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## Spectrum of acute hepatitis in hospitalized children

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### Abstract

**Background:** Acute Hepatitis has been a leading public health problem throughout the world and more so in developing countries. So this study was undertaken to study the demographic and etiological profile of acute hepatitis in our area.

**Methods:** This study a prospective observational study was done in pediatric department of district hospital Udhampur, a secondary care centre. All the patients with diagnosis of acute hepatitis were evaluated and investigated and case records were recorded in a pre-designed performa.

**Results:** Fever, yellow urine, and lack of appetite were the most common presenting complaints seen in 90.90%, 81.16%, and 77.27% of the patients respectively. Most common physical findings were hepatomegaly and icterus. The most common age group affected was 5-10 years. Fulminant hepatic failure was seen in 5% of the patients. Hepatitis A was encountered most frequently (60%), followed by mixed infections (11%) and enteric hepatitis (6.94%). Hepatitis E and Hepatitis B were encountered least frequently (1.94% each).

**Conclusion:** Hepatitis A is the leading cause of acute hepatitis in hospitalized children. A lot needs to be done to improve the vaccine coverage of Hepatitis A in our area to prevent it.

**Keywords:** Children, hepatitis, jaundice, viral

### Introduction

Acute hepatitis is a systemic infection affecting the liver predominantly. It is marked by hepatic cell necrosis and inflammation which leads to a characteristic constellation of clinical, biochemical and pathological changes <sup>[1]</sup>. The predominant etiological agents are HAV, HBV, HCV, HDV and HEV. Others like HGV, Cytomegalovirus (CMV), Herpes simplex virus, Epstein Barr virus and Yellow Fever virus account for only 1-2 per cent of all hepatitis causing viruses <sup>[2]</sup>. During the past few decades hepatitis has become an increasingly important problem throughout the world and more so in the third world countries occurring in sporadic, endemic as well as epidemic forms. Acute hepatitis has been an endemic public health problem in our setup because of poor sanitation and hygiene. This study was done to improve the understanding of epidemiology of acute hepatitis in children in our area.

### Materials and Methods

All children with the diagnosis of acute hepatitis in the age group of 1-18 years, presenting in OPD or admitted in wards from emergency in District Hospital Udhampur over a period of 2 years from March 2017 to February 2019 were included in the study. This included all children (age 1-18 yrs) presenting with:

- Acute illness including jaundice, dark colored urine, clay colored stools, anorexia, malaise, extreme fatigue and right upper quadrant pain.
- Icterus or aminotransferases levels > 2.5 times the upper limit of normal. Fulminant hepatic failure was defined as the onset of encephalopathy within 12 weeks of onset of disease <sup>[3]</sup>.

In each case a detailed history regarding the age, presenting symptoms, possible risk factors for acquiring viral hepatitis and detailed physical examination was done. Then the patient was subjected to the laboratory investigations including complete blood counts, liver function tests, widal test and blood culture. Sera were tested by ELISA for viral hepatitis A to E. The various tests done were anti-HAV IgM, anti HEV IgM, HBsAg, Anti HCV. Further investigations were done where ever felt necessary.

The data collected was compiled and entered in MS excel and analysed using appropriate statistical tools in software SPSS-18. Continuous variables were expressed as (mean  $\pm$  standard deviation) whereas categorical variables were expressed as frequency (in percentage).

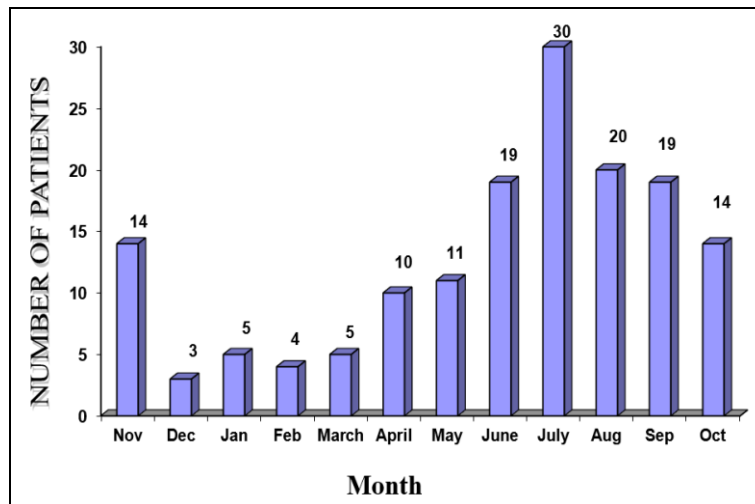
### Results

This study included the profile of 154 patients with acute hepatitis. One hundred one (65.58%) patients were male and 53 (34.42%) patients were females with male to female ratio of 1.9:1. Eighty-five (55.19%) patients belonged to rural areas whereas 69 (44.81%) belonged to urban areas. Most cases, 116 (75.32%) occurred in the months from June to November (Figure.1). Average number of patients per month was 12.83 ( $\pm$  8.16). Maximum no. of patients, 55(35.71%) belonged to the age group of 5 -10 years followed by 46(29.8%) and 42(27.22%) in the age group of 1 - 5 years and 10 - 15 years respectively (Table 1). The mean age of the patient was 7.82( $\pm$  4.08) years. Fever was the most common chief complaint seen in 140 (90.9%) patients. It was accompanied by rigors and chills in 19 (12.33%) patients. Lack of appetite was seen in 119 (77.27%) patients whereas yellow eyes and yellow urine were one of the presenting complaints in 113 (73.37%) and 125 (81.16%) patients respectively (Table 2). Triad of lack of appetite, yellow urine and jaundice was seen in 73 (47.40%) patients whereas triad of lack of appetite, fever and yellow urine was seen in 88 (57.14%) patients. The most common physical finding seen in the patients of acute hepatitis was hepatomegaly which was seen in 146 (94.80%) patients followed by icterus noted in the sclera in 138 (89.61%) patients. Significant pallor was seen in 39 (25.32%) patients, whereas splenomegaly was also seen in 39 (25.32%) patients (Table 3). The average serum bilirubin of the patients was 7.11 ( $\pm$  6.81) mg/dl with the range of 0.3 to 40 mg/dl. The average SGOT of the patients was 575.80( $\pm$  630.31) IU/L with the range of 30 to 4715 IU/L. The average SGPT of the patients was 753.24 ( $\pm$  687.36) IU/L with the range of 36 to 3960 IU/L. Ninety-three (60.38%) patients were positive for hepatitis A whereas 3 (1.94%) patients were positive for hepatitis B and hepatitis E each. Ten (6.49%) patients of acute hepatitis had enteric fever. Nine (5.84%) patients were positive for both hepatitis A virus and enteric fever whereas 7 (4.55%) patients were positive for both hepatitis A and E virus. One (0.64%) patient tested positive for hepatitis A and E virus as well as enteric fever (Table 4). In 24 (15.58%) patients, etiology remained undefined. Fulminant hepatic failure occurred in 7 (4.54%) patients, out of which 3 (42.80%) died. Three out of these 7 patients had hepatitis A virus infection and 3 were of unknown etiology. Thirty-seven (39.78%) cases of hepatitis A occurred in the age group of 5 -10 years followed by 28 (30.10%) and 21 (22.58%) cases in the age groups of 1 - 5 years and 10 - 15 years respectively.

### Discussion

In the present study, the high frequency noted in the summer months (June to November) agrees with the observation made by Chawhan *et al.* [4] & Singh J *et al.* [5] This depicts the feco-oral route as the major mode of transmission of acute hepatitis in children thus implicating infectious

hepatitis as the major cause of acute hepatitis in children. In the present study there was a male: female ratio of 1.9: 1 similar to the previous studies of Thapa *et al.* [6] & Kaur *et al.* [7]. In the present study maximum number of patients, 35.71% occurred in the age group 5 < 10 years with the mean age of the patients being 7.82 ( $\pm$  4.08) years. Chawhan *et al.* [4] reported the highest incidence of 34.6% in the age group of 4-7 years. Poddar *et al.* [3] reported the highest incidence of 46.80% in the age group of 0-5 years followed by 35.25% in the age group of 6-10 years and 17.13% in the age group of 11-15 years. This change in the age shift for maximum number of cases in our study reflects the declining levels of herd immunity in the community over time due to improvement in sanitary conditions as a result of socio-economic development as far as infectious hepatitis is concerned. In this study, the most common presenting complaints & constellation of symptoms occurred with similar frequency as reported in the previous studies done by Chawhan *et al.* [4], Kaur *et al.* [7] and Poddar *et al.* [3] with minor differences like increased incidence of bleeding tendencies in the present study. These minor differences in the chief complaints at the time of admission with the other studies could be because of different population groups in various studies. Similarly the incidence of major physical findings in this study is in agreement with majority of other studies Kaur *et al.* [7] & Poddar *et al.* [3]. The only difference was the increased incidence of ascites and pleural effusion in our study as compared to Chawhan *et al.* [4]. These findings probably reflect the expanding clinical spectrum of acute hepatitis in children. Also there were gross differences in the incidence of hepatic encephalopathy 4.54% in our study as compared to 36.6%, reported by Podder *et al.* [3], and 16.83% reported by Kaur *et al.* [7] which may be due to difference in the level of the institutions where these studies were conducted with studies at higher and sophisticated referral centers reporting higher incidence of encephalopathy due to selective admissions. The average S. bilirubin & liver enzymes were also similarly elevated as in previous studies [8, 9]. In the present study, etiology of hepatitis whether viral or non-viral could be established in 84.5% of the patients and in 15.5% patients, no cause could be identified which is similar to that found by Malathi *et al.* [10] & Podder *et al.* [3]. Khuroo *et al.* [11] in their study implicated viral etiology in only 44.6% of the cases. This difference with our study was probably due to lack of availability of effective serological test available in the eighties for various hepatotropic viruses. Poddar *et al.* [3] found hepatitis A in 64.5%, hepatitis E in 16.3%, hepatitis B in 7.6% and mixed infection in 8.1% of cases. Our percentage of hepatitis A, B, E or mixed infection or hepatitis due to other causes as enteric fever, is consistent with most of the studies [3, 6, 12]. The variations with few studies were due to different age groups studied in them. The findings in Fulminant hepatic failure were also in consonance with previous studies. Hepatitis A was the leading cause of hepatitis in all the age groups in children with most number of hepatitis A cases occurring in the age group of 5<10yrs, while previous studies [3, 6] reported the maximum number of cases of hepatitis A in children less than 5 years of age.



**Fig 1:** Month wise distribution of patients of acute hepatitis.

**Table 1:** Age wise distribution of patients of acute hepatitis.

| Age (in years) | Number of Patients n (%) |
|----------------|--------------------------|
| 1 < 5          | 46 (29.8%)               |
| 5 < 10         | 55 (35.71%)              |
| 10 < 15        | 42 (27.27%)              |
| 15 < 18        | 11 (7.14%)               |
| Total          | 154 (100%)               |

**Table 2:** Chief complaints of the patients at the time of admission.

| Chief Complaints on admission | Number of patients n (%) |
|-------------------------------|--------------------------|
| Fever                         | 140 (90.90%)             |
| Yellow urine                  | 125 (81.16%)             |
| Lack of appetite              | 119 (77.27%)             |
| Yellow eyes(jaundice)         | 113 (73.37%)             |
| Nausea / vomiting             | 104 (67.53%)             |
| Pain abdomen                  | 70 (45.45%)              |
| Clay Coloured Stools          | 39 (25.32%)              |
| Bleeding manifestations       | 35 (22.72%)              |
| Rigors and Chills             | 19 (12.33%)              |
| Insomnia                      | 7 (4.54%)                |
| Rash                          | 6 (3.89%)                |
| Joint Pain                    | 4 (2.59%)                |
| Seizures                      | 3 (1.94%)                |

**Table 3:** Physical findings on examination in patients of acute hepatitis.

| Physical finding             | Number of Patients n (%) |
|------------------------------|--------------------------|
| Hepatomegaly                 | 146 (94.80%)             |
| Icterus                      | 138 (89.61%)             |
| Pallor                       | 39 (25.32%)              |
| Splenomegaly                 | 39 (25.32%)              |
| Ascitis                      | 24 (15.58%)              |
| Altered Sensorium / Seizures | 7 (4.54%)                |
| Pleural effusion             | 7 (4.54%)                |
| Lymphadenopathy              | 3 (1.94%)                |

**Table 4:** Diagnosis wise distribution of patients of acute hepatitis.

| Markers for Hepatitis   | Number of Patients positive n (%) |
|---|-----------------------------------|
| IgM Anti HAV (Hepatitis A)  | 93 (60.38%)                       |
| HBsAg (Hepatitis B)   | 3 (1.94%)                         |
| IgM Anti HEV (Hepatitis E)  | 3 (1.94%)                         |
| IgM Anti HAV + Widal (Hepatitis A + Typhoid)                              | 9 (5.84%)                         |
| IgM Anti HAV + IgM Anti HEV (Hepatitis A + Hepatitis E)                   | 7 (4.55%)                         |
| IgM Anti HAV + IgM anti HEV + Widal (Hepatitis A + Hepatitis E + Typhoid) | 1 (0.64%)                         |
| Widal (Typhoid Hepatitis)   | 10 (6.49%)                        |
| No markers positive (Unknown)   | 24 (15.53%)                       |

(Placeholder1)

## Conclusion

Hepatitis A was the commonest cause of acute hepatitis in children. Hepatitis A vaccination programme needs to be strengthened and hepatitis A vaccine needs to be incorporated in national immunization schedule as well to prevent the morbidity related to hepatitis A. With the changing pattern of herd immunity in the community, due to improvement in standard of living, the age spectrum of hepatitis A has evolved over time to involve the children of higher age groups also.

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