

Hepatitis B Vaccination in Medical and Dental Students: A Cross-Sectional Study

Md. Usama Nasr, Md. Kamran Saleem, Abdullah Saeed

CMH Lahore Medical College & Institute of Dentistry, Lahore, Pakistan

Email: abdullahsaeed_9@outlook.com

How to cite this paper: Nasr, Md.U., Saleem, Md.K. and Saeed, A. (2024) Hepatitis B Vaccination in Medical and Dental Students: A Cross-Sectional Study. *Open Journal of Internal Medicine*, **14**, 122-130. <https://doi.org/10.4236/ojim.2024.141011>

Received: January 12, 2024

Accepted: March 23, 2024

Published: March 26, 2024

Copyright © 2024 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

Background: Medical and dental students are at risk of Hepatitis B Virus (HBV) infection. The study aimed to assess the vaccination status against Hepatitis B Virus of students in clinical and non-clinical years of a private medical and dental college, and their knowledge, attitude, and awareness about the subject. **Methods:** A cross-sectional study was conducted using a pretested, self-administered questionnaire among 203 medical and dental students of CMH Lahore Medical College and Institute of Dentistry (CMH LMC & IOD) in Lahore, Pakistan. Participants were evaluated for their knowledge and vaccination status against Hepatitis B Virus. Students were considered to be fully vaccinated (recipients of 3 doses), partially vaccinated (recipients of 1 or 2 doses), and unvaccinated. Comparisons were made between students of clinical and non-clinical years. Data was entered and analysed using Statistical Package for the Social Sciences (SPSS) version 23. **Results:** Only 66% (n = 134) of the 203 participants had ever received a Hepatitis B Virus vaccine out of which a meagre 17.2% (n = 35) were fully vaccinated. No significant difference was found in vaccine uptake between students of clinical and non-clinical years (p-value = 0.181) despite significant differences seen in the knowledge of vaccination schedule (p-value = 0.001), the prevalence of needle-stick injuries (p-value = 0.001), and knowledge of protocols to be followed after a needle-stick injury (p-value = 0.001). **Conclusion:** Our study found that a large proportion of the student population is vulnerable to HBV infection. There is a need to create awareness regarding the subject to increase vaccine uptake. HBV vaccination should be offered to all currently enrolled students and be made mandatory at the time of admission in the future.

Keywords

Hepatitis B Vaccine, Medical Students, Dental Students, Hepatitis B Vaccination, Needle-Stick Injuries

1. Introduction

A member of the Hepadnavirus family hepatitis B virus (HBV) was first discovered in 1965 [1]. The main routes of its transmission include perinatal infection, mucous membrane and skin infections due to exposure to contaminated blood or other body fluids, and sexual transmission [2]. According to WHO it resulted in 820,000 deaths in 2019 and continues to cause 1.5 million new infections each year [3]. Due to exposure to blood and blood products, healthcare workers (HCWs) are at risk of getting infected with HBV [4]. Compared to the other two blood-borne viruses *i.e.* Hepatitis C virus (HCV) and Human Immunodeficiency Virus (HIV) the risk of getting infected is much greater with HBV after occupational exposure [5]. A vaccine against HBV has been available since 1982 which has clinically proven to be safe and effective [6]. The HBV vaccine is included in the CDC's list of recommended vaccines for healthcare workers [7]. WHO's data suggests that 5.9% of the HCWs are exposed to blood-borne infections each year which corresponds to 66,000 HCWs getting infected with HBV annually [8] highlighting the importance of vaccination in this group.

The present study aimed to assess the vaccination status against HBV of medical and dental students of a private college in Lahore, Pakistan. Knowledge and awareness of the students regarding the subject were also studied. The institute recommends that students get vaccinated but does not have a vaccination program of its own. A need was felt to assess how protected the student population is from potential HBV infections. The study also aimed to find out if vaccine uptake in clinical students was greater compared to non-clinical students.

2. Material & Methods

To assess the vaccination status against hepatitis B virus (HBV) infection of medical and dental students of CMH Lahore Medical College and Institute of Dentistry (CMH LMC & IOD) a cross-sectional study was conducted in July 2021. All students enrolled in MBBS and BDS programs of the institute were eligible to participate in the study. Convenience sampling was the method of sampling employed; a pre-tested, two-part self-administered questionnaire was sent online to all years of MBBS and BDS. The questionnaire was designed by the authors of the study. As part of pilot testing, the questionnaire was administered to a small sample to identify any ambiguities, confusing items or other issues. Participants were briefed about the aims of the study and their consent was obtained in writing via the questionnaire. The first part of the questionnaire covered demographics while the second part recorded the vaccination status of the participants among other parameters studied using closed-ended questions. The sample size was calculated using Raosoft choosing a margin of error of 6%, a confidence level of 95%, a population size of 1050 (total number of students eligible to participate in the study). Results of a similar study were used to set the response distribution at 62.4% [9]. The sample size came out to be 203. No responses after the collection of the first 203 legitimate responses were accepted.

Information collected about the participants included sex, age, course (MBBS/BDS), and the year of study. Participants were asked if they had ever received a hepatitis B vaccine, the number of doses they had received, whether they had received a booster dose of the vaccine, whether they had a record of their vaccination and whether they were aware of the hepatitis B vaccination schedule. Students were also asked if they had taken a blood test to assess their immunization status against HBV after admission into this institute. The following question was on the value of anti-HBs titer and was reserved for only those who replied in the affirmative to the previous question. The questionnaire ended by asking the participants had they or anyone they knew experienced a needle-stick injury and if they were aware of protocols to be followed after such an injury. Inquiry of the vaccination schedule served in assessing the students' knowledge; vaccination status in light of the schedule knowledge depicted the attitude of the individuals.

2.1. Statistical Analysis

The data collected was coded, entered, and analyzed using the Statistical Package for Social Sciences (SPSS) version 23.0. Numbers and percentages were calculated for different variables after grouping the sample into 1) students in non-clinical years (1st and 2nd years of MBBS and BDS) and 2) students in clinical years (3rd, 4th years of MBBS and BDS and 5th year of MBBS). The Chi-square test was applied to see associations among variables. A p-value of less than 0.05 was considered to be significant.

2.2. Ethical Considerations

The study was approved by the Ethics Review Committee (ERC) of CMH LMC & IOD. Participation in the study was voluntary and the anonymity of all the participants was ensured.

3. Results

Out of the 203 participants, 68% (n = 138) were males while 32% (n = 65) were females. 64.5% (n = 131) of the respondents were MBBS students while 35.5% (n = 72) were in BDS. The age of the participants ranged from 18 to 26 years and the mean age was 21.24 ± 1.72 years.

66% of the participants (n = 134) were vaccinated against HBV while 34% (n = 69) were unvaccinated as seen in **Figure 1**. Out of the vaccinated individuals, 26.1% (n = 35) had received 3 doses (considered to be fully vaccinated) while 58.2% (n = 78) had received 1 or 2 doses of the vaccine (considered to be partially vaccinated). The remaining 15.7% (n = 21) were unsure of the number of doses they had received as can be seen in **Figure 2**. 57.5% (n = 77) of the vaccinated individuals said they had a record of their vaccination. 48.3% (n = 98) of the participants were aware of the hepatitis B vaccination schedule. A booster dose was received by 21.2% (n = 43) of the participants. Only 17.7% (n = 36) of the students said they had taken a blood test to assess their anti-HBs levels after

entering medical college. 25.6% (n = 52) of the students said they or someone they knew had experienced a needle-stick injury. Students who said they were aware of protocols to be followed after a needle-stick injury were 67.5% (n = 137) of the total.

The aforementioned parameters were compared between students in non-clinical years and those in clinical years. The difference in vaccine uptake between the two groups was found to be insignificant (p-value = 0.181) however, significant differences were found in the knowledge of the vaccination schedule (p = 0.001), the prevalence of needle-stick injuries (p = 0.001), and knowledge of protocols to be followed after a needle-stick injury. The results are summarised in **Table 1**.

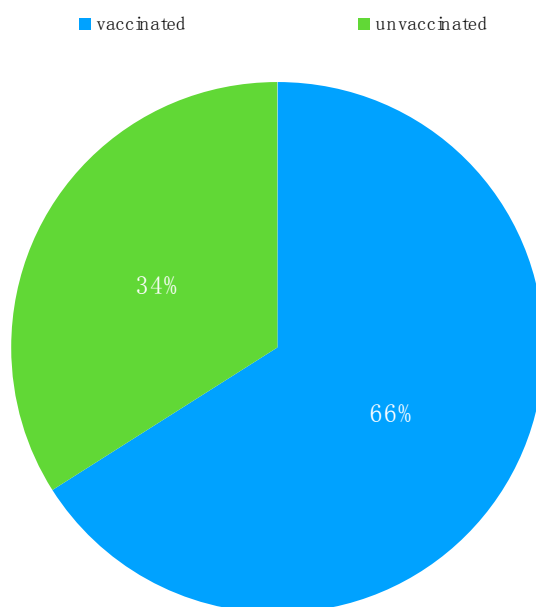


Figure 1. Vaccination Status

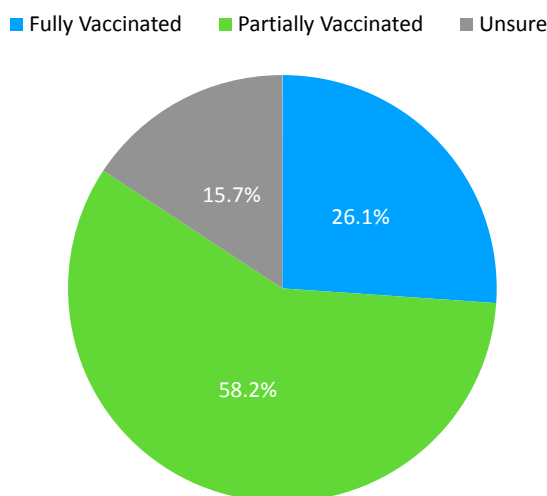


Figure 2. Breakdown of vaccinated group.

Table 1. Results summary.

		Clinical Year or Non-Clinical Year				P Value
		Clinical		Non-Clinical		
		Count	Percentage (%)	Count	Percentage (%)	
Have you ever Received Hep B Vaccine	Yes	83	61.9%	51	38.1%	0.181
	No	36	52.2%	33	47.8%	
Do you have any record of your hepatitis B vaccination?	Yes	40	51.9%	37	48.1%	0.006
	No	43	75.4%	14	24.6%	
Are you aware of the hepatitis B vaccination schedule?	Yes	72	73.5%	26	26.5%	0.001
	No	47	44.8%	58	55.2%	
Have you received a booster dose of the hepatitis B vaccine?	Yes	29	67.4%	14	32.6%	0.186
	No	90	56.3%	70	43.8%	
Are you aware of protocols to be followed after a needlestick injury?	Yes	95	69.3%	42	30.7%	0.001
	No	24	36.4%	42	63.6%	
Have you or has anyone you know experienced a needlestick injury?	Yes	42	80.8%	10	19.2%	0.001
	No	77	51.0%	74	49.0%	

4. Discussion

Hepatitis B vaccination coverage of 66% in our study is greater than that observed in similar studies conducted elsewhere in Pakistan e.g in a medical college in Islamabad where it was 60% [10] and Mirpurkhas where it was 57% [11]. However, the percentage of fully vaccinated individuals in the present study is lower than that seen in the aforementioned studies. It is also higher than what was reported in studies in Cameroon [12] and Brazil [13]. A study in Nepal reported higher vaccination coverage (86.5%) in medical and dental students than in the present study [14].

Lack of vaccination programs and “never thought of getting vaccinated” were found to be the top reasons for non-vaccination in Nepal [14]. This points to the need for awareness programs among the student population to increase vaccine uptake to avoid potential infections.

The low vaccination coverage in the present study can be explained by the fact that the HBV vaccine was not introduced in the country’s expanded program of immunization until 2002 [15] while the majority of the currently enrolled students were born before this measure was taken. This should be taken into account at the time of admission into the institute and vaccination records be demanded to assess the need for immunization and proper counseling.

Statistical analysis showed a significant association between the groups (clinical or non-clinical) and parameters like knowledge of vaccination schedule, record keeping of vaccination, the prevalence of needle-stick injuries as well as being aware of protocols to be followed after a needle-stick injury. Clinical years

impart such knowledge and also expose the students to potential needle-stick injuries so the results can be termed as expected. Although an increase in vaccination uptake is seen in the clinical group, the difference is not significant. This shows that despite the knowledge and better understanding of the risk that HBV poses to healthcare workers in the clinical group, many students are unvaccinated and vulnerable to preventable infection.

Health authorities have advised protocols that should be followed after a needle-stick injury [16] that can help prevent infections despite exposure to a blood-borne virus. Our study found that 50% (n = 42) of the non-clinical students and 20% (n = 24) of the clinical students were unaware of these protocols. These protocols include reporting the incident to authorities which studies have found is not always done [17]. Students need to be counselled and lectured on this subject.

5. Limitations

The findings of the study cannot be generalised due to its cross-sectional nature. It can be improved by including more institutions to increase the sample size. Prospective measurement of anti-HBs titers of the vaccinated individuals could improve insight into the level of protection against HBV in the student population.

6. Conclusions

A large section of the student body is unprotected against HBV infection. An increase in knowledge about the subject over time has not seen an increase in vaccine uptake. Awareness programs must be launched to counter the problem. Offering vaccination to currently enrolled students and demanding proof of vaccination at the time of admission in the future can help improve the situation.

Acknowledgements

We would like to thank Prof. Dr. Muhammad Ashraf Chaudhry, Head of the Department of Community Medicine, CMH LMC & IOD for his help and guidance throughout the project. We are also grateful to all the students who participated in the study.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

- [1] Block, T.M., Alter, H.J., London, W.T. and Bray, M. (2016) A Historical Perspective on the Discovery and Elucidation of the Hepatitis B Virus. *Antiviral Research*, **131**, 109-123. <https://doi.org/10.1016/j.antiviral.2016.04.012>
- [2] Kwon, S.Y. and Lee, C.H. (2011) Epidemiology and Prevention of Hepatitis B Virus

- Infection. *The Korean Journal of Hepatology*, **17**, 87.
<https://doi.org/10.3350/kjhep.2011.17.2.87>
- [3] WHO (2023) Hepatitis B.
<https://www.who.int/news-room/fact-sheets/detail/hepatitis-b>
- [4] Singhal, V., Bora, D. and Singh, S. (2009) Hepatitis B in Health Care Workers: Indian Scenario. *Journal of Laboratory Physicians*, **1**, 41-48.
<https://doi.org/10.4103/0974-2727.59697>
- [5] Information from the Centers for Disease Control and Prevention National Center for Infectious Diseases Exposure to Blood Blood What Healthcare Personnel Need to Know. <http://bookstore.phf.org>
- [6] Denticio, P., Buongiorno, R., Volpe, A., Zavoiani, A., Pastore, G. and Schiraldi, O. (1992) Long Term Immunogenicity Safety and Efficacy of a Recombinant Hepatitis B Vaccine in Healthy Adults. *European Journal of Epidemiology*, **8**, 650-655.
<https://doi.org/10.1007/BF00145379>
- [7] Recommended Vaccines for Healthcare Workers | CDC.
<https://www.cdc.gov/vaccines/adults/rec-vac/hcw.html#recs>
- [8] Prüss-Üstün, A., Rapiti, E. and Hutin, Y. (2005) Estimation of the Global Burden of Disease Attributable to Contaminated Sharps Injuries among Health-Care Workers. *American Journal of Industrial Medicine*, **48**, 482-490.
<https://doi.org/10.1002/ajim.20230>
- [9] Batra, V., Goswami, A., Dadhich, S., Kothari, D. and Bhargava, N. (2015) Hepatitis B Immunization in Healthcare Workers. *Annals of Gastroenterology: Quarterly Publication of the Hellenic Society of Gastroenterology*, **28**, 276.
- [10] Butt, M., Khan, I.M., Ashfaq, M.W. and Jamal, M. (2015) Hepatitis B Vaccination Status among Students of a Medical College in Islamabad. *Journal of Islamic International Medical College*, **4**, 157-161.
- [11] Asif, M., Raza, W. and Gorar, Z.A. (2011) Hepatitis B Vaccination Coverage in Medical Students at a Medical College of Mirpurkhas. *JPMA- Journal of the Pakistan Medical Association*, **61**, 680.
- [12] Aroke, D., Kadia, B.M., Anutebeh, E.N., Belanquale, C.A., Misori, G.M., Awa, A., *et al.* (2018) Awareness and Vaccine Coverage of Hepatitis B among Cameroonian Medical Students. *BioMed Research International*, **2018**, Article ID: 3673289.
<https://doi.org/10.1155/2018/3673289>
- [13] de Souza, E.P. and de Souza Teixeira, M. (2014) Hepatitis B Vaccination Coverage and Postvaccination Serologic Testing among Medical Students at a Public University in Brazil. *Revista do Instituto de Medicina Tropical de São Paulo*, **56**, 307-311.
<https://doi.org/10.1590/S0036-46652014000400007>
- [14] Bhattarai, S., Smriti, K.C., Pradhan, P.M.S., Lama, S. and Rijal, S. (2014) Hepatitis B Vaccination Status and Needle-Stick and Sharps-Related Injuries among Medical School Students in Nepal: A Cross-Sectional Study. *BMC Research Notes*, **7**, 1-7.
<https://doi.org/10.1186/1756-0500-7-774>
- [15] WHO EMRO | Expanded Programme on Immunization | Programmes | Pakistan.
<http://www.emro.who.int/pak/programmes/expanded-programme-on-immunization.html>
- [16] What Should I Do If I Injure Myself with a Used Needle?
<https://www.nhs.uk/common-health-questions/accidents-first-aid-and-treatments/what-should-i-do-if-i-injure-myself-with-a-used-needle/>
- [17] Azadi, A., Anoosheh, M. and Delpisheh, A. (2011) Frequency and Barriers of Un-

derreported Needlestick Injuries amongst Iranian Nurses, a Questionnaire Survey.
Journal of Clinical Nursing, **20**, 488-493.
<https://doi.org/10.1111/j.1365-2702.2010.03252.x>

Appendix

Immunization Status against Hepatitis B of the Students of a Private Medical and Dental College: A Cross Sectional Study.

You are invited to participate in a research about hepatitis B vaccination coverage and effectiveness among students of a private medical and dental college. Your response to this form will only be visible to the researchers.

Please answer all the questions to the best of your knowledge.

Note: This questionnaire is only meant for MBBS and BDS students of CMH Lahore Medical College and Institute of Dentistry.

Consent

I have read the preceding paragraph and agree to participate in this research

Yes

Sex: Male Female

Age: _____

Course: MBBS BDS

Year of study: 1st year 2nd year 3rd year 4th year 5th year

Immunization Status

Q1. Have you ever received hepatitis B vaccine in your life? Yes No

Q2. Do you have any record of your hepatitis B vaccination? (Answer this question only if your answer to Q1 is “yes”.) Yes No

Q3. Are you aware of the hepatitis B vaccination schedule? Yes No

Q4. How many doses of the hepatitis B vaccine did you get? (Answer this question only if your answer to Q1 is “yes”.) 1 2 3

Q5. Have you received a booster dose of hepatitis B vaccine? Yes No

Q6. Have you taken a blood test to assess your immunization status against hepatitis B after entering medical college? Yes No

Q7. Are you aware of protocols to be followed after a needlestick injury? Yes No

Q8. Have you or has anyone you know experienced a needlestick injury? Yes No