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Research Article

A Retrospective Study on Seroprevalence of Hepatitis B Virus Surface Antigen (HbsAg) among Healthy Individuals Attending a Tertiary Care Clinic in Dhaka, Bangladesh

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Abstract

Hepatitis B virus (HBV) infection is a serious public health problem in developed and developing country including Bangladesh. Hepatitis is characterized by high rate of viral persistence and potential to develop and of ever worsening chronic liver disease ranging from chronic hepatitis and occasionally hepatocellular carcinoma. About 350 to 400 million people are chronically infectedwith hepatitis B in the world. This is a retrospective studycarried out at Marks Medical College Hospital, Dhaka, Bangladesh during the period1st January to 31st December 2012, among healthy individuals who attended for clinical checkup. 3971 patients attended for medical checkup during this period. Among them, 194 patients were found to be HBsAg positive which is 4.9% of the study population. HBsAg was more prevalent in males (5.14%) than females (4.10%). HBsAg was also more prevalent in married persons (8.32%) than unmarried persons (3.19%). No such correlation was found with occupation and pregnancy status. Analysis of risk factors among the individuals indicate that multiple sex partner, unsafe injection, circumcision and tooth extraction may be potential source of infection of these healthy HBsAg positive persons. These results stress the importance of extensive screeningprograms along with survey of risk factors to determine the source of infections of hepatitis B virus in healthy populations. Determination of appropriate risk factors may help to undertake appropriate preventive strategy to reduce HBV infection in Bangladesh.

Keywords: HBsAg, Hepatitis B surface antigen, seroprevalence, Bangladesh

1. Introduction

Hepatitis B virus is a partially double-stranded circular DNA virus and is a member of the *Hepadnaviridae* family[1]. The virus consists of a core capsid which contains viral DNA and this is surrounded by an envelope containing surface antigen (HBsAg)[2]. Both whole, incomplete virus particles, consisting entirely of HBsAg, are produced during replication of

HBV[3]. The HBsAg particles vary greatly in morphology and are found in high concentrations in early acute infection and continue to be produced in chronic disease[4].

Hepatitis B virus (HBV) is a major cause of liver disease worldwide[5]. Both acute and chronic HBV infections continue to represent important health problems in most developing countries[6]. Socio-economical factors and poorly-developed health care delivery system mainly contribute to ineffective control of HBV in developing countries. The prevalence of HBV infection varies from country to country and within countries, having a close association with behavioral, environmental host factors[7]. It is estimated globally that 350-400 million people are chronically infected with hepatitis B virus. In developing countries of Africa and Asia, the prevalence is > 8% and 2 billion have markers of current or past infection and 350 million have chronic infection[8].

About 15-25% will die from chronic liver disease (liver cancer and cirrhosis) i.e at least 1 million deaths per year because of the associated long-term morbidity and mortality of these infections[9]. Bangladesh belongs to the intermediate prevalence region for HBV infection, and studies have shown that HBV is the major etiological agent of acute hepatitis, chronic hepatitis, cirrhosis of liver and hepatocellular carcinoma in Bangladesh[10,11].

The aim of our study was to evaluate the seroprevalence of hepatitis B virus surface antigen among healthy patients attending a clinic and to evaluate the correlation of hepatitis infection with socio-economic factors.

2. Materials and Method

2.1 Subjects

Three thousand nine hundred seventy one (3971) people attending a clinic in Dhaka for medical check-up were recruited for the detection of anti-hepatitis B antibodies after obtaining ethical clearance. An informed consent form and a structured questionnaire were used to obtain each patients acceptance and the following information: sex, age, occupation, marital status, educational status,

2.2 Collection of Specimens

Venous blood samples (10ml each) were aseptically collected from the subjects. Each sample was dispensed into anethylene diamine tetra acetic acid (EDTA) container immediately after collection and gently mixed to avoid coagulation. Plasma was separated from each blood. The plasma samples were stored at -20^0C until analysis[12].

2.3 Detection of HBsAg

Plasma samples were screened for hepatitis B surface Antigen by 3rd generation ELISA test kit from MediBent Diagnostic & Company Ltd., Ireland.

3. Results

A total of 3971 individuals were enrolled. Their mean age was 24.7 (SD 5.4) years. Of the 3971 individuals 194 (4.9%) tested positive for HBsAg. The people enrolled for study were from different regions of the country. They were apparently healthy individuals.

Analysis of socio-economic conditions shows that HBsAg prevalence was higher in populations ranging 20-30 years, 5.20% for 20-24 years and 5.83% for 25-29 years respectively. HBsAg prevalence was lower in young (<20 years) and elderly (40+ years) (Table 1). Males (5.14%) were found to be more infected with HBV surface antigen than females (4.10%). HBsAg was more prevalent in married persons than single persons indicating possible transmission of HBsAg from one of the partner to another. Though educational status cannot be considered as a risk factor, educational status of the healthy persons admitted in this study was analyzed and HBsAg was more prevalent in people with secondary and tertiary level education. Correlation between socio-economic conditions with prevalence of HBsAg is shown in table 2.

Table 1: Socio-economic conditions of HBsAg positive individuals

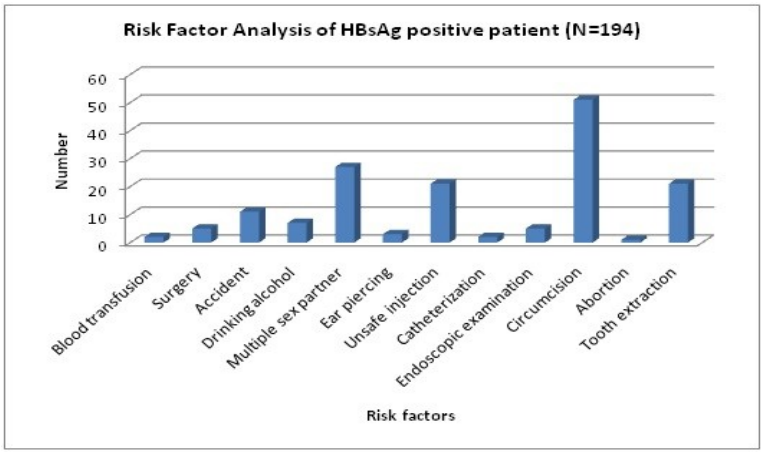
Factors	Total no of samples	No of HBsAg Positive	%
Age group			
<20 yrs	195	9	4.62
20-24 yrs	1020	53	5.20
25-29 yrs	1183	69	5.83
30-34 yrs	695	23	3.31
35-39 yrs	719	33	4.59
40+yrs	159	7	4.40
Sex			
Male	2995	154	5.14
Female	976	40	4.10
marital status			
single	2661	85	3.19
married	1310	109	8.32
Educational level			
non formal education	48	1	2.08
primary education	2680	99	3.69
secondary education	1127	85	7.54
tertiary level	116	9	7.76
Occupation			
self employed	595	19	3.19
govt. employed	0	0	0
private employed	2608	149	5.71
not employed	768	26	3.39
pregnancy status			
pregnant	0	0	0
not pregnant	0	0	0

Table 2: Risk factor analysis of HBsAg positive individuals

Risk Factors	Frequency	HBsAg Positive (N=194)	Percentage (%)	HBsAg Negative (N=3777)	Percentage (%)
Blood transfusion					
Yes	23	2	8.69	21	91.30
No	3948	192	4.86	3756	95.13
Surgery					
Yes	47	5	10.63	42	89.36
No	3924	189	4.81	3735	95.18
Accident					
Yes	231	11	4.76	220	95.23
No	3740	183	4.89	3557	95.10
Drinking alcohol					
Yes	139	7	5.03	132	94.96
No	3832	187	4.87	3645	95.12

Risk Factors	Frequency	HBsAg Positive (N=194)	Percentage (%)	HBsAg Negative (N=3777)	Percentage (%)
Multiple sexual partner					
Yes	151	27	17.88	124	82.11
No	3820	167	4.37	3653	95.62
Ear piercing					
Yes	65	3	4.61	62	95.38
No	3906	191	4.88	3715	95.11
Unsafe injection					
Yes	179	21	11.73	158	88.26
No	3792	173	4.56	3619	95.43
Catheterization					
Yes	37	2	5.40	35	94.59
No	3934	192	4.88	3742	95.11
Endoscopic Examination					
Yes	39	5	12.82	34	87.17
No	3932	189	4.80	3743	95.19
Circumcision					
Yes	2978	51	1.71	2927	98.28
No	993	143	14.40	850	85.59
Abortion/miss.					
Yes	3	1	33.33	2	66.66
No	3968	193	4.86	3775	95.13
Tooth extraction					
Yes	79	21	26.58	58	73.41
No	3892	173	4.44	3719	95.55

Figure 1: Risk factor analysis of HBsAg positive healthy individual (N=194)



4. Discussion

Hepatitis has become an issue of global importance, and in Bangladesh, hepatitis B virus infections still remain a public health problem[13]. Hepatitis B virus is transmissible through blood transfusion, sexual contacts, very close contacts, over-crowding, and using common syringes and even without any known parenteral risk factors and the infection might end up with fatal conditions like liver cirrhosis and HCC[14]. National immunization program by Hepatitis B vaccine in Bangladesh has reduced the incidence and prevalence hepatitis B infection in Bangladesh[15]. However, the impact of HB vaccination on overall HBV carrier rate has not been adequately assessed. Studies have shown that about 5-8% apparently healthy people of Bangladesh are chronically infected with the HBV[16]. In Bangladesh, the prevalence of HBsAg (+) reported a value of 8% in intra-venous drug users, and a value of 9.7% in commercial sex workers[17] and 5.9% in truck drivers[18].

In this study the prevalence rate in healthy individuals was found to be 4.9% which was lower as compared to the previous studies[14,16]. HBsAg was prevalent in healthy adults (20-30 years) compared to young and elderly persons. This data may be biased due to uneven sample size for each group and larger study population of that particular age group (20-30 years). Males were found to be more prone to hepatitis B infection than female which is in accordance with previous studies[14, 19]. No strong correlation can be deducted between socio-economic conditions and hepatitis B infection.

Potential risk factor analysis in HBsAg positive healthy individuals indicates that that multiple sex partner, unsafe injection, circumcision and tooth extraction may be potential source of infection of HBV. Individuals with history of surgery, accident, alcohol drinking and endoscopic examination has moderate prevalence of HBsAg. Blood transfusion, ear piercing, catheterization and abortion were found to be less associated with HBsAg infection in healthy individuals. Continuous surveillance is thus needed to determine the prevalence of hepatitis B virus infection in different population group in Bangladesh to determine the efficiency of vaccination and to understand the predominant risk factors to deduce any prevention strategies.

5. Conclusion

The seroprevalence of 4.9% HBsAg was of severe endemicity according to World health Organization. As Hepatitis B virus has several modes of transmission specially vertical that is mother to child and horizontal that is person to person, this finding suggest for the introduction of routine screening for HBV to all pregnant women during the antenatal period and that at birth dose vaccination is given to new born babies of mothers found to be HBsAg positive so as to reduce and prevent the spread of infection. However more data is required from larger studies to support the findings to formulate a national preventive policy to implement training, education, vaccination and prophylaxis in all healthcare set ups.

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