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

Osama Al Wutayd1, Abdullah AlRehaili2, Khaled AlSafrani2, Abdulrahman Abalkhail2, Sulaiman Mohammed AlEidi3*

1Department of Family and Community Medicine, Unaizah College of Medicine, Qassim University, Saudi Arabia; 2Unaizah College of Medicine, Qassim University, Saudi Arabia; 3Ministry of Health, Saudi Arabia

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 | Male | Female | Total |
|-----------------|------|--------|-------|
| Gender          |      |        |       |
| Male            | 164  | 157    | 321   |
| Female          | 136  | 172    | 308   |
| Pre-clerkship   |      |        |       |
| First year      | 8    | 12     | 20    |
| Second year     | 7    | 11     | 18    |
| Year            |      |        |       |
| Third year      | 8    | 12     | 20    |
| Fourth year     | 8    | 15     | 23    |
| Clerkship       |      |        |       |
| Fifth year      | 13   | 13     | 26    |
| Total           | 100  | 100    | 200   |

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

| Question                                                                 | Agree (n (%))                                                                 | Disagree (n (%))                                                                 | Correct (n (%))                                                                 |
|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| HBV infection control issues have been addressed in the teaching courses.| 207 (64.5)                                                                    | 114 (35.5)                                                                     | 207 (64.5)                                                                     |
| HBV infection control issues have been addressed in clinical practice    | 152 (44.6)                                                                    | 165 (48.6)                                                                     | 152 (44.6)                                                                     |
| HBV infection control issues have been addressed in practice             | 206 (64.2)                                                                    | 115 (35.8)                                                                     | 206 (64.2)                                                                     |
| HBV infection control issues have been addressed in research             | 205 (62.8)                                                                    | 121 (37.2)                                                                     | 205 (62.8)                                                                     |
| HBV infection control issues have been addressed in prevention            | 206 (64.2)                                                                    | 121 (37.2)                                                                     | 206 (64.2)                                                                     |

**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 | AOR (95% CI) | Practice | AOR (95% CI) |
|-----------|-----------|--------------|----------|--------------|
| Gender | Male | 29 (42%) | 1.59 (0.92-2.72) | 1.05 (0.67-1.63) | 0.62 (0.37-1.03) |
|          | Female | 126 (56%) | 1.20 (0.75-1.93) | 1.85 (1.27-2.70) | 1.28 (0.80-2.01) |
| Year | 2015-2016 | 114 (35.5%) | 1.53 (1.20-1.98) | 1.53 (1.20-1.98) | 1.53 (1.20-1.98) |
|          | 2016-2017 | 199 (62.3%) | 1.85 (1.20-1.98) | 1.85 (1.20-1.98) | 1.85 (1.20-1.98) |

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 the knowledge component, whereas 12% of students achieved 75% or more correct responses on the practice component.

Open Access Maced J Med Sci. 2019 Feb 15; 7(3):435-439.
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 [16], 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.

References

1. Cheng HC, Su CY, Yen AMF, Huang CF. Factors affecting occupational exposure to needlestick and sharps injuries among dentists in Taiwan: a nationwide survey. PLoS One. 2012; 7:e34911. https://doi.org/10.1371/journal.pone.0034911 PMid:22509367 PMCid:PMC3318009
2. Prüss-Ustün A, Rapiti E, Hutton Y. Estimation of the global burden of disease attributable to contaminated sharps injuries among health-care workers. Am J Ind Med. 2005; 48:482-90. https://doi.org/10.1002/ajim.20230 PMid:16299710
3. O’Connor MB. Needlestick injury advice in the UK and Ireland. J
Hosp Infect. 2009; 71:185-6. https://doi.org/10.1016/j.hin.2008.11.004 PMid:19070938

4. MemishZA, Assiri AM, El Dalatony MM, Hathout HM, Alzoman H, et al. Risk analysis of needle stick and sharp object injuries among health care workers in a tertiary care hospital (Saudi Arabia). J Epidemiol Glob Health. 2013; 3:123-9. https://doi.org/10.1016/j.jegh.2013.03.004 PMid:23932054

5. Deisenhammer S, Radon K, Nowak D, Reichert J. Needlestick injuries during medical training. J Hosp Infect. 2006; 63:263-7. https://doi.org/10.1016/j.jhin.2006.01.019 PMid:16650505

6. Reda AA, Fisseha S, Mengistie B, Vandyweerd JM. Standard precautions: occupational exposure and behavior of health care workers in Ethiopia. PLoS One. 2010; 5:e14420. https://doi.org/10.1371/journal.pone.0014420 PMid:21203449 PMcId:PMC3009714

7. Gerberding J. Clinical practice. Occupational exposure to HIV in health care settings. N Engl J Med. 2003; 348:826-33. https://doi.org/10.1056/NEJMcp020892 PMid:12606738

8. Talat M, Kandeel A, El-Shoubyary W, Bodenschatz C, Khairy I, et al. Occupational exposure to needlestick injuries and hepatitis B vaccination coverage among health care workers in Egypt. Am J Infect Control. 2003; 31:469-74. https://doi.org/10.1016/S0002-9343(07)60120-3 PMid:14647109

9. Bell DM. Occupational risk of human immunodeficiency virus infection in healthcare workers: an overview. Am J Med. 1997; 102:9-15. https://doi.org/10.1016/S0002-9343(97)89441-7

10. Doebbeling BN, Vaughn TE, McCoy KD, Beekmann SE, Woolson RF, et al. Percutaneous injury, blood exposure, and adherence to standard precautions: are hospital-based health care providers still at risk? Clin Infect Dis. 2003; 37:1006-13. https://doi.org/10.1086/377553 PMid:14523763

11. Beltrami EM, Williams IT, Shapiro CN, Chamberland ME. Risk and management of blood-borne infections in health care workers. Clin Microbiol Rev. 2000; 13:385-407. https://doi.org/10.1128/CMR.13.3.385 PMid:10859839

12. Baymakova M, Popov G, Andonova R, Pishmisheva M, Popov R, Zaekov N, et al. Hepatitis B virus infection: general characteristics and prevention. General Medicine. 2018; 20(3):40–46.

13. Raad II, Chaffari AM, Torres HA, Ayoub EM, Narouz Li, Bartek J, et al. Challenge of hepatitis C in Egypt and hepatitis B in Mauritania. World J Hepatol. 2018; 10(9):549–557. https://doi.org/10.4254/wjh.v10.i9.549 PMid:30310533 PMcId:PMC6177572

14. Naveira MCM, Badal K, Dhakal J, Mayer NA, Pokharel B, Del Prado RF. Seroprevalence of hepatitis B and C in Nepal: a systematic review (1973-2017). Hepatol Med Policy. 2018; 3:10. https://doi.org/10.1186/s41124-018-0039-2 PMid:30288333 PMcId:PMC6126038

15. Huang Y, Xie W, Zeng J, Law F, Ba-Thein W. Limited knowledge and practice of Chinese medical students regarding health-care associated infections. The Journal of Infection in Developing Countries. 2013; 7:144–51. https://doi.org/10.3855/jic.3099 PMid:23416661

16. Hamadah R, Kharraz R, Alsharqy A, AlFawaz D, Eshaq AM, Abu-Zaid A. Hand hygiene: knowledge and attitudes of fourth-year clerkship medical students at Alfaisal University. College of Medicine, Riyadh, Saudi Arabia. Cureus. 2015; 7:e310. https://doi.org/10.7759/cureus.310

17. Yonatan M, Kelemu, T. Assessment of knowledge and practice towards hepatitis B among medical and health science students in Haramaya University, Ethiopia. PLoS One. 2013; 8:e79642. https://doi.org/10.1371/journal.pone.0079642 PMid:24278151 PMcId:PMC3836877

18. Abdela A, Woldu B, Haile K, Mathewos B, Deressa T. Assessment of knowledge, attitudes and practices toward prevention of hepatitis B virus infection among students of medicine and health sciences in Northwest Ethiopia. BMC Research Notes. 2016; 9:410. https://doi.org/10.1186/s13104-016-2216-y PMid:27543117 PMcId:PMC4992214

19. Ibrahim AA, Elshafie SS. Knowledge, awareness, and attitude regarding infection prevention and control among medical students: a call for educational intervention. Advances in Medical Education and Practice. 2016; 7:505-10. https://doi.org/10.2147/AMEP.S109830 PMid:27579002 PMcId:PMC5001551

20. Al-Hazmi A. Knowledge, attitudes, and practice of medical students regarding occupational risks of hepatitis B virus in College of Medicine, Aljurf University. Annals of Medical and Health Sciences Research. 2015; 5:13-9. https://doi.org/10.4103/2141-9248.149765 PMid:25745570 PMcId:PMC4350056

21. Allam SA, Elsabagh HM, Shehab NS. Knowledge, attitude and practice of Tanta University medical students towards hepatitis B and C. International Journal of Research in Medical Sciences. 2016; 4:749-56. https://doi.org/10.18203/2320-6012.jirms20160152

22. Aihowais MA, Aihowais JA, Alansari YH, Alshammarri MM, Alshammarri MS, Alshammarri AS, Almaitani MK, Algarni SA. Knowledge, attitudes and practices toward prevention of hepatitis B virus infection among medical students at Northern Border University, Arar, Kingdom of Saudi Arabia. Electronic physician. 2017; 9(9):5398. https://doi.org/10.19082/5398 PMid:29038726 PMcId:PMC5633242

23. Aldeen AMZ, et al. KAP Study for prevention of HBV infection among medical students in Hail Region, Saudi Arabia. Int J Med Res. 2017; 3:31-5.

24. Motamed N, Baba Mahmoudi F, Khalilian A, Peykanheirati M, Nozari M. Knowledge and practices of health care workers and medical students towards universal precautions in hospitals in Mazandaran Province. 2006; 12:653-657.

25. Saleh, Abubakir, Oltham, Samir. Knowledge about hepatitis B infection among medical students in Erbil city, Iraq. Proceedings of 1st Eurasian Multidisciplinary forum. 2013; 3:299-304.