

# Sociodemographic profile and seroprevalence of Hepatitis E infection at a tertiary care hospital

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## Abstract

**Background:** Hepatitis E virus are common causes of enterically transmitted hepatitis spread through contaminated food and water. 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. Present study was aimed to study sociodemographic profile and seroprevalence of Hepatitis E infection at a tertiary hospital. **Material and Methods:** Present study was single-center, prospective, observational study conducted in patients with clinically suspected acute viral hepatitis and are willing to be part of the study after informed consent. RecombiLISA test was used for detection of IgM anti-HEV in human serum or plasma. **Results:** Anti – HEV test was reactive in 36 (10.29%). Anti HEV test was reactive most commonly in 31-45 years(13.27%) followed by 15-30 years(12.2%) of age group while 41-60 years and <15 years showed 4.17% and 3.28% respectively. There was no statistically significant correlation between different age group and anti HEV test. (P value – 0.187) Amongst HEV positive cases there was higher number of male cases (15.38%) as compared to female cases. (5.52%) and difference was statistically significant (p value – 0.002). Male : female ratio was 2.6:1. Mean Total Bilirubin, SGOT/AST, SGPT, ALP and A/G ratio amongst hepatitis E cases was  $3.69 \pm 2.89$ ,  $138.56 \pm 19.69$ ,  $408 \pm 112$ ,  $1516 \pm 493$  and  $0.63 \pm 0.27$  respectively. Hepatitis E was most commonly observed in the month of July (21 cases), August (7 cases) followed by September, November and December with each 1 case. There was a statistically significant correlation between seropositive cases and months. **Conclusion:** HEV incidences were found higher in older children and adults. Along with help of clinical diagnosis and biochemical analysis, timely diagnosis by serology and PCR may help in early management and prevention of complications.

**Keywords:** HEV infections, acute viral hepatitis, sociodemographic profile, Anti – HEV test

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Received Date: 20/06/2021 Revised Date: 23/07/2021 Accepted Date: 04/08/2021

DOI: <https://doi.org/10.26611/10082011>

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	Accessed Date: 04 September 2021

## INTRODUCTION

The term “Viral Hepatitis” refers to a primary infection of the liver by any one of the heterogenous group of “hepatitis viruses”, which consists of types A, B, C, D, E and G. As all types of Hepatitis viruses cause a clinically indistinguishable acute illness, their differentiation is based on their serological and molecular markers.<sup>1</sup> Hepatitis A and E are common causes of enterically transmitted hepatitis spread through contaminated food and water.<sup>2</sup> Hepatitis E Virus (HEV) are small non-enveloped single stranded RNA viruses, belongs to genus Hepevirus of family Hepeviridae.

Hepatitis E infection has been reported infrequently in young children and is more common in older children and

**How to cite this article:** Pradnya Gaikwad, Dilip Turbadkar, Sujata Baveja. Sociodemographic profile and seroprevalence of Hepatitis E infection at a tertiary care hospital. *MedPulse International Journal of Microbiology*. September 2021;20(1): 01-05.

<https://www.medpulse.in/Microbiology/>

adults. The relative paucity of Hepatitis E in the young could be explained if HEV infections of the young are either predominantly asymptomatic or if they are simply less common than those of older persons.<sup>3</sup>

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. Globally, there are around 20 million hepatitis E infections/year are being reported, over which 3 million cases are symptomatic. Around 56000 deaths/year are related to hepatitis E.<sup>6</sup> As the incidence is unreliable because most cases are sub-clinical, mild or unreported, hence epidemiology of Hepatitis E is best measured by measuring immunoglobulin M (IgM) antibodies to HEV (anti-HEV). Present study was aimed to study sociodemographic profile and seroprevalence of Hepatitis E infection at a tertiary hospital.

### MATERIAL AND METHODS

Present study was single-center, prospective, observational study conducted in department of Microbiology, LTMMC and LTMGH, Sion Hospital, Mumbai, India. Study duration was One year (January 2015 to December 2015). The study was initiated after obtaining approval from the institutional ethics committee.

#### Inclusion criteria

- All patients with clinically suspected acute viral hepatitis and are willing to be part of the study after informed consent.

#### Exclusion criteria

- Patients of chronic viral hepatitis.
- Patients not willing to be part of the study.

A detailed history was elicited and reports of LFT for each patient were recorded in the case record form. 5ml of blood was collected in a sterile vacutainer from clinically suspected acute liver disease patients attending OPD and who were admitted in the wards after taking informed consent. Serum was separated after centrifugation at 2500 rpm for 15 minutes and subjected for serological testing. RecombiLISA test was used for detection of IgM anti-HEV in human serum or plasma.

### INTERPRETATION OF RESULTS:

- Negative result indicates that there is no detectable IgM anti HEV in the specimen.
- Results just below the cut-off value, retest in duplicate the corresponding specimens was done.
- Specimens with cut-off  $\geq 1.00$  are initially considered to be positive by the HEV ELISA Kit and retested in duplicate before final interpretation.

If after retesting of a specimen, the absorbance value of the 2 duplicates are less than the cut- off value, the initial result

is non-repeatable and the specimen is considered to be negative with the HEV IgM Kit.

Data was collected and compiled using Microsoft Excel, analysed using SPSS 23.0 version. Frequency, percentage, means and standard deviations (SD) was calculated for the continuous variables. Difference of proportions between qualitative variables were tested using chi- square test or Fisher exact test as applicable. P value less than 0.5 was considered as statistically significant.

### RESULTS

Suspected hepatitis cases were most commonly observed in 15 – 30 years of age group (46.8%) followed by 31 to 45 years of age group (28%) and less than 15 years(17.42%) . As seen in the above table, suspected hepatitis cases were most commonly observed in female (51.71%) population as compared to male (48.29%). Male : female ratio was 0.93:1.

**Table 1:** Age and Gender wise distribution of cases

Characteristic	Suspected hepatitis cases (n=350)	Percentage
Age (in years)		
<15	61	17.43
15-30	164	46.86
31-45	98	28
46-60	24	6.85
>60	3	0.86
Mean age	26.99 ± 13.14	
Gender		
Male	169	48.29
Female	181	51.71

Most common clinical features amongst cases of hepatitis was fever (98.28%) followed by malaise (97.42%), abdominal pain (88.85%), Yellow discoloration of urine (23.71%) and loss of appetite (14.57%).

**Table 2:** Clinical profile of patients

Clinical features	Total	Percentage
Fever	344	98.28%
Malaise	341	97.42%
Abdominal pain	311	88.85%
Yellow discoloration of urine	83	23.71%
Loss of appetite	51	14.57%
Icterus	57	16.28%
Hepatomegaly	31	8.8%

Anti – HEV test was reactive in 36 (10.29%).

**Table 3:** Seroprevalence of Hepatitis E virus (HEV) IgM antibody

No. of cases	Reactive		Non- reactive	
	No.	%	No.	%
350	36	10.29	314	89.71

Anti HEV test was reactive most commonly in 31-45 years(13.27%) followed by 15-30 years(12.2%) of age group while 41-60 years and <15 years showed 4.17% and 3.28% respectively. There was no statistically significant

correlation between different age group and anti HEV test. (P value – 0.187) Amongst HEV positive cases there was higher number of male cases (15.38%) as compared to female cases. (5.52%) and difference was statistically significant (p value – 0.002). Male : female ratio was 2.6:1.

**Table 4:** Seroprevalence of Hepatitis E virus in clinically suspected cases

Characteristic	Anti HEV test (IgM)		Total
	Reactive cases	Non-Reactive cases	
Age group (years)			
<15	2 (3.28%)	59 (96.72%)	61
15-30	20 (12.2%)	144 (87.8%)	164
31-45	13 (13.27%)	85 (86.73%)	98
46-60	1 (4.17%)	23 (95.83%)	24
>60	0 (0%)	3 (100%)	3
Total	36 (10.29%)	314 (89.71%)	350
Gender			
Male	26 (15.38 %)	143(84.62%)	169
Female	10 (5.52%)	171 (94.48%)	181

Seropositive HEV cases was present most commonly in lower middle class (41.7%) followed by Upper lower (30.55%) and lower class (25%). There was statistically significant correlation between different Socioeconomic status and HEV cases (p value – 0.0001).

**Table 5:** Socioeconomic status of seropositive HEV cases (Kuppuswamy classification)

Class	No. of cases		Total
	Positive	Negative	
Upper	0 (0%)	1 (0.3%)	1 (0.28 %)
Upper middle	1 (2.78%)	192 (61.5%)	193 (55.43 %)
Lower middle	15 (41.67%)	79 (25.2%)	94 (6.86 %)
Upper lower	11 (30.55%)	4 (1.3%)	15 (4.29 %)
Lower	09 (25%)	38 (12.1%)	47 (13.43%)
<b>Total</b>	<b>36 (100%)</b>	<b>314 (100%)</b>	<b>350 (100 %)</b>

Mean Total Bilirubin, SGOT/AST, SGPT, ALP and A/G ratio amongst hepatitis E cases was  $3.69 \pm 2.89$ ,  $138.56 \pm 19.69$ ,  $408 \pm 112$ ,  $1516 \pm 493$  and  $0.63 \pm 0.27$  respectively.

**Table 6:** LFT of Hepatitis E

HEV	Mean	SD
Total Bilirubin	3.69	2.89
Direct Bilirubin	2.18	1.73
Indirect Bilirubin	1.51	1.33
SGOT/AST	138.56	19.69
SGPT	408.00	112
ALP	1516.00	493
Ser. Albumin	2.91	0.42
Ser. Globulin	3.59	0.68
A/G ratio	0.63	0.27

Hepatitis E was most commonly observed in the month of July (21 cases), August (7 cases) followed by September, November and December with each 1 case. There was a statistically significant correlation between seropositive cases and months (p value - <0.05).

**Table 7:** Seasonal variation of seropositive cases of Hepatitis E virus

Month	HAV		Total
	Positive	Negative	
January	0	7	7
February	0	10	10
March	0	9	9
April	0	9	9
May	0	40	40
June	5	22	27
July	21	69	90
August	7	42	49
September	1	11	12
October	0	19	19
November	1	48	49
December	1	32	33

## DISCUSSION

Acute viral Hepatitis can be self-limiting or can progress to fibrosis, cirrhosis or liver cancer. These viruses are serious public health concern because of the burden of illness and associated mortality with potential for outbreaks. Hepatitis E virus (HEV) is an enterically transmitted virus that occurs primarily in Asia, Africa, and Central America. The IgM and IgG classes of antibodies to HEV (anti-HEV IgM and anti-HEV IgG) can be detected, but the former falls rapidly after acute infection, reaching low levels within 6 month.<sup>7</sup> The seroprevalence rates of prior exposure to HEV are however relatively low, being 10-40% in most studies.<sup>8,9</sup> In our study it was observed that suspected Hepatitis cases were most commonly seen in age group of 15 to 30 years (46.8%) followed by 31 to 45 years(28%) and less than 15 years(17.42%) with Mean age  $26.99 + 13.14$ . Similarly, study conducted by Sharma P.K *et al.*,<sup>10</sup> shows maximum number of cases i.e. 52.22% in the age group of 15-35 years with mean age of  $37.4 + 15.9$  yrs. Also Antony J *et al.*,<sup>11</sup> shows 54.64% and 29.82% in the age group of 20-39 years and <19 years. Considering gender distribution in clinically suspected hepatitis cases it was observed that hepatitis was commonly among female (51.71%) population as compared to male (48.29%). Similarly, 52.22% in female and 47.78% in male was observed in a study conducted by Sharma PK *et al.*,<sup>10</sup> In the present study, the most common clinical features amongst cases of hepatitis was fever (98.28%) followed by malaise (97.42%), abdominal pain (88.85%), yellow discoloration of urine (23.71%), Icterus (16.28%) and loss of appetite (14.57%). In study conducted by Kamath SR *et al.*,<sup>12</sup> noted fever as most frequent symptom followed by Jaundice and nausea and vomiting. While Baskir K *et al.*,<sup>13</sup> noted malaise as predominant symptom followed by abdominal pain and arthralgia. Whereas Modi TN *et al.*,<sup>14</sup> and Chandra NS *et al.*,<sup>15</sup> noted Jaundice as common presenting complaint. Hepatitis E virus is a leading cause

of acute and fulminant hepatitis in developing countries. The HEV target population is young to middle aged adults, 15-40 years of age. The clinical symptoms represent as acute viral hepatitis and include Jaundice, malaise, abdominal pain, anorexia, fever and hepatomegaly.<sup>16</sup> HEV has relatively low infectivity, with a secondary attack rate of about 2%.<sup>16</sup> In the present study, anti HEV test was reactive in 36 (10.28%) cases of clinically suspected acute viral hepatitis. Joon A *et al.*,<sup>17</sup> found that seroprevalence of anti HEV of 10.54% which is similar to our study, while a study conducted in Bolivia by Bartolini A *et al.*,<sup>18</sup> and Mishra B *et al.*,<sup>19</sup> found prevalence of anti HEV IgM. of 7.3% and 18.8% respectively. HEV, and their prevalence may provide an epidemiological marker of frequency of exposure to HEV in a population. In the high-endemicity countries, anti-HEV antibody prevalence rates are higher than those in the low-endemicity countries which may indicate frequent opportunities for water contamination.<sup>20</sup> In our study out of 36 seropositive cases of hepatitis E virus, Maximum seroprevalence was in age group 31-45years (13.27%) and 15-30 years (12.2%). So maximum number of patients belonged to 15-45 year age group. Similarly Keramettin Y *et al.*,<sup>16</sup> noted seroprevalence of 11.8% in 30-39 years, while Chakrabarti K *et al.*,<sup>21</sup> showed 19% in 31-40 years and Vitral CL *et al.*,<sup>22</sup> 17.8% in 31-50 years of age group. Likewise Sarwat F *et al.*,<sup>23</sup> noted 12.5% in 26-30 years, Kermettin Y *et al.*,<sup>16</sup> noted 13.2% in 19-29 years while Rajani M (2) noted 10.7% in 21-30 years. In present study, male to female ratio was 2.6:1. Mishra B *et al.*,<sup>19</sup> and Modi TN *et al.*,<sup>14</sup> showed male to female 1.9:1 and 3.4:1 respectively which correlate with our study. while Upadhay K *et al.*,<sup>24</sup> showed 1.59:1 which is on lower side Higher seroprevalence of Hepatitis E among male might be the result of the difference in behavioral factors between the two sexes. Outdoor and social activities of males make them more exposed as compared to females. And may be a difference in health seeking behavior between the male and female population in the societies. It is said that seroprevalence rates of hepatitis E are inversely proportional to the economic status of the individual, supply of protected water supply and personal and environmental hygiene. Similarly, Sarwat F *et al.*,<sup>23</sup> in their study observed that 75% of the patients were in Lower middle socioeconomic group while 25% in upper lower socioeconomic group. Similar findings were noted in present study. Other studies conducted by Sarwat F *et al.*,<sup>23</sup> and Bashir K *et al.*,<sup>13</sup> also noted increased levels of Bilirubin, SGOT, SGPT and alkaline phosphate levels which correlate with our study. A comparison of liver function tests in HEV seropositive and seronegative patients revealed that liver enzymes were raised in hepatitis E patients indicating the malfunctioning of liver. SGPT and SGOT are the first enzymes to reveal

abnormalities during the disease process and last to normalize.<sup>13</sup> Management should be predominantly preventive, relying on clean drinking water, good sanitation, and proper personal hygiene. Travelers to endemic areas should avoid drinking water or other beverages that may be contaminated and should avoid eating uncooked shellfish. The knowledge of hepatitis E seroepidemiology in regions should be helpful for clinicians in differential diagnosis.

## CONCLUSION

HEV infections are prevalent infections among clinically suspected acute viral hepatitis patients and remain a major health problem in developing countries. HEV incidences were found higher in older children and adults. Along with help of clinical diagnosis and biochemical analysis, timely diagnosis by serology and PCR may help in early management and prevention of complications. Since a greater number of cases have been detected in lower socioeconomic class, creating awareness and educating people about sanitation and hygienic practices will help in reducing the rate of infection.

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Source of Support: None Declared  
Conflict of Interest: None Declared