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Study of risk factors related to HBsAg reactivity among outdoor patients in Dhaka Medical College and Hospital, Bangladesh

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Abstract: Current investigation attempted to uncover common risk factors associated with HBsAg positivity among the suspected patients of Hepatitis B viral infection. Blood specimens were collected from patients prescribed to undergo HBsAg positivity test and tested for the detection of HBsAg through enzyme-linked immunosorbent assay (ELISA). HBsAg positivity was analyzed in relation to age, family history of HBV infection, unprotected sex, multiple sexual partners, blood transfusions, frequency of needle pricks, intravenous drug addiction, dental surgery and other surgical operations of the patients. Out of 50 patients, 23 were found to be HBsAg positive. After statistical analysis of all the factors it was deduced that patients who had unprotected sex and whose families (especially the mother of the patient) had a history of HBV infection were mostly found to be HBsAg positive. Detection of HBsAg positive cases with multiple associated risk factors revealed that the general people in Bangladesh need to be more conscious on the possible infection aware of getting infected with HBV as they are being frequently exposed subjected to the risk factors.

Keywords: HBV Infection, Prevalence; Risk Factors, HBsAg

1. Introduction

Hepatitis is commonly known as the inflammation of the liver caused by an array of hepatitis A, B, C, D and E viruses. The specific diagnosis of the disease is accomplished by testing patients' sera for the presence of specific anti-viral antigens or antibodies [1]. Hepatitis B surface antigen (HBsAg) is known to be the trait of HBV infection with its fatal impact on public health [2,3,4,5,6,7,8,9]. Parameters used to characterize HBV infection may lie under the prevalence of HBV antigens and host antibodies; HBV genome; biochemical markers, bilirubin level; and the degree of hepatic inflammation [3,10,11,12].

The highest numbers of HBsAg carrier rates are found in developing countries with primitive or limited medical facilities [9,13]. The world can be divided into three areas where the prevalence of chronic HBV infection is high (>8%), intermediate (2-8%) and low (<2%). High endemicity areas include South-east Asia and the Pacific Basin (excluding Japan, Australia and New Zealand), sub-Sahara Africa, the Amazon Basin, parts of Middle East, the central Asian Republics and some countries in Eastern Europe is about 70-90% of the population becomes HBV infected before age of 40 and 8-20% of people are HBV carrier [9-10].

In consistent to others, recent studies conducted in Bangladesh also revealed that rates of HBV infection are higher in patients that received blood transfusions as many professional donors were found to be HBsAg positive [14]. In Bangladesh, HBV is a significant cause of morbidity and mortality, where the infection principally occurs in childhood due to the lack of sufficient health education and vaccination [15,16]. A large number of populations become vulnerable by close contacts with the HBsAg positive person. Due to the elaborate life cycle of the virus in course of time, the HBsAg positive patient starts to show symptoms, nevertheless it often becomes too late to save them. Therefore, factors posing risks of HBV infection should be chalked out especially in settings where the disease diagnosis faces technical and logistic limitations.

Along these lines, the present study was designed to (i) determine the proportion of reactivity of HBsAg among the patients, and (ii) further to find out the relationship between the risk factors and the reactivity of HBsAg among patients.

2. Materials and Methods

2.1. Study Population

The study was conducted at Dhaka Medical College Hospital from September 2013 - November 2013. Patients who were prescribed by doctors for undergoing HBsAg positivity test were included in the study. A total of 50 randomly chosen patients (43 males and 7 female patients) were included in this. Patients' consents were obtained in patient consent form before collection of samples and were kept confidential.

2.2. Ethical Consideration

Ethical permission was not required in the study as the patients were prescribed by the doctors to undertake the HBsAg positivity test.

2.3. Socio-Demographic and Other Risk Factors

A structured questionnaire was designed (Supplement II) to collect patients' socio-demographic details including age, marital status, sexual history (number of life-time sexual partners), history of blood transfusion and needle usage, occupation, history of dental surgery and operations, and finally the occupation of the patients.

2.4. Blood Sample Collection and Processing

Three cubic centimeters (cc^3) of venous blood was collected using syringe with sterile needle. The blood sample was immediately transferred into a dry test tube after collection and allowed to clot naturally. After clotting, the serum was separated by centrifugation at 3000 rpm for 20 minutes. The collected sera were then tested for detection of the presence of HBsAg using commercially available test kit for the enzyme-linked immunosorbent assay (Supplement III) following the standardized operating protocol [17,18] and manufacturer's instructions (BioTek Instruments).

2.5. Data Analysis

The relationship of the presence of HBsAg in patients with the different possible risk factors which were visualized from the history of patients collected in the questionnaire form was analyzed.

3. Results and Discussion

In Bangladesh, the HBV prevalence has been estimated to be up to 9% with an approximate carrier of 10 million [19]. A relatively dense population with poverty and lack of clinical hygiene tend the people to be unconsciously infected with HBV which in most cases remain undiagnosed [3,14]. Moreover, as demonstrated earlier, the existence of a number of risk issues assisting in disseminating hepatitis infection is also likely to result in severe fatality especially in the developing countries including in Bangladesh [3,13,14,19]. A surveillance based on the suggested risks would thus be fruitful in mitigating the propagation of the virus [19,20].

3.1. Socio-Demographic Characteristics and Behavioral Risk Factors of Study Participants

In the present study, 23 (46%) out of 50 patients were found to be HBsAg positive, among which 22 (95.65%) were males and 1 (4.34%) were females with mean (±SD) age of 24.87 (±7.11) years. The largest group (n=23, 65.21%) were illiterate and did not know whether they had a family history of HBV infection followed by those who were educated (n=23, 34.78%) and had a family history of HBV infection. Thus the results of the current study pondered the HBsAg infectivity to be higher in the middle aged male patients than female ones. As a whole, this data is clearly suggestive of the adverse outcome of unawareness not only regarding HBV pathogenesis but also on the generalized illiteracy. [14]. Legislative action consisting of awareness campaign on infectious diseases might minimize such problem.

General lack of education could be responsible for the disposition of other risk factors raising the chance of HBV infectivity. Once of such variables may be the uncontrolled sexual behavior. As found in our study, the prevalence of HBsAg was 68.4 % (Table 1) in patients; who had unprotected sex and 71.4% in patients with multiple sexual partners. Commencement of HBV infection due to mass illiteracy with sexual mal practice is indeed a global consequence as has been found in the our study [1,9,10,16,21,22,23,24,25,26,27]. Establishment of regulatory bodies with routine monitoring of the frequency of sexually transmitted diseases (STDs) thus may aid to predict on the probability of HBV infection instigation.

Table 1. *Relationship of respondents' HBsAg status with their history of unprotected sex and multiple sexual partners*

Patient's history	HBsAg status	
	Positive (%)	Negative (%)
Patients with unprotected sex (n=19)	13 (68.4)	6 (31.6)
Patients with multiple sexual partners (n=14)	10 (71.4)	4 (28.6)

3.2. Other Risk Factors Associated with HBV Infections among Study Participants

Previous studies showed that HBV transmission in low endemic countries is especially associated with injecting drug using (IDU) unsterile equipment [1,9,21,20]. However, in our study, it is very interesting to note that no significant

variation was observed in HBsAg positivity for the patients with the history of needle pricks (n=29, 44.82%), clinical operation (n=22, 45.5%) and blood transfusions taken (n=9, 44.4%) as shown in Table 2. Patients (n=26) who undergone dental scaling/ surgery showed 50% positivity of HBsAg.. Besides, the association of HBsAg positivity with drug addiction was not statistically significant (n=23, 8.6%). This might lie on the fact that at the present time the medical personnel have become more conscious and usually accomplish sterilization of the equipments before surgery which in turn, tend to reduce the chances of cross contamination by pathogens.

Moreover, 18 (78.3%) HBsAg positive patients had experienced multiple risk factors, among them 6 (33.3%) were associated with two risk factors and 12 (66.7%) had more than two risk factors to be infected. The other 5 (21.7%) patients had been associated with a single risk factor either in the form of needle pricks or dental scaling or inject able drug addiction.

Table 2. *Relationship of respondents' HBsAg status with their history of blood transfusions, needle pricks, dental scaling/ surgery and clinical operation.*

Patient's history	HBsAg status	
	Positive (%)	Negative (%)
Needle pricks (n=29)	13 (44.82)	16 (55.17)
Clinical operation (n=22)	10 (45.5)	12 (54.5)
Blood transfusion (n=9)	4 (44.4)	5 (55.6)
Dental scaling/ surgery (n=26)	13(50)	13(50)

4. Conclusion

In addition to a number of research on HBV infectivity in Bangladesh [3,14,15,16,20,25,27,288,29,30], the present study investigated the proportion and relation between the risk factors and the reactivity of HBsAg among patients and raise awareness against the risk factors that could lead to infection of HBV. The time period of the study and the number of subjects enrolled were quite small. Moreover, a larger scale study is required to fully understand the risk factors that are associated with HBsAg.

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Conflict of Interest

Authors have declared no conflict of interest.

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