



# Health Worker's Knowledge, Attitude, and Practice Toward Hepatitis B Infection at Benghazi Medical Center

Binghazi Tıp Merkezi Sağlık Çalışanlarının Hepatit B Enfeksiyonuna Yönelik Bilgi, Tutum ve Uygulamaları

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## ABSTRACT

**Objectives:** Infection by hepatitis B virus (HBV) among health care workers (HCWs) and its management are one of the pillars of viral hepatitis control and prevention strategies. Health-related behaviors are affected by different aspects of knowledge, attitude, and practice (KAP) toward HBV. The aim of this study was to investigate the relationship between KAP among HCWs and HBV infection at the Benghazi Medical Center.

**Materials and Methods:** This study used a descriptive case study with a self-administered questionnaire. The data collected between August and November 2021 were coded and analyzed using SPSS software version 23.

**Results:** The professions correctly answered 67.9% of knowledge questions, 71.0% of attitude questions, and 87.3% of practice questions. A One-Way ANOVA between participants showed significant differences between the profession groups in terms of knowledge scores [14.8; 95% confidence interval (CI): 14.4-15, p=0.001], practice scores (9.2; 95% CI: 8.9-9.5, p=0.00), and attitude scores (3.5; 95% CI: 3.4-3.6, p=0.03). The correlation coefficients between KAP revealed that the attitude and knowledge scores showed a moderately positive relationship that was statistically significant (r=0.403; p=0.001). Among 317 participants, 49% reported they had the vaccine, 33% had not received the vaccine, and 18% were unsure about their vaccine status.

## ÖZ

**Amaç:** Sağlık çalışanları (SÇ) arasında hepatit B virüsü (HBV) enfeksiyonu ve yönetimi, viral hepatit kontrolü ve önleme stratejisinin temel direklerinden biridir. Sağlıkla ilgili davranışlar, HBV'ye yönelik bilgi, tutum ve uygulamanın (KAP) farklı yönlerinden etkilenir. Bu çalışmanın amacı, Binghazi Tıp Merkezi'ndeki SÇ'ler arasındaki KAP ile HBV enfeksiyonu arasındaki ilişkiyi araştırmaktır.

**Gereç ve Yöntemler:** Bu çalışma, kendi kendine uygulanan bir anket içeren tanımlayıcı bir olgu çalışması kullandı. Ağustos ve Kasım 2021 arasında toplanan veriler, SPSS yazılımı sürüm 23 kullanılarak kodlandı ve analiz edildi.

**Bulgular:** Meslekler, bilgi sorularının %67,9'unu, tutum sorularının %71'ini ve alışırma sorularının %87,3'ünü doğru yanıtladı. Katılımcılar arasında tek yönlü bir ANOVA, meslek grupları arasında bilgi puanları [14,8; %95 güven aralığı (GA): 14,4-15, p=0,001], uygulama puanları (9,2; %95 GA: 8,9-9,5) açısından anlamlı farklılıklar olduğunu göstermiştir, p=0.00) ve tutum puanları (3,5; %95 GA: 3,4-3,6, p=0,03). KAP arasındaki korelasyon katsayıları, tutum puanı ile bilgi puanının istatistiksel olarak anlamlı orta düzeyde pozitif bir ilişki gösterdiğini ortaya koydu (r=0,403; p=0,001). Üç yüz on yedi katılımcının %49'u aşı olduğunu bildirdi; %33'ü aşı olmamıştır; ve %18'i aşı durumlarından emin değildi.

**Sonuç:** SÇ'lerin HBV hakkındaki bilgileri yetersizdir; HBV'nin önlenmesine yönelik olumlu bir tutuma sahiptirler ve HBV'nin önlenmesi için iyi uygulamalara sahiptirler. Araştırmamızdan

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**Conclusion:** HCWs' knowledge about HBV is inadequate; they have a positive attitude toward the prevention of HBV and have good practices for preventing HBV. Findings from our research emphasized the immediate need to improve HCW training and enable HCW readiness in HB prevention and management.

**Keywords:** Health care workers, hepatitis B virus, knowledge, attitude and practice

## Introduction

Healthcare workers (HCWs) are susceptible to hepatitis B virus (HBV) infection from infected patients, and HBV-infected HCWs have the potential to infect patients (1). HCWs constitute one of the high-risk groups for this infection because of their repeated exposure, and contact with the body fluids of an infected person is one of the principal modes of transmission of HBV (2). HBV is highly infectious, can be transmitted without visible blood, and remains infectious on environmental surfaces for at least seven days (3). Acute HBV infection can result in chronic hepatitis, which can cause liver cancer, cirrhosis, liver failure, and even death. Guidelines for managing chronic HBV infection in children and adults, including disease monitoring and antiviral therapy, are available (1). In a study conducted by Kermodé et al. (4) among 2 million HCWs worldwide, there was a 10-fold higher risk of contracting HBV due to occupational exposure. HCWs in developing countries are at serious risk of infection from blood-borne pathogens, especially in endemic areas such as Sub-Saharan Africa (5). The World Health Organization and the Centers for Disease Control and Prevention (CDC) advise that all HCWs receive an HBV vaccination before beginning their clinical attachments while in medical school as part of occupational safety measures (6). The low level of vaccination and high prevalence of hepatitis B surface antigen found in various studies may be explained by HCWs' lack of knowledge about the transmission route of HBV (7). Several African studies have evaluated the knowledge, attitude, and practice (KAP) of HCWs toward HBV and their vaccination status, showing that KAP by HCWs toward HBV infection is generally inadequate in most developing countries (8). While health-related behaviors are affected by different aspects of KAP, few studies have examined the KAP level of HCWs toward HBV infection in Libya. A study was carried out by Elzouki et al. (9) to determine the prevalence of hepatitis B and hepatitis C among HCWs in five major hospitals in eastern Libya between July 2008 and June 2009. The samples of 601 HCWs were tested to analyze how the risk of HBV and HCV infections is affected by the type of occupation, place of work, working period, and vaccination status. Overall, 52% of HCWs reported receiving full vaccination doses (three doses) against HBV infection. The study explored that HBV vaccines could be provided to HCWs in Libya by scaling up the current vaccination program and implementing the policy of HBV immunization in every healthcare setting as recommended by the CDC.

## Materials and Methods

The study was conducted at the Benghazi Medical Center (BMC). A descriptive case study with a self-administered questionnaire was conducted at BMC from August to November

elde edilen bulgular, SÇ'lerin eğitimini iyileştirmeye ve sağlık çalışanlarının HB önleme ve yönetimine hazır olmalarını sağlamaya acil ihtiyaç olduğunu vurguladı.

**Anahtar Kelimeler:** Sağlık çalışanları, hepatit B virüsü, bilgi, tutum ve uygulama

2021. Only the medical and assistant medical staff were included (1029 medical staff and 940 assistant staff).

The sample size was calculated using Epi Information 7 with a 5% margin of error, 95% confidence interval, and 80% study power for the population (1,969). The sample size was 322 (168 medical staff and 154 assistant staff). The questionnaire was adapted from pretested questionnaires used in previous studies. This self-administered questionnaire comprised 44 closed-ended questions divided into four parts. The first part consists of five questions about demographic characteristics and vaccine state (q1-q5); the second part consists of twenty-two questions to assess knowledge regarding HBV infection (q6-q27); the third part consists of thirteen questions investigating the attitude toward HBV infection (q28-q40); and the last part consists of four questions examining the practices of HCWs (q41-q44). A pilot study was conducted on 15 HCWs in BMC to determine the reliability and internal consistency of the KAP questionnaire (10).

The study was approved by the Libyan Authority For Scientific Research (approval number: 2529/22). Permission was obtained from BMC management. Verbal consent was obtained from healthcare workers after the purpose of the study was explained.

## Statistical Analysis

The data from the completed questionnaires were coded and analyzed using SPSS version 23. Using a five-point Likert scale, from strongly agree to strongly disagree. Responses that included "agree" and "strongly agree" were coded one if they were the correct answer; otherwise, they were coded 0. Likewise, responses of "disagree" or "strongly disagree" were coded one if it was the correct answer and else coded 0. Correct answers were added to give total KAP scores. A significance test, such as a One-Way ANOVA, was used to examine the difference in mean between the professional groups. The significance level was set at 5% ( $p \leq 0.05$ ). A post-hoc least significant difference (LSD) test was used to examine the least significant difference among the types of professions that were compared between them. The reliability and internal consistency analysis was performed using Cronbach's alpha coefficient, and the validation analysis was performed using the Content Validity Index (11). Pearson's correlation analysis was used to find a relationship between KAP.

## Results

Table 1 shows the respondents' sociodemographic characteristics. Of the 322 questionnaires distributed, 317 were completely filled out and collected, for a response rate of (98.4%). Table 2 describes the correct responses to the knowledge questions about the prevention of HBV by HCWs. For the questions "HB can

Variables	Frequency	Percentage
<b>Age in years</b>		
18-25	8	2.5
26-33	60	18.9
34-41	101	31.9
42-49	78	24.6
50-57	56	17.7
58-65	14	4.4
<b>Gender</b>		
Female	143	45.1
Male	174	54.9
<b>Profession</b>		
Medical doctor	65	20.5
Nurse	73	23.0
Pharmacist	74	23.3
Lab scientist/tech	59	18.6
Health attendant	46	14.5
<b>Years of practice</b>		
6 months to 10 years	73	23.0
11-20 years	148	46.7
21-30 years	96	30.3
<b>Highest level of education</b>		
Up to secondary school	36	11.4
Diploma	100	31.5
Degree and higher	181	57.1

be prevented by avoiding food not well cooked”, and “HB can be prevented by avoiding drinking contaminated water” overall, correct responses to these questions from all HCWs were (41.3%) and (48.3%), respectively, which means poor knowledge. Table 3 provides details of the attitude questions and the positive responses by profession. For question “Do you avoid patients diagnosed with HB?” had 53.8% responded by medical doctors, 42.4% by lab technicians, 33.8 by pharmacists, 32.9% by nurses, and 21.7% by health attendants, which means they had a poor attitude about this point. Although the HBV vaccine is mandated for HCWs, 49% reported that they have received the vaccine, 33% not received and 18% are unsure if they have received the vaccine.

Table 4 provides details of the practice questions and the percentage of respondents with good practice responses by profession. In general, most HCWs had good practices for preventing HBV. Table 5 shows the descriptive statistics for the total KAP score with the type of profession. The overall mean knowledge score for all HCWs was 14.8 (95% CI: 14.4-15.3) which means poor knowledge, while the overall mean attitude score for all HCWs was 9.2 (95% CI: 8.9-9.5) which means a good positive attitude. The overall mean practice score for all HCWs was 3.5 (95% CI: 3.4-3.6) which means good practice.

The result of the P value from a One-Way ANOVA test in terms of KAP scores is described by a post-hoc (LSD) test in Table 6a-c.

In Table 7, the correlation between knowledge score and attitude score was moderately positive, with a statistically significant value of 0.000; this means that as knowledge score rises, so does attitude score, with moderate correlated power. While the correlation between knowledge score and practice score was positive with a statistical significance of 0.000, this means that as

**Table 2.** Percentage of respondents with correct responses to knowledge questions by profession

Knowledge questions	The type of profession					
	MD, (n=65) (%) correct	N, (n=73) (%) correct	P, (n=74) (%) correct	LT, (n=59) (%) correct	HA, (n=46) (%) correct	Total, (n=317) (%) correct
HBV is 50 to 100 times more infectious than HIV	98.5%	80.8%	87.8%	94.9%	78.3%	88.3%
Hepatitis B can cause liver cancer	100.0%	83.6%	90.5%	94.9%	76.1%	89.6%
Hepatitis B can cause liver cirrhosis	95.4%	87.7%	91.9%	94.9%	69.6%	89.0%
Hepatitis B can be transmitted through the blood and blood products	89.2%	68.5%	79.7%	89.8%	73.9%	80.1%
Hepatitis B can be transmitted through sharp objects and needles	93.8%	72.6%	71.6%	88.1%	65.2%	78.5%
Hepatitis B can be transmitted through sexual intercourse	90.8%	60.3%	64.9%	81.4%	54.3%	70.7%
A healthcare worker can infect patients with hepatitis B infection	73.8%	49.3%	52.7%	61.0%	60.9%	59.0%
Hepatitis B is among the leading causes of death globally	84.6%	71.2%	58.1%	74.6%	63.0%	70.3%
Three doses of HB vaccines are required for full protection	83.1%	67.1%	55.4%	69.5%	60.9%	67.2%
Hepatitis B can be effectively prevented through vaccination	83.1%	68.5%	52.7%	66.1%	58.7%	65.9%
HB can be prevented by proper disposal of sharps and blood	90.8%	67.1%	50.0%	69.5%	54.3%	66.6%

**Table 2 Continued**

HB can be prevented by avoiding multiple sexual partners	87.7%	76.7%	54.1%	74.6%	52.2%	69.7%
HB can be transmitted through drinking contaminated water	93.8%	65.8%	74.3%	79.7%	69.6%	76.7%
HB can be transmitted by handshake or hugging an infected person	87.8%	66.2%	67.6%	62.7%	43.5%	65.6%
HB can be transmitted by faeco-orally	76.9%	32.9%	60.8%	66.1%	39.1%	55.5%
There is no vaccine available for HB infection	73.8%	45.2%	74.3%	72.9%	52.2%	64.0%
A vaccine for HB is available but is not effective	80.0%	39.7%	63.5%	62.7%	37.0%	57.4%
HB can be prevented by avoiding drinking contaminated water	70.8%	31.5%	54.1%	44.1%	39.1%	48.3%
HB can be prevented by avoiding food not well cooked	61.5%	24.7%	47.3%	32.2%	41.3%	41.3%
Hepatitis B virus can cause both acute and chronic infections?	87.7%	60.3%	59.5%	67.8%	56.5%	66.6%
Hepatitis B virus that affects the liver	80.0%	52.1%	58.1%	44.1%	50.0%	57.4%
There is an interval between doses of HB vaccines	87.7%	61.6%	58.1%	55.9%	67.4%	65.9%
Average percentage correct across all questions	85.1%	60.6%	64.9%	70.3%	57.4%	67.9%

MD: Medical doctor, N: Nurse, P: Pharmacist, LT: Lab technicians, HA: Health attendant, HBV: Hepatitis B virus, HIV: Human immunodeficiency virus, HB: Hepatitis B

**Table 3. Percentage of respondents with correct responses to attitude questions by profession**

Attitude questions	The type of profession					
	MD, (n=65) (%) +ve attitude	N, (n=73) (%) +ve attitude	P, (n=74) (%) +ve attitude	LT, (n=59) (%) +ve attitude	HA, (n=46) (%) +ve attitude	Total, (n=317) (%) +ve attitude
Do you feel at risk by virtue of your work?	87.7%	72.6%	66.2%	71.2%	65.2%	72.9%
Do you feel that you need to be protected from HB infection?	95.4%	74.0%	78.4%	78.0%	67.4%	79.2%
Do you know your HB status?	95.4%	67.1%	87.8%	84.7%	67.4%	81.1%
Do you consider it necessary to receive the HB vaccine?	96.9%	69.9%	85.1%	74.6%	65.2%	79.2%
Will you vaccinate your children against HB?	95.4%	79.5%	78.4%	78.0%	80.4%	82.3%
Will you recommend the HB vaccine to other health HCWs?	87.7%	86.3%	78.4%	74.6%	67.4%	79.8%
Is it important to get the HB vaccine?	98.5%	72.6%	70.3%	81.4%	69.6%	78.5%
Have you completed the HB vaccination schedule?	95.4%	64.4%	68.9%	76.3%	63.0%	73.8%
Does your lifestyle put you at a risk of HB infection?	80.0%	67.1%	63.5%	71.2%	60.9%	68.8%
Is the HB vaccine safe?	83.1%	58.9%	59.5%	67.8%	63.0%	66.2%
Do you takepost exposure prophylactic for HB?	72.3%	49.3%	51.4%	55.9%	60.9%	57.4%
Do you avoid patients diagnosed with HB?	53.8%	32.9%	33.8%	42.4%	21.7%	37.5%
Three doses of vaccine have you received?	76.9%	57.5%	68.9%	59.3%	65.2%	65.6%
Average percentage correct across all attitude questions	86.0%	63.5%	68.5%	70.4%	62.9%	71.0%

MD: Medical doctor, N: Nurse, P: Pharmacist, LT: Lab technicians, HA: Health attendants, HCW: Health care workers, HB: Hepatitis B

knowledge score increases, practice score increases with weakly correlated power. Moreover, the correlation between attitude score and practice score showed a weak positive relationship with a statistical significance of 0.000, which means that when attitude score increases, practice score also increases, with a weakly correlated power.

## Discussion

Our study showed a gap in knowledge about HB infection among HCWs; the overall knowledge of HCWs about HB infection was 67.9%. Another study in Khartoum (12) showed that doctors have the highest KAP, which is very close to our study and lower than the 76.9% reported in Nigeria (10). However, the answers to

**Table 4.** Percentage of respondents with correct responses to practice questions by profession

Practice questions	The type of profession					
	MD, (n=65) (%) good practice	N, (n=73) (%) good practice	P, (n=74) (%) good practice	LT, (n=59) (%) good practice	HA, (n=46) (%) good practice	Total, (n=317) (%) good practice
Do you wear gloves when performing procedures?	92.3%	78.1%	82.4%	81.4%	82.6%	83.3%
Do you wear glasses when performing procedures?	93.8%	79.5%	91.9%	81.4%	82.6%	86.1%
Do you wear a facemask when in direct contact with a patient?	96.9%	84.9%	90.5%	86.4%	87.0%	89.3%
Do you dispose of sharps properly after the procedure?	95.4%	84.9%	90.5%	91.5%	91.3%	90.5%
Average percentage correct across all practice questions	94.6%	81.9%	88.8%	85.2%	85.9%	87.3%

MD: Medical doctor, N: Nurse, P: Pharmacist, LS: Lab technicians, HA: Health attendant

**Table 5.** Descriptive statistics for knowledge, attitude, and practice (total scores) and professions

	N	Mean	95% CI		Min.	Max.	p
			Lower bound	Upper bound			
<b>Total knowledge score</b>							
Medical doctor	65	18.9	17.8	19.3	11	22	0.001
Nurse	73	13.5	12.3	14.4	5	22	
Pharmacist	74	14.3	13.4	15.1	6	22	
Lab technicians	59	15.5	14.5	16.5	5	22	
Health attendant	46	12.6	11.4	13.9	5	22	
Total	317	14.8	14.4	15.3	5	22	
<b>Total attitude score</b>							
Medical doctor	65	11.2	10.7	11.6	4	13	0.001
Nurse	73	8.5	8.1	8.9	1	13	
Pharmacist	74	8.9	8.4	9.4	5	13	
Lab technicians	59	9.2	8.6	9.6	5	13	
Health attendant	46	8.2	7.6	8.7	5	13	
Total	317	9.2	8.9	9.5	1	13	
<b>Total practice score</b>							
Medical doctor	65	3.8	3.6	3.9	0	4	0.03
Nurse	73	3.2	3.1	3.5	0	4	
Pharmacist	74	3.5	3.4	3.7	0	4	
Lab technicians	59	3.3	3.1	3.7	0	4	
Health attendant	46	3.3	3.1	3.7	0	4	
Total	317	3.5	3.4	3.6	0	4	

CI: Confidence interval, Min.: Minimum, Max.: Maximum

**Table 6a.** Results of the post hoc LSD test for total knowledge score between the types of profession

(I) profession	(J) profession	p	
Medical doctor	Nurse	0.001	Significant differences
	Pharmacist	0.001	Significant differences
	Lab technicians	0.001	Significant differences
	Health attendant	0.001	Significant differences
Nurse	Medical doctor	0.001	Significant differences
	Pharmacist	0.037	Significant differences
	Lab technicians	0.001	Significant differences
	Health attendant	0.558	No significant differences
Pharmacist	Medical doctor	0.001	Significant differences
	Nurse	0.037	Significant differences
	Lab technicians	0.056	No significant differences
	Health attendant	0.016	Significant differences
Lab scientist/tech	Medical doctor	0.001	Significant differences
	Nurse	0.001	Significant differences
	Pharmacist	0.056	No significant differences
	Health attendant	0.001	Significant differences
Health attendant	Medical doctor	0.001	Significant differences
	Nurse	0.558	No significant differences
	Pharmacist	0.016	Significant differences
	Lab technicians	0.001	Significant differences

LSD: Least significant difference

some questions revealed a lack of knowledge, such as the fact that 44.5% of participants were unaware that HBV could not be transmitted feco-orally and 23.3% did not know that the virus is not transmitted through drinking contaminated water. In addition, 51.7% were unaware that the virus could not be prevented by avoiding drinking contaminated water, and 58.7% wrongly thought that HBV could be prevented by avoiding food that is not well cooked, which is less than the 63.2% reported by another study in



**Table 6b.** Results of the post hoc LSD test for the total attitude score between types of professions

(I) profession	(J) profession	p	
Medical doctor	Nurse	0.001	Significant differences
	Pharmacist	0.001	Significant differences
	Lab technicians	0.001	Significant differences
	Health attendant	0.001	Significant differences
Nurse	Medical doctor	0.001	Significant differences
	Pharmacist	0.236	No significant differences
	Lab technicians	0.067	No significant differences
	Health attendant	0.350	No significant differences
Pharmacist	Medical doctor	0.001	Significant differences
	Nurse	0.236	No significant differences
	Lab technicians	0.472	No significant differences
	Health attendant	0.046	Significant differences
Lab technicians	Medical doctor	0.001	Significant differences
	Nurse	0.067	No significant differences
	Pharmacist	0.472	No significant differences
	Health attendant	0.012	Significant differences
Health attendant	Medical doctor	0.001	Significant differences
	Nurse	0.350	No significant differences
	Pharmacist	0.048	Significant differences
	Lab technicians	0.012	Significant differences

LSD: Least significant difference

Nigeria (10). On the other hand, 70.3% of the percentage is large compared to that reported by Samuel et al. (13), who showed that only 14.2% and 9.3% incorrectly identified the feco-oral route and drinking contaminated water as means of transmitting the virus, while 6.2% and 3.1% incorrectly thought that HBV can be prevented by avoiding contaminated water and food that is not well cooked. In our study, 80% of participants said that HBV can cause liver cancer and cirrhosis, which was inconsistent with other studies in Kabul, Afghanistan (8), where 88.24% of participants said it can. This study found that 73.8% of participants

**Table 6c.** Results of the post hoc LSD test for the total practice score by profession

(I) profession	(J) profession	p	
Medical doctor	Nurse	0.001	Significant differences
	Pharmacist	0.138	No significant differences
	Lab technicians	0.022	Significant differences
	Health attendant	0.047	Significant differences
Nurse	Medical doctor	0.001	Significant differences
	Pharmacist	0.063	No significant differences
	Lab technicians	0.406	No significant differences
	Health attendant	0.349	No significant differences
Pharmacist	Medical doctor	0.138	No significant differences
	Nurse	0.063	No significant differences
	Lab technicians	0.355	No significant differences
	Health attendant	0.486	No significant differences
Lab technicians	Medical doctor	0.022	Significant differences
	Nurse	0.406	No significant differences
	Pharmacist	0.355	No significant differences
	Health attendant	0.876	No significant differences
Health attendant	Medical doctor	0.047	Significant differences
	Nurse	0.349	No significant differences
	Pharmacist	0.486	No significant differences
	Lab technicians	0.876	No significant differences

LSD: Least significant difference

completed the HB vaccination schedule, which was lower than the 100% completion rate reported by Kumah et al. (14). Knowledge regarding preventive measures plays a role in the control of HBV. Overall, these results suggest that more knowledge is necessary when providing health education to HCWs, which is typically the first step toward risk reduction and an improvement in the quality of life. In our study, 33.8% of respondents were unsure about the safety of the HBV vaccine, which is lower than the study in Northern Vietnam (15), but higher than the 92.1% reported in Saudi Arabia for HBV vaccine safety. 27.1% of participants did not know

**Table 7.** Correlation coefficients between knowledge attitude and practice (n=317)

		Total knowledge score	Total attitude score	Total practice score
Total knowledge score	Pearson correlation	1	0.403*	0.236*
	p	-	0.001	0.001
Total attitude score	Pearson correlation	0.403*	1	0.241*
	p	0.001	-	0.001
Total practice score	Pearson correlation	0.236*	0.241*	1
	p	0.001	0.001	-

\*Correlation is significant at the 0.01 level (2-tailed)

the risk of contracting HBV by virtue of their work, unlike studies done in Saudi Arabia. 20.2% and 20.8% of respondents felt they did not need to be protected from hepatitis B infection (12). These HCWs were less likely to take HB infection control and prevention measures seriously because they thought they were not at risk of HB infection. 18.9% of participants were unaware of their HBV status, 20.8% had received the hepatitis vaccine, and 73.80% of HCWs were vaccinated, compared with 50.4% of respondents who did not know their HB status (14). Regarding practice toward HB preventive measures, 16.7% of respondents did not wear gloves when conducting procedures; this percentage was less than that in a study conducted in Kabul (62.55%) (8). Another study conducted in Sudan reported a much higher percentage of 92.8% (14). In our study, 90.5% of respondents said they properly disposed of sharps after use. However, overall correct responses to practice from all HCWs were 87.3% "good practice", may be due to the data collected during the coronavirus disease-2019 (COVID-19) period, where HCWs underwent extensive infection control training. Regarding HBV vaccine status among HCWs, this study found that 49% of respondents among 317 participants had received an HBV vaccine, which is very similar to Japan's rate of 48.20% (16). 18% of respondents are unsure if they have received the HBV vaccine, and 33% report that they have not received it. A study by Daw et al. (17) aimed to determine the prevalence of HBV markers among HCWs, investigate some risk factors for such prevalence, and outline specific policies to address these issues among HCWs. The study concludes that HBV vaccine, education, clinical advice, and health insurance should be available for HCWs who are at a higher risk of HBV infection (17).

### Study Limitations

To prevent respondents from discussing their answers with others, the questionnaires were completed in the presence of the researcher. Only medical staff and medical assistant staff were involved in the study; other BMC staff such as security staff and administrative office staff were not involved.

### Conclusion

This study found that the knowledge of HCWs at BMC about HBV is inadequate. The majority of the staff had poor knowledge

responses, a positive attitude, and good practices for preventing HBV. The rate of vaccination indicates the risk, and the main reasons that led to its occurrence were that HCWs were not vaccinated because of a lack of knowledge about vaccination. HCWs who were not vaccinated needed to implement an HBV vaccination program.

### Ethics

**Ethics Committee Approval:** The study was approved by the Libyan Authority For Scientific Research (approval number: 2529/22).

**Informed Consent:** Verbal consent was obtained from healthcare workers after the purpose of the study was explained.

**Peer-review:** Externally peer-reviewed.

### Authorship Contributions

Concept: A.E., Design: A.E., R.G.O., Data Collection or Processing: R.G.O., Analysis or Interpretation: A.E., R.G.O., Literature Search: A.E., A.B.E., R.G.O., Writing: A.E., A.B.E., R.G.O.

**Conflict of Interest:** No conflict of interest was declared by the authors.

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### References

- Lewis JD, Enfield KB, Sifri CD. Hepatitis B in healthcare workers: Transmission events and guidance for management. *World J Hepatol.* 2015;7:488-497.
- Shepard CW, Simard EP, Finelli L, Fiore AE, Bell BP. Hepatitis B virus infection: epidemiology and vaccination. *Epidemiol Rev.* 2006;28:112-125.
- Bond WW, Favero MS, Petersen NJ, Gravelle CR, Ebert JW, Maynard JE. Survival of hepatitis B virus after drying and storage for one week. *Lancet.* 1981;1:550-551.
- Kermode M, Jolley D, Langkham B, Thomas MS, Crofts N. Occupational exposure to blood and risk of bloodborne virus infection among health care workers in rural north Indian health care settings. *Am J Infect Control.* 2005;33:34-41.
- Deuffic-Burban S, Delarocque-Astagneau E, Abiteboul D, Bouvet E, Yazdanpanah Y. Blood-borne viruses in health care workers: prevention and management. *J Clin Virol.* 2011;52:4-10.
- Schillie S, Murphy TV, Sawyer M, Ly K, Hughes E, Jiles R, de Perio MA, Reilly M, Byrd K, Ward JW; Centers for Disease Control and Prevention (CDC). CDC guidance for evaluating health-care personnel for hepatitis B virus protection and for administering postexposure management. *MMWR Recomm Rep.* 2013;62:1-19.
- Mahamat G, Kenmoe S, Akazong EW, Ebogo-Belobo JT, Mbagu DS, Bowo-Ngandji A, Foe-Essomba JR, Amougou-Atsama M, Monamele CG, Mbongue Mikangue CA, Kame-Ngasse GI, Magoudjou-Pekam JN, Zemnou-Tepap C, Meta-Djomsji D, Maidadi-Foudi M, Touangnou-Chamda SA, Daha-Tchoffo AG, Selly-Ngaloumo AA, Nayang-Mundo RA, Yéngué JF, Taya-Fokou JB, Fokou LKM, Kenfack-Momo R, Tchami Ngongang D, Atembeh Noura E, Tazokong HR, Demeni Emoh CP, Kengne-Ndè C, Bigna JJ, Boyomo O, Njuom R. Global prevalence of hepatitis B virus serological markers among healthcare workers: A systematic review and meta-analysis. *World J Hepatol* 2021;13:1190-1202.
- Roien R, Mousavi SH, Ozaki A, Baqeri SA, Hosseini SMR, Ahmad S, Shrestha S. Assessment of knowledge, attitude, and practice of health-care workers towards hepatitis B virus prevention in Kabul, Afghanistan. *J Multidiscip Healthc.* 2021;14:3177-3186.

9. Elzouki AN, Elgamay SM, Zorgani A, Elahmer O. Hepatitis B and C status among health care workers in the five main hospitals in eastern Libya. *J Infect Public Health*. 2014;7:534-541.
10. Fufore MB, Cook PA, Kirfi AM. 2016. Health workers' knowledge, attitude and practice towards hepatitis B infection in Northern Nigeria. *International J Caring Sci*. 2016;9:955-965.
11. Bolarinwa OA. Principles and methods of validity and reliability testing of questionnaires used in social and health science researches. *Niger Postgrad Med J*. 2015;22:195-201.
12. Mustafa ASM, Ahmed ASM, Alamin TAA, Shaheen MTH, Hilali AMMA, Fadul MHMA, Abdelsalam AAA, Abdelrahim MAS, Elsheikh MNMA. Knowledge, attitude and practice of hepatitis (B) among healthcare workers in relation to their vaccination status in Khartoum, Sudan, 2015: a cross-sectional study. *Sudan J Med Sci*. 2018;13:22-32.
13. Samuel SO, Aderibigbe SA, Salami TAT, Babatunde OA. Health workers' knowledge, attitude and behaviour towards hepatitis B infection in Southern Nigeria. *Int J Med Med Sci*. 2009;1:418-424.
14. Kumah A, Tormeti E, Dzando G, Nutakor HS, Amenuvor WAY, Anagblah CK, Mordenu H, Awutey E, Akpeke H, Kpobi P. Knowledge, Attitude and Practices towards Hepatitis B Infection and Vaccination among Public Health Students in Ghana. *Open Journal of Preventive Medicine*. 2021;11:43-53.
15. Hang Pham TT, Le TX, Nguyen DT, Luu CM, Truong BD, Tran PD, Toy M, Bozkurt S, So S. Knowledge, attitudes and medical practice regarding hepatitis B prevention and management among healthcare workers in Northern Vietnam. *PLoS One*. 2019;14:e0223733.
16. Nagao Y, Matsuoka H, Kawaguchi T, Ide T, Sata M. HBV and HCV infection in Japanese dental care workers. *Int J Mol Med*. 2008;21:791-799.
17. Daw MA, Siala IM, Warfalli MM, Muftah MI. Seroepidemiology of hepatitis B virus markers among hospital health care workers. Analysis of certain potential risk factors. *Saudi Med J*. 2000;21:1157-1160.