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Variations in Clinical Presentation of Acute Hepatitis in Children

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ABSTRACT

Back ground and Objective: When it comes to public health issues, acute viral hepatitis (AVH) in children is a worldwide and developing-country issue. This study was carried out to identify the clinical and epidemiological spectrum of AVH in children caused by infection with hepatitis A virus (HAV) and hepatitis E virus (HEV).

Study Design: Cross-sectional

Place and Duration: The study was conducted at Bahria Medical College Karachi from May 2023 to May 2024.

Methods: Total 77 children had age <15 years were included in this study. All the included children had signs and symptoms of acute viral hepatitis. After taking informed written consent, detailed demographics included age, sex, duration of illness and socioeconomic status were recorded.Blood sample was taken for the assessment of HAV IgM and HEV IgM using an enzyme-linked immunosorbent assay (ELISA). SPSS 24.0 was used to analyze all data.

Results: There were 43 (55.8%) males and 34 (44.2%) female children among all cases. Mean age of the children was 5.9±3.24 years. Low socioeconomic status was found in 44 (51.9%) cases. Frequency of fever was 62 (80.5%), jaundice in 60 (77.9%), abdominal pain in 50 (64.9%), followed by nausea, yellowness of the eyes, loss of apetite and dark colored urine. We found thatHAV in 55 (71.4%) cases. Frequency of liver transplant found in 5 (6.4%) patients. Alanine aminotransferase (ALT) and aspartate aminotransferase (AST) was significantly higher among all cases. There was no any mortality found among all cases.

Conclusion: We found higher cases of acute AVH in this study. Acute viral hepatitis disproportionately impacted males between the ages of 6 and 10, those from lower and moderate socioeconomic backgrounds, and those who drank water that had not been cleaned.

Keywords: *Acute Viral Hepatitis, HEV, HAV, Children, Jaundice, Fever*

1. INTRODUCTION

Hepatotropic viruses such as hepatitis A virus (HAV) and hepatitis E virus (HEV) are among the most often found feco-oral infections that cause acute viral hepatitis (AVH) [1]. A significant health issue affecting children in developing nations is AVH, particularly in rural and slum communities with poor socioeconomic level. People suffer from a lack of access to clean drinking water, poor sanitation, and poor personal hygiene [2]. The WHO estimates that 20 million new cases of HEV and 1.4 million new cases of HAV are reported year globally. Due to acute HAV and HEV infections, respectively, 100,000 and

60,000 persons every year pass away. According to estimates, 90% of kids have hepatitis A by the time they turn 10 [3,4].Approximately 70%–85%, 40%–60%, and 10%–40%, respectively, of all instances of acute viral hepatitis, acute liver failure, and acute-on-chronic liver failure in the Indian subcontinent are related to HAV infection [5].

The pathophysiology of this illness is being investigated, and public health organisations from all around the world are working together. 179 of the 197 children in the UK with cases included in the UKHSA technical briefing paper had molecular testing for human adenovirus done on them. A probable connection between acute hepatitis and the human adenovirus is being looked at because 116 (64.8%) of these kids tested positive. Hepatitis A infection in acute form has a wide clinical spectrum. It may be asymptomatic or show a variety of clinical signs, some of which are unusual presentations include relapsing hepatitis, cholestatic hepatitis, and extra hepatic indications in children. Atypical instances of hepatitis A in youngsters have also been on the rise during the past few years. [6,7]

There are regional variations in the etiologies of acute and chronic liver disease in children, most likely as a result of genetic and environmental factors. In contrast, certain genetic disorders like alpha-1 antitrypsin deficiency or cystic fibrosis-associated liver disease are more likely to be detected in Western cultures. For instance, viral hepatitis is still thought to be more common in Asian populations. As opposed to this, biliary atresia (BA), whose cause is still unknown, affects individuals all over the world, albeit it appears to be more common in Asian nations like Japan and Taiwan. [8]

Infections with the hepatitis A and E viruses can happen often and in epidemics. Both residential and institutional environments have been linked to the transmission of infections. Consuming tainted food, water, milk, or dairy products that are spread by shoddy sanitation and overcrowding are the frequent implicated variables. HAV and HEV infections both have a self-limiting course and provide immunity for life [9]. In addition to fever, nonspecific gastrointestinal problems are the main symptoms that children with AVH present with. Variable frequency stomach discomfort, vomiting, nausea, and appetite loss occur after the apparent yellowness of the eyes and urine (due to excessive bilirubin). Aplastic anaemia, protracted cholestatic syndrome, and fulminant hepatic failure are rare symptoms. [10-12]

The Expanded Programme of Immunisation in Pakistan does not support routine HAV immunisation. Seroprevalence statistics are likely lacking in this case, especially for the paediatric group. In order to implement HAV vaccination and preventative measures for HEV infection in children in nations like Pakistan, it is crucial to identify the need to immunize high-risk populations (such as pregnant women, people with chronic liver disease, and young children). The purpose of this study was to better understand the epidemiology and clinical manifestations of acute HAV and HEV infection in children. It was carried out at our hospital.

2. MATERIAL AND METHODS

This cross-sectional study was conducted at Bahria Medical College Karachi from May 2023 to May 2024 and comprised of 77 children. The research did not include kids who had a history of liver illness at the time.

After obtaining the parents' informed agreement, successive sampling was used to enrol children under the age of 15 who displayed acute hepatitis symptoms and signs in the research. A child was considered to have acute hepatitis if they displayed any sign or symptom (such as fever, yellowing of the eyes or urine, appetite loss, nausea, vomiting, and abdominal pain) as well as an elevated alanine aminotransferase level and presented with their illness within the previous 21 days (ALT). Data from each instance was gathered using a standardized proforma.Age, gender, parents ' education, neighbourhood, socioeconomic level, the number of children for each family, water supply, and length of illness were among the demographic factors that were noted. Using a World Bank categorization based on monthly household income, socioeconomic status was evaluated. The following clinical manifestations were noted: fever, nausea, vomiting, yellowing of the eyes and urine, abdominal discomfort, and lack of appetite.All children had 5 mL of venous blood drawn aseptically in order to test for anti-HAV and pro IgM antibodies. After centrifuging the obtained blood samples at 1000 rpm for five minutes, the serum was extracted. A commercially available protease immunosorbent assay (ELISA) test was used to assess IgM for HAV and HEV, in accordance with the manufacturer's instructions. Prothrombin time (PT), adjusted hazard ratio (INR), ALT, alanine aminotransferase (AST), acid phosphatase (ALP), and total bilirubin were additional laboratory tests performed as part of the panel for acute hepatitis.

Data analysis was performed using SPSS software for Windows, version 24. For numerical and categorical variables, respectively, descriptive statistics in the form of meanSD and frequency (%) are used. The comparison of qualitative and numerical data between the HAV and HEV groups was performed using the chi-square test and the independent sample t-test. Significant data was defined as P-value 0.05.

3. RESULTS

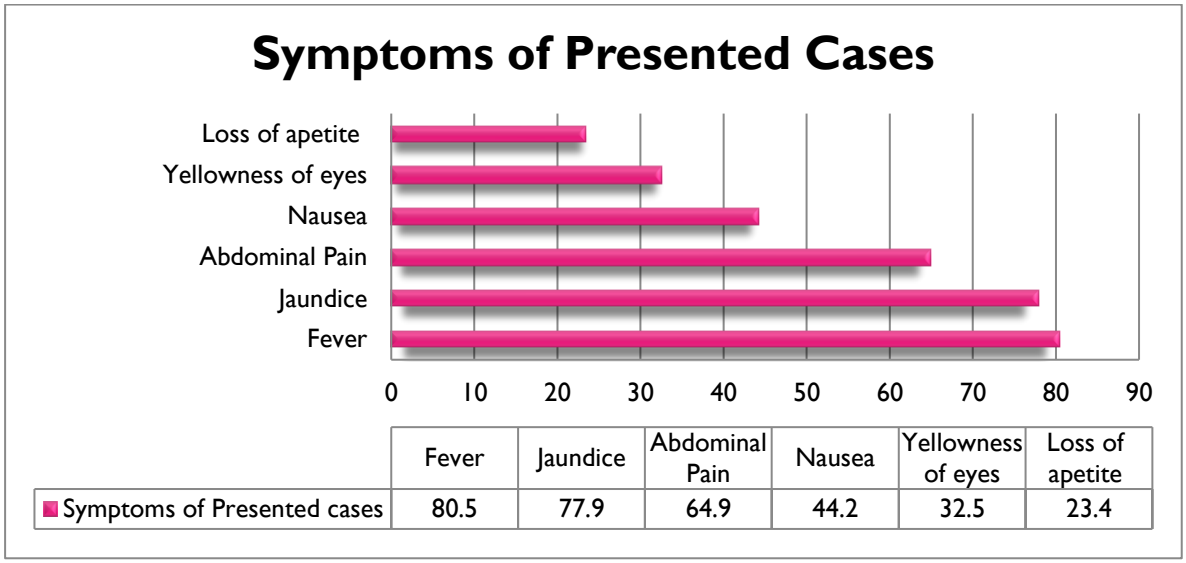
There were 43 (55.8%) males and 34 (44.2%) female children among all cases. Mean age of the children was 5.9±3.24 years and mean weight was 16.7±9.40 kg. Low socioeconomic status was found in 44 (51.9%) cases.(table 1).

Table-1: Demographics of the enrolled children

Variables	Frequency	Percentage
Mean age (years)	5.9±3.24	
Mean weight (kg)	16.7±9.40	
Gender		
Male	43	55.8
Female	34	44.2
Socio-economic status		
Low	44	51.9
Middle	25	32.5
High	8	10.4

Frequency of fever was 62 (80.5%), jaundice in 60 (77.9%), abdominal pain in 50 (64.9%), followed by nausea, yellowness of the eyes, loss of apetite and dark colored urine. We found that acute viral hepatitis in 55 (71.4%) cases.(figure 1)

Figure-1: Signs and symptoms among all children



We found HAV in 55 (71.4%) cases and frequency of HEV was 22 (28.6%).(table 2)

Table-2: Frequency of HEV and HAV among all cases

Variables	Frequency	Percentage
Acute Viral Hepatitis		
HAV	55	71.4
HEV	22	28.6
Total	77	100

Alanine aminotransferase (ALT) and aspartate aminotransferase (AST) was significantly higher among all cases. (table 3).

Table-3: Biochemical parameters in children presenting with acute viral hepatitis

Variables	Mean	Std
ALT(IU/L)	1844.6	702.8
AST(IU/L)	1806.4	1016.2
Bilirubin (mg/dL)	5.7	1.4
INR	1.13	1.2
ALP (IU/L)	603.7	175.6

Frequency of liver transplant found in 5 (6.4%) patients. There was no any mortality found among all cases.(table 4).

Table-4: Frequency of liver transplant among all cases

Variables	Frequency	Percentage
Liver transplant		
Yes	5	6.4
No	72	93.6

4. DISCUSSION

Comparing acute hepatitis caused by HEV infection to HAV infection, we discovered that HAV infection was more prevalent in three-fourths of the research subjects. The findings concur with those reported by Das et al., who found that HAV was present in 73.2% of patients and HEV in 10.7% of them [13]. The findings are equivalent to those reported by Behera and Patnaik [14]. Infection with HAV (63.15%), HBV (10.52%), and HEV (5.26%) were the most frequently reported causes of acute viral hepatitis in children. HAV frequency was 95.08% and HEV frequency was 13.11%, according to Semwal et al. [15].Due to the accessibility of the HAV vaccine, the prevalence of the disease has decreased in developing nations, although it is still widespread in those where the vaccine is not administered regularly [16].

There were 43 (55.8%) males and 34 (44.2%) female children among all cases. Mean age of the children was 5.9±3.24 years. Low socioeconomic status was found in 44 (51.9%) cases. These results were comparable to the previous researches.[17,18] Frequency of fever was 62 (80.5%), jaundice in 60 (77.9%), abdominal pain in 50 (64.9%), followed by nausea, yellowness of the eyes, loss of apetite and dark colored urine. We found that acute viral hepatitis in 55 (71.4%) cases. From October 2021 to February 2022, the United States experienced a similar severe hepatitis outbreak. The presence of severe hepatitis and human adenovirus viremia in nine children in Alabama was discovered. The observed pattern and median age at presentation (2 years, 11 months) were similar to those in our population. Prior to the beginning of jaundice, all of the youngsters were said to have had a gastrointestinal sickness and to have been otherwise healthy. Acute liver failure was present in three of the kids in this cohort. The status of the other two children did not improve despite treatment with glucocorticoids, cidofovir, intravenous immune globulin, and other medications; eventually, they underwent liver transplantation. Only one child required supporting measures to recover.[19,20]

According to our survey, a sizable portion of moms were either illiterate or had only had an elementary education, and the most prevalent method of obtaining drinking water in households was by subterranean drilling. According to Pereira et alresearch, .'s acute hepatitis infection and education level were independently correlated [21]. Hepatitis E epidemic in Islamabad, Pakistan, according to Ashraf et al. The primary cause was a result of open sewage drains next to water boring pumps that were at a lower surface level [22]. According to the authors of another research from Lahore, Pakistan, children with severe hepatitis most frequently drank water from filtration facilities and local bore wells. [23]

In our series, there were no reported deaths. In their local hospitals, children who made a full recovery without a transplant had their blood checked again. We did not have access to all follow-up data, but we did have information on 15 patients, 10 of whom had normalised liver biochemical testing 4 to 8 weeks after the initial hospital presentation. In accordance with the

consensus approach, it has been suggested that all the kids have regular aplastic anaemia monitoring. [24] The prevalence of acute hepatitis in young children has recently increased, and 6.4% of the children in our cohort who had this illness needed liver transplantation. [25]

5. CONCLUSION

We found higher cases of acute AVH in this study. Acute viral hepatitis disproportionately impacted males between the ages of 6 and 10, those from lower and moderate socioeconomic backgrounds, and those who drank water that had not been cleaned

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