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## Prevalence of hepatitis a virus (HAV) and hepatitis e virus (HEV) in the patients presenting with acute viral hepatitis

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### Abstract

**Background:** Hepatitis A virus (HAV) and Hepatitis E virus (HEV) are both enterically transmitted, resulting in acute viral hepatitis (AVH) in developing countries. They pose major health problems in our country. This study was done to determine prevalence of HAV and HEV in patients presenting with AVH and the co-infection of HAV and HEV in these patients.

**Materials and Methods:** A cross-sectional study of 1-year duration was conducted in the Department of Microbiology, MAX Hospital Dehradun. A non-random sampling of 315 patients presenting with AVH was considered in the study. On the basis of history, serum samples were analysed for IgM anti-HAV and IgM anti-HEV for the detection of HAV and HEV, respectively using commercially available ELISA kits.

**Results:** The seroprevalence of HAV- and HEV-positive patients were 10.79% and 26.66%, respectively. The seroprevalence of both HAV and HEV in patients with acute viral hepatitis was 0.32%. The prevalence of HAV and HEV among males (13% and 27.11%) was higher than in females (7.97% and 26.08%). These infections were predominantly seen during end of monsoons and beginning of winter.

**Conclusion:** The prevalence of HEV is higher than that of HAV. These data will be essential for planning of future vaccination strategies and for better sanitation programme in this part of the country.

**Keywords:** Acute viral hepatitis, co-infection, Hepatitis A Virus, Hepatitis E Virus, prevalence

### 1. Introduction

Communicable diseases are still the major health problem in our country, and the hepatitis viruses residing in India are usually the endemic forms.

Hepatitis A virus (HAV) is transmitted via the faecal-oral route, and has a global distribution [1]. HAV infection is a common infection responsible for about 1.4 million new infections worldwide each year [2]. HAV is a non-enveloped 27-nm, heat-, acid-, and ether-resistant ribonucleic acid (RNA) virus in the genus *Hepatovirus* of the family *Picornaviridae*. Antibodies to HAV (anti-HAV) can be detected during acute illness when serum aminotransferase activity is elevated and faecal HAV shedding is still occurring. This early antibody response is predominantly of the IgM class and persists for several months, rarely for 6-12 months. During convalescence, however, anti-HAV of the IgG class becomes the predominant antibody. Hepatitis A remains self-limited and does not progress to chronic liver disease [3]. With the development of safe and effective hepatitis A vaccines in the early 1990s, understanding hepatitis A epidemiology has taken on new importance, because this information is needed to make well-informed decisions about prevention strategies and appropriate vaccine use.

Hepatitis E virus (HEV) is also an enterically transmitted virus that occurs primarily in Asia, Africa, and Central America. HEV is a non-enveloped virus with a single-stranded positive-sense RNA in the genus *Hepevirus* of the family *Hepeviridae*. 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 [3].

In most studies of sporadic acute hepatitis and fulminant liver failure in the region, 20-60% of patients have been related to infection with HEV. Among pregnant women with these diseases, the rates of HEV infection have usually been higher than among non-pregnant patients. The seroprevalence rates of prior exposure to HEV are however relatively low, being 10-40% in most studies [4].

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## 2. Materials & Methods

### Study design and population

A cross-sectional study, which included 315 sera of patients during a 1-year period presenting with acute viral hepatitis was considered. The study population included sera of individuals from all age group who were suspected of acute viral hepatitis (AVH) admitted at MAX Hospital, Dehradun.

### Viral serology

On the basis of history, serum samples were analysed for IgM anti HAV and IgM anti-HEV for the detection of acute hepatitis A and acute hepatitis E, respectively using commercially available ELISA kits (General biologicals Corp for HAV IgM ELISA and MP diagnostics for HEV IgM ELISA).

### 3. Result

The study was conducted in MAX Hospital, Dehradun. over the period of 1 year. Out of total 315 samples 34 (10.79%) were positive for HAV, 84 (26.66%) were positive for HEV and only 1 (0.32%) sample was positive for both. (Table no.1)

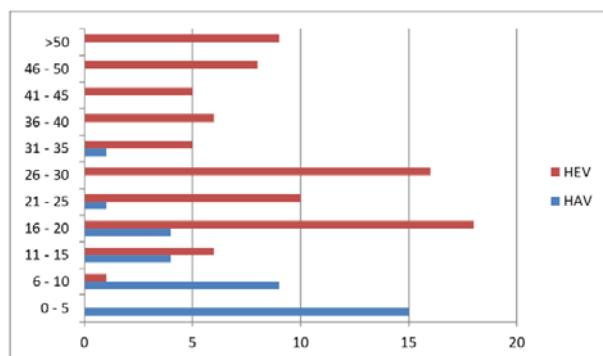
**Table 1:** Seroprevalence of HAV & HEV in patients with acute hepatitis

	Total Samples	Positive Samples	Percentage (%)
HAV	315	34	10.79
HEV	315	84	26.66
BOTH	315	1	0.32

Out of 34 HAV positive patients 23 were male and 11 were female. In HEV out of total 84 patients 48 were male and 36 were female.

Our study shows that HAV infection was prevalent below the age of 35 years with highest prevalence in the age group of 0 to 5 years of age (44.11%) followed by 6 to 10 years of age group (26.47%).

While HEV infection was prevalent over all age groups except 0 to 5 years of age and only 1 case in 6 to 10 years of age. Highest prevalence amongst the 16-20 (21.43%) years of age group followed by 26-30 (19.04%) years of age (Figure no.1). It was noted that the liver enzymes like alanine amino transferase, aspartate amino transferase were found to be deranged in all the cases.



**Fig 1:** Age dependent prevalence of HAV & HEV serological markers

### 4. Discussion

Different studies on acute viral hepatitis caused by HAV & HEV have reported varying prevalence of these viruses, HAV (1.7- 67 %) and HEV (16.3-66.3 %) [3, 6, 7]. In the

present study, HEV (26.66%) was identified to be the most common cause of acute hepatitis followed by HAV (10.79% cases). The overall prevalence of hepatitis viruses is in accordance with that of other studies [5, 6, 7].

Co-infection of HAV & HEV was found in 7 year old male, it is also seen in other studies that co infection is more common in pediatric age group as compared to adult age group. The reason for this may be pediatric group are not immune to HAV and also due to poor sanitation and contamination of water, they are exposed to HEV too, so they develop simultaneous infection by both the viruses [8]. HAV is most commonly affecting children which is 82.35%. This prevalence is similar to the results reported by B. Mohanavalli [9], Aggarwal *et al.* [10] and Arankalle *et al.* [11] where they reported >95%. Regarding Epidemiological data in developing countries where poor sanitation and people live in crowded condition, infection acquires in childhood & by age of ten 90% of population possess antibody to the virus and are immune [12]. So HAV infection is less commonly seen in adults, mitigating finding of our study. Infection rate of HEV was higher in age group of 16-20yrs of age (21.43%) followed by 26-30yrs of age (19.04%) which similar with previous study by Ramesh roop rai, who described most common age group of 16-30 yrs of age [13].

HAV and HEV infections are endemic in India and infections occur throughout the year. The main source of water contamination is due to poor sanitation, contamination of drinking water and lack of knowledge of community regarding the prevention [14].

### 5. Conclusion

With similar faecal-oral mode of transmission of Hepatitis A and E viruses and improving levels of personal and food hygiene among higher socio-economic population, periodic surveillance of HAV/HEV exposure pattern may be of immense public health value. The requirement of collaborating of sectors to work together to supply safe water and safe sewage disposal.

As it is evident from our study, infection with both the enteric hepatic viruses (HAV and HEV) is not infrequent. These data will be essential for planning of future vaccination strategies and for better sanitation program in this part of the country.

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