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Original Article

Assessment of Knowledge, Attitude and Practice regarding Hepatitis B (HBV), Hepatitis C (HCV) and HIV infection among the healthcare personnel of National Institute of Laboratory Medicine and Referral Centre, Dhaka.

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Abstract

Background: Infections such as Hepatitis B (HBV), Hepatitis C (HCV) and Human immunodeficiency virus (HIV) pose significant global health risks, particularly to healthcare workers (HCWs) who are frequently exposed to infected blood and body fluids. Therefore, the purpose of this study was to assess the knowledge, attitude, and practice (KAP) of HCWs towards HBV, HCV and HIV and establish baseline data for future interventions.

Methods: This cross-sectional study was conducted from 1st March to 31st August 2023 at the Department of Virology of National Institute of Laboratory Medicine and Referral Centre (NILMRC), Dhaka, Bangladesh. The data were collected from the participants via self-administered questionnaire which targeted socio demographic information, general knowledge, and attitude towards handling patients infected with HBV, HCV, HIV and their samples. Kolmogorov-Smirnov (K-S) test and the Shapiro-Wilk test were used to assess the normality of the data distribution.

Results: The study involved 129 participants; predominantly young adults (57%) aged 20 to 29. The median scores for knowledge, attitude, and practice were 83, 27, and 31, respectively. Notably, 51% of participants had never received immunization against hepatitis B, and only 41.9% had completed the vaccination course. A significant number, 58.1%, reported an inability to complete all three doses of the vaccine. The study found no significant association between gender and KAP scores; however, age, occupation, and job duration were significantly associated with KAP outcomes.

Conclusions: The findings suggest that while HCWs possess satisfactory knowledge about HBV, HCV and HIV, there are notable gaps in attitudes and practices related to patient care and laboratory safety. Addressing these gaps through targeted interventions like advocacy, training, and continuous supervision is essential for improving infection prevention and control. This study provides crucial baseline data to develop strategies that enhance the safety of both HCWs and patients in healthcare settings.

Key words: Hepatitis B virus; Hepatitis C virus; Human immunodeficiency virus (HIV); Health care worker

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Introduction:

Hepatitis B (HBV) and C (HCV) are leading causes of viral hepatitis, with 296 million chronic HBV[1] and 58 million chronic HCV cases globally[2]. Each year, 1.5 million new infections occur and in 2019, these viruses were responsible for 820,000 deaths, primarily due to cirrhosis and hepatocellular carcinoma[1]. HBV and HCV are mainly transmitted through parenteral routes, such as injection of infected blood. Additionally, HBV and Human immunodeficiency virus (HIV) can be spread

through mucosal contact with infected body fluids during sexual intercourse and vertically from mother to child via the placenta or breast milk[1].

Hepatitis B and C viruses can cause both acute and chronic liver infections, leading to inflammation that may be asymptomatic or result in spontaneous recovery. However, 30-70% of infections become chronic, potentially causing severe complications like liver cirrhosis, liver cancer, and death. HIV, with a similar transmission route to HBV, leads to severe immunodeficiency and is fatal if untreated. In Bangladesh, while HIV prevalence remains low (<1% among the general population), an increasing trend is seen among key populations such as immigrant workers, sex workers, and injecting drug users[3]. HBV has a prevalence of 5.4% in Bangladesh, with a carrier rate of 2-7%[4], and HCV prevalence is 0.84%[5]. These two viruses are the leading causes of chronic liver diseases in the country[6].

A potent and safe recombinant vaccine for Hepatitis B (HBV) is available, yet there are no vaccines for Hepatitis C (HCV) and HIV. In Bangladesh, HBV vaccination was introduced in the EPI schedule between 2003-2005, achieving over 90% coverage among children under 57. However, there is no free vaccination for adults, and the cost remains high[7]. Additionally, there is a lack of awareness about preventing these infections among the general population and healthcare workers in Dhaka city[8]. It is crucial to train healthcare workers to improve knowledge, encourage HBV vaccination, and ensure the practice of standard precautions when handling patients with HBV, HCV, and HIV.

Healthcare workers (Lab technologists, Lab attendants, Cleaners, Sample collectors and handlers) in Bangladesh play a critical role in managing infectious diseases like HIV, HBV, and HCV. However, fear and reluctance to attend to people living with HIV persist due to insufficient knowledge and improper handling of infectious materials, even after training[9]. To reduce these fears and prevent healthcare-associated infections, it is essential to provide continuous training and advocacy to equip healthcare workers with the necessary knowledge and skills. Emphasizing personal protective measures, safe handling practices, and post-exposure prophylaxis can ensure better care for patients and protect healthcare workers from accidental exposure.

The National Institute of Laboratory Medicine and Referral Centre (NILMRC) in Dhaka, a newly established institute focused on national reference standards and trained manpower development, conducted a descriptive cross-sectional study to assess the knowledge, attitude, and practice (KAP) of its laboratory personnel regarding infectious sample handling. Since limited research exists on this topic in Bangladesh, understanding the KAP of NILMRC's staff is essential. This study, using a self-administered structured questionnaire, aims to establish baseline data for future training and planning, helping to ensure good laboratory and biosafety practices within the institute.

So the objective of this study, was to assess the knowledge, attitude, and practice (KAP) of HCWs towards HBV, HCV and HIV and establish baseline data for future interventions.

Methods:

Study design and settings

A descriptive cross-sectional study was conducted by the Department of Virology at NILMRC, Dhaka, from March to August 2023, involving 177 healthcare workers across various departments. Data were collected via a voluntary, anonymous self-questionnaire. The study included all HCWs who consented to participate, covering roles such as doctors, technologists, administrative staff, and support personnel.

Study sample

The total population of the NILMRC is 177, but 129 were participated in this study (n=129). We informed the participants about the study objectives and its implications during the session.

Study instrument

The study used a 40-item self-administered questionnaire, including 7 demographic items, 15 on knowledge, 8 on attitude, and 9 on practice related to Hepatitis B, Hepatitis C, and HIV. Developed using a 5-point Likert scale after extensive literature review, the questionnaire was pre-tested on 5% of the sample, adjusted, and then distributed to participants.

Statistical methods

The data collected through the questionnaire were extracted to Microsoft Excel-13, then imported and analyzed by using SPSS (Statistical Package for Social Sciences) version 29. Percentage (%) was used to represent the demographic data and Chi-square test was used to check the association between variables.

Results:

General characteristics

Among the 177 healthcare professionals, 129 (72.88%) actively participated. The largest demographic group comprised young adults aged 20 to 29, constituting 57% of participants (Supplement document, Figure 1). Males constituted the majority of respondents, accounting for 67% (Supplement document, Figure 2). Educational backgrounds varied, with 25.6% graduating with honors, 17.8% possessing a medical technology diploma, and 13.2% holding postgraduate degrees in medicine. Notably, 25.6% held honours degree, 2.3% held MBBS, 16.3% held MASTERS and 13.2 % held MD/MPHIL (Supplement document, Table 1). Professionally, 14.7% were medical doctors, 38% medical technologists, 6.2% lab attendants, 15.5% cleaners, 7.8% data operators, 2.3% administrative workers, and 15.5% were categorized as other professionals (Supplement document, Figure 3). Regarding experience, 47.3% reported having less than five years in their respective roles (Supplement document, Figure 4).

Assessment of knowledge related to Hepatitis B, Hepatitis C and HIV

The study found that most participants (86%) identified Hepatitis B as a viral infection and recognized its potential to cause liver cancer (90.7%). About 70% strongly agreed on transmission through contaminated blood and body fluids, unsterilized syringes, unprotected sex, and mother-to-fetal transmission. However, opinions were mixed on transmission via contaminated food/water. Two-thirds of respondents acknowledged the increased risk of Hepatitis B for healthcare workers, and about 60% were familiar with the signs and symptoms of Hepatitis and HIV. Most supported Hepatitis B vaccination (91.5%) but opposed vaccines for HCV and HIV (48.8%).

Table 1. Knowledge related to Hepatitis B, hepatitis C and HIV infection, Immunization and Treatment (n=129)

Questions for response	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
1.Hepatis B, C and HIV is caused by Virus	111(86%)	16(12.4%)	0 (0%)	2(1.6%)	0 (0%)
2. Hepatitis B, C and HIV can be transmitted by:					
2.a.Infected mother to child	99 (76.5%)	29(22.5%)	1(0.8%)	0 (0%)	0 (0%)
2.b. Blood or body fluid splashes onto an exposed surface (eyes, mouth, or cut in the skin)	87(67.5%)	35(27.1%)	2(1.6%)	2(1.6%)	3(2.3%)
2.c. Unprotected sex	104(80.6%)	23(17.8%)	2(1.6%)	0 (0%)	0 (0%)
2.d. Casual contact (shaking hands)	7(5.4%)	15(11.6%)	19(14.7%)	27(20.2%)	62(48.1%)
2.e. Unsterilized syringes/needles sharing, accidental prick, tattooing and surgery	86(66.7%)	22(17.1%)	3(2.3%)	14(10.9%)	4(3.1%)
2.f.Coughing/sneezing	8(6.2%)	19(14.7%)	13(10.1%)	25(19.4%)	64(49.6%)

2.g.Contaminated food/water	25(19.4%)	29(22.5%)	14(10.9%)	29(22.5%)	32(24.8%)
3. Hepatitis B and C can cause cirrhosis and liver cancer.	81(62.8%)	36(27.9%)	5(3.9%)	1(0.8%)	6(4.7%)
4. Hepatitis B and C can be presented as yellowness of the eyes, weakness of the body, abdominal pain and dark urine	76(58.9%)	40(31%)	5(3.9%)	4(3.1%)	4(3.1%)
5. HIV can be presented as fever, fatigue, swollen lymph node, diarrhea, weight loss, oral thrush, pneumonia	74(57.4%)	45(34.9%)	6(4.7%)	2(1.6%)	2(1.6%)
6. HBV, HCV and HIV infections are treatable	34(26.4%)	33(25.6%)	23(17.8%)	20(15.5%)	19(14.7%)
7. An effective vaccine is available to prevent hepatitis B infection	81(62.8%)	37(28.7%)	3(2.3%)	4(3.1%)	4(3.1%)
8. An effective vaccine is available to prevent hepatitis C and HIV infection	18(14%)	15(11.6%)	13(10.1%)	20(15.5%)	63(48.8%)
9. Post -exposure prophylaxis is recommended for HBV exposure	46(35.7%)	47(36.4%)	19(14.7%)	7(5.4%)	10(7.8%)
10. Post -exposure prophylaxis is recommended for HCV exposure	36(27.9%)	36(27.9%)	21(16.3%)	23(17.8%)	13(10.1%)
11. Post -exposure prophylaxis is recommended for HIV exposure	51(39.5%)	31(24%)	17(13.2%)	12(9.3%)	18(14%)
12. HBV infection is curable	29(22.5%)	38(29.5%)	24(18.6%)	19(14.7%)	19(14.7%)
13. HCV infection is curable	9(7%)	26(20.2%)	33(25.6%)	29(22.5%)	32(24.8%)

Most participants (68.2% strongly agreed, 24.8% agreed) believed that three or more doses of Hepatitis B vaccination are necessary for full immunity. Additionally, around two-thirds agreed on the recommendation of post-exposure prophylaxis for HBV, HCV, and HIV.

Opinions on the curability of HCV and HIV were mixed, with a majority disagreeing and uncertain opinions (25.6% and 18.6%, respectively), while most believed that HBV is curable. About half of the participants believed that antivirals could be used to treat infections, including hepatitis B, C, and HIV (26.4% strongly agreed, 25.6% agreed), with some uncertainty (17.8%) and rejection (approximately 15%). (Table1)

The median score for knowledge was calculated to be 83 (Table 5), reflecting the collective understanding of the surveyed healthcare professionals.

Assessment of attitude towards Hepatitis B, Hepatitis C and HIV

The findings indicated that a majority of healthcare workers (27.9% strongly agreed, 31.8% agreed) perceive themselves to be at increased risk of contracting HBV, HCV, and HIV compared to the general population. A significant portion of respondents, 58.1%, strongly agreed that HBV, HCV, and HIV pose serious public health concerns and majority (71.3%) believed that vaccination against Hepatitis B is necessary for healthy individuals. Responses varied regarding comfort levels living with infected individuals, with 31.8% strongly disagreed and 24% strongly agreed. A majority of respondents shared the view that occasional contact with blood as risky. There is notable uncertainty or misconception regarding transmission through food, with 28.7% agreed and 34.1% disagreed. Views on the curability of HBV and HIV vary, with 36.4% strongly disagreed and 26.4% agreed (Table 2). The median attitude score was calculated to be 27 (Table 5).

Table 2. Attitude of healthcare workers towards HBV, HCV and HIV: **(n=129)**

Questions for response	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
16. Healthcare workers are at increased risk of getting hepatitis B, C and HIV than general population	36(27.9%)	35(27.1%)	41(31.8%)	10(7.8%)	7(5.4%)
17. Occasional contact with blood is not risky	20(15.5%)	14(10.9%)	18(14%)	33(25.6%)	44(34.1%)
18. Hepatitis B vaccine is unnecessary because acquiring hepatitis B infection is not as serious as HIV infection.	8(6.2%)	14(10.9%)	7(5.4%)	38(29.5%)	62(48.1%)
19. I think Hepatitis B C and HIV are serious public health problems	75(58.1%)	41(31.8%)	7(5.4%)	1(0.8%)	5(3.9%)
20. Not comfortable living with people with hepatitis B, C and HIV	31(24%)	21(16.3%)	19(14.7%)	41(31.8%)	17(13.2%)

21. I believe that hepatitis B, C and HIV infections can be transmitted through food	5(3.9%)	23(17.8%)	20(15.5%)	37(28.7%)	44(34.1%)
22. I believe that healthy people need the hepatitis B vaccine	92(71.3%)	33(25.6%)	3(2.3%)	0 (0%)	1(0.8%)
23.Hepatitis B and HIV are curable diseases	13(10.1%)	21(16.3%)	14(10.9%)	34(26.4%)	47(36.4%)

Assessment of practice towards Hepatitis B, Hepatitis C and HIV infection and Hepatitis B vaccination

Among the respondents, the majority 32.6% Never screened for HBV, HCV and HIV and 27% screened rarely whereas 18.6% screened frequently. Regarding needle pricking incidents, 20.2% reported never experiencing needle pricks, while 42.6% reported rare occurrences, and 7% reported frequent needle pricking incidents. Half of the participants (59.7%) had no history of blood or body fluid spillage. Hand hygiene practices varied, with nearly half of the respondents (48.8%) reporting always washing their hands, and 36.4% reporting frequent handwashing. Almost 98% participants never shared needles, intravenous drug razors or toothbrushes (Table 3). The median score for practice was 31 (Table 5).

A substantial portion of respondents, accounting for 51%, reported never having been vaccinated against Hepatitis B. In contrast, 48.1% indicated having received the Hepatitis B vaccine. Among those who received the vaccine, 41.9% reported incomplete vaccination, suggesting that they did not complete the recommended series of doses. Conversely, 58.1% reported completing the recommended doses, which typically involve three or more doses of the vaccine. Regarding post-vaccination monitoring, the majority of respondents (78.3%) did not undergo antibody titer testing after Hepatitis B vaccination. Only a minority (21.7%) reported undergoing such testing (Table 3).

Table 3. Practice of healthcare workers of NILMRC towards HBV, HCV and HIV infections and regarding Hepatitis B vaccination:

(n=129)

Practice of healthcare workers of NILMRC towards HBV, HCV and HIV infections					
Questions for response	**Always**	**Frequently**	**Sometimes**	**Rarely**	**Never**
24. Have you ever been needle - pricked?	9(7%)	8(6.2%)	31(24%)	55(42.6%)	26(20.2%)
25. Is there any history of blood or body fluid spillage on your body?	5(3.9%)	4(3.1%)	16(12.4%)	27(20.9%)	77(59.7%)

26. How frequently do you wash your hands with soap and water?	63(48.8%)	47(36.4%)	9(7%)	7(5.4%)	3(2.3%)
27. How frequently do you use needles/syringes used by others?	1(0.8%)	0 (0%)	1(0.8%)	1(0.8%)	125(96.9%)
28. How frequently do you share intravenous drugs?	0 (0%)	0 (0%)	0 (0%)	3(2.3%)	126(97.7%)
29. Do you use razor/shaving blades/toothbrushes used by others?	0 (0%)	0 (0%)	0 (0%)	2(1.6%)	126(97.7%)

Practice of healthcare workers of NILMRC about Hepatitis B vaccination		
Questions for response	**NO**	**YES**
30. Have you ever been vaccinated with Hepatitis B	67(51%)	62(48.1%)
31. If the response is yes for 31, how many doses of hepatitis B vaccine did you get	75(58.1%) Incomplete doses	54(41.9%) Complete doses (3 or>3)
32. Did you perform an antibody titer test after Hepatitis B vaccination	101(78.3%)	28(21.7%)

Table 4: Summation of knowledge, attitude, and practice score distribution **(n=129)**

	Knowledge sum (n = 129)	Attitude sum (n = 129)	Practice sum (n = 129)	Total Score (n= 129)
Mean	82.46	26.87	30.45	139.79
Median	83	27	31	141.00
IQR	63-105	17-35	22-36	113-170

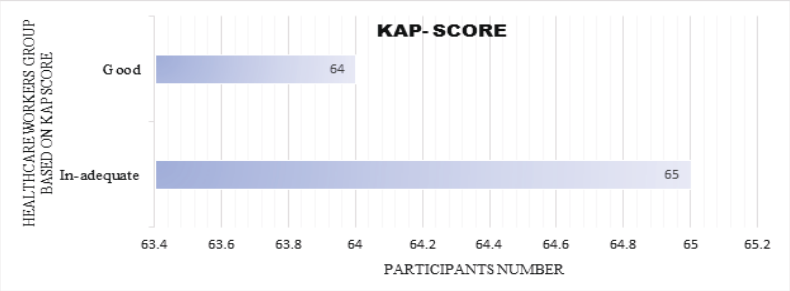

Fig 1: KAP score category among the respondents

Knowledge, Attitude, and Practice (KAP) score classification and correlation with baseline attributes

In Figure 1, it is illustrated that 64 respondents (49.6%) exhibited good KAP scores, surpassing the median score. Among the respondents, the highest number of individuals with adequate knowledge, positive attitudes, and good practices regarding Hepatitis B, Hepatitis C, and HIV infections were doctors.

Table 5 presents the correlation between KAP (Knowledge, Attitude, and Practice) scores and baseline characteristics such as age, gender, occupation, and job duration. The analysis revealed no significant association between gender and KAP scores. However, there were notable associations observed between age, occupation, and job duration with KAP scores. The median KAP score was found to be 141 (as indicated in Table 4).

This suggests that while gender may not influence KAP scores significantly, age, occupation, and job duration play significant roles in shaping individuals' knowledge, attitudes, and practices concerning these infectious diseases.

Table 5. Association of KAP score with baseline characteristics

Variables		KAP score Category		P - Value
		In adequate (<141)	Good (≥141)	
Gender	Male	47	39	.171
	Female	18	25	
Age	20 - 29	49	25	<0.001***
	30 - 39	12	21	
	40 - 49	3	12	
	50 - 59	1	6	
Occupation	Doctor	2	17	<0.001***
	Medical Tech	16	33	
	Lab attendant	5	1	
	Administration	2	1	
	Data Operator	4	6	
	Cleaner	17	3	
	Others	19	1	
Job duration (experience)	<5 years	47	14	<0.001***
	5 - 10 years	13	26	
	11 - 15 years	3	12	
	>15 Years	2	12	

Discussion:

Continuous exposure to Hepatitis B, C, and HIV poses significant risks to health workers. This study aims to enhance understanding of these infections and improve practices in specimen handling. By assessing knowledge, attitudes, and practices among NILMRC employees, the study also evaluates their vaccination status, addressing the need for improved safety and awareness.

The vaccination rate among medical personnel in our study was 48.1%, lower than Afghanistan's 56.3%. However, 41.9% of our participants completed the full HBV vaccination, compared to only 6.77% in the Afghan study[10]. A Nepal study found preclinical students under-vaccinated and poorly informed on Hepatitis B[11]. In Cameroon, only 23.4% of healthcare workers received at least one HBV dose, while in Bangladesh, 47% were vaccinated in Chittagong[12,13].

Among the participants, 111 persons (86%) strongly agree that Hepatitis B, C and HIV infection are caused by viruses. A similar study showed that 92.3% of them were aware that HBV infection is caused by a virus. 81 (62.8%) of our study strongly agrees that HBV infection can cause liver cancer compared to 88.24% in Kabul study[10]. In our study, 76.5% knew HBV, HCV, and HIV could be transmitted from mother to child, 67% through infected blood or fluids, 80.6% through sexual contact, and 66.7% via unsterilized syringes or needles. In comparison, 88.44% of participants in another study knew about mother-to-fetus transmission, with 92.43% aware of transmission via unsterile instruments. In Cameroon, most participants identified sexual intercourse (78.6%), mother-to-child transmission (73.4%), and body fluid contact (81.4%) as HBV transmission routes[12]. In our study, 49.6% strongly disagreed with transmission through coughing or sneezing, and 48.1% disagreed with casual contact like handshakes—lower than the 79.88% correct responses in a Kabul study[10]. In our study, 76 (58.9%) participants strongly agreed and 40 (31%) agreed about the common sign/symptoms about HBV and HCV infection whereas 74 (57.4%) participants strongly agreed and 45 (34.9%) agreed about knowing the s/s of HIV infection.

81 (62.8%) participants strongly agreed and 37 (28.7%) agreed with the opinion that There is an effective vaccine against HBV whereas this percentage was 69.72% in a study among HCWs of Kabul[10]. In our study 43 (68.8%) participants opposed with vaccination against HCV and HIV. Majority of the participants recommend post-exposure prophylaxis for HBV, HCV and HIV. in a similar study, 56.77% participants believe on post exposure prophylaxis of HBV[10]. 29 (22.5%) respondents of our study believe that HBV infection is curable where 82.86% respondents of a similar study believed HBV is curable. Regarding HCV and HIV infection, 25.6% participants are uncertain about the cure rate of HCV infection and 38% believes that HIV infection is not curable. 75 (58.1%) participants think HBV, HCV and HIV are serious public health concern and 71.3% believe that healthy people need HBV vaccination. In the study in Kabul, up to 55.79 % of the participants answered that they felt uncomfortable taking care of HBV-infected patient[10], similarly, 24% of our participants strongly disagree to feel comfortable to live with people with Hepatitis B, C and HIV. Majority strongly agreed that HCWs are at increased risk of getting infected with HBV, HCV and HIV than others but 34.1% disagrees with the idea that occasional contact with blood is risky. Among the participants of our study, only 18.6% screened frequently for HBV. In a similar study, 77.49% had been screened for HBV[10]. Regarding the history of accidental exposure, 42.6% rarely needle pricked and 7% frequently get needle pricked where in another study, 80.07 % of the participants reported needle prick injury in the past[10].

Conclusion:

Healthcare workers showed satisfactory knowledge of HBV, HCV, and HIV, but gaps persist in attitudes and practices, especially regarding vaccination and infection control. Low hepatitis B vaccination coverage remains a major concern. Targeted training, vaccination programs, and continuous monitoring are essential to reduce occupational risks and improve healthcare safety in Bangladesh.

Author's Statements:

Ethical Clearance:

The study got ethical clearance from Ethical Review Board of National institute of laboratory Medicine and referral center, Agargaon, Dhaka. (IRB number: NILMRC/Ethical com/Viro-2023:021)

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Author contribution:
1.Akram A: Overall Supervision, Final Manuscript Review
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5.Pervin M: Questionnaire Validation & Supervising
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7.Rana S: Data entry, Field Coordination & Participant Recruitment

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