

# Study of seroprevalence of Hepatitis A and profile of patients in clinically suspected cases of acute viral Hepatitis at a tertiary care hospital

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## Abstract

**Background:** Hepatitis A virus infection (HAV) of the young can be asymptomatic, they cause 60-70% of clinical Hepatitis in children < 15 years old. As the incidence is unreliable because most cases are sub-clinical, mild or unreported, hence epidemiology of Hepatitis A is best measured by measuring immunoglobulin M (IgM) antibodies to HAV (anti-HAV). Present study was aimed to study, seroprevalence of Hepatitis A cases and profile of clinically suspected cases of acute viral hepatitis at a tertiary hospital. **Material and Methods:** Present study was prospective and observational study conducted in patients with clinically suspected acute viral hepatitis, clinically suspected acute liver disease patients attending OPD and who were admitted in the wards, serum tested for anti HAV. **Results:** In present study, serum of 350 cases of suspected hepatitis were tested. Anti – HAV test was reactive in 15 (4.29%). Anti HAV test (IgM) was reactive most commonly in less than 15 years of age group (21.31%) followed by 15 to 30 years (0.61%) and 31-45 years (0.02%). There was statistically significant correlation between different age group and anti HAV test. Amongst HAV positive cases there was slightly higher number of female cases (4.42%) as compared to male cases. (4.14%) and male : Female ratio was 0.8:1. Hepatitis A cases were commonly observed in the month of July (11 cases), august (11 cases) and august (3 cases) and September (1case). There was a statistically significant correlation between seropositive cases and months. **Conclusion:** HAV infections are prevalent infections among clinically suspected acute viral hepatitis patients and remain a major health problem in developing countries. Reduced incidence of HAV infection in respective age group indicates the role of improved sanitary measures and public education.

**Keywords:** Hepatitis A virus, acute viral hepatitis, HAV seroprevalence, anti-HAV antibodies

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## INTRODUCTION

Acute viral Hepatitis can be self-limiting or can progress to fibrosis, cirrhosis or liver cancer. The term “Viral Hepatitis” refers to a primary infection of the liver by any one of the heterogenous group of “hepatitis viruses”, which consists of types A, B, C, D, E and G. The features common to them are their hepatotropism and ability to cause a similar icteric illness, ranging in severity from the unapparent to the fulminant fatal forms.<sup>1,2</sup> Hepatitis A Virus (HAV) are small non-enveloped single stranded RNA viruses, belongs to genus Hepatovirus of family Picornaviridae. Approximately 1.4 million cases are reported every year throughout the world.<sup>3</sup> Acute Hepatitis

A infection (AHA) is supposed to be endemic in developing countries because of low socioeconomic status, increase density of houses and untreated water consumption. Frequent infection leads to development of acquired immunity in nearly 90% of children below 10 years of age.<sup>4,5</sup> Hepatitis A virus infection (HAV) of the young can be asymptomatic, they cause 60-70% of clinical Hepatitis in children < 15 years old.<sup>6</sup> As the incidence is unreliable because most cases are sub-clinical, mild or unreported, hence epidemiology of Hepatitis A is best measured by measuring immunoglobulin M (IgM) antibodies to HAV (anti-HAV). Present study was aimed to study, seroprevalence of Hepatitis A cases and profile of clinically suspected cases of acute viral hepatitis at a tertiary hospital.

### MATERIAL AND METHODS

Present study was prospective and observational study conducted in department of Microbiology, LTMMC and LTMGH, Sion Hospital, Mumbai, India. Present study was conducted during January 2015 to December 2015 (1 year). Study was approved by institutional ethical committee.

**Inclusion criteria:** All patients with clinically suspected acute viral hepatitis, clinically suspected acute liver disease patients attending OPD and who were admitted in the wards, serum tested for anti HAV, willing to participate in the study.

**Exclusion criteria:** Patients of chronic viral hepatitis. Patients not willing to be part of the study.

A detailed history was elicited for each patient and duly recorded in the case record form. Liver function test results of study patients 5ml of blood was collected in a sterile vacutainer from after taking informed consent. Serum was separated after centrifugation at 2500 rpm for 15 minutes and subjected for serological testing. RecombiLISA test was used for detection of IgM anti-HAV in human serum or plasma.

1. The negative result indicates that there is no detectable IgM anti HAV in the specimen.
2. Results just below the cut-off value were retested in duplicate the corresponding specimens.
3. Specimens with cut-off  $\geq$  1.00 are initially considered to be positive by the HAV ELISA Kit and were retested in duplicate before final interpretation.

Data was collected and compiled using Microsoft Excel, analysed using SPSS 23.0 version. Difference of proportions between qualitative variables were tested using chi-square test or Fisher exact test as applicable. P value less than 0.5 was considered as statistically significant.

### RESULTS

In present study, serum of 350 cases of suspected hepatitis were tested. Suspected hepatitis cases were most commonly observed in 15 – 30 years of age group (46.8%) followed by 31 to 45 years of age group (28%) and less than 15 years(17.42%) . Suspected hepatitis cases were most commonly observed in female (51.71%) population as compared to male (48.29%). Male : female ratio was 0.93:1.

**Table 1:** Age and Gender wise distribution of cases

Characteristic	Suspected hepatitis cases	Percentage
Age (in yrs.)		
<15 yrs.	61	17.43
15-30 yrs.	164	46.86
31-45 yrs.	98	28
46-60 yrs.	24	6.85
>60 yrs.	3	0.86
Mean age	26.99 ± 13.14	
Gender		
Male	169	48.29
Female	181	51.71

As seen in the above table, the most common clinical features amongst cases of hepatitis was fever (98.28%) followed by malaise (97.42%), abdominal pain (88.85%), Yellow discoloration of urine (23.71%) and loss of appetite (14.57%).

**Table 2:** Clinical profile of patients

Clinical features	Total	Percentage
Fever	344	98.28%
Malaise	341	97.42%
Abdominal pain	311	88.85%
Yellow discoloration of urine	83	23.71%
Loss of appetite	51	14.57%
Icterus	57	16.28%
Hepatomegaly	31	8.8%

Anti – HAV test was reactive in 15 (4.29%).

**Table 3:** Seroprevalence of Hepatitis A virus (HAV) IgM antibody

No. of cases	Reactive		Non-reactive	
	No.	%	No.	%
350	15	4.29	335	95.71

Anti HAV test (IgM) was reactive most commonly in less than 15 years of age group (21.31%) followed by 15 to 30 years (0.61%) and 31-45 years (0.02%). There was statistically significant correlation between different age group and anti HAV test. (P value – 0.0001) Amongst HAV positive cases there was slightly higher number of female cases (4.42%) as compared to male cases. (4.14%) and male : Female ratio was 0.8:1.

**Table 4:** Seroprevalence of Hepatitis A virus in clinically suspected cases in relation to age

Age group (yrs.)	Anti HAV test (IgM)		Total
	Reactive cases	Non-reactive cases	
<15 yrs.	13 (21.31%)	48 (78.69%)	61
15-30 yrs.	1(0.61%)	163 (99.39%)	164
31-45 yrs.	1 (0.02%)	97 (98.98%)	98
46-60 yrs.	0 (0%)	24 (100%)	24
>60 yrs.	0 (0%)	3 (100%)	3
Total	15 (4.29%)	335 (95.71%)	350
Male	7 (4.14%)	162 (95.86%)	169
Female	8(4.42%)	173(95.58%)	181

Seropositive HAV cases was present most commonly in lower middle class (46.7%) followed by Upper lower (26.7%) There was statistically significant correlation between different Socioeconomic status and positive HAV cases. (P value – 0.00003)

**Table 5:** Socioeconomic status of seropositive HAV cases (Kuppuswamy classification )

Class	No. of cases		Total
	Positive	Negative	
Upper	0	1 (0.3%)	1 (0.28)
Upper middle	2 (13.3%)	191 (57%)	193 (55.14%)
Lower middle	7 (46.7%)	87 (26%)	94 (26.86%)
Upper lower	4 (26.7%)	11 (3.3%)	15 (4.29%)
Lower	2 (13.3%)	45 (13.4%)	47 (13.43%)
<b>Total</b>	<b>15 (100%)</b>	<b>335 (100%)</b>	<b>350 (100%)</b>

Mean Total Bilirubin, SGOT/AST, SGPT, ALP and A/G ratio amongst hepatitis A cases was  $2.87 \pm 2.44$ ,  $112 \pm 29.72$ ,  $307 \pm 151$ ,  $1367 \pm 595$  and  $0.69 \pm 0.25$  respectively.

**Table 6:** LFT of hepatitis A

HAV	Mean	SD
Total Bilirubin	2.87	2.44
Direct Bilirubin	1.89	1.56
Indirect Bilirubin	1.24	1.07
SGOT/AST	112.00	29.72
SGPT	307.00	151
ALP	1367.00	595
Serum Albumin	2.97	0.36
Serum Globulin	3.54	0.54
A/G ratio	0.69	0.25

Hepatitis A cases were commonly observed in the month of July (11 cases), August (11 cases) and August (3 cases) and September (1 case). There was a statistically significant correlation between seropositive cases and months. (P value - <0.05)

**Table 7:** Seasonal variation of seropositive cases of Hepatitis A

Month	HAV		Total
	Positive	Negative	
January	0	7	7
February	0	10	10
March	0	9	9

April	0	9	9
May	0	40	40
June	0	27	27
July	11	79	90
August	3	46	49
September	1	11	12
October	0	19	19
November	0	49	49
December	0	33	33

## DISCUSSION

Hepatitis A virus (HAV) infection is a common infection responsible for about 1.4 million new infections worldwide each year.<sup>3</sup> HAV is transmitted via the faecal-oral route, and has a global distribution. Antibodies to HAV (anti-HAV) can be detected during acute illness when serum aminotransferase activity is elevated and faecal HAV shedding is still occurring. This early antibody response is predominantly of the IgM class and persists for rarely 6-12 months. During convalescence, however, anti-HAV of the IgG class becomes the predominant antibody. Hepatitis A remains self-limited and does not progress to chronic liver disease.<sup>7</sup> In our study it was observed that suspected Hepatitis cases were most commonly seen in age group of 15 to 30 years (46.8%) followed by 31 to 45 years (28%) and less than 15 years (17.42%) with Mean age  $26.99 \pm 13.14$  years. Similarly, study conducted by Sharma P.K *et al.*,<sup>8</sup> shows maximum number of cases i.e. 52.22% in the age group of 15-35 years with mean age of  $37.4 \pm 15.9$  yrs. Also Antony J *et al.*,<sup>9</sup> shows 54.64% and 29.82% in the age group of 20-39 years and <19 years. Considering gender distribution in clinically suspected hepatitis cases it was observed that hepatitis was commonly among female (51.71%) population as compared to male (48.29%) population with male to female ratio of 0.93:1. Similarly, 52.22% in female and 47.78% in male was observed in a study conducted by Sharma PK *et al.*,<sup>8</sup> In the present study, the most common clinical features amongst cases of hepatitis was fever (98.28%) followed by malaise (97.42%), abdominal pain (88.85%), yellow discoloration of urine (23.71%), icterus (16.28%) and loss of appetite (14.57%). Similar findings were noted in other studies.<sup>10,11,12,13</sup> In various studies conducted abroad and India, prevalence of hepatitis A has ranged from 2.3% to the maximum of 40.5%. In our study, seroprevalence of Hepatitis A virus is 4.29% from the clinically suspected acute viral hepatitis cases. However the study conducted by, Acharya SK *et al.*,<sup>14</sup> Sharma PK *et al.*,<sup>8</sup> and Kar *et al.*,<sup>15</sup> showed seropositivity to anti HAV of 4%, 3.3% and 3.5% respectively. These were in concordance with our study. Also, a study conducted by Ranamathulla S *et al.*,<sup>16</sup> showed seroprevalence of anti HAV IgM of 6.87%. Hepatitis A is frequently mild and asymptomatic in childhood and develops a mild self-limiting illness.

However, adults with HAV infection can develop more severe symptoms, leading to serious complications. In our study, 15(4.29%) were reactive for anti HAV IgM, out of which 13(21.31%) was in the age group of <15 years. In study conducted by Rajani M.,<sup>2</sup> showed maximum seropositivity of anti HAV IgM in 0-10 years age group (16.8%). While Tewari R *et al.*,<sup>4</sup> observed maximum in 5-15 years of age group. Likewise, Pandya N *et al.*,<sup>17</sup> noted highest seroprevalence in the age group 0-5 years (44.11%) followed by 6-10 years (26.47%). Studies conducted by Agrawal M *et al.*,<sup>18</sup> Singh MP *et al.*,<sup>19</sup> Sarwat F *et al.*,<sup>20</sup> showed maximum seropositivity in <15 years of age group. The high prevalence rate in children in developing countries is attributed to their susceptibilities to infection due to poor hygiene, overcrowding and poor sanitary conditions, where there is abundant shedding of HAV in the faeces contributing to high endemicity pattern.<sup>2</sup> Out of 15 seropositive cases, 8(4.42%) were female and 7(4.14%) were male. Male to female ratio is 0.8:1. Similarly in a study conducted by Sarthi M *et al.*,<sup>21</sup> in Karnataka and vitral CL *et al.*,<sup>22</sup> showed male to female ratio of 0.85:1 and 0.96:1 respectively which were in concordance with our study. In the present study, Socioeconomic status of seropositive cases of hepatitis A showed that 46.7% belonged to lower middle class followed by upper lower (26.7%) and lower class (13.3%) which is statistically significant. Similarly, in the study conducted by Verma YS *et al.*<sup>5</sup> also observed that maximum patients belonged to lower middle class followed by upper lower class. Liver function tests (LFT) are a helpful screening tool and an effective modality to detect hepatic dysfunction. Several studies have reported complications like prolonged hepatitis, relapse, hepatic failure, haematological abnormalities etc. in hepatitis A cases.<sup>10,23</sup> Some studies show that the rate of acute liver failure related to acute HAV infection has increased from 0.1-0.3% to 1.4%.<sup>15</sup> Seropositive cases of hepatitis A among clinical suspected cases of acute viral infection was most commonly observed in the month of July (11 cases), August (3 cases) and September (1 case). Epidemics and point source outbreaks are common in rainy season when flooding leads to sewage contamination of drinking water. During June to September of each reporting year, a 17% increase in total number of reported cases above baseline was observed and laboratory confirmed hepatitis A cases followed same seasonal pattern with average increase of 18%.<sup>24</sup> Along with help of clinical diagnosis and biochemical analysis, timely diagnosis by serology and PCR may help in early management and prevention of complications. Vaccine for HAV is available but still not included universally in all immunization programmes. Hence it is recommended that vaccination programme should be intensified for HAV. Hepatitis A viral infection is mainly linked to

contaminated food and water supply. Therefore, prevention is most effective approach and transmission can be reduced by maintaining quality standard for public water supply, establishing proper disposal systems for human feces.

## CONCLUSION

HAV infections are prevalent infections among clinically suspected acute viral hepatitis patients and remain a major health problem in developing countries. Reduced incidence of HAV infection in respective age group indicates the role of improved sanitary measures and public education.

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