International Journal of Science and Research (IJSR)
ISSN: 2319-7064
ResearchGate Impact Factor (2018): 0.28 | SJIF (2018): 7.426

Prevalence of Hepatitis A & E in the Patients Presenting with Acute Viral Hepatitis in a Tertiary Care Hospital

Dr. Chandni[1], Dr. Shailpreet K Sidhu[2], Dr. Kanwardeep Singh[3], Dr. Loveena Oberoi[4], Dr. Sita Malhotra[5]

[1]Post Graduate, Department of Microbiology, Government Medical College, Amritsar, India

[2]Associate Professor, Department of Microbiology, Government Medical College, Amritsar, India

[3]Professor, Department of Microbiology, Government Medical College, Amritsar, India

[4]Professor & Head, Department of Microbiology, Government Medical College, Amritsar, India

[5]Associate Professor, Department of Microbiology, Government Medical College, Amritsar, India

Abstract: ***Introduction: Acute viral hepatitis (AVH) is a major public health problem in developing nations like India. Both Hepatitis A virus (HAV) and Hepatitis E virus (HEV) are transmitted through feco-oral route, causing acute viral hepatitis. Despite improving sanitation, health awareness, and socio-economic conditions, these infections continue to occur both in sporadic and epidemic forms in different parts of India. Aims & Objectives: The study was conducted to know the seroprevalence of HAV and HEV in the patients presenting with acute viral hepatitis. Methods: The retrospective study was conducted in the department of Microbiology, Government Medical College, Amritsar. Samples received from January 2018 to November 2019 were included in the study. A total of 1327 samples were processed in this study. The serum samples were analysed for IgM anti-HAV and IgM anti-HEV for the detection of HAV and HEV respectively, using commercially available ELISA kits. Results: The prevalence of HAV and HEV were found to be 15.4% and 29.7% respectively. The prevalence of HAV in paediatric age group (79.9%) was found to be higher as compared to adults (20.1%). However, the prevalence of HEV was higher in adults (90.4%) as compared to the paediatric age group (9.6%). The prevalence of HAV and HEV co- infection was 2.6%. Among the total, 18 (32.7%) cases of acute viral hepatitis complicating pregnancy were positive for IgM anti-HEV. Conclusion: The prevalence of HEV is much higher than that of HAV which mandates the screening for HEV, especially in pregnant women where outcome of infection is poor. Improving personal hygiene practices, maintaining quality standards for public water supplies and establishing appropriate sewage disposal systems will ensure in reduction of HAV and HEV transmission.***

Keywords: Hepatitis A, Hepatitis E, Prevalence, Acute Viral Hepatitis, Coinfection

1. Introduction

Acute viral hepatitis (AVH) is a major public health problem in India and other developing nations where conditions of hygiene and sanitation are poor. Hepatitis A virus (HAV) and hepatitis E virus (HEV) are the leading causes of AVH in the world.[1] Hepatitis E is the commonest cause of AVH in adults and hepatitis A in pediatric age group.[2],[3] Both are endemic and considered to be a major etiological agent of enterically transmitted viral hepatitis.

HEV causes a self- limiting viral infection that is transmitted by feco-oral route, primarily through consumption of contaminated food and water. It can occur as both epidemic and sporadic cases in developing countries.[4] In areas with high disease endemicity, symptomatic infection is common in young adults aged 15-40 years. Every year, there are an estimated 20 million HEV infections worldwide, leading to estimated 3.3 million symptomatic cases of hepatitis E.[5] This virus results in 20-30% mortality among pregnant women and has been implicated as an important etiological agent for fulminant hepatic failure in developing countries.[6],[7]

HAV is the major cause of acute viral hepatitis in children of 1-3 years of age group, which amounts to approximately 1.4 million cases annually.[8] However, there has been a gradual upward shift in the average age of acquiring HAV infection from early childhood to adulthood in different parts of the world.[9] HAV infection in early childhood is mostly asymptomatic or mildy symptomatic and requires only supportive management.[9] In areas of high endemicity, most children are exposed to the virus and consequent acquisition of antibodies against the virus confers lifelong immunity.[10]

Despite improving sanitation, health awareness, and socio-economic conditions, these infections continue to occur both in sporadic and epidemic forms in different parts of India. Therefore, this study was conducted to determine the prevalence of HAV and HEV and their co-infection among patients attending a tertiary care hospital, presenting with symptoms of acute hepatitis.

2. Aims & Objectives

The study was conducted to know the seroprevalence of HAV and HEV in the patients presenting with acute viral hepatitis.

3. Material and Methods

The retrospective study was conducted in the department of Microbiology, Government Medical College, Amritsar during the period of January 2018 to November 2019.

Individuals from all age group presenting with the signs and symptoms of AVH were included in the study. After obtaining the written informed consent of the patients along with completely filled patients' history form, 1-3 ml (from pediatric age group) and 3-5 mL (from adults age group) blood samples with universal precautions were collected by venipuncture, from 1327 patients presenting with AVH.

Serum was separated from blood samples after centrifugation at 3,000 rpm for 3 minutes. The serum samples were analysed for IgM anti-HAV and IgM anti-HEV for the detection of HAV and HEV respectively, using commercially available ELISA kits. The procedures were followed as per the manufacturer's instructions mentioned in the literatures provided within the ELISA kits. The ELISA tests were performed and the readings were taken spectrophotometrically within it and recorded quantitatively as Optical Density (OD) value. The cut-off value was calculated as mentioned in the manufacturer's instructions and simultaneously OD values were compared and reported as positive or negative.

4. Results

A total of 1327 samples were processed by IgM ELISA for HAV and HEV throughout the study period. 77.3% (1026/1327) were adults (age more than 12yrs) and 22.7 % (301/1327) were children (age 12 yrs or less). The prevalence of HAV infection was found to be 15.4% (204/1327), HEV infection 29.7% (394/1327) and HAV & HEV co infection 2.6 % (35/1327)**Figure 1**.

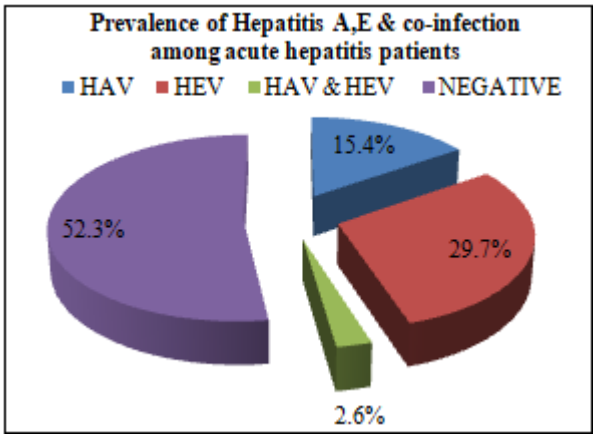

Figure 1: Prevalence of hepatitis A, E & co-infection among acute hepatitis patients

Prevalence of HAV infection was found more in children 79.9% (163/204) than in adults 20.1% (41/204). Whereas HEV infection was more prevalent in adults 90.4% (356/394) than in children 9.6% (38/394) **Figure 2.** Out of 1026 adult patients, 5.4 % (55/1026) were cases of jaundice complicating pregnancy. Out of which 32.7% (18/55) cases of acute hepatitis complicating pregnancy were positive for IgM anti-HEV. Both HAV and HEV cases were seen throughout the study period with peaks in the months of June, July and August i.e during monsoons **Figure 3.**

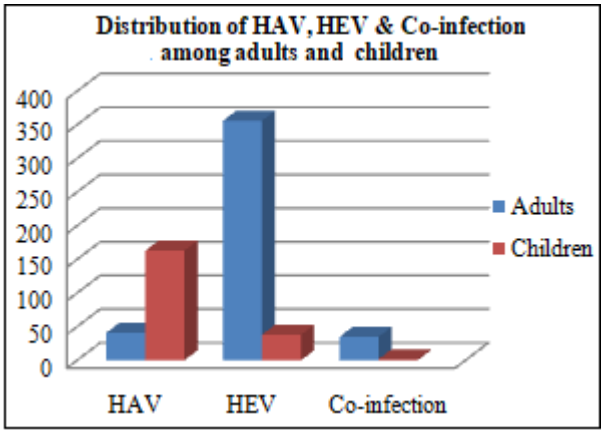

Figure 2: Distribution of HAV, HEV & co-infection among Adults and Children

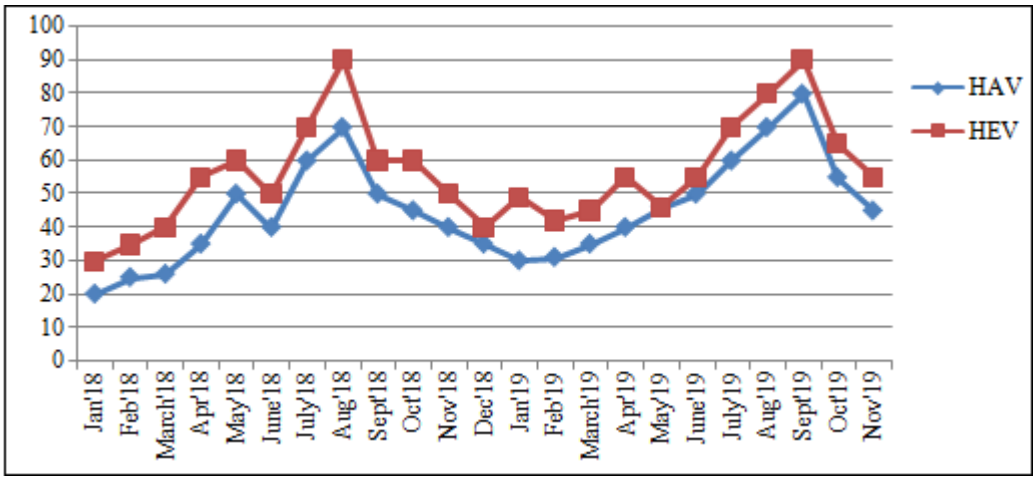

Figure 3: Seasonal Distribution of HAV and HEV Infections

5. Discussion

Hepatitis A virus (HAV) and Hepatitis E virus (HEV) both are enterically transmitted. The majority of HAV and HEV outbreaks might be due to the lack of enough sewage and sanitation systems, defecation in open fields, which can contaminate surface drinking water source. Hepatitis A infection during childhood often is asymptomatic and unrecognized, and typically confers lifelong immunity[10]. But with increasing age at time of infection, symptomatic cases become more common. With improved hygiene and sanitation reflecting India's growing economy, more children might escape childhood HAV infection and remain susceptible to infection during adolescence and adulthood[9].

Globally, HAV is considered as the common cause of viral hepatitis[11], but in our study HEV (29.7%) was identified as the major cause of acute viral hepatitis and more common than HAV (15.4%), which is similar with the results of other studies from different regions of the country[12],[13]. Studies like Singh *et al*, Naaimi *et al*, Yano *et al*, Laxmi *et al* and Ayoola *et al* reported a similar prevalence of HAV as 21.7 %, 44.8 %, 36.8 %, 12.7 % and 37 % respectively. The reasons may be due to the high prevalence of anti-HAV antibodies in general population, availability of vaccine against HAV and improved living standards and environmental hygiene[14].

HAV infection is believed to be a disease of infants and young children and the same was found in our study with 79.9% (163/204) of total HAV positivity in children. Chandra *et al*, and Agarwal S *et* al also reported the similar results. Prevalence of HAV is still very high in children as compared to adults, suggesting HAV is not showing any epidemiological shifts in our population.

Prevalence of HEV is highest in South and East Asia region, accounting for 60% of hepatitis E global incidence[15]. The present study showed that HEV was found maximum positive in adults with the prevalence of 90.4% (356/394). Mishra *et al* and Tandon *et al* have shown similar results. HEV infection is less common in young children because it is mostly asymptomatic and anicteric in them.

Many studies have shown *in utero* transmission of HEV infection in pregnant women with fetomaternal outcome ranging from intrauterine fetal death to symptomatic and asymptomatic neonatal liver infection[6],[16]. In our study, 18 pregnant females were found positive for HEV infection. Out of which, two cases had fulminant HEV followed by a fatal outcome and one pregnancy ended in stillbirth. The predominance of HEV infection in the whole spectrum of viral hepatitis makes it an important issue for vaccination. In 2011, a vaccine to prevent hepatitis E virus infection has been licensed in China but it has not yet been approved in other countries (WHO, 2017) [5].

Prevalence of HAV & HEV co-infection cases varies in different parts of India. Authors have reported it as low as 0.8%[17], 5.2%[12] and high as 11.5%[18]. In present study, prevalence of HAV & HEV co-infection was found to be 2.6%. The cases of co-infection with HEV and HAV have improved after symptomatic treatment without affecting the prognosis but in rare cases it may lead to acute liver failure[19]. Diagnosis of HAV & HEV co-infection is difficult by clinical presentation and biochemical analysis but serology and PCR may help in timely diagnosis resulting in identification of causative agent and providing support in prevention and management of acute liver failure in children and adults.

HAV and HEV infections are endemic in India and infections occur throughout the year[20]. In the present study also, both HAV and HEV cases were reported throughout the study period with the predominance in June–August, i.e., during rainy season. It is possibly due to cross contamination of drinking water with sewage during the rainy season[13]. Similarly Kumar *et al*, in viral hepatitis surveillance-India (2011–2013) observed 17% increase in the total number of reported hepatitis cases during June- September. Joon *et al*, reported that HAV and HEV both were seen to be prevalent all around the year with predominance seen towards the end of monsoons and beginning of winters. Seasonal variation in transmission of acute viral hepatitis, possibly related to mixing of contaminated soil into wells and rivers during periods of heavy rains or floods (NCDC, 2014)[15].

HAV and HEV infections are transmitted enterically and have similar risk factors; therefore, the most effective method to prevent infection is to interrupt the route of transmission and focus on proper sanitary conditions, hygiene and public education[13]. Vaccines can be used as a preventive strategy. HAV vaccine can be used in high-risk population like chronic liver disease patients, travelers visiting endemic areas, and during onset of epidemics. As HAV infection is common in younger children, inclusion of single-dose inactivated HAV vaccine in immunization schedule of children can be useful in prevention of infection[13].

6. Conclusion

The prevalence of HAV and HEV is an indirect indicator of the sanitation & hygiene practices followed in the particular area. Prevention is the most effective approach against acute viral hepatitis. The high prevalence of HEV mandates the screening for HEV, especially in pregnant women where outcome of infection is poor. Vaccination against HAV and HEV can be used as preventive measure. Maintaining quality standards for public water supplies and establishing appropriate sewage disposal systems can be done at community level which can ensure in reduction of HAV and HEV transmission. Infection risk can be reduced on an individual level, by maintaining hygienic practices such as hand-washing with clean water and avoiding consumption of contaminated food and water. The authorities should make an effort to increase the awareness among general public, to facilitate the timely preparation and make necessary arrangement for efficient response to encounter outbreak or epidemic, thus reduce morbidity, mortality and economic burden.

References

[1] Traore´ KA, Rouamba H, Ne´bie´ Y, Sanou M, Traore´ AS, et al. (2012) Seroprevalence of Fecal-Oral

Transmitted Hepatitis A and E Virus Antibodies in Burkina Faso. PLoS ONE 7(10): e48125. doi:10.1371/journal.pone.0048125
[2] Acharya SK, Batra Y, Bhatkal B. Sero epidemiology of hepatitis A virus infection among school children in Delhi; implications for HAV vaccination. J Gastroenterol Hepatol 2003; 18: 822-7.
[3] Chadha MS, Walimbe AM, Chobe LP, Arankalle VA. Comparison of etiology of sporadic acute and fulminant viral hepatitis in hospitalised patients in Pune, India during 1978-81 and 1994-97. Indian J Gastroenterol 2003; 22: 11-5.
[4] Kumar M, Kumar R, Sharma AK , Kumari S. Prevalence of Hepatitis A Virus (HAV) and Hepatitis E Virus (HEV) in the Patients Presenting with Acute Viral Hepatitis (AVH) in a Tertiary Care Hospital. Int J Med Res Prof. 2017; 3(1):297-301.
[5] Netra S, Bithu R and Maheshwari RK. Epidemiological Study of Hepatitis A Virus and Hepatitis E Virus Infection in Patients Presenting with Acute Viral Hepatitis. Int.J.Curr.Microbiol.App.Sci.2018; 7(05): 899-904.
[6] Chandra NS, Sharma A, Rai RR, Malhotra B. Contribution of hepatitis E virus in acute sporadic hepatitis in northwestern India. Indian J Med Res. 2012; 136(3): 477–482.
[7] Ahmed A, Ali IA, Ghazal H, Fazili J, Nusrat S. Mystery of hepatitis E virus: Recent advances in its diagnosis and management. Int J Hepatol. 2015; 2015: 872431
[8] Nandi B, Hadimani P, Arunachalam R, Ganjoo RK. Spectrum of Acute Viral Hepatitis in Southern India. Med J Armed Forces India. 2009 Jan; 65(1): 7-9.
[9] Mathur P, Arora NK. 2008. Epidemiological transition of hepatitis a in India: Issues for vaccination in developing countries. Indian J Med Res. 128: 699–704.
[10] Kaw HW, Aschcavai M, Redekar AG. The persistence of IgM antibody after acute clinical hepatitis A. Hepatology 1984;4:933-6.
[11] Fischer GE, Thompson N, Chaves SS et al. The epidemiology of hepatitis A virus infections in four Pacific Island nations, 1995-2008. Trans R Soc Trop Med Hyg 2009; 103: 906-10.
[12] Monika A, Ruchi K, Ashish B et al. A study of seroprevalence and co-infection of hepatitis A and hepatitis E viruses in sporadic cases in an endemic area. J Med Sci Health 2016; 2(3): 1-5.
[13] Agarwal S, Anuradha, Sahoo A, Duggal N. Seroprevalence of Hepatitis A Virus (HAV) and Hepatitis E Virus (HEV) Co-infection in the Patients Presenting with Acute Viral Hepatitis Attending a Tertiary Care Hospital in North India. J Commun Dis 2017; 49 (3): 57-60.
[14] Jacobsen KH, Koopman JS. Declining hepatitis A seroprevalence: a global review and analysis. Epidemiol. Infect 2004; 132: 1005-22.
[15] NCDC Newsletter. Vol 3. Issue 1; JanuaryMarch, 2014. p. 1
[16] Khuroo MS, Saleem M, Teli MR, Skidmore S, Sofi MA, Khuro MI. Incidence and severity of viral hepatitis in pregnancy. Am J Med. 1981; 70:252-5
[17] Radhakrishnan S, Raghuraman S, Abraham P et al. Prevalence of enterically transmitted hepatitis viruses in patients attending a tertiary-care hospital in South India. Indian J Pathol Microbiol 2000; 43: 433-36.
[18] Joon A, Rao P, Shenoy SM, Baliga S. Prevalence of Hepatitis A [11] virus (HAV) and Hepatitis E virus (HEV) in the patients presenting with acute viral hepatitis. Indian J Med Microbiol. 2015;33 (Suppl):102-05
[19] Arora NK, Nanda SK, Gulati S et al. Acute viral hepatitis types E, A, and B singly and in combination in acute liver failure in children in north India. J Med Virol 1996; 48: 215-21.
[20] Jain P, Prakash S, Gupta S, Singh KP, Shrivastava S, Singh D D, Singh J, Jain A. 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 J Med Microbiol 2013;31:261-5.