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Original Articles

Sero Positivity of Hepatitis B & C Markers Among Non-Icteric Children Attending A Tertiary Hospital in Dhaka City

ABDUL MATIN[1], MD. RAFIQUL ISLAM[2], RANJJT RANJAN ROY[3], MD. GOLAM MOWLA[4], ABM SHAHIDUL ALAM[5], RITA KHAN[6], MD. REAZUL ISLAM[7]

Abstract

Background: Viral hepatitis is a major public health problem both in developing and developed countries. Hepatitis B (HBV) and C (HCV) viruses can cause important morbidity and mortality and are major causes of acute and chronic liver diseases worldwide and often leads to cirrhosis or primary hepatocellular carcinoma. The prevalence of infection varies from country to country and within countries.

Aim & objectives: This study was an attempt to evaluate the seroprevalence rate of hepatitis B and C in non-jaundiced children who were admitted at Bangabandhu Sheikh Mujib Medical University.

Methods: A total of 100 non-icteric admitted children with different childhood diseases of either sex selected randomly were studied during July 2004 to June 2005 in the Department of Pediatrics and Microbiology, Bangabandhu Sheesikh Mujib Medical University. Venous blood was tested for HBsAg and anti-HBc (IgM) and anti-HCV viral markers by ELISA technique using kits from Dia Sorin S.n.I, Italy.

Results: The HBsAg test was positive among 19.0 %, Anti-HBc (IgM) test positive in 11.0 % and Anti-HCV test positive in 2.0 % non-icteric admitted children. Positivity was higher in male children. HBsAg was positive in 68.4% of male children and 31.5% of female children. Sero positivity was more in the 5-9 years age group. No-seroposivity was related to blood and blood products transfusion in cases of hepatitis B infection.

Conclusion: As this study shows high rate of HBsAg and Anti-HBc (IgM) sero-positivity among non-icteric sick children, so further studies with appropriate design & sample size are to be conducted.

Key words: *HBsAg, anti-HBc (IgM), anti-HCV, non-icteric children.*

1. Assistant Professor, Department of Pediatrics, Shahid Shurawardy Medical College and Hospital, Dhaka, Bangladesh
2. Associate Professor, Department of Pediatrics, Shahid Shurawardy Medical College and Hospital, Dhaka, Bangladesh
3. Associate Professor, Department of Pediatric Nephrology, Bangabandhu Sheikh Mujib Medical University, Dhaka
4. Junior Consultant, Department of Pediatrics, Shahid Shurawardy Medical College and Hospital, Dhaka, Bangladesh
5. Chief Consultant, Paediatrics, Central Police Hospital, Dhaka, Bangladesh
6. Medical officer, NICR&H, Mohakhali, Dhaka
7. Trainee Medical officer, Dhaka National Medical College & Hospital, Dhaka.

Correspondence: Dr. Abdul Matin

Introduction

Viral hepatitis is a major public health problem both in developing and developed countries. Hepatitis B virus (HBV) and Hepatitis C virus (HCV) can cause important morbidity and mortality through chronic infections and are major causes of acute and chronic liver disease worldwide[1]. Chronic infections with these viruses often lead to chronic liver disease including cirrhosis and primary hepatocellular carcinoma[2]. The prevalence of HBV infection varies from country to country and within countries, having a close association with behavioral, environmental host factors. It has been estimated that there are approximately 350 million HBV carriers in

the world, of whom 80% are Asians[3]. In Europe and North America the incidence of known carriers is about 1 in 1000 people[4]. It is estimated that 5% of world population and 10-30 million people become infected with the virus each year worldwide; many of them are children and teens. Many cases of acute hepatitis B occur sporadically with no known source and studies have shown that prior unrecognized infection is common [4]. Over 90% of infants, 50% of children and 5% of adults with acute hepatitis B will develop chronic or long-term infection[4].

The current prevalence of chronic hepatitis B based on sero positivity for HBsAg in Bangladesh ranges from 4.4% to 7.5% [5]. However, among high-risk populations, the seroprevalence of HBsAg is as high as 29% in this country [5]. Other studies in Bangladesh shows about 7%-10% population have hepatitis B infection and 3%-5% pregnant mothers in Bangladesh are carrying the hepatitis B virus [6].Carrier rate is very high, ranging from 9%-12% in Bangladesh, Korea, Myanmar, Thailand [7]. Up to 70% of cases of hepatocellular carcinoma (HCC) are attributed to HBV infection[8]. Hepatitis C is a particularly insidious disease. Initial infection often goes unnoticed, because symptoms, if there are any, are unremarkable and non-specific. But over months or years, infection often progresses to chronic hepatitis[9]. The annual incidence of HCV infection in Bhutan, Indonesia, Myanmar, Sri-Lanka and Thailand, in the general population are 1.3%, 2.5%, 3.9%, 1.4% and 0.74% respectively[7]. It is estimated that approximately 3% of the world's population is infected with HCV. Prevalence ranging from less than 1.5% in Europe, USA, Canada to over 2.5% in Africa and south-East Asia; 2.5%-5% in the Western Pacific to up to 12% in the Middle-East[10]. Long-term morbidity is characterized by cirrhosis, primary liver cancer and several extra-hepatic manifestations, including cryoglobulin associated symptoms and a sub-type of non-Hodgkin B-cell lymphoma[10]. It is estimated that 2.6 to 3.9 million people, that is around 2% to 3% of population of Bangladesh have Hepatitis C infection[6].

Hepatitis B and C viruses are transmissible through blood transfusion, sexual contacts, very close contacts, over-crowding, 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[6,7,8].

This study was an attempt to evaluate the sero-positivity of hepatitis B and C markers among non-icteric children admitted in Bangabandhu Sheikh Mujib Medical University.

Materials and Methods

This cross-sectional study was conducted in the Department of Pediatrics and Department of Microbiology of Bangabandhu Sheikh Mujib Medical University, Dhaka, from July 2004 to June 2005. A total number of one hundred (100) admitted non-icteric children of one (1) to fiftten (15) years age of either sex were selected randomly by selecting every eleventh children. The parents were explained the purpose of the study. Both the written & verbal consent was taken from the parents without any coercion. When parents reluctant to give consent for any particular case next case was selected. The exclusion criteria were very sick children, vaccinated against hepatitis B, children suffering from malignancy, parents doesn't give consent for the study. History and clinical findings were recorded in pretested semistructured questionnaire.

Three ml of venous blood was taken aseptically in plain dry sterilized test tube and serum was separated by centrifugation at a rate of 4000 rpm for five minutes. The supernatant clear serum was collected in a dry screw-cap vial labeled for individual subject and were stored at -20^0 C till it could be tested for HBsAg and anti-HBc (Ig M) and anti-HCV viral markers by ELISA technique using kits from Dia Sorin S.n.I, Italy. Positive results were interpreted according to the manufacturer's recommendations.

Results:

Table-I shows the sero positivity of the viral markers for hepatitis B and C viruses. HBsAg was positive among 19.0 %, Anti-HBc (IgM) positive in 11.0 % and Anti-HCV positive in 2.0%.

Table-I

Sero-positivity of the viral markers for hepatitis B and hepatitis C

Variable	Children without Jaundice (n=100)	
	n	%
HBsAg+ve	19	19.0
Anti-HBc (IgM)+ve	11	11.0
Anti-HCV+ve	2	2.0

Table-II shows the differences of sero-positivity in both the sexes. Positivity was higher in male children. HBsAg was positive in 68.4% of male and 31.5% of female children. Distribution of Anti-HBc (IgM) and Anti-HCV markers in both sexes are shown in the table.

Table-II

Distribution of sero-positivity of the viral markers in both the sexes.

Sex	HBsAg + ve n (%) n= 19	Anti-HBc (IgM)+ ve n (%) n = 11	Anti-HCV+ ve n (%)
Male	13(68.4)	8(72.7)	1
Female	6(31.6)	3(27.3)	1

The viral markers HBsAg and Anti-HBc (IgM) were present more in the age group (5-9 years) ; these were 73.6% and 81.8% respectively. Table-III, presents the relationship of age with viral markers sero-positivity.

Table-III

Distribution of age with positive viral markers in children

Age groups (yrs)	HBsAg+ve n (%).	Anti-HBc (IgM)+ve n (%).	Anti-HCV+ve n (%).
<5	2(10.5)	1(9)	0
5-9	14(73.3)	9(81.8)	1
10+	3(15.7)	1(9)	1

There was no-sero-positivity related to hepatitis B detected among the 23 cases having the history of blood and blood products transfusion. Table IV, presents the data numerically.

Table-IV

Shows the relationship between the blood, blood products transfusion and the sero-positivity of viral markers (HBsAg, Anti-HBc IgM and Anti-HCV).

H/O of blood & blood products transfusion	No.	HbsAg (+ve)	Anti-HBc IgM (+ve)	Anti-HCV (+ve)
Yes,	n= 23	0	0	0
No,	n= 77	19	11	2

Discussion

Routine screening for hepatitis B requires assay of at least two (2) serological markers. HBs Ag is the first detectable serologic marker of infection to appear and is found in almost all infected person. Anti-body to core antigen (HBc Ag) is also required to detect infection since it rises early after infection and persists for many months. Anti-HBc-IgM is a valuable single serologic marker for HBV infection, because it is present as early as HBsAg and continues to be present later in the course of the disease when HBs Ag has disappeared.

In this study HBs Ag was positive in 19% cases. One study was done in Moscow, Russia in 1-14 years age group and HBV positivity was 14.4%[11]. This proves HBV was widespread in Russia. The present study was done in a tertiary hospital where only selected serious cases were admitted and HBV positivity was high. One study, done by Zaki et al., tested asymptomatic children to see HBsAg positivity and found 8.5%, highest in 5-9 years age group[12]. Another study done by Zaki et al. in 1999 to see HBsAg positivity in the general population of Bangladesh and result was up to 3 years of age and no HBs Ag positive case was detected but highest 10.2% positive cases in the age group of 7-9 years[13]. It is due to intra-familial, non-sexual, non-parenteral contact[14]. Murhekar et al in 2004 studied seroprevalence in tribal school children in Andaman, India and the population size was big, subsequently discovered HBsAg positivity was 23% [15]. In contrast, study in Aligarh, North India, by Qamer et al in 2004 where they found HBsAg prevalence in children age up to 14 years was 4.5% [16]. This figure was quite low considering this present study the reason may be the study was done in healthy children and probably seroprevalence was low in that part of India. A community based study in Cameroon studied seroprevalence of HBV in school children age between 4-14 years and HBsAg was found to be present in 19.9% cases[17]. Percentages in both the studies are high, though there are structural differences between the studies. One is community based with large number of sample and the present study was hospital based with small sample size.

Regarding distribution of sex HBsAg was positive in 68.4% and Anti-HBc-IgM was positive in 72.2% cases of male children, in cases of female children it was 31.5% for HBsAg and 27.2% for Anti-HBc IgM respectively. A study done by Gerety et al. in 1974, on children showed that males are more likely to

become HBsAg carrier than females and it appeared to reflect a greater risk of exposure to this sex group[18]. Zaki et al., in Bangladesh though covering a wide age range found HBsAg was higher in male than female, 3.23:1.87.[13] In the present study the male percentage is also higher. Here HBV was higher in the age group 5-9 years which corresponds with the study done by Zaki et al., (1999) in Bangladesh where it was found to be higher in the age group 7-9 years[13]. In another study done by Zaki, et al. (2003) in Bangladesh where it was also found that HBsAg was more prevalent in age group 5-9 years (8.5%)[12]. A study in Cameroon also found that seroprevalence of HBV was high in the age group more than nine years[17]. This strongly indicates child to child transmission of HBV infection during recreational activities in that society where social distinctions among play-mates do not exist. This transmission is horizontal. Study done by Toukan (1996) in Jordan, emphasized about the intra-familial childhood horizontal transmission as an important means by which HBV endemicity rates were maintained in Middle East[14].

Out of the hundred children twenty three children had history of blood and blood-products transfusion, but did not play any role in causing sero-positivity of hepatitis viral markers. This is a positive sign; people's awareness and quality of screening procedures must have increased in relation with blood and blood products transfusion. There is also a dramatic improvement in using disposable items.

HCV, first identified in 1989, is now widely accepted as the main causal agent in blood-borne, non-A, non-B hepatitis. Anti-HCV is detected during the course of acute hepatitis (between 4 to 24 weeks) and it disappears by years. While in the chronic hepatitis C, anti-HCV persists indefinitely. In this study, out of 100 children, 2 cases were detected positive for HCV. One case is a male aged 9 years and another female aged 14 years. Out of the hundred non-jaundiced patients, 2 became positive, so the percentage is 2%. HCV prevalence is 3% in most parts of the world [19]. Since 2 cases of hepatitis C were detected it is very difficult to conclude with other demographic and environmental characters related to hepatitis C virus.

Conclusion:

There is scarcity in the number of studies to see the prevalence in non icteric sick children. This study shows high rate of HBsAg and Anti-HBc (IgM) sero-positivity. This study suggests further studies with appropriate design & sample size to be conducted.

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