

Knowledge, Attitude and Practice Among Palestinian Healthcare Workers in the Gaza Strip Towards Hepatitis B

Cross-sectional survey

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ABSTRACT: Objectives: Healthcare workers are at high risk of contracting hepatitis B virus (HBV). This survey aimed to identify the gaps and strengths in the knowledge, attitudes and practices of healthcare workers towards HBV to drive appropriate health interventions. **Methods:** This cross-sectional study was conducted between March and April 2022. A convenience sample of three at-risk healthcare professions from the major health facilities in Gaza was surveyed. A 40-item self-administered questionnaire was used. Statistical data analysis was conducted using Statistical Package for Social Sciences version 25 to obtain descriptive and inferential statistics via various nonparametric, correlation and regression tests (with $P < 0.05$). **Results:** A total of 447 healthcare workers participated in the study. Overall, 105 of the participants (23.5%) demonstrated poor knowledge (below 14/20 points) of HBV, 284 (63.5%) had moderate knowledge (14–17 points) and 58 (13%) showed good knowledge. The majority ($n = 367$, 82.1%) expressed an excellent attitude. Finally, 287 (64.2%) demonstrated a good level of practice regarding HBV infection. A history of needlestick injury was reported by 233 (52.1%) participants, 170 (73.3%) of whom reported taking appropriate preventive actions after exposure. **Conclusion:** The majority of the participants demonstrated overall good knowledge regarding HBV infection. Nonetheless, significant gaps remain in the different aspects of the knowledge, attitude and practice construct that require appropriate awareness campaigns to further limit the spread of this preventable viral infection.

Keywords: Health Knowledge, Attitudes, Practice; Attitude of Health Personnel; Hepatitis B; Epidemiology; Prevention and Control; Health Personnel; Cross-Sectional Studies.

ADVANCES IN KNOWLEDGE

- The overall knowledge about hepatitis B virus (HBV) infection among healthcare workers in the Gaza Strip was good.
- There were significant gaps in the knowledge of HBV, such as the modes of transmission and HBV therapy.

APPLICATION TO PATIENT CARE

- Assessing the knowledge, attitude and practice of healthcare workers regarding HBV will help pinpoint gaps in the HBV prevention protocols and practices, ultimately helping healthcare policymakers protect both at-risk healthcare workers and their patients.

HEPATITIS B VIRUS (HBV) IS A VACCINE-preventable viral infection of the liver with serious potential complications, such as liver cirrhosis and hepatocellular carcinoma. It is a bloodborne virus and can be transmitted through blood transfusion, sexual activity, or perinatally from an infected mother.¹ The global tally of HBV infections was estimated at 316 million cases in 2019 (all-age prevalence of 4.1%), with more than half a million HBV-related deaths worldwide during the same year.²

The Middle East is a region of low-intermediate HBV endemicity (2–4.9%), and Palestine is considered a moderately endemic area for HBV infection.^{3,4} In 2020, the HBV incidence and carrier rates in the country were 0.37 and 7.9 per 100,000, respectively. In the Gaza Strip, the rates were 0.15 and 5.6 per 100,000, respectively, during the same year.⁵ This represented a significant decline from the incidence rate of 11–

15/100,000 in Palestine between 1990 and 1994, which has been attributed to the integration of the HBV vaccine into the national vaccination schedule since 1992.⁶ The HBV vaccine is a reliable and cost-effective preventive tool with over 90% effectiveness against chronic HBV infection and nearly 70% protection against HBV-related hepatocellular carcinoma.^{7,8}

Risk factors for HBV transmission in Palestine include undergoing blood transfusion or dental procedures, sharing contaminated sharp objects, such as shaving blades, Hejamat tools and intravenous drug use.⁴ Haemodialysis patients and patients who receive treatment in neighbouring countries are also at increased risk of infection.⁹ Healthcare workers are at a significantly higher risk of HBV infection than the general population and the risk is even higher for professions that include performing invasive procedures or handling human blood and specimens

(e.g. surgeons, nurses and dentists).¹⁰⁻¹⁴ Therefore, besides HBV vaccination, additional preventive measures are necessary to protect healthcare workers against HBV infection, including the use of personal protective equipment, proper sterilisation of medical equipment, disinfection of health facilities and post-exposure prophylaxis after accidental exposure to contaminated blood or body fluids.¹⁵

Needlestick injuries represent a particularly preventable hazard that can be avoided with appropriate staff training and safety protocols.¹⁶ A study in 2004 found a 2.8% prevalence of Hepatitis B surface antigen among 399 tested healthcare workers and needlestick injuries demonstrated a highly significant association as the leading risk factor for infection. Additionally, unvaccinated healthcare workers showed higher rates of infection, with approximately twice the rate among vaccinated participants (4.1% versus 2.0%).¹⁷ Another study in 2021 demonstrated that 289 of 538 (54%) healthcare workers in Gaza had sustained at least one needlestick injury, with nurses and cleaners at the highest risk of such injuries.¹⁸

Implementing effective preventive plans for HBV infection requires healthcare workers to demonstrate an adequate understanding of the disease, as reflected in their knowledge, attitude and practice. Knowledge, attitude and practice studies have been widely used in measuring public health levels and assessing the fundamental understanding, perspectives and activities commonly shared by a certain population on a particular topic. The current study is the first to examine the knowledge, attitude and practice of healthcare workers in the Gaza Strip regarding HBV infection.

Methods

This descriptive institution-based cross-sectional study was conducted at seven governmental hospitals (Al-Shifa Medical Complex, Nasser Medical Complex, European Gaza Hospital, Indonesian Hospital, Rantissi Pediatric Complex, Al Durra Pediatric Hospital, Palestinian-Turkish Friendship Hospital), one major governmental primary health centre (Sabha Al Harazin Primary Healthcare Center) and two private hospitals (Al-Quds Specialized Hospital and Al-Sahaba Medical Complex). These institutions represent the major hospitals and health centres providing healthcare services across the Gaza Strip from north to south. The study was conducted between March and April 2022. The convenience sampling method was used to survey a total of 447 medical doctors, nurses and laboratory technicians who worked in the above-mentioned facilities, as those professions were considered to be

at the highest risk of exposure to patients and their blood specimens. The study included healthcare workers from these three professions who worked in the above-mentioned hospitals during the study period and consented to answer the questionnaire. Healthcare workers were excluded if they were from other disciplines, were absent during the data collection period or refused to participate.

The authors' constructed a questionnaire based on a literature review of previous similar studies.¹⁹⁻²³ The final version of the questionnaire included 40 items divided into four sections: the first section collected participants' sociodemographic data; the second section (20 questions) assessed their knowledge of HBV; the third section (9 questions) assessed their attitude towards HBV; and the fourth section (11 questions) assessed their practice regarding HBV. The validity and reliability of the referenced questionnaires were established by the referenced studies. Experts from the Public Health Department at the Islamic University of Gaza evaluated the questionnaire's face, substance and convergent validity and ensured that the questionnaire appropriately covered relevant questions pertaining to the study within the local context. The questionnaire was then pilot tested for acceptability and consistency with 20 respondents whose demographic characteristics were similar to those of the actual study population. Only a few linguistic modifications were required after the pilot test. Data from the pilot study were not included in the final analysis.

Healthcare workers who correctly answered 18 or more questions out of the 20 questions in the second section were considered to have high knowledge of HBV; those who scored between 14 and 17 were regarded as having moderate knowledge, and those who scored below 14 were regarded as having insufficient knowledge. In terms of attitude, scores of six and above reflected a good attitude. Meanwhile, scores of six or seven out of seven items reflected a good level of practice. These measurements resulted from the normality characteristics of data distribution: either 25-75 quartiles or the median.

The data were analysed using the Statistical Package for Social Sciences (SPSS), Version 25.0 (IBM Corporation, Armonk, New York, USA). The data analysis provided frequency tables for the variables. The Kolmogorov-Smirnov test was used to assess the sample distribution's normality. Kruskal-Wallis and Mann-Whitney tests were used to determine the relationship between the dependent variables (knowledge, attitude and practice) and the independent categorical variables of the sociodemographic data. Multinomial logistic regression was used to predict

the relationship between the cohort characteristics and the knowledge, attitude and practice domains. Statistical significance was set at *P* values of less than 0.05.

Before conducting the study, written ethical approval was obtained from the Human Resource Department at the Ministry of Health (approval letter number 918947), and administrative approvals were obtained from the directorates of each facility. Verbal consent was obtained from the participants upon answering the questionnaire. Each questionnaire was de-identified and assigned a code number throughout data entry and data analysis to maintain the anonymity and confidentiality of all the participants.

Results

A total of 447 healthcare workers working in 10 government and private health centres participated in this study; the response rate was 100%. Most of the participants (95.3%) were recruited from government hospitals. The largest age group was 24–30 years (41.4%) and the majority had more than two years of work experience [Table 1].

The majority of participants in the study (*n* = 284, 63.5%) demonstrated a moderate level of knowledge about HBV infection. On the other hand, 10 participants (2.2%) denied that HBV infection is caused by a virus, and 125 (28%) failed to acknowledge sexual transmission as a common HBV transmission mode. Also, 179 (40%) participants believed that sharing dishes with HBV-positive patients could transmit the disease, while 110 participants (24.6%) did not recognise the association between HBV infection and liver cancer. Meanwhile, 278 (56.2%) participants believed that the human body could not spontaneously cure an HBV infection, while 32 (7.2%) were oblivious to the presence of a vaccine for HBV [Table 2]. The Kruskal-Wallis test demonstrated a significant difference in knowledge levels among the different professions (*P* < 0.001).

Most of the participants (*n* = 367, 82.1%) demonstrated a good attitude towards HBV [Table 3]. Fear and sadness were the most common expected reactions to receiving a diagnosis of HBV infection, reported by 202 (45.2%) and 150 (33.6%) participants, respectively. The majority (*n* = 344, 77%) said they would first inform a physician about their illness; friends came last. Most of the participants (*n* = 365, 81.7%) would visit a health facility if they had symptoms of HBV infection as soon as they realised them, while a small number (*n* = 35, 7.8%) said they would seek traditional healers. The majority believed that instrument sterilisation, the wearing of gloves

and vaccination could prevent transmission, but 86 participants (19.2%) did not recommend post-exposure prophylaxis for those exposed to HBV.

Of the 447 participants, 296 (66.2%) were previously screened for HBV infection. There was a statistically significant difference in screening for HBV among the healthcare professions, with the highest screening rate among medical laboratory technicians (*P* = 0.005). Of the total sample, 45 (10.1%) said they would not ask for blood screening for HBV before receiving a potential blood transfusion. However, most (*n* = 405, 90.6%) would ask for a new syringe before use and use safety equipment for ear or nose piercings (*n* = 376, 84.1%) [Table 4]. Nearly half of the participants (*n* = 233, 52.1%) reported having sustained needlestick injuries before. Most of these participants followed preventive and health guidelines to prevent infection with HBV [Table 4].

No significant associations were found between knowledge levels and age, affiliation, or years of experience. There was a statistically significant difference in attitude depending on affiliation (*P* < 0.001), speciality (*P* < 0.001) and years of experience (*P* = 0.02), but not age. Practical measures were statistically different according to age group (*P* < 0.001), affiliation (*P* = 0.006) and years of experience (*P* < 0.001) but not speciality [Table 5].

Table 1: Characteristics of the participants included in this study (N = 447)

Characteristic	n (%)
Age in years	
24–30	185 (41.4)
31–40	142 (31.8)
41–50	75 (16.8)
>50	45 (10.0)
Experience	
Less than 2 years	111 (24.8)
More than 2 years	336 (75.2)
Affiliation	
Government hospitals	
Medical doctor	143 (32.0)
Nurse	195 (43.6)
Laboratory technician	88 (19.7)
Private hospitals	
Medical doctor	3 (0.7)
Nurse	18 (4.0)
Laboratory technician	0 (0.0)

Table 2: Participants' responses to questions on hepatitis B virus infection

HBV knowledge item*	n (%)				P value‡
	Total	Medical doctor†	Nurse†	Laboratory technician†	
HBV infection is caused by a virus organism	437 (97.8)	143 (97.9)	206 (96.7)	88 (100.0)	0.211
HBV infection can be transmitted from mother to foetus	370 (82.8)	134 (91.8)	159 (74.6)	77 (87.5)	<0.001
HBV infection cannot be transmitted to infants through breast milk	309 (69.1)	97 (66.4)	152 (71.4)	60 (68.2)	0.598
HBV infection cannot be spread through close contact (such as kissing)	281 (62.9)	101 (69.2)	126 (59.2)	54 (61.4)	0.147
Sexual transmission is a common way through which HBV infection can spread	322 (72.0)	104 (71.2)	156 (73.2)	62 (70.5)	0.857
HBV infection can spread through blood transfusion	432 (96.6)	144 (98.6)	201 (94.4)	87 (98.9)	0.038
HBV infection can spread through the use of sharp objects such as needles, blades and surgical tools	420 (94.0)	142 (97.3)	194 (91.1)	84 (95.5)	0.044
HBV infection can spread by using shared blades at the barber or shared ear and nose piercing tools	291 (65.1)	107 (73.3)	131 (61.5)	53 (60.2)	0.040
Undergoing medical and/or surgical procedures increases the chance of HBV infection	411 (91.9)	134 (91.8)	192 (90.1)	85 (96.6)	0.173
HBV infection cannot spread through sharing dishes with an HBV positive patient	268 (60.0)	100 (68.5)	101 (47.4)	67 (76.1)	<0.001
Symptoms of HBV infection do not appear immediately after HVB enters the body	368 (82.3)	127 (87.0)	161 (75.6)	80 (90.9)	0.001
HBV infection can lead to liver cirrhosis	380 (85.0)	123 (84.2)	182 (85.4)	75 (85.2)	0.950
HBV infection is associated with an increased risk of liver cancer	337 (75.4)	117 (80.1)	149 (70.0)	71 (80.7)	0.039
An infected individual can have an HBV infection without symptoms	359 (80.3)	126 (86.3)	159 (74.6)	74 (84.1)	0.015
Jaundice is one of the common symptoms of HBV infection	349 (78.1)	105 (71.9)	172 (80.8)	72 (81.8)	0.089
Nausea, vomiting and loss of appetite are common symptoms of HBV infection	338 (75.6)	115 (78.8)	169 (79.3)	54 (61.4)	0.002
HBV infection is incurable	241 (53.9)	80 (54.8)	129 (60.6)	32 (36.4)	0.001
HBV infection can be self-cured by the body	196 (43.8)	64 (43.8)	80 (37.6)	52 (59.1)	0.003
There is a vaccine available for HBV infection	415 (92.8)	137 (93.8)	195 (91.5)	83 (94.3)	0.594
No specific diet is required during the treatment of HBV infection	215 (48.1)	79 (54.1)	79 (37.1)	57 (64.8)	<0.001

HBV = hepatitis B virus.

*Correct answers; †Percentage from each specialty; ‡Using Chi-squared test

Multinomial logistic regression revealed that nurses were more susceptible to having lower knowledge levels, with an odds ratio of 0.161 ($P < 0.001$) [Table 6]. Additionally, being a government employee or a medical doctor was associated with higher levels of good attitude, with odds ratios of 8.505 and 8.599 ($P < 0.001$), respectively [Table 6]. Furthermore, having less than two years of work experience was associated with low levels of attitude and practice, with odds ratios of 0.292 ($P = 0.001$)

and 0.485 ($P = 0.011$), respectively [Table 6]. Finally, the three domains (knowledge, attitude and practice) demonstrated a positive correlation with each other, with a knowledge-attitude correlation coefficient of 0.275, a knowledge-practice correlation coefficient of 0.202 and an attitude-practice correlation coefficient of 0.295 ($P < 0.01$).

Table 3: Participants' responses to questions on attitude towards hepatitis B virus infection

HBV attitude items	n (%)				P value [†]
	Total	Medical doctor*	Nurse*	Laboratory technician*	
What would be your reaction if you found out that you had an HBV infection?‡					
Fear	202 (45.2)	75 (51.4)	103 (48.4)	24 (27.3)	0.001
Shame	40 (8.9%)	3 (2.1)	30 (14.1)	7 (8.0)	<0.001
Surprise	70 (15.7%)	20 (13.7)	36 (16.9)	14 (15.9)	0.713
Sadness	150 (33.6%)	54 (37.0)	50 (23.5)	46 (52.3)	<0.001
Whom would you inform about your illness?‡					
Physician	344 (77.0)	116 (79.5)	158 (74.2)	70 (79.5)	0.412
Spouse	54 (12.1)	21 (14.4)	24 (11.3)	9 (10.2)	0.564
Children	26 (5.8)	5 (3.4)	14 (6.6)	7 (8.0)	0.289
Other relatives	39 (8.7)	9 (6.2)	23 (10.8)	7 (8.0)	0.299
Friends	29 (6.5)	13 (8.9)	15 (7.0)	1 (1.1)	0.059
When do you think you would visit a health facility if you had symptoms of an HBV infection?					
Own treatment fails	45 (10.1)	8 (5.5)	26 (12.2)	11 (12.5)	0.007
As soon as I realise the symptoms§	365 (81.7)	133 (91.1)	162 (76.1)	70 (79.5)	0.007
Will not go to the health facility	37 (8.3)	5 (3.4)	25 (11.7)	7 (8.0)	0.007
What would worry you the most if you were diagnosed with HBV infection?‡					
Fear of death	97 (21.7)	37 (25.3)	45 (21.1)	15 (17.0)	0.316
Fear of disease spreading to family	277 (62.0)	95 (65.1)	120 (56.3)	62 (70.5)	0.046
Cost of treatment	36 (8.1)	9 (6.2)	17 (8.0)	10 (11.4)	0.367
Isolation from community	60 (13.4)	11 (7.5)	39 (18.3)	10 (11.4)	0.011
What would you do if you thought you had symptoms of an HBV infection?					
Go to a pharmacy	16 (3.6)	1 (0.7)	13 (6.1)	2 (2.3)	<0.001
Go to traditional healers	35 (7.8)	3 (2.1)	25 (11.7)	7 (8.0)	<0.001
Go to a health facility§	396 (88.6)	142 (97.3)	175 (82.2)	79 (89.8)	<0.001
Do you believe that instrument sterilisation is important to prevent HBV transmission?					
Yes§	437 (97.8)	142 (97.3)	210 (98.6)	85 (96.6)	0.499
No	10 (2.2)	4 (2.7)	3 (1.4)	3 (3.4)	0.499
Do you believe that wearing gloves is important to prevent transmission?					
Yes§	417 (93.3)	139 (95.2)	201 (94.4)	77 (87.5)	0.051
No	30 (6.7)	7 (4.8)	12 (5.6)	11 (12.5)	0.051
Do you believe that vaccination could prevent transmission?					
Yes§	404 (90.4)	134 (91.8)	192 (90.1)	78 (88.6)	0.722
No	43 (9.6)	12 (8.2)	21 (9.9)	10 (11.4)	0.722
Do you recommend post-exposure prophylaxis for those who had been exposed to HBV?					
Yes§	361 (80.8)	132 (90.4)	168 (78.9)	61 (69.3)	<0.001
No	86 (19.2)	14 (9.6)	45 (21.1)	27 (30.7)	<0.001

HBV = hepatitis B virus.

*Percentage from each specialty; †Chi-squared tests; ‡Can apply more than one; §Favourable attitude

Table 4: Participants' responses to questions on practice towards hepatitis B virus infection

HBV practice items	n (%)				P value [†]
	Total	Medical Doctor*	Nurse*	Laboratory Technician*	
Have you been screened for HBV?	296 (66.2)	86 (58.9)	140 (65.7)	70 (79.5)	0.005
Have you gotten yourself vaccinated?	381 (85.2)	119 (81.5)	183 (85.9)	79 (89.8)	0.209
Do you ask for a new syringe before use?	405 (90.6)	132 (90.4)	191 (89.7)	82 (93.2)	0.634
Do you ask your barber to change the blade/or use safe equipment for ear or nose piercings?	376 (84.1)	128 (87.7)	181 (85.0)	67 (76.1)	0.058
Do you ask for blood screening before blood transfusion?	402 (89.9)	118 (80.8)	203 (95.3)	81 (92.0)	<0.001
In the case that you are diagnosed with HBV infection, would you go for further investigation?	401 (89.7)	137 (93.8)	188 (88.3)	76 (86.4)	0.120
Do you avoid meeting patients with HBV?	302 (67.6)	110 (75.3)	129 (60.6)	63 (71.6)	0.009
Have you had a needlestick injury before?	233 (52.1)	66 (45.2)	124 (58.2)	43 (48.9)	0.042
Washing hands with water and soap after a needlestick injury [‡]	212 (91.0)	56 (84.8)	117 (94.4)	39 (90.7)	0.093
Clean the wound site after a needlestick injury [‡]	207 (88.8)	57 (86.4)	112 (90.3)	38 (88.4)	0.707
Check if the patient has a blood-borne disease after a needlestick injury [‡]	192 (82.4)	44 (66.7)	110 (88.7)	38 (88.4)	<0.001

HBV = hepatitis B virus.

*Percentage from each specialty; [†]Using Chi-squared test; [‡]From healthcare workers who had a history of needlestick injury.

Table 5: Interaction between cohort characteristics and knowledge, attitude and practice domains (N = 447)

Characteristic	n	Mean knowledge score ± SD	P value	Mean attitude score ± SD	P value	Mean practice score ± SD	P value
Age in years*			0.166		0.113		<0.001
24–30	185	15.10 ± 2.041		5.22 ± 0.955		5.42 ± 1.244	
31–40	142	14.86 ± 1.915		5.33 ± 0.928		5.95 ± 1.163	
41–50	75	15.15 ± 2.276		5.49 ± 0.844		6.12 ± 1.026	
>50	45	15.56 ± 2.292		5.44 ± 0.785		5.71 ± 1.160	
Affiliation[†]			0.463		<0.001		0.006
Government	426	15.09 ± 2.071		5.36 ± 0.906		5.77 ± 1.198	
Private	21	14.81 ± 14.81		4.52 ± 0.750		5.05 ± 1.203	
Specialty*			<0.001		<0.001		0.503
Medical doctor	146	15.61 ± 2.141		5.63 ± 0.654		5.68 ± 1.219	
Nurse	213	14.52 ± 1.985		5.20 ± 0.967		5.70 ± 1.241	
Laboratory technician	88	15.15 ± 1.825		5.11 ± 1.033		5.89 ± 1.098	
Experience in years[‡]			0.866		0.02		<0.001
<2	111	15.10 ± 2.013		5.07 ± 1.042		5.23 ± 1.291	
>2	336	15.07 ± 2.094		5.41 ± 0.855		5.90 ± 1.130	

SD = standard deviation.

*Kruskal-Wallis Test; [†]Mann-Whitney Test, P < 0.05.

Table 6: Predictors of demonstrating good knowledge, attitude and practice levels about hepatitis B virus (N = 447)

Item	Characteristic	n	P value	Odds ratio (95% CI)
Predictors of demonstrating a good knowledge level about HBV	Age in years			
	24–30	185	0.056	0.292 (0.082–1.034)
	31–40	142	0.102	0.369 (0.112–1.219)
	41–50	75	0.154	0.408 (0.119–1.398)
	>50	45	REF	REF
	Affiliation			
	Government	426	0.959	0.955 (0.160–5.691)
	Private	21	REF	REF
	Specialty			
	Medical doctor	146	0.600	1.283 (0.505–3.260)
	Nurse	213	<0.001	0.161 (0.058–0.445)
	Laboratory technician	88	REF	REF
	Experience in years			
<2	111	0.483	1.434 (0.523–3.932)	
>2	336	REF	REF	
Predictors of demonstrating a good attitude level about HBV	Age in years			
	24–30	185	0.508	0.662 (0.196–2.240)
	31–40	142	0.158	0.441 (0.141–1.374)
	41–50	75	0.667	0.750 (0.202–2.788)
	>50	45	REF	REF
	Affiliation			
	Government	426	<0.001	8.505 (2.912–24.840)
	Private	21	REF	REF
	Specialty			
	Medical doctor	146	<0.001	8.599 (3.493–21.168)
	Nurse	213	0.130	1.619 (0.868–3.018)
	Laboratory technician	88	REF	REF
	Experience in years			
<2	111	0.001	0.292 (0.138–0.617)	
>2	336	REF	REF	
Predictors of demonstrating a good practice level towards HBV	Age in years			
	24–30	185	0.918	1.041 (0.487–2.222)
	31–40	142	0.382	1.381 (0.670–2.846)
	41–50	75	0.248	1.612 (0.717–3.624)
	>50	45	REF	REF
	Affiliation			
	Government	426	0.055	2.544 (0.978–6.616)
	Private	21	REF	REF
	Specialty			
	Medical doctor	146	0.561	0.844 (0.476–1.496)
	Nurse	213	0.826	1.064 (0.612–1.850)
	Laboratory technician	88	REF	REF
	Experience years			
<2	111	0.011	0.485 (0.277–0.849)	
>2	336	REF	REF	

HBV = hepatitis B virus

Discussion

This study evaluated the knowledge, attitude and practice of Palestinian healthcare workers in the Gaza Strip regarding HBV. There is a lack of literature on this topic in Palestine. The authors' literature review did not identify any previous similar local studies. In Palestine, the Ministry of Health is the major provider of primary and secondary healthcare services.²⁴ Additionally, due to the poor economic conditions in Gaza, many private-sector healthcare workers are also government employees. Therefore, government-employed healthcare workers represented the majority of this study's cohort.

It was found that 76.5% of the participants demonstrated moderate or excellent knowledge of HBV. This result falls within the range revealed by other recent studies conducted between 2013 and 2019 in Ethiopia, Afghanistan and Nigeria, where 73% to 86% of the surveyed healthcare workers demonstrated good knowledge about HBV. The result is also higher than that of other studies from Cameroon and Sudan, where only 47% and 58% of the participants, respectively, had adequate knowledge.^{20,21,25–27} The different results reflect variations in knowledge among the healthcare workers in these countries, but they may also be partly attributed to variations in the professions represented by each study's population. Knowledge levels among nurses were lower than those of doctors and laboratory technicians in the current study, and similar observations were made in the studies from Afghanistan and Ethiopia.^{20,26} Overall, the healthcare workers surveyed in this study tended to possess good knowledge of HBV, similar to those in other similar studies.

In terms of knowledge, 94%, 96.6% and 82.8% of the study's participants were correct in answering that HBV can be transmitted via contaminated sharp objects, blood transfusion and from mother to foetus (i.e. vertical transmission), which approximately correlates with the results of the study from Afghanistan.²⁰ However, the results diverge concerning the transmission of HBV through unprotected sex (72.0% versus 89.6%) and whether HBV has a definitive cure (43.8% versus 82.8%). Additionally, the fact that nearly one-third of the participants in this study incorrectly answered other questions related to HBV modes of transmission (questions 3, 4, 8 and 10) reveals a significant gap in knowledge and cultural beliefs about HBV. It indicates the need for more awareness campaigns regarding the primary prevention of HBV in the Gaza Strip.

Approximately 82.1% of the participants showed an overall favourable attitude towards HBV, which is similar to the Sudanese study, where 86.4% of the participants had a favourable attitude, which is higher than the Afghan and Cameroonian studies (44% and 46%, respectively).^{20,21,25} The authors of the latter study attributed this inadequate attitude to the insufficient knowledge of the participants, which further stresses the importance of disease awareness among healthcare workers. Meanwhile, medical doctors in the Afghan study had more unfavourable attitudes towards HBV than other professions. In contrast, the doctors in this study's cohort performed much better in terms of healthy attitudes (OR = 8.599) than the other participants. Doctors undertake longer and more extensive education than the other health professions included in this study, which could explain this observation, especially in the context of the correlation between knowledge and attitude that was demonstrated in this study's analysis [Table 6].

The finding that 77% of the participants would choose to first inform a physician about their illness and 88.6% would visit a health facility if they had symptoms of HBV infection reflects a positive cultural behaviour shared among the different healthcare workers in the current study. It was also found that 93.3%, 97.8% and 80.8% of the participants acknowledged the importance of wearing gloves, instrument sterilisation and post-exposure prophylaxis. These results are better than those reported in the Sudanese study (72.7%, 64.5% and 52.7%, respectively). Again, this difference may be partly related to the different representations of healthcare professions within the respective cohorts. It may also be explained by the higher knowledge scores of this study's cohort.

The prevalence of needlestick injuries among healthcare workers is 52.1%, which replicates the findings of another recent local study where the prevalence was 54%.¹⁸ These numbers are also similar to those reported in the Sudanese study (51.8%).²¹ These alarming results warrant advocating for the widespread application of well-established safety and needlestick injury prevention guidelines.²⁸ Of the healthcare workers who suffered needlestick injuries, 91.0%, 88.8% and 82.4% showed appropriate practice responses after the injury, such as washing hands with water and soap, sterilising the wound site, and checking whether the patient had a blood-borne disease.

Overall, 85.2% of participants in this study's cohort reported being vaccinated against HBV. In a recent study from the West Bank, the prevalence of HBV vaccination among 265 dentists was 74.5%.²⁹ In contrast, the prevalence of HBV vaccination

was 56.37% in the Afghan study, below 50% in the Sudanese study, and even lower in the Cameroonian study (19%).^{20,21,25} It was estimated that HBV vaccines saved approximately \$130 billion in direct and indirect costs between 2001 and 2020 in 73 low- and middle-income countries.³⁰ Including the HBV vaccine in the Palestinian national vaccination schedule has also been credited for the declining incidence of HBV in the country.⁶ The HBV vaccination is available free of charge to the population. Additionally, HBV screening is a mandatory part of pre-employment health examinations, and this may play a role in enhancing the percentage of vaccinated people in Palestine.

In this study, a positive correlation between the different study domains (knowledge, attitude and practice) was demonstrated, which has also been reported in studies from Ghana and Pakistan.^{31,23} This finding emphasises the importance of having adequate knowledge to correct false beliefs and preconceptions and to enable healthcare workers to develop healthy attitudes and practices. The stigmatisation of HBV is an important barrier to appropriate practices, and it has been shown to exert a substantial influence on the health-related behaviour of individuals with or at risk of HBV infection.³³ Future research is invited to assess public perceptions of and prejudices towards people living with HBV. This study has several limitations, including the use of the convenience sampling method and the relative underrepresentation of private-sector employees. The study was also limited to healthcare workers in the Gaza Strip due to the area's political and geographical separation from the West Bank. These limitations might affect the generalisability of the results, so further studies are still needed. Additionally, it is important to note that knowledge, attitude and practice surveys rely on self-reported responses, which may introduce bias and reflect participant assumptions rather than objective reality.

Conclusion

The overall knowledge about HBV infection among healthcare workers in the Gaza Strip is good. However, significant gaps remain regarding modes of transmission and HBV therapy, which require the attention of disease prevention authorities. These gaps may be addressed through awareness lectures and campaigns. Most healthcare workers' attitudes and practices are within a reasonable range, and knowledge, attitude and practice were positively correlated. The study showed a high prevalence of needlestick injuries among healthcare workers in the Gaza Strip, which could be minimised by providing

targeted interventions and training to improve risk awareness. Fortunately, the vaccination coverage among healthcare workers is high, which should help reduce some of the risks they face and maintain the trend of the declining incidence of HBV in Palestine.

AUTHORS' CONTRIBUTION

AKS, YE, MA and BA contributed to the literature review, study design, data analysis and drafting of the manuscript. All authors contributed to data collection, data entry and data curation. All authors revised and approved the final version of the manuscript.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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