

Study on HBsAg Reactivity on Students of a Residential University

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ABSTRACT: Hepatitis B Virus is a significant cause of morbidity and mortality not only in Bangladesh but also globally. This cross-sectional type of descriptive study was undertaken to find out the occurrence of HBsAg reactivity among the residential university students. It was conducted among 96 residential students at Dhaka University from 1st December 2009 to 16th April 2010. A self-responding questionnaire (SRQ) was used to collect data by convenient sampling. The blood samples were taken by the volunteers and the author herself and then tested by Latex quick test and then the reactive results were rechecked with ELISA. The findings were analyzed in relation to HBsAg reactivity and its risk factors like gender, duration of hostel staying, frequency of needle prick in last year, history of previous jaundice, EPI coverage in study population and characteristics of HBsAg positive subjects. In this study the occurrence of HBsAg was found to be 3.13%. Among 96 respondents, 93 respondents (96.87%) were negative, and 3 respondents were reactive for HBsAg. Two positive respondents were found among 68 respondents who were under EPI coverage. Regarding the history of needle prick in last year, out of 3 positive subjects only 2 had a history of needle prick reported to use disposable syringe. None had a history of jaundice among the positive subjects. In this study no relationship was found with duration of hostel staying or other risk factors after statistical analysis. Hepatitis B continues to be a global public health problem despite efforts to eliminate this chronic viral disease through education, screening, and vaccination programs.

Keywords: HBsAg Reactivity, University Students, Hepatitis.

Article at a glance:

Study Purpose: The study aims to determine the prevalence of HBsAg reactivity among residential university students and its associated risk factors.

Key findings: The occurrence of HBsAg reactivity was found to be 3.13% among the 96 participants, with certain risk factors explored.

Newer findings: The study highlights the low prevalence of HBsAg among university students and the lack of significant correlation with various risk factors.

Abbreviations: HBV: Hepatitis B Virus, HBsAg: Hepatitis B Surface Antigen, EPI: Expanded Program on Immunization

INTRODUCTION

Hepatitis B is one of the major diseases of mankind, estimated to cause about 800000 deaths per year mostly from its complications of liver cancer and cirrhosis. In 2010 and 2014, resolutions of World Health Assembly (WHA) acknowledged at the political level that viral hepatitis was a global health

problem, ranking HBV as the 15th cause of death among all causes of global mortality.¹ Residential university students are always in a great risk of various diseases and HBV is one of these health problems globally. The incidence of HBV carriers is increasing day by day in our country. As the

voluntary donors are mostly from the residential university students, it is necessary to determine the occurrence of HBsAg reactivity among them. If the rate of occurrence is determined it would be easier to exclude the healthy carriers of HBV from the potential voluntary blood donors. Hepatitis B is a disease caused by Hepatitis B virus (HBV) which infects the liver of hominoids including humans and causes an inflammation there called hepatitis. Originally known as "serum hepatitis", the disease has caused epidemics in parts of Asia and Africa and it is endemic in China.^{2,3} An estimated 254 million people are living with hepatitis B and 6000 people are newly infected with viral hepatitis each day.⁴ This term 'healthy carrier' is a misleading term as they are always at high risk to develop the disease.⁵ HBV is a blood borne pathogen, transmitted by per-cutaneous or per-mucosal (e.g. sexual) exposure to infectious blood or body fluid (e.g. Semen, saliva etc). HBV circulates high titres in blood and lower titres in other body fluids (e.g. semen, vaginal fluid or saliva) and is approximately 100 times more infectious than HIV and 10 times more infectious than HCV.⁶

The hepatitis B surface antigen (HBsAg) is most frequently used to screen for the presence of this infection.⁷ It is the first serological marker to appear in a new acute infection which can be detected as early as 1 week and as late as 9 weeks (range 6-60 days) with an average of 1 month after exposure to HBV.⁸ It is the first detectable viral antigen to appear during infection. However, early in an infection, this antigen may not be present, and it may be undetectable later in the infection as it is being cleared by the host. The infectious virion contains an inner "core particle" enclosing viral genome. The icosahedra core particle is made of 180 or 240 copies of core protein, alternatively known as hepatitis B core antigen, or (HBcAg). During this 'window' in which the host remains infected but is successfully clearing the virus, IgM antibodies to the hepatitis B core antigen (Anti HBc IgM) is the only serological evidence of the disease.⁹ Hepatitis B continues to be a global public health problem despite efforts to eliminate this chronic viral disease through education, screening and vaccination programs. It was once estimated that 400 million people world-wide had chronic hepatitis B virus (HBV) infection with annual death of 1 million people among them.¹⁰ The prevalence varies widely ranging from 0.1% to 20% in different parts of the world.¹¹ While 'High' prevalence (hepatitis B surface

antigen [HBsAg] positivity rate more than 8%) regions (where the viral infection is highly endemic) include the Far East, parts of the Middle East and sub-Saharan Africa, and 'Low' prevalence (<2% HBsAg positive) regions include the United States, Northern Europe and Australia, 'Intermediate' frequency (2% to 7% HBsAg positive) is reported, among others like Japan, South Asia and parts of central Asia.¹²

Bangladesh is a densely populated country with about 150 million people where HBsAg positivity in the healthy adult population is 7.2%-7.5%.^{13, 14} In Bangladesh, most HBV infections occur in childhood as suggested by the high rate of interfamilial HBV infection, history of low rate of acute hepatitis and large number of younger populations being affected.¹⁵ But university students are more vulnerable to be affected due greater chance of exposure. They are also very prominent among the various groups of voluntary blood donors. The new Centre for Disease Control and prevention (CDC) recommended screening of HBV people of 18 years and above at least once in lifetime.¹⁶ This is why this study has been designed. The aim of this study was to determine the occurrence of seropositivity of HBsAg among the residential university students and characteristics of positive subjects, whether it had any relationship with duration of hostel staying, frequency of needle prick in the last year, EPI status and previous history of jaundice.

MATERIALS AND METHODS

It was a cross-sectional type of descriptive study carried out in the Transfusion Medicine department of Bangladesh Medical University (BMU). It was carried out in 2 hostels of Dhaka University among 50 male and 46 female residential students from 1st December 2009 to 16th April 2010. Convenient sampling was done. Blood samples were collected by the volunteers and the author herself. A self-responding questionnaire (SRQ) assisted by volunteers and the author was used as a research instrument. All the blood samples were screened HBsAg - by Latex quick test at the Transfusion Medicine department and all reactive samples were rechecked with ELISA at the Virology department of BMU.

As per specific objectives and key variables, the analysis of the data was done by SPSS 17 version.

RESULTS

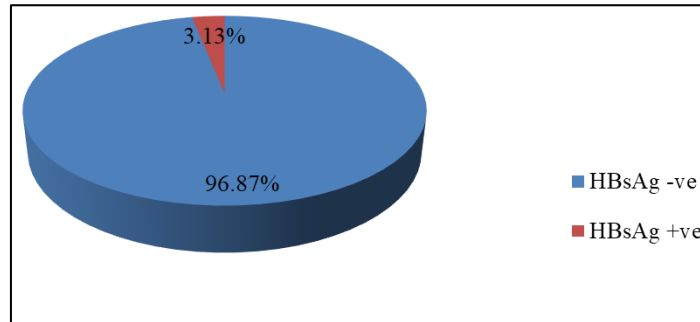


Figure 1: Pie diagram of respondents by HBsAg status

Table 1: Characteristics of HBsAg positive subjects

Variables	Frequency
Age	2
17-20 years	1
21-24 years	1
Sex	
Male	2
Female	1
Duration of hostel stay	
<1 yrs	2
1-3 yrs	1
History of needle prick last year	
One	2
Never	1
History of shaving patterns	
Shared blade	1
Not shared blade	1
N/A	1
History of Jaundice	
Yes	0
No	3
EPI coverage	
Yes	2
No	1

Table 2: Distribution of respondents by gender

Age in years	Male	Female	Total
17-20	36 (54.54%)	30 (45.46%)	66 (100%)
21-24	14 (46.67%)	16 (53.33%)	30 (100%)
Total	50 (52.08%)	46 (47.92%)	96 (100%)

Table 3: Distribution of respondents by EPI coverage and HBsAg status

EPI status in childhood	HBsAg status of the respondents		Total
	Positive	Negative	
Yes	2 (2.9%)	66 (97.06%)	68 (100%)
No	1 (3.7%)	26 (96.3%)	27 (100%)
Not known	0 (0%)	1 (100%)	1 (100%)
Total	3 (3.1%)	93 (96.87%)	96 (100%)

$\chi^2 = 0.07$, $df=2$, p value >0.05 . The result was statistically not significant.

Table 4: Distribution of the respondents by history of previous jaundice and HBsAg status

History of previous jaundice	HBsAg status of the respondents		Total
	Positive	Negative	
Yes	0 (0%)	25 (100%)	25 (100%)
No	3 (4.23%)	68 (95.77%)	71 (100%)
Total	3 (3.13%)	93 (96.87%)	96 (100%)

$\chi^2 = 1.09$, $df=1$, p value >0.05 . The result was statistically not significant.

In this study, it was found that 2 respondents (2.08%) were positive in the 17-20 years aged group and the rest one (1.04%) belonged to the 21-24 years group out of a total of 96 respondents. In case of gender distribution among the 3 positive respondents 2 were male and 1 was female. 2 positive respondents stayed in the hostel less than 1 year while 1 respondent stayed in the hostel for 1-3 years. In case of history of needle prick, 2 positive respondents had a single needle prick last year among 3 positive respondents. In case of history of shaving pattern

among the male positive respondents 1 used shared blade. Regarding the history of jaundice none of the 3 positive respondents had any history of jaundice. Two respondents were under EPI coverage and the rest of the one was not. In the context of maintaining personal hygiene 1 positive respondent maintained good personal hygiene and the rest 2 maintained average personal hygiene. In case of socio-economic conditions, all 3 positive respondents belonged to the middle class (Table 1).

Among the respondents 36 were male and 30 were female in 17-20 yrs age group while 14 were male and 16 were female in 21-24 yrs age group (Table II). EPI coverage of the respondents revealed that 68 were under EPI coverage and among them 2 were found HBsAg positive. On the contrary 27 were not under EPI coverage and from this group 1 was found HBsAg positive and the rest one respondent did not mention any answer (Table 3). Respondents having previous history of jaundice did not show any positive result but 3 of them having no previous history showed positive result (Table 4).

DISCUSSION

This study was conducted among 96 residential students at Dhaka University. The objective of the study was to determine the occurrence of HBsAg and to observe whether there is any

relationship of the occurrence that co-relates with EPI coverage in childhood, maintenance of personal hygiene and shaving pattern of the respondent. In this study, the occurrence of HBsAg was found to be 3.13% ($n=96$), which is in intermediate range where 93 subjects (96.87%) were negative, and 3 subjects were positive for HBsAg. Out of 3 positive subjects 2 were male.¹⁷ A similar study was conducted by Laskar MS, Harada N, Khan F where they found HBsAg prevalence 2.3% among school students.¹⁸ From Department of Hygiene, Yamaguchi university school of medicine, Ube, Japan carried research on prevalence of Hepatitis B surface antigen (HBsAg) in Viqarunnessa Noon Girls' school, Dhaka in 1995. The study investigated the prevalence of Hepatitis B surface antigen (HBsAg) in 836 students 6-15 years of age attending the Viqarunnessa Noon Girls' School in Dhaka. All children were of high socioeconomic status and apparently healthy at the time of serum

collection. The HBsAg prevalence was 2.3% (19 cases) by the Latex quick test but failed to confirm 7 cases (0.8%), when positive samples were rechecked by enzyme-linked Immunosorbant assay. That was the first study to explore HBsAg prevalence among school-age children in Bangladesh.

In terms of EPI coverage, 68 were under EPI coverage of which 2 were positive for HBsAg while 27 were not under EPI coverage and among them 1 was positive. The result is not significant as Bangladesh introduced HB vaccine in EPI program from 2005[17] Which did not include respondents age respectively. Mahmud S. et al conducted a study in Dhaka Shishu (Children) Hospital, Dhaka, Bangladesh on 120 cases of EPI vaccinated children enrolled from January-December 2019 while attending the inpatient department without any liver problem. The development of Anti-HBs titre greater than or equal to 10 mIU/mL is considered as protective immunity and any titre less than 10 mIU/mL as non-protective following HBV vaccination Bangladesh introduced hepatitis B vaccination in children through Expanded Program on Immunization (EPI).¹⁹

Among the respondents 25 had a previous history of jaundice, all of them found negative and 3 positive subjects found in 71 subjects who had no previous history of jaundice. Krishnamurthy et al, observed that 73% of the cases of chronic hepatitis are HBsAg positive.²⁰ In another study by Acharay et al found 50% patients of chronic hepatitis were HBsAg positive.²¹ All the studies were done in adult patients with advance liver disease, this may be the cause of the difference in the prevalence of HBsAg positivity in chronic hepatitis between the present study and other studies. As 2 of our reactive respondents had at least single history of needle prick and out of 2 male reactive respondents 1 had used shared blade for shaving. Nebbia G et al, observed that thalassaemic patients required repeated blood transfusion and hence are exposed to very high risk of hepatitis B infection.²² All the patients with positive history of parenteral exposure does not acquire HBV infection. This suggests other routes of transmission of hepatitis. Beasley RP suggested that person to person contact may transmit HBV infection from infected household contacts, through exposure of infected blood or body fluids, scratches, skin lesions, open wounds, shared needles.²³ According to the present data all the risks factors of HBsAg positive found statistically not

significant. The reason of found no association with HBsAg positivity and hostel staying might be that the university students hesitate or put out of shame the correct information regarding the questionnaire. Regarding some of the questions, such as socio-economic condition, maintenance of personal hygiene, the history of needle prick etc. the actual information may be concealed.

CONCLUSION

This study revealed that the HBsAg reactivity of the residential students at Dhaka University falls in the intermediate range though majority of the students had a negative result. This situation is alarming in the context of public health safety. A well-designed study with large sample size is required to find out the actual occurrence of the HBsAg reactivity in the population. So, the concerned authority should consider the situation.

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Conflict of Interest: None declared.

Ethical Approval: The study was approved by the Institutional Ethics Committee.

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