

PREVALENCE OF DIFFERENT VIRAL MARKERS IN PATIENTS OF ACUTE VIRAL HEPATITIS IN AND AROUND VISAKHAPATNAM: HOSPITAL BASED STUDYB. Aruna Sree¹, M. Padma Geethanjali², V. Seetha Rama Raju³, B. Rajasekhar⁴**HOW TO CITE THIS ARTICLE:**

B. Aruna Sree, M. Padma Geethanjali, V. Seetha Rama Raju, B. Rajasekhar. "Prevalence of Different Viral Markers in Patients of Acute Viral Hepatitis in and Around Visakhapatnam: Hospital Based Study". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 30, April 13; Page: 5211-5217, DOI: 10.14260/jemds/2015/761

ABSTRACT: Acute viral hepatitis (AVH) is a major public health problem and is an important cause of morbidity and mortality in the developing countries. **AIM:** The aim of the present study is to study the serological profile of acute viral hepatitis in children and adults admitted in King George Hospital, Visakhapatnam and also age and sex distribution of patients suffering from acute viral hepatitis and also comparing the etiological profile by studying serological markers of common viral agents. **SUBJECTS AND METHODS:** Samples were collected from 80 individuals with jaundice and other clinical and biochemical evidences of acute viral hepatitis. They were tested for hepatitis surface antigen, HBcIgM, HAVIgM, HEVIgM, Antibodies to HCV by the enzyme-linked immuno sorbent assay. **RESULTS:** Out of the 80 viral hepatitis cases (47 adults+33 children). In adults 20(42.5%) patients presented HBV (26.96%) was identified as the most common cause of acute hepatitis followed by HEV14 (29.8%), HEV+HAV4 (8.5%) and HAV 6(12.76%). Co-infections with more than one virus were present in 5cases; HAV-HEV co-infection being the most common. In children 16(48.5%) presented with HAV, HAV+HEV11 (33.3%), HEV4 (12.12%), HBV1 (3.03%) **CONCLUSIONS:** Vaccination of adults against hepatitis B is indicated, along with sexual education to decrease the incidence of hepatitis which is found as common etiological agent in adults. The incidence of HAV and HEV in children shows that there is need for improvement in sanitation and food habits. **KEYWORDS:** Acute viral hepatitis, hepatitis A virus, Visakhapatnam, hepatitis B, Elisa.

INTRODUCTION: Acute viral hepatitis (AVH) is a major public health problem in India and other developing nations having inadequate sanitary conditions. The term Acute Hepatitis refers to a primary infection of liver by one of five hepatotropic viruses types A, B, C, D and E. Hepatitis A, E are transmitted faeco-orally, whereas Hepatitis B,C,D are blood borne. There is a need for study of these etiological agents in jaundice for prevention of viral hepatitis which in turn is dependent on the social behavior and hygienic factors in a particular community. As hepatitis and C can lead to fulminant hepatic failure and hepato cellular carcinoma, the epidemiological study of these two viral hepatitis is necessary for the prevention of this complication specially with the advent of vaccines.

SUBJECTS AND METHODS: The samples were collected from 80 hospitalized patients of both sexes and all ages, who were referred to microbiology department over a period of 1-year from July 2013 to June 2014, who did not have a known co-existing illness were only included. Known alcoholics and patients on hepatotoxic drugs were excluded from the study. Written informed consent was taken from patients or guardians, in case patient was a child or was not able to consent. The study was approved by the institutional ethics committee.

ORIGINAL ARTICLE

The patients were tested for five hepatitis viruses, hepatitis A virus (HAV), hepatitis B virus (HBV) hepatitis C virus (HCV), hepatitis D virus (HDV) and hepatitis E virus (HEV).

An AVH case was defined as a person having an acute illness of <15days duration with a discrete onset of any sign or symptom (e.g., fever, headache, malaise, anorexia, nausea, vomiting, diarrhea and abdominal pain) and either a) jaundice or b) elevated serum alanine amino transferase (ALT) levels >100IU/L documented at least twice at a 1-week interval without any history of pre-existing liver disease.¹ Approximately 5ml blood sample was collected from all cases, serum was separated and stored at -20°C until tested. Relevant clinical information was collected from the laboratory data base and clinical case sheets that included history of jaundice, physical signs and symptoms and biochemical results (Aspartate amino transferase [AST], ALT, serum bilirubin and alkaline phosphatase [ALP]).

Laboratory Investigations: Serum was assessed for anti HAV immunoglobulin M, hepatitis B surface antigen (HBsAg), anti HCV total antibodies and anti HEV IgM. All analyses were performed using commercial kits based on the enzyme-linked immunosorbent assay (ELISA) as per the manufacturer's instructions.² To decrease the rate of false positivity, the initially reactive samples were re tested.

STATISTICAL METHODS: The prevalence of hepatitis viruses were analyzed in percentage and were compared with other studies.

RESULTS: In the present study 80 serum samples collected from patients with acute viral hepatitis with jaundice were screened for various serological markers by ELISA technique.

Hepatitis A virus was taken positive if the serum sample contained IgM antiHAV. Hepatitis B Virus infection was identified if both the HBsAg and IgM anti-Hbc are present in the sample. Hepatitis E virus was taken as positive if the sample had IgM anti-HEV. For Hepatitis C also antibodies to HCV were considered.

TOTAL NO.	HAV	HBV	HCV	HEV	HAV+HEV	HBV+HEV	NON REACTIVE
80	22 (27.5%)	21 (26.25%)	0	18 (22.5%)	15 (18.75%)	1 (1.25%)	3 (3.75%)

Table 1: % prevalence of different virus markers in 80 subjects

Out of 80 cases (table 1) considered for this study HAV + was detected in 22 patients (27.5%) which is being the commonest virus isolated in the study, HBV + was detected in 21 (26.25%) cases as second commonest etiological agent in this study, HEV +ve was detected in 18 cases (22.5%), and coexistence of both HAV + HEV was seen in 15 (18.75%) cases and HBV+HEV was noted in 1 (1.25%) cases, and no viral markers for HAV, HBV, HCV and HEV were noted in 3 (3.75%) cases.

Group	Total no	HAV	HBV	HCV	HEV	HAV+HEV	HBV+HEV	Non-reactive
Children (0-15 yrs)	33	16	1	0	4	11	0	1
Adult (above 16yrs)	47	6	20	0	14	4	1	2

Table 2: The incidence and etiology of acute viral hepatitis in children and adults

ORIGINAL ARTICLE

The incidence and etiology of acute viral hepatitis in children and adults is shown in table 2 .in children out of 33 cases 16(48.5%) were HAV positive and HBV positive for 1(3.03%), HCV nil, HEV 4(12.12%), HAV+HEV co infection is seen in 11 cases (33.33%), nonreactive 1 case (3.03%).

In adults out of 47 cases 6(12.76%) were HAV positive, 20(42.5%) were HBV positive, HCV nil, 14(29.8%) cases HEV, HAV+HEV co infection is seen in 4(8.5%), HBV+HEV1 (2.12%), non-reactive 2 cases (4.25%).

Group	Male	Female
Adults (16 + years)	23	24
Children (0-15 yrs)	22	11

Table 3: Sex wise distribution of incidence of acute viral hepatitis

As revealed from table 3 , Sex wise distribution of incidence of acute viral hepatitis was found to be equal in adult male and females but in children male children 22 were more effected and female 11.

Age in Yrs.	Total cases	HAV	HBV	HCV	HEV	HAV+HEV	HBV+HEV	NR
0-3	3	3(13.6%)	-	-	-	-	-	-
4-5	8	5(22.7%)	-	-	-	3(20%)	-	-
6-10	17	7(31.8%)	1(4.8%)	-	3(16.7%)	5(33.3%)	-	1(33.3%)
11-15	5	1(4.5%)	-	-	1(5.5%)	3(20%)	-	-
16-20	9	2(9%)	1(4.8%)	-	4(22.2%)	2(13.3%)	-	-
21-30	23	3(13.6%)	12(57.1%)	-	6(33.3%)	1(6.6%)	1	-
31-40	7	1(4.5%)	2(9.5%)	-	2(11.1%)	1(6.6%)	-	1(33.3%)
>40	8	-	5(23.8%)	-	2(11.1%)	-	-	1(33.3%)
Total	80	22	21	0	18	15	1	3

Table 4: The incidence of viral hepatitis in different age groups

As revealed from table 4, in 0-5 yrs the incidence of HAV was seen in 8 cases, indicating Hepatitis A as common etiological agent in this group. In 6-15 yrs HAV alone or in combination with HEV seems to be common.

In 0-15 yrs age group only one case of HBV was found, indicating low prevalence of vertical transmission, HBV was found in 12 members in 21-30 yrs age group indicating HBV is the common etiological agent in this sexually active group. In 31-40 age group, 2 cases and >40 yrs 5 cases, indicating HBV was common in age more than 20 yrs.

HEV is absent in 0-5 yrs age group, in 6-15 yrs 4 cases and 16-30 yrs 10 cases were seen and 2 each in 31-40 yrs and > 40 yrs groups, indicating HEV is next common etiological agent in adults.

HAV + HEV together were seen in 3 cases in 4-5 age group and 5 cases in 6-10 yrs age group, 3 cases in 11-15 yrs group , indicating HAV + HEV co infection is common in children.

HBV + HEV was found in one case in 21-30 yrs age group. No case was positive for HCV in the present study.

ORIGINAL ARTICLE

DISCUSSION: Several studies on AVH are available from India that have reported varying prevalence of hepatotropic viruses: HAV (1.7-67%), HBV (7.3-42%), HCV (1.16-10.6%) and HEV (16.3-66.3%).³⁻⁹ In the present study, HAV (27.5%) was identified to be the most common cause of acute hepatitis followed by HBV (26.25% cases), HEV (22.5% cases) and HCV (0%). The overall prevalence of hepatitis viruses is in accordance with that of other studies mentioned in Table 5.

Table 5: Prevalence of acute viral hepatitis markers in different studies.

Year of study	Place of study	Total samples studied	HAV HBV HCV HEV				Comments	References
			% positive					
1984	New Delhi	100	14	42	-	-	Adults	3
		78	67	9	-	-	Children	
2002	New Delhi	177	1.7	19.8	3.4	51.4	Adults	4
		129	3.1	8.6	3.1	66.3	Children	
2002	Chandigarh	172	64.5	7.6	1.16	16.3	Children (<14 years)	5
2006	New Delhi	1932	11.4	16.61	2.02	26.24	Adults	6
2007	Chandigarh	685	17.5	7.3	2.8	38.6	Individuals aged 10-70 years	7
2010	New Delhi	74	8.1	12.3	10.6	25.3	Adults	8
		124	26.61	23.38	12.90	27.42	Adults	
2012	Lucknow	143	27.27	9.79	11.18	6.99	Children	9
		97	34.02	9.27	9.27	7.21	Children	
2012	New Delhi	108	28.7	25.9	21.29	23.14	Adults	9
		33	48.5	3.03	0	12.12	Children	
2014	Present study (Visakhapatnam)	47	12.76	42.5	0	29.8	Adults	

HAV: Hepatitis A virus, HBV: Hepatitis B virus, HCV: Hepatitis C virus, HEV: Hepatitis E virus

Prevalence of HAV in children of the present study is 48.5%, which is a high prevalence rate and is in accordance with other studies conducted in other parts of India.

Tandon et al (1984)³ HAV (67%), Poddar et al (2002)⁵ HAV (64.5%), are in support with our study proving Hepatitis A as the common etiological agent in children.

On contrary to our study Kaur et al (2002)⁴ has shown increased prevalence of HEV (66.3%) in children. So from the above we can understand that HAV which is transmitted by feco-oral route is more prevalent in children, may be due to the poor sanitary and health hygiene.

The prevalence of HAV in adults of the present study is 12.75% which appears to below and is in accordance with other studies conducted in other parts of India.

In support to our study the following studies showed less prevalence of HAV in adults Tandon et al (1984)³ HAV (14%), Kauretal (2002)⁴ HAV (1.7%), and Irshad et al (2010)⁸ HAV (8.1%).

On contrary Jain et al (2013)⁹ showed HAV (28.7%) as common cause of viral hepatitis in adults.

ORIGINAL ARTICLE

So from the above we can conclude that HAV is less prevalent in adult, although these people belong to the same geographical area, most probably due to existing immunity due to exposure to the virus in the childhood.

Prevalence of HBV in children of the present study is 3.03%, which is a low prevalence rate and is in accordance with other studies conducted in other parts of India.

The studies which are in support with low prevalence of Hepatitis B are Tandon et al (1984)³ HBV (9%), Kaur et al (2002)⁴ HBV (8.6%), Poddar et al (2002)⁵ HBV (7.6%), Jain et al (2013)⁹ HBV (9.27%).

So from the above we can understand that prevalence of HBV which is transmitted vertically from mother to child is less in children.

The prevalence of HBV in adults of the present study is 42.5% which appears to be high prevalence rate. Study by Tandon et al (1984)³ showed a prevalence of HBV (42%) which is in support to our study.

Other studies showed increased prevalence, but not indicated HBV as primary cause of viral Hepatitis. Kaur et al (2002)⁴ HBV (19.8%), Hussain et al (2006)⁶ HBV (16.61%), Irshad et al (2010)⁸ HBV (12.3%), and these 3 studies showed Hepatitis E as the primary cause of hepatitis in adults. Jain et al (2013)⁹ showed the prevalence of HBV (25.9%) lower than HAV (28.7%).

The increased prevalence of HBV in adults may be due to sexual transmission of the disease and its prevalence can be reduced by vaccination.

In our study the prevalence of HCV is 0% in both adults and children, Tandon et al. (1984)³ has also showed a prevalence of 0% in both the groups which is in support to our study.

In contrary other studies showed prevalence of Kaur et al (2002)⁴ HCV in adults (3.4%), in children (3.1%), Poddar et al (2002)⁵ has showed a prevalence of HCV (1.16%) in children, Hussain Z et al (2006)⁶ has showed a prevalence of HCV (2.02%) in adults, kumar s et al (2007)⁷ showed a prevalence of HCV (2.8%) in adults. These studies indicate the prevalence of HCV is increasing in both adults and children in the present years. So further studies are required in Visakhapatnam to evaluate Prevalence of HCV.

The prevalence of HEV in children in the present study is low 12.12% which is in accordance with Tandon et al (1984)³ HEV (0%), poddar et al (2002)⁵ HEV (16.3%), Jain et al (2013)⁹ HEV (7.21%).

The prevalence of HEV in adults in the present study is 29.8% which is less than Kauretal (2002)⁴ HEV 66.3%, Kumar s et al (2007)⁷ HEV (38.6%), Chandra NS (2014)¹⁰ HEV (41.8%)

From the above we can conclude that the prevalence of HEV is increasing in the present years.

CONCLUSIONS:

1. Out of the 47 adults with acute viral hepatitis studied, HBV was found to be the common etiological agent in 20 people (42.5%).
2. The next common etiological agent found in adults was Hepatitis E in 14 cases (29.8%) and in combination with HAV in 4 cases (8.5%).
3. HAV was found in 6 patients (12.76%). Only in one case HBV+HEV were found in adults.
4. In children Hepatitis A virus was found to be common cause of acute hepatitis (48.5%) alone or in combination with HEV i. e 33.3%.
5. Hepatitis E virus found in 4 children (12.12%), being the common virus seen in acute viral hepatitis (either alone or in combination with hepatitis A).

ORIGINAL ARTICLE

6. There was only one case of Hepatitis B reported in a male child of 10 years, indicating absence of vertical and perinatal transmission in and around Visakhapatnam.
7. There was no case positive for hepatitis C. Further studies are needed to conclude the incidence of hepatitis C in Visakhapatnam.
8. Sex wise distribution of incidence of acute viral hepatitis was found to be equal in adult male and females but in children male children were more affected.
9. Vaccination of adults against hepatitis B virus is indicated, along with sexual education to decrease the incidence of hepatitis B which is found as common etiological agent in adults.
10. The incidence of HAV and HEV in children shows that there is a need for improvement in sanitation and food hygiene.

REFERENCES:

1. United States Centers for Disease Control and Prevention. 2012 National Notifiable Diseases and Conditions and Current case Definitions. Available from: http://www.cdc.gov/nndss/document/2012_Case%20Definitions.pdf. [Last accessed on 2012 May 16].
2. ELISA Protocol taken from <http://www.lifetechnologies.com/in/en/home/references/protocols/cell-and-tissue-analysis/elisa-protocol/general-elisa-protocol.html>.
3. Tandon BN, Gandhi BM, Joshi YK. Etiological spectrum of viral hepatitis and prevalence of markers of hepatitis A and B virus infection in north India. *Bull World Health Organ* 1984; 62:67-73.
4. Kaur R, Gur R, Berry N, Kar P. Etiology of endemic viral hepatitis in urban North India. *Southeast Asian J Trop Med Public Health* 2002; 33:845-8.
5. Poddar U, Thapa BR, Prasad A, Singh K. Changing spectrum of sporadic acute viral hepatitis in Indian children. *J Trop Pediatr* 2002; 48:210-3.
6. Hussain Z, Das BC, Husain SA, Murthy NS, Kar P. Increasing trend of acute hepatitis A in north India: Need for identification of high-risk population for vaccination. *J Gastroenterol Hepatol* 2006; 21:689-93.
7. Kumar S, Ratho RK, Chawla YK, Chakraborti A. The incidence of sporadic viral hepatitis in North India: A preliminary study. *Hepatobiliary Pancreat Dis. Int* 2007; 6:596-9.
8. Irshad M, Singh S, Ansari MA, Joshi YK. Viral hepatitis in India: A Report from Delhi. *Glob J Health Sci* 2010; 2:96-103.
9. P Jain, S Prakash, S Gupta, KP Singh, S Shrivastava, DD Singh, J Singh, A Jain: Prevalence of hepatitis A virus, hepatitis B virus, hepatitis C virus, hepatitis D virus and hepatitis E virus as causes of acute viral hepatitis in North India: A hospital based study: *Indian Journal of Medical Microbiology Year : 2013 | Volume : 31 | Issue : 3 | Page: 261-265.*
10. Chandra NS1, Ojha D1, Chatterjee S2, Chattopadhyay D3: Prevalence of hepatitis E virus infection in West Bengal, India: a hospital-based study. *J Med Microbiol.* 2014 Jul; 63 (Pt7):975-80. doi: 10.1099/jmm.0.072249-0. Epub 2014 May 12.

ORIGINAL ARTICLE

AUTHORS:

1. B. Aruna Sree
2. M. Padma Geethanjali
3. V. Seetha Rama Raju
4. B. Rajasekhar

PARTICULARS OF CONTRIBUTORS:

1. Associate Professor, Department of Microbiology, RIMS, Srikakulam.
2. Professor & HOD, Department of Physiology, Andhra Medical College, Visakhapatnam.

FINANCIAL OR OTHER

COMPETING INTERESTS: None

3. Assistant Professor, Department of Physiology, Andhra Medical College, Visakhapatnam.
4. Paediatrician, Private Practitioner, Visakhapatnam.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. V. Seetha Rama Raju,
D. No.65-3-456/1,
Ex. Service Men Colony,
Visakhapatnam.
E-mail: drseetharamaraju@gmail.com

Date of Submission: 15/03/2015.
Date of Peer Review: 16/03/2015.
Date of Acceptance: 31/03/2015.
Date of Publishing: 13/04/2015.