Bangladesh J Med Microbiol 2007; 01 (02): 52-55

Bangladesh Society of Medical Microbiologists

Original Article

Seroprevalence of Hepatitis E Virus (HEV) Infection Among Patients Attending BSMMU, Dhaka

Ayesha Begum, Shahina Tabassum , Md. Nazrul Islam, Afzalunnessa

Department of Virology, Bangabandhu Sheikh Mujib Medical University, Shahbag, Dhaka

Abstract

The present study was done to determine the seroprevalence of the infection by Hepatitis E virus (HEV) among patients attending Bangabandhu Sheikh Mujib Medical University (BSMMU), Shahbag, Dhaka. Serum samples from 408 subjects, aged between 0-69 years, attending BSMMU from different rural and urban areas of Bangladesh were tested for HEV IgG by enzyme linked immunosorbent assay (ELISA). Anti-HEV IgG was found among 20.6% of the study population. A higher rate of seropositivity (26.1%) was found among patients attending from urban than those from rural (15.1%) areas which is statistically significant (P < 0.01). A gradual rise in prevalence of anti-HEV IgG was observed among the study population according to age, starting from 10.6% in the 0-9 years age group and increasing with higher age thereafter. The HEV IgG prevalence reached its highest (28.3%) in the 30-39 years, which remained at around the same level in the 40-49 years (25.0%) and 50-59 years (26.0%), with a drop of incidence in the 60-69 years age group (17.8%). The study indicates HEV infection as a public health problem in Bangladesh and suggests to ensure increased awareness to prevent and control future outbreaks.

Key words: Hepatitis E virus, Seroprevalence, ELISA

Introduction

Hepatitis E virus (HEV) is an enterically transmitted hepatitis virus that is endemic in many developing countries with poor conditions of hygiene and sanitation. Acute hepatitis due to HEV occurs sporadically and epidemics have occurred where food and drinking water supplies have been contaminated by sewage.[1] Sixty percent of the sporadic cases of hepatitis in Indian adults have been reported to be caused by HEV.[2] The virus spreads primarily through faecal-oral transmission and lacks chronic sequelae.[3] Clinical hepatitis E disease is usually seen in young adults between 15-40 years of age.[4] An average of 20% case fatality was observed among pregnant women hospitalized for HEV infection. This rate was found higher than the mortality seen among other adults (0.5-4.0%) infected with the virus.[5,6] For most infected patients, HEV infection is asymptomatic, but in 20-30% of cases, primarily in adolescents and young adults, it is accompanied by signs and symptoms of acute viral hepatitis including jaundice. The disease is self-limiting and no chronic sequelae or carrier state has been documented.[3,7] Since the 1950s, serious epidemics originating from contaminated drinking water have been reported. [2, 5, 8-14]

The purpose of this study was to find out the prevalence of HEV infection among rural and urban population, attending BSMMU, by detecting antibody to Hepatitis E virus.

Methods

This cross-sectional study was conducted on a total of 408 subjects. Serum from all subjects were tested for HEV specific IgG. Blood specimens were collected at One Point Collection Centre, Bangabandhu Sheikh Mujib Medical

✉ *Correspondence:*
Dr. Ayesha Begum
Lecturer
Department of Microbiology
Dhaka Medical College, Dhaka.

University (BSMMU), Shahbag, Dhaka and laboratory works were carried out at the department of Virology, BSMMU, Dhaka, from February to June, 2006.

A predesigned proforma was used to record the medical history of patients including age, sex, occupation, address. Patients attending from Metropolitan cities and Pauroshova areas were considered as urban, and other from district headquarters and rest areas of the country were defined as rural. Serum was collected, labeled and preserved at -20^{o}C in the department of Virology, BSMMU, Dhaka. Sera samples were tested for Hepatitis E virus (HEV) immunoglobulin G (IgG) using an enzyme linked immunosorbent assay (ELISA) (ADALTIS, Italy).

Data were entered into SPSS 11.5 program for windows and then analyzed, significance of difference was estimated by using statistical methods, and comparison between groups was done by Chi-square test. Probability less than 0.05 was considered as significant.

Results

Among the total 408 study population, 205 (50.25%) were from rural and 203 (49.75%) from urban population. The patients were stratified into age groups by 9 years. The age-specific seroprevalence of anti-HEV in the 0-9 years age group was found 10.6% with a gradual rise of 28.3% among the 30-39 years age group. (Table I)

Table I: Presence of HEV lgG antibody among study population according to age groups

Age groups in years	No (%) cases of HEV antibody test result	
	Positive	Negative
0-9 (n=66)	7 (10.6)	59 (89.4)
10-19 (n=67)	9 (13.4)	58 (86.6)
20-29 (n=60)	15 (25.0)	45 (75.0)
30-39 (n=60)	17 (28.3)	43 (71.6)
40-49 (n=60)	15 (25.0)	45 (75.0)
50-59 (n=50)	13 (26.0)	37 (7.04)
60-69 (n=45)	8 (17.8)	37 (82.2)
Total (n=408)	84 (20.6)	324 (79.4)

The incidenc of anti-HEV IgG among patients coming from urban and those from rural areas was considered and it was shown that the seropositivity among urban subjects was significantly higher (26.1%) than that of rural (15.1%) subjects (P<0.01). (Table II)

Table II: Incidence of HEV lgG antibody in urban and rural population

Population	HEV antibody		Total	Significance
	Positive N (%)	Negative N (%)		
Urban	53 (26.1%)	150 (73.9%)	203	P<0.01
Rural	31 (15.1%)	174 (84.9%)	205	

An analysis of anti-HEV IgG incidence by age groups was made between cases attending from rural and urban areas. It was found that in the rural group, anti-HEV in the 0-9 years age group was 10.7% in contrast to 15.8% in the urban group. The peak seroprevalence (23.3%) in the rural group was observed in the 40-49 years age group, whereas it was highest (40.0%) in the 30-39 years age group among the urban group. The anti-HEV IgG in urban populations among the 20-29 and 30-39 years age groups was significantly higher than those of the same age groups in rural population (P<0.05). (Table III).

Table III: Age-wise incidence of HEV lgG among rural and urban population

Age group in years	No (%) of HEV antibody test results among Rural			Urban			Significance*
	Positive	Negative	Total	Positive	Negative	Total	
0-9	3 (10.7%)	25 (89.3%)	28	6 (15.8%)	32 (84.2%)	38	P>0.5
10-19	3 (8.1%)	34 (91.9%)	37	4 (13.3%)	26 (86.7%)	30	P>0.1
20-29	4 (13.3%)	26 (86.7%)	30	11 (36.7%)	19 (63.3%)	30	P<0.05
30-39	5 (16.7%)	25 (83.3%)	30	12 (40.0%)	18 (60.0%)	30	P<0.05
40-49	7 (23.3%)	23 (76.7%)	30	8 (26.7%)	22 (73.3%)	30	P>0.5
50-59	4 (15.4%)	22 (84.6%)	26	9 (37.5%)	15 (62.5%)	24	P>0.05
60-69	5 (20.8%)	19 (79.2%)	24	3 (14.3%)	18 (85.7%)	21	P>0.5
Total	31 (15.1%)	174 (84.9%)	205	53 (26.1%)	150 (73.9%)	203	P<0.01

*Tested by Chi-square

Discussion

Infection with Hepatitis E. virus (HEV) is widespread and is endemic with frequent epidemics in many developing countries in Asia, Africa, and Latin America. In industrialized countries, although anti-HEV has been detected in 4 to 36% of healthy individuals, sporadic cases of Hepatitis E not associated with traveling to regions of endemicity have only rarely been reported.[15, 16, 17] A study from Hong Kong revealed that the prevalence of anti-HEV IgG was 24% in subjects aged over 20 years but was 4% in younger subjects.[18] The prevalence of anti-HEV positivity was reported to be 0.5% from Europe.[8] A recent study from Chennai in southern India reported seroprevalence of 5.3% and 9.0% in children <2 years of age and in 10-12 years age group respectively.[19] The age-specific seroprevalence of antibody to HEV studied in Pune, India showed the peak anti-HEV among the 26-35 years age group (33%) and found at about the same level among older age groups.[20]

Similarly, in the present study, the prevalence of HEV IgG in the youngest (0-9 years) age groups was found 10.6% with a gradual rise with increasing age. The peak anti-HEV prevalence was 28.3% in the 30-39 years age group, and remained at around the same level in the 40-49 years (25.0%) and 50-49 years age group (26.0%), with a drop of prevalence (17.8%) in the 60-69 years age group. In the present study, anti-HEV IgG among the urban subjects was significantly higher than that of rural subjects (26.1%) vs (15.1%) ($P<0.01$). The incidence of anti-HEV IgG in the urban population in the 20-29 and 30-39 years of age group was significantly higher than that of same age group in rural population ($P<0.05$). However, the difference of incidence of HEV IgG between rural and urban subjects aged between 0-9 and 10-19 years, were not statistically significant ($P> 0.5$). The few occurrences of increased incidence among the urban papulation could probably be attributed to higher population densities and possible contamination of drinking water supply with sewage.

The results of this investigation identifies the presence of HEV infection in Bangladesh and suggests that it should be considered a public health problem. Increased awareness and understanding of the disease among general population will improve ability of the healthcare workers to recognize, control and prevent outbreaks. However, further studies with larger sample size should be carried out for confirmation of these findings

References

1. Daniel HDJ, Warier A, Abraham P, Sridharan G. Age-wise exposure rates to Hepatitis E virus in a Southern Indian patient population without liver disease. Am J Trop Med Hyg 2004; 71 (5): 675-678.
2. Arankalle VA, Chobe LP, Jha I, *et al*. Aetiology of acute sporadic non-A, non-B Viral Hepatitis in India. J Med Virol 1993; 40: 121-125.
3. Khuroo MS. Study of an epidemic of non-A, non-B Hepatitis: possibility of another Human Hepatitis virus distinct from post transfusion non-A, non-B type. Am J Med 1980; 68: 818-824.
4. Balayan MS. Hepatitis E virus infection in Europe: regional situation regarding laboratory diagnosis and epidemiology. Clin Diagn Virol 1997; 1: 1-9.
5. Krawczynski K. Hepatitis E. Hepatology 1993; 17: 932-941.
6. Purdy MA, Carson D, McCaustland KA, *et al*. Viral specificity of Hepatitis E virus antigens identified by fluorescent antibody assay using recombinant HEV proteins. J Med Virol 1994; 44: 212-214.
7. Chandha MS, Arankalle VA, Banerjee K. Follow up of cases of enterically transmitted non-A, Non-B Hepatitis. J Assoc Physicians India 1991; 39(8): 651-652.
8. Clayson ET, Shreshtha MP, Vaughn DW, Snitbhan R, Shreshtha KB, Longer CF. Results of Hepatitis E virus infection and disease among adolescents and adults in Katmandu, Nepal. J Infect Dis 1997; 172: 763-766.
9. Kane MA, Bradley DW, Shrestha SM. Epidemic Non-A, Non-B Hepatitis in Nepal. JAMA 1984; 252: 3140-3145.
10. Khuroo MS, Duermeyer W, Zargar SA, Ahanger AA, Shah MA. Acute sporadic Non-A, Non-B Hepatitis in India. Am J Epi 1983; 118: 360-364.
11. Myint H, Soe MM, Khin T, Myint TM, Tin KM. A clinical and epidemiological study of an Epidemic of Non-A, Non-B Hepatitis in Rangoon. Am Soc Trop Med Hyg 1985; 34: 1183-1189.
12. Favorov MO, Fields HA, Purdy M A. Serologic Identification of Hepatitis E Virus Infections in Epidemic and Endemic Settings. J Med Virol 1992; 36: 246-250.
13. El-Zimaity DMT, Hyams KC, Imam IZE, *et al*. Acute Hepatitis E in an Egyptian Pediatric Population. Am J Trop Med Hyg 1993; 48: 372-376.
14. Huang RT, Li DR, Wei J, Huang XR, Yuan XT, Tian X. Isolation and Identification of Hepatitis E Virus in Xinjiang, China. J Gen Virol 1992; 73: 1143-1148.
15. Erker JC, Desai SM, Schlauder GG, Dawson GJ, Mushahwar

IK. Hepatitis E variant in the United States: Molecular characterization and transmission in cynomolgus macaques. Virology 1999; 80: 681-690.

16. Schlauder GG, Dawson GJ, Erker JC, *et al*. The sequence and phylogenetic analysis of a novel Hepatitis E virus isolated from a patient with acute hepatitis reported in the United States. J Gen Virol 1998; 79: 447-456.

17. Schlauder GG, Desai SM, Znatti AR, Tassopoulos NC, Mushawar IK. Novel Hepatitis E virus (HEV) isolates from Europe. Evidence for additional genotypes of HEV. J Med Virol 1999; 57: 234-251.

18. Lok ASF, Kwan WK, Randolph M, *et al*. Seroepidemiological survey of hepatitis E in Hong Kong by recombinant based enzyme immunoassays. Lancet 1992; 340: 1205-1208.

19. Mohanavalli EB, Dhevahi, Menon T, Malathi S, Thyagarajan SP. Prevalence of antibodies to hepatitis A and Hepatitis E virus in urban school in Chennai. Indian Pediat 2003; 40: 328-331.

20. Arankalle VA, Tsarev SA, Chandha MS, *et al*. Age-specific prevalence of antibodies to Hepatitis A and E viruses in Pune, India, 1982 and 1992. J Infect Dis 1994; 171: 447-50.