Knowledge of risk of exposure to hepatitis B virus and Vaccination status against hepatitis B virus infection among Health Care Workers in Jimma University specialized hospital, Jimma Southwest Ethiopia.

By

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Jimma Ethiopia

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Abstract

Background: Health care workers (HCWs) are at a great risk of occupational exposure with blood borne pathogens like Hepatitis B virus. The risk of occupational exposure to such infection has been the concerns of HCWs for years. However, there is scarcity of information on prevalence and risk factors of Hepatitis B virus infection in the study area.

Objective: To assess the level of knowledge on risk factors of hepatitis B virus infections and vaccine, history of accidental exposure to body fluids and their vaccinations status against HBV infection among health care workers in Jimma University specialized hospital.

Methods: A cross-sectional study was conducted among 246 health care workers in JUSH, Jimma town, Oromia region, Southwest Ethiopia. Data was collected in month of August 2015 by structured self –administered questionnaire which was used to collect information on socio-demographic characteristics, knowledge of the risk factors for HBV infections and HBV vaccine, section on history of accidental exposure to HBV and section on vaccination status. Data was coded, entered and analyzed using SPSS software version 20.0

Result and discussion: A total of 260 questionnaires were distributed to the Health Care workers (HCWs) working in the study area and 246 were completed and returned giving a response rate of 94.6%. Majority of the respondents, 131(53.3%), were male and 144(58.5%) of them were nurses. Most of the respondents had history of hollow needle injury which accounts 112(45.5 %) and a total of 203(82.5%) had history of mucosal exposure to different type of body fluids. About 128(52 %) of had fair knowledge of the risk factors to HBV infection and 133(52.4%) considered health care setting as high risk to HBV infection despite the fact that only 3(3.3%) of them were adequately vaccinated.

Conclusion: The study has clearly shown that most of them had fair knowledge about risk of HBV infection and were not vaccinated against HBV mainly because of expensiveness of vaccine and lack of motivation. Hence, sensitizing HCWs either by training or using Medias is better in addition to providing vaccine to HCWs as part of work place safety before their beginning of clinical practices.

Acronyms

ACIP	Advisory Committee on Immunization Practices
Anti-HBs	Antibody to hepatitis B surface antigen
CDC	Centers for Disease Control and Prevention
CI	Confidence interval
FDA	Food and Drug Administration
EPI	Expanded program me for immunization
HBsAg	Hepatitis B surface antigen
HBV	Hepatitis B virus
HCC	Hepatocellular carcinoma
HCV	Hepatitis C Virus
HCWs	Health care workers
HIV	Human immunodeficiency virus
Ig	Immunoglobulin
IU	International units
JUSH	Jimma University Specialized Hospital
MSM	Men sex With Men
US	United States
STDs	Sexually transmitted diseases
WHO	World Health Organization
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Introduction

1.1. Background

Hepatitis B is an infection caused by the hepatitis B virus (HBV), which is transmitted through percutaneous (i.e., breaks in the skin) or mucosal (i.e., direct contact with mucous membranes) exposure to infectious blood or body fluids. The virus is highly infectious; for nonimmune persons, disease transmission from a needle stick exposure is up to 100 times more likely for exposure to hepatitis B e antigen (HBeAg)--positive blood than to HIV-positive blood (1). HBV infection is a well recognized occupational risk for Health care personnel globally. The risk for HBV is associated with degree of contact with blood in the work place and with the hepatitis B e-antigen status of the source persons (2). The virus is also environmentally stable, remaining infectious on environmental surfaces for at least 7 days (3).

Because of the high risk of HBV infection among HCP, routine pre-exposure vaccination of HCP against hepatitis B and the use of standard precautions to prevent exposure to blood and other potentially infectious body fluids have been recommended since the early 1980s (4)

In the occupational setting, multiple doses of HBIG initiated within 1 week following percutaneous exposure to HBsAg-positive blood provides an estimated 75% protection from HBV infection (5-7).

There was no study conducted in Ethiopia which assesses the hepatitis B vaccination status among HCWs. One study find out that overall, 14.2% of the HCWs received one or more doses of hepatitis B vaccine and among which 6.5% were fully vaccinated. HCWs in public Hospitals were less likely to receive hepatitis B vaccine than those working in private Hospitals. (8)

In conclusion, it's advisable to create awareness to HCWs, ensure vaccine availability and accessibility and utilize EPI facilities to offer the adult vaccine to HCWs.

1.2. Statement of the problem

Hepatitis B virus (HBV) has long been recognized as an occupational risk for health-care personnel (HCP), including HCP trainees (9,10). The virus remains infectious for prolonged periods on environmental surfaces and is transmissible in the absence of visible blood (9). HCP do not recognize all exposures to potentially infectious blood or body fluids (10) and, even if exposures are recognized, often do not seek post exposure prophylactic management (11). In serologic studies conducted in the United States during the 1970s, HCP had a prevalence of HBV infection approximately 10 times greater than the general population (9). In 1983, an estimated 17,000 HBV infections occurred among HCP (1). The World Health Organization estimates that, of the 35 million HCPs worldwide, three million experience percutaneous exposure to blood pathogens each year, of these exposures: two million HCPs were exposed to HBV; 0.9 million to HCV; and 170,000 to HIV. As aresult of these exposures, 150,000 HCPs contracted HCV, 70,000 contracted HBV, and 500 contracted HIV per year [12]. More than 90% of the infections that result from these exposures are in low income countries (13, 15). Developing countries, especially those in sub-Saharan Africa, report the highest incidences of occupational exposures (13, 14, and 16).

It is found that peri-natal transmission of HBV is almost negligible to occupational exposure in health care setting like Ethiopia where there is high risk of needle stick injuries and sharp injuries, and yet only small percentage of HCWs reported.(17)

Vaccines to prevent HBV became available in the United States in 1981 and were recommended by the Advisory Committee on Immunization Practices (ACIP) for HCP in 1982 (4). Although a high proportion of healthy vaccine recipients in clinical trials respond to hepatitis B (HepB) vaccination, the proportion of responders can be lower among the general population, particularly among persons with chronic medical conditions (18,19). Acute and chronic HBV infections are rare among HCP who respond to HepB vaccination, but HCP who do not respond to vaccination are thought to remain susceptible. Postvaccination serologic testing for antibody to hepatitis B surface antigen (anti-HBs) identifies vaccine nonresponders and guides the need

for revaccination, additional testing for chronic HBV infection, and counseling for HCP who remain susceptible after failing to respond to vaccination.(20).

In 1991, ACIP recommended consideration of postvaccination serologic testing for anti-HBs for HCP at risk for needlestick exposures (21). In 1997, ACIP recommended postvaccination serologic testing 1–2 months after completion of the HepB vaccine series for HCP who have contact with patients or blood and who are at ongoing risk for injuries with sharp instruments or needlesticks (22). Since 1982 (when HepB vaccine was recommended for HCP), major declines have occurred in reports of acute hepatitis B among HCP (23). In 2011, ACIP reaffirmed that unvaccinated and incompletely vaccinated HCP at reasonably anticipated risk for blood or body fluid exposure should receive HepB vaccination before potential exposure, and HCP at high risk for exposure should receive postvaccination serologic testing 1–2 months after completion of the vaccine series (24). This report provides CDC guidance for persons working, training, or volunteering in health-care settings who have documented HepB vaccination received years before hire or matriculation (e.g., when HepB vaccination was received as part of routine infant [recommended since 1991] or catch-up adolescent [recommended since 1995] vaccination). No postvaccination serologic testing is recommended after routine infant or adolescent HepB vaccination. Although acute HBV infections have declined substantially since HepB vaccination was introduced in the United States, a risk for occupational exposure to HBV persists (23) largely from persons with chronic HBV infection. Because vaccine-induced anti-HBs wanes over time, testing HCP for anti-HBs years after vaccination might not distinguish vaccine nonresponders from responders. Pre-exposure assessment of current or past anti-HBs results upon hire or matriculation, followed by one or more additional doses of HepB vaccine for HCP with anti-HBs <10 mIU/mL, if necessary, helps to ensure that HCP will be protected if they have an exposure to HBV-containing blood or body fluids. (25, 26)

An expert panel convened by CDC acknowledged that the risk for HBV infection for vaccinated HCP can vary widely by setting and profession, and might be low enough in certain settings that assessment of anti-HBs status and appropriate follow-up can be done at the time of exposure to potentially infectious blood or body fluids. This approach relies on HCP recognizing and

reporting blood and body fluid exposures and therefore might be applied on the basis of documented low risk, implementation, and cost considerations. (24)

Certain HCP occupations have lower risk for occupational blood and body fluid exposures (e.g., occupations involving counseling versus performing procedures), and none trainees have lower risks for blood and body fluid exposures than trainees. Some settings also will have a lower prevalence of HBV infection in the patient population served than in other settings, which will influence the risk for HCP exposure to hepatitis B surface antigen (HBsAg)-positive blood and body fluids. (24)

Therefore, there is an urgent need to focus efforts on mitigating transmission through improving the work environment and making use of the available vaccine for HCWs who are susceptible. All health-care institutions including JUSH should ensure that HCP receive training to recognize and report exposures, have systems in place to facilitate reporting and post exposure assessment, and have prophylaxis readily accessible for timely administration.

Finally, this study will help us in reminding all health care workers needs to be aware of risk of HBV infection in health care setting is high. It also recommends and encourages health care workers to have adequate vaccination against hepatitis B infection and needs to report immediately after any occupational exposure. This report also can guide clinicians, occupational health and student health clinicians, infection-control specialists, hospital and health-care training program administrators, and others in selection of an approach for assessing HBV protection for vaccinated HCP

Literature Review

According to the World Health Organization (WHO), two billion people (one-third of the global population) have been infected with the hepatitis B (HB) virus (HBV) worldwide, and about 350 million are chronic carriers (4%-6% of the world population)[27].Approximately 600000 people die every year due to the consequences of HBV infection [27]. Chronically infected individuals have a 25% risk of dying from the sequelae of chronic HBV infection, such as cirrhosis and hepatocellular carcinoma (HCC) [28]. Globally, chronic HBV infection accounts for 54.4% of the cases of liver cancer [29]. HBV infection is one of the vaccine-preventable infectious diseases. In 1991, the WHO recommended the integration of the HB vaccine into the national immunization programs in countries with an HBV carrier prevalence of 8% or higher by 1995 and in all other counties by 1997[30]

HBV varies in its prevalence worldwide. Countries can be divided by their level of endemicity, which is based on the percentage of the general population that is seropositive for HBsAg (chronic carriers). Countries with high endemicity have more than 7% seropositivity levels, intermediate 2%-7%, low 0.5%-2% and very low endemicity countries have < 0.5% seropositivity[31,32].The prevalence of HBV chronic infection is particularly high in sub-Saharan Africa,ranging from 7 to 26%[33]. In Ethiopia countrywide study published in 1986 recorded HBV prevalence of 40%, HBsAg seroprevalence of 6% [34]. Whilst estimates of HBsAg prevalence of 10–14% and seroprevalence of 76–79% for Ethiopian adults [34, 35, 36]

Health care workers are at a high risk of HBV infection through occupational exposure to blood, and the incidence of this infection among them has been estimated to be 2-4 times the level in the general population [37]. It is more infectious than the other blood-borne pathogens and estimates of the risk of a single needle stick injury indicate a risk of 300 hepatitis B virus infection (30% risk), 30 hepatitis C virus infection (3% risk) and 3 HIV infection (0.3% risk),per 1,000 respective exposures [37]. In the United States, the incidence of HBV infection among all health care workers is estimated to be 3.5 to 4.6 infections per 1000 workers, which is 2- to 4-times the level for the general population [37]. HBV infections are generally considered endemic in sub-Saharan Africa [38].In Hawassa City, Southern Ethiopia analytical cross-sectional study was conducted and 30.9% of health-care workers had experienced at least one needle stick injury in the previous year [39]

The main modes of transmission also vary between countries of high and low endemicity. In high endemicity countries, and in stark contrast to the West, peri-natal and horizontal transmissions (exposure from close household contacts or play with other children) are the dominant modes [40, 41]. In these countries, 70%-90% of the population show serological evidence of previous or current HBV infection. In lower endemicity countries, HBV transmission is mainly limited to high risk groups, such as intravenous drug users and HCWs, or is acquired sexually. Although not the main transmission mode, healthcare-acquired infections

can assume greater importance in developing countries due to lack of resources for disposable equipment and sterilization, or lack of awareness of infection control practices [42.43].

The disease is thus more likely in health workers in Ethiopia, a country with high prevalence of the disease. A study of HBsAg carrier pregnant women in Addis Ababa [44] provided direct evidence of the low risk of peri-natal transmission.

Most current vaccines are produced by recombinant technology [45], and the vaccine prevents HBV infection in 90%-100% of people who produce sufficient antibody responses [46]. It is also highly effective as post-exposure prophylaxis in cases of possible perinatal transmission, even where HBV immunoglobulin co-administration is not possible [47]. Current consensus is that booster doses are not necessary to maintain immunity. Finally, although susceptible to freezing, present vaccines are heat stable, a great advantage in developing countries where access to cold storage facilities [48]

In 1992, WHO's Global Advisory Group of the Expanded Programme on Immunization recommended that all highly endemic countries included hepatitis B vaccination into their national childhood immunization programs by 1995, and all other countries by 1997[49,50]. As of 2006, more than 160 countries had implemented universal hepatitis B vaccination and most recent introduction of Hepatitis B vaccine as penta was in 2007, in Ethiopia [51]. Several western countries with very low endemicity, such as the United Kingdom, have chosen to pursue a policy of targeted vaccination of high-risk groups rather than universal vaccination [52].

In countries which implemented universal childhood vaccination early on, such as Taiwan, the Gambia, and Malaysia, HBV vaccination was found to be very effective, both in terms of disease prevention and health costs [32,53].

HBV infection in Africa is thought to be acquired almost always in early childhood by horizontal transmission rather than by vertical transmission [54-57]. In Sub-Saharan countries, a birth dose is not used; instead, a 6-, 10-, and 14-wk ("6-10-14") after birth vaccination schedule is common [58, 59]. Although a birth dose might be beneficial for African infants [59], no information about the birth dose or regional goals in Africa is available.

In 70% or more of the countries with selective immunization programs, high-risk individuals include the following: injection drug users; non-injection users who are living with current injectors; sexual partners of injection users; children of injectors; MSM; close family contacts; healthcare workers; laboratory staff; police, fire, and rescue services; babies born to mothers who chronically infected with HBV or to mothers who have had acute hepatitis B during pregnancy; people traveling to or going to reside in an area of high or intermediate prevalence; individuals receiving regular blood or blood products [60].

The need for booster doses in HB vaccine programmes remains controversial. The duration of vaccine-induced immunity is uncertain, but it is definitely long-term (> 15-20 years) (61,62,63).

Several studies have reported that booster doses of infantile immunization should be considered in adolescence (64, 65, and 66). However, numerous studies have demonstrated that booster doses are not needed in immunocompetent individuals who have received a complete series of HB vaccines (61, 62, 63, 67, and 68)

At present, the WHO does not recommend the universal administration of booster doses. However, immunocompromised hosts, such as hemodialysis patients and HIV-positive patients, are known low responders to vaccines. Although routine serologic examinations of anti-HBs antibody levels are not needed after HB vaccination, it is recommended that healthcare providers, chronic hemodialysis patients, HIV-infected patients, and other immunocompromised individuals should be monitored and receive booster doses if their anti-HBs antibody levels decrease to less than 10 mIU/mL(68,69).

Because of the high risk of HBV infection among HCP, routine pre-exposure vaccination of HCP against hepatitis B and the use of standard precautions to prevent exposure to blood and other potentially infectious body fluids have been recommended since the early 1980s (10). In the occupational setting, multiple doses of HBIG initiated within 1 week following percutaneous exposure to HBsAg-positive blood provides an estimated 75% protection from HBV infection (5, 6, 7)

There is one study conducted in Ethiopia which assesses the hepatitis B vaccination status among HCWs. It finds out that overall, 14.2% of the HCWs received one or more doses of hepatitis B vaccine and among which 6.5% were fully vaccinated. HCWs in public Hospitals were less likely to receive hepatitis B vaccine than those working in private Hospitals. (8)

In conclusion, it's advisable to create awareness to HCWs, ensure vaccine availability and accessibility and utilize EPI facilities to offer the adult vaccine to HCWs.

Significance of study

HBV infection is one of the diseases considered to be a candidate for global eradication, similar to polio, but it is presumed that several decades of effort will be necessary to eradicate HBV. However, the path to the eradication of HBV presents further obstacles. The difficulties to overcome include identifying the best ways to increase coverage rates, closing the gap between recommendations and routine practices, approaching and treating high-risk individuals, screening and treating chronically infected individuals, and preventing breakthrough infections. HB vaccines are very effective against HBV infection and were shown to be the first useful tool for cancer prevention therefore high endemic countries like Ethiopia needs to apply universal vaccination to eradicate nationally.

Objectives

3.1. General objectives

To asses level of Knowledge of risk of exposure to HBV and Vaccination status against HBV among Health Care Workers in Jimma University specialized hospital, Jimma Southwest Ethiopia.

3.2. Specific objectives

1. To determine the level of knowledge of risk factors for hepatitis B virus infection among health care workers in the hospital.
2. To assess history of accidental exposure in the hospital among the respondents
3. To determine vaccination status among health care workers against hepatitis B virus infection in the hospital.
4. To determine level of knowledge of hepatitis B vaccine among health care workers in the hospital
5. To assess perception of risk of hepatitis B virus infection in the health care settings

Methods and Materials

4.1. Study area and study period

Jimma University specialized hospita (JUSH) is one of the senior teaching public hospital in Ethiopia under ministry of education. it is located in Jimma town, Jimma Zone,Oromia region,southwestern part of Ethiopia about 352km away from Addis Ababa. The Hospital serves about 15 million people living within a very wide catchment area of about 250km radius mainly from Jimma town.

The hospital provides inpatients and outpatients services including major surgery divided in 12 major departments or units. These includes Internal medicine, Surgery, Pediatrics, Gynecology-obstetrics, pathology, radiology, ICU(Intensive Care Unit),ophthalmology, dentistry, dermatology, psychiatry, laboratory units with inpatients and outpatients pharmacy services.

In addition, it is the centre of clinical training for both undergraduate educations in different field of study including medicine and postgraduate training in internal medicine, surgery, Gynecology/obstetrics, pediatrics, radiology, pathology and ophthalmology

Currently, it has 450beds which will be expanded to about 600bedded hospital and has a total of more than 550 clinical staff without including residents, interns and senior clinicians of college of medical and public health science.

The study was carried out in August and September 2015 using self administered questionnaire among healthcare workers in JUSH.

4.2. Study design

Cross-sectional study design was used

4.3. Source population

The source population of the study was all health care workers working in the hospital.

4.4. Study population

The study population was all sampled health care workers available in the inpatient department of internal medicine, surgery, Gynecology and obstetrics (GYN-OBS), dentistry and Intensive care unit (ICU) in the study period.

The inclusion criteria was health care workers hired by the hospital and college of health science, medical postgraduate students who gave informed consent and available during the study period. The exclusion criterions include undergraduate medical students and non-clinical staffs like administrative staff, cleaners and guards.

4.5. Sample size determination and sampling techniques

From 12 major areas (departments) in the hospital five areas are selected by simple random sampling technique using balloting. All health care workers available in the inpatient department of internal medicine, surgery, Gynecology and obstetrics (GYN-OBS), dentistry, Intensive care unit (ICU) were recruited in the study period.

Questionnaire was administered to all the respondents available in the study area.

4.6. Measurements

Variables of the study

Dependent variable: - vaccination status

Independent variables: -

Socio-demographic

Age, Sex, year of experience, type of profession, work place (department)

Level of Knowledge of risk factors of HBV infection

Educational status

Accidental exposure to HBV infection

Needle stick injury, type of needle , type of body fluid, abraded skin contact with infected body fluid

Knowledge of hepatitis B vaccine

Types of vaccine, frequency of vaccination, routes of vaccine delivery, post vaccination testing, post exposure prophylaxis

Perception of risk of hepatitis B virus infection

Fear of acquiring Hepatitis B virus

Accessibility of vaccine

Frequency of contact with patients with HBV virus infection

Availability of HBIG for post exposure prophylaxis

4.7. Data collection procedure

For collection of data, a structured pretested questionnaire that was prepared based on some previous studies in Cameroon (71, 72) used, and panel of experts consulted.

The questionnaire was pretested and further modified based on the feedback during pretesting.

The questionnaire had four sections: socio-demographic characteristics, history of accidental exposure, knowledge of the risk factors for HBV infections and HBV vaccine, section on perception of risk hepatitis B infection and section on vaccination status

The questionnaire was self-administered: consented participants was given printed copies of the questionnaire and allowed time to fill them at their will and convenience. Participants then returned this questionnaire anonymously to the data collectors.

For the evaluation of the general knowledge of the risk factors for HBV infection and HBV vaccine, we calculated the mean percentage of correct answers for all the questions on the risk factors and the HBV vaccine. Their knowledge was considered "good" if the mean percentage of correct answers is equal or greater than 75%, "fair" if it is less than 75% and equal or greater than 50%, and "poor" if it is less than 50%.(71, 72)

Regarding perception , participants were asked to what extent they agreed or disagreed (using a five-point Likert scale ranging from "strongly agree" to "strongly disagree") with each of the statements. For the 10 statements, total scores that could be achieved ranged from 10 to 50. Mean of the score will be calculated and scores between 10 –mean(34.7)were considered as low

risk of infection and scores higher than mean- 50 were considered perception of health care facilities as a risk of infection to HBV is high[73, 74]

Four data facilitators were health care workers who had experience in data collection and handling was recruited for the data collection process. One day of training was given to the data facilitators about how to distribute the questionnaire to the study participants.

4.8. Data quality management

The completeness of questionnaires is checked every day by the principal investigator. Incorrectly filled or missed questionnaires were not included in the study.

4.9. Data analysis

Data was coded, entered and analyzed using the Statistical Package for Social Science (SPSS) version 20.0 for Windows. We described continuous variables using either medians with interquartile ranges (IQR) or means with standard deviations, and categorical variables using their frequencies and percentages.

The Chi-square test was used to compare variables and a p-value less than 0.05 is considered statistically significant.

4.10. Operational definitions

Adequately vaccinated: If they had received a minimum of three intramuscular injections of 20micrograms of HBsAg (hepatitis B surface antigen) at a schedule of 0,1 and 6 months; thus completing the minimum primary HBV vaccination series

Healthcare workers (HCW): Include physicians, nurses, emergency medical personnel, dental professionals and students, medical and nursing students, laboratory technicians, pharmacists, hospital volunteers, and administrative staff.

Hepatitis B infection : Formerly called “serum hepatitis”, it is caused by the hepatitis B virus (HBV).

Hepatitis B Immune Globulin (HBIG): A medication that is given as a “post-exposure” treatment to prevent hepatitis B.

Inadequately vaccinated: If they had started HBV Vaccinations but did not complete the three doses of primary vaccination

Infection: The results of the presence of harmful microorganisms in the body. Infections can be acute (sudden) or chronic (persistent).

Needle stick: Refers to an accidental puncture of the skin while handling hypodermic needles or syringes in the health care setting.

Not vaccinated: If they had never received a dose of an HBV vaccine.

Risk Factors: Refers to behaviors and conditions that increase the possibility of an individual developing a disease.

Standardprecautions: Guidelines recommende by centers for disease control and prevention for reducing the risk of transmission of blood born and other pathogens in the hospital

Transmission: The way or method by which a disease can be spread.

Vaccine: A medication that stimulates the production of antibodies to protect against a specific disease.

Vaccination: Injection of a killed microbe in order to stimulate the immune system against the microbe, thereby preventing disease.

Virus: A tiny microorganism, smaller than bacteria, which can invade the body and cause disease.

4.11. Ethical considerations

All study participants were adequately informed about the purpose, method and anticipated benefits of the study by the data collectors. They were given clear options regarding voluntary participation. Verbal consents are obtained from each participants and confidentiality of the study subjects is maintained.

RESULTS

5.1. Socio demographic

A total of 260 questionnaires were distributed to the Health Care workers (HCWs) working in the study area and 246 were completed and returned giving a response rate of 94.6%. one hundred thirty one(53.3%) were male. Their age ranges from 20 to 55 with a mean ± SD age of the respondents was 27± 5.5years. About 144(58.5%) participants were nurses, 87(35.4%) of participants were working in the inpatient department of general surgery and 165(67.1 %) of participants have less than 5 years working experience in health care settings.

Table 1 socio-demographic distribution by age, sex, occupational status and place of work among respondents of HCWs in JUSH, southwest Ethiopia, Sept. 2015

Variables		Quantity	Percent (%)
Age group	20-29	188	76.4
	30-39	46	18.7
	40-49	8	3.3
	50-59	4	1.6
Sex	Male	131	53.3
	Female	115	46.7
Occupation	Nurse	144	58.5
	Midwife	39	15.9
	Physician	63	25.6
Number of years in practice	<5	165	67.1
	5-10	64	26.0
	>10	17	6.9
Ward (current working place)	Internal medicine	63	25.6
	Surgery	87	35.4
	Gynecological /Labor /Maternity	79	32.1
	ICU	9	3.7
	Dentistry	8	3.3

5.2. Accidental exposure to body fluids

From the beginning of their clinical training, about 171(69.5%) of HCWs had history at least percutaneous exposure from which hollow needle injury accounts about 112(45.5 %) and a total of 203(82.5%) had history of mucosal exposure to different type of body fluid the commonest being blood 96 (39%) followed by amniotic fluid and urine 37(15%) each and saliva 28 (11%)

Table 2:- Accidental exposure to body fluids among respondents of HCWs in JUSH. southwest Ethiopia, Sept.2015

Variables		Quantity	Percent(%)
Percutaneous	Hollow needle	112	65.5
	Solid needle	59	34.5
Mucosal (splash)	Blood	96	47.3
	Saliva	28	13.8
	Amniotic fluid	37	18.2
	Cerebrospinal fluid	4	2.0
	Urine	37	18.2
	Pleural fluid	1	.5

5.3. Knowledge of risk factors of HBV infection and vaccine

Among the respondents, about 128(52 %) of had fair knowledge of the risk factors to HBV infection. For some of the specific questioned inquired , 228(95.4%)and 225(93%) participants of HCWs knew that hepatitis B virus infection can be transmitted through broken skin in contact with blood of HBV positive patient, and percutaneous needle stick injury, respectively. Majority of respondents knew that HBV is contagious (96.6%), HBV carrier may look healthy without showing any symptoms of the disease (83.7%) and patients can spread hepatitis to HCWs (93.4%)

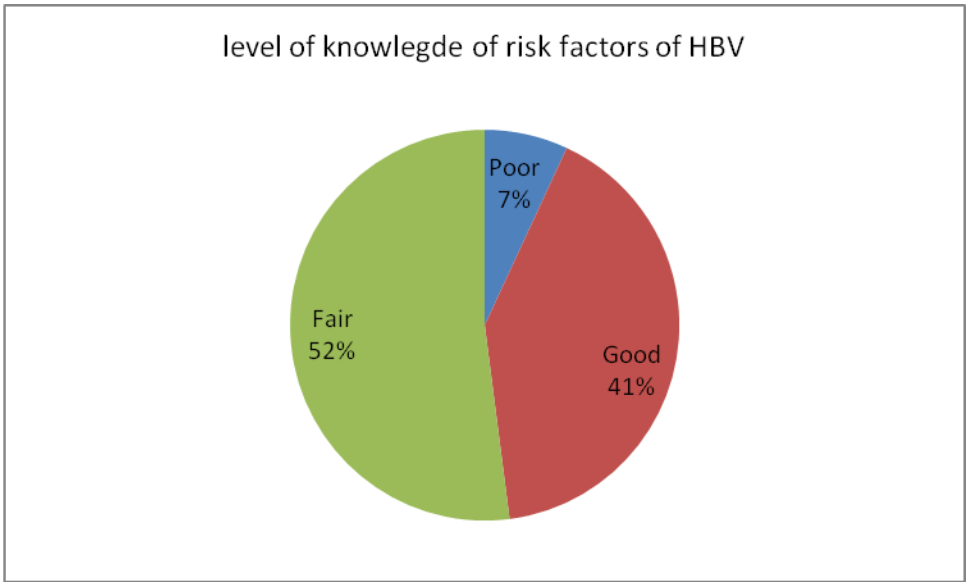

Fig 1. Level of knowledge of risk factors among HCWs in JUSH, southwest Ethiopia, Sept 2015

About half (50.8%)of the studied population had poor knowledge about the vaccine. About 132(30.2%) wrongly indicated that complete vaccination consists of just 2 doses of vaccine.

Fig.2. Level of knowlegde HBV vaccine among repondents of HCWs in JUSH,southwest Ethiopia, Sept 2015

5.4. Perception

Among the respondents, 117(47.6%) considered their work as putting them at low risk of contracting hepatitis B infection. Diagram below shows that 133(52.4%) of the respondents considered the risk of infection to HBV as high when calculated based on five point likert scale method.

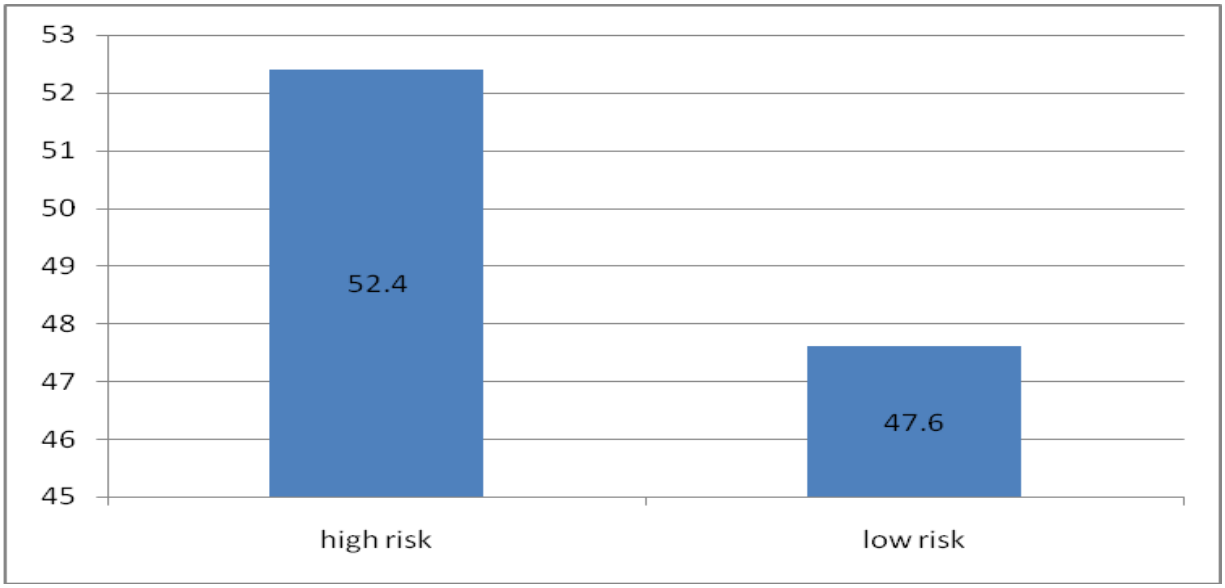

Fig.3. Perception of health care setting as risk of contracting HBV infection by HCWs in JUSH,southwest Ethiopia ,Sept 2015

5.5. Vaccination status

Three (3.3%) participants were adequately vaccinated against HBV, 33(13.4%) were inadequately vaccinated and 205 (83.3%) were not vaccinated. Among the participants who had never had any dose of the HBV vaccine, the main reasons for not being vaccinated were lack of money to pay for the vaccine 90(36.6%), lack of sufficient information on the availability of vaccine 53(21.5%), and lack of motivation 35(14.2%). Among participants58.5% had vaccinated at private institution and the remaining 41.5%% were vaccinated at other governmental hospital.

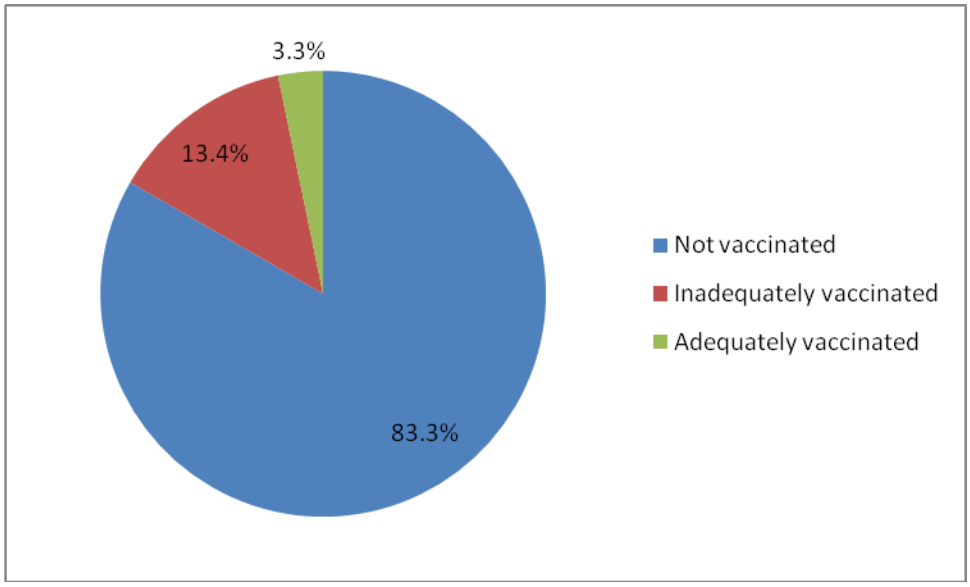

Fig.4. HBV vaccination status among respondents of HCWs of JUSH,southwest Ethiopia,Sept. 2015

Discussion

In this study we describe, among healthcare workers in Jimma University specialized hospital, Ethiopia, their knowledge of risk factors for HBV infection, history of accidental exposure to blood, awareness of HBV vaccine and their vaccination status. We found that 112(45.5 %) HCWs had at least percutaneous hollow needle injury and 96 (39%) of our participants had had at least one accidental exposure to blood since the beginning of their training and no post exposure measures are taken to reduce the risk of HBV transmission. Comparatively, in Hawassa City, Southern Ethiopia analytical cross-sectional study was conducted and 30.9% of health-care workers had experienced at least one needle stick injury in the previous year [39]. In Ethiopia countrywide study published in 1986 recorded HBV prevalence of 40%, HBsAg sero-prevalence of 6% [34]. Not reporting accidental exposure to blood increases the risk of HBV infection, since no post-exposure preventive measures are taken to reduce the risk of infection. Considering the relative high HBV prevalence in the general population of Ethiopia and the fact that HBV have a 30% risk of contamination after exposure by a single needle stick injury in non-immune individuals [37], our findings show that HCWs in Ethiopia are at a high risk of HBV infection and highlight the necessity of HBV vaccination in this particular population.

Unfortunately, only 19.6 % of our participants had one or more vaccination of which 3.3 % were adequately vaccinated. This is much lower than figures reported in study done on occupational exposure to blood, hepatitis B vaccine knowledge and uptake among medical students in Cameroon which showed 18% and also disagrees with the range of 18-19% estimated by the WHO as coverage rate for developing countries [15].There is one study conducted in Ethiopia which assesses the hepatitis B vaccination status among HCWs. It finds out that overall, 14.2% of the HCWs received one or more doses of hepatitis B vaccine and among which 6.5% were fully vaccinated. HCWs in public hospitals were less likely to receive hepatitis B vaccine than those working in private Hospitals [8]. In this study, among participants, 58.5% had vaccinated at private institution. This low HBV vaccine uptake among our participants parallels with their poor knowledge of the risk factors of HBV infection, despite the fact that the majority considered that they are at a higher risk of contracting HBV infection than the general population. The main reasons reported by our participants for not being vaccinated were lack of money to pay for the vaccine 90(36.6%), lack of sufficient information on the availability of vaccine 53(21.5%), and

lack of motivation 35(14.2%). There is no statistically defining reason for poor vaccination status Therefore, strongly recommending HBV vaccination and making the vaccine available free of charge should enhance vaccination uptake in health care workers in Ethiopia. It would be good for health care workers to be vaccinated when they come to their clinical attachments.

One of the important limitations of this study is its reliance on information obtained from the respondents about their vaccination status. The second limitation is that we assumed that all the respondents who had received 3 doses are adequately vaccinated with or without undergoing post-vaccination antibody assay and not assessed.

Conclusion and Recommendation

This study provided, for the first time in Ethiopia, quantitative data on the knowledge of risk exposure and practices of vaccination against hepatitis B among health care workers. It highlights a fair level of knowledge about the disease together with lower rate vaccination status. Moreover, our study has shown a high rate of accidental exposure to blood and body fluids leading to a high risk of occupational exposure to HBV.

Finally, HBV vaccination should be strongly recommended and the vaccine made accessible for health care workers before the beginning of their training. The results of the present study should prove useful for interventions targeted at healthcare workers and for future information and prevention campaigns directed at the general population and populations at highest risk of HBV.

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Jimma University

College of Health Sciences

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Appendix I:-Informed Consent

Title of the Project*:* Knowledge of risk of exposure to HBV and Vaccination status against HBV infection in Health Care Workers in Jimma University specialized hospital, Jimma Southwest Ethiopia, 2007E.C

Aim of this research: Health care workers (HCWs) are at a great risk of occupational exposure with blood borne pathogens like Hepatitis B virus. Hence, the aim of this study is to assess the level of knowledge the health care workers in hospital (JUSH) on risk of exposure to HBV and vaccine, pattern of exposure and their vaccinations status against HBV infection.

The procedures involved in this study include:

In the study, there will be no medical or dental procedures provided to participants. Participants must only answer questions in a questionnaire. Answering questions on this questionnaire, which should only take you about (5-10) minutes to be completed. There are no risks to you if you participate in this research. Your participation will increase knowledge about this important issue. All information collected will remain confidential. Neither your name nor your address will be recorded in any assessment. There is no obligation or compulsion for you to participate, and you have the freedom to agree or not agree to participate this will not have any effect on your right to receive the health care. You may quit from the research on any time.

Please indicate(√) Below if you wish to participate or decline to do so:

☐ I wish to participate

☐ I do not wish to participate

Signature of participant_____

Thank You for Your Cooperation

Facilitator name_____ Supervised by: Dr. Ayano shanko

Appendix II:- Survey questionnaire

Code no. _____ Name of your institution _____

Date ___/___/___.

Section 1: General information: socio-demographic status

S/N	Question		Response	Skip
1	Age		Year _____	
2	Sex		1. Male 2. Female	
5	Current working status (occupation)		1. Nurse 2. Midwife 3. Physician 4. Others specify _____	
6	Number of years in practice:		1. < 5 2. 5-10 3. >10	
7	Ward (current working place)		1. Internal medicine 2. Surgery 3. Gynecological /Labor /Maternity 4. ICU 5. Dentistry 6. Other specify	
8	Accidental exposure to blood /body fluids	Percutaneous	1. Hollow needle	
			2. Solid needle	
			3. Surgical blade	
			4. Other specify _____	

		Mucosal (splash)	1. Blood	
			2. Saliva	
			3. Amniotic fluid	
			4. Cerebrospinal fluid	
			5. Urine	
			6. Pleural fluid	
			7. Other specify_____	

Section 2: Knowledge of risk factors of hepatitis B virus infection among health care workers in JUSH (Should be answered by circling from the item provided)

S/ No	Question	Response	Skip
1	HBV can be caused by bacteria	1. Yes 2. No 3. Don't know	
2	HBV is contagious	1. Yes 2. No 3. Don't know	
3	HBV carrier may look healthy without showing any symptoms of the disease	1. Yes 2. No 3. Don't know	
4	HBV can be lethal	1. Yes 2. No 3. Don't know	
5	Patients can spread hepatitis to HCWs	1. Yes 2. No 3. Don't know	
6	HCWS can spread the virus to their patients	1. Yes 2. No 3. Don't know	
7	HBV vaccination is not for all people	1. Yes 2. No 3. Don't know	
8	HBV vaccination does not cause hepatitis	1. Yes 2. No 3. Don't know	
9	HBV vaccination can prevent hepatitis	1. Yes 2. No 3. Don't know	
10	HBV vaccination does not increase the risk for complications	1 Yes 2. No 3. Don't know	

11	HBV vaccination is contraindicated in pregnancy	1. Yes 2. No 3. Don't know	
12	The antibodies for HBV need to be checked after three titers	1. Yes 2. No 3. Don't know	
13	Potential routes of HBV in the dental setting may include which of the following:		
	a. Broken skin in contact with saliva contaminated with blood of HBV positive patient	1. Yes 2. No 3. Don't know	
	b. Broken skin in contact with blood of HBV positive patient	1. Yes 2. No 3. Don't know	
	c. Broken skin in contact with saliva of HBV positive patient	1. Yes 2. No 3. Don't know	
	d. Intact skin with blood of HBV positive patient	1. Yes 2. No 3. Don't know	
	e. Intact skin with intact skin of HBV positive patient	1. Yes 2. No 3. Don't know	
	f. Needle stick injury	1. Yes 2. No 3. Don't know	

SECTION 3 :- knowledge of hepatitis B vaccine among health care workers in JUSH (Please make circle on the item you respond)			
S/ No	Question	Response	Skip
3.1	Hepatitis B vaccine should be given to all health care workers as part of work place safety	1. Yes 2. No 3. Not sure	

3.2	Hepatitis B vaccine can be administered simultaneously with HBIG (the immunoglobulin) when indicated	1. Yes 2. No 3. Not sure	
3.3	Persons who have previously been infected with HBV are immune to reinfection and do not require postexposure prophylaxis.	1. Yes 2. No 3. Not sure	
3.4	When indicated as part of PEP, it should be administered within 24hrs of exposure	1. Yes 2. No 3. Not sure	
3.5	For complete protection, vaccination consists of at least two doses.	1. Yes 2. No 3. Not sure	
3.6	If HCWs were vaccinated for hepatitis B in the past and not tested for immunity, should they be tested now?	1. Yes 2. No 3. Not sure	

SECTION 4:- Perception of risk HBV infection (Please make circle on the item you respond)			
S/ No	Question	Response	Skip
4.1	When admitted to hospital, patients who are HBV-positive should not be put in rooms with other patients	1. Strongly agree 2. Agree 3. Neutral 4. Disagree 5. Strongly disagree	
4.2	When caring for a person with HBV , you need to worry about putting yourself and friends at risk of contracting the disease	1. Strongly agree 2. Agree 3. Neutral 4. Disagree 5. Strongly disagree	

4.3	Healthcare workers in your institution worry about getting HBV while caring for patients	1. Strongly agree 2. Agree 3. Neutral 4. Disagree 5. Strongly disagree	
4.4	Glove use for all patient care contacts is a useful strategy for reducing risk of transmission of HBV	1. Strongly agree 2. Agree 3. Neutral 4. Disagree 5. Strongly disagree	
4.5	In the absence of standard precaution health care facilities can be the source of infection for HBV	1. Strongly agree 2. Agree 3. Neutral 4. Disagree 5. Strongly disagree	
4.6	The risk of occupational HBV infection among health workers in your work place is high	1. Strongly agree 2. Agree 3. Neutral 4. Disagree 5. Strongly disagree	
4.7	All patients should be tested for HBV before they receive health care	1. Strongly agree 2. Agree 3. Neutral 4. Disagree 5. Strongly disagree	
4.8	I deliver the same standard of care to patients with HBV as I do for other patients	1. Strongly agree 2. Agree 3. Neutral 4. Disagree 5. Strongly disagree	
4.9	I feel that I do not have the skills needed to effectively and safely treat patients with HBV	1. Strongly agree 2. Agree 3. Neutral 4. Disagree 5. Strongly disagree	
4.10	Following infection control guidelines will protect me from being infected with HBV at work	1. Strongly agree 2. Agree 3. Neutral 4. Disagree 5. Strongly disagree	

ECTION 5:Vaccination status among health care workers in JUSH for HBV (please answer by placing **circle** on the item provide)			
S/ No	Question	Response	Skip
1	Does your institution provide you vaccination against HBV infection?	1. Yes 2. No 3. Not sure	
2	Have you ever been vaccinated for HBV?	2. Yes 2. No 3. Not sure	
3	If 'No' for the above question (2) what do you think the reason?	1. Fear of side effects 2. Expensive to buy 3. Lack of motivation 4. Not available in the country 5. Other specify _____	
4	If Yes for question (2) how often did you get vaccination?	1. Once 2. Twice 3. Three times 4. Other _____	
5	If Yes for question (2), where did you get the vaccination?	1. Private 2. Institution (hospital)	

Thank you very much

Assurance of investigator

The undersigned agrees to accept responsibility for the scientific, ethical and technical conduct of the research project and for provision of required progress reports as preterm and conditions of the research and publications of Jimma University.

Name of student: Ayano shanko, MD

Date _____ signature _____

Approval of the advisors

Advisors name signature date

1. Dr Daniel yilma (MD, Internist)_____ _____
2. Mr. Desta Hiko (BSc, MPHE)_____ _____