

A Study of Seroprevalence of Hepatitis A Virus IgM Antibody in Patients of Viral Hepatitis in Tertiary Care Hospital, Jamnagar, Gujarat India

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Original Research Article

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Article History

Received: 13.06.2018

Accepted: 23.06.2018

Published: 30.06.2018

DOI:

10.21276/sjpm.2018.3.6.4



Abstract: Hepatitis A virus (HAV) infection is one of the important causes of hepatitis in developing countries. It is transmitted through feco-oral route. They pose major health problems. To determine the prevalence of HAV in patients presenting with acute viral hepatitis. Serum samples of the patients presenting with fever, nausea, vomiting, and jaundice were collected and analyzed by using commercially available RecombiLISA ELISA kit for the detection of immunoglobulin M (IgM) against HAV. A 20 months retrospective study was conducted in the Department of Microbiology, Shri M. P. Shah Govt. Medical College, Jamnagar, Gujarat (India). Of the 532 serum samples subjected to RecombiLISA ELISA for detection of anti-HAV IgM in patients, 157 (29.51%) were found to be positive. The prevalence was found to be more in male patients than in female patients, that is, 81(51.59%) and 76(48.41%), respectively, and was predominantly seen in the 6–15 years of the school-going age group. Peak cases were found in the monsoon season. Regular monitoring of clinical, serological and molecular characteristics would help in understanding the epidemiology of HAV and in planning the intervention studies.

Keywords: Hepatitis A virus, Seroprevalence, Epidemiology, RecombiLISA, Serological, Jamnagar.

INTRODUCTION

Viral hepatitis, caused by any of the six hepatotropic viruses, viz. 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), represents a major health problem worldwide. Among these, hepatitis A virus (HAV) is a most common causative agent of human acute hepatitis and is considered to be one of the epidemiologically important viruses. It is a small, non-enveloped 27 nm, symmetrical ribonucleic acid (RNA) virus, which is resistant to heat, acid, and ether. The HAV was first isolated by Purcell in 1973. It belongs to family Picornaviridae and genus Hepato-virus [1]. HAV has a worldwide distribution, and accounts for more than 1.5 million cases of viral hepatitis annually [2, 3]. Disease incidence varies over time and geography, with differences among countries and even cities. Sero-epidemiological data contributes significantly for a better understanding of the changing epidemiology of this infection. HAV infections are transmitted through

feco-oral route, either by direct contact with an infected person or by consumption of contaminated water or food. Low Socio-economic status, high density housing and inadequate water treatment contribute to a pattern of high endemic in developing countries in which more than 90% of the population has acquired natural immunity before the age of 10 often from an asymptomatic infection. In such countries, explicit forms of hepatitis A are relatively rare with only exceptional severe cases [4]. Infected children who become infected are usually asymptomatic or with mild symptoms while infected adults with hepatitis A can develop fever, asthenia and jaundice.

The epidemiological pattern of hepatitis A infection is currently declining in many developing countries with improved sanitary conditions and hygienic practices. In recent years India and other transitional economies are showing a significant epidemiological shift of HAV infection from high endemicity to intermediate endemicity [5]. Increasing

numbers of youth and adults, especially in urban developed areas, are now susceptible to HAV with considerable increase in morbidity with rare mortality.

MATERIALS AND METHODS

This study was conducted in Microbiology Department, Shri M.P. Shah Govt. Medical College, Jamnagar, Gujarat (India) from January 2016 to August 2017 for a period of 20 months.

Case Definition and Criteria of Inclusion

Patients with one or more of the following characteristics were included in the study:

- Acute clinical illness that includes malaise, extreme fatigue, fever, anorexia, vomiting. Combined with right upper quadrant pain and dark urine.
- Clinical jaundice and positive bile pigment in urine and elevated total serum bilirubin.
- History of contact with an acute or known chronic case of viral hepatitis.

We included patients of both sex from all age groups. On the basis of history of fever, nausea, vomiting, and jaundice, blood samples of the OPD and

IPD patients were collected as per the laboratory protocols. Serum was separated and tests were run on RecombiLISA ELISA kit for the detection of anti-HAV IgM. RecombiLISA ELISA kit is based on enzyme linked fluorescent assay technology and claims sensitivity and specificity of 100 % and 100 %, respectively. All the kits were supplied by CTK BIOTECH and used according to supplier’s instruction manual. Positive and negative controls were provided along with the kit. Test value of ≥ 1.0 was considered positive and lesser than < 1.0 was considered negative. Interpretation of the test was made taking into consideration the patient history and the result of any other test performed.

RESULTS AND DISCUSSION

Out of the 532 serum samples were tested, 157(29.51%) were positive for anti HAV antibodies (Table-1).

Table-2 shows month wise distribution of total cases and positive cases, also show total and positive cases reported in males and females.

Table-1: Sero prevalence of HAV

TOTAL SAMPLES	POITIVE SAMPLES	PREVALENCE (%)
532	157	29.51%

Table-2: Month wise distribution of HAV cases

Month	Samples		Males		Females	
	Total	Positive	Total	Positive	Total	Positive
January-2016	16	3	9	0	7	3
February-2016	14	2	9	1	5	1
March-2016	19	2	7	0	12	2
April-2016	25	9	8	3	17	6
May-2016	24	4	14	2	10	2
June-2016	52	10	35	6	17	4
July-2016	42	17	27	8	15	9
August-2016	30	8	18	4	12	4
September-2016	44	25	22	11	22	14
October-2016	34	15	15	8	19	7
November-2016	29	13	21	9	8	4
December-2016	13	5	9	4	4	1
January-2017	00	00	00	00	00	00
February-2017	16	01	11	0	5	1
March-2017	31	5	18	2	13	3
April-2017	22	1	16	1	6	0
May-2017	29	3	21	3	8	0
June-2017	30	6	18	3	12	3
July-2017	38	18	21	11	17	7
August-2017	24	10	11	5	13	5
Total	532	157	310	81	222	76

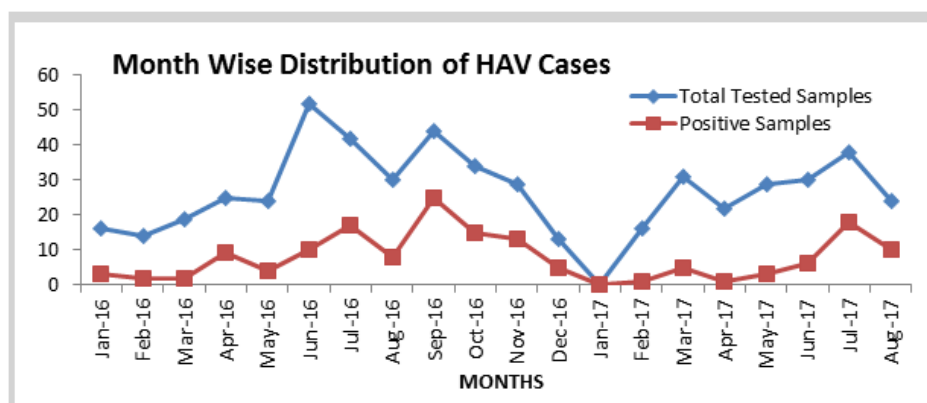


Fig-1: Month wise distribution of HAV cases

The patients included 532, out of them 310 in males was 81(51.59%) and in females were 222 were males and 222 were females. The sero-positivity were 76(48.41%) (Table-3).

Table-3: Sex wise sero-positivity of HAV

	Total samples	Poitive samples	Prevalence (%)
Male	310	81	51.59%
Female	222	76	48.41%
Total	532	157	100%

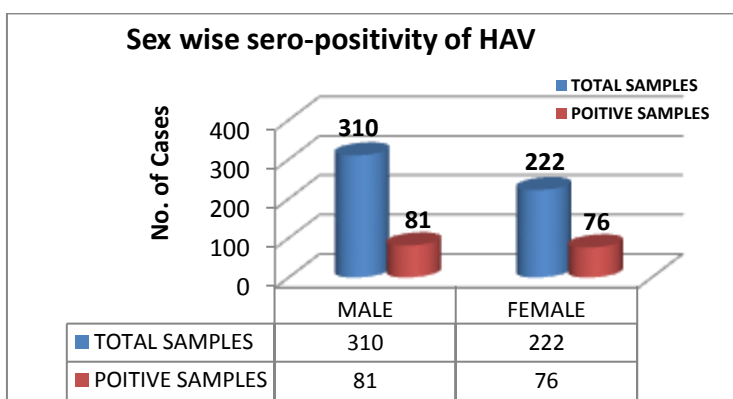


Fig-2: Sex wise sero-positivity of HAV

Sero-prevalence rate according to age group 58(36.94%) in 0 to 5 years of age, 70 (44.59%) in 6 to 15 years of age group, 28(17.83%) in 16 to 40 years of age group and 1(0.64%) in more than 40 years of age group (Table-4)

Table-4: Age group wise sero-prevalence of HAV

Age (year)	Total samples	Positive samples	Prevalence (%)
0-5	95	58	36.94%
6-15	114	70	44.59%
16-40	246	28	17.83%
>40	77	01	0.64%

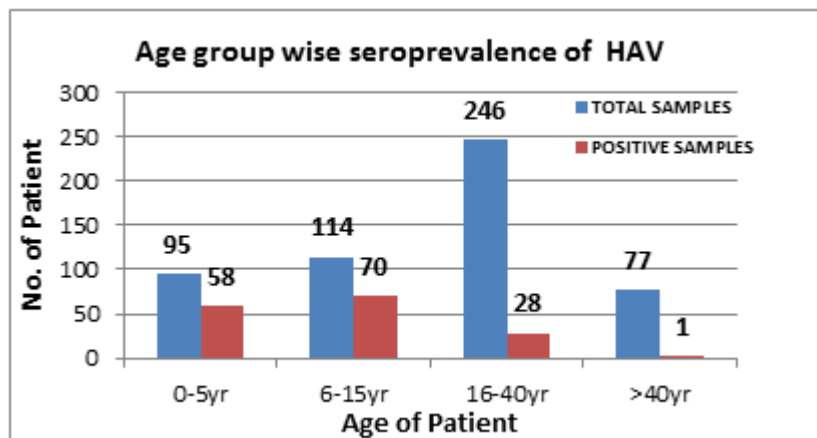


Fig-3: Age group wise sero-prevalence of HAV

We collected data of acute hepatitis A from our hospital and compared them with other studies; we found significant rise in the sero-prevalence in the children of the age group 6–15 years as compared with small children, which shows improvement in the care of children at home and their socioeconomic status. This age group is usually the school-going age group, which is exposed to contaminated environment, and who are not mature enough to take care of themselves. HAV multiplies in liver cell hampering its functions and leading to stimulation of immune response resulting in liver inflammation and antibody synthesis of both IgM and IgG type [6].

Prevalence of Hepatitis A virus IgM antibodies in patients in the present study is 29.51%(157/532) which is comparable with the study of B. Aruna *et al.* Visakhapatnam, 2014 who noted 27.5%(22/80), Study of Jain P *et al.* Lucknow, 2013 who noted 26.96%(72/267), Study of Tewari *et al.*, New Delhi, 2014 who noted 33.7%(30/89).

Prevalence of Hepatitis A virus IgM antibodies in male patients in the present study is 51.59%(81/157) and in female patients is 48.41%(76/157), which is comparable with the study of Birajdar SV *et al.* ambajogai, Maharashtra, 2016 who noted 57.6%(19/33) in male and 42.4%(14/33) in female, Study of Pandya N *et al.* Rajkot, 2014 who noted 60%(39/65) in male and 40%(26/65) in female.

Prevalence of Hepatitis A virus IgM antibodies in Children patients in the present study is 61.24%(128/209) which is comparable with the study of U. Poddar *et al.* 2000, Chandigarh having 64.5%(111/272), Study of BN Tandon *et al.* New Delhi, 1984 who noted 66.7%(18/27) of prevalence of HAV.

Prevalence of Hepatitis A virus IgM antibodies in adult patients in the present study is 8.97%(29/323) which is comparable with the study of M. Irshad *et al.* New Delhi, 2010 who noted 8.11%(6/74), Study of

Tewari *et al.* New Delhi, 2014 who noted 7.55%(4/53), Study of B. Aruna *et al.* Visakhapatnam, 2014 who noted 12.76%(6/47) prevalence of HAV.

HAV is endemic in North India and found throughout the year. Still some studies have reported seasonal variation as it peaks in monsoon months of the year. Similarly, we have reported more cases in monsoon season.

Seasonal prevalence of Hepatitis A virus IgM antibodies in the present study is 20.0%(30/150) during January to June and 43.22%(83/192) during July to December, 2016, which is comparable with the study of Tewari *et al.* New Delhi, 2014 who noted 24.39%(10/41) during January to June and 41.67%(20/48) during July to December. Both study show high prevalence during monsoon.

CONCLUSION

This study investigated that infections have been found in school-going children of >5 years, which shows improvement in the education of mothers' hygiene and socioeconomic status. Hepatitis A, because of epidemiological shift, has now been diagnosed more in teenagers and adults with more severe symptoms that are similar to other viral hepatitis, so the diagnosis must be confirmed by serological testing for the detection of IgM. In an infection, genotype, serotype, and seroprevalence of the nearby area should be tracked immediately to prevent outbreaks. More studies on sero-epidemiology should be carried out to evaluate the appropriate age of HAV vaccination, and also proper guidelines can be formulated for immunization in developing countries.

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