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ORIGINAL ARTICLE

Prevalence, Knowledge, Attitude, and Practices of Hepatitis B Virus Among Dental Students at the University of Science and Technology, Aden, Yemen

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ABSTRACT

Introduction: Infection with the hepatitis B virus (HBV) continues to be a serious global public health concern, impacting a substantial proportion of the worldwide population. **Objective:** This study investigates the prevalence of HBV and assesses knowledge, attitudes, and practices (KAP) among dental students at the University of Science and Technology (UST) in Aden, Yemen.

Method: A cross-sectional study design was conducted among 186 dental students at the University of Science and Technology, Aden, Yemen. Blood samples were screened for HBV using ELISA, and a pretested questionnaire assessed KAP.

Results: A significant majority (89.2%) of participants reported awareness of HBV, indicating a baseline understanding of the infection. Knowledge levels were good (41.9%), moderate (41.9%), and poor (16.1%). Attitudes were almost positive (64.5%), while practices were poor (31.2%), moderate (54.8%), and good (14%). None of the 142 students who provided blood samples tested positive for HBV.

Conclusion: This study reveals significant knowledge gaps among UST dental students regarding HBV. Despite recognizing the disease's severity, misconceptions persisted. Targeted educational interventions are needed to enhance HBV awareness among future healthcare professionals.

Keywords: Knowledge, Attitude, Practice, Hepatitis B, Prevalence, Dental Students.

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INTRODUCTION

Hepatitis B virus (HBV) infection remains a pressing global public health issue, ranking as the most prevalent chronic infection worldwide. Hepatocellular carcinoma and cirrhosis are two serious liver diseases that can develop from an untreated HBV infection. According to estimates from the World Health Organization (WHO), 257 million people worldwide suffer from chronic HBV infections, and roughly one-third of the world's population (2 billion people) is infected each year. HBV-related complications result in approximately 700,000 deaths worldwide (1). Prevalence of HBV and HCV may be different in different regions of Yemen and various groups of the same community. Previous studies revealed prevalence rates of HBV as 10.5 % in Sana'a, 4.75 % in Aden, 5.6 % in Hajah, 26.3 % in Sogotra and 2.7 % in Mukala (2).

Unprotected sexual contact, tainted blood transfusions, and the reuse of unsterilized needles are the main ways that HBV is spread. There are additional serious hazards from mother-to-child transmission during delivery and by coming into contact with contaminated bodily fluids such as blood, saliva, or urine. Additionally, HBV transmission has been reported during dental procedures, including teeth extraction, endodontic treatments, and surgical procedures, highlighting the importance of strict infection control measures in healthcare settings (3).

Dental professionals and students in health professions are at a higher risk of occupational exposure to blood-borne diseases, including hepatitis B, than other professionals (4). Historically, occupational exposure to HBV infection has been recognized as a significant workplace hazard for dental professionals. However, research has shown that students in health professions often have awareness about the risks of HBV transmission in the workplace, highlighting a critical knowledge gap (5). Studies have highlighted this knowledge gap. For example, a study conducted in India revealed that 58.8% of dentistry students were aware of preventive measures, whereas only 28.4% were aware of the post-exposure treatment for HBV infection (6).

Similarly, an Italian study revealed that only 44.1% and 32.4% of dental students correctly identified all infections that can be acquired or transmitted during

their practice (7). Furthermore, a Taiwanese study showed that while 75% of dental students knew about hepatitis B infection, they lacked understanding of vaccine dosage, transmission, prevention, and precautions (8).

Ongoing education and awareness initiatives regarding hepatitis B, vaccination, and anti-HBs testing are crucial for bridging the knowledge gap. To achieve this, students must continually enhance their knowledge, foster a positive attitude, and acquire practical clinical experience (9). Research assessing knowledge, attitudes, and practices (KAP) related to HBV infection has proven to be a valuable tool for informing public health policy development, particularly when tailored to address the specific knowledge needs of at-risk populations.

Yemen's general public and healthcare professionals are at high risk of contracting HBV (10, 11). However, the occupational exposure of dentistry students to HBV remains poorly understood, highlighting the need for additional studies. This research sought to evaluate dental students' KAP regarding HBV and ascertain the virus's prevalence within this population.

Significance of Study

Research on HBV prevalence and KAP among dental students is crucial, as it can inform the development of educational curricula for locally trained dental students and guide ongoing workplace training in high-risk areas where knowledge is scarce.

The outcomes of this study could also contribute to the assessment of workplace safety and occupational health policy development, such as the consideration of mandatory vaccination policies for dental students in university settings. Furthermore, this research may indirectly promote safer workplace practices by identifying areas for improvement, providing guidance on safer working methods, and monitoring dental students' adherence to safety protocols.

METHODS

An analytical cross-sectional study with a quantitative method was carried out from 26 March to May 2022 among dental students at the University of Science & Technology, Aden, Yemen. A selfadministered questionnaire was used to assess the students' KAP towards HBV, including their knowledge about the modes of transmission,



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prevention, and attitude towards vaccination and infection control practices. In addition, blood samples were obtained from the participants and tested for hepatitis B surface antigen (HBsAg) to determine the prevalence of HBV infection. The collected serum samples were tested for HBSAg by using a commercial ELISA kit according to the manufacturer's protocol (Bioneovan CO. CO.LTD CatLog No BE101A).

Study Population

The study population comprised dental students from 3rd, 4th, and 5th grade that have direct contact with patients and work in dental clinics of UST University. This study recruited dental students from three different levels who voluntarily agreed to participate. All participants provided informed consent prior to participating in the study, and their identities were maintained as confidential throughout the research process.

Data analysis

Statistical evaluation of the acquired data was conducted using Statistical Package for Social Sciences (SPSS) software version 22.0. The quantitative data was expressed as percentages, frequencies, mean, and standard deviation (X±SD). A chi-square test of association was used to compare proportions. In all statistical tests, a P-value < 0.05 was considered statistically significant.

Scoring of KAP

This study assessed knowledge about HBV prevention and control using 15 questions. Each correct answer was scored as 1, while incorrect answers or "I don't know" responses were scored as 0, resulting in a total knowledge score ranging from 0 to 15. The total scores for each student were then categorized into three levels: poor, moderate, and knowledge. Healthcare workers (HCWs) who scored 5 or less were classified as having poor knowledge, those who scored between 6 and 10 had moderate

knowledge, and those who scored between 11 and 15 had good knowledge regarding HBV prevention and control.

The attitudes of healthcare workers were assessed using three questions. Each correct answer was scored as 1, while incorrect answers or "I don't know" responses were scored as 0, resulting in a total attitude score ranging from 0 to 3. Attitude scores were categorized as either neutral or positive. Students who scored 1 or less were classified as having a negative attitude.

Practice scores were categorized into three levels: poor, moderate, and good. The total practice scores ranged from 0 to 4. A score of 0 indicated poor practices, scores between 1 and 2 indicated moderate practices, and scores between 3 and 4 indicated good practices.

Ethical Considerations

Before conducting the study, formal ethical approval was obtained from the Medical Research Ethics Committee, Faculty of Medicine and Health Sciences, University of Science and Technology (UST) MEC No. (MEC/AD066). Additionally, informed consent was secured from each participant, ensuring they understood the study's purpose and were assured of the confidentiality of their data.

RESULTS

This study surveyed 186 students, yielding a response rate of 90%. The participant demographic was evenly distributed between males (50.0%, n=93) and females (50.0%, n=93), with an equal proportion of both sexes represented, with a mean age of 20.31 years (SD=1.96). The majority of participants (87.1%, n=162) fell within the 20-24 age range, while 12.9% (n=24) were between 25 and 35 years old. In terms of marital status, the results showed that 87.7% (n=163) of the respondents were single, 11.8% (n=22) were married, and 0.54% (n=1) were divorced, as summarized in Table 1.



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Characteristic	Frequency (n = 186)	Percentage (%)					
Gender							
Male	93	50 %					
Female	93	50 %					
Marital status							
Single	163	87.7					
Married	22	11.8					
Divorce	1	0.54					
Age categories							
18-25 years old	162	87.1					
26-35 years old	24	12.9					

Table 1: Sociodemographic Characteristics of Participants. (n = 186).

The majority of participants (89.2%, n=166) reported being familiar with hepatitis. When asked about the mode of transmission, 84.3% (n=140) correctly identified blood transfusion as a primary means of transmission (Table 2). However, misconceptions were also prevalent, with 3.01% (n=5) believing

hepatitis can be transmitted through sneezing and coughing, and smaller percentages attributing transmission to mosquitoes (1.8%, n=3), flies (0.6%, n=3)n=1), ticks (0.6%, n=1), or other vectors. Notably, 22.9% (n=38) of participants were unsure about the transmission methods.

Among Respondents: Causes and Transmission Modes						
Variable	Frequency	%				
Heard about hepatitis (n=186)						
Yes	166	89.2				
No	20	10.8				
Caused by (n=166)						
Virus	162	97.6				
Don't know	4	2.4				
Mode of infection (n=166)						
Close contact with patient, sneezing, coughing	5	3.01				
Mosquito	3	1.8				
Flies	1	0.6				
Tick	1	0.6				
Blood	140	84.3				
Don't know	38	22.9				

Table 2: Self-Reported Awareness of Hepatitis B

A significant majority (89.2%) acknowledged the severity of hepatitis B virus (HBV) infection. However, misconceptions were observed regarding HBV transmission, with 39.8% believing it is hereditary and 36.7% thinking it spreads through the air. More than half (51.8%) were aware of mother-tochild transmission, while 62.7% knew it could be transmitted through sexual contact. A significant proportion (77.1%) correctly identified toothbrush sharing as a transmission route, but only 42.8%

disagreed with the misconception that shaking hands could spread HBV (Table 3).

Regarding symptoms, 73.5% acknowledged that HBV presents with signs, but 50.0% mistakenly believed eating food prepared by an infected person could transmit the virus. While 62.7% knew asymptomatic carriers could spread the virus, only 47.6% knew where to obtain HBV immunization. Encouragingly, 71.7% understood that healthy individuals need vaccination, while 55.4% recognized the necessity of vaccination at their age.



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The survey revealed varying levels of knowledge about hepatitis B among respondents. Although 50.9% of respondents were familiar with the hepatitis vaccine, only 13.1% were aware of the recommended vaccination timeline (Table 4).

In terms of practice, 44.6% of participants had been previously screened for hepatitis, but only 18.7% had

received the HBV vaccine. Despite this, respondents' attitudes towards HBV prevention were largely positive, with 63.3% believing the HBV vaccine can prevent transmission, 70.5% agreeing that sterilization of medical instruments prevents transmission, and 71.7% emphasizing the importance of using protective barriers (Table 5).

Item.	Yes No Don			i't know		
	N	(%)	N	(%)	N	(%)
HBV is a serious Infection	148	89.2	12	7.2	6	3.6
Do people get HBV from genes (heredity)?	66	39.8	79	47.6	21	12.7
HBV can be transmitted from a pregnant woman to her fetus	86	51.8	46	27.7	34	20.5
Hepatitis B transmitted by sexual intercourse	104	62.7	40	24.1	22	13.3
HBV can be transmitted by sharing a toothbrush with an infected person	128	77.1	24	14.5	14	8.6
Do people get HBV through the air (coughing or staying in the same room)?	61	36.7	87	52.4	18	10.8
HBV spread by shaking hands with an infected person	71	42.8	77	46.4	18	10.8
Does hepatitis B infection have signs or symptom?	122	73.5	34	20.5	10	6.0
HBV can be transmitted by sharing spoons or bowls for food	91	54.8	53	31.9	22	13.3
HBV can be transmitted by eating food prepared by an infected person	83	50.0	61	36.7	22	13.3
If someone is infected with hepatitis B but they look and feel healthy, do you think that person can spread hepatitis B?	104	62.7	49	29.5	13	7.8
Do you know if healthy people need vaccination?	119	71.7	35	21.1	12	7.2
Do you know if you need a vaccination at your age?	92	55.4	48	28.9	26	15.7
Do you think hepatitis B can be prevented by vaccinations?	105	63.3	38	22.9	23	13.9
Do you know where one can get hepatitis B immunizations?	79	47.6	65	39.2	22	13.3
Have you heard of hepatitis vaccine?	99	59.6	67	40.4		
Do you know time for giving hepatitis vaccine (n=99).	13	13.1	86	86.9		
Knowledge Score						
Poor	30	16.2				
Moderate	78	41.9				
Good	78	41.9				

 Table 3: Knowledge of HBV infection among Participants (n=166)



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Attitude questions	Yes		No		Don'	t know
	N	(%)	N	(%)	N	(%)
HBV vaccination could prevent transmission	105	63.3	38	22.9	23	13.9
Sterilization of instruments prevents transmission of HBV	117	70.5	31	18.7	18	10.8
Wearing gloves is important to prevent transmission	119	71.7	27	16.3	20	12.0
Attitude Score						
Positive	120	64.5				
Negative	66	35.5				

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Table 5: Practices of Dental Students Regarding Hepatitis B at UST (n	1=166)).
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Attitude questions	Yes		No		Don't know	
	N	(%)	Ν	(%)	N	(%)
HBV vaccination could prevent transmission	105	63.3	38	22.9	23	13.9
Sterilization of instruments prevents transmission of HBV	117	70.5	31	18.7	18	10.8
Wearing gloves is important to prevent transmission	119	71.7	27	16.3	20	12.0
Practices' score						
Poor	52	31.3				
Moderate	91	54.8				
Good	23	13.9				

The study aimed to determine the prevalence of HBV infection among dental students, with 142 participants providing blood samples for analysis. The results showed no evidence of HBsAg positivity, suggesting a very low prevalence of HBV infection in this population.

DISCUSSION

This study explores the prevalence, knowledge, attitudes, and practices of dental students at UST University concerning Hepatitis B (HBV) infection. Dental clinics present a high risk for blood-borne pathogen transmission, particularly HBV, due to occupational exposure to infected patients' blood and bodily fluids (12). Dental students, especially those undergoing clinical training, are at increased risk of accidental injuries from sharp instruments, which heightens their vulnerability to HBV infection (13). The study highlights growing concerns regarding

HBV transmission among healthcare professionals and patients. Notably, the results revealed that none of the participating students tested positive for HBV infection. However, previous studies in Yemen reported that the seroprevalence of HBsAg ranges from 8% to 20%, with nearly 50% of the general



population testing positive for HBV-IgG. Among healthcare workers in Taiz, the seroprevalence of HBsAg was documented at 2.76% (14).

This study's findings differ significantly from those in Ghana, where the prevalence of HBV infection among healthcare workers reached 26.3% (15). Variations in results across studies may stem from differences in working environments, sample sizes, and participant categories. While the prevalence among dental students appears low, the overall risk of HBV remains a major public health concern in Yemen. Therefore, understanding students' knowledge, attitudes, and practices related to HBV is critical for infection control and prevention.

The study found that 89.2% of participants were aware of HBV infection, aligning with similar research conducted in Sudan (16) and Vietnam (17). This is an encouraging result, as knowledge is a fundamental step toward adopting preventive behaviors. The main sources of information for respondents were academic institutions, followed closely by healthcare professionals and social media platforms.

Comparatively, a study in Nigeria found that young adults (18) relied mainly on the Internet, with schools as the second most common source of information. Similarly, medical students in Pakistan identified media, clinical settings, and doctors as their primary knowledge sources regarding HBV infection (19). Education plays a significant role in enhancing awareness (20). Given that the participants in this study are university students, their relatively high level of education contributes to their knowledge of HBV.

Despite this, 16.1% of respondents demonstrated poor knowledge of HBV, while 41.9% had good knowledge, suggesting that awareness of HBV prevention remains fresh in students' minds. Prior studies in Taiwan (8) and Pakistan (21) reported that dental students had reasonable knowledge about HBV but lacked sufficient understanding of vaccine dosages, transmission routes, prevention methods, and precautionary measures. Compared to similar studies in Ethiopia, the level of HBV knowledge among the participants in this study was lower (22). Differences in knowledge levels across countries may be attributed to variations in educational policies, resource allocation, and public health awareness campaigns (23-25). The findings indicate that dental students generally have a positive attitude toward HBV vaccination and infection control practices. The absence of HBV infection among the participants underscores the effectiveness of preventive measures, including vaccination programs. However, continuous education and reinforcement of infection control protocols remain essential to safeguard dental students and healthcare workers.

Regarding HBV transmission, 84.3% of students acknowledged blood and blood products as the most common sources of infection, while 15.7% were unaware of this risk. Horizontal transmission was recognized as the primary mode of HBV spread, with invasive diagnostic and therapeutic procedures increasing the likelihood of infection. These results align with previous studies that have identified similar knowledge gaps among dentists and dental assistants.

Despite high awareness of HBV vaccination, less than one-third of participants reported being fully vaccinated. While over half of the students correctly answered questions regarding HBV—such as its nonhereditary nature-several barriers discouraged vaccination uptake. These included concerns about work pressure, misconceptions about vaccine protection, and lack of motivation for HBV testing and immunization. Common risk factors associated with HBV transmission include unprotected sex, blood transfusions, needle stick injuries, shared needles, and lack of vaccination, all of which influence individual decisions regarding preventive measures. These findings are consistent with research conducted in Ghana (15) and India (26), where similar trends were observed.

Most students demonstrated a positive attitude toward HBV prevention, with 63.3% agreeing that vaccination is an effective protective measure. This percentage is higher than findings from previous studies (27, 28). However, adherence to infection control measures, including compliance with standard precautions such as glove usage (71.7%), needs improvement. This percentage is lower than findings from a previous study at Sana'a University (29). In Saudi Arabia, despite students expressing positive attitudes toward infection control. compliance with HBV vaccination remained low (30). Key barriers to vaccination included time constraints and uncertainty regarding vaccine effectiveness.



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Students with high confidence in the vaccine's safety and efficacy demonstrated better adherence to the recommended immunization schedule.

A concerning finding is that 80.7% of dental students had not completed the full HBV vaccination regimen. with only 10 students receiving all three doses. This vaccination rate is lower than that reported in other countries with similar socioeconomic conditions. Overall, only 18.3% of students had been vaccinated, whereas studies in Pakistan and Vietnam showed higher vaccination rates among doctors, nurses, and paramedical staff, where 60% were fully immunized. Only 14.0% of respondents demonstrated good overall compliance regarding preventive practices, while 54.8% exhibited moderate adherence, and 31.2% had poor preventive practices. Given their frequent exposure to blood, bodily fluids, and contaminated instruments, dental students are at higher risk for HBV and other blood-borne infections. This study has certain limitations, including recall bias, the cross-sectional design, reliance on selfassessment data, and restriction to a single dental clinic. Future large-scale studies are recommended to obtain more comprehensive insights into HBV prevalence and knowledge among dental professionals and the general population.

Furthermore, considering the risk of needlestick injuries and contact with contaminated blood products, it is strongly recommended that dental students be vaccinated before starting clinical training. To ensure adequate protection against HBV infection, vaccination should be a compulsory requirement for admission to dental programs.

CONCLUSION

The study reveals that the prevalence of HBV infection among dental students is low, and most students exhibit good knowledge and a positive attitude regarding vaccination and infection management. However, gaps in compliance with preventive measures and vaccination uptake remain concerning. These findings underscore the importance of education, training, and institutional policies in fostering a safe and healthy clinical environment for dental students.

Furthermore, the study highlights that while most dental students at UST University in Aden have heard of HBV, there are discrepancies in knowledge, attitude, and practice. HBV vaccination is not mandatory in Yemeni dental and medical schools, and factors such as cost and lack of awareness may contribute to low vaccination rates. Despite an acceptable level of knowledge and favorable attitudes, dental students' compliance with infection control protocols remains a pressing concern. Strengthening educational programs, enforcing vaccination requirements, and implementing strict infection control guidelines will be essential in mitigating HBV transmission risks among future dental professionals.

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Conflict of Interest

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