

## **Seroprevalence of hepatitis A virus (HAV) and hepatitis E virus (HEV) in the patients presenting with acute viral hepatitis at tertiary care hospital, Gujarat**

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**Conflicts of Interest:** Nil

### **Abstract**

**Background:** Hepatitis A virus and Hepatitis E virus are enterically transmitted viral hepatitis, resulting in development of acute viral hepatitis. These infections are major public health problem in worldwide, with higher incidence in developing countries.

**Objective:** This study was conducted to determine the seroprevalence, co-infection, demographic profile of patient and diagnosis in relation to hepatitis A virus and hepatitis E virus.

**Material and Method:** A retrospective cross-sectional study was conducted over a period of 15 month (May 2020 – July 2021) in department of microbiology, civil hospital Rajkot. The study included 395 patients of suspected enterically transmitted acute viral hepatitis admitted in civil hospital, Rajkot, will be analysed for IgM anti HAV and IgM anti HEV for detection of

enterically transmitted viral hepatitis by using ELISA method.

**Result:** In this present study total of 395 samples were tested for IgM HAV and IgM HEV. Out of which 91 samples (23.04%) positive for IgM HAV and 3 samples (0.76%) positive for IgM HEV. Out of total 94 positive samples, 1 sample (1.06%) was positive for both HAV and HEV infection. Male (54.25%) were slightly more infected as compare to female (45.75%). Most of cases were isolated from urban area (61.70%) as compare to rural area (38.30%).

**Conclusion:** These two viral infections cannot be eradicated as these viruses have animal reservoir. Still the spread of infection is reduced by a simple measure of personal and community hygiene. However, these data will be useful for planning of future vaccine strategies and for better sanitation program in this region.

**Keyword:** Enterically transmitted viral hepatitis, Co-infection.

### Introduction

Hepatitis A Virus (HAV) and Hepatitis E Virus (HEV) causes a self-limiting viral infection that is transmitted by fecal-oral route, primarily through consumption of contaminated food and water. The risk of infection is inversely proportional to levels of sanitation and personal hygiene. <sup>[1, 2, 3]</sup>

HAV infection account for 1.4 million new cases per year worldwide <sup>[4]</sup> Infections due to HAV is mostly asymptomatic, self-limiting and exposure to the virus provides lifelong immunity. <sup>[5]</sup>

HAV mainly affects infants and young children and in developing countries, nearly all children are infected with HAV by the age of 18 and as the standard of living improved, the peak incidence of hepatitis A virus moves from young children to older age. <sup>[6]</sup>

HEV lead to development of fulminant hepatitis in pregnant women mainly during 3rd trimester of pregnancy with high mortality rate. <sup>[7]</sup>

Women with hepatic infection were also more likely to have obstetric complication including intra uterine death and poor fetal outcome including preterm delivery and still birth. <sup>[8]</sup>

Exposure rate of HAV and HEV over a period of time are different in different parts of country and in different socioeconomic groups. <sup>[9]</sup>

### Materials and methods

#### Material and Method of study

Serum sample received from patients of suspected enterically transmitted acute viral hepatitis at civil hospital Rajkot and study was conducted in Microbiology laboratory. Sample will be analysed for IgM anti-HAV and IgM anti-HEV for detection of acute

hepatitis A and Acute hepatitis E, respectively using ELISA kits.

**Design of study:** Cross-sectional study

**Duration of study:** 15 Months (May 2020-July 2021)

**Sample material:** Serum

#### Inclusion criteria

The present study consist of 395 patients suspected of enterically transmitted viral hepatitis, both indoor and outdoor patients were included in this study. The study population included individuals of all age group who were suspected of enterically transmitted acute viral hepatitis will be screened by using commercially available ELISA kits. The diagnosis in each case was based on laboratory investigation.

#### Exclusion criteria

All the patients with viral hepatitis other than enterically transmitted viral hepatitis were excluded from this study.

#### ELISA test for HAV and HEV

96 Well ELISA test for the qualitative detection of anti-HAV IgM and anti-HEV IgM in human serum or plasma. Here we use RecombiLISA kit for testing. It should be store at 2-8°C.

HAV IgM and HEV IgM ELISA kit is a solid-phase enzyme-linked immunosorbent assay based on the principle of the IgM capture technique for the detection of anti-HAV IgM and anti-HEV IgM in human serum or plasma. The anti-hepatitis A virus IgM test is the preferred confirmatory test for acute hepatitis A because it has high sensitivity and specificity when used on specimens from persons with typical symptoms. Serum anti-hepatitis.

A virus IgM usually can be detected five to 10 days before symptom onset, and the level remains elevated for four to six months. A positive result for anti-HEV IgM indicates acute HEV infection.

**Results**

Study included total 395 patients suspected of enterically transmitted viral hepatitis during a period of 15 month in department of microbiology, civil hospital, Rajkot. Out of which 91 samples (23.04%) positive for IgM HAV and 3 samples positive for IgM HEV [Figure 1]. The prevalence of HAV and HEV co-infection in patients with acute viral hepatitis was 1.06% (1 sample) [Figure-2]. Out of total 94 positive samples, 51(54.25%) was male and 43 (45.75%) was female [Fighre-3]. Seroprevalence of hepatitis A infection was most common in age group of 1-20 yr. of age (93.41%) and hepatitis E infection was more common in age group of 21-50 yr. of age (66.66%) [Figure-4]. In this study, most of cases were isolated from urban area 58 (61.70%) compare to rural area 36 (38.30%).

Table1: seroprevalence of Hav and HEV

Type of hepatitis	Total	Positive	Percentage
HAV	395	91	23.04%
HEV	395	3	0.76%

Figure 1: CO-infection of hav and hev

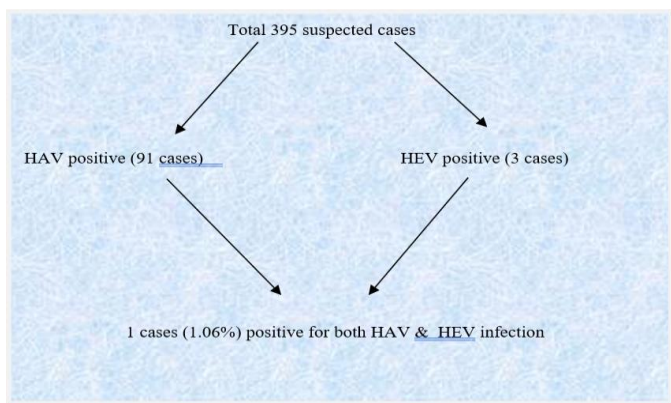


Table 2: sex wise seroprevalence of hav and hev

Sex	No of total positive cases	Percentage
Male	51	54.25%
Female	43	45.75%
Total	94	100%

Table 3: age wise seroprevalence of hav & hev

Age in a year	No of positive cases and percentage for HAV	No of positive cases and percentage for HEV
1-10 year	64 (70.33%)	01 (33.33%)
11-20 year	21 (23.08%)	00 (0%)
21-30 year	04 (4.39%)	01 (33.33%)
31-40 year	01 (1.1%)	00 (0%)
41-50 year	00 (0%)	01 (33.33%)
51-60 year	01 (1.1%)	00 (0%)
Total	91	03

**Discussion**

Enterically Transmitted viral hepatitis is a major public health problem worldwide.

The present study consists of total 395 patients suspected of enterically transmitted viral hepatitis. Both indoor and outdoor patients of all age groups were included in this study. Out of total 395 suspected patients, 94 patients (23.79%) show positive viral markers for enterically transmitted viral hepatitis.

In this study the number of HAV cases were more than HEV cases which is in contrast to previous studies from India where HEV was found to be the dominant agent. [10, 11, 12] Joon et al. [13] and Ashram Ismal Khan et. al [14] reported higher prevalence of HAV (19.31%) as compare to HEV (10.54%) from Karnataka, India.

Co-infection of hepatitis A viral infection and hepatitis E viral infection was 1 (1.06%) which was lower than other study. [12, 13, 15]

In present study, seroprevalence of HAV in age group of 1-20 years were 93.41% which is higher than the studies conducted by other author [16] and seroprevalence of HEV in age group of 21-50 years was 66.66% which is lower than the studies conducted by another author. [16]

Present study shown that HAV infection occur more common in young children in an age group of 1-20 year (93.41 %) because adult have protective antibodies and

mostly immune to HAV, whereas HEV occur mostly in older children and adults in a age group of 21-50 year (66.66%).

In our study, higher seroprevalence was found in male than female. Similar findings observed in other studies also. [13, 16, 17] It may be because of greater exposure of male in their professional and social activities.

### Conclusion

This study shows that, Hepatitis A infection is a major public health problem of pediatric age group in tropical countries such as India. Poverty, overcrowding, low literacy rate, contaminated drinking water & food, poor personal hygiene are the significant associations. Interventions including health education and personal hygiene to the children and the parents, especially to the mothers are required.

Hepatitis E infection lead to fulminant hepatitis in pregnant women where outcome of infection with HEV is very poor. So increase personal hygiene and health education reduce mortality and morbidity due to viral hepatitis.

These two viral infections can't be eradicated as these viruses have animal reservoir. However these data will be useful for better sanitation program in our country.

### Abbreviations

HAV - Hepatitis A virus

HEV - Hepatitis E virus

Ig - Immunoglobulin

ELISA - Enzyme linked immunosorbent assay

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