

A RETROSPECTIVE ANALYSIS OF ACUTE HEPATITIS A VIRUS SEROPOSITIVITY AMONG CHILDREN OF RURAL DISTRICT IN SOUTHERN INDIA, PRESENTING WITH ACUTE FEBRILE ILLNESS IN A TERTIARY CARE HOSPITAL

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Abstract

Background: Acute febrile illness (AFI) poses a diagnostic challenge to both clinicians and laboratories. Of the varied causes of acute febrile illness, Acute Viral Hepatitis (AVH) due to Hepatitis A Virus poses a major public health problem in children, especially in developing countries. This study was conducted to find out the seropositivity rate of acute hepatitis A virus infection among children presenting with acute febrile illness. **Materials and Methods:** The study was conducted retrospectively, by going through the serology reports, for a period of two months of all children between 0-10 years of age, who presented with acute febrile illness. About 134 samples were included as study samples and their HAV IgM ELISA reports were analysed and documented. **Result:** 64.18 % of study population were male children and 35.82% were female children. 47.76% of children are of >5-10 years of age. Out of 134 samples tested for HAV IgM, 8 (5.97%) were tested positive. 75% of HAV IgM seropositive cases were male children and 25% were female children. 75% of HAV IgM seropositive cases belong to the age group of >5-10 years of age. Among the 8 HAV IgM seropositive cases, 100% had fever and raised C - reactive protein (CRP), 62.5% had abdominal pain and vomiting. **Conclusion:** HAV infection is still a problem in developing countries which do not include HAV vaccination, as a part of their immunisation schedule. Hepatitis A Virus has to be included as a possible differential diagnosis of AFI, as they may prove fatal if not promptly treated.

INTRODUCTION

Acute febrile illness, among children is one of the most challenging clinical scenario for pediatricians, as it poses difficulty in prompt diagnosis, due to varied etiological factors and non-availability of required diagnostic laboratory services in all hospital setups. Approximately 20% of daily pediatric consultations is due to febrile illness with significant mortality and morbidity.^[1] Acute febrile illness presents as an acute onset of fever with body temperature more than 38.0 OC, in the absence of any local focus of infection. The etiological cause for acute febrile illness can be very may ranging from infectious to non-infectious. Bacteria, virus, Fungi and parasitic infections come under infectious causes, whereas non –infectious etiology is due to inflammatory disorders, vaccinations, malignancies and some autoimmune disorders.

Of the varied causes of acute febrile illness, viral infection is the most common, with a prevalence rate of 51.1% in India.^[2] Out of these viral diseases, Acute Viral Hepatitis (AVH) poses a major public health problem in children, especially in developing countries. Hepatitis A Virus (HAV)) causes infectious hepatitis with a prevalence rate of 75% among children presenting with symptoms of AVH.^[3] Hepatitis A Virus is an enterically transmitted single stranded RNA virus and is the leading cause of jaundice in children between 1- 15 years of age. Major risk factors for acquiring Hepatitis A Virus infection were unsafe drinking water, food, poor socioeconomic status, poor sanitation, overcrowding and lack of personal hygiene. The most common clinical manifestations of HAV infection is acute hepatitis (>90%) with less than 5% of children presenting with life threatening fulminant hepatitis. According to WHO nearly 1.4 million new cases of HAV was reported worldwide

and about 1, 00,000 people die of acute hepatitis A virus infection every year worldwide.^[4] Not many studies were available to determine the prevalence of various agents causing nonspecific acute febrile illness in pediatric age group. Hence our study was conducted to specifically find out the seropositivity rate of acute hepatitis A virus infection among children attending fever OPD with acute febrile illness.

MATERIALS AND METHODS

The study was conducted retrospectively, by going through the serology laboratory reports of Microbiology Department for a period of two months. Hepatitis A Virus IgM ELISA reports of the blood samples of all children between 0-10 years of age, who attended the fever OPD with acute febrile illness, during the two months study period were included consecutively in the study. About 134 samples were included as study samples during the study period. The presenting symptoms of the study subjects were got from the history noted in the laboratory requisition slip.

The received blood samples from the study population were centrifuged at 2000 RPM for 10 minutes and serum was separated. It is aliquoted into separate vials and is labelled accordingly. The serum samples were tested for the presence of IgM antibodies against Hepatitis A Virus by Indirect ELISA technique. HAV IgM ELISA kits of Dia. Pro Diagnostic Bioprobes, Lot no.1121 and expiry date 2024-02 was used. Standard Operating procedures according to manufacturer's instructions were followed. In house HAV IgM positive controls were included with every test run. Appropriate calibrators were used along with every test run. Optical density (OD) values were obtained from calibrated ELISA reader. Validity of the test run and the results were analyzed as per the manufacturer's instructions. The results were documented and analyzed statistically.

RESULTS

A total of 134 sample reports of IgM HAV ELISA, from children between 0-10 years of age were collected during the 2 months study period.

(Table 1) About 64.18 % of study population were male children and 35.82% were female children. Majority of children were in the age group of >5-10 years of age (47.76%).

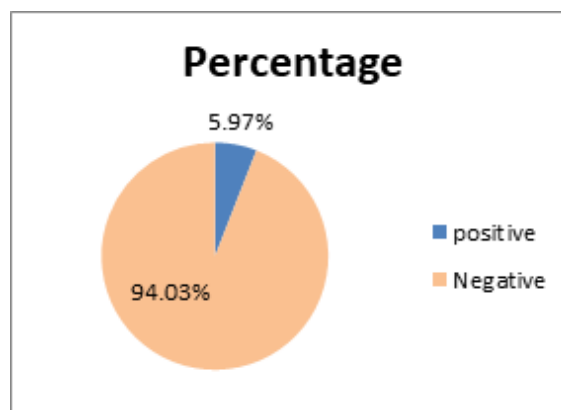


Figure 1: HAV IgM Seropositivity (n=134)

Out of the 134 samples tested for HAV IgM antibody by ELISA, 8 (5.97%) were tested positive and 126 (94.03%) were tested negative (Figure 1).

About 75% of HAV IgM seropositive cases were male children and 25% were female children. 75% of HAV IgM seropositive cases belong to the age group of >5-10 years of age (Table 2).

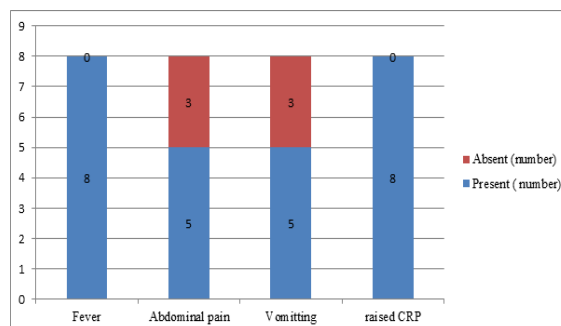


Figure 2: Common presenting symptoms of HAV IgM positive cases (n=8)

Among the 8 HAV IgM seropositive cases, 100% had fever and raised C - reactive protein (CRP), 62.5% had abdominal pain and vomiting. None had symptoms and signs of jaundice (Figure 2).

Table 1: Age distribution of the study population (n=134).

Age (in years)	Male		Female		Total	
	No	%	No	%	No	%
0-3	12	8.96	10	7.46	22	16.42
>3-5	30	22.39	18	13.43	48	35.82
>5-10	44	32.83	20	14.93	64	47.76
Total	86	64.18	48	35.82	134	100

Table 2: Age wise distribution of HAV IgM seropositive cases (n=8)

Age (in years)	Male		Female		Total	
	No	%	No	%	No	%
0-3	0	0	0	0	0	0
>3-5	1	12.5	1	12.5	2	25
>5-10	5	62.5	1	12.5	6	75
Total	6	75	2	25	8	100

DISCUSSION

This study was conducted to find out the seropositivity rate of acute hepatitis A virus infection among children attending fever OPD with acute febrile illness. A total of 134 sample reports of IgM HAV ELISA, from children between 0-10 years of age were collected during the 2 months study period from serology laboratory of Microbiology department.

[Table 1] About 64.18 % of study population were male children and 35.82% were female children. Majority of children were in the age group of >5-10 years of age (47.76%). Our study data correlated well with the study conducted by Vaishnavi Kavirayan et al,^[5] who has documented that 58.4% of their cases were between 6-10 years of age and majority of them were males 57.9%. The higher febrile illness rate in elder children may be due to the fact; they are attending preschool, sharing drinking water, food and difficulty in imposing hand hygiene, which aids in easier transmission of infectious agents. Lack of safe drinking water, poor hygiene and sanitation plays a major role in the transmission of HAV. Study conducted by M S Chadha et al,^[6] states that nearly 52.5% of children by two years of age and 90.9 % of children by 6 years of age are exposed to Hepatitis A Virus, in India.

[Figure 1] Out of the 134 samples tested for Acute Hepatitis due to HAV by IgM antibody ELISA, 8 (5.97%) were tested positive and 126 (94.03%) were tested negative. Similar study done by Vaishnavi Kavirayan et al,^[5] has documented that 31.8% of acute febrile illness is due to Hepatitis A Virus and other common agents detected being, Dengue (10.6%), Hepatitis E virus (9%), Scrub typhus (2.9%), Leptospirosis (5%), Brucellosis (3.9%), Typhoid (1.7%) and Rickettsial diseases (7.1%).

Our seropositivity rate of AVH due to HAV is much lower than the one documented by Javaria Rasheed et al,^[3] and Alam S et al,^[7] as 75% and 70% respectively. The higher positivity rate in these studies may be due to the fact that these authors has only specifically included children presenting with symptoms and signs of acute viral hepatitis as their study population, whereas in our study we have included children presenting with acute febrile illness, which covers wide etiological agents. Behera and Patnaik,^[8] has documented that HAV was responsible for 63.15% of hepatitis among children, while Pooja Semwal et al,^[9] has said that nearly HAV was responsible for 95.08% of hepatitis in children. This is due to that fact that the study population was selective to disease in question and also the seropositivity rate is calculated using both IgM and IgG seropositive cases.

[Table 2] About 75% of HAV IgM seropositive cases were male children and 25% were female children. 75% of HAV IgM seropositive cases belong to the age group of >5-10 years of age. Our data correlates well with Javaria Rasheed et al,^[3] were 43.5% of

HAV seropositive children are 6-10 years of age and 56.5% were males. He documents that male children 6-10 years of age from lower socioeconomic status using unsafe drinking water are more prone to acute viral hepatitis. Similarly, study conducted by Rana and Lone (10) has observed a high prevalence of HAV in male children (60.8%) compared to female patients (39.13%) with 60% of children acute hepatitis in 5-10 years of age. This increased occurrence of HAV infection in elderly male children may be due to the fact of more outdoor behavioural activities, occupational exposures and lack of safe drinking water and personal hygiene. Also, consumption of food and water from restaurants and street side eateries with poor hygienic conditions makes this age group at high risk for acquiring infections.^[11]

[Figure 2] Among the 8 HAV IgM seropositive cases, 100% had fever and raised C - reactive protein (CRP) levels, 62.5% had abdominal pain and vomiting. None had symptoms and signs of jaundice. Studies conducted by various other authors have also documented that fever is the most common symptom (96.42%-82.1%), followed by icterus (100%-80%).^[12-14] Studies conducted by Sharanya Murlidharan et al,^[15] and Shrishu R Kamath et al,^[16] showed that fever (96%,90.3%), abdominal pain (78%,35.5%), vomiting(47%,87.1%) and jaundice (65%,90.3%) respectively, as the common clinical presentations among children presenting with acute hepatitis A virus infection.

Vaishnavi kavirayan et al,^[5] has documented in their study that, 36% of children has presented with fever alone as a symptom. Hence, it is of utmost importance to consider acute hepatitis A virus, as one of the differential diagnosis of acute febrile illness in children, especially from developing countries where HAV vaccination is not routine.

CONCLUSION

Fever is a sign of systemic inflammation, due to varied infectious and non-infectious etiology. Acute febrile illness (AFI) poses a diagnostic challenge to both clinicians and laboratories as it may prove fatal if not treated promptly. Local epidemiology of infectious diseases, geographic settings and population demography will play a role in appropriately diagnosing AFI.

The present study indicates the seroprevalence of acute hepatitis A virus infection among children presenting with AFI in a rural district of Southern India, adding on to the literature data on Hepatitis A Virus and the need to include them as a possible differential diagnosis of AFI. HAV infection is still a problem in developing countries which do not include HAV vaccination, as a part of their immunisation schedule.

Multicentric studies with larger study population in this topic will help in further understanding of this illness with adequate seroprevalence data. Also, it

may aid in developing strategies for prevention and vaccination against Hepatitis A virus. Health education, awareness of HAV clinical presentation, proper sanitation and provision of safe drinking water will pave an effective way in curbing this public health problem.

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