

**ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCES
SCHOOL OF NURSING AND MIDWIFERY**

**ASSESSMENT OF KNOWLEDGE ABOUT HEPATITIS B VIRUS
INFECTION AND VACCINATION STATUS OF HEALTH CARE
WORKERS AGAINST HEPATITIS B VIRUS IN SELECTED HEALTH
INSTITUTIONS OF EAST WOLLEGA ZONE, WEST ETHIOPIA, 2018**

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**A THESIS SUBMITTED TO GRADUATE STUDIES OF ADDIS ABABA
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COLLEGE OF HEALTH SCIENCES
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STATEMENT OF DECLARATION

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ABBREVIATIONS AND ACRONYMS

AOR	Adjusted Odd Ratio
CI	Confidence Interval
COR	Crude Odd Ratio
ETB	Ethiopian Birr
HBsAg	Hepatitis B surface antigen
HBV	Hepatitis B virus
HCPs	Health care professionals
HCWs	Health care Workers
HIV	Human Immune-deficiency virus
IRB	Institutional Review Board
NGOs	Non-governmental Organizations
PI	Principal Investigator
PPS	Probability Proportional to size
SPSS	Statistical Package for social Science
SD	Standard Deviation
WHO	World Health Organization

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ABSTRACT

Background: Hepatitis B virus (HBV) infection is a serious and common infectious disease of the liver, affecting millions of people throughout the world. World Health Organization (WHO) has recommended vaccination for all health care workers (HCWs). In addition to this center for disease control and prevention and WHO guidelines recommend that all healthcare providers and trainees should be knowledgeable about Hepatitis B infection; however, previous studies reported that knowledge of hepatitis B was unsatisfactory and vaccination coverage was low among HCWS.

Objective: To assess the knowledge about HBV infection and vaccination status of health care workers in Health Institutions of East Wollega Zone, West Ethiopia.

Methods and materials: Institution based cross-sectional study was conducted on randomly selected 513 HCWs. Multi stage sampling technique was used. Self-administered questionnaire was used to collect the data. Then the data was entered into Epi-data 4.2 version and exported to Statistical Package for Social Science (SPSS) version 20 for analysis. All covariates that are significant at p value < 0.05 in bivariate analysis were considered for further multivariate logistic regression analysis to detect true predictors of vaccination status.

Result: The questionnaire was distributed to 513 HCWs and only 500(97.5%) of them returned it. Out of the total respondents 316(63.2%) were knowledgeable and 184(36.8%) were not knowledgeable. The finding of this study also revealed 299(59.8%) of the HCWs were vaccinated and 201(40.2%) of them were unvaccinated. However, only 34.2% of HCWs were fully vaccinated. Work experience, type of health institution and training on infection prevention were the factors associated with Knowledge level. On the other hand educational level, working unit, history of occupational exposure, type of health institution and vaccine unavailability were the factors associated with vaccination status of HCWs (p value < 0.05).

Conclusion and Recommendation: The finding of the present study generally shows insufficient knowledge about HBV and low rate of HBV vaccine coverage among health care workers. This shows that there is still a need to improve the knowledge and vaccination coverage of health care workers. Therefore, it is recommended that a deliberate programme of training on Hepatitis B infection and vaccine provision should be implemented for all health care workers.

Keywords: Health care workers, knowledge level, vaccination status

1. INTRODUCTION

1.1 Background

Hepatitis B virus (HBV) infection is a serious and common infectious disease of the liver, affecting millions of people throughout the world and it is transmitted by being exposed to infected blood and other body fluids such as semen and vaginal fluid (1). The common modes of transmission of this virus include mother to infant, sexual contact, unsafe injection practices and transfusions of infected blood (2). Health care workers(HCWs) are at a greater risk to acquire hepatitis B Virus with reasonably anticipated risk for exposure to blood or blood-contaminated body fluids (1). A study conducted in Kenya on susceptibility of health care workers to hepatitis B shows the annual incidence of needle stick injury was 0.97 per health care worker (3).

Hepatitis B virus is a major global health problem causing approximately 686,000 deaths worldwide annually. Sub-Saharan Africa is considered as area of high endemicity with HBsAg sero-prevalence of 8% or higher (4). According to meta-analysis findings done on prevalence of hepatitis viruses in Ethiopian population, the HBsAg prevalence among healthcare professionals in Ethiopia was 7.3–9.0% (4).

According to World Health Organization, the global burden of Hepatitis B infection due to occupational exposure accounted 2.5% (5). Many studies revealed that needle stick injury prevalence is high in Ethiopia (6) and this is one of the occupational risks that expose health care workers in Ethiopia to hepatitis B infection (7).

HBV can be effectively prevented by vaccination; because effective vaccine has been available since the 1980s and the complete vaccine series induces protective antibody levels in more than 95% of infants, children and adults. Hepatitis B vaccine has been included in the childhood immunization programme, alongside the targeted immunization programme for those individuals who are at increased risk of HBV because of their occupation, lifestyle or other factors. World Health Organization (WHO) and Centers for Disease Control and Prevention (CDC), have recommended vaccination for all HCWs who are at occupational risks of acquiring hepatitis B virus infection (8,10).

Health care workers (HCWs) have a great tendency to be exposed to blood while on the job; therefore they should be offered a full 3 doses of hepatitis B vaccine. A deep intramuscular (IM) injection into the deltoid muscle is recommended for adult hepatitis B vaccination (9).

Center for disease control and prevention and WHO guidelines recommends that all healthcare providers and trainees should be knowledgeable about Hepatitis B infection. According to these guidelines they should receive comprehensive training concerning blood borne pathogens to adhere to the principles of Standard Precautions, including hand washing, the use of personal protective barriers, and proper disposal of sharp materials. Healthcare care workers should also follow the current guidelines for disinfection and sterilization medical instruments used in patient care (8, 10).

The Ethiopian Federal Ministry of Health (FMOH) infection-prevention guidelines also recommend that all health care workers should get vaccinated against hepatitis B virus prior to clinical attachments at their school. However the WHO estimate showed that HBV vaccination coverage among HCWs is only 18–39% in developing countries compared to 67–79% in developed countries (11). Therefore this study assessed HBV infection knowledge, vaccination status and their associated factors among health care workers in East Wollega zone health institutions.

1.2 Statement of the problem

Though there is a vaccine against Hepatitis B virus available since 1982, the global prevalence of HBV infection in the general population in 2015 was 3.5% (12). Prevalence was the highest in the African (6.1%) and Western Pacific regions (6.2%) and this puts health care professionals at a risk of acquiring hepatitis B infection; because they serve the whole population (12). A study conducted in the United States shows that the prevalence of HBV infection in HCWs was 10 times higher than the general population (13).

The World Health Organization (WHO) also estimated that 6200 HBV infections occur each year among sub-Saharan African HCWs (11). The prevalence of HBV among HCWs of Ethiopia is also high according to meta-analysis findings done on prevalence of hepatitis viruses, which revealed the HBsAg prevalence among healthcare professionals in Ethiopia 7.3–9.0% (4). Due to this hepatitis B infection is an important public health problem in Ethiopia, with healthcare workers at increased risk of acquiring hepatitis B infection because of job related exposure. These workers are often in direct contact with infectious material, especially HBV-infected blood or, via a needle stick injury, with HBV-contaminated body fluids (12,13).

According to center for disease control and prevention and WHO guidelines all healthcare providers and trainees should be knowledgeable about Hepatitis B infection and also recommends vaccine for all health care workers (8, 10). However few studies conducted in Ethiopia revealed significant number of health care workers were not knowledgeable about hepatitis B infection and low coverage of hepatitis B virus vaccine. Several studies conducted in different areas of the world shows, factors affecting the knowledge and vaccination status of health care workers were age, sex, work experience, type of health institutions, training on standard precaution, and profession of the health care workers. Some factors related to knowledge (type of health institution and training on standard precaution) and vaccination status of health care workers (history of occupational exposure and working unit) were not included in the previous studies in Ethiopia. In addition to this no studies conducted among HCWs in private and governmental health institutions at a zonal level in Ethiopia. Therefore this study assessed the knowledge about HBV infection, vaccination status against hepatitis B infection and their associated factors among HCWs working in health institutions of Eastern Wollega zone, west Ethiopia.

1.4. Justification

Hepatitis B infection is highly contagious and is affecting health care professionals of Ethiopia. Studies also reveal that the prevalence of hepatitis B infection is high in HCWs of Ethiopia. An effective vaccine that can prevent HBV is available. But in developing world the coverage of this vaccine is low. There is a fact that all health care professionals should have a good knowledge of hepatitis B virus infection, however studies conducted in Ethiopia reported many number of HCWs had poor knowledge. There is only one published study done in Ethiopia about factors associated with knowledge of hepatitis B virus infection. None of the previous published studies conducted in Ethiopia investigated this topic among HCWs in both private and governmental health institutions at a Zonal level and the sample size is relatively larger than the previous studies. Therefore this study assessed the knowledge about HBV infection, vaccination status against hepatitis B infection and their associated factors among HCWs working in health institutions of Eastern Wollega zone, west Ethiopia.

1.4 Significance of the study

World Health Organization has recommended HB vaccine for all health care workers since they have occupational exposure to this infection; but the rate of incidence of HB infection is still increasing. Therefore it is very crucial to know the level of knowledge of health care workers in health institutions of east Wollega zone about hepatitis B virus infection, their vaccination status and associated factors, because the result could assist the ministry of health, policy makers and health institution managers to develop strategies to raise the knowledge of HBV infection, improve vaccination coverage and also to tackle the factors that negatively affects the knowledge and vaccination status of health care workers.

The result of this study will also help researchers as a baseline evidence for further studies.

2. LITERATURE REVIEW

2.1 Knowledge of hepatitis B virus infection

A cross sectional study conducted in medical interns of rural medical college in India 83.3% of them had a good knowledge regarding hepatitis B infection (14). In contrast to this in a study conducted in Brazil on assessment of hepatitis B knowledge of health care workers about half 133 (49.6%) of HCWs had low knowledge level of Hepatitis B virus infection (15).

Another cross sectional study conducted on knowledge of hepatitis B virus infection in different parts of Nigeria among health care workers also shows that majority of the HCWs were knowledgeable about hepatitis B virus infection; in study conducted among health care workers in a tertiary hospitals in Nigeria 367 (96%) out of 410 total respondents were knowledgeable about hepatitis B virus infection (16). Similar study conducted in health care workers in Jos, North Central Nigeria shows majority of the participants have a good knowledge about HB infection, but majority of them had poor knowledge of hepatitis B vaccine. In this study out of the total 288 respondents, Two hundred and forty nine respondents (86.5%) had good knowledge of HB infection and only 12 (5.2%) of the respondents had good knowledge of hepatitis B vaccination (17).

In a cross sectional study conducted to assess the knowledge of Hepatitis B vaccine (HBV) among health care workers in Bahirdar city administration, from a total of 374 respondents 62% of them were knowledgeable about hepatitis B infection (18). In another cross sectional study conducted on assessment of HBV knowledge among health care workers in Gondar University hospital relatively higher (73.1%) number of health care workers have good knowledge of HBV infection (19).

2.2 Hepatitis B Vaccination status of health care workers

The World Health Organization has estimated that the average HBV vaccination rate among HCWs ranges from 18 to 39% in developing countries to 67–79% in developed countries (10). A cross sectional study conducted to assess Hepatitis B vaccine coverage and factors relating to its acceptance among health care workers of a tertiary care center in North India; shows that a few number of health care workers were fully vaccinated; from a total of 600 health care workers participated in the study only 38.8% of them were fully vaccinated, 21.4% received less than three doses and 40% of them were unvaccinated. The major (31.1%) reason for not vaccinated were unavailability of the vaccine in health institutions(20).

Another cross sectional study conducted on prevalence of Hepatitis B virus infection in health care workers of a tertiary care center in India and their vaccination status shows that out of a total 446 HCWs participated in the study 252(56.5%) were received vaccine; but only 224(50.2%) of them were fully vaccinated, 186(41.7%) were never received the vaccine and the remaining 8(1.8%) didn't know their status (21).

In a cross sectional study conducted on the Prevalence of HBV and HBV vaccination coverage in health care workers of tertiary hospitals of Peshawar, Pakistan; shows that more than half of the HCWs were fully vaccinated; a total of 824 health care workers participated in the study; and only 605(73.42%) completed all the three doses of the hepatitis B vaccine. In this study 85% of doctors had completed the full dose, 15% of them not completed and 65.4% of nurses had completed the three doses, 34.6% of nurses had not completed the three doses of hepatitis B vaccine. One of the reason for not vaccinated was 21.7% of respondents of a study never thought about it(19). The same study conducted in Burkina Faso shows Hepatitis B vaccination coverage among health care workers is low (i.e., only 47.7 % of 452 HCWs had received at least one dose of HBV vaccine and 10.9 % of them were fully vaccinated (20).

In a cross sectional study conducted to assess Hepatitis B vaccination status among health care workers in a tertiary hospital in Ethiopia, a total of 186 health care workers participated in the study; out of these 51% of them had never vaccinated for hepatitis B vaccine. Only 28.7% of them had completed the full dose of the vaccine and 20.3% of them had received less than three doses (21). Another study conducted in HCWs of Shashemene town, shows very few number of health care workers were vaccinated; from a total of 410 respondents only 53(12.9%) of them

had completed the full regimen of the vaccine, 13(3.2%) of them had received less than three doses and the remaining 344(83.9%) had never received the vaccine. The reasons for not taking the vaccine by the respondents were, 165 (48%) because the vaccine was not found in nearby institution and 95 (27.6%) not delivered in the institution, 45 (13.1%) gave the reason ‘never thought about it’ and only 1 (0.3%) of the respondents gave the reason ‘it was not important’ (22).

Similarly, a study conducted on Hepatitis B vaccine knowledge and vaccination status among health care workers of Bahr Dar city administration shows that only few number of Health care workers were vaccinated, a total of 370 respondents were participated in the study; out of these only 20(5.4%) of them completed the three doses of hepatitis B vaccine, 17(4.6%) of the HCWs received less than three doses and majority 333(90%) of them had never received hepatitis B vaccine (18).

2.3 Factors affecting Knowledge of HBV Infection

A study conducted in Healthcare Workers in Jos, North Central Nigeria revealed 249 (86.5) of the respondents had good knowledge of HBV which was found to increase with increasing year experience ($p=0.000$)(23). Another study conducted in health care workers of white Nile state hospitals in Sudan shows the level education of health workers was significantly associated with the knowledge about HBV Infection($p=0.001$) (24).

In a study conducted in University of Gondar Hospital regarding Knowledge and attitude of health care professionals about hepatitis B virus infection only the type of profession has significant association with knowledge of respondents on HBV infection. Medical doctors have 8.4 times knowledgeable about HBV than other professionals with adjusted odds ratio =8.399, CI =1.536–45.936 (25).

2.4 Factors affecting vaccination status of health care workers

A study conducted on Hepatitis B vaccination status and associated factors among health care workers in Burkina Faso shows that less than half of the participants received at least one dose of the vaccine. Among the 452 total respondents, the full immunization coverage against HBV was estimated at 10.9 %. Factors associated with vaccination status were age, occupation, and seniority in the profession (20). A study conducted in India identified three factors having statistically significant association with vaccination status of HCWs; these factors were History of accidental exposure to blood or blood products, acceptable knowledge about HBV infection, and perceived susceptibility to infection, these factors increases the odds of vaccination by 5.2, 4.7 and 3.6 fold respectively (26).

According to a study conducted on low coverage of hepatitis B vaccine and determinants among health professionals working in Amhara regional state hospitals, the prevalence of hepatitis B vaccine coverage was 4%. In contrast to the cross sectional study conducted in Burkina Faso and Indian health care workers hepatitis B vaccination was not associated with profession, marital status, age, and needle stick injury. Other factors that significantly associated with hepatitis B vaccination was Work load, negligence, cost of the vaccine and unavailability of the vaccine and they decreased the odds of vaccination by 81%, 96%, 88% and 75% respectively. The factors that increased the probability of vaccination was Universal precaution training, awareness of HBV and increased years of experience which increased the probability of vaccination by 14.75 fold, 4.55 fold and 7.27 fold respectively (27).

Similarly in a cross sectional study conducted on Hepatitis B virus vaccination status and associated factors among health care workers in Shashemene town sex, work experience and type of institution were significantly associated with vaccination status; female respondents were about four times as likely to be fully vaccinated as compared to the male HCWs. Those who had a work experience 5–9 years were about six times more likely, and those who had ≥ 10 years were twelve times more likely to be fully vaccinated than those who had a work experience of < 5 years. Those who work at governmental health care institutions are two times more likely to be fully vaccinated than that of respondents from non-governmental health care institutions (22).

Other similar study conducted in Ethiopia also shows that type of profession, level of education, age, and marital status were significantly associated with vaccination status. Doctors, pharmacists, first degree holders, master degree holders, and unmarried health professionals were vaccinated than the other groups (21).

Generally the findings from the review of literature show that the knowledge level of health care workers regarding hepatitis B infection varies with in a country and also from country to country. According to the review knowledge of hepatitis B infection among health care workers in Brazil, north central Nigeria, tertiary hospital in Nigeria, Bahirdar city administration and University of Gondar hospital revealed that the knowledge level of HCWs regarding hepatitis B infection were 49.6%, 86.5%, 96%, 62%, and 73.3% respectively, which ranges from 49.6% to 96%. Level education, work experience and profession were reported to be significantly associated with knowledge of health care workers about HBV infection.

According to this review vaccination coverage rates also vary in different areas of the world. It ranges from 5.4% to 73.42% according to the cross sectional studies conducted among health care workers tertiary care center in North India, India, Pakistan, Burkina Faso, Bahir Dar city administration, Shashemene town and tertiary hospitals in Ethiopia which shows 38.8%, 50.2%, 73.42%, 10.9%, 5.4%, 12.9% and 28.7% respectively. Age, occupation, work experience, type of health institution, knowledge, history of occupational exposure, work load, cost of vaccine, unavailability of vaccine, marital status and training on standard precaution were reported to be factors associated with vaccination status of health care workers.

In Ethiopia few studies conducted on knowledge of HBV infection and there is only one published study that investigated determinants of knowledge of hepatitis B infection among health care workers. In addition to this some factors that affect knowledge (type of health institution and training on standard precaution) and vaccination status of health care workers (history of occupational exposure and working unit) were not included in the previous studies in Ethiopia. Therefore this study assessed HBV infection knowledge, vaccination status and their associated factors among health care workers in East Wollega zone health institutions.

1.4 Conceptual Framework

The conceptual framework is developed by the principal investigator after thorough review of literature. Factors affecting the knowledge and vaccination status of health care workers are shown in the figure below.

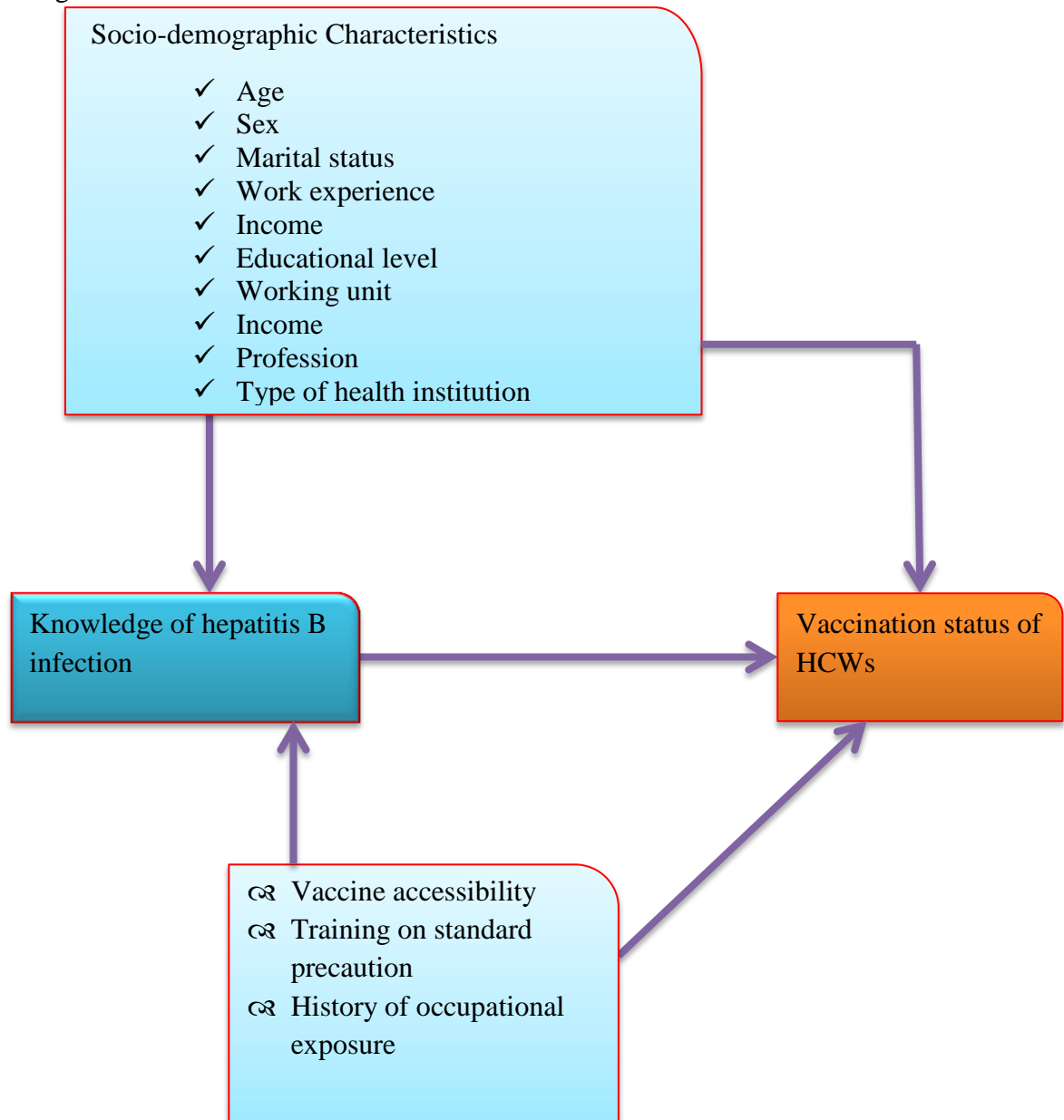


Figure 1: Conceptual frame work developed by the principal investigator after review of literature about factors affecting knowledge of HBV infection and vaccination status among health care workers, 2018

3. OBJECTIVE

3.1 General objective

To assess the knowledge about HB infection, vaccination status, and their associated factors among health care workers of East Wollega zone, west Ethiopia, 2018

3.2 Specific objectives

- * To assess the knowledge of HB among health care workers in health institutions of East Wollega Zone.
- * To determine the vaccination status of health care workers in health institutions of East Wollega Zone.
- * To identify factors affecting the knowledge of HBV among HCWs in health institutions of East Wollega Zone
- * To identify factors affecting health care workers' vaccination status in health institutions of East Wollega Zone.

4. METHODS AND MATERIALS

4.1 study area and period

The study was conducted in East Wollega Zone Health institutions from March to April 2018. East Wollega is one of the zones in the central Oromia Region of Ethiopia. Nekemte is serving as the capital city of the zone and it is located 328 KM to west of Addis Ababa. East Wollega is bounded on the southwest by Illubabor, on the west by the Didessa river which separates it from West Wollega, on the northwest and north by the Benishangul-Gumuz Region, on the northeast by Horo Guduru Wollega Zone, on the east by West Shewa, and on the southeast by the Gibe river which separates it from Jimma. According to population projection conducted by the Central Statistical Agency (CSA), in 2017 this Zone has a total population of 1,598,809, of whom 795,618 are men and 803,191 women; with an area of 12,579.77 square kilometers(28). The zone has a total of 60 health centers, 5 hospitals and 65 private clinics. In public health institutions there are 1662 health care workers and in private clinics there are 550 health care workers.

4.2 study design

Institution based cross sectional study was conducted from March to April, 2018

4.3 Population

4.3.1 Source population

All health care workers who were working in East Wollega zone health institutions.

4.3.2 Study population

All HCWs having direct contact with patients, in randomly selected health institutions in East Wollega zone.

4.3.3 Sample population

All randomly selected health care workers in randomly selected health institutions of East Wollega zone.

4.4 Eligibility Criteria

4.4.1 Inclusion Criteria

- ☞ Health care workers who have direct contact with patients (i.e. physicians, nurses, clinical laboratory technologists, Anesthetists and midwives) and permanent employees of the health institutions.

4.4.2 Exclusion Criteria

- ☞ Health care workers who are not available at the time of data collection due to different reasons (annual leave, sick leave, maternity leave...)

4.5 Sample size determination

The sample was determined using the formula for single population proportion by considering 62 percent proportion of knowledge level of hepatitis B vaccine among health care workers of Bahir Dar City Administration(16) since it increases the sample size, 95% level of confidence, 5% margin of error and 10% non-response rate.

$$n = \frac{(Z_{\alpha/2})^2 P (1-p)}{d^2}$$

Where:

- ✓ n = Sample size
- ✓ P = Proportion of knowledge 62%
- ✓ d = margin of error
- ✓ $Z (\alpha/2)^2$ = confidence interval and significance level

$$n = \frac{(1.96)^2 0.62(1 - 0.62)}{(0.05)^2}$$
$$= \underline{\underline{363}}$$

Since the population is less than 10,000 correction formula should be used

$$nf = \frac{n}{1+n/N} + \text{non-response rate}(10\%), \text{ where } N=2212$$

$$= \frac{363}{1+363/2212} + \text{Non-response rate (10\%), where, } N=2212$$

$$= 312 + 32$$

$$= \underline{\underline{342}}$$

Considering the design effect = 1.5, the final sample size is:

$$= 342 \times 1.5$$

$$= \underline{513}$$

4.6 Sampling technique

A multi stage sampling technique was used. The health facilities were stratified to hospitals, health centers and private clinics. After stratification of the health facilities a two stage sampling technique was used. The first stage involves the selection of the Health Facilities from each strata using Simple Random Sampling (SRS) technique. The second stage involves the selection of eligible health care workers in each strata using simple random sampling technique by applying probability proportional to size (PPS) allocation to each health facility (fig. 2). There are 5 hospitals (2 referral and 3 general), 60 health centers and 65 private clinics in East Wollega zone. From these health facilities two hospitals (one general and one referral hospital), 8 health centers and 10 private clinics (medium and higher clinics) were randomly selected (table 1). In these selected health facilities there are a total of 606 health care workers (general hospital=148, referral hospital=222, health center=140, private clinics=96). After the selection of these health facilities only eligible health care workers were randomly selected from each health facilities by using the principle of proportional allocation. Finally a total of 513 (general hospital=125, referral hospital=188, health center=119, private clinics=81) health care workers were selected (fig. 2).

Table 1 Allocation of the health care workers in health institutions of East Wollega Zone, 2018

Type of health institution		Total number of Health care workers	Samples taken
Hospitals	Nekemte referral Hospital	222	188
	Arjo Hospital	148	125
	Total	370	313
Health centers	Getema	17	15
	Cheleleki	20	17
	Sire	18	15
	Diga	17	14
	Gudetu Arjo	18	15
	Ano	16	14
	Gute	16	14
	Arjo	18	15
Total	140	119	
Private clinics	Abdi Bori	9	7
	Yomiyu Medium clinic	7	6
	Awash Internal medicine specialty clinic	19	16
	Africa Medium clinic	7	6
	Oromiya Medium clinic	7	6
	Mayo Medium clinic	8	6
	Marsimoy Medium clinic	8	7
	National medium clinic	18	15
	Naol medium clinic	6	5
	Soressa Medium clinic	8	7
Total	96	81	

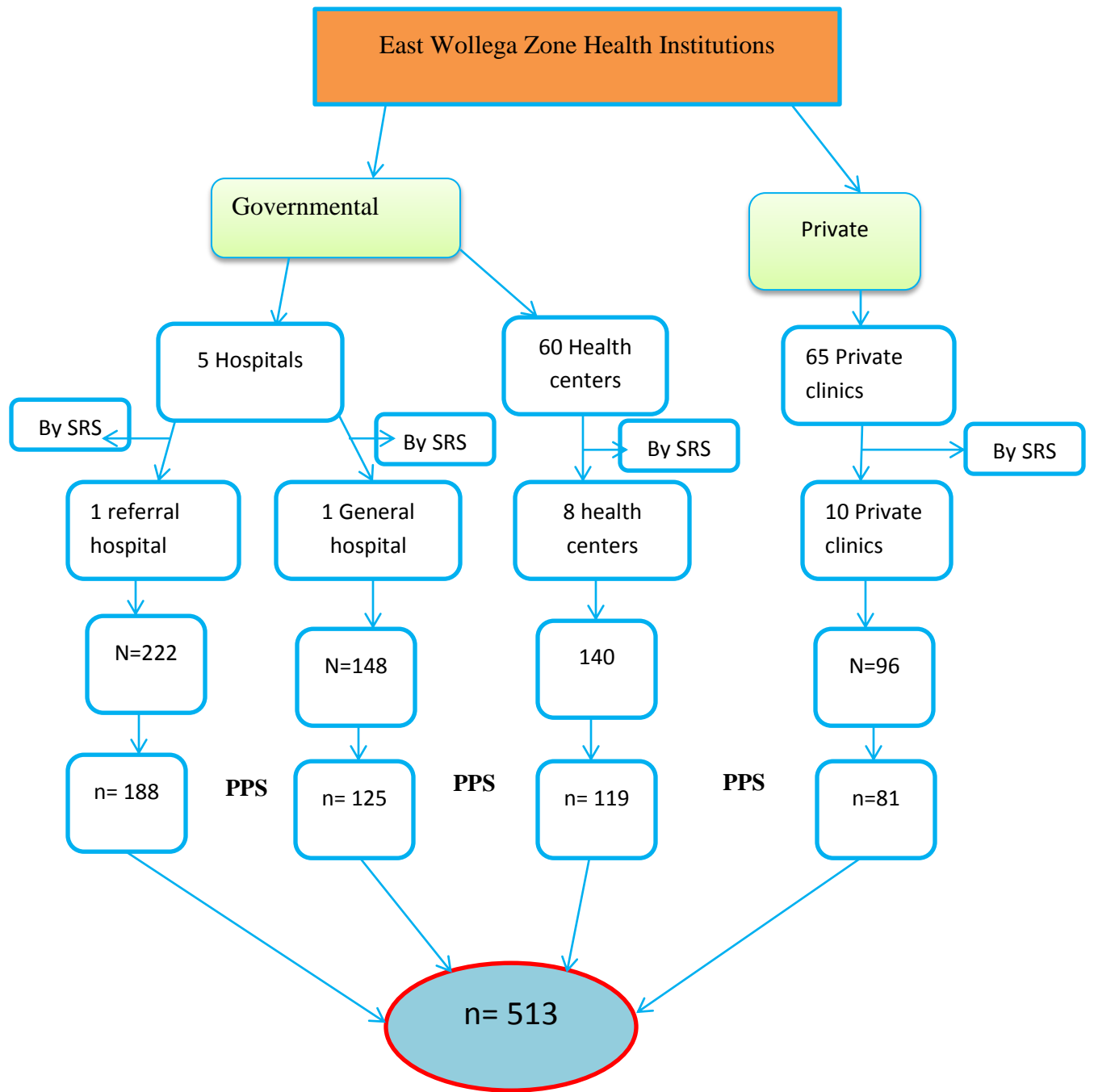


Figure 2 schematic presentation of the sampling procedure

4.7 Operational definitions

Health-care workers (HCWs):- individuals who are directly involved in patient care including doctors, midwives, nurses, health officers, anesthetists and laboratory technicians (technologists).

Knowledge level: - the knowledge level of health care workers was divided into two depending on the mean score of the knowledge questions as knowledgeable and not knowledgeable.

☞ **Knowledgeable about hepatitis B infection:** -those study participants who scored greater than or equal to the mean score of knowledge questions about HBV.

☞ **Not knowledgeable about hepatitis B infection:** - those study participants who scored less than the mean score of knowledge questions about HBV.

Vaccination status: - depending on the number of doses they received it is categorized into fully vaccinated, vaccinated, partially vaccinated and unvaccinated.

☞ **Fully vaccinated:** - Those health care workers who received a full course (3 doses) of hepatitis B vaccine

☞ **Partially vaccinated:** - Those health care workers who received only 1 or 2 doses of hepatitis B vaccine.

☞ **Unvaccinated:** - Those health care workers who didn't received any doses of hepatitis B vaccine

☞ **Vaccinated:** - Those health care workers who received any doses of hepatitis B vaccine.

4.8 Variables

4.8.1. Independent variables

- ✓ Age
- ✓ Sex
- ✓ Marital status
- ✓ Religion
- ✓ Educational status
- ✓ Income
- ✓ Current working unit
- ✓ Profession of the participants
- ✓ Work experience
- ✓ Accessibility of HB vaccine

- ✓ Training on standard precaution
- ✓ History of occupational exposure
- ✓ Knowledge HBV

4.8.1. Dependent variables

- ✓ Knowledge of HBV infection
- ✓ Vaccination status

4.9. Data Collection Methods

4.9.1. Data Collection Instruments

The data collection instrument was a structured pretested self-administered questionnaire. The questions were adapted from other prior similar study conducted in Ethiopia(22) and it was prepared in English language. It contains three parts: socio-demographic characteristics, knowledge of Hepatitis B infection and factors related to knowledge of hepatitis B infection and vaccination status. The questionnaire comprised a total of 42 questions. The first part is questions regarding socio-demographic characteristics of the participants, the second part is about knowledge of Hepatitis B infection which contains three sub-categories (ten questions is knowledge about transmission, seven questions about natural history and diagnosis and 4 questions about prevention of HBV) and the part is 11 questions about factors related to knowledge of hepatitis B infection and vaccination status.

4.9.2. Data Collectors and Data Collection Procedure

The data was collected by a total of ten data collectors who have a minimum of diploma in nursing. Two supervisors with BSc in Public Health or nursing were selected from the health facilities. Data collectors and supervisors were trained for 1 day by principal investigator with the objectives of standardizing the data collection instrument.

The responsibility of the supervisors was to check whether the questionnaires are correctly filled out during data collection period. Supervisors collected the translated and completed questionnaire and through research assistants handover it to the principal investigator on the day data collection are conducted. Each questionnaire filled was

checked for completeness of the information's by the principal investigator and was analyzed subsequently.

4.10 Data Quality Control

Data collectors and supervisors were provided with intensive training on the objective of the study, contents of the questionnaires and how to maintain confidentiality and privacy of the study subject. Pre-test was conducted on 26 health care workers in Wollega University referral Hospital before the actual data collection begins and necessary correction was made on the questionnaires.

The collection of data was checked by principal investigator on daily basis for any incompleteness and /or inconsistency. Each questionnaire is identified by the ID given for it.

4.11. Data Processing and Analysis

All the data was checked for completeness and internal consistency by cross checking and then coded and double entered into Epi Data version 4.2 computer software packages and cleaned for inconsistency. For further analysis the data was exported to Statistical Package for Social Science (SPSS) version 21 software. The descriptive analysis of data was indicated using numerical summary measures and the data was presented using frequency tables, figures and graphs. Bivariate and Multivariate logistic regression was used to show association between dependent and independent variables. All covariates that was significant at p value < 0.05 in bivariate analysis was considered for further multivariate analysis guided by conceptual framework to control all possible confounders and to detect true predictors of vaccination status. Finally, those variables that showed $p < 0.05$ in multivariate analysis will be taken as important predictors of the vaccination status of health care workers. To measure the strength of association between dependent and independent variables, Crude Odd Ratio (COR) and Adjusted Odd Ratio (AOR) with 95% Confidence interval (CI) was calculated.

Finally, the variable which shows statistical significance (p-value < 0.05 cut point) in multivariate analysis was considered as important variables. Bar graph and pie chart was used for diagrammatic summarization of categorical variables and tables were used for summarization of variables.

4.12. Ethical Considerations

To conduct the study, an ethical clearance and supporting letter was obtained from Addis Ababa University College of health Sciences, School of Nursing and Midwifery Institutional Review Board (IRB). Official letter was written to East Wollega zonal Health Department and the data collection was started after permission and cooperation letter was written to all health facilities on which the study was carried out.

The study title, purpose, procedure and duration, possible risks and benefits of the study were clearly explained for the participants. Then, individual informed written consent was taken from the respondents and was assured of confidentiality by excluding their name during the period of data collection. They were informed well that they have full right to totally refuse to participate and/or withdraw from the study at any time of they have any difficulty.

4.14. Dissemination of Results

Finding of this study will be presented in open defence and submitted to Addis Ababa University, East Wollega Zonal Health department and NGOs working on study focus area. Effort will also be made to publish in peer reviewed journals and will be presented in different national and international conferences and seminars.

5. RESULTS

5.1 Socio-demographic characteristics

The questionnaire was distributed to all 513 HCWs, but 13 of them not returned the questionnaire making the response rate of 97.5%. From these participants 305(57.8%) were Males and the remaining were females. Majority of the health care workers were in the age group of 18-29 and the mean age of the health care workers was 31 years with a standard deviation of 6.7 and range of 35. More than half of the health care professionals 296(59.2%) were married and more than two-third 329(65.8%) of the health care professionals were protestant religion followers.

Most of them 354(70.8%) were first degree holders and majority 169 (33.8%) and 139(27.8%) of the HCPs had monthly income of 3000-5000 and 5000-7000 respectively. Most 230(46%) of the health care professionals were nurses (fig. 3) and majority 304(60.8%) of the HCWs were working in Hospitals. The average year of experience was 7.2 with SD of 6.2 and range of 35. Three-fourth 375(75%) of the HCWs had less than 10 years of work experience and 183(36.6%) of the HCWs were working in outpatient department (table 2).

Table 2 Socio-demographic characteristics of health care workers in health institutions of East Wollega Zone, 2018(n=500)

Socio-demographic characteristics		Frequency	Percentage (%)
Sex	Male	305	61
	Female	195	39
	Total	500	100
Age	18-29 years	289	57.8
	30-39 years	162	32.4
	>40 years	49	9.8
	Total	500	100
Marital status	single	200	40
	married	296	59.2
	divorced	0	0
	Widowed	4	0.8
	total	500	100
Religion	Orthodox	133	36.6
	Muslim	24	4.8
	Protestant	329	65.8
	Catholic	4	0.8
	Others	10	2
	Total	500	100
Educational status	Diploma	112	22.4
	Degree	354	70.8
	Master degree	22	4.4
	Specialist	12	2.4
	Total	500	100
Monthly Income	<3000	66	13.2
	3000 – 5000	169	33.8
	5000 – 7000	139	27.8
	>7000	126	25.2
	Total	500	100
Work experience	0-4 years	179	35.8
	5-9 years	196	39.2
	≥10 years	125	25
	Total	500	100
Type of health institution	Hospital	304	60.8
	Health center	118	23.6
	Private	78	15.6
	Total	500	100
current working unit	Inpatient	99	19.8
	Outpatient	183	36.6
	Laboratory	87	17.4
	Delivery	51	10.2
	Injection room	34	6.8
	Others	46	9.2
	Total	500	100

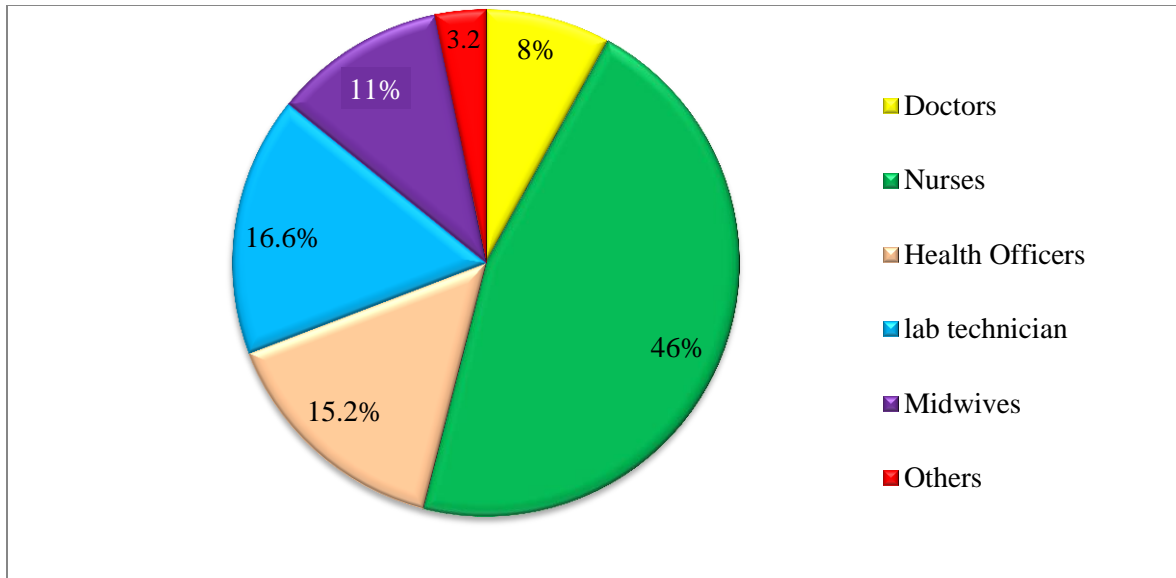


Figure 3 Profession of health care workers in East Wollega zone health institutions, 2018

5.2 Knowledge of health care workers about hepatitis B infection

5.2.1. Knowledge about transmission of HBV

Out of the total respondents about half 257(51.4%) of them said HBV can't be transmitted by touching a person with HBV, Similarly majority 478(95.6%) said sharing injecting needles with infected individuals can transmit HBV (table 3).

5.2.2. Knowledge about Natural history and Diagnosis

A total of 500 HCWs responded to the questions. Out of these respondents majority 398(79.6%) of them said HBV can cause liver cancer. More than half of the respondents answered correctly all the questions related to the natural history and diagnosis of Hepatitis B virus infection (table 3).

5.2.3. Knowledge about prevention of HBV

Out of the respondents majority 470(94%) of them know that there is an effective vaccine that can prevent hepatitis B virus infection (table 5). Two hundred twenty two (44.4%) of the respondents said hand washing couldn't reduce the transmission of HBV infection (table 3)

Table 3 Knowledge of health care workers in health institutions of East Wollega Zone march, 2018 (n=500)

Variables	Correct answer N (%)	Incorrect answer N (%)
Hepatitis B virus can be transmitted		
By touching a person with hepatitis B	257(51.4)	243(48.6)
By kissing a person with hepatitis B	394(78.8)	106(21.2)
By eating food prepared by a person with hepatitis B	403(80.6)	97(19.4)
By sharing eating utensils	391(78.2)	109(21.8)
Through air when coughing or sneezing	191(26.2)	369(73.8)
By sharing foods	421(84.2)	79(15.8)
By sharing toothbrushes	443(88.6)	57(11.4)
By sharing injecting needles	478(95.6)	22(4.4)
By having unprotected sex with a person with hepatitis B	465(93)	35(7)
From mother to child at birth	450(90)	50(10)
Natural history and diagnosis		
Hepatitis B can cause liver cancer	398(79.6)	102(20.4)
Hepatitis B can cause death	455(91)	45(9)
Most people infected with Hepatitis B have no symptoms	403(80.6)	97(19.4)
People with hepatitis B can be infected for life	418(83.6)	82(16.4)
There is an effective medicine to cure hepatitis B disease	376(75.2)	124(24.8)
There is an effective treatment for hepatitis B disease	340(68)	160(32)
People with Hepatitis B do not need regular check up	443(88.6)	57(11.4)
Regarding prevention		
There is a vaccination to prevent hepatitis B virus	470(94)	30(6)
Hand washing can reduce transmission of hepatitis B virus	278(55.6)	222(44.4)
People with hepatitis B should use condom when having sex	458(91.6)	42(8.4)
People hepatitis B should tell their family members to get tested	466(93.2)	34(6.8)

5.3 Knowledge level of health care workers about hepatitis B virus infection

A total of 500 HCWs responded to the questions. There were 21 items concerning knowledge of hepatitis B virus infection. The correct answer to each item was scored as 1 and the incorrect answer were scored as 0. The range of score by the respondents was 6-20 and the mean was 15.9(75.7%) with a standard deviation of 2.3. The health care workers those scored above the mean (above 75.7% of the knowledge questions) were considered as knowledgeable and those scored below the mean (15.9) were considered as not knowledgeable. Out of the total respondents 316(63.2%) were knowledgeable and 184(36.8%) were not knowledgeable (as shown in Fig. 3)

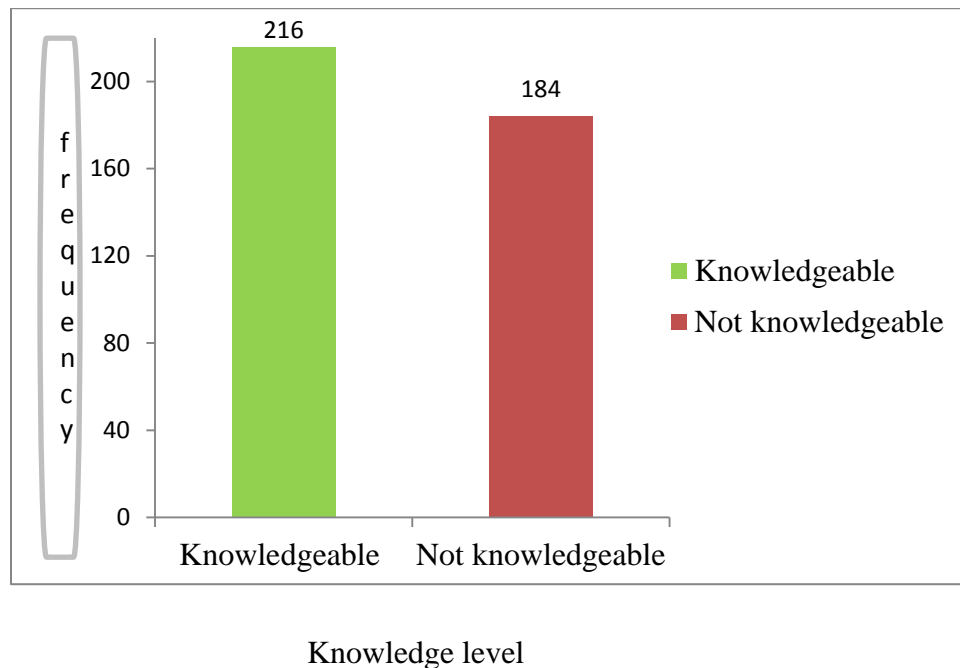


Figure 4: Knowledge level of health care workers in health institutions of East Wollega Zone march, 2018 (n=500)

5.4 History of occupational exposure to conditions that predispose HCWs to HBV infection

More than half 271(54.2%) of the health care workers responded to the questions had history of exposure to blood or body fluids on their intact skin and a significant number 94(18.8%) of health care professionals had history of exposure to blood or body fluids on unprotected skin (table 4).

Table 4 History of occupational exposure to conditions that predispose health care workers of East Wollega zone health institutions to HBV infection march, 2018(n=500)

Questions	Responses	
	Yes N (%)	No N (%)
Have you ever had history of exposure to blood or body fluids on intact skin?	271(54.2)	229(45.8)
Have you ever had history of splash of blood or body fluids to eye or mouth in the past 12 months?	97(19.4)	403(80.6)
Have you ever had history of exposure to blood or body fluids on unprotected skin?	94(18.8)	406(81.2)
Have you ever had history of exposure to needle stick injury?	180(36)	320(64)

5.5 Training on infection prevention

Out of the respondents only 193(28.6%) of them received training on infection prevention, among these only 86(17.2%) received more than once and the majority (307(61.4%)) never received training on infection prevention (as shown in table 5).

Table 5 History of training on infection prevention of health care workers of East Wollega zone health institutions to HBV infection march, 2018(n=500)

Variables	Frequency (%)
Ever received training on infection prevention	107(21.4)
Never received training on infection prevention	307(61.4)
Received more than once on infection prevention	86(17.2)
Total	500(100)

5.6 Vaccination status of health care workers

Out of 500 respondents 299(59.8%) of them were vaccinated and 201(40.2%) of them were unvaccinated. Only 34.2% of them were fully vaccinated and 25.6% were partially vaccinated (as shown in Fig. 4).

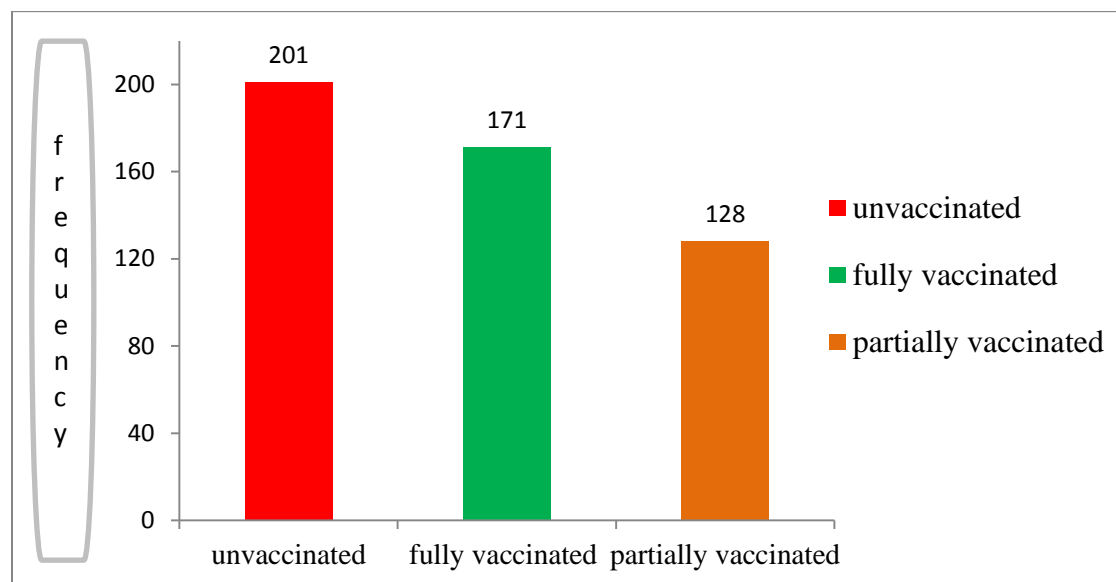


Figure 5 vaccination status of health care workers of East Wollega zone health institutions to HBV infection march, 2018(n=500)

5.7 Reason for not vaccinated against Hepatitis B virus of the HCWs

The reason for not being vaccinated among those 201 HCWs not vaccinated against Hepatitis B Virus were the vaccine not delivered in the institution(32.8%), never thought about it(27.9%), not delivered in nearby health institution (18.9%) and 13.4% of them didn't think was important(as shown in the fig. 5).

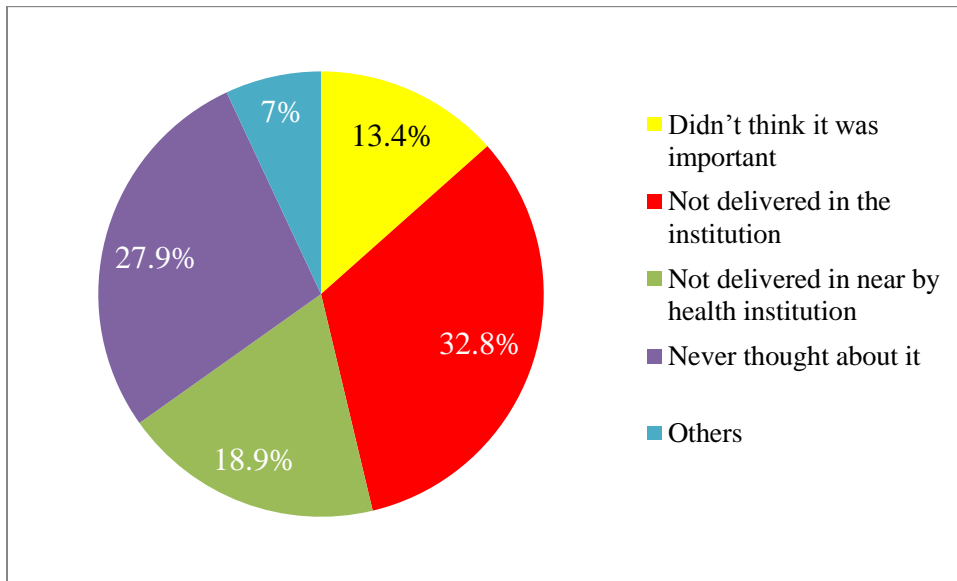


Figure 6:Reason for not vaccinated against Hepatitis B virus among health care workers of East Wollega zone health institutions to HBV infection march, 2018(n=500)

5.8 Factors associated with Knowledge of health care workers

In bivariate analysis the factors like age, work experience, educational level, profession, type of health institution and training on standard precaution were associated with knowledge of HCWs regarding Hepatitis B infection. To control for possible confounders further multivariate analysis was done and only three factors (work experience, training on standard precaution and type of health institution) were identified as having statistically significant association (p value < 0.05, 95% CI) with knowledge level of health care workers.

The finding of this study shows knowledge level of HCWs increases with a corresponding increase in their year of experience. The work experience of ≥ 10 increases the odds of the knowledge about hepatitis B infection by 3.8 fold as compared to those who had <5 years of experience with AOR=3.8(CI=1.8-7.9). The knowledge level of health care workers in governmental health institution was higher than those in private health institutions; being in governmental health institution increases the odds of the knowledge about hepatitis B infection by 2.1 fold with AOR=2.4(CI=1.4-4.0) and Training on standard precaution also increases the odds of knowledge level of health care workers by 2.1 fold with AOR=2.1(CI=1.4-3.2)(table 6).

Table 6 Factors affecting Knowledge of health care workers in health institutions of East Wollega Zone march, 2018 (n=500)

Covariates	Category	Knowledge level		COR(CI)	AOR(CI)
		Knowledg eable	Not knowledgeable		
Work experience	<5 years	95(53.1)	84(46.9)	1	1
	5-9 years	126(64.3)	70(35.7)	1.6(1.05-2.4)*	
	≥ 10 years	95(76)	30(24)	2.8(1.6-4.6)***	3.8(1.8-7.9)***
Type of health institution	Governmental	280(66.4)	142(33.6)	2.3(1.4-3.75)***	2.4(1.4-4.0)***
	Private	36(46.2)	42(53.8)	1	1
Training on standard precaution	Yes	144(74.6)	49(25.4)	2.3(1.55-3.42)***	2.1(1.4-3.2)**
	No	172(56)	135(44)	1	1

AOR= Adjusted Odd Ratio; CI= Confidence Interval, COR= Crude Odd Ratio; *= p-value <0.05, **= p-value <0.025, ***= p-value <0.001

5.9 Factors associated with vaccination status of Health care workers

In bivariate analysis the covariates: Age, educational level, type of health institution, current working unit, vaccine availability, training on standard precaution and history of occupational exposure were associated with vaccination status of the HCWs. Multivariate logistic regression were done to control for confounders and finally only six variables were significantly associated with vaccination status of the health care workers. These variables were type of health institution, vaccine availability, working unit, standard precaution training, history of occupational exposure and educational level.

Educational level is significantly associated with vaccination status of HCWs with (p value < 0.05, 95% CI). Being a degree holder increases the odds vaccination of health care workers by 2.9 fold with [AOR =2.9(CI=1.5-5.4)] and regarding working unit, being in an outpatient unit reduces the odds of vaccination by 66% with [AOR=0.44(0.22-0.86)].

HCWs working in health institution in which the vaccine was available were about 5 times more vaccinated than those working in health institution in which the vaccine was not available with AOR of 5.3(95% CI 3.2-8.7). Being in governmental health institutions increases the odds of vaccination rates by 10.7 fold with an AOR of 10.7 (95% CI 5-23), training on standard precaution increases the odds of vaccination rate of health care workers by 2.1 fold with an AOR of 2.1(95% CI 1.2-3.6) and history of occupational exposure to Blood or other body fluids increases the odds of vaccination rates of HCWs by 2.1 fold with 2.1(95% CI 1.2-3.6) (table 7).

Table 7 Factors associated with vaccination status of health care workers of East Wollega zone health institutions march, 2018(n=500)

Covariates	Category	Vaccinated		COR(CI)	AOR(CI)
		Yes	No		
Educational level	Diploma	36(32.1)	76(67.9)	1	1
	Degree	245(69.2)	109(30.8)	4.7(3-7.4)***	2.9(1.5-5.4)**
	Master degree	12(54.5)	10(45.5)	2.5(1.01-6.4)*	
	Specialist	6(50)	6(50)	2.1(0.64-7)	
Type of health institution	Hospital	289(68.5)	133(31.5)	14.7(7.3-29)***	10.7(5-23)***
	Private	10(12.8)	68(87.2)	1	1
Current working unit	Outpatient	97(53)	86(57)	1.01(0.64-1.58)	0.44(0.22-0.86)*
	Inpatient	74(74.7)	25(25.3)	2.6(1.5-4.6)**	
	Lab	59(67.8)	28(32.2)	1.8(1.07-3.3)*	
	Others	69(52.7)	62(47.3)	1	
Infection prevention training	Yes	143(74.1)	50(25.9)	2.76(1.87-4.10)***	2.1(1.2-3.6)**
	No	156(50.8)	151(49.2)	1	1
Vaccine available	Yes	201(85.2)	35(14.8)	9.73(6.28-15.06)***	5.3(3.2-8.7)***
	No	98(37.1)	166(62.9)	1	1
History of occupational exposure	Yes	183(67.5)	88(32.5)	2.02(1.4-2.9)***	2.1(1.2-3.6)***
	No	116(50.7)	113(49.3)	1	1

AOR= Adjusted Odd Ratio; CI= Confidence Interval, COR= Crude Odd Ratio; *= p-value <0.05, **= p-value <0.025, ***= p-value <0.001

6. Discussion

Despite there is an expectation that all HCWs should be knowledgeable about Hepatitis B virus infection about 184(36.8%) of the health care workers in the recent study were not knowledgeable about HBV infection and the remaining 316 (63.2%) were knowledgeable. It is higher than a study conducted in Brazil on assessment of hepatitis B knowledge of health care workers which revealed about half 133 (49.6%) of HCWs had low knowledge level of Hepatitis B virus infection (15) and very low when compared to study conducted in Nigerian tertiary hospitals among HCWs that revealed 96% of the respondents were knowledgeable about HBV infection. However, it is in line with a study conducted in HCWs of Bahr Dar city administration in which 62% of them were knowledgeable about Hepatitis B virus infection (18). These discrepancies in the level of knowledge of health care workers might be due to the difference in the provision of trainings on infection prevention among these countries. In this study three factors (work experience, type of health institution and training on standard precaution) were significantly associated with the knowledge level of HCWS about HBV infection with a (p value < 0.05, 95% CI).

The knowledge of Health care workers increases with a corresponding increase in their year of work experience. In the present study those health care workers ≥ 10 years of work experience were about 4 times more likely to be knowledgeable about HBV infection than those HCWs who had work experience of < 5 years with AOR=3.8(CI=1.8-7.9). In the same way in a study conducted in Healthcare Workers in North Central Nigeria the knowledge of health care workers about HBV infection found to increase with increasing year of experience(24). This implies that stayed in the health institutions had a more chance of getting training on infection prevention (standard precautions).

Regarding the type of health institution where the HCWs were working, being in governmental health facilities increases the knowledge of health care workers by 2.1 fold as compared to those working in private health institutions with an AOR=2.4(CI=1.4-4.0). This discrepancy might be due to the initiation of implementation of Hepatitis B vaccination program in only governmental health institutions and another reason may be HCWs in private health institutions had a little chance of getting trainings.

Another factor found to be associated with the knowledge of HCWs in this study was training on standard precaution. Training on standard precaution increases the odds of knowledge of health care workers by 2.1 fold with an AOR=2.1(CI=1.4-3.2). In contrast to this in a study conducted among HCWs in University of Gondar Training on infection prevention/standard precaution was not associated with knowledge of HBV infection(25). The difference may be because of the fact that the present study included HCWs in private health institutions and the previous study didn't include health care workers in private health institutions.

Health Care Workers have a greater risk of acquiring Hepatitis B infection, because they are prone to occupational exposure. Therefore A priority should be given to health care workers to protect them from this disease since there is an effective vaccine with 95% sero-conversion rates.

The present study revealed that 299(59.8%) of HCWs were vaccinated with one or more doses of HBV vaccine, however only 171(34.2%) of the HCWs were fully vaccinated from a total of 500 respondents. The World Health Organization has estimated that the average HBV vaccination rate among HCWs ranges from 18 to 39% in developing countries to 67–79% in developed countries (10). Therefore, the percentage of fully vaccinated HCWs in Health institutions of East Wollega Zone (34.2%) was within the range of WHO's estimation of vaccination rates of HCWs in developing countries which indicates very low coverage.

Comparison of result of the recent study with a cross sectional study conducted to assess Hepatitis B vaccine Coverage among health care workers of a tertiary care center in North India showed comparable results in which only 38.8% of the health care workers were fully vaccinated(26). However, it is very low when compared to studies conducted among HCWs in a tertiary care hospital in Pakistan and a study in India which revealed fully vaccinated rates as 606 (73.2%) and 224(50.2%) respectively(19,23). The reasons for the lower rate of vaccination among HCWs in the recent study compared with other studies might be the difference in availability of the vaccine and the difference in the focus given to the prevention of HBV infection by the government in these countries.

Another cross sectional studies conducted among HCWs of Bahr Dar City Administration, North West Ethiopia, HCWs of Shashemene Zonal town, and Health Care Workers in a Tertiary Hospital in Ethiopia have reported full vaccination rates of 5.4%, 12.9%, and 28.7% respectively (18, 21 and 22). The vaccine coverage in the recent study was found to be higher when compared to these studies. This might be due to the time the studies were conducted, because currently the vaccine is available free in some of the governmental health institutions.

The world organization recommended Hepatitis B vaccine for all health care workers; However, 201(40.2%) of the respondents in the recent study were not vaccinated. The reasons for not vaccinated were; the vaccine was not delivered in the institution (32.8%) and not found in nearby institution (18.9%), which shows 51.7% the health care workers were not vaccinated due to unavailability of vaccine. It is higher than a study conducted in India in which only 31.1% of the respondents were not vaccinated due to unavailability of vaccine, but lower than study conducted in HCWs of Shashemene Zonal town in which 75.6% of the HCWs were not vaccinated due to the same reason(22). In present study 27.9% gave the reason 'never thought about it' which was higher than 21.7% of respondents of a study in Pakistan who gave same reason; This study also revealed 24.8% of the respondents were not vaccinated because they didn't think it was important (19), which is higher than the present study. The possible reason for the differences might be the difference in the time the vaccine implementation program initiated.

In the present study educational level, working unit, unavailability of vaccine, history of occupational exposure, training on standard precaution and type of health institution were significantly associated with vaccination status of health care workers with (p value < 0.05, 95% CI).

Regarding educational level HCWs who were degree holders were more vaccinated than diploma holders with AOR=3.2(95% CI 1.6-5.3). It supports a study conducted in Nigeria which revealed HCWs with higher educational level had higher vaccination coverage(17). Similarly, a study conducted in HCWs of tertiary hospitals in Ethiopia revealed that HCWs who are degree holders had higher vaccination coverage(21);

HCWs from governmental health institutions had higher vaccination coverage rates than those from private health institutions with AOR of 10.7 (95% CI 5-23). This finding is similar with a study done in Ethiopia among HCWs of Shashemene zonal town health care workers from governmental were more likely vaccinated than those from private health institutions(22).

However it is much higher in the present study; the reason may be currently the vaccine is available free in many of governmental health institutions and unavailable in any of the private health institutions; but previously the vaccine had been given in few hospitals as campaign.

According to the finding from the present study unavailability of vaccine in health institutions reduces the odds of vaccination in HCWs by 83%. Similarly a study conducted in health care professionals working in Hospitals of Amhara Regionals state reported unavailability of vaccine reduces the odds of vaccination by 75%(27).

On the other hand Training on standard precaution increases the odds of vaccination of HCWs by 2.1 fold with AOR of 2.1(95% CI 1.2-3.6); similarly, a study conducted in health care professionals working in Hospitals of Amhara Regionals state revealed that training on standard precaution increases the odds of vaccination by 14.75 fold (27).

In this study history of occupational exposure to blood or body fluids also increases the odds of vaccination rate by 2.1 fold [(AOR=2.1(1.2-3.6)]. This result supports a study conducted in Indian health care workers which shows history of accidental exposure to blood or body fluids increases the vaccination rates of health care workers by 5.2 fold(26).

7. STRENGTH AND LIMITATION OF THE STUDY

7.1 Strength of the study

In this study a multi stage sampling technique was used this made relatively a larger sample size included in the study compared to previous studies conducted in Ethiopia because it includes all the health care workers working in both governmental and private health institutions of the Zone. In addition to this the response rate in the present study is also high.

7.2 Limitation of the study

Vaccination status was self-reported; because of this recall bias could happen and this may led to over- or underestimation of vaccination coverage. The other limitation of this study is inadequacy of literatures especially on factors affecting health care workers' knowledge of HBV infection

8. CONCLUSION

Despite there is a fact that all HCWs should be knowledgeable about HBV infection; in the present study the knowledge level of HCWs regarding hepatitis B infection were unsatisfactory because 36.8% of health care workers were not knowledgeable. The factors associated with low knowledge level of HCWs were shortage of trainings, low level education and short duration of work experiences.

On the other hand the finding of the present study generally shows low rate of HBV vaccine coverage among health care workers of East Wollega zone health institutions, since 40.2% of the HCWs never received the vaccine. The major reason for not being vaccinated were unavailability of vaccine in health institutions and Vaccination status significantly varies based on level of education, type of health institution and working unit of HCWs. Unavailability and having no training on standard precaution were also identified as the major barriers for vaccination. This shows that there is still a need to improve the vaccination coverage of health care workers in order to protect them from acquiring hepatitis B infection.

9. RECOMMENDATION

Based on the study findings, the following recommendations were forwarded for the policy makers, regional health bureau, zonal health department, for health care workers, Hospital, health center and clinic managers and researchers.

Policy makers

The vaccination status of the HCWs in private health institution is very low when compared to those in governmental health institutions; therefore the policy makers need to consider implementation of the hepatitis B virus vaccine in private health institutions. On the other hand more than half of [271(54.2%)] of the HCWs were exposed to conditions that expose them to HBV infection; so the policy makers need to expand sustainable infection control and prevention strategies.

Regional Health Bureau and Zonal Health Department

The knowledge of HCWs about HBV infection was unsatisfactory; so the regional health bureau and zonal health department needs to consider the importance of trainings so as to protect them from acquiring the infection. The vaccination rate is also low; therefore, regional health bureau need to raise the coverage by providing direction for the Zonal health department on the strategies to improve the vaccination implementation program. Since the vaccine is unavailable in most of the health care institutions they need to make the vaccine available in all health care institutions in order to improve vaccination coverage.

Hospital, health center and clinic managers

Since the vaccination rates of the HCWs varies by their working unit they need to consider the importance of regular monitoring and evaluation during the implementation of the vaccination program.

Health care workers

They need to adhere to the principles of standard precautions and immunization against Hepatitis B virus.

Researchers

It is better to investigate the vaccine coverage with laboratory confirmation of vaccination status of HCWs because only using self-administered questionnaire may lead to recall bias.

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ANNEXES

Annex I Participant information sheet and informed consent

Good morning/afternoon dear participant! My name is _____. I am working as a data collector for the study being conducted among HCWs of East wollega Zone by Milkias Dugassa, who is studying for his master's degree at Addis Ababa University, School of Nursing and Midwifery. I kindly request you to give me your attention to explain you about the study and being selected as the study participant.

The study title: Assessment of Knowledge about Hepatitis B Infection, Vaccination Status and Factors Affecting Vaccination Status of Health Care Workers in Selected Health Institutions of East Wollega Zone, West Ethiopia.

Purpose of the study: The findings of this study can be of paramount importance for the Regional health bureau and Zonal health department to plan intervention programs to improve the vaccination status of health care workers. Moreover, the aim of this study is to write a thesis as a partial fulfillment of a master's program in master of Adult health in Nursing for the principal investigator.

Procedure and duration: There are about 42 questions. Read carefully and answer your best answer on the provided space. It will take about 30 minutes, so I kindly request you to spare me this time for filling the questions.

Risks and benefits: The risk of participating in this study is very minimal, but only taking 30 minutes from your time. There would not be direct payment for participating in this study. But the findings from this research may reveal important information for the local health planners.

Confidentiality: The information you provide for us will be confidential. There will be no information that will identify you in particular. The findings of the study will be general for the study community and will not reflect anything particular of individual person. The questionnaire will be coded to exclude showing names. No reference will be made in oral or written reports that could link participants to the study.

Rights: Participation for this study is fully voluntary. You have the right to declare to participate or not in the study. If you decide to participate, you have the right to withdraw from the study at any time and this will not label you for any loss of benefits which you otherwise are entitled. You do not have to answer any question that you do not want to answer.

Contact address: If there are any questions or enquires any time about the study or the procedure, please contact through the following address:

Principal investigator: Mr. Milkias Dugassa Cell phone: +251(0)917642597.
Email:mlkysdgs@gmail.com.

Declaration of informed voluntary consent:

I have read/ was read to me the participant information sheet. I have clearly understood the purpose of the research, the procedures, the risks and benefits, issues of confidentiality, the rights of participating and the contact address for any queries. I have been given the opportunity to ask questions for things that may have been unclear. I was informed that I have the right to withdraw from the study at any time or not to answer any question that I do not want. Therefore; I declare my voluntary consent to participate in this study with my initials (signature) as indicated below.

Name of participant: _____ Signature of participant: _____.

Name of Data collector _____ Signature of Data collector_____.

Result of the interview:

1. Completed
2. Partially completed
3. The interviewee refused
4. Others-----

N.B: This is to be signed face to face in the presence of data collector and the copy is provided to the participant.

Annex II: English version questionnaire

PART ONE: SOCIO DEMOGRAPHIC INFORMATION

No	Question	Possible response	Code
101	Sex	1. Male 2. Female	
102	Age	In year -----	
103	Religion	1. Orthodox 2. Muslim 3 Protestant 4. Catholic 5. Others (specify)	
104	Marital status	1. Married 4.Widowed 2. Single 5. Separated 3. Divorced	
105	Profession	-----	
106	Work experience	-----years-----months	
107	Type of health institution	1. Hospital 2. Health Center 3. Private	
108	Monthly Income	-----ETB	
109	Current working unit	-----	
110	Educational level	-----	

PART TWO: KNOWLEDGE ABOUT HBV

2.1 Knowledge about Transmission of HBV

HBV is transmitted by the following reasons;

No	Question	Possible response	Code
201	By touching a person with hepatitis B	1. True 2. False 3. Don't know	
202	By kissing a person with hepatitis B	1. True 2. False 3. Don't know	
203	By eating food prepared by a person with hepatitis B	1. True 2. False 3. Don't know	
204	By sharing eating utensils	1. True 2. False 3. Don't know	
205	Through the air when a person with hepatitis B coughs or sneezes	1. True 2. False 3. Don't know	
206	By sharing foods	1. True 2. False 3. Don't know	
207	By sharing toothbrushes	1. True 2. False 3. Don't know	
208	By sharing injecting needles, e.g. needles used in acupuncture, tattooing, body piercing or drug use	1. True 2. False 3. Don't know	
209	By having unprotected sex with a person infected with hepatitis B	1. True 2. False 3. Don't know	
210	Through mother to child at birth	1. True 2. False 3. Don't know	

2.2 Knowledge about Natural history & Diagnosis of HBV

No	Question	Possible response	Code
211	Hepatitis B can cause liver cancer	1. True 2. False 3. Don't know	
212	HBV disease can cause death	1. True 2. False 3. Don't know	
213	Most people infected with hepatitis B have no symptoms	1. True 2. False 3. Don't know	
214	People with hepatitis B can be infected for life	1. True 2. False 3. Don't know	
215	There is an effective medicine to cure HBV disease.	1. True 2. False 3. Don't know	
216	There are effective treatments for hepatitis B virus disease.	1. True 2. False 3. Don't know	
217	Healthy people with hepatitis B do not need regular check-up	1. True 2. False 3. Don't know	

2.3 Knowledge about Prevention of HBV

No	Question	Possible response	Code
218	There is a vaccination to prevent hepatitis B	1. True 2. False 3. Don't know	
219	Washing hands before eating prevents getting hepatitis B	1. True 2. False 3. Don't know	
220	People with hepatitis B should use condoms when having sex	1. True 2. False 3. Don't know	
221	People with hepatitis B should tell their family members to get tested	1. True 2. False 3. Don't know	

PART FTHREE: VACCINATION STATUS, FACTORS ASSOCIATED WITH VACCINATION STATUS AND KNOWLEDGE OF HEPATITIS B VIRUS INFECTION

S/N	Question	Possible response	Code
222	Have you ever had history of exposure to blood or body fluids on intact skin?	1. Yes 2. No	
223	Have you ever had history of splash of blood or body fluids to eye or mouth in the past 12 months?	1. Yes 2. No	
224	Have you ever had history of splash of blood on cuts or unprotected skin?	1. Yes 2. No	
225	Have you ever had history of exposure to needle stick injury?	1.Yes 2.No	
226	Have you ever taken training on standard precaution?	1. Yes 2. No	
227	If yes to Q 225 how many times?	1.once 2.more than once	
301	Have you ever been vaccinated against HBV?	1. Yes 2. No 3. Can't remember	
If you answered 'No' to question number 301 please go directly to question number 303			
302	How many doses did you receive?	1. 1 time 2. 2 times 3. 3 times	
303	If you are not vaccinated, what was the reason?	1. Did not think it was important 2. Not delivered in the institution 3. Not found in nearby institutions 4. Never thought about it 5. Others (specify).....	
304	How do you rate the price of HBV vaccine?	1. It is affordable 2. It is expensive 3. It is very expensive 4. Don't know	
305	Is the HBV vaccine available in your institution?	1. Yes 2. No	

Thank you very much!