Knowledge, Attitude and Practice of Hepatitis B Virus and Its Vaccination Among Health Care Professionals in Selected Public Hospitals of Addis Ababa, Ethiopia

By:

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This is to certify that the thesis prepared by Gashu Afework entitled: *Knowledge, attitude and practice of hepatitis B virus and its vaccination among health care professionals in selected Public Hospitals of Addis Ababa, Ethiopia* and submitted in partial fulfillment of the requirements for the degree of Master of Science (MSc.) in Pharmacoepidemiology and Social Pharmacy complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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Abstract

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Addis Ababa University, March, 2015

Occupational exposure occurs frequently among health care workers (HCWs). The most serious occupational health hazard faced by HCWs worldwide is exposure to hepatitis B virus (HBV). Having enough Knowledge and proper attitudes toward this infection is crucial in prevention of occupational hepatitis infection. Therefore this study was conducted to assess knowledge, attitude and practice of HBV and its vaccination among health care professionals (HCPs) in selected public hospitals of Addis Ababa, Ethiopia. Both qualitative and quantitative methods were used. Qualitative study involved key informants interviews whereas quantitative method was carried out by using structured self-administered questionnaire. This study revealed that HCPs' knowledge regarding occupational exposure of HBV is found to be good as majority of our participants correctly answered most of the question pertaining to it. Relatively larger proportion, 103 (44.8%) of the respondents were found to have neutral attitude score. One hundred seventy eight (77.7%) of them had been screened for and received hepatitis B Vaccine, and one hundred sixty (94.1%) of them had received full course of the vaccine. Knowledge score was significantly associated with: education level, type of profession and area of practice; whereas profession type and history of training were the only predictors of vaccination status. In conclusion, majority of the survey participants had moderate to high knowledge score, however, larger percentage of HCPs had negative or neutral attitudes on HBV and its vaccination. In spite of this, vaccination

status was encouraging. The gaps identified in some areas of knowledge, attitude and practice of HBV call for concern among all stakeholders since HCPs have a high risk of being infected with HBV owing to their high frequency of exposure to infectious fluids coupled with the high infectivity of HBV.

Key words: *Hepatitis B virus, Knowledge, Attitude, Practice, Occupational exposure*

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List of abbreviations

AARHB	Addis Ababa Regional Health Bureau
Anti-HBs	Antibody for Hepatitis B surface antigen
CDC	Center for Disease Control and Prevention
CI	Confidence Interval
FMHACA	Food, Medicine and Health Care Administration and Control Authority
HB	Hepatitis B
HBcAg	Hepatitis B core Antigen
HBeAg	Hepatitis B endogenous Antigen
HBIG	Hepatitis B Immune Globulin
HBsAg	Hepatitis B Surface Antigen
HBV	Hepatitis B Virus
HCV	Hepatitis C Virus
HCPs	Health Care Professionals
HCWs	Health Care Workers
HIV	Human Immune Deficiency Virus
IG	Immune Globulin
KAP	Knowledge, Attitude and Practice
KIs	Key Informants
NSIs	Needle Stick Injuries
PEP	Post Exposure Prophylaxis
PPE	Personal Protective Equipment
SPSS	Statistical Package for Social Sciences
WHO	World Health Organization

1. Introduction

Occupational exposure occurs frequently among HCWs. They are potentially exposed to infectious materials such as blood, tissue, infectious body fluids, medical supplies, equipment or surfaces contaminated with these body fluids (Canini *et al*., 2002). Exposure to Blood-borne pathogens is the most serious occupational health hazard faced by HCWs worldwide. These pathogens are mostly Hepatitis B, C, and HIV viruses (Lavanchy, 2004).

HBV is one of those of viruses responsible for hepatitis. Hepatitis is an inflammation of the liver that may occurs following infection by HBV or other causes. This virus causes an asymptomatic infection, acute or chronic infection, and chronic infection in turn may leads to liver cirrhosis and hepatocellular carcinoma (Lok and McMahon, 2007).

HBV is a highly infectious blood-borne virus responsible for acute and chronic hepatitis B (HB) infections of the liver resulting in considerable morbidity and mortality. It is the leading cause of substantial liver damage on our planet earth (Ramsay *et al*., 2007). HBV is serious public health concern and an important occupational hazard for workers who are exposed to blood and blood products, and other body fluids. This is partly related to the high infectivity of the virus. It is known to be more infectious than other blood-borne pathogens; 50-100 times more infectious than HIV and about 5-10 times more infectious than HCV. Estimated cases of 16,000 hepatitis C, 66,000 hepatitis B, and 1,000 HIV infections occurred in the year 2000 worldwide amongst HCWs due to their occupational exposure (Lavanchy, 2004; Pruss-Ustun *et al*., 2005).

In essence, HB is preventable viral infection. The most effective and feasible means of preventing HBV infection is by vaccination and avoidance of exposure to blood and other potentially infectious fluids. HB-vaccine was introduced 1982 in the U.S and remained as the

mainstay of HB prevention. It has generally been described as having excellent record of safety and effectiveness with a protective efficiency of 90–95%. In fully vaccinated subjects the vaccine will provides long term protection from HB infection, probably life-long (Margolis, 1995; Weinbaum *et al*., 2009).

HCWs that are in direct contact with patients are always prone to the acquisition of the infectious disease. Hence, they should be aware of the risk involved in the treatment procedures and should take appropriate precautions in dealing with patient's conditions. This study was therefore conducted to assess knowledge, attitude and practice (KAP) of HBV and its vaccination among HCWs.

2. Statement of the problem

Viral hepatitis is a leading cause of virus associated morbidity and mortality, affecting millions of individuals worldwide. Hepatitis B leads to chronic liver disease and put people at high risk of death from cirrhosis of the liver and liver cancer (Lavanchy, 2004). It has many ways of transmission such as unprotected sexual contact, vertical transmission from mother to child, injury by needles or sharp materials, and exposure during medical procedures (Shepard *et al*., 2006).

According to World Health Organization (WHO) estimation, there are over 2 billion HBV infected people and there are about 620,000 HBV related deaths each year. In addition, approximately 4.5 million new HBV infections occur worldwide each year, of which a quarter progresses to liver disease (WHO, 2012). It is estimated that 57% of cases of liver cirrhosis and 78% of cases of primary liver cancer result from HBV or HCV infection (Perz *et al*., 2006). One study in Ethiopia showed that 12% of medical admission and 31% of mortality in medical wards is attributable to liver disease (Tsega, 2000).

Globally 40% of HBV infections among HCWs were due to occupational exposure. Most exposures are caused by blood or body fluids especially due to needle stick injuries (NSIs) which poses substantial risk (WHO, 2002a). The increased incidence of NSIs in HCWs is known to arise from high risk activities with low safety measures (Wilburn & Eijkemans, 2004).

Infections from blood borne pathogens are more pronounced in those HCWs who are found in developing countries. This is resulted from the high prevalence and increased occupational risk of these pathogens in these regions (Kane *et al*., 1999; Simonsen *et al*., 1999). Risky practices like careless handling of contaminated needles, unnecessary injections on demand, reuse of

inadequately sterilized needles, and improper disposal of hazardous fluids worsens the potential risk of occupational transmission of these blood borne pathogens among the HCWs (Charles *et al*., 2001).

An increased risk of occupational exposure affects the safety and well-being of HCWs as well as the quality of care delivered by them. HCWs in high risk areas of hospital settings are potentially at an increased risk of experiencing substantial anxiety and depression. Hence, occupational exposures not only lead to acquiring infectious pathogens but also affect the mental health of HCWs (Pruss-Ustun *et al*., 2005; Sohn *et al*., 2006).

The burden of HBV infection is very high, but it has not received the attention it deserves from the global community because of the silent or benign nature of the disease in its early stages and the insidious way in which it causes chronic liver disease. These factors have resulted in "*the silent epidemic*" we are experiencing today (WHO, 2012).

Since existing treatment for hepatitis B virus infection does not provide a complete cure, prevention remains vital. Prevention is the only safe strategy for reducing the high prevalence of this infection. Having enough Knowledge and proper attitudes toward the infection is crucial in preventing its occupational exposures. But the knowledge, attitude and practices of HBV transmission vary among HCWs. Studies have shown that the overall knowledge, attitude, and practice of HCWs about HBV infection is inadequate (Habib *et al*., 2011; Laraqui *et al*., 2009).

Assessing health care worker's awareness and practice on HBV infection and its preventive means would be essential to develop evidence based recommendations for reducing the risk of HBV related occupational hazards. Even though there are some serological surveys reported in the literature (Abebe *et al*., 2003; Negero *et al*., 2011; Shimelis *et al*., 2008), there is high

scarcity of literatures regarding the KAP of occupational exposure to HBV and its vaccination among HCPs in Ethiopia. So this study was conducted to address this gap. Our study could also lay down a basis for those who wish to conduct further study in this area.

3. Literature review

3.1. Structure of HBV

HBV is double stranded (incomplete) circular DNA virus that belongs to the Hepadina virus group with 3200 nucleotides and 42nm in length (Figure 3.1). The major breakthrough in the discovery of the viral structure is the work of Blumberg *et al*. (1965) that discovered the HBsAg, and few years later, Dane *et al.* (1970) visualized the HBV virion. Since then, significant advancement has been made regarding the epidemiology, virology, natural history and treatment of HBV (Geller, 2002).

DNA of the virus is found inside the core structure together with the viral reverse transcriptase, an enzyme responsible for making copies of HBV. The viral core is surrounded by an envelope from which HB surface antigen (HBsAg) originates. HBsAg is a protein on the surface of hepatitis B virus. A high level of HBsAg can be detected in serum during acute or chronic hepatitis B infection. This antigen is also used to make hepatitis B vaccine, which is also called a recombinant subunit vaccine. The body produces antibodies to HBsAg (Anti-HBs) as part of the normal immune response to infection. Anti-HBs also develop in successfully vaccinated individuals against hepatitis B. Another antigen, hepatitis B endogenous antigen (HBeAg), is an accessory protein secreted during active multiplication of HBV. Positive test for HBeAg is related to an increased infectivity of a person (CDC, 2005; Robotin and Mathews, 2008)

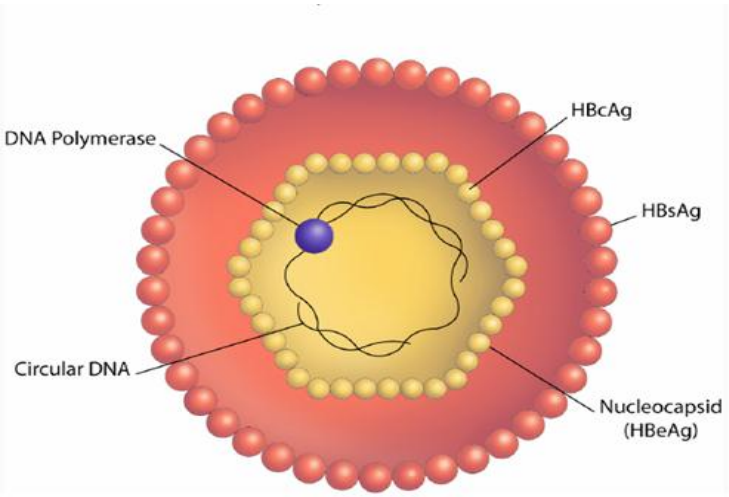

Figure 3.1. The structure of HBV

3.2. Symptoms and diagnosis

The symptoms for all forms of acute viral hepatitis are very similar that include: Flulike symptoms (fever, fatigue, nausea, vomiting, loss of appetite and joint pain) and other symptoms (dark urine, clay-colored stool, abdominal pain and jaundice) (CDC, 2014).

About 15% to 40% of chronically infected individuals will suffer from significant symptoms in their lifetime, and up to 25% will die from directly related causes. Over 65% of infected individuals may be asymptomatic, and others may have mild symptoms often mistaken for the flu. Unlike the flu, symptoms of acute hepatitis may continue for several weeks or, rarely, months. Approximately 15–40% of infected patients will develop cirrhosis, liver failure, or hepatocellular carcinoma. Development of chronicity is related to the age at which infection is acquired. Roughly half of infected children and about 10% of infected adults will progress to chronic infection (Lok and McMahon, 2007).

Acute hepatitis may go undiagnosed and chronic hepatitis is frequently undiagnosed for several years or even years after the initial infection. Since hepatitis symptoms are so nonspecific,

history taking and physical exam alone cannot allow us to differentially diagnose it. Serological tests are used to identify the causative agent and stage of the infection. Liver biopsy may also be indicated to assess the stage of liver damage (CDC, 2014).

3.3. Modes of transmission

Occupational exposure occurs through percutaneous injury such as needle stick or cut with sharps, contact with the mucus membrane of eyes or mouth of an infected person, contact with non-intact skin exposed with blood or other potentially infectious body fluids (CDC, 2003). The risk of non-percutaneous exposure has not been well quantified, but it may account for a significant proportion of HBV transmission in the healthcare setting (CDC, 2001). HBV can survive in dried blood for up to a week and thus may be transmitted via discarded needles or fomites, even days after initial contamination. Blood and serous fluid are known to contain the highest viral concentrations. Although HBV DNA has been detected in other body fluids, such as saliva, nasopharyngeal secretions, semen, or vaginal fluid, occupational transmission of HBV from these fluids has not yet been documented. The available data suggests that transmission is unlikely to occur through contact with urine or feces (Kidd-Ljunggren *et al*., 2006).

3.4. Epidemiology of HBV infection

3.4.1. General epidemiology

HBV infection is a serious global public health problem. It occurs all over the world (Figure 2.). Overall, approximately 45% of the global populations live in areas of high chronic HBV prevalence and about 43% in intermediate HBV prevalence, the rest being those living in areas of low prevalence of the virus (Mahoney, 1999). More than 75% of HBV infections occur in Asia and Africa. Although the prevalence of HBV carriers varies between countries in the same

continent, it can be broadly classified into regions of high, intermediate and low endemicity. In high endemic areas, like central Asian republics, Southeast Asia, Sub-Saharan Africa and the Amazon basin, the HBV carrier rate is over 8%. In low endemic regions, like the United States, Northern Europe, Australia and parts of South America, HBsAg prevalence is less than 2%. Middle East, some Eastern European countries and the Mediterranean basin are considered areas of intermediate endemicity with a carrier rate between 2% and 8% (WHO, 2002b).

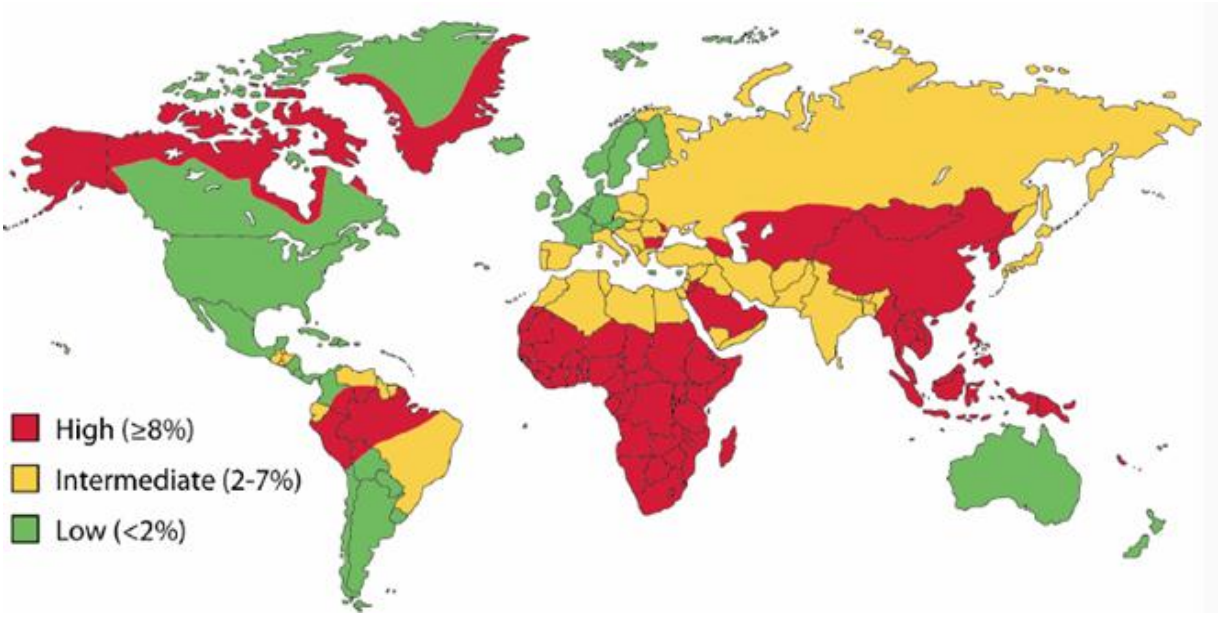

Figure 3.2. Worldwide prevalence of HBV (adopted from CDC, 2014)

In developing regions such as Sub-Saharan Africa, the prevalence of HBV is high but much of the disease burden caused by the virus goes undocumented (Roy and Robillard, 1995). In Ethiopia as in other Sub-Saharan Africa, HBV infections cause significant burden of acute and chronic disease among children and adults. Sero-epidemiological studies, although quite small in scale, confirm Ethiopia as having significant HB transmission. Surveys in different parts of the country indicates that the prevalence of HBV was high ranging from 4.7% to 14.4% (Abebe *et*

al., 2003; Diro *et al*., 2008; Shimelis *et al*., 2008). In Addis Ababa a community based sero-epidemiological survey found a population prevalence of HBsAg to be 7% (Abebe *et al*., 2003).

3.4.2. Epidemiology of HBV in HCWs

As far as the burden of HBV in HCWs is concerned, numerous studies have shown that they are at higher risk of acquiring HBV than the general population. Clinicians with direct patient contact, such as physicians, dentists, nurses, and dialysis workers, laboratory workers have higher risk of exposure to HBV than other HCWs (Sepkowitz, 1996). A review of studies done in the USA has shown a high prevalence rates of HBV ranging from 13 to 18% in some groups of HCWs such as surgeons, and even higher rate, about 27% have been reported among dentists and oral surgeons (Beltrami *et al.*, 2000).

In Sub-Saharan Africa too, exposure to HBV remains a serious risk to HCWs. It has been estimated that 6200 HBV infections occur each year among HCWs in Sub-Saharan African (Pruss-Ustun *et al*., 2005). In Ethiopia, being part of Sub-Saharan Africa, the problem of HBV to its HCWs cannot be an exception, for instance one study indicated that out of the 126 medical waste handlers and 126 non-medical waste handlers recruited in the study, significant differences were observed in the detection rates of HBsAg, the higher rate being in medical waste handlers (Shiferaw *et al*., 2011).

3.5. Prevention and control of HBV in the healthcare setting

3.5.1. Postexposure prophylaxis

In the healthcare setting it's difficult to keep exposures to HBV at bay as it could occur irrespective of the various preventive measures available. PEP provides an opportunity to prevent infection in the vulnerable HCWs (Puro *et al.*, 2005).

Upon exposure of the HCWs to HBV, PEP is based largely on active immunization with HB vaccine and passive immunization with hepatitis B immune globulin (HBIG). However, firstly the exposured site must be treated right away, which generally involves reducing the dosage of the exposure through bleeding and washing with clean water or saline and soap depending on the site. Next, the employee should undergo an evaluation that includes recording of details of the exposure (time, date, type, and site), known information on the source patient (HIV, HBV, and HCV status), and the employee's relevant health history (including HB immunization status and post-immunization titer) (CDC, 2001). Multiple factors should be considered in deciding whether postexposure prophylaxis for HBV is warranted or not (Annex. X).

An adequate dose of HBIG provides immediate antibody directed protection against HBV. Usually HBIG is provided to serve a short-term bridge in the control of HBV until the immune system produces long-term protective response. HBIG is prepared from human sera that contain anti-HB antibodies. The normal dose for HBIG is 0.06 ml/kg given by intramuscular injection (CDC, 2001; Gerberding, 1995).

3.5.2. Hepatitis B vaccine

Two HBV vaccines are approved for use in adults; administration of three separate injections into the deltoid muscle is required (Table 3.1). It provides protection against HBV, both pre-exposure and post-exposure. In pre-exposure vaccination, three intramuscular doses of HB vaccine are given resulting in protective efficacy of 90%-95% in healthy recipients (Mast, 2006; Varghese *et al.*, 2003).

Table 3.1. HB vaccines (source: CDC, 2001)

Vaccine	Dose and route	# Doses	Schedule
Engerix-B	20µg(1.0ml IM)	3	0,1,6 months
Recombivax HB	10µg(1.0ml IM)	3	0,1,6 months

In Ethiopia, to protect children against serious childhood illnesses, the expanded program for immunization program (EPI) delivers eight vaccines including HB vaccine. HB vaccines are new vaccines introduced into the EPI program in the country in 2007. In the routine EPI program, these antigens are being given in the public sectors. Some private hospitals in the capital city, Addis Ababa, provide HB vaccines in addition to the seven vaccines provided in public facilities (FMOH, 2010).

3.5.3. Post-vaccination serologic testing

After completing the vaccine series, post-vaccination titers should be tested on all HCWs (Mast, 2006). All HCWs should undergo serologic testing1–2 months following the final dose of the HB vaccine series. If serologic test result is >10mIU/mL, it indicates protective immunity. If a HCW's serologic test (anti-HBs) is negative, the three doses of vaccine series should be repeated and then test for anti-HBs 1–2 months after the last dose of vaccine is required. If the result is still negative after completing the subsequent doses of the vaccine, the HCW is considered a nonresponder to HB vaccination (CDC, 2001).

3.6. Studies on KAP of HBV and its vaccination

In a study conducted in HCWs of India, amongst 254 HCWs, only 57.7% were vaccinated against HBV. Knowledge of HBV infection and accessibility of HBV vaccine were important

factors of vaccination. Seventy nine (31.1%) HCWs were unable to complete vaccination because of non-accessibility of vaccine (Chaudhari *et al.,* 2009).

Another study done among HCWs in tertiary care hospitals in India, only 1198 (55.4%) of HCWs screened had been vaccinated, 600 (27.7%) had never been vaccinated and 364 (16.4%) were unaware of their vaccination status. Protective immunity test (> 10 IU/mL) were seen in only 61.7% of the HCWs. (Sukriti, 2008)

A survey conducted in Kuwait revealed that knowledge of the various aspects of HBV was generally high. Their attitude towards HBV infections was encouraging, since a high percentage of respondents reported positive beliefs toward various attitude questions. Particularly, 80.5% indicated that their job puts them at risk of HBV infection, 87.1% reported their need to be protected from HBV infection, and 86.3% considered it necessary to receive the vaccine. About three quarters of the respondents (74.7%) have actually received HB vaccine. Among them, 84.0% completed the vaccination doses. Amongst those who have never received any dose of vaccine, 79.3% had no specific reason for not receiving the vaccine (Soad *et al*., 2012).

In a cross sectional study conducted in Italian public hospitals, the overall vaccination coverage was 85.3%. Logistic regression analysis showed that place of residence of HCWs (odds ratio 4.2; 95% confidence interval 2.6–6.7) and age (odds ratio 4.5; 95% confidence interval 2.6–7.8), both were independent predictors of vaccine acceptance (Stroffolini *et al.*, 2008).

A study done in USA that assessed predictors of HB vaccine acceptance in HCWs showed that independent predictors of initiating the vaccine series encompassed; younger age (95% CI, 0.96-0.997), occupation (95% CI, 1.0-4.3) and increased blood exposure frequency (95% CI, 1.6-3.5) (Doebbeling *et al.*, 1996).

According to a study done among operating room personnel in Nigeria, out of a total of 228 operating room personnel participated in the study, only sixty-one (26.8%) of them had been vaccinated. Majority of them had good knowledge on the risk factors for HBV infection. Some 91.7%, 83.2%, and 84.6% believed that HBV infection can be transmitted through percutaneous injury, mucous membrane contact with blood, and contact of abraded skin with potentially infected tissue, respectively. It was found that many of the staffs were unvaccinated due to lack of time to attend to vaccination and lack of enough information about HB vaccine (Emeka *et al*., 2011).

According to a study done among HCWs in Burkina Faso, out of total 452 HCWs surveyed, 47.7 % had received at least one dose of HBV vaccine. Factors associated with vaccination status were age ($p = 0.005$), occupation ($p = 0.005$), and seniority in the profession ($p = 0.001$). Anti-HBs was found in 61.6 % of respondents, with significant differences ($p = 0.01$) between subjects who received at least one dose of vaccine (76.7 %) and those who reported never having been vaccinated (50.3 %) (Ouédraogo *et al.*, 2013).

In a cross sectional study was carried out in four public hospitals in Wad Medani, Sudan, a good respondents' knowledge about HBV transmission was observed. More than 50% of HCWs were not vaccinated. Reasons for failure to be vaccinated were unawareness of the vaccine's availability which was expressed by 48.2% and cost of the vaccine, expressed by 29.5% of workers and 12.9% of them didn't believe in vaccination as an important preventive measure that to be taken. Fear of contracting hepatitis from the vaccine or doubt of efficacy of the vaccine was cited by 9.4% respondents (Bakry *et al.*, 2012).

4. Objectives

4.1. General objective

To assess knowledge, attitude and practice of HBV and its vaccination among HCPs in selected public hospitals of Addis Ababa, Ethiopia.

4.2. Specific objectives

- To assess knowledge of HCPs on occupational exposure to HBV and its vaccination
- To assess attitude of HCPs on occupational exposure to HBV infection and its vaccination
- To assess practice with regards to HBV infection prevention and vaccination status among HCPs
- To assess determinants of HBV knowledge and vaccination status among HCPs

5. Methodology

5.1. Study area, setting and period

This study was conducted between June 01 and July 28, 2014, in Addis Ababa, Ethiopia. Addis Ababa is the capital city of Ethiopia located at geographic center of the country (9° 10 48″ North and 38° 440 24″ East). It is divided into ten sub-cities and has a population size of over three million (3,038,096) with annual growth rate of 2.1% (CSA, 2007). During the study time, the city had 48 hospitals. Thirteen were public hospitals; of which 5 were under Addis Ababa Regional Health Bureau (AARHB) and 5 specialized referral hospitals. There are also various hospitals, health centers and clinics established by NGOs, and hospitals and clinics that were privately owned (FMHACA, unpublished data).

This study was conducted in three hospitals under AARHB, namely Rasdesta Damtew Memorial Hospital, Yekatit 12 memorial hospital and Zewditu Memorial Hospital. Zewditu Memorial and Yekatit 12 Memorial Hospitals are referral hospitals under the Addis Ababa City Government Health Bureau whereas Damtew Memorial Hospital is general hospital. During the study period there were 145 HCPs in the five departments of Zewditu memorial hospital, about 110 in Yekatit 12 Memorial Hospital and 32 in the three departments of Rasdesta Damtew Memorial Hospital (it lacks maternity and dental care services).

5.2. Study design

Both qualitative and quantitative methods were used. Qualitative study involved KI interviews while quantitative study was a cross-sectional study design which was conducted by using semi-structured self-administered questionnaire.

5.3. Source and Study population

5.3.1. Source population

All HCPs encompassing physicians, dentists and dental technician, nurses, health officers, anesthesiologist, laboratory technologists/technicians and midwives working in exposure prone unit of the selected public Hospitals of Addis Ababa, and who are directly involved in day-to-day patient care were the source population.

The source populations for the qualitative study were all department heads working in exposure prone unit of selected public Hospitals of Addis Ababa.

5.3.2. The study population

HCPs that are in direct contact with the patients or equipment used on patients and are more likely to get exposure to blood borne pathogens were included. So all HCPs working in the departments which were deemed to be a "*high risk*" unit that encompass dentistry, maternity and delivery, emergency, laboratory and surgical unit of the selected public Hospital of Addis Ababa and who met the inclusion criteria were our study population.

The study populations for the qualitative study were all department heads working in dentistry, maternity and delivery, emergency, laboratory and surgical department of selected public Hospitals of Addis Ababa.

5.4. Study variables

- **Knowledge and attitude related independent variables:** age, sex, marital status, profession types, work experience, educational status and history of training.

- **Practice related independent variables:** age, sex, marital status, profession type work experience, educational status and previous exposure to blood born pathogen, history of training, knowledge of HB vaccine and attitude toward HBV vaccination

- **Dependent variables:**
  - Knowledge on occupational exposure of HBV infection
  - Knowledge on HBV vaccination
  - Attitude toward occupational exposure of HBV infection
  - Attitude toward HBV vaccination
  - Vaccination status among HCPs

5.5. Sample size determination and selection procedure

For quantitative method since the total number of study population was easy to manage, all HCPs working in the selected departments during the period of data collection and met the inclusion criteria, and who were willing to participate were included in this study. Accordingly, our total study subjects for the quantitative study from randomly selected three Hospitals were 240 HCPs (Figure 5.1).

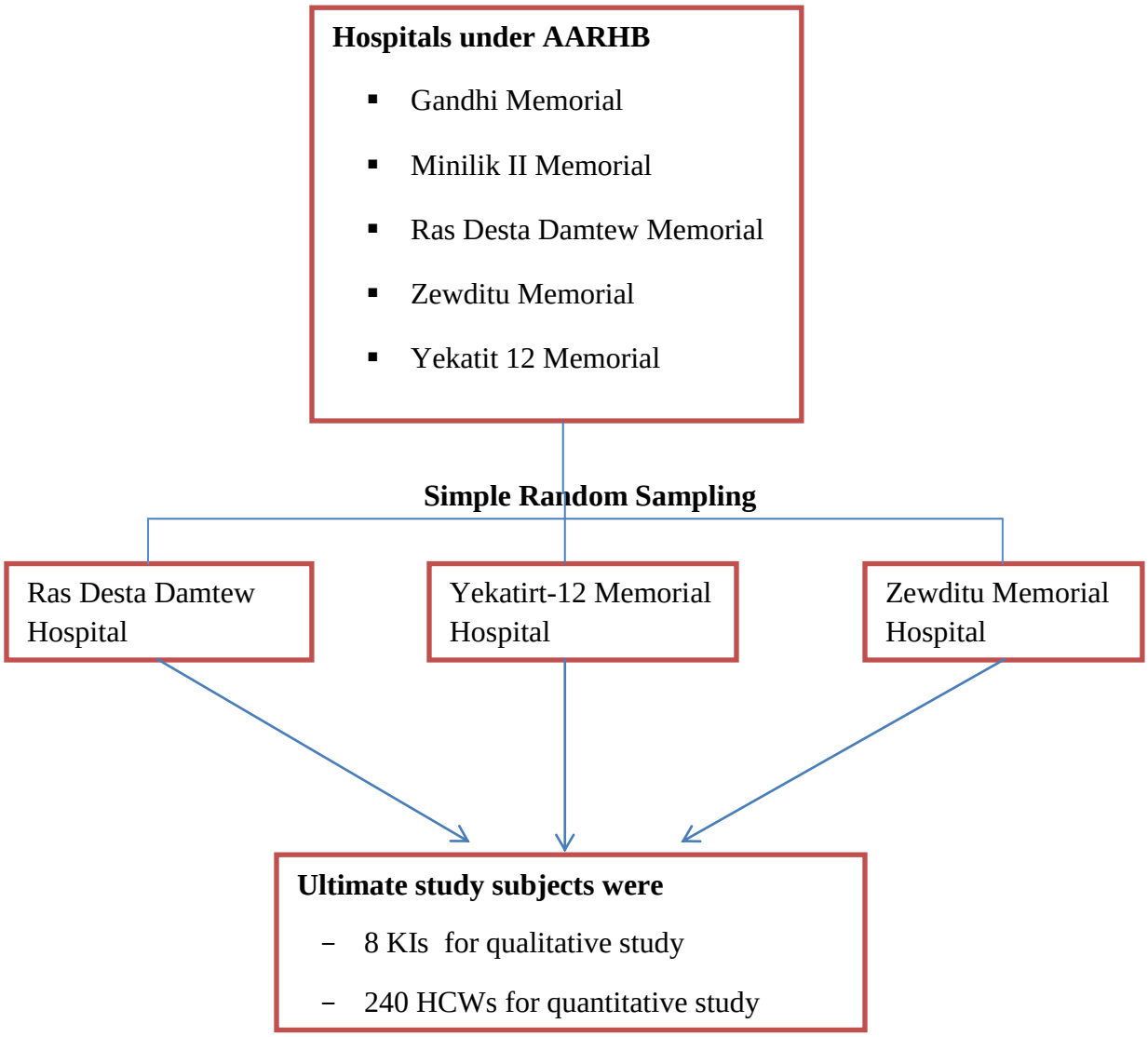

Figure 5.1. A schematic presentation of selection of study setting and participants

A purposive sampling technique was used to identify our KIs for the qualitative study. Heads of the departments were purposively selected because they are supposed to be information rich than other HCPs.

5.6. Inclusion and exclusion criteria

All HCPs who were working in the selected departments and that had an experience of six months and above were included in this study. Those HCPs having an experience below six months were excluded. This cut-off point was chosen in order to enable us to properly assess the practice section.

5.7. Data collection procedures

5.7.1. Data collection instruments

To pave ways for quantitative study and to define variables for the survey especially factors that affect vaccination status among HCPs as well as to supplement the quantitative study, KI interviews were held by using semi-structured in-depth interview guide. The key informants (KIs) interview tool was constructed based on evidence from literatures, largely focusing on African studies. It consisted of seven key questions and eight probing points. These questions were posed to interviewees to inquire their views on HCPs awareness of HB infection and prevention of occupational exposure to HBV as well as factors that can affect HBV vaccination status among HCPs working in their respective department. The interview on average took 15 minutes.

For quantitative study after thoroughly reviewing the relevant literatures, a draft of semi-structured questionnaire was developed and then important points addressed by KIs was incorporated. Questionnaires were first developed in English and translated into local language, Amharic. It was consisted of a series of questions on the KAP of respondents on HBV infection and its prevention (Annex VI). The questionnaire was handed over to the respondents in person.

5.7.2. Data quality assurance

Pre-test was done before the start of actual data collection. Based on the result from the pre-test, slight modification was made to the original questionnaire (the question that asks ethnicity of the participant was removed due nearly zero response rate, and response option No. 3 was added to question No. 2.2 as it was frequently responded under *"Other"* option.) Two data collectors (B.Sc. nurses) were recruited in this study. Discussion was held between principal investigator and the data collectors to clear out any difficulties they might encounter during data collection. In addition to this they were given an orientation on how to obtain informed consent that encompassed: the significance of the survey, importance of respondent's participation and what the survey outcome is mean to them, voluntary nature of the study and confidentiality issues. The data collectors were supervised and the filled questionnaires were checked by the principal investigator.

All KI interviews were conducted by the principal investigator. The interview was conducted by probing and exploring whenever it was necessary. Responses were recorded by audio recorder (for 7 KIs) and note-taking (for one KI) based on their consent.

5.8. Data processing and analysis

For quantitative part, first the data was checked for completeness and consistency. Then it was coded and entered in the computer using statistical package for social science (SPSS) software, version 20. Random checking was done to verify the validity of the entered data. For knowledge questions value "1" was assigned for correct answers and while "0" was assigned to all other answers. Likewise for a positive attitude item, a score of "4," "3," "2," "1," and "0" was used for strongly agree, agree, neutral, disagree, and strongly disagree respectively. The score was reversed for all the negative items (Annex IX). Grading of the scores into 3 levels was made

using conventional Bloom's cut off point (Bloom, 1968). All individual answers were summed up, and overall knowledge and attitude scores were computed by using Microsoft Excel 2010. Simple descriptive statistics such as frequency and percentage were used to summarize the results, and chi-square and binary logistic regression were used to describe the association between variables. P-value < 0.05 was considered as statistically significant association. Once analyzed, the data was presented and discussed as per the listed objectives of the study

Qualitative data analysis was done after audio records were transcribed and verbatim and notes were compiled. Thematic analysis was carried out. KI's opinions were revolved around two main points which were then identified as themes. Next, coding of interview text relating to these themes was performed. Quotes that would help in understanding of the content of the theme were identified. Quotes were designated for each department head as follows: "*Emgcy"* for heads of emergency department "*Dent"* for dental unit head, "*Lab"* for laboratory "*Delv"* for deliver and "*Surg"* for surgery.

5.9. Ethical consideration

Ethical clearance was obtained from the institutional review board (IRB) of Addis Ababa University, School of Pharmacy. A letter of cooperation was written from Addis Ababa City Administration Health Bureau to each Hospital. The aim of the study was clearly explained to the study participants. Information was collected after obtaining informed consent from each participant. Verbal consent was obtained from study participants for both qualitative and quantitative part (Annex I and V). The interviews were pre-scheduled and took place in the respondent's office during office hours so as to assure optimum privacy. The personal information of study participants was kept entirely anonymous, and confidentiality was assured throughout the study period.

5.10. Operational definitions

Health care professionals: In this study it is intended to indicate those health care personnel, who were working in health care setting, and who were involved in day to day patient cares; it does not include administrative and other supportive staffs.

Awareness: Concepts that HCPs hold in their mind about occupational HBV infection and its vaccination based on information they had.

Attitude: The feeling and beliefs of respondents in a favorable or unfavorable manner toward HBV infection and its vaccination.

- Negative (unfavorable) attitude: those HCPs having a total attitude score below 21 points
- Neutral Attitude: those HCPs having an overall attitude score between 22-27 points
- Positive attitude (favorable): those HCPs having total attitude score between 28-36 points

Knowledge: The understanding that the respondents had regarding occupational infection of HBV and its preventive strategies

- Low levels- having overall knowledge score below 60% (0-7 points)
- Moderate levels- having overall knowledge score between 60%-79% (8-10 points)
- High levels- having overall knowledge score 80% and above (11-14 points)

Practice: The actions intended to do in order to prevent infection from HBV and habit and customs of HCPs related to receiving HB vaccine.

6. Results

A total of 287 HCPs who were available during the period of data collection were reached; of whom 251 of them agreed to participate. Eleven filled questionnaires were discarded due to significant incompleteness, giving the ultimate response rate 80.1%. Zewditu Memorial Hospital comprised larger proportion 125 (52%) of the respondents; followed by Yekatit 12 Memorial Hospital which encompassed 93 (38.8%). The minimum numbers of participants were from Rasdesta Damtew Memorial Hospital which comprised 22 (9.2%).

6.1. Socio demographic characteristics of study participants

The age of the study participants ranged from 20 to 55 years with the median age of 28 years (IQR=25-31). The age group 25-29 constituted the largest part that comprised 144 (39.2%) of the respondent. Almost half, 120 (51.1%) of the study participants were male. Majority 134 (57.0%) of the study participants were single followed by married 89 (37.9%). One hundred fifty one (62.9%) participants were orthodox; while 50 (20.8%) and 28 (11.7%) of them were protestant and Muslims respectively. With regards to their professional characteristics, 104 (43.3%) were nurses, followed by midwives 40 (16.7%) and laboratory technologists/technician 35 (14.6%). Majority 153 (63.8%) of them were degree holders. Regarding the work experience nearly two-third 150 (65.2%) of the study participants had less than five years of experience (Table 6.1).

Table 6.1. Background information of HCPs in selected public hospitals of Addis Ababa, Ethiopia, July, 2014.

Variables		Frequency	Percentage
Age (n=227)	20-29	144	63.4
	30-39	64	28.2
	40-49	16	6.7
	50 & Above	3	1.3
Sex (n=235)	Male	115	48.9
	Female	120	51.1
Marital status (n=235)	Single	134	57.0
	Married	89	37.9
	Others*	12	5.1
Religion (n=240)	Orthodox	151	62.9
	Protestant	50	20.8
	Muslim	28	11.7
	Others**	11	4.6
Profession (n=240)	Nurse	104	43.3
	Midwife	40	16.7
	Lab. technologist and technician	35	14.6
	Medical Doctor	27	11.3
	Dental Doctor	15	6.2
	Health officer	13	5.4
	Anesthesiologist	6	2.5
Educational status (n=240)	Diploma	78	32.5
	Degree	153	63.8
	Others†	8	3.7
Area of practice (n=236)	Surgical	72	30.5
	Delivery	61	25.8
	Emergency	45	19.1
	Laboratory	35	14.8
	Dental	23	9.7
Experience (n=230)	< 5years	150	65.2
	≥5years	80	34.8

**Divorced and widowed ** Catholic, Jehovah Witness and Adventist † Certificate, Master's Degree and Specialists*

6.2. HBV infection information source and knowledge

Two hundred thirty (96%) of the study participants responded that they have ever heard or read about HB infection, and thus further data analysis was done only for these study participants. About half, 106 (48.2%) of the study participants reported that they had ever attained training on infection prevention. As depicted in Table 6.2 below, the major source of information for the study participants were under graduate or post graduate education, which encompassed 196 (86.3%) followed by on-job training and internet each comprising 66 (29.1%).

Table 6.2. Source of information for HCPs who were working in selected public hospitals of Addis Ababa, Ethiopia, July, 2014 (N=230).

Source of information	Frequency	Percentage
Under/post-graduate education	196	86.3
On-job training	66	29.1
Internet	66	29.1
Journals	42	18.5
Mass media	31	13.7
Friends	30	13.2

The percentages do not add up to 100 because multiple responses possible

Fourteen questions were designed to assess the knowledge of participants in two main parts: transmission of HBV and the management of the infection. The overall knowledge score ranged from 0 to 13 with a mean of 9.2 (SD=2.1). Figure 6.1 shows the proportion of the study participants whose score fall into three categories as per Bloom's cut off point (60%-80%). Nearly half 117 (51%) of the study participants fall under the category of "*moderate knowledge score"* while only 69 (30%) were found to have high knowledge score.

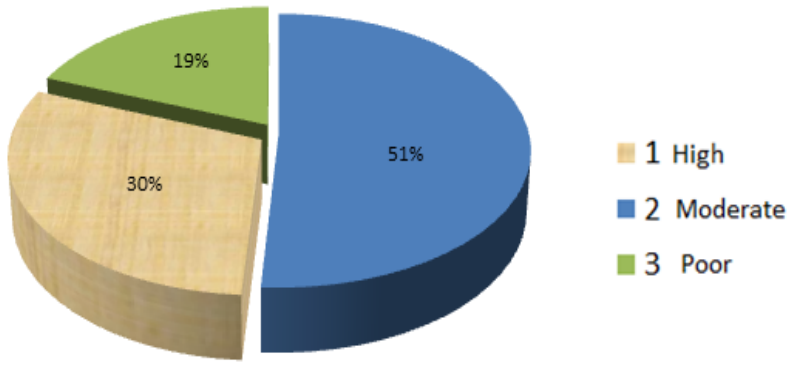

Figure 6.1 Percentages of the study participants whose total knowledge score fall under the three category of knowledge score in selected public hospitals of Addis Ababa, July, 2014.

Majority (more than 90%) of participants who were informed about HB infection knew that the virus can be transmitted by: needle stick injury, mucous membrane contact with infectious body fluid, infected blood and amniotic fluid. Two hundred five (89.9%) of them knew that HB can be transmitted by amniotic fluid. However only 66 (29.2%) of them knew that urine is non-infectious. A little less than half, 105 (47.5%) of them did not now that HBV cause liver cancer.

With regards to management of occupational HBV infection, knowledge score for different question was found to be variable. One hundred thirty one (57.5%) of the participants correctly responded that HBV infection cannot be cured. Three-fourth (75.2 %) of the study subjects properly answered the number of doses of the vaccine required for complete protection of HBV infection and fifty three (24.8%) of them did not know it. Expected interval between the first dose and the second dose, and last dose and the second dose was known by 117 (56.8%) and 123 (61.8%) of the respondents respectively. Greater proportion 145 (63.6%) of the respondents did not know that the vaccine reduce the likelihood of being positive after occupational exposure.

One hundred thirty six (62.7%) of respondents knew that after completing the vaccine series, anti-Hbs serologic testing has to be done. However, only 96 (44.2%) of the study participants knew that the vaccine series have to be repeated if test result is negative (Table 6.3).

Table 6.3. Knowledge of HCPs on occupational HBV transmission and its managements, in selected public hospitals of Addis Ababa, Ethiopia, July, 2014.

No.	Question	Response n (%)		
		Yes	No	I don't know
1.	Occupational exposure to HBV infection can occur through percutaneous injury (n=229)	212 (92.6)	8 (3.5)	9 (3.9)
2.	Occupational exposure to HBV can occur through mucous membrane contact with infectious body fluid (n=229)	218 (95.2)	4 (1.7)	7 (3.1)
3.	Blood is infectious body fluid for HBV (n=229)	223 (97.4)	2 (0.9)	4 (1.7)
4.	Vaginal fluid is infectious for HBV (n=230)	218 (94.8)	7 (3.0)	5 (2.2)
5.	Amniotic fluid is infectious body fluid for HBV(n=228)	205 (89.9)	15 (6.6)	8 (3.5)
6.	Urine is infectious body fluid (n=226)	126 (55.8)	66 (29.2)	34 (15.0)
7.	HBV can cause liver cancer (n=221)	116 (52.5)	35 (15.8)	70 (31.7)
8.	HB infection is curable disease (n=228)	47 (20.6)	131 (57.5)	50 (21.9)
9.	After occupational exposure the vaccine reduce the likelihood of being positive (n=228)	83 (36.4)	95 (41.7)	50 (21.9)
10.	After completing the vaccine series, anti-Hbs serologic testing has to be done for all HCPs (n=217)	136 (62.7)	36 (16.6)	45 (20.7)
11.	If anti-Hbs serologic test result is negative, the vaccine series has to be repeated (n=217)	96 (44.2)	65 (30.0)	56 (25.8)

6.3. Attitude of HCPs toward HBV infection and its vaccination

Nine questions were designed to assess the opinion of participants using five level likert scales (strongly disagree, disagree, neutral, agree and strongly agree). Table 6.5 shows response of participants to each question that assesses their attitude toward HBV infection and its vaccination. For opinions that were sought on whether HB is great public health problem; 106 (46.5%) of the respondents strongly agreed and 77 (33.85%) of the respondents agreed that HBV is great public health problem. Respondents' attitude on whether their job puts them at greater risk of HB infection seems to favor positive response (strongly agree and agree). One hundred nineteen (51.7%) strongly agreed and sixty (26.1%) of them agreed, and none of the respondent had strong objection in this regard. Concerning the mandatory vaccination of HCPs, majority of the study participants responded positively to this question, strongly agreed being 129 (56.6%) and agreed 57 (25%). None of the respondent had strong objection on this point. For the question items: safety of HBV vaccine, effectiveness of the vaccine after repeated exposure, involvement HBV positive HCPs in an invasive procedure, and importance HB vaccine as PEP when patient status is unknown, the opinion seems to be divided (it inclined towards positive responses though).

Table 6.4. Attitude of HCPs towards HBV infection and its vaccination in selected public hospitals of Addis Ababa, Ethiopia, July, 2014.

No	Variable	Likert respo		
		Strongly agree N (%)	Agree N (%)	Neutral N (%)
1	HB is great public health Problem (n=228)	106 (46.5)	77 (33.8)	36 (15.8)
2	HCPs are at greater risk of HB infection (n=230)	119 (51.7)	60 (26.1)	47 (20.4)
3	It is necessary for HCPs to receive HB vaccine (n=228)	129 (56.6)	57 (25)	39 (17.1)
4	HBV vaccine is safe (n=226)	64 (28.3)	96 (42.5)	43 (19)
5	After repeated exposure to contagious fluid/ material, the vaccine reduces likelihood of being HBV positive (n=226)	49 (21.7)	72 (31.9)	73 (32.3)
6	HCWs positive for HBV should not be involved in an invasive procedure (n=228)	65 (28.5)	82 (36)	49 (21.5)
7	The vaccine is not important if the exposure is not with patient blood of known HBV positive (n=226)	67 (29.6)	69 (30.5)	41(18.1)
8	There should be the vaccine guideline in work areas (n=229)	126 (55)	69 (30.1)	29 (12.7)
9	Training on HBV and the vaccine is important for a behavioral change (n=228)	124 (54.4)	67 (29.4)	31 (13.6)

The overall attitude score for all items was computed for each participants, and the minimum attitude score was 10 and the maximum was 35 with mean attitude score of 25.96 (SD=4.53). Greater proportion 103 (44.8%) of the respondents was found to have neutral attitude and 96 (41.7%) of them had positive attitude towards HB infection and its vaccination. Figure 6.2 depicts the proportion of the study participants whose total score fall under the categories of negative, neutral or positive attitude score.

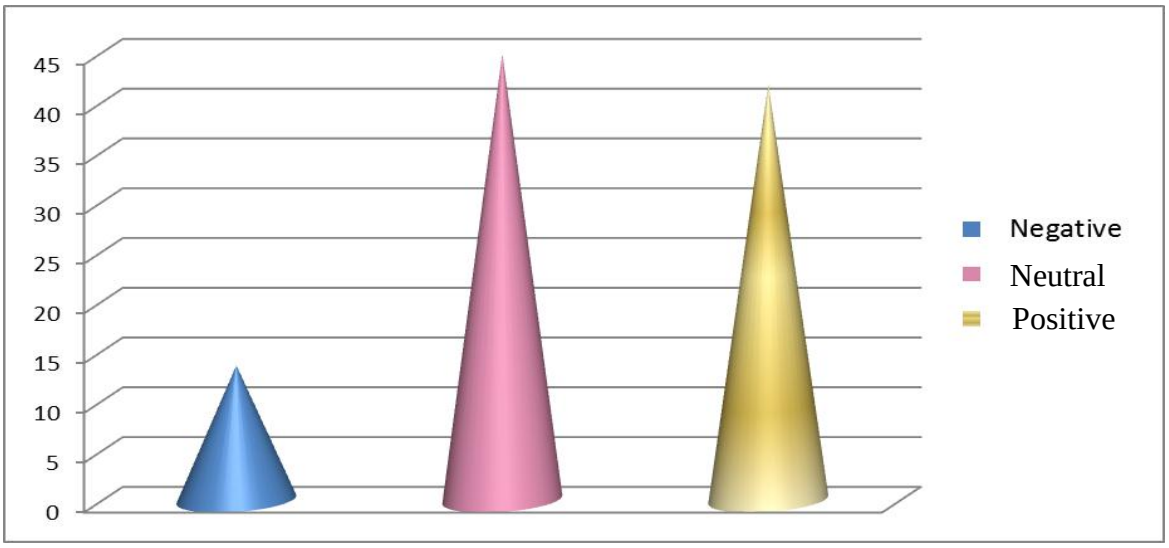

Figure 6.2 Percentages of the study participants whose total attitude score fall under the three the category of attitude scores, in selected public hospitals of Addis Ababa, Ethiopia, July, 2014

6.4. Hepatitis B infection prevention related practices

Out of 230 study subjects who had information on HB infection, 178 (77.7%) of them had been screened for HBV and received HB Vaccine of whom; 160 (94.1%) of them had received full course of the vaccine. Eighty three (36.7%) of the survey participants said that they had ever

been exposed to HBV risky conditions. With regards to the frequency of the exposure, nearly half (48.1%) of the respondent had frequency of exposure more than once a week (Table 6.6).

Table 6.5. HBV infection prevention related practices among HCPs in selected public hospitals of Addis Ababa, July, 2014.

No	Variable	Response option	Frequency	Percentage
1	History of exposure to HBV risky* conditions (n=226)	Yes	83	36.7
		No	118	51.8
		I don't remember	25	11.1
2	Frequency of exposure (n=54)	≤1/wk.	28	51.9
		>1/wk.	26	48.1
3	HCPs ever received HB Vaccine (n=229)	Yes	178	77.7
		No	51	22.3
4	HCPs received the full course of vaccines series (n=170)	Yes	160	94.1
		No	10	5.9

**NSIs or contact of infectious fluid with mucous membrane or non-intact skin*

For survey participants who had the history of exposure, the likely options were listed in the survey instrument and the respondents frequently picked being busy 38 (45.2%) and rushing at work 35 (41.7%) as underlying causes for the exposure. As clearly depicted in the Table 6.6, the most frequently taken measure after the incidence of the exposure was found to be washing the injury with antiseptics and water 56 (67.5%); while up to 40 (48%) of them had checked the status of the patient.

Table 6.6. Reasons of HCPs for being exposed to potentially infectious situation and measures taken afterwards in selected public hospitals of Addis Ababa, Ethiopia, July, 2014.

Variable	Frequency (N=83)	Percentage
Reasons for exposure		
Being busy	38	45.2
Rushing at work	35	41.7
Lack of infection control supplies	29	34.5
Careless handling of patients and medical instruments	15	17.9
Being exhausted	11	13.1
Other reason*	12	14.3
Measure taken after exposure to infectious material or fluid		
Washed with antiseptics	56	67.5
The status of the patient was checked	40	48.2
Immediately reported	26	31.3
The injured site was allowed to bleed	20	24.1
Other measure was taken**	7	8.4

The percentages do not add up to 100 because multiple responses possible

**Uncooperative and restless patients, sudden fluid splash, being inexperienced at work*

*** Prayer, having screened for HBV antigen, do nothing because I'm already vaccinated*

For study participants who didn't take the vaccine, the frequently stated reasons were: unavailability of the vaccine and price of the vaccine each comprising 37 (71.2%) and 24 (46.2%) respectively (Table 6.7). For study participants who didn't complete the vaccine series, all of them said that they were on wait for the last dose (this study was conducted ahead of the time for the last dose).

Table 6.7. Reasons of HCPs for not being vaccinated, in selected public hospitals of Addis Ababa, Ethiopia, July, 2014 (N=51).

Reasons	N	%
Unavailability of the vaccine	37	71.2
Price of the vaccine	24	46.2
Afraid of SE of the vaccine	6	11.5
Did not have the information	4	7.7
Being busy	3	5.8
Afraid of needle	1	1.9

The percentages do not add up to 100 because multiple responses possible

6.5. Determinants of knowledge score among HCPs

A chi-square test of independence was performed to examine the relation between knowledge score and socio-demographic variables as well as professional characteristics of HCPs. The result indicated that only education level (X^2=8.356, p=0.015), type of profession (X^2= 21.156, p=0.007) and area of practice (X^2=17.04, p=0.030) of the respondents were found to have significant association with overall knowledge score. Relatively higher number of study participants in the category *"degree and above"* were found to have *"moderate and higher knowledge score"* than the *"diploma and below"* group. In the contrary, relatively higher number 21 (28.8%) of survey participants in the category *"diploma and below"* were found to have poor knowledge score. As to profession type, larger proportion 43 (42.1%) of nurses were found to have higher knowledge score than other profession. With regards to area of practice, relatively greater, 31 (45%) percentage of survey participants working in the surgical department were found to have high knowledge score than participants who were working in the other departments (Table 6.9).

Table 6.8. Chi-square test for determinant of overall knowledge score in selected public hospitals of Addis Ababa, Ethiopia, July, 2014.

Variables		Overall knowledge score N(%)			Chi-square	P-value
		Low	Moderate	High		
Sex	Male	22 (19.6)	51 (45.5)	39 (34.9)	1.83	0.40
	Female	21 (18.6)	61 (54.0)	31 (27.4)		
Religion	Orthodox	28 (19.2)	74 (50.7)	44 (30.1)	2.22	0.91
	Islam	4 (14.3)	16 (57.1)	8 (28.6)		
	Protestant	10 (22.2)	22 (48.9)	13 (28.9)		
	Others*	2 (18.2)	4 (36.4)	5 (45.4)		
Marital status	Married	25 (19.1)	62 (47.3)	44 (33.6)	2.19	0.71
	Others**	16 (19.0)	45 (53.5)	23 (27.5)		
Educational status	Diploma and below	21 (28.8)	36 (49.3)	16 (21.9)	8.36	0.02$^{\delta}$
	Degree and above	22 (14.1)	80 (51.3)	54 (34.6)		
Profession	Nurse	16 (15.7)	43 (42.2)	43 (42.1)	21.12	0.01$^{\delta}$
	Midwife	13 (37.1)	16 (45.7)	6 (17.2)		
	Lab.	6 (17.6)	20 (58.8)	8 (23.6)		
	Medical doctor	6 (22.2)	15 (55.6)	6 (22.2)		
	Others†	3 (9.4)	22 (68.8)	7 (21.8)		
Area of practice	Surgical	11(15.9)	27 (39.1)	31 (45.0)	17.04	0.03$^{\delta}$
	Delivery	17 (30.4)	26 (46.4)	13 (23.2)		
	Emergency	7 (15.9)	25 (56.8)	12 (27.3)		
	Lab	6 (17.6)	20 (58.8)	8 (23.6)		
	Dental	2 (8.7)	16 (69.6)	5 (21.7)		
Experience	<5	22 (15.7)	74 (52.9)	44 (31.4)	2.39	0.30
	≥5	19 (23.8)	36 (45)	25(31.2)		
History of training	Yes	20 (18.9)	51 (48.1)	35 (33.0)	0.52	0.78
	No	21 (18.4)	60 (52.6)	33 (29.0)		

*δ Significant association, *Catholic, Jehovah Witness and Adventist, **Single, Divorced and Widowed †Dental doctors, Health officers and Anesthesiologists, Lab.- laboratory technician and technologist*

A chi-square test of independence was also performed to examine the relation between knowledge score and attitude score among health care workers. The P-value (0.40) indicated that there was no statistically significant association between the two variables.

6.6. Determinants of vaccination status among HCPs

A logistic regression analysis was conducted to identify predictors of vaccination status among HCPs. When binary logistic regression was run separately for each predictor (Bivariate analysis); marital status [OR=3.5 (95% CI=1.7-7.2)], profession type [OR=2.6 (95% CI=1.3-5.1)], experience [OR=6.2 (95% CI=2.3-16.4)] and history of training [OR=2.9 (95%C=1.4-5.7)] were found to be significant predictors of vaccination status. However, multivariate analysis that only profession type and history of training made a significant contribution to prediction ($p = 0.05$ and 0.025 respectively). In this regard, nurses were 3.8 times more likely to take the vaccine. Likewise those who had history of training on infection prevention were 2.8 times more likely to take the vaccine than those who didn't have history of training. Other variables were not a significant predictor (Table 6.10).

Table 6.9. Determinants of vaccination status among HCPs in selected public hospitals of Addis Ababa, Ethiopia, July, 2014

Variables		Yes N (%)	No N (%)	Crude OR (95%CI)	AOR (95% CI)
Sex	Male	86 (77.5)	25 (22.5)	1 (0.5-1.9)	1.1 (0.5-2.5)
	Female	87 (77.7)	25 (22.3)	1	1
Religion	Orthodox	114 (78.6)	31 (21.4)	0.4 (0.1-3)	2 (0.2-23.5)
	Islam	20 (71.4)	8 (28.6)	0.3 (0-2.3)	2 (0.2-27.1)
	Protestant	33 (75)	11 (25)	0.3 (0.1-2.6)	0.7 (0.1-8.7)
	Others*	10 (90.9)	1 (9.1)	1	1
Marital status	Married	85 (88.5)	11 (11.5)	3.5 (1.7-7.2)$^{\delta}$	0.4 (0.1-1)
	Others**	89 (69)	40 (31)	1	1
Educational status	Diploma and below	52 (71.2)	21 (28.8)	1	1
	Degree and above	125 (81.2)	29 (18.8)	0.6 (0.3-1.1)	2.4 (0.9-6.1)
Profession	Nurse	87 (86.1)	14 (13.9)	2.6 (1.3-5.1)	3.8 (1.5-9.5)$^{\delta}$
	Others†	90 (70.9)	37 (29.1)	1	1
Area of practice	Surgical	55 (79.7)	14 (20.2)	1.2 (0.6-2.5)	0.6 (0.2-1.6)
	Other††	118 (76.1)	37 (23.9)	1	1
Experience	<5	98 (70.5)	41 (29.5)	1	1
	≥5	74 (93.7)	5 (6.3)	6.2 (2.3-16.4)$^{\delta}$	3.3 (0.9-12)
History of training	Yes	92 (86.8)	14 (13.2)	2.9 (1.4-5.7)	2.8 (1.1-7.1)$^{\delta}$
	No	78 (69.6)	34 (30.4)	1	1
Overall knowledge score	Low	34 (77.3)	10 (22.7)	1	1
	Moderate	85 (74.6)	29 (25.4)	0.7 (0.3-1.8)	0.6 (0.2-1.8)
	High	58 (82.9)	12 (17.1)	0.6 (0.3-1.3)	0.7 (0.2-2.5)
Overall attitude score	Negative	24 (77.1)	7 (22.9)	1	1
	Neutral	83 (82.2)	18 (17.8)	1.3 (0.5-3.3)	1.1 (0.3-4)
	Positive	70 (72.9)	26 (27.1)	1.7 (0.9-3.4)	0.5 (0.1-1.7)

*δ Significant association * Catholic, Jehovah Witness and Adventist **Single, Divorced and Widowed †Midwifes, Laboratory Technologist/Technicians, Medical doctors, Dental doctors, Health officers and Anesthesiologist †† Emergency, Laboratory and Dentistry*

6.7. Qualitative result

The result presented here represents in-depth interview of selected departments' heads (delivery, dentistry, emergency, laboratory and surgery) on awareness and practice of HBV infection and its vaccination. In this qualitative study, a total of 8 interviews were held. Two main themes from these in-depth interviews were identified.

Awareness on HBV infection

Key informant expressed almost similar views regarding the awareness of HCWs on HB infection and infection prevention. Majority of the KIs believed that HCWs working in their department had adequate awareness on HB infection. Their opinion is emanated from the fact that HCWs working in their department were at high risk of contracting infectious pathogens, and thus they are supposed to be more knowledgeable and they also are required to be vigilant about infectious pathogens and are expected to know proper handling of patients and potentially infectious fluids. Moreover, the KIs supposed that these days there is an increase in awareness of HBV among HCWs. Two out of eight ascribed the increase in awareness to initiation of the vaccination program, saying that after the vaccination was commenced, HBV became the subject of discussion. One of our key informants tried to express this concept as follows:

> *"In the previous times staffs were said to have low awareness on HBV infection. However, right after the vaccination program was embarked on, the HCWs started to explore relevant information about it… nowadays it seems that the awareness of HBV is increasing…"*(Emgcy 01).

The KI's also explained that the basis for deeming staffs working in their respective department to have appropriate awareness on HBV infection is from what they happen to observe while

HCWs handle risky situations in the course of their professional practice and while they discuss each other on this matter. Three out of eight believed that these days HCWs are more concerned about HBV rather than HIV. Among them one said;

> *"…these days our biggest worry is not HIV it is HBV rather; this is because HBV is highly infectious than HIV and other blood borne pathogens"* (Emgcy 01).

Their concern is worsened by the lack of awareness of the lay public about HBV. KI's view is emanated from the fact that virtually all patients that HCWs encounter are known to be unscreened for the virus, so it's difficult to know the status of the patients and take the necessary care while handling HBV positive patients.

Nearly all KIs (seven of them) said that most of senior staffs working in their department had taken training on infection prevention (not geared towards HBV though) and they recommended that since HBV is a big concern in health care setting, HBV focused training need to be organized so as to make the awareness of the HCWs even better.

With regards to determinants of occupational HBV infection, all KIs' view was focused on environmental and patient-related factors. As environmental factor they mentioned like non conducive and crowded working room and uncooperative and restless patient as patient related factors. With regard to some flaws from HCWs as an underlying cause for occupational exposure, our interviewees expressed conflicting views. Few of them (two) admitted that some HCWs are careless in handling patient and potentially infectious materials while others refuted it. One of our KIs tried to explain this concept as follows:

"…I can't say that all HCWs take appropriate care while providing the service… you may sometimes observe some kind of carelessness on using personal protective equipment (PPE) among the HCWs, especially experienced ones…" (Dent).

Factors affecting vaccination status

When asked about the underlying causes for not being vaccinated among HCWs, majority of the KIs stressed unavailability of the vaccine in their hospital and cost of the vaccine in private facilities as important factors for vaccination against HBV among HCWs. Some said the vaccination program seemed to be some kind of campaign. In relation to this concept, one of our KIs expressed his view like this:

"…senior staffs have taken the vaccine but currently there is no continual supply of the vaccine for recently recruited employees…" (Surg 03).

They also said that some staffs would want to get vaccinated on their own had it not been the high cost of screening and vaccine in private health facilities. In relation to this, KIs indicated that the government should give due emphasis to the safety of HCWs by making the necessary infection prevention supplies and the vaccines available.

Other determinants mentioned by some KI include: ignorance from staffs, lack of accurate lab result (screening test) and afraid of the side effect of the vaccine. In relation to the lack of accurate lab result in public hospitals, one of our respondents described his experience in this way:

"…the vaccine is offered after the screening for HBV negativity but the test was not accurate…in my own experience I was not allowed to take the vaccine for test result

showed slightly reactive for HBV as per the lab test done in the hospital but when confirmatory test was done somewhere else it was found to be negative for HBV" (Surg 01).

Few KIs expressed the concerns of some of the HCWs for not receiving vaccine in relation to the perceived side effect of it. Although HB vaccine, which is identified as a recombinant subunit vaccine is known to have excellent record of safety, few of our KIs said that some HCWs doubt the safety of the vaccine. Here is how one of our participants expressed her view.

"…some HCWs think that the vaccine is life attenuated and if someday their immunity decline, it may cause the infection. …" (Delv 01).

Majority of KIs also indicated that to alleviate the problem of occupational exposure, regular training and uninterrupted supply of PPE is essential. PPEs were not regularly available due to lack of emphasis and awareness of administrative staffs on infection prevention equipment and supplies. All KIs agreed that their department and other stakeholders should play crucial role in strengthening infection control strategies. Some complemented this views saying that since they are working in the infection prone units, they should play crucial role in facilitating the activities related to infection prevention.

Awareness of HCWs about the serological screening is also among the determinants of having complete vaccination. When KIs were asked whether immune response test was done for those staffs who had completed the vaccine series, all said there is no such thing in their hospital as post-vaccination serological test. One of our key informants responded like this;

"…I don't even know what immune response test is…'' (Lab 01).

7. Discussion

This study assessed the knowledge, attitudes and practices of HBV and its vaccination among HCPs in selected public hospitals of Addis Ababa, Ethiopia. Two hundred thirty (96%) of the study participants responded that they have ever heard or read about HB infection. Most of the survey participants who had never heard or read about HBV were freshly recruited recent graduates, and this in part may be due the absence of addressing this topic during training in their schools.

In the present study, HCPs knowledge regarding occupational transmission of HBV was found to be good. This result goes hand in glove with some key informant's view since they had said that these days there is an increase in awareness of HBV infection after initiation of the vaccination program. Our finding is also compatible with study done in Nigeria since majority of them had good knowledge about the risk factors for occupational transmission of HBV infection (Emeka *et al*., 2011). Other studies have found that knowledge about the risk of contracting HBV is generally low amongst HCWs (Moghimi *et al.*, 2008; Stein *et al*, 2003). A possible explanation for this disparity could be due to difference in the risk of occupational hazard among HCWs, level of vaccination and time in which studies were conducted. In this study only subjects deemed to be the "*high risk groups"* were included, and they are more likely to have better knowledge than other HCWs.

It is evident that positive attitude toward HB infection prevention is important in management of occupational HBV infection. However, several studies have found both negative and positive attitudes among HCWs towards HBV infection and its prevention. In our study overall attitude score was not good as greater proportion, 127 (55.2%) of the respondents was found to have

neutral or negative attitude towards HB infection and its vaccination. Similarly, one study in Nigeria has shown poor attitude score among HCWs (Ibekwe and Ibeziako, 2006). But our finding is inferior as compared to other studies; for instance a study in Kuwait revealed a high percentage of respondents reported positive beliefs towards HB infection (Soad *et al*., 2012). Another study has also shown a good level of attitude toward HB infection and its vaccination among HCWs (Africa, 2010). The disparities in the finding of various studies is not straightforward to explain but it can be attributed to difference in on-job training status among the HCWs as it can helps in changing attitudes of the HCWs. In our study the greater proportion of HCPs had not attended training on infection prevention.

The circumstances leading to exposure may be dictated by working environment and certain job-related practices. In the present study, all KIs agreed that work environment and patients related factors as contributing factors for the exposure. In quantitative study, respondents frequently picked out being busy and rushing at work as contributing factors for exposure to HB infection. Most frequently taken measure after occurrence of the exposure was found to be washing the injury with antiseptics and water (67.5%), while up to 48% of them had checked the status of the patient. Occupational exposures almost go undocumented in many developing countries (Roy and Robillard, 1995). Similarly, in our study immediate reporting was practiced only by 31.3% of the respondents. This is inconsistent to CDC's recommendation which states all HCWs should report after sustaining the injury (CDC, 2001). One study revealed that HCWs didn't report NSIs because they didn't want to know the results of tests after reporting and others didn't think reporting was of any use (Makary *et al.*, 2007), and this partially may explain lower reporting practice in the present study.

In this study, 77.7% of HCPs had been screened and received HB Vaccine. This figure is superior as compared to a study done in Sudan, Burkina Faso and Nigeria where only 50%, 47.7% and 26.8% of HCWs respectively were vaccinated (Bakry *et al.*, 2012; Emeka *et al*., 2011; Ouédraogo et al., 2013). Comparable result was reported in the cross-sectional survey conducted in Kuwait; where about three quarters of the respondents (74.7%) have received Hepatitis B vaccine (Soad *et al*., 2012). But our figure is lower as compared to study done in Italy (Stroffolini *et al*, 2008). Reasons for the observed difference of findings between different research results might be due to the difference in the level of awareness among HCWs, and economic difference of the study population which causes poor accessibility and affordability of the vaccine in developing countries.

Most of the surveyed HCPs indicated that unavailability and high price of the vaccine are among the barriers for not being vaccinated. Likewise majority of KIs emphasized unavailability of the vaccine in their hospital and cost of the vaccine in private institution as important factor influencing vaccination status. A study in India has also shown that along with knowledge of HBV infection, the availability of HBV vaccine was important factor of vaccination (Chaudhari *et al.*, 2009). In Sudanese study, the main reasons for failure to be vaccinated were unawareness of the vaccine's availability and expensiveness of the vaccine (Bakry *et al.*, 2012). This country-to-country difference in the specified reason could be due to dissimilarity in the study setting and economic difference of the study population.

In our study, in spite of having of having fair vaccination status among HCPs, immune response test was not done after completing the vaccine series. This result is inconsistent with CDC's immunization guidelines, where serologic testing 1–2 months following the final dose of the HB vaccine series is a requirement (CDC, 2001). Our finding is in agreement with KAP study done

in Tikrit which showed that out of surveyed HCPs none of them had immunity test (Noaman *et al.*, 2012). However, this result was not in agreement with a study done in Pakistan where there were 60% of study participants who knew their status of immunity against HBV (Rana *et al.*, 2000).

Since the efficacy of the vaccine is known to be 90-95%, about 5 to 10 % of those vaccinated will fail to show immunity against HBV (CDC, 2001). So it is important to have immunity test after completing the vaccine series in order to identify the non-responders. Lack of immune titer test in present study was due low level of knowledge among the HCPs about the importance of immune test. Even among senior staffs there was knowledge gap about immunity test as reflected both in qualitative and quantitative study. Only 62.7% of respondents knew that after completing the vaccine series, anti-Hbs serologic testing has to be done, and only 44.2% of the study participants knew that the vaccine series have to be repeated if test result is negative. But CDC's HBV immunization guidelines recommends that the vaccine series should be repeated 2 months after the last dose of the vaccine if the serologic test is negative (CDC, 2001).

As far as determinants of knowledge score is concerned, the study indicated that only level of education, type of profession (being nurse) and area of practice (being in surgical unit) were found to have significant association with overall knowledge score. The effect of education status on knowledge score is evident; more educated HCWs are expected to have better knowledge level. One study in china has also shown that education level is important determinant of knowledge level (Chao *et al*., 2010). In this study, the association between area of practice and knowledge score was linked to uneven distribution of HCPs with better educational background; degree holders had been disproportionally concentrated in surgical department. In our study type of profession (being nurse) was found to have significant association with

knowledge level but other studies such as study by Chao *et al*. (2010) showed that nurses were found to have lower knowledge level than other professions such as physicians. The association in our study should be interpreted with some cautions as it might be due to uneven distribution of the profession type. The present study comprised of higher number of nurses.

In the present study, only profession type and history of training made a significant contribution to prediction to vaccination status. It is evident that training of staffs on infection prevention helps in changing mindsets and usually makes them to be sensitized, and this in part could explain why it is a significant predictor of vaccination status. In this study profession type (being nurse) is also a significant predictor of vaccine acceptance, and again this might due to the fact that majority of our survey participants were nurses. Other studies have also showed that occupation is an important predictor of vaccination status (Doebbeling *et al.*, 1996; Emeka *et al*., 2011).

Our study revealed that the knowledge and attitude scores were not significantly associated, and they were not significant predictors of vaccination status as well. It seems quite surprising but it is not uncommon to find out lack of association between these variables. One study from Nigeria showed that knowledge on risk of contracting HBV did not have any influence on vaccination status (Ibekwe and Ibeziako, 2006). But other study such as study in Botswana stands in contrast with what was found in our study; where positive attitude was found to be a significant predictor of vaccination status (Africa, 2010). Good knowledge does not necessary translate into good attitude; by the same token, attitude of HCWs may not always be proportional to vaccination since availability of the vaccine may dictate vaccination status more.

As in any other studies, there are some potential limitations in our study that should be considered when interpreting the results. First, in cross-sectional study, all factors (outcome and its determinant) are measured simultaneously; therefore, no temporal relationship between variables and outcomes can be ascertained. Another limitation is that, this study was limited to public hospitals under AARHB, which limits generalizability of the result to HCWs in other wings of public hospitals, private and non-governmental facilities. There was also probability of volunteer bias, where non-responders may have had lower knowledge, attitudes and practices in comparison to responders, and thus would not be interested in participating. In spite of these limitations, our study also has several strengths. For instance, combining both qualitative and quantitative method increases the validity of our findings. To our knowledge, there have been no other studies on HBV knowledge and practices performed on HCPs. Given the absence of previous study, our findings present valuable information about KAP of the HCPs.

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8. Conclusion

The knowledge of HBV infection and its vaccination for majority of our respondents was ranged from moderate to high, and larger percentage of HCPs had negative or neutral attitudes on HBV and its vaccination. In spite of this, the vaccination status was encouraging as greater proportion of HCPs had been screened and received HB Vaccine. However, some areas of KAP of HCPs need to be corrected or improved. Areas where HCPs had knowledge deficiencies were: whether HBV infection is curable or not, number of doses of the vaccine required for complete protection, expected interval between the doses of the vaccine, the effectiveness of the vaccine when used as PEP, and requirement of post-vaccination serological testing. Knowledge score was significantly associated with: education level, type of profession and area of practice. Profession and history of training were the only significant predictors of vaccination status. Vaccination status was not significantly associated knowledge and attitudes score; there was no statistically significant association between knowledge and attitude score as well.

9. Recommendations

Based on our key findings, we would like to forward the following recommendation.

For the hospital administrators and policy makers

- Governmental and non-governmental organizations need to consider expanding the currently available prevention facilities and put in place sustainable infection control and prevention strategies.

- Training of HCW's on proper uses of PPEs as well as safe handling and proper disposal of potentially infectious fluids and devices would be important to reduce occupational HB transmission.

- It would be much helpful if awareness creation activities like disseminating important information on HBV infection and its vaccination are done, especially in areas where HCPs had knowledge deficiencies and unfavorable attitudes.

- There was a great deal of newly employed healthcare workers who were unvaccinated, this indicates the need for well-planned and clear policies of HBV vaccination in order to maintain a steady supply HB vaccine.

- Due emphasis should be given to improve HCPs knowledge and attitude on post vaccination immunity test and encourage them to have investigated their status of immunity against HB

- It is important to look into ways of making anti-HBs testing available for all healthcare workers, especially those who are at a greater risk of exposure to blood or other potentially infectious material.

Way forward for researchers

- Further study should be conducted in other level of health care settings and other part of the country so as to have broader understanding of KAP of the HCPs
- Problems related to HB vaccine availability in public hospitals and cost in private facilities being frequently stated reasons for not receiving the vaccine, indicates the need to assess accessibility and affordability of HB vaccine.

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Annexes

Annex I. English version of verbal consent format for key informants

Greetings! My name is Gashu Afework and I'm a post-graduate student in school of Pharmacy, Addis Ababa University. I'm conducting my research on assessment of knowledge, attitude and practice of HBV and its vaccination among HCPs in selected government's Hospitals of Addis Ababa.

I'd like to conduct a key informant interview with you to gain some insight about the current status of vaccination among HCWs in your department/ward with special emphasis to factors that can affect their vaccination status. Your response may help us to pave way for quantitative study which is to be conducted among HCPs. I am asking you for a little of your time, only about 15-20 minutes. Your participation in this interview is fully based on your consent. However, your information is very important for the study. The information provided in this interview will be used for the research purpose only and strictly kept confidential. No identifiers will be used in the documentation process of the interview and in case there is any information that may identity you, they will be kept under strict confidence with the PI.

With your permission, I'd like to use an audio recorder to assure a more complete documentation of the interview.

Do you agree to go ahead with the interview?

Annex II. English version of in-depth interview guide

1. Do you think HCWs in your department have adequate awareness regarding hepatitis B infection and its prevention?

   Probe: _____

   ☞ The possible reasons for the inadequacy

   ☞ Training status

2. What risk factors for occupational exposure to infectious disease?

   Probe:_____

   ☞ In relation to working environment

   ☞ Patient character

   ☞ HCWs attributes

3. The vaccination status of HCWs and the possible reasons for not being vaccinated?

   Probe: _____

   ☞ Vaccine availability and other hospital related factors

   ☞ Cost of the vaccine

4. Have HCWs the screed for post- vaccination anti-HBs serologic testing?

   Probe_____

5. In your opinion how can HCWs encouraged to have better awareness and get vaccinated?

   Probe_____

6. What do you think are the roles of hospital administrators and your department to alleviate the problems related to occupational exposure and immunization?

   Probe_____

   What are the challenges

7. Anything you'd like to add or comment on?

Thank you for your time and participating in the study.

Annex III. Amharic version of verbal consent format for key informants

በግንዛቤ ላይ የተመሰረተ የስምምነት ማረጋገጫ ቅጽ

ጤና ይስጥልን! (እንደምን አደሩ/ዋሉ)። ስሜ ጋሹ አፈወርቅ ይባላል። በአዲስ አበባ ዩንቨርስቲ በፋርማኮእፕድሞሎጂና ሶሻል ፋርማሲ ት/ክፍል የማስተርስ ተማሪ ስሆን የመመረቅያ ጽሁፌን የጤና ሰራተኞች ስለሄፓታትስ ቢ ቫይረስ (HBV) እና ስለ በሽታዉ ክትባት (HBV vaccination) ያላቸዉን ግንዛቤና ክትባቱን የተከተቡ ሰራተኞች ሁኔታ (HBV vaccination status) በማጥናት ላይ እንገኛለን።

የጥናቱን ሀሳብ በቅድምያ መረዳት እንድያስችለንና በለሎች የጤና ሰራተኞች ለሚናካህደዉ ጥናት መንደርደርያ እንድሆነን ጉዳዩ በዋናነት ከሚመለከታቸዉ የድፓርትመንት ሃላፍዎች ጋር ቃሌ መጠየቅ ለማድረግ አቅደናል። ቃሌ መጠየቁን ለመፈጸም የሚፈጀዉ ግዜ 15-20 ደቅቃ ብቻ ነዉ። የሚሰጡኝ መረጃና አስታየትዎ ምስጥውነቱ የተጠበቀ ስለሆነ መረጃዉ ከጥናቱ አገልግሎት ዉጪ ለማንም በምንም ሁኔታ አይገለጽም። በተጨማርም በቃለ መጠየቁ ላይ የመሳትፍ አለመሳተፍ መብትዎ የተጠበቄ ነዉ። ይሁንና ከእርስዎ የሚገኘዉ መረጃ በጥናቱ መጨረሻ ማወቅ ስለምንፈልገዉ ዉጤት ከፍተኛ ጠቀሜታ አለዉ።

የሚሰጡኝን መረጃ በደንብ መያዝ እንድያስችለኝ ፈቃደኛ ከሆኑ በቃለ መጠየቁ ላይ መቅለጸ ድምጽ (audio recorder) ለመጠቀም አስበአለሁ።

ስለጥናቱ አጠቃላይ ሁኔታ ግዜዎትን ሰጥተዉ ስለሰሙኝ አመሰግናለሁ።

በቃለ መጠይቁ ላይ ለመሳተፍ ፈቃደኝ ነዎት?

Annex IV. Amharic version of in-depth interview guide

1. ድፓርትመንትዎ ዉስጥ የሚሰሩ የጤና ባለሞያዎች ስለ ሄፓታትስ ቢ እንፈክሽን (HBV infection) እና ከተላላፍ በሽታ ራስን ስለመጠበቅ (infection control) ተገብዉን ግንዛቤ ያላቸዉ ይመስሎታል?

አውጣጣ_____

- ☞ ለግንዛቤዉ እጥረት ምክንያቶቹ
- ☞ የስልጠና ሁኔታ

2. ለተላላፍ በሽታ መጋለጥ (occupational exposure) መክንያቶቹ ና አጋላጭ ሁኔታዎች ምንድናቸዉ

- ☞ ከስራ አከባቢ አንጻር
- ☞ ከታካሚ አንጻር
- ☞ ከጤና ባለሙያ አንጻር

3. ክትባቱን የወሰዱ የጤና ባለሞያዎች ሁኔታና ላለመከተብ ምክንያቶቹ

አውጣጣ_____

- ☞ የክትባቱ አቅርቦትና ለሎች ከሆስፕታሉ ጋር የተገናኙ ችግሮች
- ☞ የክትባቱ ዋጋ

4. ክትባቱን ሙሉበሙሉ ወስደዉ ከጨረሱ በኋላ እምዩን ረስፖንስ (immune response) ለማረጋገጥ የደም ምርመራ (anti-HBs serologic testing) ተሰርቶላቸዉ ነበር?

አውጣጣ_____

5. በእርስዎ እምነት የጤና ባለሞያዎችን ግንዛቤ ለማሻሻልና ክትባቱን እንድከተቡ እንዴት ማበረታታት ይቻላል?

አውጣጣ_____

6. የችግሩን መጠን ለመቀነስ የድፓርትመንትዎና የሆስፕታሉ ሚና ምን መሆን አለቤት ብለዉ ያምናሉ?

አውጣጣ_____

- ☞ ተግዳሮቶቹ

7. በመጨረሻም የሚጨምሩት ወይም አስታየት ልሰጡበት የሚፈልጉት ነገር ካለ?

አመሰግናለሁ

Annex V. English version of verbal consent format for HCPs

How are you? My name is _____. I'm here to execute a study by Gashu Afework, who is studying his MSc at Addis Ababa University, school of pharmacy. The study entitled- *knowledge, attitude and practice of HBV and its vaccination among HCPs in selected public hospitals of Addis Ababa.* I will request you to listen carefully to what I am going to read to you about the purpose and general condition of the study and you will tell me whether you agree or disagree to participate in this study.

The purpose of this study is to assess knowledge, attitude and practice regarding HBV and its vaccination among HCPs. The study might be helpful to develop effective recommendations in reducing the risk occupational exposure to HBV and improving HCPs safety in their practice area. I am asking you for a little of your time, about 15-25 minutes only to participate in this study. The information you give us will be very useful in the realization of this study, and it will be kept confidential and your name and address will not be recorded so as to protect your confidentiality. You have also the rights to answer or not for the questions which might be inconvenient for you. However, your information is very important for the study. Again we would like to confirm to you that all your answers are confidential and used for research purpose only.

Are you willing to participate in this study?

To get additional information you can contact us on:

Principal investigator: Gashu Afework

Contact address: Mob: 0926037791

E-mail: gashumanafework@yahoo.com

Research Advisor: Dr. Teferi Gedif, AAU

E-mail: tgedif@gmail.com

Annex VI. English version of the survey questionnaire

Addis Ababa University

School of pharmacy

Department of pharmaceutics & social pharmacy

Semi-structured questionnaire designed to assess KAP of HBV and its vaccination among HCPs in selected public hospitals of Addis Ababa

I. Socio-demographic and occupational characteristics of the respondent (circle your answers)

No	Question	Response option
1.	Your age (write on the space provided)	…….
2.	Sex	1. Male 2. Female
3.	You current marital status	1. Unmarried 2. Married 3. Divorced 4. Widowed
4.	What is your religion?	1. Orthodox 2. Muslim 3. Protestant 4. Catholic 5. Others/specify.....
5.	What is your profession?	1. Medical Doctor 2. Nurse 3. Health officer 4. Lab. Technologist/Technician 5. Anesthetics 6. Midwifes

		7. Dentist/Dental technician 8. Other /specify…….
6.	Your educational level	1. Certificate 2. Diploma 3. First Degree 4. Master's Degree 5. Specialist/specify the field_____
7.	In which department are you working currently?	1. Surgical department 2. Laboratory 3. Delivery unit 4. Emergency department 5. Dental department
8.	Work experience as health care professional	…….years
9.	Have you ever attended training on infection prevention?	1. Yes 2. No

II. Participant knowledge on HBV infection and its vaccination

No	Question	Response option	Remark
1.	Have you ever heard/read about HBV?	1. Yes 2. No ⟶	**If your answer is No please don't go any further & stop here.**
2.	What is your source of information? (Multiple answers are possible)	1. Training 2. Mass media 3. Formal educa-tion/school 4. Friends	

		5. Internet 6. Journals 7. Other/specify……	
3.	Can you get HBV infection through percutaneous injury?	1. Yes 2. No 3. I don't know	
4.	Can you get HBV infection through mucous membrane contact with blood?	1. Yes 2. No 3. I don't know	
5.	Is blood infectious body fluid?	1. Yes 2. No 3. I don't know	
6.	Is vaginal fluid infectious body fluid?	1. Yes 2. No 3. I don't know	
7.	Is amniotic fluid infectious body fluid?	1. Yes 2. No 3. I don't know	
8.	Is urine infectious body fluid?	1. Yes 2. No 3. I don't know	
9.	Is hepatitis B curable disease?	1. Yes 2. No 3. I don't know	
10.	Does HBV cause liver cancer?	1. Yes 2. No 3. I don't know	
11.	How many doses of HB vaccine required for complete protection?	……..	
12.	What is expected interval between the first		

	dose and the dose next to it in month?	……..	
13.	What is expected interval between the last dose and the dose preceding it in month?	…….	
14.	If the vaccine is taken after exposure does it reduce the likelihood of being positive for HBV?	1. Yes 2. No 3. I don't know	
15.	For HCWs who have completed their vaccine series, should their immunity status be checked (anti-HBs serologic testing should be done)?	1. Yes 2. No 3. I don't know	
16.	If their immunity test result is negative does the vaccine series need to be repeated?	1. Yes 2. No 3. I don't know	

III. Participant Attitude toward HBV infection and its vaccination

(Please use ✓ mark to indicate your answers)

No	Indicate your level of agreement for following statements	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1.	Hepatitis B is serious public health problem					
2.	Your job puts you at greater risk of HB infection					
3.	It is necessary for you to receive HB vaccine					
4.	HB vaccine is safe					
5.	After exposure to contagious fluid/ material, the vaccine reduces likelihood of being HBV positive					
6.	HBV positive HCWs should not be involved in exposure prone in-					

	vasive procedures					
7.	The vaccine is not important if the exposure is not with patient blood of known HBV positive					
8.	There should be the vaccine guideline in work areas					
9.	Training of the vaccine is important for a behavioral change					

IV. Participant practice related to occupational exposure of HBV and its vaccination

No	Question	Response option
1.	Have you ever been exposed to HBV risky conditions? (Percutaneous injury or mucous membrane contact with infectious fluid)	1. Yes 2. No 3. I do not remember
2.	If yes to the above question what factor contributes to the exposure? (multiple answer is possible)	1. Lack of infection prevention supplies 2. Being busy 3. Rushing at work 4. Careless handling of the patient or infectious materials 5. Others/specify……
3.	If yes for question no 2, what sort of postexposure preventive measures did you take?	1. Immediately reporting 2. Know about patients' disease 3. Allow injury to bleed 4. Wash with soap, water and antis septic 5. Other/specify ……
4.	Have you ever received hepatitis B Vaccine?	1. Yes 2. No

		3. I do not remember
5.	Reason for not being vaccinated (for unvaccinated only)	1. Cost of the vaccine 2. The vaccine is not easily available 3. Afraid of vaccine's side effect 4. Vaccination is not necessary 5. Lack of information 6. Afraid of needles 7. Too busy 8. Other/specify……
6.	Have you received full course of vaccination?	1. Yes 2. No 3. I do not remember
7.	If your answer is No to questions no 6, what was reason for not receiving full course of vaccination?	1. Fear of adverse effects 2. Assuming that it was enough 3. Being busy 9. Afraid of needles 4. Other/ specify……

Annex VII. Amharic version of verbal consent format for HCPs

የቃለ መጠይቅ ስምምነት ማረጋገጫ ለጤና ሰራተኞች

ጤና ይስጥልን!(እንደምን አደሩ/ዋሉ)። ስሜ _____ ይባላል። እኔ በአዲስ አበባ ዩንቨርርስቲ ፋርማሲ ት/ክፍል የማስተርስ ድግሪዉን በመስራት ላይ ከሚገኝ ከጋሹ አፈወርቅ ጋር በመስራት ላይ ስሆን የመመረቅያ ጽሁፉን የጤና ሰራተኞች ስለሄፓታትስ ቢ ቫይረስ (HBV) እና ስለ በሽታዉ ክትባት (HB vaccination) ያላቸዉን ግንዛቤና ክትባቱን የተከተቡ ሰራተኞች ሁኔታ (HB vaccination status) በተሰኜ ርእስ በማጥናት ላይ ይገኛል። ስለዝህም እርስዎ ስለጥናቱ አላማና አጠቃላይ ሁኔታ ስገጽልዎት በጥሞና ካዳመጡኝ በኃላ በጥናቱ ለመሳተፍ ፈቃደኛ መሆን አለመሆንዎን እንድገልጹልኝ በትህትና እጠይቃለሁ።

የዝህ ጥናት ዓላማ የጤና ሰራተኞች ስለሄፓታትስ ቢ ቫይረስ (HBV) እና ስለ በሽታዉ ክትባት (HBV vaccination) ያላቸዉን ግንዛቤና ክትባቱን የተከተቡ ሰራተኞች ሁኔታ (HBV vaccination status) በተመረጡ የአዲስ አበባ የመንግስት ሆስፒታሎች ላይ ማጥናት ይሆናል። የጥናቱ ዉጤትም የጤና ሰራተኞች በስራ ላይ የምያጋጥማቸዉን የችግሩ ተጋላጭነት ለመቀነስና ደህንነታቸዉ እንዲተበቅ ለማድረግ ጠቃም መኔሻ ሃሳብ ይሆናል። በጥናቱ ላይ ለመሳተፍ የሚፈጀዉ ግዜ 15-25 ደቅቃ ብቻ ነዉ። የሚሰጡኝ መረጃና አስታየት ምስጥራውነቱ የተጠበቄ ስለሆነ መረጃዉ ከጥናቱ አገልግሎት ዉጪ ለማንም በምንም ሁኔታ አይገለጽም። በተጨማርም በጥናቱ ላይ የመሳትፍ አለመሳተፍ ሙብትዎ የተጠበቄ ነዉ። ይሁንና ከእርስዎ የሚገኘዉ መረጃ በጥናቱ መጨረሻ ማወቅ ስለምንፈልገዉ ዉጤት ከፍተኛ ጠቀሜታ አለዉ።

ስለጥናቱ አጠቃላይ ሁኔታ ግዜዎትን ሰጥተዉ ስለሰሙኝ አመሰግናለሁ።

በጥናቱ ላይ ለመሳተፍ ፈቃደኝ ነዎት?

ስለጥናቱ ጥያቄ ካለዎት የጥናቱን ባለቤት በምከተለዉ አድራሻ ማግኘት ይችላሉ።

የጥናቱን ባለቤት: ጋሹ አፈወርቅ

ሞባይል: 0926037791

ኢ-መይል: gashumanafework@yahoo.com

የጥናቱ አማካሪ: ዶክተር ተፈሪ ገድፍ (አዲስ አበባ
ዩንቨርስቲ)

ኢ-መይል: tgedif@gmail.com

Annex VIII. Amharic version of the questionnaire

አዲስ አበባ ዩንቨርስቲ

ፋርማሲ ት/ቤት

ፋርማስትክስና ሶሻል ፋርማሲ ት/ክፍል

ክፍል አንድ፡- የተሳታፍዉን አጠቃላይ መረጃ የሚመለከቱ ጥያቅዎች

ተቁ.	ጥያቄ	የመልስ አማራጮች
1.	እድሜዎ ስንት ነው? (በባዶዉ ቦታ ላይ ይፃፉ)	_____ዓመት
2.	ፆታ	ı. ወንድ 2. ሴት
3.	የጋብቻ ሁኔታዎ	ı. ያላገባ 2. በትዳር ላይ ያለ 3. የተፋታ (የተለያዩ) 4. የትዳር ጓደኛ በሞት የተለየ
4.	የየትኛው ኃይማኖት ተከታይ ነዎት?	ı. ኦርቶዶክስ 2. የእስልምና 3. ፕሮተስታንት 4. ካቶሊክ 5. ሌላ/ይጥቀሱት_____
5.	ሞያዎ ምንድነው?	ı. የህክምና ዶክተር 2. ነርስ 3. የጤና መኮንን 4. መድካል ላቦራቶሪ ተክኖሎጅስት/ተክንሻን 5. አንስተትክስ 6. ምድዋይቭ 7. የጥርስ ሐክም/ተክንሻን 8. ሌላ/ይጥቀሱት _____
6.	የትምህርት ደረጃዎ	ı. ሰርተፍከት 2. ድፕሎማ 3. የመጀመርያ ድግሪ 4. ማስተረስ ድግሪ 5. ስፔሻልስት/ዘርፉን

		ይጥቀሱት_____
7.	በአሁን ግዜ የሚሰሩበተ ድፓርትመንት	1. ሰርጅካል ድፓርትመንት 2. ላቦራቶሪ 3. ማዋለጃ ክፍል 4. ድንገተኛ ክፍል 5. የጥርስ ሕክምና ክፍል
8.	በጤና ሞያ ያለዎት የስራ ልምድ	_____ዓመት
9.	ከተላላፍ በሽታዎች ራስን ሰለ መጠበቅ (infection prevention) ስልጠና ወስደዉ ያዉቃሉ?	1. አዎ 2. አይ

ክፍል ሁለት፡- የተሳታፍዉን ግንዛቤ ስለሄፓታትስ ቢ እንፈክሽንና ስለክትባቱ

ተ.ቁ	ጥያቄ	የመልስ አማራጮች	ርማርክ (Remark)
1.	ስለ ሄፓታትስ ቢ ቫይረስ ሰምተዉ ወይም አንብበዉ ያዉቃሉ?	1. አዎ 2. አይ ⟶	**መልስዎ አይ ከሆነ ቀጥሎ ያሉ ጥያቄዎች ስለማይመለከቶት እዝሁ ያቁሙ። እናመሰግናለን።**
2.	የመረጃዎ ምንጭ ምንድነዉ? (ከአንድ መልስ በላይ መመለስ ይቻላል)	1. ስልጠና 2. ብዙዋን መገናኛ 3. መደበኛ ትምህርት 4. ጓደኛ 5. ኢንተርነት 6. ጆርናሎች(Journals) 7. ሌላ/ይጥቀሱት _____	
3.	ሄፓታትስ ቢ ከአንድ ሰዉ ወደ ለላ በስለታም ነገር በምመጣ ጉዳት ይተላለፋል?	1. አዎ 2. አይ 3. አላዉቅም	
4.	በሙኮስ መምብረንና(Mucous membrane) በሰዉነት ፈሳሽ ንክክ ቫይረሱ ይተላለፋል?	1. አዎ 2. አይ	

		3. አላዉቅም	
5.	ቫይረሱ በደም ንክክ አማካይነት ይተላለፋል?	1. አዎ 2. አይ 3. አላዉቅም	
6.	ቫይረሱ በቫጃይናል ፍሉድ(Vaginal fluids) አማካይነት ልተላለፍ ይችላል?	1. አዎ 2. አይ 3. አላዉቅም	
7.	ቫይረሱ በሽርት ዉሃ(Amniotic fluids) አማካይነት ልተላለፍ ይችላል?	1. አዎ 2. አይ 3. አላዉቅም	
8.	ቫይረሱ በሽንትአማካይነት ልተላለፍ ይችላል?	1. አዎ 2. አይ 3. አላዉቅም	
9.	ሄፓታትስ ቢ ቫይረስ ፍቱን መድሐንት አለዉ?	1. አዎ 2. አይ 3. አላዉቅም	
10.	ሄፓታትስ ቢ የጉበት ካንሰር ያመጣል?	1. አዎ 2. አይ 3. አላዉቅም	
11.	ክትባቱ ለስንት ጊዜ ነዉ የሚሰጠዉ? (በባዶዉ ቦታ ላይ ይፃፉ)	_____ጊዜ	
12.	በመጀመርያና በቀጣዩ ዶዝ (dose) መካከል ያለዉ የጊዜ ርዝማኔ ምን ያህል ነዉ?	_____ ወር	
13.	በመጨረሻና ከእርሱ በፍት ባለዉ ዶዝ (dose) መካከል ያለዉ የጊዜ ርዝማኔ ምን ያህል ነዉ?	_____ወር	
14.	በሄፓታትስ ቢ ለተበከለ ፈሳሽ ወይም ቁስ ከተጋለጡ በኋላ ክትባቱን ብወስዱት በቫይረሱ የሚያዝ እድል ይቀንሳል?	1. አዎ 2. አይ 3. አላዉቅም	
15.	ክትባቱን ወስደዉ ለጨረሱ ሁሉ እምዩን ረስፖንስ (immune response) ለማረጋገጥ የደም ምርመራ (anti-HBs serologic testing) መደረግ አለበት?	1. አዎ 2. አይ 3. አላዉቅም	
16.	የደም ምርመራዉ (anti-HBs serologic testing) ነጋትቭ (negative) ከሆነ ክትባቱ በድጋሚ መወሰድ	1. አዎ 2. አይ	

	አሌበት?	3. አላዉቅም	

ክፍል ሶስት፦ ተሳታፍዉ ስለሄፓታትስ ቢ እንፈክሽንና ስለክትባቱ ያለቸዉን አመለካከት የተመለከቱ ጥያቄዎች

(መልስዎን ለማመልከት ✓ ምልክት ይጠቀሙ)

ተ.ቁ.	ለሚከተሉት ነጥቦች የሚሴማዎትን ይመልሱ	በጣም እስማማለሁ	እስማማለሁ	መካከለኛ	አልስማማም	በጣም አልስማማም
1.	ሄፓታትስ ቢ ከባደ የማሀበረሰብ ችግር ነዉ					
2.	ስራዎ ለሄፓታትስ ቢ እንፈክሽን የበለጠ ተጋላጭ የሚያደርግ ነዉ					
3.	የሄፓታትስ ቢ ክትባት የግድ ያስፈልገዎታል					
4.	የሄፓታትስ ቢ ክትባት ደህንነቱ አስተማማኝ (safe) ነዉ					
5.	በተበከለ ፈሳሽ ወይም ቁስ በተደጋጋም ብጋለጡ አንዴ የወሰዱት ክትባት ለረዥም ግዜ የመከላከል ሀቅም አለዉ					
6.	ሄፓታትስ ቢ ያሌባቸዉ የጤና ባለሞያዎች ከደም ጋር ንክክ በሚበዛበት የህክምና ዘርፍ (invasive procedure) ላይ መሰማራት የለባቸዉም					
7.	ለችግሩ ብጋለጡና ታካምዉ በሄፓታትስ ቢ ቫይረስ ሜያዝ አለሜያዙ ካልታወቄ ክትባቱን መዉሰድ አስፈላጊ አይደለም					
8.	ስለ ሄፓታትስ ቢ ክትባት መመርያና ደንብ በጤና ተቋማት መኖር አሌበት					
9.	የባህርይ ለዉጥ ለማምጣት ስለ ሄፓታትስ ቢ እና ስለክትባቱ ስልጠና መሴጠት አሌበት					

ክፍል አራት፡- ተሳታፍዉ ስለሄፓታትስ ቢ እንፈክሽንና ስለክትባቱ ያላቸዉን ተሞክሮ የተመለከቱ ጥያቅዎች

ተ.ቁ.	ጥያቄ	የመልስ አማራጮች
1.	ሄፓታትስ ቢ እንፈክሽን ለሚያስተላልፉ ሁኔታዎች ተጋልጠዉ ያዉቃሉ? (በስለታም ነገር የመቁሰለ አደጋ ወይም ለሰዉነት ፈሳሽ መጋለጥ)	1. አዎ 2. አይ 3. አላስታውስም
2.	ለጥያቄ ቁ.2 መልስዎ አዎ ከሆነ ለመጋለጥዎ ምክንያቱ ምን ነበር? (ከአንድ መልስ በላይ መመለስ ይቻላል)	1. እንፈክሽን መከላከያ ቁሶች (supplies) በበቂ ሁኔታ አለመኖራቸዉ 2. የስራ ጫና 3. በስራ ላይ ችኮላ 4. ታካምዉንና ሕክምና ቁሶችን በጥንቃቄ አለመያዝ 5. ሌላ/ይጥቀሱት _____
3.	ለችግሩ ከተጋለጡ በኋላ ምን አይነት እርምጃ ወሰዱ? (ከአንድ መልስ በላይ መመለስ ይቻላል)	1. ዎድያዉኑ ርፖርት ማድረግ 2. ታካምዉ በቫይረሱ መያዝ አለመያዙን ማረጋገጥ 3. ጉዳቱ የተከሰተበት ቦታ እንድደማ ማድረግ 4. በወሃ በሳሙናና በአንትሰፕትክስ (anti-septics) ዎድያዉ ማጠብ 5. ሌላ/ይጥቀሱት _____
4.	የሄፓታትስ ቢ ክትባት ተከትበዋል?	1. አዎ 2. አይ 3. አላስታውስም
5.	መልስዎ አይ ከሆኔ ለምን አልተከተቡም? (ከአንድ መልስ በላይ መመለስ ይቻላል)	1. ክትባቱ ዋጋዉ ዉድ ነዉ 2. ክትባቱ እነዴ ልብ አይገኝም 3. የክትባቱን የጎንዮሽ ችግር ፈርቼ 4. ክትባቱ ያስፈልገኛል ብዬ አላምንም 5. ስለ ክትባቱ መረጃዉ የለኝም 6. መርፌ መዌጋት እፈራለሁ 7. ስራ ስለምበዛብኝ ግዜ የለኝም 8. ሌላ/ይጥቀሱት _____
6.	ለጥያቄ ቁ.6 መልስዎ አዎ ከሆኔ ክትባቱን ሙሉበሙሉ ወስደዉ ጨርሰዉ ነበር?	1. አዎ 2. አይ 3. አላስታውስም

7.	ለጥያቄ ቁ.7 መልስዎ አይ ከሆኔ ለምን ክትባቱን ወስደዉ አልጨረሱም? (ከአንድ መልስ በላይ መመለስ ይቻላል)	1. የክትባቱን የጎንዮሽ ችግር ፈርቼ 2. የወሰድኩት መጠን ይበቃል ብዬ 3. ግዜ አጥቼ 4. መርፌ መዌጋት እፈራለሁ 5. ሌላ/ይጥቀሱት _____

Annex XI. Bloom's cut off point and coding of the scores

Knowledge section

A correct answer was given 1 score and 0 score for wrong answer. The scores vary from 0-14 points and were classified into 3 levels as follows: Bloom's cut off point, 60%-80%.

Scores	**Descriptions**
▪ 11-14 (80-100%)	High levels
▪ 8-10 (60-79%)	Moderate levels
▪ 0- 7 (≤ 59%)	Low levels

Attitude section

The rating scale for attitude questions on a Likert scale which include both positive and negative was scored as follow:

Positive Statement		Negative Statement	
Option	Scores	Option	Scores
Strongly agree	4	Strongly agree	0
Agree	3	Agree	1
Neural	2	Neural	2
Disagree	1	Disagree	3
Strongly disagree	0	Strongly disagree	4

The scores were classified into 3 levels (Positive, Neutral and Negative Attitude).

- Positive Attitude 28-36 scores (80%-100%)
- Neutral Attitude 22-27 scores (60%-79%)
- Negative Attitude 0-21 scores (≤ 59%)

The practice section (vaccination status)- the overall vaccination status is said to be (good, fair and poor) based on the same criteria (Bloom's cut off point, 60%-80%).

Annex X. Recommended PEP for exposure to HBV (source: CDC, 2001)

Vaccination and antibody response status of exposed workers*	Treatment		
	Source HBsAg positive	Source HBsAg negative	Source unknown or not available for testing
Unvaccinated	HBIG[§] x 1 and initiate HB vaccine series[¶]	Initiate HB vaccine series	Initiate HB vaccine series
Previously vaccinated Known responder**	No treatment	No treatment	No treatment
Known nonresponder[††]	HBIG x 1 and initiate revaccination or HBIG x 2[§§]	No treatment	If known high risk source, treat as if source were HBs Ag positive
Antibody response unknown	Test exposed person for anti-HBs[¶¶] 1. If adequate,** no treatment is necessary 2. If inadequate, [††] administer HBIG x 1 and vaccine booster	No treatment	Test exposed person for anti-HBs 1. If adequate,** no treatment is necessary 2. If inadequate, [††]administer vaccine booster and recheck titer in 1–2 months

- * Persons who have previously been infected with HBV are immune to reinfection and do not require PEP, **A responder is a person with adequate levels of serum antibody to HBsAg
- † HB surface antigen, ††A non-responder is a person with inadequate response to vaccination
- ¶ HB vaccine, ¶¶ Antibody to HBsAg
- § HB immune globulin, §§ the option of giving one dose of HBIG and reinitiating the vaccine series is preferred for non-responders who have not completed a second three-dose vaccine series. For those who previously completed a second vaccine series but failed to respond, two doses of HBIG are preferred