

# Vaccination Status, Knowledge, Attitudes and Practices Toward Hepatitis B Infection Among Students of Medical Laboratory Sciences at Sudan International University

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## Research note

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# Abstract

**Objective:** This study aimed to assess the level of awareness about Hepatitis B infection, and the HBV testing and vaccination history among students of medical laboratory sciences (MLS) at Sudan international university.

**Results:** A total of 271 students responded to the questionnaire. Among them, 67% were females, and 33% were males with a mean age of  $20.93 \pm 1.6$  years. Only 66 (24.4%) students were vaccinated against hepatitis B, whereas 205 (75.6%) students had never been vaccinated. Out of all study participants, 121 (44.6%) had never been tested for HBV. Among the study participants, 60.4% had good knowledge about HBV, 85% had a positive attitude toward HBV, and 85% had good practices related to HBV. The mean awareness score was 18.3, with 64% of participants having satisfactory awareness about HBV. Moreover, this awareness was significantly predicted by the study level of the student ( $P = .000$ ). Being on the fourth year of study was associated with satisfactory awareness about HBV (OR = 0.41, 95% CI 0.188–0.889).

## Introduction:

Hepatitis B virus (HBV) infection is a global public health issue and a common cause of liver cirrhosis and hepatocellular carcinoma (HCC). Globally, an estimated 257 million people are living with chronic HBV, with the WHO African Region and the Western Pacific Region being the most affected [1]. Several studies have provided estimates of the prevalence of HBV infection among the Sudanese population [2–5]. A recent systematic review and meta-analysis in Sudan reported that the HBV seroprevalence rates ranged from 5.1–26.8% with an overall pooled prevalence of 12.1%. According to the study findings, Khartoum State had the highest prevalence of HBV infection in Sudan with a proportion of 12.7% [6].

Healthcare workers (HCWs) are at high risk of HBV infection in healthcare settings. The prevalence rate of HBV in HCWs is about 2–10 times higher than the general population [7, 8]. Students of health sciences are at risk of HBV infection during their clinical and practical sessions of study. Therefore, satisfactory awareness about HBV is very important to protect them against the infection. Several studies have assessed the awareness of medical students about HBV [9–11]. Despite the fact that health-related behaviors are affected by different aspects of knowledge, attitude, and practices (KAP), few studies have examined the KAP level of HCWs toward HBV infection in Sudan. One recent study examined the KAP level of nurses and midwives toward HBV infection in Khartoum, Sudan [12].

At present, no studies have assessed the awareness of medical laboratory science (MLS) students about hepatitis B in Sudan.

## Methods:

A descriptive, institutional-based cross-sectional study was conducted at SIU. A total of 277 MLS students in their second, third, and fourth year of study were selected using a stratified random sampling technique. The participation in the study was voluntary. A pretested self-administered questionnaire was

designed consisting of four parts (Supplementary file). Part I was designed to obtain sociodemographic characteristics. Part II (Q1–19) was designed to test the participants' knowledge across multiple domains, including etiology of the disease, signs and symptoms, modes of transmissions, preventive measures, treatment, and vaccination. The participants could choose between three predetermined options, namely, "Yes," "No," and "Do not know." Part III (Q20–22) was designed to assess participants' attitudes toward hepatitis B infection. Part IV (Q23–Q26) was designed to identify participants' practices related to hepatitis B infection. Data analysis was conducted using SPSS version 23.0. In parts II, III, and IV of the questionnaire, participants' responses were compared with a standard template, and one mark was assigned for each correct response. The knowledge score was calculated by summing the marks of questions (1–19). Good knowledge was defined by answering  $\geq 70\%$  of the knowledge questions correctly, whereas poor knowledge was defined as  $< 70\%$  of correct answers. The attitude score was calculated by summing the marks of questions (20–22). Positive attitude was defined by answering  $\geq 70\%$  of the attitude items correctly, whereas negative attitude was indicated by  $< 70\%$  of correct answers. The practice score was calculated by summing the marks of questions (23–26). Good practice was defined by answering  $\geq 70\%$  of the practice items correctly, whereas malpractice was indicated by  $< 70\%$  of correct answers. Pearson's correlation test was used to determine the correlations between mean KAP.

Students' overall awareness about HBV was obtained by summing the total number of correct answers (right knowledge, good attitude, and practice). Therefore, the maximum possible score was 26. Then, this score was used to categorize participants into satisfactory ( $\geq 70\%$ ) and unsatisfactory ( $< 70\%$ ) awareness. Logistic regression was carried out to predict the overall awareness (satisfactory or unsatisfactory) as a dependent variable based on demographic characteristics (age, gender, residence, and study level) as explanatory variables. For all tests,  $P < 0.05$  was considered statistically significant.

## Results:

A total of 271 students responded to the questionnaire with a response rate of 97.8%. Among them, 181 participants were females (66.8%), while the remaining 90 (33.2%) were males. In terms of age, the participants were young adults aged between 18 and 26 years with a mean age of  $(20.93 \pm 1.62)$  years.

In terms of the vaccination status, only 66 (24.4%) of the participants had been vaccinated at the time of the study, while 205 (75.6%) were never vaccinated.

All participants were residing in the three localities of Khartoum State, namely, Khartoum, North Khartoum, and Omdurman, with a distribution of 194 (71.6%), 40 (14.8%), and 37 (13.6%), respectively.

In terms of the study level, 106 (39.1%) participants were in the second year of college, 79 (29.2%) were in the third year, and 86 (31.7%) were in the fourth year.

According to the score of correct answers for the 19 knowledge items, 60.4% of participants had good knowledge about HBV, while 39.6% had poor knowledge. For all participants, the mean knowledge score

was  $13.79 \pm 2.99$ . The knowledge items, frequency, and percentages of correct responses of study participants are shown in Table 1.

Table 1  
Frequency of correct responses of the study participants to Knowledge items about HBV (n = 271)

Knowledge Item	Frequency	Percentage (%)
Hepatitis B is a viral infection	253	93.4
Hepatitis B is an infectious disease	243	89.7
Hepatitis B can affect any age group	227	83.8
What is the course of hepatitis B disease?	173	63.8
People can get Hepatitis B through the air	145	53.5
Hepatitis B can be transmitted through use of unsafe needles or sharps	251	92.6
Hepatitis B can be transmitted by transfusion of blood & blood products	261	96.3
Hepatitis B can be transmitted by contact with infected blood or body fluids	240	88.6
Hepatitis B can be transmitted from mother to her fetus	196	72.3
Hepatitis B can be transmitted by sharing spoons or bowls for food	152	56.1
Hepatitis B can be transmitted by eating food prepared by an infected person	177	65.3
Hepatitis B can be transmitted by sharing a toothbrush with an infected person	175	64.6
Early symptoms of Hepatitis B are same like cold and flu	144	53.1
Jaundice is one of the common symptoms of Hepatitis B	211	77.9
Are there no symptoms of hepatitis B in some of patients?	139	51.3
Hepatitis B can cause liver cancer	197	72.7
Is Hepatitis B curable/treatable?	128	47.2
Is a laboratory test available for Hepatitis B?	233	85.9
Is vaccination available for Hepatitis B?	192	70.8

Overall, 85% of the study participants had a positive attitude toward HBV prevention, while only 15% had a negative attitude. For all participants, the mean attitude score was  $2.12 \pm 0.71$ . The attitude items, frequency, and percentages of participants' responses were as follow: regarding the question (Do you consider wearing gloves when dealing with biological materials can prevent you from getting HBV

infection?) a total of 247 (91.1%) answer yes, the remaining responses (24, 8.9%) were no. When it comes to the question (Are you willing to be screened for hepatitis B after a needle or sharp stick?) 217/271 (80.1%) responded with Yes answer. When the participants asked (do you think that person with Hepatitis B should be isolated from other people to prevent spreading of infection?) a total of 160/271 (59.05%) responded with yes answer, whereas 111/271 (41.0%) responded with no.

Overall, 80.5% of study participants had good practices related to the prevention and protection from HBV, while only 19.5% had poor practices. For all participants, the mean practice score was  $2.41 \pm 1.10$ . The practice items, frequency, and percentages of participants' responses are shown in Table 2.

Table 2  
Responses of study participants for practices related to HBV items (n = 271)

Practice item		Frequency	Percent
Have you ever done screening for Hepatitis B?	Yes	121	44.6
	No	150	55.4
Do you ask for screening of blood before transfusion?	Yes	206	76.0
	No	65	24.0
Do you ask for a new syringe before use?	Yes	228	84.1
	No	43	15.9
Have you ever participated in health education program related to Hepatitis B?	Yes	97	35.8
	No	174	64.2

Among the study participants, a statistically significant positive correlation was observed between knowledge and attitude scores ( $R = 0.116$ ,  $P = .000$ ), whereas the correlation between knowledge and practice scores was statistically insignificant ( $R = 0.213$ ,  $P = .056$ ).

Regarding the overall score of awareness about HBV, the mean score for all participants was  $18.3 \pm 3.55$ . Moreover, 64.2% of participants had satisfactory awareness, whereas 35.8% had unsatisfactory awareness about HBV. Concerning the study level, a statistically significant difference was observed in the awareness level between students in the second, third, and fourth years ( $\chi^2 = 35.759$ ,  $P = 0.000$ ). The highest awareness level was observed among students in the fourth year of study as 83.7% of them had satisfactory awareness about HBV, compared to 43.4%, and 70.9% for the second and third year of study respectively.

Regression analysis revealed that among the selected sociodemographic variables, only the study level was a statistically significant predictor of awareness about HBV ( $P = .000$ ). In this model, being at the

fourth year of study was associated with satisfactory awareness about HBV compared with the second and third years of study (OR = 0.41, 95% CI 0.188–0.889) (Table 3).

Table 3  
Logistic regression model for prediction of students' awareness about HBV

	<b>B</b>	<b>S.E.</b>	<b>Wald</b>	<b>p. value</b>	<b>Odds Ratio</b>	<b>95% C.I.</b>	
						<b>Lower</b>	<b>Upper</b>
Age	-0.175	0.104	2.829	0.093	0.84	0.685	1.029
Gender	-0.06	0.305	0.039	0.844	0.942	0.517	1.714
Residence			0.055	0.973			
Residence (1)	-0.086	0.4	0.046	0.829	0.917	0.419	2.009
Residence (2)	-0.105	0.502	0.044	0.834	0.9	0.337	2.408
Level			30.719	0.000			
Level (1)	-2.304	0.431	28.579	0.000	0.1	0.043	0.232
Level (2)	-0.894	0.396	5.089	0.024	0.409	0.188	0.889
Constant	5.597	2.342	5.711	0.017	269.54		

## Discussion:

Current study showed a favorable level of knowledge as 60.4% of the study participants had good knowledge about HBV. This finding was in line with other similar studies, including the study conducted among medical students of Tanta University, Egypt, in which 57.85% of students had good knowledge about HBV [13], a study at Haramaya University showed that 56.5% of students were knowledgeable regarding HBV infection prevention [14]. Moreover, a study conducted in Pakistan reported that the knowledge level among medical students was 57.1% [15]. Our finding is slightly higher than that of a study conducted among health science students in Woldia University, Northeast Ethiopia; (52%) showed good knowledge about HBV [16]. In addition, our finding is greater than that reported by a study conducted in Saudi Arabia, in which 50% of medical students at the University of Dammam had good knowledge about HBV [17], also a study conducted among preclinical medical students of a medical college in Nepal reported that 50.8% had good knowledge regarding hepatitis B [18]. On the other hand, the level of knowledge observed in this study was lower than that observed in a study done in Ethiopia, wherein 80.1% of the participants had good knowledge about HBV [19]. Out of the 19 knowledge items used in the questionnaire, the mean knowledge score for the study sample was 13.79. This figure is similar to the Haramaya University study, in which the mean knowledge score was 11.52 out of 16 knowledge items [14]. In addition, the mean in this study was comparable with that of another study, in which 10 items were used to assess knowledge and the mean score was 7.35 [11]. However, this finding

was not consistent with that of the study of medical college in Nepal, in which the median knowledge of participants was 61.00 (57.00–66.00) [18].

In terms of the attitude, the participants of this study showed a positive attitude toward HBV infection, while positive attitude was associated with good knowledge in other studies [9–10].

In terms of practices related to HBV, the majority of the study participants showed good practices toward HBV as indicated by their responses in the questionnaire. This combination of good knowledge, positive attitude, and good practice observed in this study is in accordance with a previous similar finding [9]. Good practice seems to be based on good knowledge, while poor knowledge is most probably associated with malpractices. Despite these associations, no significant correlation was observed in this study between knowledge and practice scores, while the knowledge and attitude scores were significantly correlated. This finding slightly differs from an Iranian survey, in which knowledge was positively correlated with both attitude and practice components [11]. This difference could be attributed to the difference in the number of knowledge and practice items in each study. In this study, 19 and 4 items were used to assess knowledge and practice, respectively. However, in the Iranian study, 10 and 9 items were used to assess knowledge and practice, respectively [11].

In the present study, only 66 (24.4%) of the participants had been fully vaccinated against HBV at the time of the study, while 205 (75.6%) had never taken the vaccine. These findings were higher than those of a study conducted among students of medicine and health sciences in Northwest Ethiopia (only 5 (2%) students had completed the three doses of HBV vaccination) [10]. Similarly, a study conducted on medical and health science students in Haramaya University reported that 13.4% of the students received one or more doses of the hepatitis B vaccine, and only 4.7% of the students were fully vaccinated [14]. On the other hand, the vaccination status of the present study participants was lower than that of a study conducted on preclinical medical students of a medical college in Nepal (67 (37%) participants were fully vaccinated against hepatitis B, while 71 (39.2%) were never vaccinated) (18). In addition, the study conducted on undergraduate public health students in Ghana reported that 100 (44.2%) participants had received at least one dose of hepatitis B vaccine, while 30.5% completed the vaccination [20]. Another study conducted among medical students of Karachi, Pakistan reported that 79% of the students were vaccinated for hepatitis B; however, 70.6% of them were completely vaccinated [15].

In present study, less than half of the respondents (121, 44.6%) were previously screened for hepatitis B, which was agreed by previous studies, wherein 49.4% [15] and 49.6% had been tested for HBV infection [20].

In conclusion, the majority of MLS students included in this study had satisfactory awareness about hepatitis B infection. Additionally, progression in study level showed a positive impact on the level of students' awareness about HBV.

## **Limitation:**

The study was conducted at a single Medical Laboratory Sciences College, so generalization cannot be insured.

## **Declarations:**

### **Ethics approval and consent to participate:**

Ethical approval for this study was obtained from the Faculty of Medical Laboratory Sciences, Sudan International University Ethics Committee. Participation in the study was voluntary. Verbal consent was taken from each participant after clearly explaining the purpose and objectives of the study. They were informed to withdraw from the study at any time and/or to refrain from responding to questions if they were not interested to participate by any reason, Moreover, confidentiality was assured for all the information provided and personal identifiers were not included on questionnaire. Anyone who filled the form was understood to have given the consent.

### **Consent for publication:**

Not applicable.

### **Availability of data and materials:**

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

### **Competing Interest:**

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

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### **Authors' contributions:**

Ahmed Elhadi, Eman Elfaki contributed to this project and article equally thorough study planning, collection of data, performing data analysis, and wrote the manuscript. Mustafa E Yassin revised and helped to draft the manuscript for publication. All authors read and approved the final manuscript.

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## Supplementary Files

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- [QuestionnaireAwarenessofHBV.doc](#)