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7 **Knowledge, Attitude, and Practice among Palestinian Healthcare Workers in**
8 **the Gaza Strip towards Hepatitis B**

9 *A cross-sectional survey*

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16
17 **Abstract**

18 **Objectives:** Healthcare workers are at a high potential risk of Hepatitis B virus infection (HBV).
19 This survey aims to identify gaps and strengths in the knowledge, cultural perceptions, and
20 practices of healthcare workers towards HBV in order to drive appropriate health interventions.

21 **Methods:** This cross-sectional study was conducted between March and April 2022. We
22 surveyed a convenience sample of three at-risk healthcare providers from the major health
23 facilities in Gaza. A 40-item, self-administered questionnaire was used. Statistical data analysis
24 was conducted using SPSS version 25 to obtain descriptive and inferential statistics via various
25 nonparametric, correlation, and regression tests (with $p < 0.05$). **Results:** 447 healthcare workers
26 participated in the study. Overall, 105 (23.5%) demonstrated poor knowledge (under 14\20
27 points), 284 (63.5%) had moderate knowledge (14-17 points), and 58 (13%) showed good
28 knowledge about HBV. The majority (367, 82.1%) expressed an excellent attitude. Finally, 287
29 (64.2%) demonstrated a good level of practice toward HBV infection. A history of needle stick
30 injury was reported by 233 (52.1%) participants, of whom 170 (73.3%) reported taking

31 appropriate preventive actions after exposure. **Conclusion:** The majority of participants
32 demonstrated overall good knowledge regarding HBV infection. Nonetheless, significant gaps
33 remain in the different aspects of the KAP construct, which require appropriate awareness
34 campaigns to further limit the spread of this preventable viral infection.

35 **Keywords:** Health Knowledge, Attitudes, Practice; Attitude of Health Personnel; Hepatitis B;
36 Epidemiology; prevention and control; Health Personnel; Cross-Sectional Studies.

37 38 **Advances in Knowledge:**

- 39 • The overall knowledge about HBV infection among HCWs in Gaza Strip is good.
- 40 • There were significant gaps in knowledge, such as modes of transmission and HBV
41 therapy.

42 **Application to Patient Care:**

- 43 • Assessing the knowledge, attitude, and practice among HCWs will help pinpoint gaps in
44 the HBV prevention protocols and practices, ultimately helping health policy-makers
45 protect both at-risk HCWs and their patients.

46 47 **Introduction**

48 Hepatitis B virus (HBV) is a vaccine-preventable viral infection of the liver with serious potential
49 complications such as liver cirrhosis and hepatocellular carcinoma. It is bloodborne and may be
50 transmitted through blood transfusion, sexual activity, or perinatally from the infected mother.¹

51 The global burden of HBV was estimated at 316 million cases in 2019 (all-age prevalence of
52 4.1%), with more than half a million HBV-related deaths globally during the same year.²

53
54 The Middle East is an area of low-intermediate HBV endemicity (2% - 4.9%).³ Palestine is
55 considered a moderately endemic area for HBV infection.⁴ The HBV incidence and carrier rates
56 in the country were 0.37 and 7.9/100,000 population, respectively, in 2020. In the Gaza Strip, the
57 rates were 0.15 and 5.6/100,000 populations, respectively, during the same year.⁵ This represented
58 a significant decline from an incidence rate of 11-15/100,000 between 1990–1994 in Palestine,
59 which has been attributed to adapting the HBV vaccine into the national vaccination schedule since
60 1992.⁶ The HBV vaccine is a reliable and cost-effective preventive tool with over 90%

61 effectiveness against chronic HBV infection and nearly 70% protection against HBV-related
62 hepatocellular carcinoma (HCC).^{7,8}

63
64 Risk factors for HBV transmission in Palestine include undergoing blood transfusion or dental
65 procedures, sharing contaminated sharp objects such as shaving blades and Hejamat tools, and
66 intravenous drug use.⁴ Hemodialysis patients and patients who receive treatment in neighboring
67 countries also are at increased risk.⁹ HCWs are at a several-fold higher risk of contracting HBV
68 infection compared to the general population,¹⁰⁻¹² and the hazard is higher for professions that
69 include performing invasive procedures or handling human blood and specimens (e.g., surgeons,
70 nurses, dentists).^{13,14} Therefore, besides HBV vaccination, additional preventive measures are
71 necessary to protect HCWs against HBV infection, including the use of personal protective
72 equipment (PPE), proper sterilization of medical equipment, disinfection of health facilities, and
73 post-exposure prophylaxis after accidental exposure to contaminated blood or body fluids.¹⁵

74
75 Needle stick injuries (NSIs) represent a particularly preventable hazard that can be avoided with
76 appropriate staff training and safety protocols.¹⁶ A study in 2004 found a 2.8% prevalence of
77 Hepatitis B surface antigen (HBsAg) among 399 tested healthcare workers, and needle stick
78 injuries demonstrated a highly significant association as the leading risk factor for infection. Also,
79 unvaccinated healthcare workers showed higher rates of infection with approximately twice the
80 rate among vaccinated participants (4.1% vs. 2.0%).¹⁷ Another study in 2021 demonstrated that
81 289 of 538 healthcare workers in Gaza (54%) had had at least one NSI, with nurses and cleaners
82 at the highest risk.¹⁸

83
84 Implementing effective preventive plans for HBV infection necessitates that HCWs demonstrate
85 an adequate understanding of the disease, reflected in their knowledge, attitude, and practice
86 (KAP). KAP studies have been used widely in measuring public health levels, assessing the
87 fundamental understanding, perspectives, and activities commonly shared by a certain population
88 on a particular topic. This is the first study to examine the KAP of HCWs in the Gaza Strip towards
89 HBV infection.

90 **Methods**

91 *Study design, settings, and population*

92 This descriptive, institution-based, cross-sectional study was conducted at seven governmental
93 hospitals (Al-Shifa Medical Complex, Nasser Medical Complex, European Gaza Hospital,
94 Indonesian hospital, Rantissi Pediatric Complex, Al Durra Pediatric Hospital, Palestinian-Turkish
95 Friendship hospital), one major governmental primary health center (Sabha Al Harazin Primary
96 Healthcare Center), and two private hospitals (Al-Quds Specialized Hospital and Al-Sahaba
97 Medical Complex). These institutions represented the major hospitals and health centers providing
98 healthcare services across the Gaza Strip from north to south. The study was conducted between
99 March and April 2022. The convenience sampling method was used to survey 447 medical doctors,
100 nurses, and laboratory technicians who worked in the above-mentioned facilities, as those
101 professions were considered to be at the highest risk for exposure to patients and their blood
102 products. The study included HCWs from the three professions who worked in these hospitals
103 during the study period and consented to fill out the questionnaire. We excluded HCWs from other
104 disciplines, those who were absent during the data collection period, and those who refused to
105 participate.

106

107 *Data Collection*

108 The study team constructed a questionnaire based on a literature review of previous similar
109 studies.¹⁹⁻²³ The final version of the questionnaire included 40 items divided into four sections; the
110 first section included the sociodemographic data of participants, the second section (20 questions)
111 assessed participants' knowledge, the third section (9 questions) assessed participants' attitudes,
112 and the fourth section (11 questions) assessed participants' practice towards HBV. The validity
113 and reliability of the referenced questionnaires were established by the referenced studies. Experts
114 from the Public Health Department at the Islamic University of Gaza evaluated our questionnaire's
115 face, substance, and convergent validity and ensured that the questionnaire appropriately covered
116 the relevant questions pertaining to the study within the local context. The questionnaire was then
117 piloted for acceptability and consistency with 20 respondents who shared similar demographic
118 characteristics with the actual study population. Only a few linguistic modifications were required
119 after the pilot testing, and data from the pilot study were not included in the final analysis.

120 ***Scoring System***

121 HCWs who scored 18 or more correct answers out of 20 questions in the second section were
122 considered to have high knowledge about HBV; scores between 14 and 17 were regarded as
123 moderate knowledge, while scores below 14 were regarded as having insufficient knowledge. In
124 terms of attitude, scores of six and above reflected a good attitude. Meanwhile, scoring six or seven
125 out of seven items reflected a good level of practice. These measurements resulted from the
126 normality characteristics of data distribution, either 25-75 quartiles or the median.

127

128 ***Data Analysis***

129 Data were analyzed using the statistical package for social sciences (SPSS) version 25 (SPSS Inc.,
130 Chicago, IL, USA). Data analysis provided frequency tables for variables. The Kolmogorov-
131 Smirnov test was used to assess the sample distribution's normality. Kruskal-Wallis and Mann-
132 Whitney tests were used to determine the relationship between the dependent variables
133 (knowledge, attitude, and practice) and the independent categorical variables of the
134 sociodemographic data. The multinomial logistic regression was used to predict the relationship
135 between the cohort characteristics and KAP domains. Statistical significance was set at p-values
136 of less than 0.05.

137

138 ***Ethical Consideration***

139 Before conducting the study, written ethical approval was obtained from the Human Resource at
140 the Ministry of Health, and administrative approvals were obtained from the directorate of each
141 facility. Verbal consent was obtained from participants upon answering the questionnaire. Each
142 questionnaire was deidentified and assigned a code number throughout data entry and data analysis
143 in order to maintain anonymity and confidentiality for all participants.

144

145 **Results**

146 ***Sociodemographic characteristics of the cohort***

147 A total of 447 HCWs working in ten governmental and private health centers participated in our
148 study (**Table 1**). The response rate was 100%. Most participants were recruited from governmental
149 hospitals (95.3%). The largest age group was 24-30 years (41.4%), and the majority had more than
150 two years of work experience (**Table 1**).

151 ***Knowledge about HBV and its associated factors***

152 The majority of participants in our study demonstrated a moderate level of knowledge about HBV
153 infection (284 HCWs; 63.5%). On the other hand, ten participants (2.2%) denied that HBV
154 infection is caused by a virus, and 125 (28%) failed to acknowledge sexual transmission as a
155 common HBV transmission mode. Also, 179 (40%) participants believed that sharing dishes with
156 HBV-positive patients can transmit the disease, while 110 (24.6%) participants did not recognize
157 the association between HBV infection and liver cancer. Meanwhile, 278 (56.2%) of participants
158 believed that the human body could not spontaneously cure an HBV infection, while 32 (7.2%)
159 were oblivious to the presence of a vaccine against HBV (**Table 2**). The Kruskal-Wallis test
160 demonstrated a significant difference in knowledge levels among the different professions ($p <$
161 $.001$). Still, no significant associations were found between knowledge levels and age, affiliation,
162 or experience years (**Table 5**).

163

164 ***Attitude about HBV and its relations***

165 Most participants demonstrated a good attitude (367 participants, 82.1%) (**Table 3**). Fear and
166 sadness were the most common expected reactions to receiving a diagnosis of HBV infection,
167 reported by 202 (45.2%) and 150 (33.6%) participants, respectively. The majority (344, 77%) said
168 they would first inform the physician about their illness, while friends came last. Most participants
169 (365, 81.7%) would visit a health facility if they had symptoms of HBV infection as soon as they
170 realized them, while 35 (7.8%) said they would seek traditional healers. The majority believed that
171 instrument sterilization, wearing gloves, and vaccination could prevent transmission, but 86
172 (19.2%) did not recommend post-exposure prophylaxis for those exposed to HBV. There was a
173 statistically significant difference in attitude depending on affiliation ($p < 0.001$), specialty ($p <$
174 0.001), and experience years ($p = 0.02$) but not age (**Table 5**).

175

176 ***Practical measures for HBV and needle stick injuries***

177 Of 447 participants, 296 (66.2%) have been screened previously for HBV infection. There was a
178 statistically significant difference in screening for HBV among health specialties, with the highest
179 screening rate among medical laboratory technicians ($P = 0.005$). Of the sample, 45 (11.1%) said
180 they would not ask for blood screening for HBV before receiving a potential blood transfusion.
181 Most, however, ask for a new syringe before use (405, 90.6%) and apply safety equipment for ear

182 or nose piercing (376, 84.1%) (**Table 4**). Nearly half (233, 52.1%) the participants reported having
183 needle stick injuries before. Of those, most followed preventive and health guidelines to prevent
184 infection with HBV (**Table 4**). Practical measures were statistically different according to age
185 groups ($p < 0.001$), affiliation ($p = 0.006$), and years of experience ($p < 0.001$), but not specialty
186 (**Table 5**).

187

188 *Predictors of KAP performance among participants*

189 The multinomial logistic regression revealed that nurses were more susceptible to having lower
190 knowledge levels with an odds ratio of 0.161 ($P= 0.000$) (**Table 6**). Also, being a governmental
191 employee or a medical doctor was associated with having higher levels of good attitude, with an
192 odds ratio of 8.505 and 8.599 ($P= 0.000$) (**Table 6**). Additionally, having less than two years of
193 work experience was associated with low levels of both attitude and practice, with an odds ratio
194 of 0.292 and 0.485, respectively ($P= 0.001$ and 0.011) (**Tables 6**). Finally, the three domains
195 (knowledge, attitude, and practice) demonstrated a positive correlation with each other, with the
196 knowledge-attitude correlation coefficient (.275), knowledge-practice correlation coefficient
197 (.202), attitude-practice correlation coefficient (.295), ($P<0.01$).

198

199 **Discussion**

200 This study evaluated the KAP of Palestinian HCWs in the Gaza Strip towards HBV. There is a
201 dearth of literature on this topic in Palestine. Our literature review did not identify previous similar
202 local studies. The Ministry of Health (MoH) is the major provider of primary and secondary
203 healthcare services in Palestine.²⁴ Also, due to poor economic conditions in Gaza, many private-
204 sector HCWs are also government employees working two jobs. Therefore, government-employed
205 HCWs represented the majority of our cohort.

206

207 We found that 76.5% of participants demonstrated moderate or excellent knowledge regarding
208 HBV. This result falls within the range revealed by other recent studies done between 2013-2019
209 from Ethiopia, Afghanistan, and Nigeria, where 73% to 86% of surveyed HCWs demonstrated
210 good knowledge about HBV. It is also higher than other studies from Cameroon and Sudan, where
211 only 47% and 58% of participants, respectively, had an adequate knowledge.^{20,21,25-27} The different
212 results reflect variations in knowledge among the HCWs in these countries, but they may also be

213 partly attributed to variations in the professions representing each study's population. Knowledge
214 levels among nurses were lower than doctors and laboratory technicians in our study, and similar
215 observations were made in the studies from Afghanistan and Ethiopia.^{20,26} Overall, HCWs
216 surveyed in our study fall closer to the better-educated end of the knowledge spectrum revealed in
217 those studies and other studies in the literature.

218
219 Also, in terms of knowledge, 94%, 96.6%, and 82.8% of participants answered correctly that HBV
220 could be transmitted via contaminated sharps, blood transfusion, and from mother to fetus (i.e.,
221 vertical transmission), which approximately correlates with the results of the Afghanistan study.²⁰
222 However, the results diverge where it concerns the transmission of HBV through unprotected sex
223 (72.0% vs. 89.64) and whether HBV has a definitive cure (43.8% vs. 82.86%). Additionally, the
224 fact that nearly one-third of participants in our study wrongfully answered other questions related
225 to HBV modes of transmission (questions 3, 4, 8, and 10) reveals a significant gap in knowledge
226 and cultural beliefs about HBV and indicates the need for more awareness campaigns regarding
227 primary prevention of HBV in the Gaza Strip.

228
229 About 82.1% of the participants showed an overall favorable attitude toward HBV, which is
230 similar to the Sudanese study in which 86.4% of participants had a favorable attitude, and higher
231 than the Afghan and Cameroonian studies (44% and 46%, respectively).^{20,21,25} The authors of the
232 latter study attributed the inadequate attitude to the insufficient knowledge of the participants,
233 which further stresses the importance of disease awareness among HCWs. Meanwhile, medical
234 doctors in the Afghan study had more unfavorable attitudes toward HBV compared to the other
235 professions. In contrast, doctors in our cohort performed much better in terms of healthy attitudes
236 (OR 8.599) compared to the remaining participants. Doctors receive longer and more extensive
237 education compared to the other health professions, which could explain this observation,
238 especially in the context of the correlation between knowledge and attitude that was demonstrated
239 in our analysis (**Table 7**).

240
241 The finding that 77% of participants chose the physician as the first go-to person to inform about
242 their illness and 88.6% would visit a health facility if they had symptoms of HBV infection reflects
243 a positive cultural behavior shared among the different HCWs in our study. We also found that

244 93.3%, 97.8%, and 80.8% of participants acknowledge the importance of wearing gloves,
245 instrument sterilization, and post-exposure prophylaxis. These results are better than those in
246 the Sudanese study (72.7%, 64.5%, and 52.7%, respectively). Again, this difference may be partly
247 related to the different representations of healthcare professions among the cohorts. It may also be
248 explained by the better knowledge scores of our study.

249
250 The prevalence of NSIs among HCWs was 52.1%, which replicates the findings of another recent
251 local study where the prevalence was 54%.¹⁸ The numbers are also similar to those reported in the
252 Sudanese study (51.8%) (21). These alarming results warrant advocating for the widespread
253 application of well-established safety and needlestick prevention guidelines.²⁸ Of the HCWs who
254 suffered NSIs, 91.0%, 88.8%, and 82.4% showed appropriate practice responses after the injury,
255 such as washing hands with water and soap, sterilizing the wound site, and checking if the patient
256 has a blood-borne disease.

257
258 Overall, 85.2% of participants in our cohort reported being vaccinated against HBV. In a recent
259 study from the West Bank, the prevalence of HBV vaccination among 265 dentists was 74.5%.²⁹
260 In contrast, the prevalence of HBV vaccination was 56.37% in the Afghan study, under 50% in
261 the Sudanese study, and even lower in the Cameroon (19%).^{20,21,25} It is estimated that HBV
262 vaccines saved an estimated \$130 billion in direct and indirect costs between 2001 and 2020 in 73
263 low- and-middle income countries.³⁰ Adopting the HBV vaccine in the Palestinian national
264 vaccination schedule is also credited for the declining incidence of HBV in the country.⁶ HBV
265 vaccine is available to the population free of charge. Also, HBV screening is a mandatory part of
266 the pre-employment health examination, which may play a role in enhancing the percentage of
267 vaccinated people in Palestine.

268
269 In our study, we demonstrated a positive correlation between the different study domains
270 (knowledge, attitude, and practice), which has also been reported in studies from Ghana and
271 Pakistan.^{31,23} This finding emphasizes that having good knowledge is essential in order to modify
272 false beliefs and preconceptions and help HCWs develop healthy attitudes and practices.
273 Stigmatization of HBV is an important barrier to appropriate practices and it has been shown to
274 exert substantial influence on the health behavior of individuals with or at risk for HBV.³³ Future

275 research is invited to assess public perceptions and prejudices toward people living with HBV
276 infection. This study has several limitations, including the use of the convenience sampling method
277 and the relative underrepresentation of private-sector employees. The study was also limited to
278 HCWs in the Gaza Strip due to the political and geographical separation from the West Bank.
279 These limitations might limit the generalization of the results, so further studies are still needed.
280 Finally, KAP surveys are inherently reliant on self-reported responses, therefore the results might
281 partly reflect participant assumptions rather than reality.

282

283 **Conclusion**

284 The overall knowledge about HBV infection among HCWs in Gaza Strip is good. However,
285 significant gaps remain, such as regarding modes of transmission and HBV therapy, requiring the
286 attention of health prevention authorities. These gaps may be addressed through awareness lectures
287 and campaigns. Most HCWs' attitudes and practices are within a reasonable range, and knowledge,
288 attitude, and practice demonstrated a positive correlation. The study showed a high prevalence of
289 NSIs among HCWs in the Gaza Strip, which could be minimized by providing targeted
290 interventions and training to improve risk awareness. Fortunately, though, the vaccination
291 coverage among HCWs is high, which should help averse against some of the risks and maintain
292 the trend of the declining incidence of HBV in Palestine.

293

294 **Authors' contribution**

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

298

299 **Conflict of Interest**

300 The authors declare no conflicts of interest.

301

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304

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410 **Table 1:** Demographic characteristics of the participants.

Demographic characteristics	N	Percent
Age		
24-30	185	41.4%
31-40	142	31.8%
41-50	75	16.8%
Older than 50	45	10.0%
Experience years		
Less than 2 years	111	24.8%
More than 2 years	336	75.2%
Affiliation		
Governmental Hospitals		
Medical Doctor	143	32%
Nurse	195	43.6%
Laboratory Technician	88	19.7%
Private Hospitals		
Medical Doctor	3	0.7%
Nurse	18	4%
Laboratory Technician	0	0%
Total	447	100.0%

412 **Table 2:** Participant's responses to knowledge on HBV infection.

HBV Knowledge Items ‡	Total	Medical Doctor†	Nurse†	Laboratory Technician†	P-value *
HBV infection is caused by a virus organism	437 (97.8%)	143 (97.9%)	206 (96.7%)	88 (100.0%)	.211
HBV infection can be transmitted from mother to fetus	370 (82.8%)	134 (91.8%)	159 (74.6%)	77 (87.5%)	.000
HBV infection cannot be transmitted to the infants through breast milk	309 (69.1%)	97 (66.4%)	152 (71.4%)	60 (68.2%)	.598
HBV infection cannot be spread through close contact (such as kissing)	281 (62.9%)	101 (69.2%)	126 (59.2%)	54 (61.4%)	.147
Sexual transmission is a common way through which HBV infection can be transmitted	322 (72.0%)	104 (71.2%)	156 (73.2%)	62 (70.5%)	.857
HBV infection can spread through blood transfusion	432 (96.6%)	144 (98.6%)	201 (94.4%)	87 (98.9%)	.038
HBV infection can spread through sharps such as needles, blades and operation tools	420 (94.0%)	142 (97.3%)	194 (91.1%)	84 (95.5%)	.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%)	.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%)	.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%)	.000
Symptoms of HBV infection do not appear immediately after the entrance of HVB into the body	368 (82.3%)	127 (87.0%)	161 (75.6%)	80 (90.9%)	.001
HBV infection can lead to liver cirrhosis	380 (85.0%)	123 (84.2%)	182 (85.4%)	75 (85.2%)	.950
HBV infection is associated with an increased risk of liver cancer	337 (75.4%)	117 (80.1%)	149 (70.0%)	71 (80.7%)	.039
An infected individual can have HBV infection without symptoms	359 (80.3%)	126 (86.3%)	159 (74.6%)	74 (84.1%)	.015
Jaundice is one of the common symptoms of HBV infection	349 (78.1%)	105 (71.9%)	172 (80.8%)	72 (81.8%)	.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%)	.002

HBV infection is not curable	241 (53.9%)	80 (54.8%)	129 (60.6%)	32 (36.4%)	.001
HBV infection can be self-cured by the body	196 (43.8%)	64 (43.8%)	80 (37.6%)	52 (59.1%)	.003
There is vaccine available for HBV infection	415 (92.8%)	137 (93.8%)	195 (91.5%)	83 (94.3%)	.594
No specific diet is required during the treatment of HBV infection	215 (48.1%)	79 (54.1%)	79 (37.1%)	57 (64.8%)	.000

* Chi-Square Tests, † Percentage from each specialty, ‡ Correct answers

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Accepted Article

415 **Table 3:** participant's responses on attitude towards HBV infection.

HBV Attitude items	Total	Medical Doctor [†]	Nurse [†]	Laboratory Technician [†]	P-value *
What would be your reaction if you found out that you have HBV infection? ‡					
Fear	202 (45.2%)	75 (51.4%)	103 (48.4%)	24 (27.3%)	.001
Shame	40 (8.9%)	3 (2.1%)	30 (14.1%)	7 (8.0%)	.000
Surprise	70 (15.7%)	20 (13.7%)	36 (16.9%)	14 (15.9%)	.713
Sadness	150 (33.6%)	54 (37.0%)	50 (23.5%)	46 (52.3%)	.000
Whom would you inform about your illness? ‡					
Physician	344 (77.0%)	116 (79.5%)	158 (74.2%)	70 (79.5%)	.412
Spouse	54 (12.1%)	21 (14.4%)	24 (11.3%)	9 (10.2%)	.564
Children	26 (5.8%)	5 (3.4%)	14 (6.6%)	7 (8.0%)	.289
Other relatives	39 (8.7%)	9 (6.2%)	23 (10.8%)	7 (8.0%)	.299
Friends	29 (6.5%)	13 (8.9%)	15 (7.0%)	1 (1.1%)	.059
When do you think you will visit health facility if you have symptoms of HBV infection?					
Own treatment fails	45 (10.1%)	8 (5.5%)	26 (12.2%)	11 (12.5%)	.007
Soon as I realized the symptoms [§]	365 (81.7%)	133 (91.1%)	162 (76.1%)	70 (79.5%)	.007
Will not go to the health facility	37 (8.3%)	5 (3.4%)	25 (11.7%)	7 (8.0%)	.007
What would worry you the most if you are diagnosed with HBV infection? ‡					
Fear of death	97 (21.7%)	37 (25.3%)	45 (21.1%)	15 (17.0%)	.316
Fear of disease spread to family	277 (62.0%)	95 (65.1%)	120 (56.3%)	62 (70.5%)	.046
Cost of treatment	36 (8.1%)	9 (6.2%)	17 (8.0%)	10 (11.4%)	.367

Isolation from community	60 (13.4%)	11 (7.5%)	39 (18.3%)	10 (11.4%)	.011
What would you do if you think you have symptoms of HBV infection?					
Go to pharmacy	16 (3.6%)	1 (0.7%)	13 (6.1%)	2 (2.3%)	.000
Go to traditional healers	35 (7.8%)	3 (2.1%)	25 (11.7%)	7 (8.0%)	.000
Go to health facility [§]	396(88.6%)	142 (97.3%)	175 (82.2%)	79 (89.8%)	.000
Do you believe that instrument sterilization is important to prevent transmission?					
Yes [§]	437 (97.8%)	142 (97.3%)	210 (98.6%)	85 (96.6%)	.499
No	10 (2.2%)	4 (2.7%)	3 (1.4%)	3 (3.4%)	.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%)	.051
No	30 (6.7%)	7 (4.8%)	12 (5.6%)	11 (12.5%)	.051
Do you believe that vaccination could prevent transmission?					
Yes [§]	404 (90.4%)	134 (91.8%)	192 (90.1%)	78 (88.6%)	.722
No	43 (9.6%)	12 (8.2%)	21 (9.9%)	10 (11.4%)	.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%)	.000
No	86 (19.2%)	14 (9.6%)	45 (21.1%)	27 (30.7%)	.000

*Chi-Square Tests, † Percentage from each specialty, ‡can apply more than one, § Favorable attitude

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Table 4: Participant’s responses on practice toward HBV infection.

HBV practice items	Total	Medical Doctor [†]	Nurse [†]	Laboratory Technician [†]	P-value [*]
Have you been screened for HBV infection?	296 (66.2)	86 (58.9%)	140 (65.7%)	70 (79.5%)	.005
Have you got yourself vaccinated?	381 (85.2)	119 (81.5%)	183 (85.9%)	79 (89.8%)	.209
Do you ask for new syringe before use?	405 (90.6)	132 (90.4%)	191 (89.7%)	82 (93.2%)	.634
Do you ask your barber to change blade/or safe equipment for ear or nose piercing?	376 (84.1)	128 (87.7%)	181 (85.0%)	67 (76.1%)	.058
Do you ask for blood screening before transfusion?	402 (89.9)	118 (80.8%)	203 (95.3%)	81 (92.0%)	.000
In case you are diagnosed with HBV infection, would you go for further investigation?	401 (89.7)	137 (93.8%)	188 (88.3%)	76 (86.4%)	.120
Do you avoid meeting a patient with HBV infection?	302 (67.6)	110 (75.3%)	129 (60.6%)	63 (71.6%)	.009
Have you had a needle stick injury before?	233 (52.1)	66 (45.2%)	124 (58.2%)	43 (48.9%)	.042
Washing hands with water and soap after a needle stick injury [‡]	212 (91.0)	56 (84.8%)	117 (94.4%)	39 (90.7%)	.093
Clean the wound site after a needle stick injury [‡]	207 (88.8)	57 (86.4%)	112 (90.3%)	38 (88.4%)	.707
Check if the patient has a blood-borne disease after a needle stick injury [‡]	192 (82.4)	44 (66.7%)	110 (88.7%)	38 (88.4%)	.000

** Chi-Square Tests, † Percentage from each specialty, ‡ From HCWs who had a history of needle stick injury*

420 **Table 5:** Interaction between cohort characteristics and KAP domains.

Demographic characteristics	N	Knowledge score Mean (SD)	P-value	Attitude score Mean (SD)	P-value	Practice score Mean (SD)	P-value
Age *			0.166		0.113		0.00
24-30	185	15.10 (2.041)		5.22 (.955)		5.42 (1.244)	
31-40	142	14.86 (1.915)		5.33 (.928)		5.95 (1.163)	
41-50	75	15.15 (2.276)		5.49 (.844)		6.12 (1.026)	
More than 50	45	15.56 (2.292)		5.44 (.785)		5.71 (1.160)	
Affiliation **			0.463		0.00		0.006
Governmental	426	15.09 (2.071)		5.36 (.906)		5.77 (1.198)	
Private	21	14.81 (14.81)		4.52 (.750)		5.05 (1.203)	
Specialty *			0.00		0.00		0.503
Medical Doctor	146	15.61 (2.141)		5.63 (.654)		5.68 (1.219)	
Nurse	213	14.52 (1.985)		5.20 (.967)		5.70 (1.241)	
Laboratory Technician	88	15.15 (1.825)		5.11 (1.033)		5.89 (1.098)	
Experience years **			.866		0.02		0.00
Less than 2 years	111	15.10 (2.013)		5.07 (1.042)		5.23 (1.291)	
More than 2 years	336	15.07 (2.094)		5.41 (.855)		5.90 (1.130)	

* *Kruskal Wallis Test*, ** *Mann-Whitney Test*, $P < 0.05$

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423 **Table 6:** Predictors of demonstrating a good knowledge, attitude and practice levels about HBV.

Item	Demographic characteristics	N	p value	Odds ratio	CI 95 (Lowe Bond)	CI 95 (Upper Bond)
Predictors of demonstrating a good knowledge level about HBV	Age					
	24-30	185	.056	.292	.082	1.034
	31-40	142	.102	.369	.112	1.219
	41-50	75	.154	.408	.119	1.398
	More than 50	45	REF	REF	REF	REF
	Affiliation					
	Governmental	426	.959	.955	.160	5.691
	Private	21	REF	REF	REF	REF
	Specialty					
	Medical Doctor	146	.600	1.283	.505	3.260
	Nurse	213	.000	.161	.058	.445
	Laboratory Technician	88	REF	REF	REF	REF
	Experience years					
Less than 2 years	111	.483	1.434	.523	3.932	
More than 2 years	336	REF	REF	REF	REF	
Predictors of demonstrating a good attitude level about HBV	Age					
	24-30	185	.508	.662	.196	2.240
	31-40	142	.158	.441	.141	1.374
	41-50	75	.667	.750	.202	2.788
	More than 50	45	REF	REF	REF	REF
	Affiliation					
	Governmental	426	.000	8.505	2.912	24.840
	Private	21	REF	REF	REF	REF
	Specialty					
	Medical Doctor	146	.000	8.599	3.493	21.168
	Nurse	213	.130	1.619	.868	3.018
	Laboratory Technician	88	REF	REF	REF	REF
	Experience years					
Less than 2 years	111	.001	.292	.138	.617	
More than 2 years	336	REF	REF	REF	REF	
Predictors of demonstrating a good practice level about HBV	Age					
	24-30	185	.918	1.041	.487	2.222
	31-40	142	.382	1.381	.670	2.846
	41-50	75	.248	1.612	.717	3.624
	More than 50	45	REF	REF	REF	REF
	Affiliation					
	Governmental	426	.055	2.544	.978	6.616
	Private	21	REF	REF	REF	REF
	Specialty					
	Medical Doctor	146	.561	.844	.476	1.496
	Nurse	213	.826	1.064	.612	1.850
	Laboratory Technician	88	REF	REF	REF	REF
	Experience years					
Less than 2 years	111	.011	.485	.277	.849	
More than 2 years	336	REF	REF	REF	REF	