

## Seroprevalence of Hepatitis B Virus and Hepatitis C Virus as Causes of Acute Viral Hepatitis in North India: A Hospital Based Study

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### Reprint Request

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### Abstract

*Context:* Hepatitis is an inflammation of the liver, most commonly caused by a viral infection. Acute viral hepatitis (AVH) is a major public health problem and is an important cause of morbidity and mortality. *Aim:* The aim of the present study was to determine the prevalence of parenterally-transmitted hepatitis viruses, hepatitis B virus (HBV) & hepatitis C virus (HCV) as causes of AVH in a tertiary care hospital of North India. *Settings and Design:* Blood samples were collected from patients with clinically suspected acute infectious hepatitis over a 1 year period. *Subjects and Methods:* Samples were tested for hepatitis B surface antigen & anti HCV IgG by the enzyme linked immunosorbent assay. Seroprevalence rate was calculated and stratified by age. *Statistical Analysis Used:* Fisher's exact test was used and percentages were calculated for comparison. *Results:* The study population comprised of 9652 patients presenting with acute hepatitis. Samples were collected from patients with clinically suspected acute infectious hepatitis. Seroprevalence rate was calculated and stratified by age. Of the 9652 cases, 558 (5.8%) had a confirmed viral aetiology. HBV (3.96%) was identified as the most common cause of acute hepatitis compared to HCV (1.8%). Co-infections was present in 2 cases. *Conclusions:* Among the parentally transmitted viral hepatitis, HBV is more common and Health education & vaccination is necessary to control these infections.

**Keywords:** Seroprevalence; Hepatitis B; Hepatitis C; Viral Hepatitis.

### Introduction

Hepatitis is an inflammation of the liver, most commonly caused by viral infections. Acute viral hepatitis (AVH) is a major public health problem in India and other developing nations having inadequate sanitary conditions. Major etiological agent of enterically-transmitted viral hepatitis includes Hepatitis A (HAV) and Hepatitis E virus (HEV). Infection due to Hepatitis A virus is endemic in less developed countries, although its prevalence

has decreased recently in areas where sanitary conditions have been improving. Hepatitis B virus (HBV) is transmitted by parenteral, vertical and sexual routes, whereas hepatitis C virus (HCV) is usually transmitted by transfusion [1,2].

Clinical presentation due to these viruses largely overlaps. These range from asymptomatic and inapparent to fulminant and acute fatal infections on one hand, and from subclinical persistent infections to rapidly progressive chronic liver disease with cirrhosis and hepatocellular carcinoma on the other.

[3]. According to the World Health Organisation (WHO), approximately 240 million people are chronically infected with HBV worldwide, while 150 million people are infected with HCV [4].

Since there is paucity of data regarding seroprevalence of viral hepatitis in North India therefore, this study was undertaken to determine the prevalence of parenterally-transmitted hepatotropic viruses HBV & HCV among patients presenting with acute viral hepatitis (AVH) so that appropriate management of cases as well as preventive strategies for this part of the country could be planned..

### Materials and Methods

This prospective study was conducted in the Department of Microbiology at Sher i Kashmir Institute of Medical Science J&K, which is a tertiary care hospital in Northern India, from January 2016 to December 2016. Samples were collected from patients with clinically suspected acute infectious hepatitis at Hospital. Serum samples were collected from 9652 patients.

Approximately 5 ml blood sample was collected from all cases; serum was separated and stored at -20°C until tested. Following ELISA Kits were used for testing serum samples for the relevant viral markers.

Hepatitis B virus surface antigen (ErbaLisa Hepatitis B)

IgG Hepatitis C virus. (NANBASEC-963 Anti HCV)

The optical density (OD value) value was taken in ELISA reader and cut off value was calculated as per manufacturer's guidelines.

### Results

A total of 9652 patients were enrolled in the study. Out of 9652 cases 6853 were males & 2800 were females. Of the 9652 patients, 361 were children, and 7345 were adults. Out of 9652 patients, a total of 558 (5.8%) cases had a confirmed viral aetiology while in 9094 (94.2%) cases, hepatitis virus could not be detected. Among the two viruses Hepatitis B virus (HBV) infection was more common and was found in the maximum number of cases (3.96%) whereas Hepatitis C virus (HCV) infection was seen in 1.8% of cases (Table 1).

In children the overall seroprevalence of Hepatitis C was less ie 0.3% however none of the cases enrolled in the study tested positive for hepatitis B (Table 2).

The age-specific seroprevalence of HBV infection was highest in the age group 31-40 years (7.50%) and 41-50 years (7.15%). However the age-specific seroprevalence of HCV increased with age, peaking at 41-50 years (3.75%) followed by 51-60 years (1.3%) and 1-10 years (2.58%) respectively. Co-infection of HBV with HCV was present in 2 cases (Table 3).

**Table 1:** Seroprevalence of HBV & HCV

Virus	Investigation type	No of tests performed	Positive tests
HBV	HBsAg ELISA	9652	382 (3.96%)
HCV	IgG ELISA	9652	176 (1.80%)

**Table 2:** Seroprevalence of viral hepatitis in children and adults

Viral hepatitis	Children	Adults
HBV	0%	3.96%
HCV	0.03%	1.79%

**Table 3:** Seroprevalence of Hepatitis B and Hepatitis C in different age groups

Age group	Total no of patients	HBV	HCV
0-10yr	129	0 (0%)	0 (0%)
11-20yr	232	0 (0%)	3 (1.29%)
21-30yr	4693	69 (1.47%)	39 (0.83%)
31-40yr	2810	211 (7.50%)	66 (2.34%)
41-50yr	1146	82 (7.15%)	43 (3.75%)
51-60yr	426	16 (3.75%)	11 (2.58%)
Above 60yr	216	4 (1.85%)	5 (2.34%)
Total	9652	382	176

## Discussion

The present study was conducted to evaluate the seroprevalence of Hepatitis B & C viral markers among children and adults. In our study, HBV (3.96%) was found to be common cause of Acute viral hepatitis (AVH) than due to HCV (1.8%) among the parentally transmitted viruses. Similar results were seen by P. Jain et al [5] who in their study found a seroprevalence of HBV (16.10%) and HCV (11.98%) respectively.

In our study both HBV & HCV infections were common etiological agents in adults (3.96% & 1.79%) whereas in children only HCV infection was seen however its seroprevalence was low (0.03%). Similar results were seen by Lakshmia et al., [3] from South India who reported HBV as the commonest cause of viral hepatitis in adults followed by HEV (29.8%). Seroprevalence of hepatitis B virus infection was low in our study (3.96%) when compared to other studies by P. Jain 26.96%. However LiviaMelo Villar (Livia Melo et al., 2014) from Brazil reported HBV infection 1.8%, Karatekin et al., from Turkey reported 3.8%. Wang YB reported the overall seroprevalence of HBV 6.1% which was comparable to our study [5,6,7,8]. Age wise incidence showed lowest seroprevalence of Hepatitis B in 0-10 years age group i.e. 0% which indirectly indicates the low incidence of vertical transmission of hepatitis B infection. The successful introduction of the HBV vaccine into the National Immunization Program in India has had a great impact on the prevalence of HBV markers among children. The results of the present study showed that universal vaccination of infants has contributed directly to the reduction in the prevalence of HBV.

In our study seroprevalence of HCV was low in children (0.03%) and adults (1.79%). Jain et al., reported a high prevalence of HCV was seen in both children (6.29%) and adults (18.54%)[5]. Mushtaq et al., (2009) from Aligarh reported low seroprevalence of HCV in children (2.03%) [9].

The peak prevalence of Hepatitis B and Hepatitis C was observed in the age groups of 31-40 yrs & 41-50 yrs. Higher prevalence in these age groups may be attributed to iatrogenic factors including vaccinations by the use of unsterilized kits, transfusion of unscreened blood, and higher indulgence in unprotected sexual activities and illicit drug abuse etc. Further the trend of immunization against hepatitis-B has been introduced in the recent few

years. Therefore the older age group population having a higher prevalence of HBsAg in our study is presumptively due to lack of immunization against the disease in their time.

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