



## A STUDY ON THE PREVALENCE AND SEASONAL VARIATION OF HEPATITIS A IN PATIENTS ATTENDING JNIMS HOSPITAL

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### ABSTRACT

**BACKGROUND:** Hepatitis is the most common cause of acute viral hepatitis. It causes severe, often fatal disease in adults especially in those with underlying liver dysfunction but is mostly asymptomatic in children. The present study was conducted with the aimed to find the prevalence and seasonal variation of HAV infection in patients attending JNIMS hospital.

**METHODOLOGY:** A cross sectional hospital based study was conducted in the department of Microbiology, JNIMS, Imphal, Manipur. Rapid immunochromatographic assay was performed for the detection of IgM antibody to HAV in human serum.

**RESULTS:** Out of the 84 serum samples 20(23.80%) was found to be positive for hepatitis IgM, of which 11 (55%) were found in males and 9(45%) were found in females. A seasonal increase in incidence of HAV infection was found during the rainy season of January – March (50%) and April – June (35%).

**CONCLUSION:** The global seroepidemiology of hepatitis A is changing in many developing nations giving rise to unique non immune adolescent and adult populations emerging in endemic regions thereby conferring a risk of developing severe hepatitis A. Hence, finding the prevalence, seasonal variation and timely detection of HAV infection will help in minimising the development of further complication

**KEYWORDS :** Hepatitis A, seasonal variation, IgM antibodies

### INTRODUCTION

Hepatitis A virus (HAV) is a 27nm, non enveloped RNA virus belonging to the Picornavirus family. HAV is now recognised as the prototype of a new genus Hepatovirus<sup>1</sup>. Only one serotype and six genotype of the virus are known. Genotype I–III is involved in human infection<sup>2</sup>.

HAV is transmitted through faeco-oral either by direct contact or by consumption of contaminated water/food. The virus multiplies in the intestinal epithelium and reaches the liver by hematogenous spread. Globally, the HAV prevalence in the population is directly related to the improved socio economic and sanitation levels worldwide. Hence, less developed countries such as Africa, Asia and Central and South America with very poor sanitary and hygienic conditions, HAV infections is highly endemic<sup>3</sup>.

With the development of effective vaccine against HAV in the 1990s and improvement in socio economic conditions, epidemiology of hepatitis A has changed. The age groups more affected has shifted from first decade to second and third decade, severity of disease which was nearly asymptomatic or mild in children become more symptomatic in adults<sup>4,5</sup>.

Hence, the global seroepidemiology of hepatitis A is changing in many developing nations giving rise to unique non immune adolescent and adult populations emerging in endemic regions thereby conferring a risk of developing severe hepatitis A.

We carried out this study to find the prevalence and seasonal variation of HAV infection in patients attending JNIMS hospital.

### OBJECTIVES/AIMS:

- To find the prevalence of HAV infection in patients attending JNIMS hospital.
- To find the seasonal variation of HAV infection among the positive cases.

### METHODOLOGY

A cross sectional hospital based study was carried out in the department of Microbiology, Jawaharlal Nehru Institute of Medical Sciences, Manipur, India from January, 2017 to December, 2017 for a period of 1 year.

All the eighty four (84) blood samples of the OPD and IPD patients sent to Microbiology Dept. for performing the test for detection of IgM antibody to HAV in patient's serum were included in the study

Serum samples were separated and tests were performed by using

Insight HAV – IgM device manufactured by Tulip Diagnostic (P) Ltd. It is a rapid immune chromatographic assay for detection of IgM antibodies to HAV in human serum.

The testing device was labelled with specimen identity and place on a horizontal surface. 5µl of serum samples was pipetted out in a test tube. Then 250µl of sample running buffer was added to the test tube (1:50 dilution) and mix well. This is the test specimen. Holding the sample dropper vertically, exactly 3 drops of the test specimen was dispensed into the sample port. The result is read at the end of 10 minutes. If two purple coloured bands appear at the control region (C) and test region (T), it indicates the sample contains detectable amount of IgM antibodies to HAV. If only one purple coloured band appears at the Control region(C), it indicates absence of IgM antibodies to HAV. The test result is considered invalid if no band appears either at the control region(C) or test region(T).

### RESULTS AND OBSERVATION

In this study 84 serum samples were tested for hepatitis A IgM. 20(23.80%) was found to be positive for hepatitis A IgM. Of the 20 positive cases, 11 of them (55%) were found in male and 9(45%) cases were found in females. A seasonal increase in the incidence of HAV infection was found during the rainy season of January – March (50%) followed by the months of July – September (35%).

**Table1. Age and sex wise distribution of the study groups**

Age(years)	Male	Female
<15	12	9
16-30	13	15
31-45	11	10
46-60	7	3
>60	2	2
Total	45	39

**Table2. Age wise distribution of positive cases**

Age(years)	Male	Female
<15	4	4
16-30	3	1
31-45	3	1
46-60	1	3
>60	0	0
Total	11(55%)	9(45%)

**Table3. Seasonal trend and positivity**

Months	No. of positive cases	%
January – March	10	50%

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April – June	7	35%
July – September	2	10%
October – December	1	5%

## DISCUSSION

In our study out of the 84 serum samples tested 20(23.84%) was found to be positive for hepatitis A IgM. In a study by Rahana Tewari et al in Delhi 30(33.7%) patients was found to be positive for hepatitis A IgM. In other studies, seroprevalence of 34.02% in children and 28.70% in adult has been documented for IgM<sup>6</sup>. In other Iranian studies, the seroprevalence of HAV infection has been reported to be over 95%. Between 2006 and 2007, a cross sectional population based study from Tehran, Iran in 551 subjects showed and an overall seroprevalence rate of anti-HAV of IgG of 90% and concluded that the seroprevalence of HAV still was too high for recommending routine vaccination in the general population<sup>7</sup>.

In developing countries with poor sanitary condition and hygienic practices, most children (90%) have been infected with the hepatitis A virus before the age groups of 10 years<sup>18</sup>. In our study also, maximum number of patients below the age groups of 15 years (40%) were positive for hepatitis A while 20% were positive in age groups of 15 – 30 years, 31 – 45 years and 46 – 60 years.

In countries of intermediate endemicity such as Korea, Indonesia, Thailand, Sri Lanka and Malaysia, the available literature indicates that the incidence is decreasing in urban area, with age at infection increasing from very childhood to late adolescence resulting in increased the risk of outbreaks, morbidity, and complications in younger population<sup>9,10</sup>.

In our study, out of the 20 positive cases, 11 of them (55%) were found in male and 9(45%) cases were found in females. Men were found more positive than women in other studies<sup>11-13</sup>, also probably due to the greater exposure of men in their professional and social lifestyle and this co-relates with other studies.

A seasonal variation was recognized in this study with the highest incidence in spring and summer. Furthermore, a seasonal increase in incidence of HAV infection was found during the season January – March (50%) where rainfall is scanty and this might lead to poor hygiene and environmental sanitations. This was followed by the months of July – September (35%) where the index of rains is very high.

These findings indicate that the HAV infection is transmitted indirectly through rainfall because these rains usually fill up the rivers so they could overflow and the persons could be contaminated with this water<sup>14</sup>. Some other studies have also reported seasonal variation of HAV infection as it peaks in summer and monsoon months<sup>15</sup>. A study in North India by Tewari R et al has reported more cases in the month of August that is monsoon season<sup>16</sup>.

## LIMITATIONS

Because of scarcity of resources and facilities, we could not perform molecular studies. It has been documented that in Indian population, genotype IIIA is found to be a predominant one. Having knowledge of genotype is significant as different genotype and serotype causes diseases of different severity in the population. Some can cause sporadic cases whereas some can cause outbreaks. This may help in taking control measures in the society to prevent outbreak in that particular area.

## CONCLUSION

Immunization against HAV is costlier than conducting seroprevalence test. So in countries where asymptomatic or mild infection leads to acquired immunity, a prior seroprevalence test should be performed. 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.

## REFERENCES

1. Francki RIB, Fauquet CM, Krudson DL, Brown F. The classification and nomenclature of viruses, fifth report of the international committee on taxonomy of viruses. Arch Virology. 1991;2:S320-326.
2. Lu L, Ching KZ, Paula VS, Nakano T, Siegi G, Weitz M et al. Characterization of the complete genomic sequence of genotype II hepatitis A virus (CF 53/Berne isolate).

- Journal General Virology.2004; 85(10): 2943-29 52.
3. Das AK. Changing seroepidemiology of hepatitis A infection and its prevention in endemic regions. International Journal of Health and Allied Science.2016; 5(2):75 - 79. Doi: 10.4103/2278-344X.180427.
4. Bose M, Bose S, Saikia A, Medhi S, Dekha M. Molecular epidemiology of hepatitis A virus infection in NE India. Journal of Medical Virology. 2015; 87(7): 1218 – 1224.
5. Nalbantoglu B, Donma MM, Ozdilek B, Karasu E, Nalbantoglu A. Shifting epidemiology of hepatitis A infection and vaccination status of children aged 6 months – 12 years: time for massvaccination. Iran Journal Pediatrics. 2013; 23(3): 276 – 280.
6. Jain P, Prakash J, Gupta S, Singh KP, Shrivastava S, Singh DD et al. Prevalence of hepatitis A virus, hepatitis B virus and hepatitis C, hepatitis D virus, hepatitis E virus as causes of acute viral hepatitis in north India, a hospital based study. Indian Journal Med Microbiology.2013; 31(3): 261-265.
7. Mohebbi SR, Rostami Nejad M, Tahaei SM, Pourhoseingholi MA, Habibi M, Azimzadeh Pet al. Seroepidemiology of hepatitis A and E virus infections in Tehran, Iran: A population based study. Trans R Soc Trop Med Hyg. 2012; 106: 528 – 531.
8. Jacobsen KH, Wiersma ST. Hepatitis A virus seroprevalence by age and world region, 1990 and 2005. Vaccine.2010; 28: 6653 – 6657.
9. Kim YJ, Lee HS. Increasing incidence of hepatitis A in Korean adults. Intervirology. 2010; 53:10-14
10. Moon HW, Cho JH, Hur M, Yun YM, Choe WH, Kwon SY et al. Laboratory characteristics of recent hepatitis A in Korea: Ongoing epidemiological Shift. World Journal of Gastroenterology. 2010; 16: 1115 – 1118.
11. Al Joon A, Rao P, Shenoy SM, Baliga S. Prevalence of hepatitis A virus (HAV) and hepatitis virus (HEV) in patients presenting with acute viral hepatitis. Indian Journal of Medical Microbiology. 2015; 33:S102 – 105.
12. Al – Naalmi AS, Turkey AM, Khaleel HA, Jalil RW, Mekhlef DA, Kareena SA et al. Predicting acute viral hepatitis serum markers in patients with suspected acute viral hepatitis attending primary health care centers in Baghdad: a one year cross – sectional study. Global Journal of Health Science. 2012; 4(5):172 – 183.
13. Kamal EM, Mahmoud S, Hafez T, El – Fouly R. Viral hepatitis A to E in South Mediterranean countries. Mediterranean Journal of Hematology and Infectious Diseases. 2010; 2(2):2010001.
14. Villar CM, Paulo VS, Gaspar AM. Seasonal variation of HAV infection in the city of Riode Janeiro, Brazil. Journal of the Institute of Tropical Medicine of Sao Paulo. 2002; 44: 289 – 92.
15. Jain P, Prakash S, Gupta S, Singh KP, Shrivastava S, Singh DD et al. 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. 2013; 31(3): 261 – 5.
16. Tewari R, Makerja V, Dudeja M. Prevalence of hepatitis A in southern part of Delhi, India. International Journal of Medical Science and Public Health. 2016; 5(10):2067-70.