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Prevalence Of Acute Hepatitis B Virus Infection Among Children With Liver Disease Admitted In A Public Tertiary Level Hospital In Dhaka

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Abstract:Objective: *This study was conducted to determine the prevalence of acute hepatitis B virus (HBV) infection among children admitted in Pediatric Gastro-enterology and Nutrition Department of Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh. The second objective was to identify the risk factors of HBV infection with target group for vaccination.* ***Methodology:*** *Children were selected purposively with liver disease presented with jaundice, abdominal distention, abdominal pain, fever, haematemesis and melaena.* ***Result:*** *Among the total participants 28(31.8%) were within the age range of 8.1 to 10 years, 25(28.4%) within 4 to 6 years and the least 10(11.4%) within 2 to 4 years. Out of the total studied children, 55(62.5%) were male and 33(37.5%) were female and M:F was 1.7:1. Among the 88 studied children, 11(12.5%) were found to be positive for HBsAg, 3(3.4%) for anti HBc-IgM, 1(1.1%) for both and both the tests were negative in 73(83.0%) children. Sixty one (69.3%) of the studied children were vaccinated against hepatitis B virus. Eleven children (12.5%) of the total had H/O blood transfusion/trauma/injection, 13(14.8%) had umbilical sepsis, 14(15.9%) underwent dental procedure, 10(11.4%) had previous surgery, and 23(26.1%) of the total male children had history of circumcision.* ***Conclusion and recommendation:*** *This study revealed that preschool children are high risk age group for HBV infection and horizontal transmission is possibly the major mode of transmission. Universal immunization coverage should be enhanced to reduce the incidence of HBV infection and this virus related chronic liver disease in children.*

Key Words: *Acute Hepatitis, Hepatitis B Virus*

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I. Introduction

Viral hepatitis is a major public health problem affecting millions of people worldwide. Approximately 2 billion people in the world have been infected with HBV, 400 million of whom are chronic carriers[1]. Approximately 45% of the world's population live in regions where HBV infection is endemic[2]. WHO has categorized countries based upon the prevalence of hepatitis B surface antigen (HBsAg) into high endemicity with prevalence 8% or more. Sub-saharan Africa, most of Asia and the Pacific Islands fall into this group[1,3]. Southern parts of Eastern and Central Europe, Middle East and Indian subcontinent, Central and South America fall into the intermediate endemic group with prevalence between 2-7%[1,3]. Western Europe and North America, Australia fall into the low endemic group with prevalence less than 2%[1,3] . When a person is first infected with hepatitis B, they are said to have acute hepatitis. People who continue to harbor the virus are referred to as "carriers". If liver damage develops because of longstanding infection, the person is said to have chronic hepatitis[4]. Hepatitis B virus can cause an acute illness with symptoms that last several weeks, including yellowing of the skin and eyes (jaundice), dark urine, extreme fatigue, nausea, vomiting and abdominal pain[5]. The virus causes acute hepatitis of varying severity even fulminant hepatitis and persists in 95% of older children leading to chronic liver disease that can later develop into cirrhosis of liver and hepatocellular carcinoma[6]. Worldwide, about 1 million deaths occur each year due to chronic forms of the disease and HBV is responsible for 60-80% of all primary liver cancers[7]. HBV is transmitted through percutaneous or parenteral contact with infected blood, body fluids, sexual intercourse and also spread from mother to child at birth, or from person to person in early childhood [5].The diagnosis of HBV infection is confirmed by demonstration of HBV markers including HBsAg, HBeAg and anti HBc-IgM[5,8]. HBsAg is present in serum during acute infection and persists in chronic cases. The presence of HBsAg indicates the person is potentially infectious[5,8]. The presence of HBeAg is associated with relatively high infectivity and severity of disease[7]. Demonstration of

anti HBc-IgM in serum indicates HBV infection, current or past, anti HBc-IgM is present in high titre during acute infection and usually disappears within six months although it can persist in some cases of chronic infection. This test, therefore, reliably diagnose acute HBV infection[7]. It is estimated that more than 8 million people of Bangladesh are chronically infected with HBV[9]. About eight percent of its population are infected with the virus each year[10]. Each year nearly 1,50,000 new born babies are infected with Hepatitis B virus and a large number of infants and children are infected with hepatitis B virus vertically from infected mother[10]. Due to lack of awareness about immunization, preventive measures and improper blood screening, Bangladesh is moderately endemic for HBV infection. Majority of the previous studies were conducted in selected groups such as blood donors, drug addicts, commercial sex workers including general population .The magnitude of HBV infection among Bangladeshi children is unclear. This is very important to determine the sero-prevalence of HBV infection in children because the likelihood that infection with the HBV becomes chronic depends upon the age at which a person becomes infected. This study is an attempt to determine the prevalence, burden and risk factors of HBV infection with target group for vaccination. Findings of this study will help to take appropriate measures to prevent the spread of HBV infection.

II. Methodology

It was a descriptive cross sectional study done in Pediatric Gastro-enterology and Nutrition department of Bangabandhu Sheikh Mujib Medical University (BSMMU) involving children of both sex up to 10 years of age. Children were enrolled by purposive sampling who admitted with the manifestations of liver disease like jaundice, abdominal pain, abdominal distension, fever, haematemesis and melaena. Serological tests (HBsAg, anti HBc-IgM) were performed to detect the prevalence of acute HBV infection in children admitted with hepatic manifestations. Furthermore, analysis of the enrolled children was done on the basis of risk factors of HBV infection, socio-demographic characteristics, immunization status, and knowledge of the parents regarding hepatitis B virus and HB vaccines. After having written informed consent data was collected in a structured questionnaire and was analyzed in SPSS version 21. Ethical clearance was taken from the ethical review committee of BSMMU.

III. Results

In this study, most of the children 28(31.8%) were within the age range of 8 to 10 years. Out of the total 88 studied children, 55(62.5%) were male and 33(37.5%) were female & M:F = 1.7:1**.** Regarding the sero-marker among the studied children (n=88), 11(12.5%) were positive for HBsAg, 3(3.4%) positive for anti HBc-IgM, 1(1.1%) were positive for both and both the tests were negative in 73(83.0%) children. Gender wise distribution of the sero-marker revealed that among the total 55 male children, 10(18.18%) were found to be positive for only HBsAg and 2(3.63%) positive for only anti HBc-IgM. Among the total 33 female children, 1(3.03%) were positive for only HBsAg and 1(3.03%) for only anti HBc-IgM. Both the tests were positive in 1(3.03%) female children [**Table-1]**. Here, in this study, 3(30%) of the children with positive HBsAg were within the age group of 2 to 4 years, 2(8%) with positive anti HBc-IgM were within 4 to 6 years and 1(4%) with positive for both tests were within 4 to 6 years. Nineteen (21.6%) fathers of the studied children were illiterate while 20(27.3%) of them completed their primary education. Regarding the mothers' education, 31(35.2%) were illiterate whereas 25(28.4%) completed their primary education. Regarding occupation of the fathers, 2(2.2%) were jobless, 3(3.4%) farmer, 21(23.9%) doing some business, 6(6.8%) large business, 18(20.4%) were in government job and 28(31.8%) in private job. Most of the mothers of the surveyed children 47(53.4%) were house wife [**Table-2**]. Most of the mothers' 22(25%) of the surveyed children heard about the hepatitis B virus or the vaccine while 66(75%) did not know about the virus or the vaccine. Among the 22 mothers of the studied children who heard about the HBV or hepatitis B vaccine, 7(32%) of them heard from their relatives, 6(27%) from family members, 4(18%) from doctors/nurses, 3(14%) from NGOs and the remaining 2(9%) from TV/radio/newspapers. In [**Table-3],** clinical presentation of most of the children were jaundice (64.8%), fever (53.4%) and abdominal pain (53.4%). Eleven(12.5%) studied children had H/O blood transfusion /trauma/injection, 13(14.8%) had umbilical sepsis, 14(15.9%) underwent dental procedure, 10(11.4%) had previous surgery and 23(26.1%) of the total 55 male children had history of circumcision [**Table-4]**. Immunization against hepatitis B virus was completed in 69.30% of the studied children.

Table-1: Main clinical and demographic characteristics of the studied population (n=88)
Data are presented as number (%)

Age	Variable
< 2 years	13 (14.8)
2 - 4 year	10(11.4)
4 - 6 years	25(28.4)
6 – 8 years	12(13.6)
8 - 10 years	28(31.8)

Male gender	55(62.5)
Female gender	33(37.5)
HBsAg +ve	11(12.5)
Anti HBc-IgM + ve	3(3.4)
HBsAg+HB_cAb (+ve)	1(1.1)
HBsAg+HB_cAb (-ve)	73(83)

Table-2: Educational status and occupation of parents (n=88)
Data are presented as number (%)

Father's education	
Illiterate	19(21.6)
Primary education	20(22.7)
Secondary education	24(27.3)
Higher secondary education	17(19.3)
Undergraduate education	7(8.0)
Graduation	1(1.1)
Mother's education	
Illiterate	31(35.2)
Primary education	25(28.4)
Secondary education	18(20.5)
Higher secondary education	10(11.4)
Undergraduate education	4(4.5)
Father's occupation	
Jobless	2(22.2)
Farming	3(3.4)
Small business	21(6.8)
Large business	6(20.4)
Government job	18(31.8)
Mother's occupation	
House wife	47(53.4)
Hard labor	19(21.6)
Technical	11(12.5)
Professional	3(3.4)
Handicrafts, small business	8(9.1)

Table-3: Clinical manifestations of studied children (n=88)
Data are presented as number (%)

Clinical manifestation	
Fever	47(53.4)
Abdominal distension	33(37.5)
Jaundice	57(64.80)
Abdominal pain	47(41.36)
Haematemesis	9(10.2)
Malena	28(31.8)

Table-4: Frequency of the risk factors among the studied children (n=88):

Data are presented as number (%)

Risk factors	
H/Obloodtransfusion/trauma/ injection	11(12.5)
H/O umbilical sepsis	13(14.8)
H/O visit to dentist	14(15.9)
H/O previous surgery	10(11.4)
H/O circumcision in male	23(26.1)

IV. Discussion

Hepatitis B virus (HBV) is encountered sporadically the year round in Bangladesh. It results in a wide range of liver diseases, with asymptomatic acute hepatitis at one end to hepatocellular carcinoma (HCC) at the other end of the spectrum[10]. In this study maximum numbers of the cases (31.8%) were within the age group of 8 to 10 years with male preponderance (21.81%). Study done by Malik et al[11] and Mehnaz et al[12] in Pakistan involving children of one to fifteen years and one month to fourteen years respectively, where they found acute viral hepatitis is higher in male. Gerety et al[13] studied on children and showed that males are more likely to become HBsAg carrier than females. In this study, a higher percentage of HBV was detected in the age group 10 years and above. A study in India found that HBV positivity was high in age group of 6-10 years[14]. This study result was similar to the above studies. HBsAg was positive in 12.5% cases and anti HBc-IgM in 3.4% cases, only 1.1% being positive for both markers. It means 17% of the total participants aged up to 10 years were affected by acute HBV infection who were admitted with liver disease. Abe et al[15] studied on children with liver disease in the age group 1 to 14 years and found 65.6% positive for HBV. Study done by Mehnaz et el[12] in Pakistan among children with liver disorders was tested for HBsAg and 37.5% was detected positive. In a study by Islam et al[16] 15.4% cases were positive for HBsAg. Malathi et al[14] in India found hepatitis B in 22% of children presented with liver disease. Result of this study was almost consistent with these studies. In this study 61(69.3%) were immunized against hepatitis B virus. Noman et al[17] found 13.2% of the study population to be vaccinated against HBV. In this study higher rate of vaccination against HBV may be due to introduction of hepatitis B vaccine in EPI (Expanded Program on Immunization) in Bangladesh since 2003. In the present study 47(53.4%) children presented with fever, 33(37.5%) had abdominal distention, 57(64.8%) of them had jaundice, 47(53.4%) had abdominal pain, 9(10.2%) had haematemesis and 28(31.8%) had melaena. Similar findings were noted in a study done by Zaki et al[18]. In this study 11(12.5%) of the children had H/O blood transfusion/trauma/injection, 13(14.8%) umbilical sepsis, 14(15.9%) had H/O taking to dentist, 10(11.4%) had previous surgery, 23(26.1%) of the total 55 male children underwent circumcision. Similar findings were reported in another study in Bangladesh[19] by Rukunuzzaman et al. In this study 22(25%) mothers of the surveyed children heard about the hepatitis B virus or about vaccine while 66(75%) did not know about the virus at all. Noman et al[17] in his study in Pakistan found that 80% of the people had heard about the HBV and 76.7% people had heard about the vaccine against hepatitis B virus.

V. Conclusion and recommendation

Preschool children are the high-risk age group for HBV infection and horizontal transmission is possibly the major mode of transmission. Therefore, to prevent the HBV infection, children of three years old or below, uncovered by the national immunization program, should be targeted for vaccination. Universal immunization (EPI) coverage should be enhanced to reduce the incidence of HBV infection and this virus related chronic liver disease in children. Further large scale studies can be done to investigate some key questions in greater depth.

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