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ORIGINAL ARTICLE

BRIDGING THE GAP: EVALUATING HEPATITIS B OCCUPATIONAL RISK PREPAREDNESS AMONG INTERN DOCTOR'S IN A BANGLADESHI MEDICAL COLLEGE

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Abstract:

Background: *The incidence of HBV infection among health care workers is 2-4 times higher than general population and mostly occurred by percutaneous route. Lack of knowledge may lead to adverse professional outcome among healthcare workers in regions where the risk is high. This study was aimed to evaluate the knowledge, awareness and approach of our intern doctors towards occupational exposure of HBV in Bangladesh.* ***Methods:*** *This cross-sectional study was carried out on 100 working intern doctors from different departments of Rangpur medical college hospital, Bangladesh over a period of 06 months from January 2023 to June 2023. Data were collected using a self-structured questionnaire by personal interview.* ***Results:*** *Regarding mode of transmission of HBV, 38% of interns have overall good knowledge about HBV infection, 43% have average and 19 % have poor knowledge about HBV infection. Only 49% of interns know that both oral and injectable treatments are available for HBV infection, 76% knew that HBV has post exposure prophylaxis. In the area of practical measures for occupational safety, only 47% used sterilized instruments in every procedure and 60% of them used gloves in every procedure, 73% of them claimed needle prick or minor cut injury during their work,but only 44% took necessary measures. Only 17 interns took yearly Anti HBs titer check and 44% have full family vaccination coverage.* ***Conclusion:*** *The study highlights the need for better health education on safety measures to prevent infections in healthcare workers. Inadequate knowledge has led to negative attitudes towards HBV patients, impacting patient care.*

Keywords: *Hepatitis B Virus, Intern Doctors, Occupational Risk, Knowledge and Practice.*

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Introduction:

Hepatitis B virus (HBV) infection is a major concerning disease throughout the world and approximately 400 million people are infected with HBV at present.[1] The prevalence of HBV markedly varies among different parts of world. About 60% of world population resides in highly endemic regions like Southeast Asia, China and Africa, of which 8% or more people are HBV infected.[1] Bangladesh is an intermediate endemic area having 5.4% HBV prevalence.[2] HBV is 50-100 times

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more infectious than HIV and 10 times than HCV.[1] Horizontal and perinatal transmissions are the main mode of transmission in majority of HBV cases. Other important routes are sexual contact, injectable drug abuse, blood and blood products. However occupational exposures in health care workers (HCWs) are also a major concern especially in countries where HBV infection is high. The incidence of HBV infection among health care workers is 2-4 times higher than general population and mostly occurred by percutaneous route. Globally annual HBV infection rate among HCW's is 5.9% on the other hand, in Bangladesh this figure is 8% found in a recent study.[3,4] Knowledge of HBV as well as awareness among HCW's is very important in prevention of occupational exposure of this virus. Only standard infection control practice can prevent the hospital spread of HBV. Soundknowledge creates awareness, which ultimately lead to appropriate practical approach. Lack of knowledge may lead to poor professional safety among healthcare workers in developing regions that increase the risk.[5,6] In Bangladesh, no study performed till date about knowledge and attitude of HBV infection among HCW's particularly young interns, as they are very prone to exposure in multidisciplinary tertiary care hospital. So, this study was aimed to evaluate the knowledge, awareness and approach of intern doctors towards occupational exposure of HBV in Bangladesh.

Methods:

This cross-sectional study was carried out on 100 intern doctors from different departments of Rangpur medical college hospital, Bangladesh over a period of 06 months from January 2023 to June 2023. All participants were asked permission before taking the interview with an informed written consent form. Data were collected using a self-structured questionnaire by personal interview, which was adapted from few previous studies.[7,8] The reliability of the questionnaire was tested over 20 interns and they all can understand all questions. The questionnaire contains 03 parts and a total of 33 items. First part covers sociodemographic characteristics and personal status of HBV infection; second part contains 18 questions regarding knowledge such as transmission, investigation and treatment of HBV infection; and third part contains 09 question regarding their approach towards prevention of occupational exposure of HBV. Each variable from questions regarding knowledge was given 1 for yes and zero for no. Thereliability of the questionnaire was tested by Cronbach'sAlpha at acceptable level > 0.7.The Cronbach's Alpha of the16 variable was 0.8. Quartile range was used to identify thecutoff points for knowledge levels. The scores of knowledge above 75% (≥14) was nominated as good knowledge,the scores between the inter-quartile, 50%-75% (14-10) wasnominated as average, and the scores below 50% (≤10) was nominated as poor knowledge.[7] Statistical analyses were carried out by using the Statistical Program and Service Solution (SPSS) version 25.0 for Windows. Continuous variables expressed as mean & standard deviation and categorical variables as frequencies and percentages. Association between variable were described as high (>60%), moderate (50-60%), low(30-50%) and very low (<30%).Testing factors related to knowledge was carried by Chi-Square test at 95% confidence level and P-value less than0.05 was considered as significant. Ethical permission was taken from Institutional Review Board of Rangpur Medical College.

Results:

Demographic profiles of the intern doctors showed that, 55 were male and rest 45 were female doctors. 30% of the intern doctors have not yet performed their screening test for HBV infection, whereas (70%) are screened. Of these 100 doctors, 19 are not vaccinated yet, though 55 are fully vaccinated, rests of 9 were on current vaccination (Table-I).

Table I

Demographic and personal profile of Intern doctors: (n=100)

Profiles	Percentage (%)
Gender	
Male	55.0
Female	45.0
Department	
Surgery	24.0
Gynaecology	24.0
Medicine	37.0
Paediatrics	13.0
Dentistry	2.0
HBV screening status	
Done	70.0
Not done	30.0
Vaccination status	
Never received	19.0
Full dose	55.0
Incomplete dose	17.0
On schedule	9.0
Needle prick/cut injury during work	
Yes	73.0
No	27.0

Regarding mode of transmission of HBV, most of the intern doctors correctly answered that HBV can be transmitted by blood and blood products (100%), needle injury (91%), contact with open wounds(86%), sexual contact (96%) and during delivery of fetus (84%). However, only 46 % knew that HBV can be transmitted by breast feeding (Table-II).

Table II

Knowledge and practices regarding occupational exposure of HBV infection :(n=100)

Knowledge Domains :

A. Mode of Transmission*:

Questions	Correct answers (%)	Wrong answers (%)
Blood and blood products	100	0
Sharing plate, glass, bed, hand shaking	68	68
Sexual contact	96	04
Contact with an open wound	86	14
Needle injury	91	09
Infected mother to child during delivery	84	16
During breast feeding	46	54
Feco oral route	75	75

B. Prevention of Transmission*:

Questions	Correct answers (%)	Wrong answers (%)
HBV screening	91	9.0
Effective vaccination	92	8.0
Safe sex	86	14.0
Provision of safe drinking water	73	73.0
Safe disposal of human excreta	78	78.0
Wearing gloves during work	83	17.0

C. Investigation of HBV:

Questions	Correct answers (%)	Wrong answers (%)
Preferable screening test		
HBsAg		60.0
Anti HBc total		11.0
Both	29	29.0
Effective vaccination status test		
Anti HBS	64	64.0
Anti HBc		24.0
Anti HBe		12.0

D. Treatment of HBV:

Questions	Correctanswers (%)	Wrong answers (%)
Available treatment		
Only oral		37.0
Only injection		14.0
Both	49	49.0
HBV has post exposure prophylaxis		
Yes	76	76.0
No		24.0

Practice regarding prevention of occupational transmission of HBV:

Questions	Safe practice (%)	Unsafe practice (%)
Wear aprons in work places	91	09
Wear gloves in every procedures	60	40
Use of sterilized instruments in every procedures	47	53
Take necessary actions after accidental needle/ cut injury	44	56
Use mask or eye glass during procedures	32	68
Confident in treating/dealing HBV positive patients	36	64
Give health education to all HBV patients you treat	41	59
Yearly screening of HBV	17	83
Your family is vaccinated	44	56

*Multiple answers

Only 49% of interns know that both oral and injectable treatments are available for HBV infection. However, 76% knew that HBV has post exposure prophylaxis. (Table-II).

Thus, 38% of interns have overall good knowledge about HBV infection, 43% have average and 19 % have poor knowledge about HBV infection. (Figure-1).

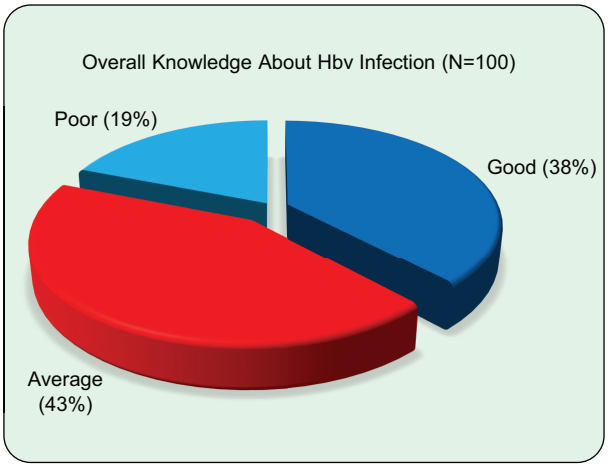

Fig.-1: *Overall knowledge about HBV infection (n=100)*

Majority of the inters were aware that, vaccine is safe and effective (96%), prevention & control is the mainstay of HBV infection (93%) and all healthcare workers should be vaccinated (98%), but 32% of doctors were not aware of risk of HBV infection (32%) (Figure-2).

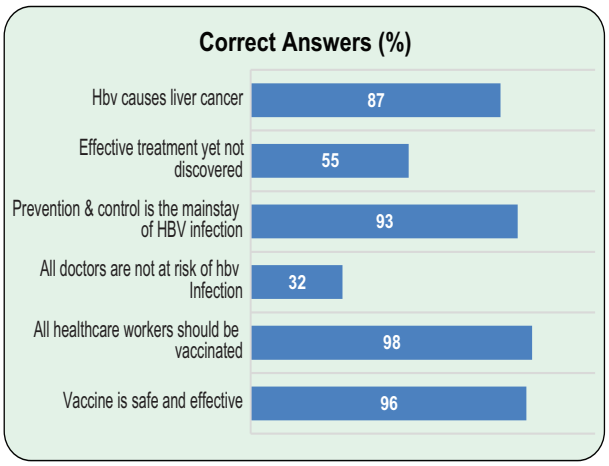

Fig.-2: *Awareness about occupational risk of HBV infection (n=100)*

During the interview 73 % of them claimed needle prick or minor cut injury during their work, while only 44% of interns took necessary measures after accident. Only 17 interns took yearly Anti HBs titer check and 44% have full family vaccination coverage (Table-II).

We have analyzed some key associations between demographic profiles and knowledge/practice among intern doctors in our study which were described in Table-III.

Table III

Associations between Demographic Characteristics and Knowledge and Practices among Intern doctors:

- Departmental Associations with Risk Exposure & Practices

(*Inferred from overall injury rate (73%) and procedural risk levels)

Department	Needle Injury Rate	Post-Injury Action Rate	Sterilized Instrument Use	Confidence in Treating HBV+
Surgery (24%)	High (Likely >80%)*	Low (<40%)	Low (Likely <45%)*	Low (<40%)
Gynaecology (24%)	High (Likely >80%)*	Low (<40%)	Low (Likely <45%)*	Low (<40%)
Medicine (37%)	Moderate (~70%)	Moderate (~50%)	Moderate (~50%)	Moderate (~50%)
Paediatrics (13%)	Lower (<60%)*	Higher (>60%)*	Higher (>60%)*	Higher (>60%)*
Dentistry (2%)	Variable*	Variable*	Variable*	Variable*

- Vaccination Status & Preventive Practices (*Inferred from aggregate practice patterns)

Vaccination Status	Yearly Screening	Family Vaccination	Post-Exposure Action	Risk Perception
Never (19%)	Very low (<10%)	Very low (<30%)	Very low (<30%)	High neglect
Incomplete (17%)	Low (<15%)	Low (<40%)	Low (<40%)	Moderate neglect
Full (55%)	Low (20-25%)*	Moderate (50-60%)*	Moderate (50-60%)*	Complacent
On schedule (9%)	Higher (>30%)*	Higher (>60%)*	Higher (>60%)*	Alert

Table III (Con'td)

• Knowledge Gaps vs. Critical Practices

Knowledge Deficiency	Affected Practice	High-Risk Groups
Breastfeeding transmission (54%)	Patient education (59% unsafe)	Non-medicine departments
Sanitation myths (73-78%)	PPE negligence (gloves: 40% unsafe)	All departments
PEP awareness gap (24%)	Post-injury inaction (56% unsafe)	Surgery/Gynaecology interns
Treatment options (51% incorrect)	Low confidence (64% unconfident)	Unvaccinated/incomplete interns

• Gender & Protective Practices(*Inferred from overall rates and typical behavioral patterns in medical literature)

Gender	Consistent Glove Use	Family Vaccination	Post-Exposure Action	PPE Compliance Trend
Male (55%)	Lower (<55%)*	Lower (<40%)*	Lower (<40%)*	Higher risk-taking
Female (45%)	Higher (>65%)*	Higher (>50%)*	Higher (>50%)*	Higher caution

Discussion:

Medical professionals are working in an area which can be compared with an active volcano filled with HBV, HCV and many other life-threatening germs. Intern doctors are the most vulnerable candidate for occupational exposure to this germ world, before their entry into the future world. By this study, we can measure the level of knowledge and preventive practice towards occupation exposure to HBV of our upcoming doctors. As Rangpur Medical College is one of the largest medical colleges in Bangladesh, this study may be the representative picture for the rest of the country. In this study, it was found that 64% of the interns are vaccinated, which is quite similar with a study in Saudi Arabia (KSA) where 69.5% had received HBV vaccine,[9] but quite higher than another study in Bangladesh (40.7%).[10] Regarding knowledge of HBV vaccines, 81% of students knew that carriers could transmit infection (89.5% of them said that it could not be spread by casual contact, 80% said it could be spread by contact with open wound, 96.5% knew it could be transmitted by contaminated blood and body fluids, 92.5% knew that HBV could be transmitted by unsterilized syringe, needle or surgical instruments and 79.5% said it could be transmitted by unsafe sex). The findings were in accordance with a previous study from Cameroon, which reported that its participants had a good knowledge of the study on HBV infection.[11]Our results indicate that levels of knowledge among medical students are not proportionate with acceptable levels of compliance with the vaccination. Few studies among Arab medical students showed lower HBV awareness in countries such as Syria[12] and Iran [13]. Our study found that most of the intern doctors lacked important information about cross infection control methods. It was found that, only 68% recognized that HBV is transmitted by sharing plate, glass, bed, hand shaking and less than half 46% recognized that HBV could be transferred during delivery of fetus However 84 % knew that HBV can be transmitted by breast feeding and only 46% knew about breast feeding transmission. Our study agrees with those internationally that have identified limitations in knowledge among al HCWs about HBV toward the occupational risk of the disease.[14-17]For these specific modes of transmission (for example, saliva, maternofetal, breast milk) there were a confusions and misconceptions among the survey doctors. Only 29 % of interns correctly answered that, both HBsAg and Anti HBc (total) is the preferable screening test and 60 % preferred HBsAg as screening test. 64% interns exactly answered for Anti HBS as a test to see the effective vaccination status. Only 49% of interns know that both oral and injectable treatments are available for HBV infection. However, 76% knew that HBV has post exposure prophylaxis. In a study on medical students in KSA found that, 86.5% of students knew that vaccine could prevent HBV infection and 64% knew HBV had post exposure prophylaxis and only 55% knew that it could be cured.[8] While findings regarding attitudes towards HBV, it was found only 36% of the respondents surveyed were willing to continue care for HBsAg positive patients, which in far low than a study in KSA (70.7%).[8]During the interview 73 % of them claimed for needle prick or minor cut injury during their work, while only 44% intern took necessary measures after accident. However, a study in Sudan found, more than 60% of the HCWs do nothing for suspicious of being infected with HBV, 24.4% consider local dressing and 15% believe in self-testing when being suspicious.[7] In another study among medical students; about 22% had a needle prick injury but 68% would report that injury.[8] Regarding use of the barrier techniques such as gloves, facemasks or protective eye glasses provides

additional barriers against HBV transmission.[14] In the area of safe practical approaches, only 47% interns' use sterilized instruments in every procedure, use of gloves in every procedure(60%), use of protective eye glasses (only 32%). We found some similarity with these findings in one study in KSA. In their study, only 34.1% reported of always using double gloves, 46.3% reported of wearing eyeglasses and 85.4% reported of using facemasks among dentists.[18] Thisstudy reveals that, while interns have good foundational knowledge, departmental risks, complacency in vaccinated individuals, and myths about non-vector transmissions critically impact practices. Structural interventions are essential to bridge these gaps.

Conclusion:

Physicians must have proper knowledge, interest, and skills to ensure safety from occupational hazards. It is crucial for medical and dental students to be vaccinated against HBV before treating patients. The study highlights the need for better health education on safety measures to prevent infections in healthcare workers.

Recommendations:

Inadequate knowledge has led to negative attitudes towards HBV patients, impacting patient care. Changes in the medical college curriculum in Bangladesh are necessary, with a focus on early education and regular seminars to update knowledge on HBV prevention.

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Conflict of Interest:

No author has any conflict of interest to disclose for this manuscript. The authors themselves are responsible for their ideas and views expressed in this article, which do not necessarily represent the views, decisions or policies of the institutions with which they are affiliated.

Ethical Approval:

The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). This study was approved by the Institutional Review Board of the Rangpur Medical College. Written informed consent was taken from all the patients before taking part of the study.

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