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CLINICO-ETIOLOGIC PROFILE OF ACUTE VIRAL HEPATITIS IN CHILDREN PRESENTING TO TERTIARY CARE CENTER OF RURAL MAHARASHTRA.

Chintan Patel[1], Amit Kumar Pandey[1], Prashant Nigwekar[2], Jayashree Jadhav[3], Runvi Patil[4]
1. Junior Resident, Department of Pediatrics, Rural Medical College, Loni.
2. Professor, Department of Pediatrics, Rural Medical College, Loni.
3. H.O.D. & Professor, Department of Pediatrics, Rural Medical College, Loni.
4. M.B.B.S. Intern, Department of Pediatrics, Rural Medical College, Loni.

ARTICLE INFO **ABSTRACT** **ORIGINAL RESEARCH ARTICLE**

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Key Words: Acute viral hepatitis, hyperbilirubinemia, Hepatitis A, Hepatitis E.

Background: Acute Viral hepatitis is defined as an infection of the hepatic tissue due to hepatotropic and/or non hepatotropic viruses causing hepatocellular inflammation which is a self-limiting illness usually resolving completely within 4-6 weeks of time. The clinical band of acute viral hepatitis ranges from subclinical disease to fulminant hepatic failure. We conducted this study to ascertain the Clinico- etiologic profile along with the outcome of acute viral hepatitis in children belonging to rural western Maharashtra.

Method: A retrospective observational study was conducted in department of Pediatrics after ethical approval from the institution and included children from 6 months to 12 years of age and was conducted during November 2021 and included patients admitted to Pravara Rural Hospital during October 2020 to October 2021.

A total of 28 children were clinically diagnosed with acute viral hepatitis were included in the study and data was obtained and analyzed using appropriate statistical tool.

Results: Among 28 cases 18(64.28%) were boys and 10 were girls (35.71%). Mean age group was 7.03± 2.54 years. Virology marker revealed 20 (71%) cases positive for hepatitis A(HAV), 1(3%) case positive for hepatitis E (HEV), and co-infection with HAV and HEV in 1(4%) case, no specific etiology was detected in 4(14%) cases, 1(4%) case positive for hepatitis B and hepatitis C cases were detected. Jaundice was the most common (100%) presenting complaint, followed by fever (92%), pain abdomen (85%), high colored urine (72%). Conjugated hyperbilirubinemia was detected in all (100%) the HAV, HEV positive cases, hepatic enzymes raised above 5 times of normal limit in all the HAV, HEV positive cases. INR more than 2.5 was noticed among 3 HAV positive cases (10.71%). Acute liver failure was seen in 2 children, and both the cases died after 3-4 days of PICU

Corresponding author
Dr. A. K. Pandey*

admission.
Conclusion: Hepatitis A is most common cause of acute viral hepatitis in pediatrics population. Hepatitis E infection leads a more severe clinical course than HAV infection.

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INTRODUCTION

Viral hepatitis defined as infection of the liver caused by hepatotropic and/or non-hepatotropic viruses which can be self-limiting or can result in to fibrosis [1]. Acute hepatitis is a self-limiting illness characterized by an abrupt onset of symptoms with the hepatocellular inflammation usually resolving completely within 4-6 weeks. When there is a continuing inflammation beyond six months (three months in children), it is labeled as chronic hepatitis [2]. Viral hepatitis continues to be a major health problem in both developing and developed countries. This disorder is caused by at least 5 pathogenic hepatotropic viruses recognized to date: hepatitis A (HAV), B(HVB), C (HCV), D (HDV), and E (HEV) viruses. Many other non-hepatotropic viruses (and diseases) can cause hepatitis, usually as 1 component of a multisystem disease. These include herpes simplex virus, cytomegalovirus, Epstein-Barr virus, varicella zoster virus, HIV, rubella, adenovirus, enteroviruses, parvovirus B19, and adenovirus [3]. The clinical spectrum of acute viral hepatitis ranges from entirely subclinical and inapparent infection to rapidly progressing and fulminant hepatic failure. Hepatitis A (HAV) and E (HEV) viruses are feco-orally transmitted and self-limiting, whereas hepatitis B (HBV), C (HCV) and D (HDV) are transmitted parenterally and may progress to chronic hepatitis. India is hyperendemic for hepatitis A and E. Acute hepatitis resulting from most etiology has similar clinical features [4]. The characteristic clinical features of acute hepatitis include nausea, vomiting, right hypochondrial pain, and jaundice. The prodromal phase of nonspecific symptoms, including fever, myalgia and anorexia is characteristic of viral hepatitis, but may also be seen in other conditions [1-4]. The syndrome of acute hepatitis is usually diagnosed in the presence of elevated serum transaminase which has a cut-off upper limit 5-10 times the upper limit of normal. Alkaline phosphatase (ALP) elevation is seen in all cases of acute hepatitis but is usually less than three times of upper limit of normal. The ALP elevation is proportionately less for the degree of jaundice if present [5,6]. Viral hepatitis is a common disease in India and it occurs in epidemic and endemic forms [7]. This study was conducted to evaluate and understand the clinical profile of acute viral hepatitis along with the etiologic profile and final outcome of the disease in children.

MATERIALS AND METHODS:

A retrospective observational study was conducted in department of Pediatrics after ethical approval from the institution and informed consent from the relatives of the patients. The children from 6 month to 12 years of age were included and was conducted during November 2021.

A total of 28 children presented with acute onset of jaundice, fever, vomiting/nausea, abdominal pain, anorexia, malaise, high color urine and with positive viral marker for acute viral hepatitis were included in the study. Whereas patients with chronic liver disease, biliary obstruction, hemolytic diseases, active tuberculosis and on anti-tubercular drug, autoimmune hepatitis, inherited metabolic disorder, and recent history of hepatotoxic drug or toxin exposure, enteric fever and diagnosed malaria were excluded from the study. Data was obtained and analyzed using appropriate statistical tool.

RESULTS AND OBSERVATIONS: -

Out of total 28 cases, majority of cases i.e., 18 were from >5-10 years, with boys being 12, and girls being 6. Whereas 4 cases were from >10 years age group. Majority of the study population i.e., 63% were from upper lower class, 21% were from lower class and only 5% cases were from upper class according to modified Kuppuswamy classification for socioeconomic status.

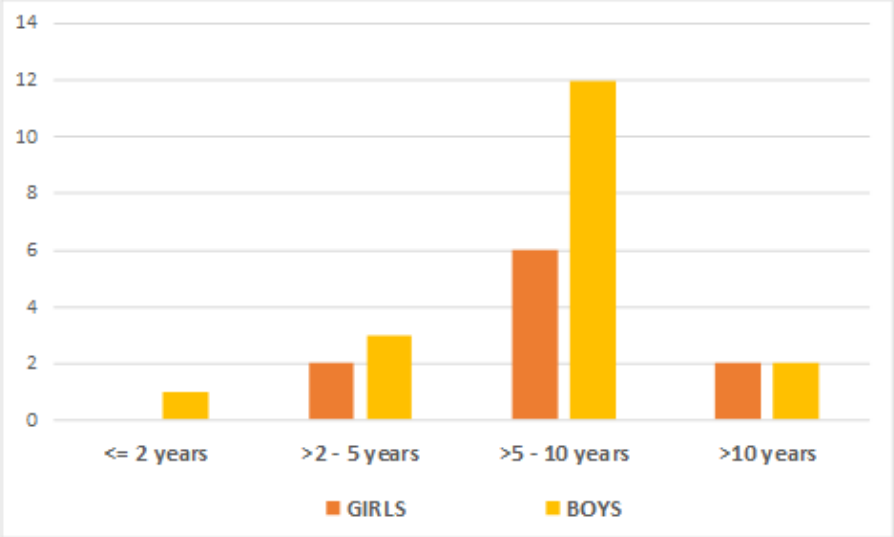

Figure 1: Age group distribution of the study population.

Out of 28 cases, 20 cases (71%) were from HAV, 4 cases (14%) Idiopathic, 1 case (4%) from HAV+HEV, 1 case (4%) from HCV, 1 case (4%) from HBV, 1 case (3%) from HEV has been noted.

The most common symptom seen in our study was jaundice (100%), followed by fever (92%), Abdominal pain (85%), dark colored urine (72%), Anorexia (68%), vomiting (60%), and nausea (55%), with few presented with pruritis, diarrhea, abnormal behavior. Whereas, the most common sign was icterus (100%), hepatomegaly (94%) and hepatic tenderness (82%), with few presenting with pallor, ascites, and edema.

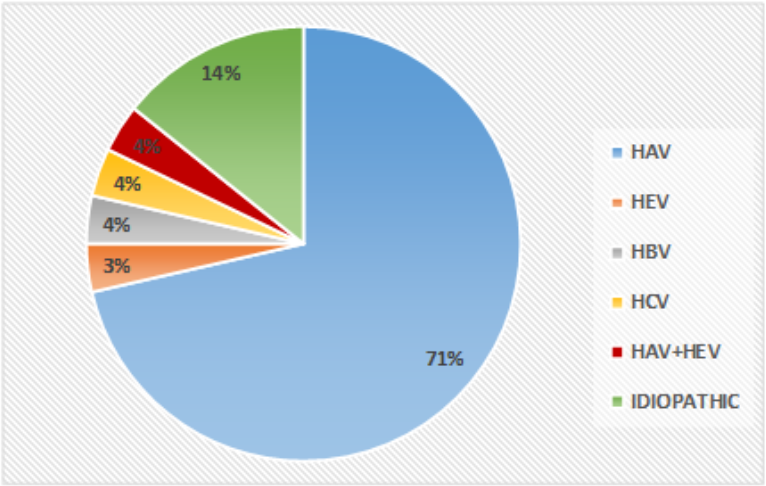

Figure 2: Etiological distribution of the study population.

The investigation profile of the study population included the following parameters such as SGOT, SGPT, bilirubin, coagulation profile with INR and serum albumin as shown in table 1.

Table 1: Distribution of the various Laboratory parameter of the study population.

	HAV	**HBV**	**HCV**	**HEV**	**HAV+HEV**	**IDIOPATHIC**
SGPT (mg/dl)						
>40 - 500	4	1	1	0	0	2
>500 – 1000	10	0	0	1	1	2
>1000	6	0	0	0	0	0
SGOT (mg/dl)						
>40 – 500	8	1	1	1	0	2
>500 – 1000	8	0	0	0	1	2
>1000	4	0	0	0	0	0
S. Albumin (mg/dl)						
<3.5	2	0	0	0	0	0
>3.5	18	1	1	1	1	4
INR (seconds)						
<1.5	14	1	1	1	1	3
1.5 – 2.5	3	0	0	0	0	1
>2.5	3	0	0	0	0	0

SGOT- serum glutamic-oxaloacetic transaminase; SGPT- Serum glutamic pyruvic transaminase; INR- international normalized ratio; mg- milligram; dl-decilitre; HAV- Hepatitis A; HBV- Hepatitis B; HCV- Hepatitis C; HEV- Hepatitis E.

Out of 28 total cases, Serum AST level of 8 cases fell under 40-500 mg/dl range, 8 cases fell under 500-1000 mg/dl range and 4 cases of HAV fell >1000 mg/dl. Whereas Serum ALT level of 8 cases fell under 40-500 mg/dl range, 14 cases fell under 500-1000 mg/dl range and 6 cases of HAV had serum ALT >1000 mg/dl. Out of 20 cases associated with HAV infection, 18 cases had Serum Albumin levels >3.5 mg/dl and 2 cases had Serum Albumin level <3.5 mg/dl. Out of 28, 14 INR values were <1.5, 3 were in between 1.5-2.5 and 3 were >2.5 associated with HAV as seen in table 1. Majority of the cases i.e., 26 (92.8%) had conjugated hyperbilirubinemia as seen in figure 3.

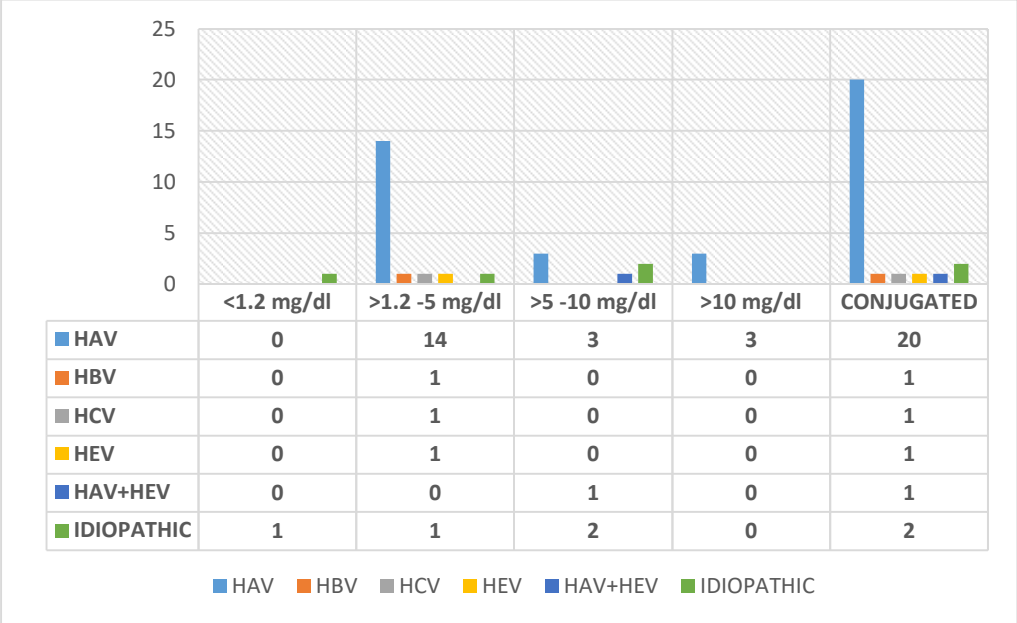

Figure 3: Distribution of serum bilirubin levels among the study population.

DISCUSSION

Acute viral hepatitis is a significant health issue in children of rural western Maharashtra and people belong to lower socioeconomic status due to lack of supply of safe drinking water along with poor personal hygiene & sanitation. Our study consists of total 28 cases suffering from Acute Viral Hepatitis out of which 18 were boys and 10 were girls, with male: female ratio1.8:1, this was similar to Behera MR et al [4], Das et. Al [13] and Girish et al [1] whereas female preponderance was seen in Parekh Z et al [12]. In this study, majority of cases were from 5-10 years age group similar to the study done by Behera et. Al, Kamath et. Al (61.6%) [8] and Das et. Al (64.28%) [13]. In the above study, it indicates that 12 (63%) out of 28 suffering from AVH belong to upper lower class while only 1 (5%) out of 28 was from upper class.

Table 2: Comparison between clinical features and etiology among similar studies.

Variables		Present Study	Girish et al [1]	Das et al [13]	Sravanthi et al [14]	Rewatkar et al [15]	Sharma et al [16]
Total Population		28	48	56	35	100	88
BOYS		18	22	31	20	41	48
GIRLS		10	26	25	15	59	40
Clinical	Jaundice	28	40	56	31	99	80
	Fever	26	48	54	0	89	60
	Anorexia	19	4	43	2	77	74
	Nausea	15	8	37	4		62
	Vomiting	17	40	29	31	93	64
	Pruritis	6	-	7	0	5	31

	Abdominal Pain	24	-	45	20	54	54
	Diarrhoea	2	4	3	2	13	50
	Abnormal Behaviour	1	-	3	0	0	-
	Dark Coloured urine	20	34	47	26	68	76
Clinical features-	Icterus	28	48	56	35	100	-
	Pallor	3	17	9	12	18	-
	Hepatomegaly	26	37	49	28	78	80
	Splenomegaly	1	5	4	2	31	32
	Hepatic tenderness	23	-	43	0	73	-
	Ascites	2	8	3	3	2	20
	Edema	1	10	2	7	0	80
Etiology	HAV	20	-	41	25	88	75
	HEV	1	-	6	9	3	8
	HBV	1	-	0	0	2	4
	HCV	1	-	0	0	0	-
	HAV+HEV	1	-	1	0	0	1
	IDIOPATHIC	4	-	8	0	1	-

HAV infection contributed to 20 (71%) of the total 28 cases which implies that hepatitis A is the most common cause of pediatric Acute Viral Hepatitis while 4 (14%) out of 28 cases which were diagnosed with AVH with unknown cause. This was found consistent with the study conducted by Das et. Al (73.21%) [13], Behera et. Al (63.15%) [4], Poddar et. Al (64.5%) [6], who all had HAV infection as the major cause of the illness.

This can be attributed to the lack of awareness regarding the availability of vaccine and lack of knowledge on mode of disease transmission among lower socio-economic status.

Only one case of HBV infection was seen in the present study which can be due to significant reduction of the acute hepatitis B virus infection during the last few decades because of inclusion of HBV vaccine in the national immunization schedule and routine blood donor screening. Most of the cases in this study presented with jaundice as the most common clinical symptom which was closely followed by fever, abdominal pain and dark colored urine which was similar to the study by Das et. Al [13], Parekh et. Al [12] and Behera et. Al [1] whereas icterus was the most common clinical sign seen in this study closely followed by hepatomegaly and hepatic tenderness consistent with Parekh et. Al [12], Das et. Al [13] and Girish et. Al [1]. Other uncommon clinical features were splenomegaly, ascites, edema as seen in table 2.

The laboratory studies suggested that serum bilirubin and hepatic enzymes were elevated in all the cases and patients with severely elevated levels had prolonged hospital stay along with higher chances of complications similar to previous studies [4,6,8,12-14]. Out of the total study population, two developed hepatic encephalopathy and died after 3 days of PICU admission due to the complication of disease.

Recent literature has shown that India is now witnessing an epidemiological transition from High to Intermediate

endemicity owing to rapid (but unequal) development and improving the standards of hygiene as highlighted by progressively decreasing age related seroprevalence rates as in present study [1,6,8,12-14]. World Health Organization recommends that countries undergoing transition from High to Intermediate HAV endemicity should consider introduction of large scale HAV vaccination [17]. However, this decision must be based on actual national seroprevalence data like seroepidemiological surveys, intensive disease surveillance, cost effectiveness analyses. In this context, present study highlights the significance of HAV related pediatric disease burden in the region and underlines the unmet need of further population based large studies to further epidemiology of HAV infection in INDIA, in order to prioritize the inclusion of HAV vaccination in the National Immunization Schedule.

CONCLUSION:

The most common cause of acute viral hepatitis in children is Hepatitis A virus in the western rural parts of Maharashtra. The need of the hour is to enlighten the general population regarding personal hygiene and safe drinking water along with sanitary practices. Also educating the public regarding the availability of HAV vaccine and its effectiveness in preventing the disease along with high suspicion of the illness in the endemic regions.

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