

**SEROLOGICAL DIAGNOSIS OF HAV AND HEV AND THEIR PREVALENCE IN CLINICALLY SUSPECTED CASES OF ACUTE VIRAL HEPATITIS**

\*Dr. Jayshri D. Pethani<sup>1</sup>, Dr. Pankti D. Panchal<sup>2</sup>, Dr. N.M.Shaikh<sup>3</sup>, Dr. Lata Patel<sup>4</sup>, Dr. Sanjay Rathod<sup>1</sup>, Dr. Parul D. Shah<sup>5</sup>  
<sup>1</sup>Associate Professor, <sup>2</sup>Second yr. Resident doctor, <sup>3</sup>Assistant Professor, <sup>4</sup>Tutor, <sup>5</sup>Professor & Head, Department of Microbiology, Smt. N.H.L. Municipal Medical College, Ahmedabad.

**ABSTRACT**

**INTRODUCTION:** 'Viral Hepatitis' denotes a primary infection of liver by heterogeneous group of Hepatitis virus. They are clinically indistinguishable, leading to morbidity and mortality. Mainly diagnosed by serological and molecular markers. Hepatitis A and Hepatitis E viruses are transmitted by faeco-oral route and cause sporadic as well as outbreaks of acute viral hepatitis.

**OBJECTIVES:** Prevalence of HAV and HEV in patients of acute viral hepatitis along with their co-existence and correlate between various clinical/serological/biochemical parameters.

**MATERIALS & METHODS:** Study was conducted in our institute from January to August, 2012. 922 samples were tested for HAV and HEV infection of clinically suspected cases. Samples were analysed for IgM anti HEV and IgM anti HAV antibody by ELISA method. They were followed up clinically and correlated with their biochemical parameters.

**RESULTS:** Out of 922 samples, 57 were positive for anti HAV IgM indicating prevalence rate of 6.18%, majority patients were in paediatric age group 5-10 yrs. In case of HEV, 308 samples were positive with prevalence rate of 33.40%, majority patients were in adult age group 21-30 yrs. Sclera icterus was main presenting complain with serum bilirubin ranging between 3.1-6.0 mg/dl in 44.93 %. In 27.94% patients increased SGPT level was between 501-750 IU/l. Infection rate was higher in males. Co infection rate was 2.57%.

**CONCLUSION:** Study shows high prevalence of HEV than HAV. Prevalence was higher in adult & paediatric age group in case of HEV & HAV respectively. Jaundice was most common sign with increased bilirubin & SGPT level in serum. Improving personal hygiene and better sanitation will reduce the infection rate.

**KEY WORDS:** Hepatitis A virus (HAV), Hepatitis E virus (HEV), Jaundice, Seroprevalence

**INTRODUCTION:**

Viral hepatitis caused by any of the hepatitis viruses, i.e. hepatitis A virus (HAV), hepatitis B virus (HBV), hepatitis C virus (HCV), hepatitis D virus (HDV), hepatitis E virus (HEV) and hepatitis G virus (HGV), which is a major health event worldwide. <sup>(1)</sup> Among these HAV & HEV is most common cause of acute hepatitis in human considering as epidemiologically important one. Its high prevalence is related to spread of these infectious agents by the fecal-oral route usually through contact between people or by ingestion of contaminated food or water. <sup>(1-3)</sup> HAV belongs to the genus *Hepatovirus* and is a member of the *Picornaviridae* family. HAV is a non-enveloped virus 27–32 nm in diameter. The viral genome is a single-stranded RNA of positive polarity, which is non-segmented and is packaged in an icosahedral capsid. <sup>(5)</sup> HAV strains in children but may become symptomatic needs intervention and can affect adults too. <sup>(6)</sup> HEV was classified as a new Calciviridae family on the basis of its structure and genome organization. The Hesperivirus genus is still the only known member of this family. HEV is a non-enveloped cubic-

shaped virus 27–33 nm in diameter and has tooth-like projections on its surface. The viral genome consists of a single stranded RNA of positive polarity. <sup>(4)</sup> Both viruses transmit through feco oral route and illness caused by these enterically transmitted viruses are usually mild & self-limiting, patient may present with fever, nausea, abdominal pain, vomiting, decreased appetite or yellowish discoloration of skin, mucus membrane & urine along with elevated Serum Alanine Aminotransferase (SGPT) & serum bilirubin level on laboratory examination. <sup>(8-9)</sup> Hepatitis a& E are generally found to be very simple & fairly treated but if proper care is not taken then they can lead to chronic hepatitis in immunocompromised patients. HEV infection is responsible for high mortality rates (up to 20%) in pregnant women. <sup>(7-9)</sup>

So this study aims to know Prevalence of HAV and HEV in patients of acute viral hepatitis along with their co-existence and correlation between various clinical/serological/biochemical parameters.

**MATERIALS & METHODS:**

From January to August 2012, 922 serum samples were collected from the outpatient department of gastroenterology of our institute for anti-HAV IgM & anti-HEV IgM. In the outpatient department the subjects were identified with symptoms of jaundice, fever, loss of appetite, abdominal pain, scleral icterus, altered sensorium, encephalopathy and fatigue. Detailed histories of each patient including all biochemical parameters were noted. Patients reactive for HBsAg, known cases of chronic hepatic failure & on alcohol were excluded from study. Blood samples were collected from all the subjects after taking the informed consent. All of the serum

samples were tested using commercially available ELISA based kits for anti-HAV IgM & anti-HEV IgM.

**RESULTS:**

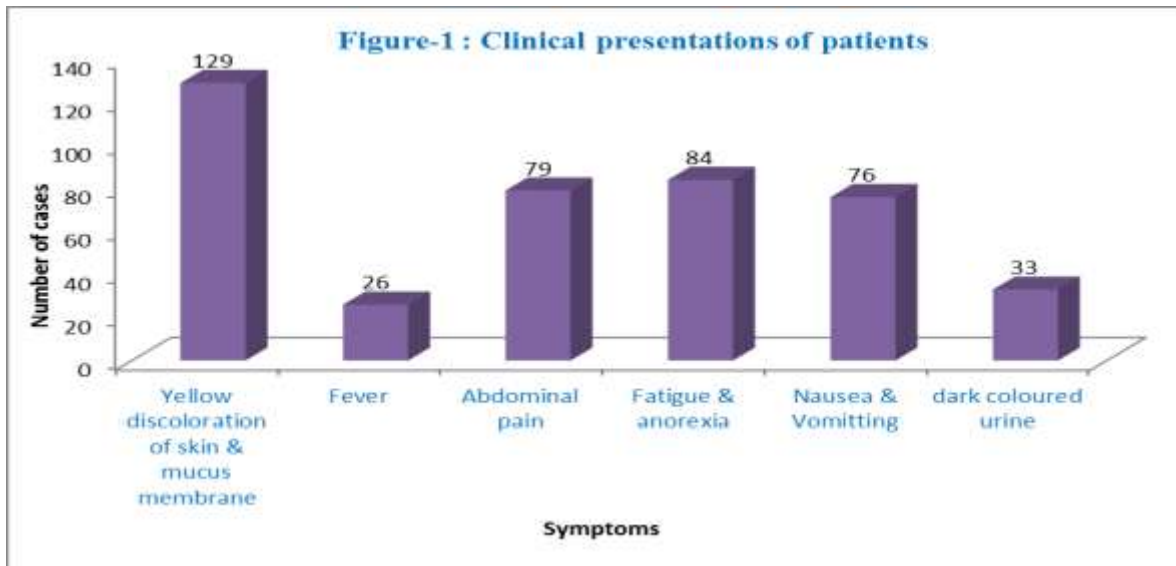
Of the 922 samples, 57(6.18 %) were positive for anti HAV-IgM & 308(33.40%) were positive for anti HEV IgM. In HEV cases highest age group affected was between 21-30 yrs of age (34.74%) while lowest group included pediatric age group (0.3%). In HAV cases highest age group affected was between 5-10 yrs of age (52.63%) while lowest group contributed by 21-30 yrs of age group(0.3%). Age wise distribution is depicted in Table-1. Males were commonly affected than females.

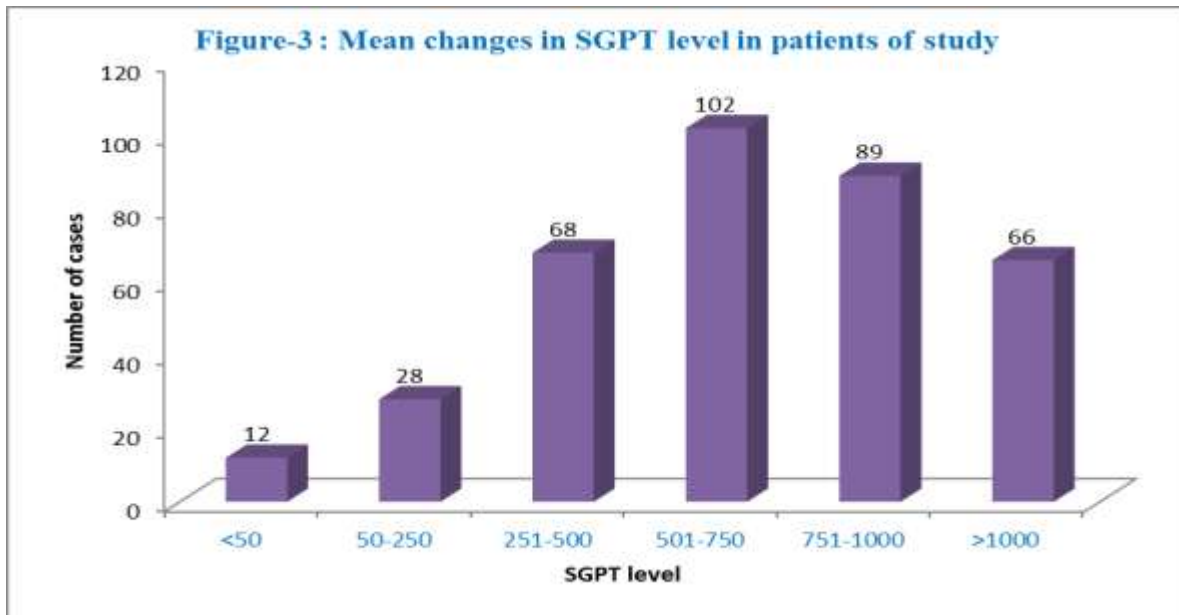
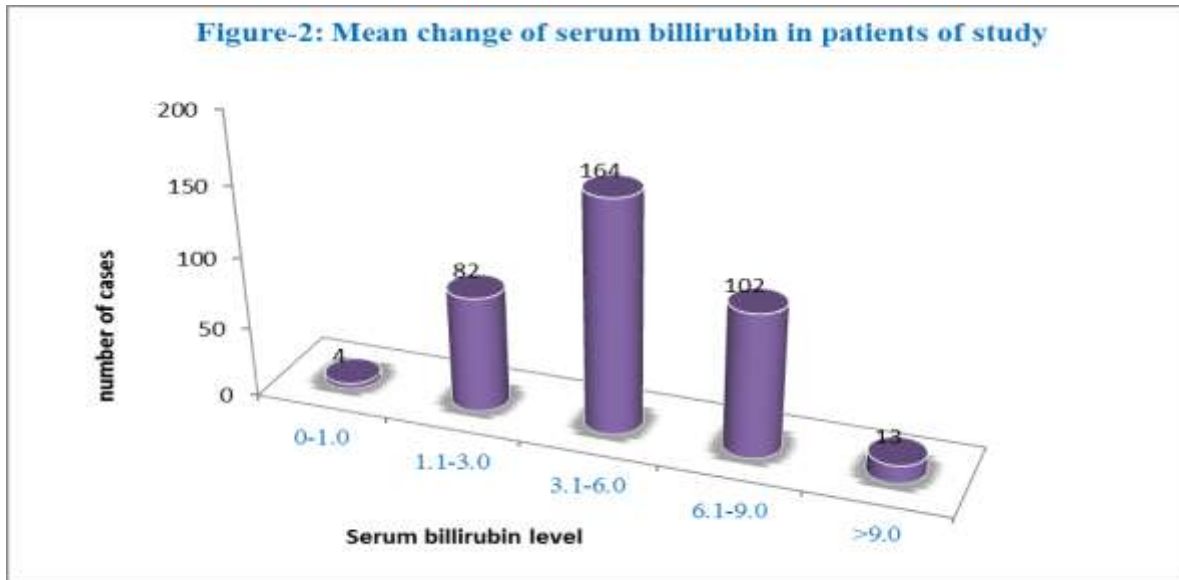
Table 1: Age wise distribution of positive patients

Age group (Yrs.)	No. of cases for HAV	No. of cases for HEV
<1	1	0
1-4	20	2
5-10	30	1
11-20	5	38
21-30	1	107
31-40	0	72
41-50	0	63
>50	0	25
Total	57	308

129 patient showed yellowish discoloration of skin & mucus membrane (34.52%), which is a major presenting symptom followed by anorexia & fatigue in 84 (20.82 %) and least observed was fever in 26(6.02% ) number of patients (Figure-1). Comparing with biochemical markers all were correlated auspiciously, in which elevated billirubin & SGPT level in serum were noted. Different range and amongst them most frequently noted is depicted in Figure -2 & 3. Largest numbers of patients were showing increased billirubin range between 3.1-6.0

mg/dl, showed in 164(44.93%) patient’s lab investigation & smallest range was comprised by 0-1.0mg/dl, in 4 patients (1.09%). Major cases were following in SGPT range of 501-750I U/L (27.94%). Youngest patient in case of HAV was of 8 month who was presented with hepatic encephalopathy. 2 out of 18 suspected pregnant women for hepatitis E found to be positive for anti HEV IgM, suffered from an illness & died indicating mortality rate of 11.11% in them.HAV and HEV coinfection rate was 2.57%





**DISCUSSION:**

This study reviewed various serological and biochemical parameters of jaundice in patients with features suggestive of acute viral hepatitis. Our study shows HAV is most commonly affecting children which is 89.47%, This prevalence is similar to the results reported by B. Mohanavalli,<sup>(12)</sup> Aggarwal et al.<sup>(11)</sup> and Arankalle et al.<sup>(10)</sup> where they reported >95%.In this study(52.63%) children between 5-10 yrs were most commonly affected, which is similar to study by B. Mohanavalli <sup>(12)</sup> in which most common age group was affected was between 6-8 yrs of age group. Regarding Epidemiolocal data in developing countries where poor sanitation and people live in crowded condition , infection acquires in childhood & by age of ten 90% of population possess antibody to the virus and are immune.<sup>(1)</sup> So HAV infection is less commonly seen in adults, mitigating finding of our study. Infection

rate of HEV was higher in age group of 21-30yrs of age, which similarize with previous study by Ramesh roop rai , who described most common age group of 16-30 yrs of age.<sup>(13)</sup>

In our study maternal mortality rate was 11.11% , while study by Aggrawal et al & Ramesh roop rai noted prevalence of 12-20% & 5.1% respectively.<sup>(11),(13)</sup> In Pregnancy immunological changes occur for maintenance of probably antigenic fetus in maternal environment by somewhat suppressing maternal immunity, which leads to increased risk of infection or aggravates present infection. Adding to that increased level of steroid hormones during pregnancy promotes virus replication & growth, predisposing to hepatic dysfunction which ultimately ends in fulminant cases.<sup>(14)</sup> Such High prevalence in maternity points towards that any suspicious clinical features or biochemical parameters described in this study should

immediately follow attention to put patient on clinical therapy and should be confirmed by specific anti HEV Ig M test to arrive at definite diagnosis to reduce mortality. HAV was however low compared to HEV in the present study. All confirmed cases were correlated well with biochemical markers which indicate that clinical suspicion can be made on such ground to start empirical treatment.

#### CONCLUSION:

IgM anti-HEV & IgM anti-HAV is a reliable and sensitive marker for diagnosis of recent HEV & HAV infection respectively when suspecting a case of enterically transmitted hepatitis. Liver enzymes level of positive patients showed raised values than normal value and well correlated with sign and symptoms. Though definite diagnosis by specific anti HEV & HAV IgM should be made to know recent infection & seroprevalence rate which is epidemiological important. Incidence of HEV infection is maximum in young adults (21-30 years) than in paediatric and old age groups while prevalence of HAV was higher in children (5-10yrs.) & lower in young adults. In developing countries most people browbeaten and living in crowded condition except people belonging to higher middle class & upper class. These patients live in overcrowded area, which reflects the poor sanitation and low standard of lifestyle-all these things, contributes to the transmission of infection. Improve hygiene & living life style can reduce illness.

#### REFERENCES:

1. Anathnarayan, paniker; Hepatitis virus; Textbook of microbiology-8<sup>th</sup> edition; Universities press-New delhi, 2009; p 536-548.
2. Law B, Diaz-Mitoma F, Safary A. Combined vaccination against hepatitis A and B in children and adolescents. Abstract on 9th Asian Congress of Paediatrics, 23-27 Mars 1997, Hong Kong. J Paediatr Child Health 33 (1): S58.
3. Jacobsen KH and Koopman JS. The effect of socio-economic development on worldwide hepatitis A virus

sero-prevalence patterns. Int J Epidemiol 2005; 34(3):600-609.

4. Balayan MS, Andjaparidze AG, Savinskaya SS, et al. "Evidence for a virus in non-A, non-B hepatitis transmitted via the fecal-oral route ". Intervirology 20 (1): 23-31.
5. Cristina J, Costa-Mattioli M (August 2007). "Genetic variability and molecular evolution of hepatitis A virus". Virus Res. 127 (2): 151-7.
6. Connor BA (2005). "Hepatitis A vaccine in the last-minute traveler". Am. J. Med. 118 (Suppl 10A): 58S-62S
7. Labrique AB, Thomas DL, Stoszek SK, Nelson KE. Hepatitis E: an emerging infectious disease. Epidemiol Rev 1999; 21:162-179.
8. Emerson SU, Purcell RH. Running like water—the omnipresence of hepatitis E. N Engl J Med 2004; 351:2367-2368.
9. Angelia et al: Hepatitis E Seroprevalence and Seroconversion among US Military Service Members Deployed to Afghanistan. The Journal of Infectious Diseases 2010; 202(9):1302-1308.
10. Arankalle VA, Tsarev SA, Chadha MS, Alling DW, Emerson SU, Banerjee K, et al. Age-specific prevalence of antibodies to hepatitis A and E viruses in Pune, India, 1982 and 1992. J Infect Dis 1995; 171: 447-450
11. Aggarwal R, Naik S, Yachha SK, Naik SR. Seroprevalence of antibodies to hepatitis A virus among children in Northern India. Indian Pediatr 1999; 36: 1248-1250.
12. B. Mohanavalli, E. Dhevahi, Thangam Menon, S. Malathi, S.P. Thyagarajan: Prevalence of Antibodies to Hepatitis A and Hepatitis E Virus in Urban School children in Chennai, India. Indian Pediatrics 2003; 40:328-331.
13. Ramesh Roop Rai, Seroepidemiology and role of polymerase chain reaction to detect viremia in an epidemic of hepatitis E in Western India, Tropical Gastroenterology 2008. 29;4:202-206.
14. Dr. Udaykumar Navaneethan et al, Hepatitis E and pregnancy- Understanding the pathogenesis. Liver Int. 2008 November; 28(9): 1190-1199.