. The highest prevalence was in the department of internal medicine with 9(2.6%), but the lowest prevalence was in the department of Psychiatry with 1(0.3%).This study also showed that the study area is intermediate regarding endemicity (2-8%) with HBV and consistent with previous serologic data from most region of Ethiopia (1).The prevalence in Pakistan in the Department of Surgery (2007) was around 3.6 %(17). Other study done in one of tertiary eye care centre in Pakistan (2009) reported the prevalence as 4.6% during the study period (16). Studies done in Ethiopia on different target populations, for example, a study done by Abebe et al (2003) (11) on Addis Ababa residents, Shimelis et al (2007) at Saint Paul's General Specialized Hospital on VCT clients(1), by Tessema et al (2010) (25) at University of Gondar on blood bank and by Negero et al (2011) among VCT clients at Shashemene Hospital (4) showed 7%, 5.7%, 4.7% and 5.7% HBsAg prevalence, respectively. In comparison with this study, the magnitude is lower from the study conducted on Addis Ababa residents and VCT clinics. These deviations of prevalence could be due to the type of patients, geographical, economical status, social distribution, differences in method, type of lab test kit used and sample size.

Generally this study and other previous studies conducted in Ethiopia showed lower prevalence than WHO report of greater than 8% for HBsAg. This difference might be due to target population, because in endemic area of Africa and Asia, most infections occur in infants and

children as a result of maternal-neonatal transmission or close childhood contact (16, 18). Therefore, the studies done on adults have lower prevalence than infants and children making the prevalence of these studies lower than WHO report.

The common co morbidity were HIV and Diabetic mellitus accounting 17(4.9%) each of them, out of this 2(0.6%) of HIV positive patients were HBsAg positive.

Of the 345 subjects that participated in the study, 9 (2.6%) had CLD as co morbidity and out of this 6(0.6%) (OR =75.257 95% CI, (13.513—419.112), *P*=.000) were HBsAg positive. Ten (2.9%) had CKD as co morbidity and out of this 1(0.3%) was HBsAg positive. History of liver disease was statically significantly associated with HBsAg positivity. The main cellular target of HBV is the hepatocytes, and in humans, these are the only cells convincingly shown to replicate the virus. HBV is responsible for chronic hepatitis, leading to cirrhosis and liver cancer in many parts of the world. HBV is causally associated with primary hepatocellular carcinoma (PHC) (3, 19). This is also consistent with a Study done by Negero et al (2011) (4) among VCT clients at Shashemene Hospital.

From the different risk factors for HBV infection only illicit drug use is statistically significantly associated with increased risk of HBV carriage (OR =30.56 95% CI, (1.890–494.238) *P*=.016). A study done by Negero et al (2011) (4) among VCT clients at Shashemene Hospital showed history of having invasive procedures, unsafe drug injection and hospital admission were significantly associated with increased risk of HBV carriage. Other study done by Daniel et al (2014) (1) among diabetic patient at Woldiya hospital reported statistically significant association between HBsAg positivity and history of invasive procedures like tooth extraction, abortion and body piercing.

History of transfusion and history of tattooing body/gum were not associated with HBsAg in our study. Shimelis et al, 2007 (1) also reported that transfusion with blood or blood products is no longer an important risk factor for acute viral hepatitis. History of multiple sexual partners is not associated with HBsAg positivity in our study.

CHAPTER SEVEN

Conclusions and Recommendations

The overall prevalence was 5.2 % for HBsAg. Illicit drug use and having chronic liver disease were found to be statistically significantly associated with HBV infection.

Recommendations

Implementing preventive measures and also awareness creation through health education about HBV transmission and prevention, including efforts to ensure, all injections be administered with sterile syringes and needles is critical. We also recommend conducting large national wide study.

References

1. Daniel Mekonnen, Solomon Gebre Selassie, Surafel Fantaw, Andualem Hunegnaw, Adanew Mihret. Prevalence of hepatitis B virus in patients with diabetes mellitus. Pan African Medical Journal. 2014; 17:40.
2. Jules L.Dienstag.Acute Viral Hepatitis.In: Dan L. Longo, Dennis L. Kasper, J. Larry Jameson, Anthony S. Fauci, Stephen L. Hauser and Joseph Loscalzo (18eds). Harrison's principles of internal medicine. United States of America: McGraw-Hill Companies, Inc., 2012:2538.
3. World Gastroenterology Organization. WGO Practice Guideline Hepatitis B.2008: 5.
4. Asfaw Negero, Zufan Sisay and Girmay Medhin. Prevalence of Hepatitis B surface antigen among visitors of Shashemene General Hospital voluntary counseling and testing center. BMC Research Notes .2011, 4:35.
5. G, Gish, Stephen Locarnini.Chronic hepatitis B viral infection. In: Tad taka Yamada (5eds).Textbook of Gastroenterolog.Singapore: Fabulous Printers Pte Ltd, 2009:2112.
6. D. Lavanchy. Hepatitis B virus epidemiology, disease burden, treatment, and current and emerging prevention and control Measures. Journal of Viral Hepatitis, 2004, 11, 97–107.
7. KahsayHuruy,Afework Kassual,Andargachew Mulu,Netsanet Worku and Teshome Fetene.Seroprevalence and Risk Factors for Hepatitis B Virus Infection in the Healthy Blood Donors at Jimma University Hospital, Southwest Ethiopia. Pharmacology online .2008, 3: 32-37.
8. World Health Organization .Prevention of Hepatitis B in India.2002:3.
9. Ayman A. Abdo, Faisal M, Sanai and Faleh Z. Al-Faleh. Epidemiology of Viral Hepatitis in Saudi Arabia: Are We Off the Hook? Saudi J Gastroenterology. 2012; 18(6): 349–357.
10. WorldHealthOrganization.Hepatitis.Availableat:http://www.who.int/topics/hepatitis/en/ Accessed 09/27/2014.
11. Abel Girma Ayele and Solomon Gebre-Selassie. Prevalence and Risk Factors of Hepatitis B and Hepatitis C Virus Infections among Patients with Chronic Liver Diseases in Public Hospitals in Addis Ababa, Ethiopia. ISRN Tropical Medicine. 2013:7.

12. Sonia Roman, Alexis Jose-Abrego, Nora Alma Fierro and Griselda Escobedo-Melendez et al. Hepatitis B virus infection in Latin America: A genomic medicine approach. World J Gastroenterology. 2014, June 21; 20(23): 7181-7196.

13. Mukhlid Yousif, Hatim Mudawi, Sahar Bakhiet, Dieter Glebe and Anna Kramvis1. Molecular characterization of hepatitis B virus in liver disease patients and asymptomatic carriers of the virus in Sudan.BMC Infectious Diseases .2013, 13:328.
14. Bienz K. A. General Virology In: Fritz H.Kayser, Kurt A.Bienz, Johannes Eckert, Rolf M and Zinkernagel (5th Ed.) Kayser, Medical Microbiology? / Inc. 2005:429-434.
15. WorldHealthOrganization.Hepatitis.Availableat:http://www.who.int/csr/disease/hepatitis/whocdscsrlyo20022/en/index3.html#transmission.Accessedon10/01/2014.
16. Junejo SA, Khan NA and Lodhi AA. Prevalence of Hepatitis B and C infection in patients admitted at Tertiary Eye Care Centre: A hospital based study. Pak J Med Sci 2009; 25(4):597-600.
17. Syed Abid, Fareed Akbere Shah,Khalid Ahmed.Prevalence of hepatitis B and C virus in surgical patients. Pakistan journal of surger.2007, 23:2.
18. Fatima Valente, Barbara Vieira do Lago, Carlos Augusto Velasco de Castro, Adilson José de Almeida Selma A Gomes and Caroline Cordeiro Soares.Epidemiology and molecular characterization of hepatitis B virus in Luanda, Angola. Mem Inst Oswaldo Cruz, Rio de Janeiro. 2010, 105(8): 970-977. Jinlin Hou, Zhihua Liu and Fan GU. Epidemiology and Prevention of Hepatitis B Virus Infection. International Journal of Medical Science.2005, 2(1):50-57.
19. Miriam J. Alter. Epidemiology of hepatitis B in Europe and worldwide. Journal of Hepatology .2003, 39:64–69.
20. Elizabeth W. Hwang and Ramsey Cheung. Global Epidemiology of Hepatitis B Virus (HBV) Infection. North American Journal of Medicine and Science.2011, 4:1 7.
21. C F Kiire. The epidemiology and prophylaxis of hepatitis B in sub-Saharan Africa: a view from tropical and subtropical Africa. Gut. 1996, 38(2): S5-S12.
22. Kefene H Rapicetta, M Rossi GB Bisanti L Bekura, D Morace G Palladino P Di Rienzi A ContiS, Bassani F et al. Ethiopian National Hepatitis B Study. J Med Virol.1988, 24(1):75-84.

23. A. Abebe, D.J.Nokes, A. Dejene, F. Enquselassie, T. Messele and F. T.Cutts. Seroepidemiology of hepatitis B virus in Addis Ababa, Ethiopia: transmission patterns and vaccine control. Epidemiol. Infect. 2003, 131:757–770.

24. David M. Parenti, Donald Lucas, Angela Lee and Richard H. Hollenka.Health Status of Ethiopian Refugees in the United States. Am J Public Health.1987; 77:1542-1543.
25. Belay Tessema, Gizachew Yismaw and Afework Kassu et al.Sero-prevalence of HIV, HBV, HCV and syphilis infections among blood donors at Gondar University Teaching Hospital, Northwest Ethiopia: declining trends over a period of five years. BMC Infectious Diseases .2010, 10:111.
26. Office JUER. Jimma University Specialized Hospital and Existing medical services. Available at: http://www.ju.edu.et/jimma-university-specialized-hospital-jush .Accessed on 10/19/2014.
27. Dutta S Shivananda PG and Chatterjee A .Prevalence of hepatitis B surface antigen and antibody among hospital admitted patients in Manipal. Indian J Public Health.1994, 38(3):108-12.

Annex I: Consent Form and questionnaire

Consent form for study participants

Jimma University College of Public Health and Medical Sciences, Jimma University.

Questionnaire for assessing the prevalence and risk factors of hepatitis B virus infection among patient admitted to, JUSH fromNovember**2014-April/2015**.

Consent form

A).INFORMATION TO THE PARTICIPANT

Interview code no _____

Greeting and self-introduction and consent

Greeting: - Good morning/afternoon.

My name is _____. I am a physician / Nurse working in JUSH. We are conducting a scientific research on the prevalence and risk factors of hepatitis B virus infection among patient admitted to JUSH, Nov/**2014-April/2015**. Therefore, I would like to inform you that you are one of the potential participants in this study. This study requires you to participate so that important information can be obtained regarding your health. Your participation is entirely based on your willingness and your refusal doesn't affect the service you get from us in any way. If you are willing to participate in the study, we will interview you and review your chart for some health related questions and we will collect 5 cc of blood to determine the HBsAg from the serum, which will not impose any risk to you.

The information gathered will be used for writing a proposal for partial fulfillment of a specialty certificate in Internal Medicine at Jimma University. Your participation is only determined by you .Here, I want to assure you that any information obtained from you and your medical records

will remain confidential indefinitely. The participant won`t be asked any fee during the study. You can dropout any time during the study and also you have full right to ask us questions. If, at

any time, you have questions about the study, you may contact me at (+251-934552776/11017454).

Do you wish to participate in the study?

If the participant agrees to participate in the study, proceed with interview and Draw blood for HBsAg after the patient has signed the consent.

I, _____have been told of the contents of this research form and I have adequate information about the research and understood it; and I do agree to participate in this Research study.

Name of Participant …….

Signature of Participant _____

Date_____

If the participant says “No, I don’t want to participate in the study”, thank him (her) and stop.

Thank you!

Name of interviewer_____ Date_____/_____/_____

In Amharic

ፅ/ለተሳታፊው፡ የሚሰጥ ጥናት ውል ማስገንዘቢያ

እኔ ዶ/ር ቴዎድሮስ ገብሩ የተባልኩ የውስጥ ደዌ ህክምና ት/ት ክፍል የመጨረሻ አመት ሬዚደንት የመመረቂያ ጽሁፌን ለመስራት ለሚያስፈልገኝ ጥናት እርስዎ መመረጥዎን ላሳውቅዎት ወዳለው::

ጥናቱ የሚካሄደው በቃል መጠይቅ ና በደም ምርመራ ሲሆን በእርሶ ላይ ምንም አይነት ጉዳት አይደርስም::

ከጥናቱ መውጣት ከፈለጉ በማንኛውም ሰዓት አቋርጠው መውጣት ይችላሉ::ይህም በማድረግዎ ምንም ዓይነት ተጽዕኖ አይደርብዎትም::

ከጥናቱ የሚገኘው ውጤት ወደፊት የሚካሂዱ ሌሎች ጥናቶች መነሻ ከመሆኑም ባሻገር የተፈለገው ጥናት በዞናችን ምን እንደሚመስል ያስገነዝባል::

የርሶ ስምና ሌሎች የርሶን ማንነት የሚያመለክቱ ነገሮች በጥናቱ ላይ አይገቡም::

አመሰግናለሁ::

፪/ የተሳታፊው ፍቃደኛነት ማረጋገጫ ቅጽ

ስለጥናቱ በቂ ውቅት ስላገኘሁ በሙሉ ፍቃዴ ለመሳተፍ ወሰኛለሁ:: የተሳታፊው ፊርማ----------

ተሳታፊው በጥናቱ ለመሳተፍ ካልፈለገ አመሰግነው ያሰናብቷቸው::

የጠያቂው ስም ና ፊርማ----------

ቀን----------

Afaan Oromotin

Odeffanoo Qoratamaaf kennamu

Ani maqaan koo Dr.Tewodros Gabru yoon ta’u,Karoora barrefama eebbaa irrati hirmaataa akka naaf taatan kabajaan isin gaafadha. Qorannoon kan adeemsiifamu gaaffiifi qorannoo dhiigatiin yoo ta’u, rakkoo tokkoyuu kan isinirra geessisu hin jiru. Dhiigni harka keessanirra Siriinjiidhan erga fudhatameen booda gara laaboratoritti ergame .

Odeffannoon qorannoo kanarraa argamu hojii fuuldura ademsifamuf gargaarsa guddaa kenna. Qorrannoo keessaa yeroo barbaadaniti bahuun kan danda’amu yoo ta’u, kuni immo tajaajila isiniif keennamu irrati dhiibbaa tokkollee hin geessisu.

II) Mallattoo Mirkanessaa

Qo’anna irrati qooda fudhachuuf yoo waligaltan bakka armaan gaddii irrati mallatton mirkanessa.

Galatoomaa

Mallattoo hirmaata qorannoo----------

Maqaa –Qorataa ----------

Guyyaa----------

Yoo qo’anna irrati qooda fudachuu hin barbaanne,Isaan galateefadhaati dhiisaa.

Questionnaire number_____

Annex I: Questionnaire designed to assess the Prevalence and risk factors of hepatitis B virus infection among patient admitted to JUSH, November 2014 to April**.**

Identification and demographic

Medical record (card) number _____; previous card number (If you had) ---------

Date of admission: ----------; Ward----------

Sex A. Male B. Female

Age (in years) _____

Socio economical information

2.1. Residence A. Urban B. Rural

2.2. Current occupational status

A. Driver B. Jobless C. Daily laborer/house servant

D. Commercial (Merchant) E. Student F. Government/private employee

G. Farmer H. Housewife I. Other specify_____

2.3. Religion

A. Muslim B. Orthotics

C. Protestant D. Other (Specify) _____

2.4. Marital status

A. Married B. Single C. Separated

D. Divorced E. Widow

2.4. Ethnicity

A. Oromo B. Amhara C. Tigrae

D. Gurage E. Yeme F. Others (specify) _____

2.5. Educational Status

A. Illiterate B. Can wire and read C. Grade 1-4

D. Grade 5-8 E. Grade 9-10 F. Grade 11-12 G. College or university

3. **Questioner related to HBV infection risk factors**

Have you have or ever practiced the following?

3.1. Ear piercing A. yes B. No

3.2. Nose piercing A. yes B. No

3.3. Uvulectomy A. yes B. No

3.4. Tattooing on body A. yes B. No

3.5. Tattooing on gum A. yes B. No

3.6. Dental extraction at home A. yes B. No

3.7. Dental extraction at health facility A. yes B. No

3.8. Do you have circumcision A. yes B.No

3.9. If number 3.8 is yes, where is the place of circumcision?

A. at home

B. at health facility

C. other (specify) _____

3.9. Shaving A. yes B. No

3.10. Delivery by TBA A. yes B. No

3.11. Abortion A. yes B. No

3.12. Hospital admission A. yes B. No If yes why? _____

3.13. Surgical procedure A. yes B. No

3.14. Blood transfusion A. yes B. No

3.15. Contact with jaundiced patient A. yes B. No

3.16. Traditional body piercing for treatment A. yes B. No

3.17. Having sex more than one person A. yes B.No

3.18. Previous history of hepatitis B vaccination? A. yes B. No

3.19. Illicit drug use A. Yes B. No

Co-morbidities (CLD**,**STI, HIV, DM ,and CKD **)**

_____

Laboratory result of HBsAg

A. Positive B. Negative

Data collector: Name_____
Sign_____

Supervisor
(principalinvestigator):Name_____Sign_____

Annex II: SOP (Standard Operation Procedure)

Materials:

Cotton, Cotton balls, 70% alcohol, Tourniquet, Needle and Syringe.

Procedure:-

Assemble needle and syringe.

Apply tourniquet above elbow.

Moisten cotton with alcohol and rub cotton on the vein you have selected.

Place left thumb below proposed point of entry, press down firmly and pull skin towards you.

Point needle in direction vein and hold syringe at 15 degree angle with needle bevel up.

Push needle firmly and deliberately into vein and withdraw blood.

Release tourniquet, pick up dry cotton and gently hold it on the puncture.

Withdraw needle and press cotton on puncture.