

Factors Associated with Hepatitis B Virus (HBV) Infection among The University students in Dhaka, Bangladesh

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ABSTRACT

Background and Objectives: University students are the major blood donors in Dhaka city. There is no HBV immunization policy for university students in Bangladesh, and the virus can be transmitted during blood transfusion if blood is not adequately screened. This study was conducted to determine the prevalence of HBV infection, vaccination status of HBV, and to determine risk factors for HBV infection among University students in Bangladesh.

Methods: The cross-sectional study was conducted among 614 randomly selected students of four Universities in Dhaka from July 2018 to November 2018 on behalf of Thalassemia hospital and Institute, a project of IACIB during the screening of Thalassemia carriers among the students. Student's demographic information was collected by using a questionnaire. Blood samples were collected to screen HBsAg along with Thalassemia carriers. SPSS version 20 was used for data analysis.

Results: During the study we found 5% HBV infection and 19.2% vaccination coverage for HBV. HBV infection was higher (8.9%) among graduate students ($p=0.031$), 22.5% among married students ($p=0.001$). Students having an HBV vaccine, not having sexual contact, and not having a history of surgery were less likely to have HBV infection with odds ratios (95% CI) of 9.396 (1.038-85.022), 48.268 (13.511-172.436) and 14.407 (3.863-53.732) respectively.

Conclusion: Absence of HBV vaccination, unsafe sexual contact and history of previous surgery are the major cause of HBV infection among university students. Students should be aware of HBV infection, and appropriate screening, as well as vaccination programs, should be launched in the universities of Bangladesh.

Keywords

HBV, Infection, Risk factor, Students, University, Vaccination.

Introduction

Hepatitis B Virus (HBV) is a significant challenge to health worldwide. It is responsible for the potential life-treating disease Hepatitis B infection. HBV attacks the liver and can result in acute and chronic infection, cirrhosis of the liver, and primary liver cancer. The virus is mainly spread by per cutaneous or mucosal exposure to the blood or other body fluids of an infected person

through various forms of human transmission [1]. An estimated 257 million people are living with hepatitis B virus infection (HBsAg positive). In 2015, approximately 887,000 people died due to hepatitis B, mostly from the complications of cirrhosis and hepato cellular carcinoma [2]. Hepatitis B and Hepatitis C are responsible for 96% of all hepatitis mortality, in which 47% accounted for resulting from Hepatitis B [3,4]. In 2010 about 248 million individuals were HBsAg positive, and in 2013 HBsAg prevalence was 3.61 % (95% CI 3.61–3.61) in the globe. In the WHO Southeast Asian Region, about 34,000,099 people are HBsAg

positive, and HBsAg sero prevalence was 1.90 % (1.90–1.90).

In Bangladesh, HBsAg sero prevalence is 3.10% (2.99-3.21), and about 4,678,624 people are HBsAg-positive [5]. Liver diseases related to Viral Infection are one of the major causes of morbidity in Bangladesh, and a large proportion of acute hepatitis, chronic liver disease, hepato cellular carcinoma, and post-transfusion hepatitis cases could be attributed to HBV infections [6]. Early detection is essential to minimize the risk and impact of viral liver diseases. Several diagnostic tests could be used to detect the existence of HBV in the blood.

While the hepatitis B core antigen (anti-HBc) is a significant biomarker in the detection of HBV infection, HBsAg is the most reliable biological biomarker of HBV [7]. Most of the previous studies in Bangladesh have used HBsAg as the biomarker of HBV [8-11]. Whereas different studies have been conducted among the known major high-risk groups to find out the prevalence of the HBV infection in Bangladesh, the prevalence of HBV infection in the university students has received little attention [9-20]. The study was conducted to determine the prevalence of HBV infection, to identify the prevalence of vaccination of HBV as well as to determine possible risk factors for HBV infection among the university students in Bangladesh.

Material & Methods

The descriptive cross-sectional study was conducted among the students of Jahangirnagar University, Daffodils International University, City University, and Manarat International University in Dhaka from July 2018 to November 2018. A total of 614 students coming from different divisions of Bangladesh were selected randomly. Information on personal status and some demographic variables was collected using a closed-end questionnaire through approximately 10 minutes of face-to-face interviews with participants.

After proper aseptic measures, blood samples were collected from the middle cubital vein by skilled nurses and then collect it to EDTA tube on the spot. Blood samples were then transported to the laboratory of Thalassemia Hospital and Institute, Savar, Dhaka. The blood samples distinctively were marked to avoid mistakes and biases. Data on the respondents were given the same credential's number as of their blood samples to minimize errors. At room temperature, the test tubes with blood samples were centrifuged at 3,000 rotations per minute for 8-10 minutes, and blood plasma was collected.

Plasma samples were screened by a commercial test kit (chromatographic immunoassay), HBsAg Rapid Test-cassette (CTK, biotech, Inc. USA) for the presence of HBsAg. When any test result was found as positive, the test was repeated once for the confirmation. The test was performed by medical technologists and confirmed by physicians. Positive cases were then confirmed by the ELISA test. SPSS version 20 was used for data analysis. Written informed consent was obtained from the participants after describing the rationale and aims of the study and informing that

they had the ability to withdraw from participation voluntarily. Privacy and confidentiality were maintained during the process. The local ethical committee approved the research protocol of the Institute of Allergy and Clinical Immunology of Bangladesh (IACIB).

Results

Socio-demographics

The socio-demographic and educational background of university students is shown in table 1. A total of 614 students were screened for hepatitis B infection, where 34.5% of the students were in the age group 21 years to 22 years of age. The majority (79.8%) of the students were undergraduate students. Among them, 66.9% were male, and the rest of them were female students. 93.5 % of students were unmarried. Besides the majority of the students were from the central region of Bangladesh.

Table 1: Socio-demographic and educational background of the students.

Characteristics		Number (n=614)	Percentage
Age (years)	19-20	97	15.8
	21-22	212	34.5
	23-24	200	32.6
	>24	105	17.1
Level of study	Graduate	124	20.2
	Undergraduate	490	79.8
Sex	Male	411	66.9
	Female	203	33.1
Marital Status	Married	40	6.5
	Unmarried	574	93.5
Division	Barishal	35	5.7
	Chattagram	58	9.4
	Dhaka	241	39.3
	Khulna	75	12.2
	Mymensingh	47	7.7
	Rajshahi	76	12.4
	Rangpur	65	10.6
	Sylhet	17	2.8

Hepatitis B virus infection and vaccination status of university students.

Of the 614 students tested, 31 were positive for hepatitis B infection (positive HBsAg), giving an overall prevalence rate of 5% (Table 2). The study stated that 80.8% of the students did not immunize against HBV, and 19.2% of students were immunized.

Table 2: HBV infection and immunization status of university students.

Infection and vaccination status		Frequency	Percentage
Hepatitis infection	Yes	31	5.0
	No	583	95.0
Hepatitis vaccination status	Yes	118	19.2
	No	496	80.8

Risk factor for HBV infection among university students in Bangladesh.

The study found a significant association between hepatitis B infection, vaccination status, having unsafe sexual relations, and a history of blood surgery (Table 3). Students who immunized against HBV were 9.396 times less likely to have HBV infection than those who did not immunize ($p=0.046$). The study revealed that the students who had no sexual relation 48.268 times lower chance to have HBV infection than the students who had sexual relation ($P: 0.001$).

Table 3: Risk factors determination for HBV infection.

Factors	Unadjusted OR	CI (95%)		P-value	Adjusted OR	CI (95%)		P-value	
		Lower	Upper			Lower	Upper		
	Undergraduate								
	Graduate	2.288	1.066	4.910	0.034	1.083	0.375	3.125	0.883
Marital Status	Married								
	Unmarried	7.284	3.096	17.141	0.000	0.329	0.083	1.309	0.115
Vaccination Status of HBV	Yes	7.532	1.017	55.803	0.048	9.396	1.038	85.022	0.046
	No								
Having a sexual relation	Yes								
	No	18.994	8.604	41.929	0.000	48.268	13.511	172.436	0.000
History of blood transfusion	Yes								
	No	23.080	6.949	76.654	0.000	6.136	0.978	38.511	0.053
History of surgery	Yes								
	No	15.491	6.114	39.249	0.000	14.407	3.863	53.732	0.000

Discussion

The study was conducted to determine the prevalence of HBV infection, vaccination status, and the causes of HBV infection among university students in Bangladesh. University students have been selected because many students donate blood voluntarily to the patients and HBV transmit during blood transfusion. Though the Enzyme-Linked Immunosorbent Assay (ELISA) and Nucleic Acid Testing methods are more reliable methods for detection of HBV infection worldwide, for mass scale screening rapid screening test (ICT) is the cost-effective and right choice especially in developing countries. In our study, overall HBsAg prevalence was 5.0%, whereas similar findings (4.3%) was found among the students of Jagannath University, Dhaka [14]. The findings of our study are supported by Ashraf et al., 2010, where the prevalence rate of HBsAg was 6.5% [12]. It is a matter of concern that the HBsAg positive rate is increasing among the young generation in Bangladesh. Findings of our study agree with the previous study carried out in Dhaka where HBsAg was found positive 4.4% among the non-inject able drug users (non-IDUs) and 6.2% among the inject able drug users (IDUs) [21]. Both our study and the study of Pandeya, 2013 in Nepal, found that hepatitis B infection was more prevalent among males [22]. One possible explanation could be the high exposures of the risk factor of the male as female are more occupied with their household workers.

Although the study was conducted among the educated population of Bangladesh, they are not aware of HBV, and only 19.2% of students were previously vaccinated for HBV. In our study, the immunization rate is higher than the immunization rate of 12.3%, found from the study of Islam M.M. et al., 2016 [14]. This

Finally, the study also found that the students who did not have performed surgery were 14.407 times less likely to have HBV infection ($P:0.001$).

The study determines that the absence of immunization for HBV, having unsafe sexual relations, and the history of previous surgery is the cause of HBV infection among the university students of Bangladesh.

cross-sectional study could not be finding out the route of HBV transmission among the university student, besides other factors may influence the findings of the study. Despite some limitations, the findings of the study are very alarming. It indicates that it is the right time to take the hepatitis B vaccination program among university students as well as the general population. Creating awareness is also necessary as sex education, instruction on using condom correctly and make sure to visit a medical institution that can relieve.

Conclusion

Lack of immunization for HBV, unprotected sexual contact and previous surgery are the causes of HBV infection among university students in Bangladesh. Increasing awareness and proper vaccination are possible solution to prevent further HBV infection among university students in Bangladesh. Mechanisms for implementation and follow up of infection control among university students need to be strengthened. Though HBV vaccination has been incorporated in the EPI schedule, students should be screened for HBV and vaccinated (who previously were not vaccinated) at the time of the first enrolment in the university.

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