

# The Prevalence of Hepatitis A Causing Acute Viral Hepatitis in Western Rajasthan

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## ABSTRACT

**Introduction:** Hepatitis A is one of the leading agents to cause acute viral hepatitis in India. It is enterically transmitted and cause asymptomatic or mild symptomatic acute viral hepatitis. Knowledge of HAV prevalence can help in selecting appropriate vaccine and preventive strategies to fight against it.

**Materials and Methods:** Blood samples were collected from the patients suspected for acute viral hepatitis and serum was separated after centrifugation. ELISA was performed for the detection of anti-HAV IgM and results were recorded as optical density value and compared with cut off value.

**Result:** A total of 297 patients were tested and 24% (n=71) were found to be positive for Anti HAV IgM antibodies with 60.6% (n=43) males and 39.4% (n=28) females. The highest positivity was observed in children below the age of 5 years.

**Conclusion:** The prevalence of HAV infection is high in western Rajasthan and educating the local population about improving personal hygiene and designing vaccination strategy is required.

**Keywords:** Anti-HAV IgM; Enterically transmitted virus; Enzyme Linked Immunosorbent Assay; Hepatitis

## INTRODUCTION

Hepatitis A virus (HAV) is one of the leading viral agents responsible for acute viral hepatitis (AVH) in the world. Developing nations with compromised sanitary conditions have AVH as a major public health problem. HAV, like other hepatitis virus, are found in endemic form in India. HAV belongs to genus Hepatovirus under the family Picornaviridae. It is a RNA virus, 27 nm in size, non enveloped having an incubation period of 2-3 weeks. It is transmitted through feco-oral route via contaminated food and water leading to a self-limiting AVH which ensures immunity to re-infection. [1] HAV multiplies in liver

cell hampering its functions and leading to stimulation of immune response resulting in liver inflammation and antibody synthesis of both IgM and IgG type. [2]

HAV infections are usually asymptomatic or mild symptomatic among children while severe liver diseases like cholestatic and relapsing hepatitis develops in adults. Improved sanitary conditions have an impact in shifting of HAV infections from children to adults. [3] The mortality rate of HAV infection is reported very low (0.05% to 0.1%) in India. [4] Serological demonstration of antibodies against HAV establishes the diagnosis. Safe and effective vaccines are available against HAV. [5]

Prevention strategies and use of appropriate vaccine can be decided on the knowledge of HAV infection prevalence of the region. Therefore, this study was conducted to determine the prevalence of HAV infection among the patients with AVH symptoms in Western Rajasthan.

## MATERIALS AND METHODS

A prospective, cross-sectional study was conducted in the department of Microbiology, Dr. S.N. Medical College and Associated hospitals, Jodhpur for a period of 30 months from January 2016 to July 2018.

All the patients visiting the OPD of Dr. S.N. Medical College and Associated hospitals, clinically suspected for acute viral hepatitis, were included in the study.

After obtaining the consent from patients, 1-2 ml blood samples from children and 5 ml from adults were collected aseptically by expert phlebotomist and sent to Serology and Immunology Laboratory of the Microbiology Department. The blood samples were centrifuged at 3000 rpm for 3 minutes to obtain serum.

The serum samples were analyzed for anti HAV IgM antibodies by using commercially available Enzyme Linked Immunosorbent Assay (ELISA) kits (Medical Biological Service, Opera- MI-Italy) as per instructions mentioned in the manufacturer's literature provided within the ELISA kit. The ELISA test was performed in the automated DAVINCI Quattro (Biomeuriex, Marcy l'Etoile, France) along with spectrophotometric reading which was recorded quantitatively as Optical Density (OD) value. The OD value of samples were compared with the cut-off value (calculated as instructed by manufacturer) and reported as positive or negative.

**Statistical Analysis:** Chi-Square test was used for statistical analysis using Statistics and Sample Size Pro App Version 1.0 and a p value <0.01 was considered significant.

## RESULT

A total of 297 patients participated in the study while sample was found to be hemolysed so it was excluded from study. Out of 296 patients, 71 (24%) were seropositive while 225 (76%) were seronegative for anti HAV IgM antibodies. The male to female gender ratio was 1.5:1 with 60.6% males (n=43) and 39.4% females (n=28) among 71 ser-positive patients.

Table 1. The age group of the patients found seropositive for Anti-HAV IgM in ELISA.

Age Group	Number of Seropositive Patients
<1 year	3
1-5 years	22
6-10 years	14
11-15 years	09
16-25 years	15
26-45 years	06
>45 years	03

The higher rate of positivity was noted in paediatric age group patients (Table 1). The patients with age group above 45 years were observed least affected by HAV with only 3 sero-positive cases.

The Chi-Square value was recorded 9.635 and the p-value was calculated 0.00191. The results were significant at p <.01.

## DISCUSSION

The spectrum of AVH is distributed worldwide with approximately more than 1.4 million new cases reported annually. The HAV rarely cause fulminant hepatitis and is seldom fatal with a fatality rate of 0 to 2 percent. [6-7] The seroprevalence of HAV varies with time and geographical location from country to country, city to city and even within different communities of same city. [8-9] There are very few published data available from India for acute HAV hepatitis and some of them suggest changing epidemiological outline. [10-12] Joon et al reported 19.31% seropositivity for HAV from Mangalore while Sarthi et al reported 37.25% seropositivity for HAV in patients presenting with AVH from Davengere. Both studies are from different cities of same state, Karnataka (India) with a

notable difference in prevalence rate of HAV. [13-14] A seropositivity rate of 30.63% and 44.8% for HAV were reported from Brazil and Bagdad respectively. [15-16] The difference in seroprevalence findings of present study and that of other studies may relate to differences in HAV epidemiology in different geographical location, population group and social habits.

Few authors have reported decreased incidence of AVH with HAV in small children [10,17] due to improved socioeconomic status while in present study the incidence among paediatric age group is recorded very high. The high rate of prevalence of HAV infection among children, especially those with age range between 1 year to 5 years, in this region can be due to two major reasons such as (i) this age group is not mature enough to take care of themselves, and (ii) Dr. S.N. Medical College and associated hospital caters not only the Jodhpur city but the most of villages located in western Rajasthan where the clean water supply is not available in most houses and the sanitary conditions are compromised. Similar results are also reported by few other authors too. [18-20] The sanitary conditions are compromised in developing countries where people live in crowded places, the children get infected with HAV before the age of ten and 90% of population carry anti-HAV antibodies and become immune to the virus. [21]

Western Rajasthan is a dry region, part of Thar Desert, with very low rainfall. The drainage system are not enough to control unexpected heavy rains specially in old city areas where short period flood like situations are noted in monsoon even in short rain durations. During such short term over flooded situation the drinking water contamination with sewage can't be denied. HAV can cause superinfection or coinfection with other hepatitis virus. HAV co-infection has previously been reported along with HEV from western Rajasthan. [22]

**Limitation:** The present study is hospital based study, no healthy volunteers from community was evaluated for anti HAV antibodies so these results cannot be used for estimation of disease burden in community.

## CONCLUSION

The result of present study reveals the endemicity of HAV in western Rajasthan region and still higher among young children especially below 5 years of age. The study at regular interval needs to be performed for to evaluate and to observe changes in pattern of HAV prevalence in this reason. The results of present study can help in framing public health policies like sanitation program and formulation of vaccination strategies for appropriate use and controlling hepatitis A efficiently.

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