

## Hepatitis A: A Clinical Spectrum of the Disease in Children Admitted in a Tertiary Care Hospital

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**Abstract:**

**Introduction:** HAV causes acute hepatitis worldwide, mostly through oral-faecal pathways. While rich nations have lower infection rates, injection drug users, men who have sex with males, travellers to endemic areas, and secluded populations are at risk. HAV doesn't cause chronic liver illness like hepatitis B or C. Children over 12 months should be vaccinated. Poor sanitation causes high endemic rates in impoverished countries.

**Aims and Objectives:** This study aims to examine the clinical spectrum of Hepatitis A in paediatric patients.

**Method:** The Paediatric Department of Hind Medical College Ataria, Sitapur conducted this cross-sectional study from February 2022, to February, 2023, to investigate acute hepatitis in children aged 1-12. The Institutional Ethical Review Board approval had been taken for the study, excluding children with preexisting liver disease and including those with acute hepatitis symptoms lasting  $\leq 21$  days, high ALT, and parental agreement. Demographics, clinical symptoms, ELISA blood samples for anti-HAV and anti-HEV IgM antibodies, and laboratory data were collected.

**Results:** Table 1 shows 150 youngsters with HAV-induced acute viral hepatitis. The average age was  $7.3 \pm 3.0$  years, with 42% aged 6-10 years. Male patients made up 53.33% and rural residents 55.33%. Maternal education varied, and 36.66% were lower-middle-class. Table 2 lists HAV-related symptoms including fever (72.66%), jaundice (65.33%), and black urine (70.00%). Table 3 shows increased bilirubin, ALT, AST, ALP, and INR, emphasizing the necessity for early medical intervention in acute HAV patients.

**Conclusion:** The majority of HAV-induced acute viral hepatitis cases occur in 6-10-year-olds, highlighting the need for routine immunisation and public health education.

**Keywords:** "hepatitis A virus (HAV)", Acute hepatitis, cholestatic, "hepatitis E virus (HEV)".

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**Introduction**

The "hepatitis A virus (HAV)" is a prevalent causative agent of acute hepatitis on a global scale. The transmission of the "Human Immunodeficiency Virus (HIV)" is predominantly facilitated through the oral-faecal route, whereby individuals are exposed to contaminated water, or food, or engage in close physical interaction with an infected individual. Based on data from the "World Health Organisation (WHO)", it can be observed that infection rates in wealthy countries are relatively low [1]. Nevertheless, it is important to note that there are certain populations who are considered to be at a higher risk. These groups include individuals who engage in injection-drug usage, males who have sexual relations with other men, individuals who are travelling to locations where the disease is prevalent, and isolated communities. Unlike hepatitis B or C, "human adenovirus (HAV)" does not induce chronic liver disease [2,3].

Acute hepatitis often manifests as a limited-duration sickness, with the occurrence of fulminant hepatitis being infrequent. Common symptoms associated with acute infection encompass nausea, vomiting, abdominal discomfort, exhaustion, malaise, diminished appetite, and fever. The recommended approach for addressing this condition involves the provision of supportive treatment. Various clinical patterns that might be observed in this context encompass cholestatic, protracted, and recurrent manifestations of the disease. It is advisable to provide the HAV vaccine to those aged 12 months and above who are at risk of exposure, such as travellers to regions where the virus is prevalent, men who engage in same-sex sexual activity, individuals who use illegal drugs, those who may encounter the virus through their employment, and individuals with chronic liver disease [4,5].

The “Hepatitis A virus (HAV)” is widely recognized as a prevalent etiological agent responsible for acute hepatitis infection on a global scale. According to the “World Health Organisation (WHO)”, an estimated 1.5 million individuals contract “Hepatitis A Virus (HAV)” annually. Developing countries characterized by poor socioeconomic status and inadequate sanitation and hygiene practices have elevated levels of endemic rates. Typically, exposure in the context of these developing nations is predominantly observed during the early stages of life [6].

In the paediatric population, acute hepatitis A infection typically does not exhibit symptoms in young children. However, older children may display various clinical manifestations, including unusual presentations such as cholestatic hepatitis, extrahepatic signs, and relapsing hepatitis. Both the cholestatic and relapsing versions have been linked to a higher prevalence of immune-complex deposition illnesses, such as cutaneous vasculitis, arthritis, and cryoglobulinemia [7]. The presence of HLA-DRB 1310, a genetic marker, has been linked to the development of paediatric autoimmune hepatitis in cases of prolonged hepatitis A virus infection. When assessing a paediatric patient presenting with persistent cholestasis or recurring jaundice, it is important to include atypical Hepatitis A infection as a potential diagnosis in the differential diagnosis [8].

Infections caused by the “hepatitis A virus (HAV)” and “hepatitis E virus (HEV)” can manifest as both sporadic cases and outbreaks. The transmission of infectious diseases has been extensively documented in both household and institutional environments. The prevailing factors that have been implicated include the ingestion of food, milk, dairy products, or water that has been contaminated, which is often exacerbated by inadequate sanitation practices and overcrowded conditions. Both “hepatitis A virus (HAV)” and “hepatitis E virus (HEV)” infections are characterized by being self-limiting, meaning that they resolve on their own without medical intervention [9,10]. Additionally, individuals who have experienced these illnesses develop lifelong immunity, meaning they are protected from future infections caused by the same virus. Children diagnosed with “acute viral hepatitis (AVH)” typically exhibit a range of nonspecific gastrointestinal symptoms alongside fever. The manifestation of jaundice, characterized by the observable yellowing of the urine and eyes resulting from elevated levels of bilirubin, is afterwards accompanied by abdominal pain, emesis, queasiness, and diminished appetite, exhibiting varying degrees of occurrence. Uncommon presentations encompass fulminant hepatic failure, aplastic anemia, and protracted cholestatic syndrome [11,12].

The Expanded Programme of Immunisation in Pakistan does not endorse routine immunization for HAV. The probable cause of this situation might be attributed to a lack of comprehensive seroprevalence data, namely pertaining to the pediatric demographic. The evaluation of the necessity to provide vaccinations to populations at high risk, including pregnant women, individuals with chronic liver conditions, and young children, is crucial for the implementation of “hepatitis A virus (HAV)” immunization and preventative measures against “hepatitis E virus (HEV)” infection in children residing in countries like Pakistan [13,14].

The acute infection caused by the “hepatitis A virus (HAV)” is often a condition that resolves on its own. It is characterized by symptoms such as nausea, vomiting, discomfort in the upper right quadrant of the abdomen, general feeling of unwell, loss of appetite, muscle pain, exhaustion, and fever. Patients may experience the onset of dark urine and pale faeces within a span of approximately one week, subsequently accompanied by the manifestation of jaundice, icteric sclera (characterized by a yellowish hue), and pruritus [15]. It is commonly observed that patients often exhibit heightened concentrations of serum alanine aminotransferase, bilirubin, lambda-glutamyl transpeptidase, aspartate aminotransferase, and alkaline phosphatase. The laboratory abnormalities generally exhibit resolution during a period of 1 to 6 weeks subsequent to the manifestation of symptoms. The incubation phase typically spans a duration of 14 to 28 days, although in certain cases it may extend up to 50 days. The degree of symptom severity exhibits variation across different age groups and comorbidities, with a particular emphasis on pre-existing chronic liver disease. The majority of youngsters who have acute HAV infection do not exhibit any symptoms [16-18].

## Method

### Research Design

This cross-sectional study was carried out at the Department of Paediatric Medicine in our hospital, from February 2022 to February 2023, which evaluated acute hepatitis in children ranging in age from 1-16 years. On February 2023, authorization for the study was granted by the Institutional Ethical Review Board. Children who had a history of liver disease were not allowed to participate in the study, but those who displayed symptoms and signs of acute hepatitis were allowed to participate in the study utilising successive sampling after receiving informed consent from their parents. Children who presented with an acute illness that lasted less than 21 days and was accompanied by any hepatitis-related symptoms (such as fever, jaundice, anorexia, nausea, vomiting, and abdominal pain) were considered to have acute hepatitis. Additionally,

their alanine aminotransferase (ALT) levels were found to be increased. Recording demographic information such as age, gender, parental education, residential area, socioeconomic level, household size, water source, and illness duration was a necessary part of collecting data. Modified Kupuswamy classifications served as the basis for the categorization of socioeconomic status. The clinical presentations were documented, and blood samples were collected using aseptic techniques for the assessment of anti-HAV and anti-HEV IgM antibodies, as well as other relevant laboratory parameters for acute hepatitis. These parameters included PT, INR, ALT, AST, ALP, and total bilirubin, and they were analysed via “enzyme-linked immunosorbent assay (ELISA)” tests in accordance with the manufacturer’s guidelines.

### Inclusion and exclusion

#### Inclusion

- Children 1 year to 16 years presented with signs and symptoms of acute viral hepatitis.
- Children exhibiting increased levels of “alanine aminotransferase (ALT)”.

#### Exclusion

- Children below 1 yrs.
- Children who have a confirmed medical record of previous liver illness or chronic hepatitis.
- Children who were unable to get informed permission from their parents or legal guardians.

#### Statistical Analysis

This study used IBM SPSS 24 for Windows for statistical analysis. Given a 60% HAV prevalence,

95% confidence, and 7% margin of error, a minimum sample size of 150 children was estimated to assure statistical power. Summary statistics included mean and “standard deviation (SD)” for numerical variables and frequencies with percentages for categorical categories. Categorical and numerical data were evaluated using the chi-square test and independent sample t-test to compare HAV and HEV groups. Study findings were interpreted using a statistical significance level of  $p < 0.05$ .

#### Ethical Approval

The Ethical Committee of our hospital has approved the study.

#### Result

Table 1 shows HAV-induced acute viral hepatitis in children. A study of 150 children had an average age of  $7.3 \pm 3.0$  years. Age distribution revealed a substantial proportion of cases in the 6-10 years age group (42.00%), followed by children aged  $\leq 5$  years (33.33%) and those beyond 10 years (24.66%). Male patients predominated (53.33%) and female cases 46.66%. In terms of residence, 55.33% were rural and 44.66% urban. Lower-middle-class families made up 36.66% of the population. Mothers were illiterate (20.00%) and graduates (13.33%). The drinking water supply was diverse, with 33.33% municipal, 30.00% bottled, and 36.66% underground. The median sickness duration was 6.5 days, ranging from 2 to 21 days, demonstrating the acute character of hepatitis A in these youngsters.

**Table 1: Clinical features of acute viral hepatitis in children**

| Characteristics            | Value         |
|----------------------------|---------------|
| Age (years)                | $7.3 \pm 3.0$ |
| $\leq 5$                   | 50 (33.33%)   |
| 6-10                       | 63 (42.00%)   |
| $> 10$                     | 37 (24.66%)   |
| Gender                     |               |
| Male                       | 80 (53.33%)   |
| Female                     | 70 (46.66%)   |
| Area of residence          |               |
| Rural                      | 83 (55.33%)   |
| Urban                      | 67 (44.66%)   |
| Socioeconomic status       |               |
| Low                        | 35 (23.33%)   |
| Lower-middle               | 55 (36.66%)   |
| Upper-middle               | 35 (23.33%)   |
| High                       | 25 (16.66%)   |
| Maternal education         |               |
| Illiterate                 | 30 (20.00%)   |
| Primary education          | 25 (16.66%)   |
| Secondary education        | 23 (15.33%)   |
| Higher secondary education | 22 (14.66%)   |
| Graduate and above         | 20 (13.33%)   |

|                            |             |
|----------------------------|-------------|
| # of children in house     | 3 (2.00%)   |
| Source of drinking water   |             |
| Municipal supply           | 50 (33.33%) |
| Bottled water              | 45 (30.00%) |
| Underground water          | 55 (36.66%) |
| Duration of illness (days) | 6.5 (2-21)  |

Table 2 shows the prevalence of common HAV-related symptoms in children. Fever was the most common symptom in 72.66% of 150 youngsters. Visual jaundice and black urine were also common, affecting 65.33% and 70.00% of children, respectively, indicating viral hepatitis. Vomiting (52.66%), nausea (46.66%), and stomach pain (39.33%) were

other common symptoms of acute viral hepatitis in children. Around 72.00% of patients also experienced appetite loss. These findings emphasise the necessity of recognising these clinical signs for early diagnosis and treatment of paediatric acute viral hepatitis.

**Table 2: Acute viral hepatitis children's complaint frequency**

| Presenting complaint   | HAV (n=150)  |
|------------------------|--------------|
| Fever                  | 109 (72.66%) |
| Vomiting               | 79 (52.66%)  |
| Abdominal pain         | 59 (39.33%)  |
| Yellowness of the eyes | 98 (65.33%)  |
| Dark-colored urine     | 105 (70.00%) |
| Nausea                 | 70 (46.66%)  |
| Loss of appetite       | 108 (72.00%) |

Table 3 shows the biochemical markers of acute viral hepatitis in 150 HAV-infected children. Significant liver function abnormalities are shown. The increased bilirubin level ( $5.9 \pm 1.8$  mg/dL) indicates severe jaundice. Elevated ALT and AST readings, averaging  $1698.5 \pm 961.4$  IU/L and  $1699.7 \pm 988.1$  IU/L, respectively, indicate significant liver injury.

Elevated ALP readings ( $639.1 \pm 271.0$  IU/L) indicate hepatic involvement. The INR, which measures blood clotting function, is high at  $1.7 \pm 0.5$ , indicating poor liver synthetic function. These data show the severity of liver failure in children with acute HAV infection, emphasising the necessity for early medical intervention and hepatic function monitoring.

**Table 3: Acute viral hepatitis in children biochemical parameters**

| Parameter         | HAV (n=150)        |
|-------------------|--------------------|
| Bilirubin (mg/dL) | $5.9 \pm 1.8$      |
| ALT (IU/L)        | $1698.5 \pm 961.4$ |
| AST (IU/L)        | $1699.7 \pm 988.1$ |
| ALP (IU/L)        | $639.1 \pm 271.0$  |
| INR               | $1.7 \pm 0.5$      |

## Discussion

The Hepatitis A virus (HAV) is a prevalent infectious disease that is typically obtained through the fecal-oral route. The phenomenon is prevalent in rapidly developing urban areas. The persistence of this disease, despite the widespread availability of a highly effective vaccination, can be attributed to the inadequate state of sanitation infrastructure. The condition can exhibit a variety of clinical presentations, ranging from asymptomatic infection to severe hepatitis [19, 20]. The objective of this study was to examine the clinical characteristics of pediatric patients diagnosed with Hepatitis A infection. This study presents a retrospective review of pediatric patients, aged 6 months to 12 years, who were diagnosed with Acute Hepatitis A Virus (HAV) based on the detection of IgM antibodies in a tertiary care hospital over the course of one year. In contrast,

our study found that substantial proportion of cases in the 6-10 years age group (42.00%), followed by children aged  $\leq 5$  years (33.33%) and those beyond 10 years (24.66%). Simultaneously, our study also found 53.33% of male patients predominated rather than 46.66% of female cases. The study focused on the examination of clinical characteristics and consequences. The study's findings indicate that while hepatitis A infection is typically a self-limiting condition, the presence of co-infection, underlying liver disease, and the use of specific medications can lead to the development of severe consequences. Therefore, it is imperative to ensure that all patients are diligently monitored until a full recovery is achieved [20].

A study was undertaken to investigate the progression and potential consequences associated with hepatitis A in pediatric patients. A total of seventy-

eight children who were diagnosed with acute viral hepatitis A, as confirmed by the presence of IgM anti-HAV, were included in a prospective study to investigate the potential involvement of other bodily systems and the occurrence of sequelae. The study's findings indicate that while hepatitis A infection is typically a self-limiting condition, it is not uncommon for individuals to experience extrahepatic symptoms and mortality. It is imperative to ensure that all patients are diligently monitored until full recovery is achieved. The ability to identify complications relies solely on a robust level of suspicion [21].

A research investigation was undertaken to determine the incidence of hepatotropic viruses in the etiology of acute liver failure among pediatric patients hospitalized at a tertiary hospital in Kolkata. The study aimed to analyze the clinical and laboratory parameters, including viral indicators, of pediatric patients diagnosed with acute liver failure. The data will be collected using a pre-established and structured proforma. The study comprised patients between the ages of 1 and 12 years who were admitted and satisfied the criteria for acute liver failure. Furthermore, our study found that HAV-induced acute viral hepatitis in children reported a high rate of cases in boys aged 6-10. Half of the children were rural and many were from lower-middle-class homes. The brief duration of symptoms highlights the acute character of hepatitis A in children. Study participants had different maternal education and drinking water sources. The primary etiology of acute liver failure in pediatric patients in southern Bengal is attributed to hepatotropic viruses. Among these viruses, hepatitis A and E are primarily transmitted through the gastrointestinal route [22].

The objective of the study was to determine the clinical range of acute viral hepatitis A (AVH-A) infection in pediatric patients, investigate the correlation between atypical symptoms and laboratory results, and assess the prognosis of patients exhibiting typical and atypical manifestations of hepatitis A virus (HAV) infection. The study comprised children under the age of 18 who exhibited characteristics indicative of acute viral hepatitis (AVH) and tested positive for IgM anti-hepatitis virus (HAV) antibodies. These children were selected from both inpatient and outpatient settings. In underdeveloped nations, it is relatively unusual for children with acute viral hepatitis A (AVH-A) to exhibit atypical signs, including persistent cholestasis and ascites. These manifestations are observed in around one-sixth of the affected patients [23].

A study was conducted to evaluate the clinical progression and biochemical characteristics of symptomatic pediatric patients diagnosed with viral hepatitis A, who exhibited uncharacteristic clinical presentations. Among a cohort of 229 pediatric patients diagnosed with hepatitis A, a notable proportion of 14.4% exhibited unusual symptoms. The typical

manifestations observed in patients included prolonged cholestasis, abrupt liver failure, recurrence, ascites, and hematological complications. On the other hand, our study shows that children with HAV-related symptoms had significant rates of fever, ocular jaundice, and dark urine, indicating viral hepatitis. Common symptoms included vomiting, nausea, stomach pain, and appetite loss. These findings emphasize the necessity of quickly recognizing and treating these clinical symptoms to manage juvenile acute viral hepatitis. The liver histology findings indicated the presence of chronic liver disease in six pediatric patients who experienced prolonged jaundice. The study observed that those who exhibited atypical presentations were characterized by advanced age and elevated levels of total serum bilirubin in comparison to those who displayed usual presentations. Roughly, 15.3% of pediatric patients diagnosed with acute hepatitis A infection have an unusual clinical presentation, which has been linked to a higher incidence of morbidity [24].

The objective of the study was to provide a comprehensive analysis of the clinical manifestations observed in cases of acute hepatitis A within the regions of Seoul and Gyeonggi province over the course of the past two years. There has been an observed increase in the age distribution of individuals diagnosed with acute hepatitis A in recent years. In contrast, our study demonstrates the biochemical parameters of children, which has found that HAV-infected children's biochemical marker investigation showed substantial liver function impairments. High bilirubin, ALT, AST, ALP, and INR values indicate liver damage and impaired synthetic function. Early medical care and hepatic function monitoring are essential for children with acute HAV infection. The majority of patients experienced a smooth recovery process without any notable complications. Nevertheless, a significant proportion of individuals exhibited atypical manifestations, including acute hepatitis and renal failure. In cases with hepatitis A where seronegativity is observed, it is necessary to do a subsequent serologic test to detect the presence of IgM anti-HAV antibodies [25].

### Conclusion

This study concluded that HAV-caused acute viral hepatitis is the most common form of the disease, with the biggest age group afflicted being 6 years to 10. These findings emphasize the necessity of including hepatitis A vaccination in routine immunisation programmes, especially for children this age. It also emphasises public health education campaigns' importance. Safe drinking water, hand hygiene, appropriate waste disposal, and hygienic latrines should be the focus of these initiatives. Population awareness of acute viral hepatitis clinical signs is also crucial. Early diagnosis and treatment are crucial to preventing this disease's morbidity and

mortality. We can significantly reduce hepatitis A and improve public health by applying these methods.

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