

Original article

Seropositivity of hepatitis viral markers in icteric children

Sarker NR¹, Saha SK², Ghosh DK³, Adhikary A⁴, Mridha A⁵, Alam MR⁶

Abstract

Viral hepatitis is a major public health problem in the world affecting millions of children every year despite the availability of vaccines, prophylactic measures and improved sanitation. The prevalence of infection varies from country to country and within countries, having a close association with behavioral, environmental, host factors. This study was an attempt to evaluate the sero-prevalence rate of various viral hepatitis markers of 50 icteric children who attended pediatric outpatient department of Shaheed Suhrawardy Medical College Hospital from January 2010 to December 2010. All the patients were screened for HAV, HEV, HBV, HCV. Anti HAV IgM were positive in 65.22 %, Anti HEV IgM in 34.78 % and HBsAg in 4% of icteric children. None of the icteric children were positive for hepatitis C virus. Most of the icteric children presented with fever, anorexia and nausea /vomiting. This study shows high rate of HAV and HEV infection among icteric children.

Key words: HBsAg, anti HAV IgM, anti HEV IgM, anti-HCV, icteric children

Introduction

Viral hepatitis is a major public health problem in developing and developed countries affecting millions of children every year despite the availability of vaccines, prophylactic measures and improved sanitation. Hepatitis A (HAV) and E (HEV) only cause acute hepatitis but hepatitis B virus (HBV) and C virus (HCV) are important cause of morbidity and mortality through

chronic infections and are major causes of acute and chronic liver disease worldwide and often leads to cirrhosis or primary hepatocellular carcinoma.^{1,2}

Hepatitis A virus (HAV) is the most common cause of acute viral hepatitis worldwide.³ Globally it is responsible for at least 1.4 million new infections each year.⁴ Although infection with HAV is often mild and asymptomatic in young children, the disease can be severe in adults.⁵ The distribution and prevalence of HAV infection is very closely related to local hygiene and sanitation conditions, and consequently may vary across countries depending on the socioeconomic status (SES) of the population.⁶ The highest incidence of hepatitis A infection has previously been reported in developing countries of Africa, Central and South America and South-East Asia.^{7,8} Bangladesh is considered to be a country where hepatitis A infection is hyperendemic with 100% of children \leq 6 years of age exposed and immune to HAV.^{5,9} However, rapid improvements in hygiene and socioeconomic conditions, specifically in sections of the urban population, are taking place.

Hepatitis E virus (HEV), an emerging pathogen,^{10,11} causes significant disease in endemic countries and is the leading cause of enterically transmitted viral hepatitis illness globally.¹² Large annual epidemics are attributed to HEV,^{12,13} and studies suggest that HEV is etiologically responsible for 10%–95% of admitted cases of hepatitis across South Asia.¹⁴ Globally, prevalence rates of antibody to hepatitis E virus (anti-HEV) vary by region, population, and circulating genotypes of HEV, with unexpectedly high seropositivity in some developed settings.¹⁴

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.¹⁵ Over 90% of infants, 50% of children and 5% of adults with acute hepatitis B will develop chronic or long-term infection. The current prevalence of chronic hepatitis B (based on seropositivity for HBsAg) in Bangladesh ranges from 4.4% to 7.5%. However, among high-risk populations, the sero-prevalence of HBsAg is as high as 29%.¹⁶ Other study shows about 7% -10% population have hepatitis B infection, and 3%-5% pregnant mothers

1. *Dr Nihar Ranjan Sarker, Associate Professor, Pediatrics, Shaheed Suhrawardy Medical College, Dhaka. Email : sarkernihar@gmail.com
2. Dr Santosh Kumar Saha, Junior Consultant, Pediatrics, National Centre for Control of Rheumatic Fever & Heart Disease, Dhaka.
3. Dr Dilip Kumar Ghosh, Assistant Professor, Gastroenterology, Shaheed Suhrawardy Medical College, Dhaka.
4. Dr Alpana Adhikary, Assistant Professor, Gynae & Obstetrics, Shaheed Suhrawardy Medical College, Dhaka.
5. Dr Alamin Mridha, Associate Professor, Pediatrics, Shaheed Suhrawardy Medical College, Dhaka.
6. Dr Md Razibul Alam, Assistant Professor, Gastroenterology, BSMMU, Dhaka

*For correspondence

are carrying the hepatitis B virus in Bangladesh.¹⁷ Carrier rate is very high, ranging from 9%-12% in Bangladesh, Korea, Myanmar, Thailand.¹⁸ Up to 70% of cases of hepatocellular carcinoma are attributed to HBV infection.¹⁹

Hepatitis C is a particularly insidious disease. An acute Hepatitis C virus infection is mostly asymptomatic but evolves towards chronicity in approximately 85% of cases. 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.²⁰ 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. In most of the patients there may be no symptoms.¹⁷

Hepatitis B and hepatitis C viruses are transmissible through blood transfusion, sexual contacts, very close contacts, over-crowding, and using common syringes and even without any known parenteral risk factors. The infection may end up with fatal conditions like liver cirrhosis and HCC.

This study was carried out to know the epidemiology of infective hepatitis by means of various viral markers among icteric children along with their presenting symptoms & signs.

Methods

This cross-sectional study was conducted in the pediatric out patient department (OPD) of Shaheed Suhrawardy Medical College Hospital, Dhaka from January 2010 to December 2010. A total number of 50 consecutive icteric children were included in the study after informed written consent from parents/guardians. Diseases which have clinical presentation of hepatitis but diagnosed as having other etiology ie malaria, enteric fever, dengue, haemolytic jaundice and drug induced jaundice were excluded. History, clinical findings and laboratory results were recorded in a pretested semi-structured questionnaire. Patients were tested for serum bilirubin, SGPT, alkaline phosphatase, anti HAV IgM, anti HEV IgM, HBsAg and Anti HCV.

Results

Out of 50 icteric children 31 were male and 19 were female. Mean age, weight and height of male children were 7.4 years, 21.5 kg & 116.25 cm respectively. These were 8.2 years, 19.03 kg & 114.52 cm respectively for female children. (Table-I)

Table - I : Demographics of Patients

Characteristics	Male	Female
Mean Age (years)	7.4	8.2
mean weight (Kg)	21.5	19.03
Mean height (Cm)	116.25	114.52

All patients presented with Jaundice and anorexia. Fever was present in 84% patients in the present series. Among the gastrointestinal symptoms anorexia, nausea/vomiting (92%) were the most common symptoms. Ascites and oedema were seen in 4% and 2% cases respectively. (Table-II)

Table - II : Distribution of symptoms/Signs

Symptoms/signs	Frequency (n=50)	Percentage
Fever	42	84
Jaundice	50	100
Anorexia	50	100
Nausea/vomiting	46	92
Abdominal pain	22	44
Ascites	02	4
Oedema	01	2

Jaundice was mild in 56% , moderate in 42% and severe in 2% cases. (Table-III)

Table -III : Serum bilirubin on first presentation

Bilirubin level(mg/dl)	Frequency(n=50)	Percentage
1-5	28	56
5-10	21	42
>10	1	2

Maximum number of patient had 3001-5000 units/ml SGPT level (34%). Most patient (96%) had PT <20 seconds. Out of 50 icteric children 4(8%) patients were HBsAg positive. Most of the icteric children were positive for Anti HAV IgM (65.22%) and Anti HEV IgM (34.78%). None of the children were positive for hepatitis C virus. (Table-IV)

Table-IV : Distribution of patients according to viral markers

Viral markers	Frequency	Percentage
Anti HAV IgM	30 (46)	65.22
Anti HEV IgM	16 (46)	34.78
HBsAg	04 (50)	8
Anti HCV	0 (46)	0

Discussion

The present study indicates a higher seropositivity of HAV & HEV in patients suspected of suffering from viral hepatitis in Bangladesh. It does not reflect the exact prevalence of viral hepatitis in Bangladesh but this probably reflects the current situation related to viral hepatitis in Bangladesh. The seropositivity of HAV and HEV are quite high and alarming in Bangladesh as evident from this study. It is well known that these two viruses cause infections in over-crowded residential areas and spread by feco-oral route. One important issue as evident from this study is the very high seropositivity of HAV (65.22%) infection in young children predominantly under 12 years of age. This indicates that HAV infection is acquired in early years of life. The younger population takes food and drinks from different fast food restaurants, open hotels, restaurants in crowded, slum areas where the hygiene is not properly maintained. Our study is closely correlate with the study by Samir k saha et al where they found overall Anti HAV sero-positivity was 69.6%.²¹

The higher seropositivity of HEV infection among adults (56.1%) compared to children (34.78%) in our study is also similar to that of research work published on population based studies in India, Pakistan, Hong Kong and Somalia.²²⁻²⁵ Although hepatitis B vaccine is available for the last 25 years, still majority of the population of Bangladesh can not afford the vaccine due to various reasons. More over unsafe use of blood and blood products, sharing of needles and lack of proper knowledge regarding hepatitis B is prevailing in Bangladesh. This is well reflected by the high sero-positivity of HBsAg (8%) in this study. Hepatitis B virus vaccin is now included in the EPI and is being provided free of cost for the last few years but the reflection of vaccine coverage is not yet evident. Our sero-positivity is less than that of Pakistan²⁴ and Kenya²⁶ where the sero-positivity found is 10% and 26.2% respectively.

Study done by Malathi et al in India showed a 22 % prevalence of Hepatitis B among the children admitted in hospital for acute viral hepatitis.²⁴ In the present study HBsAg was positive in 8% cases. In this study only outdoor patients were taken as sample.

In this study, as found from the history of the patients, transfusion of blood and blood-products did not play any role in causing sero-positivity of hepatitis B viral markers. In this study, no case was detected positive for HCV. HCV prevalence is around 3% in most parts of the world.²⁷

In conclusion, the present study indicates high seropositivity of hepatotropic viruses like HAV (65.22%), HEV (34.78%) and HBV (8%) in patients suffering from acute hepatitis in Bangladesh. Urgent and strict preventive measures are needed to combat this menace. Further large scale studies with appropriate design & sample size are required in this regard.

References

1. Behrman RE, Kliegman RM, Jenson HB. Nelson Textbook of Pediatrics. 17th Ed. Philadelphia: Saunders; 2004. p. 1325-27.
2. Alter MJ, Mast EE, Margolis HS. Strategies to prevent and control hepatitis B and C virus infections: a global perspective. *Vaccine* March. 1999; 17: 1730-3.
3. Koff RS. Hepatitis A. *Lancet*. 1998; 351:1643-1649.
4. Jacobsen KH, Koopman JS. The effects of socioeconomic development on worldwide hepatitis A virus seroprevalence patterns. *Int J Epidemiol*. 2005;34:600-609.
5. Khan WI, Sultana R, Rahman M, Akhter H, Haq JA, Ali L, Mohsin MA, Khan AK. Viral hepatitis: recent experiences from serological studies in Bangladesh. *Asian Pac J Allergy Immunol*. 2000;18:99-103.
6. Dienstag JL, Isselbacher KJ. Acute viral hepatitis. In: Braunwald E, Fauci AS, Kasper DL, Hauser SL, Longo DL, et al., editors. *Harrison's principles of internal medicine*. 15th ed. New York: McGraw-Hill; 2001. p. 1726-1728.
7. Previsani N, Lavanchy D. Hepatitis A. World Health Organization. Department of communicable disease surveillance and response. WHO. 2000. pp. 1-39.
8. David AM. Hepatitis A outbreaks-methods of intervention in South-East Asian countries. *Int J Infect Dis*. 2004;8:201-209.
9. Millinship S. 2002. Hepatitis B, Health on the Net Foundation [Online]. Available from: [http:// www.hon.ch/Library/Theme/HepB/intro.html](http://www.hon.ch/Library/Theme/HepB/intro.html).
10. Balayan MS, Andjaparidze AG, Savinskaya SS, et al. Evidence for a virus in non-A, non-B hepatitis transmitted via the fecal-oral route. *Intervirology* 1983;20(1):23-31.
11. Reyes GR, Purdy MA, Kim JP et al. Isolation of a cDNA from the virus responsible for enterically transmitted non-A, non-B hepatitis. *Science* 1990;247(4948):1335-1339.
12. Labrique AB, Thomas DL, Stoszek SK, et al. Hepatitis E: an emerging infectious disease. *Epidemiol Rev*. 1999;21(2):162-179.

13. Melnick JL. A water-borne urban epidemic of hepatitis. In : Hartman FW, editor. *Hepatitis Frontiers*. Boston: Little Brown; 1957. p. 211-225.
14. Sheikh A, Sugitani M, Kinukawa N et al. Hepatitis E virus infection in fulminant hepatitis patients and an apparently healthy population in Bangladesh. *Am J Trop Med Hyg.* 2002;66(6):721-724.
15. Anna S F. 1998. *Hepatitis B and C in Asians*. University of Michigan. Available from: <http://www.femsdoes.org/conference/9th/9hepatitibandcinasians>.
16. Kowdley KV. 2005. *Epidemiology of Chronic Hepatitis B: Current Perspectives - Special Report form APASL* . Available from: <http://archieeve.mail-list.com/hbvresearch/msg07707>.
17. Liver Foundation of Bangladesh. 2005. *Hepatitis B and Some Information* [Online]. Available from: <http://www.liverfoundationbangladesh.com/news>.
18. World health Organization. 2002. *Health Situation in South-East Asia Region 1994-1997* [Online]. Available from : http://209.61.208.100/health_situation_94-97/ch5_2.4.html
19. World health Organization. 1992. *Global health situation and projections and estimates*. World Health Organization, Geneva.
20. Swiss Hepatitis C Cohort Study, 2005. *Hepatitis C virus*. [Online]. Available from : http://www.sevhep.cohort_specificionfo_main.html
21. Saha SK, Saha S, Shakur S, Hanif M, Habib MA, Datta SK et al. Community-based cross-sectional seroprevalence study of hepatitis A in Bangladesh. *World J Gastroenterol.* 2009 October 21; 15(39): 4932-4937
22. Arankalle VA, Tsarev SA, Chadha MS, Alling DW, Emerson SU, Banerjee K et al. Age specific prevalence of antibodies to hepatitis A and E viruses in Pune, India, 1982 and 1992. *J Infect Dis.* 1995; 171: 447-50.
23. Lok AS, Kwan W, Moeckli, Yarbough PO, Chan RT, Reyes GR et al. Seroepidemiological survey of Hepatitis E in Hong Kong by recombinant-based enzyme immunoassays. *Lancet* 1992; 340: 1205-08.
24. Mujeeb SA, Shaikh MA, Kehar SI. Prevalence of HBV infection in hemodialysis patients. *J Pak Med Assoc.* 1994; 44: 226
25. Mushawar IK, Dawson GJ, Bile KM, Magnus IO. Serological studies of an enterically transmitted non-A non-B hepatitis in Somalia. *J Med Virol.* 1993; 40: 218-21
26. Atina JO, Oguto EO, Hardison WG, Mumo J. Prevalence of hepatitis A, B, C and human immunodeficiency virus seropositivity among patients with acute icteric hepatitis at the Kenyan National Hospital. *East Africa Med J.* 2004; 81: 183-87.
27. Khan M. hepatitis C will be a major health issue in Bangladesh. *Bangladesh Observer*, viewed on 3 december, 2004