ID Design Press, Skopje, Republic of Macedonia
Open Access Macedonian Journal of Medical Sciences. 2019 Feb 15; 7(3):435-439.
https://doi.org/10.3889/oamjms.2019.118
eISSN: 1857-9655
Public Health

Current Knowledge, Attitudes, and Practice of Medical Students Regarding the Risk of Hepatitis B Virus Infection and Control Measures at Qassim University

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Citation: Al Wutayd O, AlRehaili A, AlSafrani K, Abalkhail A, AlEidi S. Current Knowledge, Attitudes, and Practice of Medical Students Regarding the Risk of Hepatitis B Virus Infection and Control Measures at Qassim University. Open Access Maced J Med Sci. 2019 Feb 15; 7(3):435-439. https://doi.org/10.3889/oamjms.2019.118

Keywords: Medical students; Hepatitis virus infection; Occupational health hazards; University education; hepatitis B virus

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Received: 12-Nov-2018; **Revised:** 09-Jan-2019; **Accepted:** 05-Feb-2019; **Online first:** 10-Feb-2019

Funding: This research did not receive any financial support

Competing Interests: The authors have declared that no competing interests exist

Abstract

BACKGROUND: Medical students are exposed to occupational health hazards in hospitals during their studies and lack sufficient education about infection control measures. Injury to medical students is a substantial problem and students have an increased risk of hepatitis B virus (HBV). To understand how medical students think about infection control, it is important to identify the strengths and weaknesses of their education.

AIM: To assess current knowledge, attitudes, and practice of medical students regarding HBV infection and control measures at Qassim University, Saudi Arabia.

MATERIAL AND METHODS: A cross-sectional study was conducted at a medical college. Participants completed a 39-item self-administered questionnaire assessing demographics, knowledge, attitudes, and practice. Item response frequencies were calculated. Responses were recorded into yes (strongly agree and agree) and no (neutral, disagree, and strongly disagree) answers. Correct responses were totalled and categorised as good or poor performance. A scale cut-off of less than 75% correct responses was considered poor, and 75% or more correct responses was considered good. Odds ratios and 95% confidence intervals were calculated, and the chi-square test was used for analysis.

RESULTS: A total of 21%, 41%, and 8% of students expressed good knowledge, attitudes, and practice, respectively. There was no statistically significant difference between males and females on knowledge ($p = 0.089$), attitudes ($p = 0.829$), and practice ($p = 0.248$). There was a statistically significant difference between academic years on knowledge ($p = 0.0001$), attitudes ($p = 0.0001$), and practice ($p = 0.0001$).

CONCLUSION: Most medical students have poor knowledge, attitudes, and practice regarding the risk of HBV infection. It is recommended that a policy is implemented for training on infection prevention for all medical students before they start clinical practice. Prevention programs about HBV infection should be instituted, and existing programs must be strengthened.

Introduction

Hepatitis B virus (HBV) infection is a major public health concern in any health care institution. The risk of occupational exposure to HBV among health care workers (HCWs), particularly students in health professions, is a major public health issue [1]. Medical students are exposed to occupational health hazards in hospitals during their academic and clerkship years but lack sufficient education about infection control measures. Injuries to HCWs, including medical students, remains a substantial problem in the health care systems of many countries and leads to increased risk in acquiring infections such as HBV [2], [3], [4], [5]. Global studies have demonstrated that every HCW has a chance to acquire injury related to work four times a year [6], [7]. Exposure to infected blood as a consequence of injury means that HCWs (including medical students) are at great risk of infections from the human immunodeficiency virus, HBV, and hepatitis C [8], [9], [10], [11]. Studies showed that HBV demonstrate huge social and economic burden on the society and the authority, with high prevalence rates in some countries around the world, which explain the urgent need to develop more sophisticated infection control procedures training [12], with implementing efficient public health measures and infection control practices to help control the issue [13], moreover, introducing

successful public health policies and guidelines will lead to a great decrease and improvement of the HBV status in any community [14].

Prospective studies on HCWs have found that the average risk for HBV transmission is 6% to 30% [15]. Some studies indicate that students lack understanding and do not use isolation precautions and personal protective equipment [16]. Although there are many studies on professional HCWs, few studies have focused on undergraduate medical students. This study aimed to determine the knowledge, attitudes, and practice of medical students regarding the risk of HBV infection and control measures.

This study was conducted at Unaizah College of Medicine, Qassim University, which will be expected to graduate their first batch in mid of 2019. Meanwhile, there has not been any study that investigates this issue in the Qassim region. This study is important to understand how medical students think about occupational health hazards, and the first step is to identify the strengths and weaknesses of their current educational curriculum to help evaluate the infection control training and improve the teaching process.

Material and Methods

A quantitative observational cross-sectional study was conducted in Unaizah College of Medicine, Qassim University, Saudi Arabia. All medical students were recruited by contacting the student affairs office and academic year group leaders. All students from the second to the sixth years were included; students in their preparatory year and their internship year were excluded, no other inclusion/exclusion criteria were applied.

A 39-item self-administered questionnaire was constructed that measured demographics, knowledge, attitudes, and practice. To ensure the face validity of the questionnaire, a pilot study was conducted with 30 medical students at Qassim University. This pilot study was used to validate the logistics of data collection, to establish the clarity of the questionnaire, and to estimate the timing for data collection. The questionnaire took about 10 to 15 minutes to complete. To ensure content validity, the questionnaire was reviewed by community medicine physicians, and amendments were made based on their recommendations. We calculated frequency scores for all items. Then, for each question, we recorded the strongly agree and agreed responses into a YES response, and recorded the neutral, disagree, and strongly disagree responses into a NO response. The number of correct responses was totalled and categorised as good or poor performance. Scores on knowledge, attitudes, and practice were calculated by scoring correct responses as 1 and incorrect responses as 0. A scale cutoff of less than 75% correct responses was considered poor, and 75% or more correct responses was considered good.

Statistical analysis

IBM SPSS Statistics for Windows (SPSS statistical software V.21 (IBM Corp. Released 2012) was used for data entry, data management, and analysis. Odds ratios (ORs) and 95% confidence intervals (CI) were calculated, and chi-square was used for analysis. Logistic regression analysis was used to test interactions among variables. All p-values were based on two-tailed tests. The minimum significance level will be 0.05, with all p values based on two-tailed tests.

Institutional review board (IRB) approval was obtained from Unaizah College of Medicine, Qassim University, for this study before study execution.

Results

The response rate was 92%. Table 1 shows the demographic data of our sample, with the number of students according to gender and year of education.

Table 1: Demographic data

Characteristics			Frequency	Percentage
Gender		Male	164	51.1
		Female	157	48.9
Year	Pre-clerkship	First year	136	42.4
		Second year	44	13.7
	Clerkship	Third year	63	19.6
		Fourth year	54	16.8
		Fifth year	24	7.5
Total		Total	321	100

Table 2 shows the number of responses for each question on knowledge, attitudes, and practice for HBV and control measures. Correct responses to each question varied between 41.1% to 81.9%, 34.6% to 79.8%, and 31.5% to 75.7% for knowledge, attitudes, and practice, respectively.

Table 3 shows that 21% of the students achieved 75% or more correct responses on knowledge and 79% showed poor knowledge. There were 41% of the students who achieved 75% or more correct responses on attitudes and 59% who scored poorly on attitudes. There were 8% of the students who achieved 75% or more correct responses on practice and 92% who scored poorly on practice. The knowledge, attitude, and practice scoring percentages were not statistically significant between males and females. Finally, a comparison of clerkship students with pre-clerkship students showed that clerkship

students scored significantly higher than pre-clerkship students on knowledge, attitudes and practice.

Table 2: Participant responses to a questionnaire on the risk of hepatitis B virus infection and control measures

Part I (Knowledge)	Yes n (%)	No n (%)	Correct answers n (%)
HBV infection control issues have been addressed in the teaching courses.	207 (64.5)	114 (35.5)	207 (64.5)
HBV is the most contagious blood-borne pathogen acquired through accidental exposure to blood.	206 (64.2)	115 (35.8)	206 (64.2)
HBV can be spread through sharing injecting equipment, such as needles and operation tools.	251 (78.2)	70 (21.8)	251 (78.2)
Needlestick injuries are considered a mode of HBV transmission.	233 (72.6)	88 (27.4)	233 (72.6)
An infected mother may transmit HBV to her newborn baby during delivery.	165 (51.4)	156 (48.6)	165 (51.4)
Chronic HBV infection can lead to liver cirrhosis.	233 (72.6)	88 (27.4)	233 (72.6)
Chronic HBV infection can lead to liver cancer.	168 (52.3)	153 (47.7)	168 (52.3)
Most chronic HBV infection cases are symptomatic.	169 (52.6)	152 (47.4)	152 (47.4)
Sterilization (e.g., surgical instruments) is considered a measure to prevent HBV transmission.	197 (61.4)	124 (38.6)	197 (61.4)
Routine blood screening for HBsAg is considered a measure to prevent HBV transmission.	164 (51.1)	157 (48.9)	164 (51.1)
Ensuring safe injection practices is considered a measure to prevent HBV transmission.	217 (67.6)	102 (31.8)	217 (67.6)
Drinking and eating from contaminated drinks is a risk factor for HBV.	120 (37.4)	201 (62.6)	201 (62.6)
HBV test is conducted before marriage.	176 (54.8)	145 (45.2)	176 (54.8)
The minimum number of doses for a complete primary HBV vaccination is three.	132 (41.1)	189 (58.9)	132 (41.1)
Pregnancy is a contraindication for the use of the HBV vaccine.	120 (37.4)	200 (62.3)	200 (62.3)
People who are carriers of HBV are at risk of infecting others.	145 (45.2)	176 (54.8)	145 (45.2)
Can HBV be caught through casual contact such as holding hands?	85 (26.5)	236 (73.5)	236 (73.5)
Can HBV be spread through contact with open wounds/cuts?	194 (60.4)	126 (39.3)	194 (60.4)
Can HBV vaccine prevent HBV?	217 (67.6)	104 (32.4)	217 (67.6)
Can HBV be transmitted by unsterilized syringes, needles, and surgical instruments?	227 (70.7)	92 (28.7)	227 (70.7)
Can HBV be transmitted by unsafe sexual contact?	198 (61.7)	123 (38.3)	198 (61.7)
Do you think that there is a laboratory test for HBV?	263 (81.9)	58 (18.1)	263 (81.9)
Is HBV curable/treatable?	173 (53.9)	147 (45.8)	147 (45.8)
Do you think that post-exposure prophylaxis is available for HBV?	135 (42.1)	186 (57.9)	135 (42.1)
Part II (Attitudes)			
Do you think you are at risk of acquiring HBV infection during practice training?	207 (64.5)	114 (35.5)	207 (64.5)
Do you think you are at a higher risk of HBV infection than the general population?	189 (58.9)	132 (41.1)	189 (58.9)
I feel that I do not have the skills needed to effectively and safely deal with occupational HBV risk in health care settings.	111 (34.6)	210 (65.4)	111 (34.6)
I do not believe in the HBV vaccine.	66 (20.6)	255 (79.4)	255 (79.4)
I believe that changing gloves during blood collection and testing is a waste of time.	64 (19.9)	256 (79.8)	256 (79.8)
I believe that all patients should be tested for HBV before they receive health care.	124 (38.6)	197 (61.4)	197 (61.4)
I do not like treating people with HBV.	72 (22.4)	248 (77.3)	248 (77.3)
I believe that following infection control guidelines will protect me from being infected with HBV at work.	188 (58.6)	133 (41.4)	188 (58.6)
Part III (Practice)			
I get rid of tools and objects contaminated with blood in a medical waste bag, regardless of the presence of the source of infection.	187 (58.3)	133 (41.4)	133 (41.4)
I perform needle recapping for needles after giving injections or using needles.	152 (47.4)	169 (52.6)	169 (52.6)
Have you conducted screening for HBV?	101 (31.5)	219 (68.2)	101 (31.5)
Have you been vaccinated against HBV?	133 (41.4)	188 (58.6)	133 (41.4)
I always change gloves for each patient during blood taking.	194 (60.4)	127 (39.6)	194 (60.4)
Have you ever had a needlestick injury?	78 (24.3)	243 (75.7)	243 (75.7)
I always report needlestick injuries.	145 (45.2)	176 (54.8)	145 (45.2)

Discussion

A major occupational hazard for HCWs is HBV infection. There have been few studies in Saudi Arabia on undergraduate medical students' knowledge, attitudes, and practice of HBV infection. Such data are important in designing health intervention methods and public health policies. Assessing knowledge, attitudes, and practice is a useful step in assessing how much individuals are receiving medical training adopt risk-free disease behaviours for contagious diseases. Medical students should be aware of the risks involved in dealing with patients and should adopt the appropriate management procedures and precautions during training on infectious diseases. Our study involved 321 participants and included almost equal proportions of male and female students: 51.1% and 48.9%, respectively.

Table 3: Multivariate analysis of factors associated with knowledge, attitudes, and practice regarding the risk of hepatitis B virus infection and control measures among medical students

Variables		Knowledge Good n = 69 n (%)	Knowledge Poor n = 252 n (%)	AOR (95% CI) P value	Attitudes Good n = 133 n (%)	Attitudes Poor n = 188 n (%)	AOR (95% CI) P value	Practice Good n = 25 n (%)	Practice Poor n = 296 n (%)	AOR (95% CI) P value
Gender	Male	29 (42%)	135 (53.6%)	1.59 (0.92-2.72) 0.089	67 (50.4%)	97 (51.6%)	1.05 (0.67-1.63) 0.829	10 (40%)	154 (52%)	1.62 (0.70-3.73) 0.248
	Female	40 (58%)	117 (46.4%)		66 (49.6%)	91 (48.4%)		15 (60%)	142 (48%)	
Year	Pre-clerkship	34 (49.3%)	209 (82.9%)	1	87 (65.4%)	156 (83%)	1	10 (40%)	233 (78.7%)	1
	Clerkship	35 (50.7%)	43 (17.1%)	5 (2.81-8.89) < 0.001	46 (34.6%)	32 (17%)	2.57 (1.53-4.34) < 0.001	15 (60%)	63 (21.3%)	5.54 (2.37-12.94) < 0.001

We first categorised data according to individual academic years; however, some years contained very small numbers of students. We, therefore, categorised data by clerkship status, which produced a better test of differences. There was no significant difference in knowledge, attitudes, and practice between males and females, but there were differences between academic years. We found that 21% of students achieved 75% or more correct responses on knowledge (which we considered as indicating a good level of knowledge), whereas 79% had poor knowledge. We found that 41.1% of medical students knew that the minimum number of doses for complete HBV vaccination is three, and 42.1% knew that post-exposure prophylaxis is available for HBV. These results are compatible with findings from a study at Haramaya University in Ethiopia, which showed an overall low knowledge score [17]. Studies of medical students in Erbil city in Iraq [18] and in Qatar [19] demonstrated similar poor knowledge of HBV and its infection control measures. Also, a study at Aljouf University, Saudi Arabia, found that students had inadequate overall knowledge of the occupational risks of HBV infection; although 63.0% considered the vaccine safe and 52.2% had been vaccinated against HBV, 72% of participants did not know post-exposure prophylaxis for HBV [20]. A study of the attitudes of medical students at Tanta University, Egypt, toward hepatitis B and C revealed that only 57.8% of participants had sufficient knowledge; 63.3% had incorrect knowledge of modes of transmission of infection, 49.7% did not know that there is a treatment for B and C viral hepatitis, and 13.5% did not know that there is a vaccine for B viral hepatitis [21]. In contrast, a study in northwest Ethiopia [22], and a study at Northern Border University, Saudi Arabia, [18] showed that medical students had good knowledge of the mode of transmission and prevention of HBV, findings inconsistent with those of the present study. In addition, a study of medical

students in Hail, Saudi Arabia, demonstrated that most participants had adequate knowledge of HBV infection and its mode of transmission, 73.6% knew that HBV infection was associated with liver cancer, and 81.4% were aware of the HBV vaccine and that it provides protection against HBV infection [23]. Differences in the number of questions on knowledge could explain why our findings differ from those of these previous studies. We found that 41% of students achieved 75% or more correct responses on attitudes (which we considered as indicating good attitudes), whereas 59% showed poor attitudes; these figures are compatible with those of the Hail study, which found that pre-clinical students showed unfavourable attitudes toward HBV prevention compared with clinical year students [23]. In contrast, the studies of medical students in northwest Ethiopia [22], Qatar [19], and Northern Border University [18] identified good attitudes toward HBV infection in medical students. Also, the Tanta University study showed that more than 75% of participants had a positive attitude toward viral hepatitis B and C; although a small proportion of respondents had negative or unsure attitudes, most (81.6%) did not share objects of personal use with others [21]. We found that 25 (8% of the sample) students achieved 75% or more correct responses on practice (which we considered as indicating good practice), whereas 296 showed poor practice. A study in Mazandaran Province, Iran, showed that low knowledge scores were related to lack of regular post-employment education [24], and the study at Haramaya University in Ethiopia [17] indicated that adequate knowledge of the subject matter could lead to good infection control practices. The poor practice results found here are by findings from a study of medical students in northwest Ethiopia [22], and a study at Northern Border University [18], both of which showed poor practice toward HBV risk. In the Tanta University study, 68.1% of participants achieved good practice scores [21], and the Hail study showed good practice scores for the prevention of HBV infection [23]. The low knowledge scores among our students can be explained by the inadequate tuition on infection control measures in the curriculum. Lack of post-employment education about infection control affects health care personnel as well as students [24]. Although we found that knowledge, attitudes, and practice improved as students progressed through their academic years, this could be a result of students' increased awareness of infection control measures when they start their clerkship years. Despite these positive findings, our study revealed that most participants had poor practice regarding HBV risk. These findings demonstrate the urgent need to address the gap between student knowledge and practice by strengthening health educational programs on infection control precautions. Concerted efforts are needed to understand the reasons underlying poor knowledge, attitudes, and practice regarding HBV, and to determine if these stem from current medical college curricula. More in-depth investigations are recommended [25]; also, a comprehensive ongoing occupational hazard training program should be implemented as a mandatory course for all medical students. More attention should also be paid to post-educational studies on infection control precautions as practised in clinical settings [22]. As medical students are at increased risk of exposure to hospital-acquired infections in their training practice at hospitals, they should be vaccinated against HBV as they enter the medical college. Also, preventive health departments should be established in medical colleges, which would take responsibility for implementing a well-planned program of vaccination for all newly enrolled medical students. Before starting clinical training, it is recommended that policy is implemented for complete vaccination and training on infection control prevention measures for all medical students [17]. This study had some limitations. The use of a self-report questionnaire may have resulted in recall bias. Also, the study sample was restricted to medical students from one college in one city; therefore, the results cannot necessarily be generalised to other health college students from the same university who are also exposed to the risk of HBV infection.

In conclusion, medical students showed poor knowledge, attitudes, and practice regarding the risk of HBV infection and control measures. Implementation of an occupational hazard course for undergraduate medical students is highly recommended.

Acknowledgement

We would like to express our deepest appreciation to all those who provided us with the possibility to complete this study, we would like to show our gratitude to the research unit members of Unaizah College of Medicine for their help and support. We also thank the medical students for their participation in our study.

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