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Research Article

Knowledge about Hepatitis B Virus and Practice of Universal Precautions Toward Hepatitis B Virus Infection Among Medical and Health Science Students of Madawalabu University, South East Ethiopia

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ABSTRACT

Background: Blood borne pathogens are present in blood and body fluid and can cause disease in humans. There are more than 20 blood-borne diseases, Particularly Hepatitis B virus (HBV) is the most common blood borne infection and the only one of the three serious viral infections for which an immunization exists.

Objective: To assess knowledge about Hepatitis B virus infection and practice of universal precautions toward prevention of Hepatitis B virus infection among medical and health science students in Madawalabu University, 2014

Methodology: Cross sectional Study was conducted among Health science students of Madawalabu University who had a minimum one month exposure to the hospital setting from May 01-19, 2014. Stratified sampling method was used to select study subjects. Data were collected by using a semi-structured, Pre-tested and self-administered questionnaire prepared in the English Language. The mean score was used to classify respondents as had adequate knowledge about Hepatitis B virus and good practice of universal precaution. Multivariable logistic regression with 95%CI and Adjusted Odds Ratio was used to see associated factors with the knowledge level of Hepatitis B virus infection.

Results: Out of 350 study subjects 208 (59.4%) and 198 (56.6 %) students have adequate knowledge of Hepatitis B virus and had a good practice of Universal precautions respectively. About 249 (71.1%) were never screened for Hepatitis B virus. About 260 (74.3%) were reported that not trained on Universal precaution protocol before attachment to clinical practice. No significant association was found between knowledge level and practice of Universal precaution toward prevention of Hepatitis B virus infection.

Conclusion and recommendation: This study found that the most of the students were not screened for hepatitis B virus and not got trained on Universal precaution Protocol toward prevention of Hepatitis B virus infection. And still students are practicing needle recap that puts them at risk of contracting the infection. So, Training programs should be put in place to promote the appropriate use universal precaution among these students and screening program should be done before start of clinical attachment to prevent transmission of the infection.

Keywords: Hepatitis B virus; Standard precaution; Infection prevention; Blood borne diseases; Infection

BACKGROUND

Blood borne pathogens, such as bacteria and viruses, are present in blood and body fluid and can cause disease in humans. There are more than 20 blood-borne diseases. Hepatitis B virus (HBV) is the most common blood borne infection and the infections for which an immunization exists [1].

Blood borne infections are a major concern for all health care workers. HBV can be transmitted possibly through percutaneous injuries such as needle stick injury, cut with a sharp object, or contact of mucous membrane or non-intact skin with blood, tissue, or other potentially infectious body fluids [2].

Needle stick injury (NSI) is a major occupational health and safety issue faced by healthcare professionals. Percutaneous injuries, caused by needle sticks and other sharps also pose a significant risk of occupational transmission of blood borne pathogens [3].

The most common causes of needle-stick injury are two-handed recapping and the unsafe collection and disposal of sharps waste.

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The risks of blood borne pathogens can be reduced through adherence to standard precautions in the workplace [4].

Universal precautions are designed to prevent health care workers being exposed to blood and body fluids through basic principle of infection control such as hand washing, utilization of appropriate protective barriers, such as gloves, mask, gown and eyewear, and safe handling of needles regardless of patients' diagnosis and presumed infection status [4,5].

Despite the presence of Hepatitis B vaccine and Universal precaution to prevent its transmission, HBV remains the most commonly transmitted blood borne pathogen in the healthcare setting [6].

Globally, an estimate of one-third of the population has been infected with HBV, approximately 350 million people are lifelong carriers and 170 million individuals worldwide are estimated to be infected from HCV. More than 90% these infections occur in developing countries [7].

The burden of HBV infection is highest in the developing world, particularly in Asia and sub-Saharan Africa [8]. WHO estimated that the prevalence of HBV infection in Africa is on average more than 10 % [9,10]. In Ethiopia, a study conducted in Addis Ababa showed that the mean prevalence of HBsAg was 6.1% [11], at shashamane General hospital about 5.7% [12], at the Goba general hospital it was about 7.4% [13].

Medical students lack experience and skill and are; therefore, at a higher risk of infection from unsafe practices [14].

In certain aspects on Universal Work Precautions medical students were less knowledgeable than health care providers. Consequently, they are at risk of infection with blood borne viruses, including Hepatitis B virus infection and the others.

However, no study was conducted to assess the knowledge of Hepatitis B virus transmission, prevention methods and compliance of universal precaution on the prevention aspects of this deadly virus. So, the present study was conducted to assess the knowledge about HBV and practice Universal precaution toward its prevention.

MATERIALS AND METHODS

Study area and period

The research was conducted from May 01-19, 2014 at College of medicine and health science, Madawalabu University. Madawalabu University is one of the higher educational institutions in Ethiopia established in 2007. This university is located in Bale Zone, South east Ethiopia, and Oromia region. It is 430 km from Addis Ababa. However; despite its being new the university can be categorized as the rapidly changing institution in terms of student admission, expansion of programs and campuses. Currently, the university is running over 32 programs at BA/BSc and BED levels. There are two districts and two referral Hospitals providing both preventive and curative health services in Bale zone. The university has two campuses, namely Bale Robe campus (main campus) and Bale Goba campus (college of medicine and health science)

College of medicine and health science has four departments (Innovative medicine, public health officer, Generic nursing and midwifery) and a total of 708 students at the time of the study.

Study design

Institution based cross sectional study design was employed.

Population

Source of population: All regular students of Goba College of medicine and health sciences.

Study population: Students who had a minimum of one month clinical attachment.

Study population

Sample size determination and sampling procedures/sample size determination: The sample size was determined based on a single population proportion formula. Since no study was done regarding knowledge of Hepatitis B virus in the study area, the expected proportion of knowledge about Hepatitis B virus infection was taken as 50%, the 95% confidence level and 5% marginal error and the final sample size was 384.

Sampling procedures: The study participants were selected using stratified sampling technique. First the students were stratified based on year of study departments. Second, the sample size was distributed proportionally in each year of study based on the student population they have. Finally, using students' list, respondents were selected by simple random sampling.

Study variables

Dependent variables: Knowledge level of students about hepatitis B virus infection.

Independent variables: Socio demographic variables, knowledge about HBV, practice about universal precaution to prevent HBV, the history of needle stick injury, history of accidental body fluid splash, duration of clinical attachment, history of training on infection prevention methods, and HBV infection screening.

Operational definitions: Knowledge was assessed by questions focusing on transmission and prevention methods of HBV infection. Each response was scored as 'yes' or 'no' or 'I don't know'. The scoring range of the questionnaire was 14 (largest) to 0 (smallest). A respondent's scores for all knowledge questions were summed up and mean score was calculated. Those students who scored mean of 11 and above were considered as knowledgeable, whereas who scored a mean of below 11 were considered as not knowledgeable about Hepatitis B virus. The Cronbach's alpha for internal consistency of knowledge items was 0.91. Regarding the Practice of universal precaution, students were asked about seven questions. Each question was labelled with 'yes' or 'No'. A respondent's scores for all Practice questions were summed up and mean score was calculated. Then after, students who scored a mean score of 5.0 and above were categorized as having a good practice, whereas those scored below a mean score of 5.0 were not. The Cronbach's alpha for internal consistency of practice items was 0.8.

Data collection tool and data collection procedures: A structured, pre-tested and self-administered questionnaire prepared in English language was used to collect data. This tool includes socio demographic part and screening practices, questions regarding knowledge about HBV and universal precaution practice to prevent risks of HBV infection. Data were collected by distributing the questionnaire to students who had a minimum one month exposure to the hospital setting.

Data quality assurance: The tool was developed by reviewing different literatures and Standard guideline on universal precaution. Introduction was given to those students before they start filling the questionnaire on day of data collection. They were also introduced the purposes of conducting this research. The collected data were reviewed and checked for completeness by Investigators.

Data processing and analysis: Data were entered and analyzed using the SPSS software package (Version 16). Descriptive statistics were computed to determine knowledge level students about hepatitis B virus infection and practices of Universal precaution toward prevention of Hepatitis B virus infection. Frequency distribution was done for socio demographic variables. The Independent variables were entered to multiple logistic regressions with Enter method. A significant association was declared at $P \leq 0.05$. Adjusted Odds Ratio was used to see the strength of the association.

Ethical consideration: The study was conducted after obtaining institutional ethical clearance from Research and Community Service Directorate of the College. Information about the study was given to all Study subjects and was assured about the confidentiality of their response. Verbal consent was obtained from each respondent and they were also told that they have the right not to participate in the study.

RESULTS

From the total 384 study subjects, 350 of them were included in the study yielding the response rate of 91.1%.

Socio demographic characteristics

Of the total (350) study subjects, 285 (81.4%) were from the age group of 20-24. Of the total respondents 282 (80.6%) were male and 182 (52%) were from third year students. One Hundred twenty four (35.4) were from the nursing department. Concerning the marital status of respondent about 308 (88%) was single. Of the total students included in the study, 184 (52.6%) had three months and above clinical attachment experience (Table 1).

Table 1: Socio demographic characteristics of health science students of Madawalabu University, South east Ethiopia, 2014.

Variable		Frequency	Percent
Age	15-19	6	1.7
	20-24	285	81.4
	25+	59	16.9
Sex	Male	282	80.6
	Female	68	19.4
Year of study	Second	27	7.7
	Third	182	52
	Fourth	141	40.3
Department	Nursing	124	35.4
	Midwifery	84	24
	Public health	99	28.3
	Medicine	43	12.3
Duration of clinical attachments	≤ 3 months	166	47.4
	>3 month	184	52.6

Two hundred forty nine of the students (71.1%) never screened for Hepatitis B virus. One hundred Eighty eight (53.7%) were not immunized against Hepatitis B virus. Of the total participants, 260 (74.3%) were never trained on universal precaution before hospital attachment (Table 2).

Table 2: Distribution of respondents on history of HBV screening and immunization among health science students of Madawalabu University, South east Ethiopia, 2014.

Variable	Frequency	Percent
Screened for HBV		
Yes	101	28.9
No	249	71.1
If yes		
Reactive	14	3.9
None reactive	87	24.9
History of HBV immunization		
Yes	90	25.7
No	188	53.7
Not sure	72	20.6
Taking training on universal precaution before hospital attachment		
Yes	90	25.7
No	260	74.3

The magnitudes of the accidental needle stick injury and a splash of the patient's body fluid was 76 (21.7%) and 89 (25.4%) respectively (Table 3).

Table 3: Prevalence of needle sticks injury and accidental splash of body fluid among health science students of Madawalabu University, South east Ethiopia, 2014.

		Number	Percentage
Needle stick injury	Yes	76	21.7
	No	274	78.3
Accidental splash of body fluid	Yes	89	25.4
	No	261	74.6

Knowledge towards Hepatitis B transmission and prevention: Out of the 350 participants 142 (40.6%) were not knowledgeable whereas 208 (59.4%) had adequate knowledge about Hepatitis B virus infection transmission and prevention methods (Table 4).

Practice of universal precaution to prevent Hepatitis B virus infection: Out of the 350 students, 152 (43.4%) had a good practice, whereas 198 (56.6%)) had a poor practice of universal precaution toward prevention of Hepatitis B virus infection. The majority of the respondents, 325 (92.9%) washed their hands after patient Care or handling contaminated items during patient care and 259 (74%) of the respondents wear Goggles in procedure where there is a possibility of blood/body fluid exposure. A majority, 158 (45.1%) of the respondents recap the used needles by two hands while the rest not (Table 5).

In multiple logistic regressions, having the history of Accidental splash of body fluid was found the significant predictor of Knowledge level of students about Hepatitis B virus infection (AOR=2.8, 95%CI;1.52-4.79, p=0.001) (Table 6).

Table 4: Distribution of item questions used to determine level knowledge toward HBV transmission and prevention methods among health science students of Madawalabu University, South east Ethiopia, 2014.

S/n	Knowledge questions	Yes (N, %)	No(N,%)	I don't know
	Transimition modes of HBV			(N, %)
1	Reuse of contaminated syringe	271 (77.4)	54 (15.4)	25 (7.1)
2	Donating unscreened blood	269 (76.9)	47 (13.4)	34 (9.7)
3	Unprotected sexual intercourse/multiple sexual partner	254 (72.6)	39 (11.1)	57 (16.3)
4	Reuse of razor	264 (75.4)	37 (10.6)	49 (14)
5	Use of unsterilized medical instruments	280 (80)	42 (12)	28 (8)
6	Needle stick or by injury with sharp object	279 (79.7)	35 (10)	36 (10.3)
7	Exposure to body fluids(blood, semen, saliva and other)	292 (83.4)	36 (10.3)	22 (6.3)
8	Contact with infected person	274 (78.3)	50 (14.3)	26 (7.4)
9	Contact of patient body fluid with eye mucosa or oral mucosa	253 (72.3)	56 (16)	41 (11.7)
10	Breast feeding Hepatitis B positive mother	242 (69.1)	72 (20.6)	36 (10.3)
11	Hepatitis B virus carrier can be asymptomatic	261 (74.8)	56 (16)	33 (9.2)
	Prevention methods of HBV			
12	Compliance of universal precaution can prevent hepatitis B virus and other blood borne pathogens	296 (84.6)	45 (12.9)	9 (2.6)
13	There is a vaccination to prevent hepatitis B virus	275 (78.6)	60 (17.1)	15 (4.3)
14	Screening all patient for hepatitis infection	268 (76.6)	60 (71.1)	22 (6.3)

Table 5: Frequency distribution of Practice related to Hepatitis B prevention among medicine and health science students, Madawalabu University, 2014.

S/no	Questions on Practice of universal precaution to prevent Hepatitis B virus infection	Yes (N, %)	No (N, %)
1	Washed hands after patient Care or handling contaminated items	325 (92.9)	25 (7.1)
2	Wearing Goggles in procedure where possibility of blood/body fluid exposure	259 (74.0)	91 (26.0)
3	Wearing masks in procedure where possibility of blood/body fluid exposure	251 (71.7)	99 (28.3)
4	Wearing gloves for contact with body fluids, non-intact skin and mucous membranes	319 (91.1)	31 (8.9)
5	Cover all cuts and abrasions on your body that has possibility to be exposed to patient body fluids?	282 (80.6)	68 (19.4)
6	Recap the used needles by your two-hands	158 (45.1)	192 (54.9)
7	Collecting and disposing used needles and sharps (scalpel blades, lancets, razors, and scissors) in proof safety boxes	317 (90.8)	33 (9.2)

Table 6: Factors associated with knowledge of Hepatitis B virus infection among health science students of Madawalabu University students, 2014.

Variable		COR (95% CI)	P	AOR (95% CI)	P
Academic level	Second	0.67 (0.29-1.52)	0.56	0.78 (0.27-2.29)	0.95
	Third	1.57 (1.0-2.46)	0.67	1.35 (0.79-2.30)	0.37
	Fourth year	1		1	
Department	Nursing	0.23 (0.09-0.55)	0.001	0.28 (0.05-1.44)	0.276
	Midwifery	0.19 (0.07-0.46)	0	0.21 (0.04-1.13)	0.069
	Health Officer	0.37 (0.14-0.88)	0.026	0.43 (0.11-1.74)	0.238
	Medicine	1		1	
Duration of attachtemets	One to three months	0.84 (0.55-1.29)	0.43	0.89 (0.29-2.574)	0.857
	Four and above months	1			
Screening status	Yes	1.10 (0.67-1.69)	0.81	0.93 (0.53-1.61)	0.927
	No	1		1	
Immunization Status for HBV	Yes	1.10 (0.56-2.05)	0.83	1.17 (0.57-2.41)	0.689
	No	0.69 (0.39-1.19)	0.19	0.57 (0.31-1.06)	0.066
	Not sure	1		1	
Training on infection prevention	Yes	1.32 (0.81-2.18)	0.26	1.11 (0.63-1.93)	0.699
	No	1		1	

Needle stick injury	Yes	1.14 (0.68-1.92)	0.63	0.97 (0.53-1.78)	0.968
	No	1		1	
Accidental splash of body fluid	Yes	2.20 (1.31-3.78)	0.003	2.8 (1.52-4.79)	0.001
	No	1		1	
Age	15-19	0.18 (0.03-1.12)	0.06	0.61 (0.07-5.07)	0.601
	20-24	0.49 (0.27-0.94)	0.027	1.12 (0.45-3.11)	0.802
	25 and Above	1		1	

DISCUSSION

Scientific knowledge about HBV transmission is essential for medical students. They can take proper protection during their clinical posting as HBV is 50 times easier to transmit than HIV [4]. Knowledge of blood-borne illnesses and universal precautions should be the foundation of any safe-practice methods in the hospital. This study found that about fifty nine percent had adequate knowledge about Hepatitis B virus infection, its transmission and prevention methods.

The concerning practice of universal precaution about 56.6% had good practice of universal precaution. However, this study found no association between knowledge of Hepatitis B virus and practice of universal precautions among the students which is in line with study by Askarian et al. [14,15].

Age and duration of experience, which many believed to be the hallmarks of good practice, were not significantly associated with knowledge or practice in this study. However, Level of awareness of universal precautions increased with longer year of service in the health care sector.

This study also finds out that nursing students, midwifery students and public health officer students were less likely knowledgeable about transmission and prevention methods of hepatitis B virus compared to Medicine students.

These might be due to that medical students are those with a health background, having a bachelor degree in a health science field and had more work experience on infection prevention methods. Those students who had a history of accidental splash of patient/client body fluid were more likely knowledgeable about Hepatitis B virus. It may be due to that students experienced the event may be more aware about diseases that can be transmitted through the body fluid splash on eye, nasal mucosa and on open wound.

This study found that the overall knowledge of the risk of transmission and prevention of HBV from HBsAg positive patients to a non-immune Heath Care Workers for midwife students was low which about was 48.8%. About 83.7% of medical students were having adequate knowledge about hepatitis B virus transmission and prevention methods compared to nursing students (54%) and Public health students (64%).

The study conducted by Motamed et al. Reported 74.5% medical students and 89.9% health care workers practicing washing with soap and water for 5 minutes as the first step on contact with infectious materials [15,16]. This finding is in line with the present study in which majority of, 92.9% were responded washing hands after accidental contact with blood, body fluids, secretions, or contaminated items with water and soap can prevent the transmission of Hepatitis B virus to health and non-immunized individuals.

About 91.1% students in present study said Wearing gloves for contact with body fluids, non-intact skin and mucous membranes and about 90.8% responded collecting and disposing used needles and sharps (scalpel blades, lancets, razors, and scissors) in proof safety boxes can prevent the transmission of the virus.

This finding is in line with studies conducted among Medical students of Ajman, United Arab Emirates which reported that about 94.3% participants viewed it necessary to wear surgical aprons while performing surgery and 95.4% reported to dispose sharps in a closed puncture resistant basket [17].

The use of eye protection was found to be low in most settings. For example, eye protection was used by 16.3% of Nigerian nurses, auxiliary nurses, doctors, laboratory scientists and domestic staff, 23.1% of Nigerian dentist [18]; 43.8% Iranian dentists, general practitioners, pre clinicians, surgeons and interns who did surgical procedures [19]. In contrast, in this study, 74% of the participant reported that used eye protection. This can be considered as a good practice toward the prevention of the transmission of the virus when a chance of body fluid splash to the eyes.

The practice of recapping of needles was found to be still common in healthcare settings. For example, about 47.3% of Moroccan nurses; nurse assistants and supporting staff [20] and 60.8% of Iranian medical student [21] recapped used needles, while in another Nigerian study, only 32.9% of HCWs didn't recap needles [22].

Reportedly 92% medical students practicing recapping needles and another study by Hesse et al. Found 78% health care workers practicing recapping needles [23,24]. However, Recapping of used needles is reported as one way through which health workers sustain needle pricks. In the present study about 54.9% of the respondents have not practiced recapping of the used needles. Even though Recapping and disassembly increases the risk of needle stick injury about 45.1% of the students were still practicing needle recapping.

HBV is the most infectious blood borne virus and in many parts of the world. Screening and Routine immunization of health workers against infection with HBV is an effective way to protect them [6]. However, in the present study about 71.1% of the students were not screened for hepatitis B virus before their clinical attachments and 53.7% were not immunized for the virus.

CONCLUSION AND RECOMMENDATION

This study found that the majority of respondents was not screened for hepatitis B virus and not get trained on Universal precaution toward prevention of Hepatitis B virus infection. And still students are practicing needle recap which puts them at risk of contracting the infection. Having history body fluid splash was a significant predictor of Knowledge level of HBV infection. So Training programs should be put in place to promote the appropriate use

universal precaution protocol among these students and screening program should be done before start of clinical attachment and Vaccine should be given to them to prevent transmission of this infection.

COMPETING INTERESTS

No Competing interests

AUTHOR'S CONTRIBUTIONS

TB wrote the proposal, participated in data collection, analyzed the data and drafted the manuscript. GM involved in writing a proposal, data collection and review of the manuscript.

DATA AVAILABILITY

The data used to support the findings of this study are available from the corresponding author upon request.

CONSENT FOR PUBLICATION

Not applicable.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethical clearance was obtained from Ethical Review Board of University of Madda Walabu University, College of Medicine and Health Sciences, Institute of Public Health prior to data collection. Written informed consent was obtained from each study participant after the purpose of the study explained. Food handlers who were not volunteered to continue from the beginning or from any part of the interview were respected to do so. Privacy and strict confidentiality were maintained during the interview process. Name and personal identifiers of participants had not been included in order to maintain Anonymity.

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The research was self-funded. The authors' independently design the study, analyze and interpret the data, prepared the manuscript.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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