e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2026; 18(1); 485-490

Original Research Article

Seroprevalence of Hepatitis a Virus [HAV] and Hepatitis E Virus [HEV] in the Patients Presenting with Acute Viral Hepatitis at Tertiary Care Hospital of Southern Rajasthan

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Received: 13-11-2025 / Revised: 12-12-2025 / Accepted: 13-01-2026

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Conflict of interest: Nil

Abstract:

Background: Hepatitis A virus (HAV) and Hepatitis E virus (HEV) cause acute viral hepatitis in humans and are transmitted mainly through the fecal-oral route.

Objective: This study was done to determine the seroprevalence of Hepatitis A virus (HAV) and Hepatitis E virus (HEV) among the patients presenting with symptoms of acute viral hepatitis (AVH) in southern Rajasthan.

Setting and Design: It was a prospective observational study conducted from July 2024 to June 2025 involving patients presenting with acute viral Hepatitis visiting our tertiary care hospital.

Material and Methods: The study population included 333 patients (outdoor and hospitalized) having clinical features of AVH. Serum samples collected from those patients were tested in duplicate for anti-HAV IgM and anti-HEV IgM antibodies using commercially available enzyme-linked immunosorbent assay (ELISA) kits.

Result: A total of 333 samples; were included in this study, out of which 133 patients were found to be positive for HAV and HEV; IgM anti HAV antibodies were detected in 132 (39.6%) serum samples tested and 1 (0.30%) serum sample was positive for IgM HEV antibodies. HAV positivity rate was significantly high among males (27.6%) in comparison to females (12.31%). HAV infection was common in all age groups and it was more prevalent in the age group between 1 to 15 years with the highest prevalence 77 (23.12%) with HAV infection Maximum number of cases were observed in the month of September and October.

Conclusion: Health and civic authorities should make efforts to increase the awareness among general public, to encounter outbreak or epidemic, thereby to reduce morbidity, mortality and economic burden. The data collected through this study can be used in planning the vaccination strategies, it also emphasizes on implementation of better sanitation programme and hygiene measures in our geographical region.

Keywords: Acute viral hepatitis, ELISA, Hepatitis A virus, Hepatitis E virus, Seroprevalence, Seasonal variation.

DOI: 10.25258/ijcpr.18.1.79

Introduction

Viral hepatitis refers to a primary infection and inflammation of the liver by any of the heterogeneous group of hepatitis virus types A, B, C, D and E. [1] The identification of these viruses has started with the detection of Hepatitis B Virus (HBV) in 1970, followed by HAV in 1973, Hepatitis D Virus (HDV) in 1977, HEV in 1983, Hepatitis C Virus (HCV) in 1989 and lastly Hepatitis G Virus (HGV) in 1996 [2]. Each day,

approximately 3,500 lives are lost to liver disease due to viral hepatitis worldwide. [3]

Acute viral hepatitis (AVH) caused by enterically transmitted hepatitis A virus (HAV) and hepatitis E virus (HEV) poses a major health problem in developing countries such as India. Both viruses are transmitted primarily by the fecal–oral route. [4] They cause a self-limiting illness that rarely progresses to acute liver failure. Acute phases of illness include symptoms like jaundice, dark urine, nausea, vomiting, extreme fatigue, malaise, anorexia, right upper quadrant tenderness, and abdominal pain along with elevated liver enzymes. [5, 6, 7, 8].

HAV is a member of genus Hepatovirus belonging to family Picornaviridae. It is a 27-nm non-enveloped ssRNA virus. The virus has a single serotype and 7 genotypes [9] It has an incubation period of 2-3 weeks, occurs asymptomatically in some and the age group most affected are 1-3 years followed by young children.[10] Hepatitis A infection is self-limiting and exposure to the virus ensures immunity to re-infection. Fortunately, HAV infection is vaccine-preventable. [11]

HEV is a member of the Hepeviridae family of non-enveloped single-stranded RNA viruses. With an incubation period of 2 to10 weeks, the fecal oral route is responsible for the transmission of this agent. [12] HEV has at least 4 different types: genotypes 1, 2, 3 and 4. Genotypes 1 and 2 have been found only in humans transmitted by fecal-oral route. Genotypes 3 and 4 circulate in several animals (including pigs, wild boars, and deer) without causing any disease, and occasionally infect humans. Genotype 1 is usually observed in developing countries and causes community-level outbreaks. [13] HEV infection, mirroring HAV, results in acute viral hepatitis. However, HEV poses a significant threat to pregnant women, potentially progressing to fulminant hepatitis and even mortality. HEV demonstrates a preference for adult populations compared to children and often follows both sporadic and epidemic patterns of incidence. [14-16]

In India, the estimated burden of viral hepatitis is very high, Outbreaks of HAV and HEV infection occur following monsoon rain, heavy flooding or massive uptake of untreated sewage into city water treatment plant. Awareness campaigns and initiatives like the National Viral Hepatitis Control Program (NVHCP) are crucial for prevention and achieving elimination goals by 2030.

Aims & Objective: This prospective, cross-sectional study was conducted on all symptomatic patients of acute viral hepatitis attending the tertiary-care hospital in Udaipur, Rajasthan, informed & written consent was obtained from all patients. The present study was aimed

1) To determine the seroprevalence of HAV and HEV and their co-infection among patients presenting with AVH attending our tertiary care hospital at southern part of Rajasthan.
2) To assess their epidemiology in relation to age and seasonal prevalence of these infections in this region.

Material and Methods

It was prospective, cross- sectional study conducted on all symptomatic patients presenting with AVH attenting the American institute of medical sciences [AIIMS] as a tertiary care teaching hospital, Udaipur in southern Rajasthan from July 2024 to June 2025.

Inclusion Criteria: Blood samples from symptomatic patients of all ages and both sexes presenting with symptoms of AVH, including fever, jaundice, hepatomegaly, and abnormal liver function test results, received in the department of microbiology were included in the study.

Exclusion Criteria: Hemolyzed and insufficient blood samples were excluded.

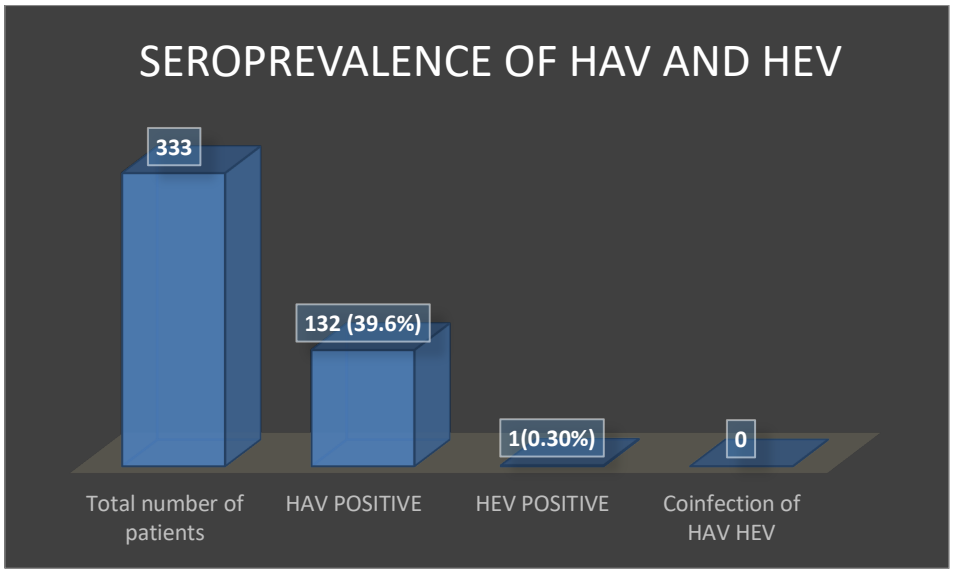
Sample Collection: Following collection, blood samples were centrifuged at 1000 rpm for 5 min to separate serum, which was then analyzed for anti-HAV immunoglobulin M (IgM) and anti- HEV IgM using commercially available RecombiLISA HAV and HEV IgM enzyme-linked immunosorbent assay (ELISA) test kits manufactured in India by CTK Biotech LLP. The tests were conducted according to the manufacturer's guidelines provided with the ELISA kits. Positive and negative controls provided with the kits were run for test validation as per instructions. Internal quality control was established by testing known positive samples.

Statistical Analysis: Data collected was fed into Microsoft Excel and analysis were done using SPSS version 11.

Observation and Results

A total of 333 serum samples were included in this study, out of which 138 serum samples were tested for only IgM anti-hepatitis A virus [HAV] and 8 serum samples were tested for only IgM anti-hepatitis E virus [HEV].187 serum samples were tested for both anti HAV HEV coinfections. Out of 333 samples; 133 patients were positive for both HAV and HEV. Of these 325 [138 + 187] suspected HAV cases, Anti HAV IgM antibodies were detected in 132 (39.6%) serum samples. Among 195 [187+ 8] suspected HEV cases, 1 (0.30 %) serum sample was positive for Anti-HEV IgM

antibodies as shown in Graph 1. Coinfection to HAV &HEV was not observed in any of the cases.



Graph 1: Seroprevalence of HAV and HEV and coinfection

Gender wise distribution of patients showed HAV positivity rate was significantly high among males in comparison to females. 92 (27.6%) male and 41 (12.31%) females were positive. (Table 1)

Table 1: Gender specific distribution of HAV HEV positive samples

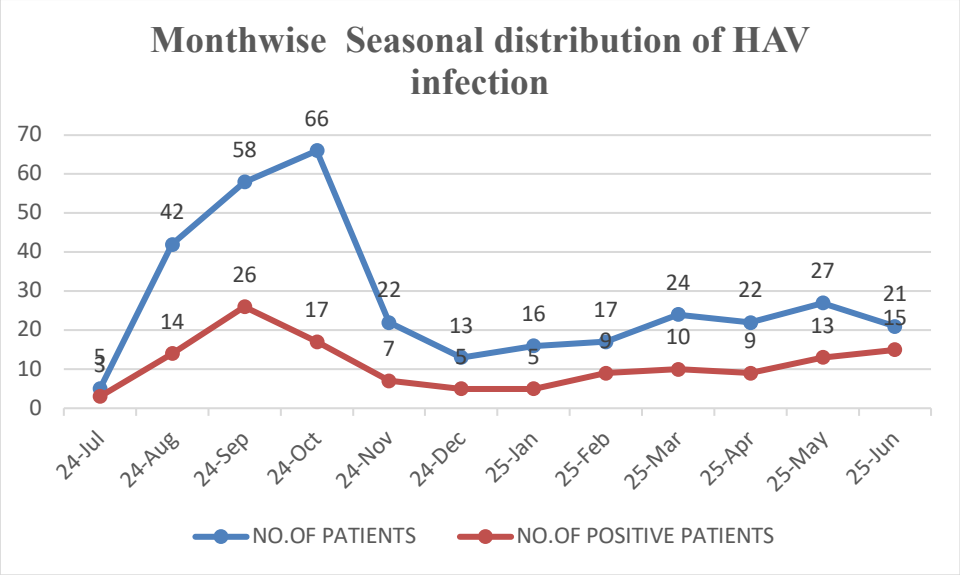
Gender	Number of samples	Positive HAV samples	Positive HEV samples
Male	212	92 (27.6 %)	1(0.30%)
female	121	41 (12.31%)	0
Total	333	133 (39.6%)	1 (0.30%)

As shown in Table 2 Age-wise distribution of patients, all age group were affected by HAV infection; However, HAV infection was seen in all age group. It was found to be more prevalent in the age group between 1 to 15 years with the highest prevalence 77 (23.12%), followed by the age group of 16 to 30 years 52 (15.61%). Age group 31-49 and above 50 were least affected by HAV. In our study only one patient more than 50 years age group was found to be positive (0.30%) for HEV infection.

Table 2: Age wise distribution of HAV and HEV patients

Age	Number of patients	Positive HAV patients	Positive HEV patient
1 to 15	161	77(23.12%)	
16 to 30	91	52 (15.61%)	
31 to 49	53	3 (0.90%)	
>50 Above	28	1 (0.30%)	1 (0.33%)
Total	333	133	1 (0.33%)

As shown in Graph 2 Seasonal variation of study population of HAV and HEV; HAV positive cases were recorded throughout the year with a peak season observed during the monsoon and the start of the winter in Udaipur. Maximum positive cases were observed in Autumn i.e. the month of September and October. There was no significant difference of HAV and HEV infection rate among rural and urban area in our study.



Graph 2: Seasonal distribution of HAV infection month wise

Discussion

This prospective hospital-based study recruited 333 patients who had given informed and written consent and had been ethically approved. The aim of this study was to determine the prevalence of Hepatitis A virus (HAV) and Hepatitis E virus (HEV) infections and their coinfection in patients referred to the American International Institute of Medical Sciences, Udaipur, Rajasthan, from July 2024 to June 2025.

The prevalence of Hepatitis A virus (HAV), Hepatitis E virus (HEV) and co-infection of HAV+HEV among AVH was determined throughout the year. In our study HAV was found significantly more common than HEV, with a prevalence rate of 39.6% for HAV compared to only 0.30% for HEV and co-infection of HAV+HEV was not found in our study. The present study was incoordination to the Triputi bajpai et.al. [17] where the prevalence rate of HAV was 35.8 % compared to only 1.80% for HEV and Parameswari K et. al. [18] the prevalence rate as 42.9 % HAV compared to only 2.49 % for HEV. Generally, the socioeconomic conditions of sanitation and hygiene are closely related to the incidence of Hepatitis A. The primary mode of HAV transmission is through contaminated water, which is a major concern in areas with poor water sanitation. This study highlights to the importance of addressing water quality, especially in urban areas where municipal water may be contaminated, contributing to higher infection rates. In contrast, HEV appears to be less common, with a much lower incidence observed during the study period. Several studies from India have reported a varying prevalence of HAV ranging from 1.7% to 67%. [19] Lower HAV HEV prevalence may be the consequence of declining trend due to improved living standards and environmental hygiene.

Gender specific positivity of HAV male infection among in our study being 92 (27.6 %) was significantly more positive compared to females 41 (12.31%). Prevalence of HAV (39.6%) were higher in males (27.6%) than in females (12.31%) which is in accordance to study by Rawat S.et al.[20] (male 18.34%; female 12.84%), as Men tend to have a weaker immune response compared to women, possibly contributing to the higher positivity rate in males. The lower positivity rate in females (12.31%) could be attributed to strong immune response, which can lead to better resistance to infections.

Age-wise distribution of HAV infection; in this study showed HAV was widespread across all age groups, with significant no. of cases particularly among children and young adults. The age group between 1 to 15 years showed the highest prevalence 77 (23.12%), followed by the age group of 16 to 30 years 52 (15.61%). Children generally have less developed immune systems compared to adults, making them more susceptible to infections. The higher rate of positive cases for Hepatitis A Virus (HAV) among individuals aged 1-15 years could be attributed to several factors Increased Exposure in Childhood and Adolescence, Lower Immunity in Younger Populations, Lack of Vaccination. HEV was detected in one adult patient which was above 50 years. This study is similar to the Sharma A et.al in 2024;[21] in his study also found that the age group between 1 to 20 showed the highest prevalence 34 [15.23%] followed by the age group of 21 to 30 years.

HAV and HEV infections occurred throughout the year, although seasonal variation in the incidence was evident with the maximum number of cases

reported from June to October, i.e. monsoon and post-monsoon seasons or start of winter. Maximum positive cases were observed in Autumn month September and October followed by rainy season in our study. This finding is consistent with other studies from Northwestern part of India. The data provided shows a fluctuation in the number of positive patients across several months, with some months having a higher percentage of positive patients than others. There could be several reasons for this pattern, and here are some possible explanations: Seasonality and Environmental Factors, Changes in Testing or Screening, Behavioral Factors, Healthcare Accessibility, Reporting Bias or Errors. The HAV and HEV infections are transmitted by the feco-oral route, shortage of drinking water supply in summers, and cross-contamination of drinking water with sewage during the monsoons, increases the chances of spread of these infections. Paleshwar MS et al 2022.[22] also showed similar results (i.e) September (16.79%) and October (11.83%) months the HAV positivity rate was found to be high.

Conclusion

Our study identifies a higher prevalence of HAV as compared with HEV infection. HAV infection was found to be more common in pediatric population. For planning of future strategies for vaccination and/or better sanitation program in southern Rajasthan region.

These findings highlight the need for comprehensive public health strategies to reduce HAV and HEV transmission. Effective strategies likely involve collaboration between public health and healthcare systems to (i) Improve sanitation infrastructure, (ii) Promote proper hygiene practices, (iii) Implement HAV vaccination programs, and (iv)Maintain ongoing surveillance of HAV and HEV infections is essential. A supply of safe drinking water and safe sewage disposal can play an important role to control HAV/HEV infections. This study highlights there is need for strategies and better sanitation program to be implemented in Southern Rajasthan Region. The critical areas, healthcare systems and public health agencies can work as well as raising awareness campaign initiatives like NVHCP which are crucial for prevention & achieving eliminatin goals by 2030 toward reducing the morbidity, mortality, and economic burden associated with HAV and HEV infections.

Bibliography

1. Adhunika Singh1, Yogendra Kumar Tiwari2. Seroprevalence of Hepatitis A and Hepatitis E in Patients Suffering From Acute Viral Hepatitis in a Tertiary Care Hospital of Rajasthan. International Journal of Pharmaceutical and Clinical Research. 2024; 16(6); 1687-1696.
2. Kuntz E, Kuntz HD. Hepatology. Textbook and Atlas. Springer; 2008; 3(2).
3. Centers for Disease Control and Prevention (CDC). Global Viral Hepatitis; 2024. Available from: https://www.cdc.gov/hepatitis/global/index.html
4. Vitral CL, da Silva-Nunes M, Pinto MA, de Oliveira JM, Gaspar AM, Pereira RC, et al. Hepatitis A and E seroprevalenc and associated risk factors: A community-based cross-sectional survey in rural Amazonia. BMC Infect Dis. 2014; 14:458.
5. Joon A, Rao P, Shenov SM, Baliga S. Prevalence of hepatitis A virus (HAV) and hepatitis E virus (HEV) in the patients presenting with acute viral hepatitis. Indian J Med Microbiol. 2015; 33:102–105.
6. Samaddar A, Taklikar S, Kale P, Kumar CA, Baveja S. Infectious hepatitis:a 3-year retrospective study at a tertiary care hospital in India. Indian J Med Microbiol. 2019; 37:230–234.
7. Antony J, Celine TM. A hospital-based retrospective study on frequency and distribution of viral hepatitis. J Global Infect Dis. 2014; 6:99–104.
8. Sarangi G, Dash M, Mahapatra D, Paty BP, Mohanty DP, Chayani N. Fecal-oral-transmitted hepatitis A and E prevalence in Eastern India: a 3-years retrospective study. J Med Soc. 2019; 33:86–90.
9. Meena, Jinwal; Pandey, Maneesha; Gagrani, Neelesh; Shaw, Prachi; and Bajpai, Trupti. Seroprevalence of hepatitis A virus and hepatitis E virus among the patients presenting with acute viral hepatitis admitted in a tertiary care center located in Central India, Menoufia Medical Journal: 2021;34: (2): Article 30.582-586.
10. Nandi B, Hadimani P, Arunachalam R, Ganjoo RK. Spectrum of acute viral hepatitis in Southern India. Med J Armed Forces India. 2009;65: 7–9.
11. Stapleton JT. Host immune response to hepatitis a virus. J Infect Dis. 1995;171 (Suppl 1): S9-14.
12. Rawat S, Gil PS, Gupta T, Malhotra P, Parmar A. Prevalence of hepatitis A virus and hepatitis E virus in the patients presenting with acute viral hepatitis in Rohtak, Haryana, India. Int J Res Med Sci. 2019; 7: 1792–5.
13. Patel P, Sood N, Modi D. Prevalence of Hepatitis A Virus and Hepatitis E Virus Infection in Patients from A Tertiary Care Hospital of West India, Ahmedabad.
14. Van Cuyck H, Fan J, Robertson DL, Roques P. Evidence of recombination between divergent Hepatitis E virus. J Virol. 2005; 79:9305-14.

15. Hepatitis A and E. Available from: https://www. hopkinsmedicine.org/health/conditions-and-diseases/ hepatitis/hepatitis-a.
16. Chobe LP, Arankalle VA. Investigation of a hepatitis A outbreak from Shimla, Himachal Pradesh. Indian J Med Res. 2009; 130:179-84.
17. Bajpai T, Shaw P, Pandey M. Seroprevalence of hepatitis A virus AND Hepatitis E virus among the patients presenting with acute viral hepatitis admitted in a tertiary care center located I Central India. Menoufia Medical Journal. 2021; 34(2):582.
18. Parameswari K, D. Vanisree, K. Monica: Prevalence of Hepatitis A and Hepatitis E in Patients Presenting with Acute Viral Hepatitis at a Tertiary Care Hospital, Guntur, Andhra Pradesh. European journal of cardiovascular medicine; open access. 2025;15(7):917-920.
19. Jain P, Prakash S, Gupta S, Singh KP, Shrivastava S, Singh DD, et al. Prevalence of hepatitis A virus, hepatitis B virus, hepatitis C virus, hepatitis D virus and hepatitis E virus as causes of acute viral hepatitis in North India: a hospital-based study. Indian J Med Microbiol. 2013; 31:261-5.
20. Rawat S, Gil PS, Gupta T, Malhotra P, Parmar A. Prevalence of hepatitis A virus and hepatitis E virus in the patients presenting with acute viral hepatitis in Rohtak, Haryana, India. Int J Res Med Sci. 2019; 7:1792-5.
21. Sharma A, Kumar N, Sood A. Seroprevalence of Hepatitis A virus and Hepatitis E virus in patients presenting with acute viral hepatitis: A retrospective study of 2-years at tertiary care Hospital, Himachal Pradesh in Northern India. Indian J Microbiol Res. 2024;11(1):38-41.
22. Palewar MS, Joshi S, Choudhary G, Das R, Sadafale A, Karyakarte R. Prevalence of Hepatitis A Virus (HAV) and Hepatitis E Virus (HEV) in patients presenting with acute viral hepatitis: A 3-year retrospective study at a tertiary care hospital in Western India. J Family Med Prim Care. 2022;11:2437-41.