

## Spectrum of Acute Hepatitis B at Tertiary Care Center of Northern India

Malhotra P\*, Malhotra V, Nanda S, Gupta U, Gill PS and Sanwariya Y

Department of Medical Gastroenterology and Microbiology, Gynecology & Obstetrics, PGIMS, Rohtak & D.G.H.S, Haryana, India

### \*Corresponding author:

Parveen Malhotra, 128/19,  
Civil Hospital Road, Rohtak, Haryana,  
India (124001),  
E-mail: drparveenmalhotra@yahoo.com

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## 1. Abstract

**1.1. Introduction:** Hepatitis is often a viral infection and Hepatitis B Virus (HBV) is reason in significant proportion of cases worldwide. Hepatitis B virus impact on liver can be of varying severity ranging from acute hepatitis to chronic hepatitis which can further lead to chronic liver disease, liver cirrhosis and hepatocellular carcinoma (HCC). There is very limited study on Acute Hepatitis B which are needed to understand its epidemiology and to create strategies to improve public health which may help in the disease prevention and control.

**1.2. Aims and objectives:** The aim was to study Clinico-epidemiological profile in patients having acute infection of hepatitis B virus and to assess the various risk factors, age & sex distribution and geographic foci of the disease, if any.

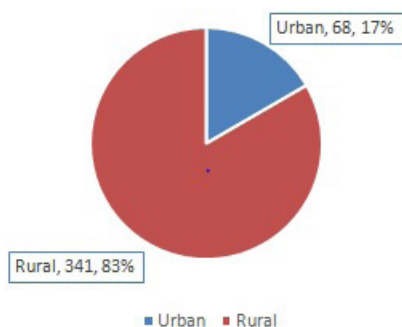
**1.3. Materials & Methods:** It was an epidemiology based, prospective study conducted at Medical Gastroenterology Department, PGIMS, Rohtak over a period of three years. Four hundred and nine (409) patients who were found to be having features of acute hepatitis and confirmed to be positive for HbsAg on Enzyme linked Immunoassay test (ELISA) and HBV DNA on PCR testing were enrolled in the study.

## 2. Introduction

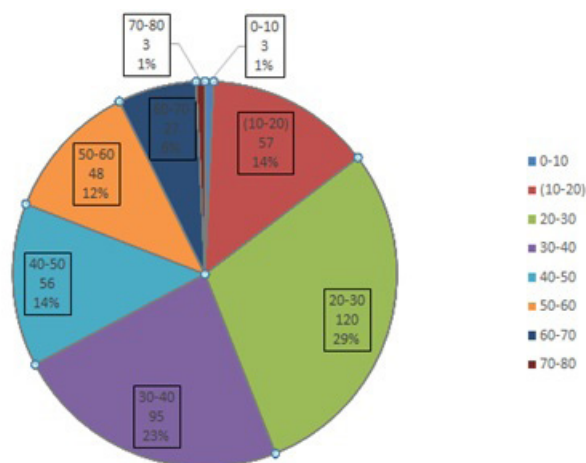
Hepatitis B virus (HBV) infection is a significant health problem in India. Since India has one-fifth of the world's population, it possibly accounts for a large proportion of the worldwide HBV burden. It is estimated that 15-25% of these chronic hepatitis B cases are likely to suffer from cirrhosis and liver cancer and may die prematurely.

Horizontal transmission in childhood and Mother to Child transmission of HBV is considered to be the most common mode of transmission. In India, Hepatitis B surface Antigen (HbsAg) positivity in the general population ranges from 1.1% to 12.2%, with an average prevalence of 3-4% [1]. Based on some regional level studies, it is estimated that in India, approximately 40 million people are chronically infected with Hepatitis B [2]. Chronic HBV infection accounts for 40% of Hepato-cellular Carcinoma (HCC) and 20-30% cases of cirrhosis in India [1]. All key and bridge population groups under HIV infections are especially vulnerable to viral hepatitis infections too like recipients of multiple blood/ blood products transfusion, patients on hemodialysis, People Who Inject Drugs, MSM, female sex workers, sexual partners of infected people, prisoners, migrants and truckers, close first degree relatives and family members: mother, siblings, spouse and children, of persons affected with viral hepatitis (Figure 1). Hepatitis B has long gestation periods before the disease progresses to advanced stages resulting in liver cirrhosis and liver cancer, resulting in mortality if treatment is not provided in time [3]. Acute hepatitis B is a vaccine-preventable disease. The introduction of universal newborn and risk group vaccination has led to a decline in the incidence of HBV infection in most countries [4, 5]. Infection with HBV frequently remains unnoticed, and might only be noticed by seroconversion to HbsAg positive or anti-Hbc-positive results, or mild-to-moderate elevation of transaminases [6]. Several vaccine trials comparing vaccine to placebo arms have indicated that the majority of patients contracting HBV actually will have some liver enzyme elevation [7]. After an incubation of 2-24 weeks, jaundice has been reported to develop in about 14-30% of infected individuals [8-10].

The likelihood of symptomatic disease following HBV infection is likely influenced by the infectious dose within an inoculum [11], the pathogenicity of the infecting strain, and the immune response of the host. There are very sparse studies available on Acute Hepatitis B infection which is strongly needed for understanding its epidemiology and to create strategies to improve public health which may help in the disease prevention and control [12]. Hence, this study was undertaken to study epidemiological profile of Acute Hepatitis B infection (Figure 2).



**Figure 1:** Rural/ Urban distribution of 409 Acute Hep-B Patients



**Figure 2:** Age wise distribution of 409 Acute- Hep-B Patients

### 3. Aim and Objectives

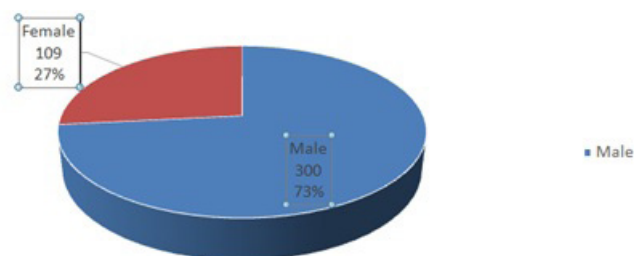
The aim was to study Epidemiological profile in patients having acute infection of hepatitis B virus and to assess the various risk factors, age & sex distribution and geographic foci of the disease, if any.

### 4. Materials and Methods

This was a hospital & epidemiology based, prospective, observational study conducted at Medical Gastroenterology Department, PGIMS, Rohtak over a period of three years i.e. 1st April 2017 to 31st March, 2020. An informed consent was obtained from each patient prior to entering into the study. A detailed history and physical examination was carried out and samples were collected for every subject. The record of each patient was meticulously maintained in the department. The proforma for hepatitis B patients was filled in each file which consisted of patient's detail like age, sex, rural or ur-

ban location, occupation, risk factors exposure especially in last six months like history of blood transfusion, tattooing, surgical or dental intervention, any hospitalization requiring injections or intravenous fluid requirement, Intravenous drug abuse, history of jaundice in other family members or neighborhood. An acute viral hepatitis case was defined as a person having an acute illness of <15 days duration with a discrete onset of initial prodrome (e.g. fever, headache, malaise, anorexia, nausea, vomiting, diarrhea, and abdominal pain) and either a) jaundice or b) elevated serum alanine transferase (ALT) > ten times of baseline value, documented at least twice at a 1 week interval without any history of pre-existing liver disease. Those with co-infection with hepatitis C & HIV, alcoholic, autoimmune, hemolytic, malarial, drug induced hepatitis, cholestatic jaundice, chronic liver disease or acute on chronic liver disease were excluded from the study. A sample of 7-10 ml of blood was collected aseptically from all the patients. Serum was separated by centrifugation, aliquoted & stored at -20 degree till further tests were performed. Every subject underwent detailed set of investigations which included like complete haemogram, liver & renal function test, ESR, INR, anti-HAV IgM ELISA, HbsAg ELISA, anti-HCV IgM ELISA, anti-HEV IgM ELISA assay, and ultrasound abdomen (Figure 3).

Four hundred and nine (409) patients who were found to be having features of acute hepatitis and confirmed to be positive for HbsAg on Enzyme linked Immunoassay test (ELISA) and HBV DNA by polymerase chain reaction (P.C.R) testing and were enrolled in the study.



**Figure 3:** Sex wise distribution of 409 Acute- Hep-B Patients

### 5. Data Analysis

Collected data were entered in the MS Excel spreadsheet, coded appropriately and later cleaned for any possible errors. Analysis was carried out using SPSS (Statistical Package for Social Studies) for Windows version 20.0 and online Graph Pad software (Prism 5 for Windows) version 5.01. During data cleaning, more variables were created so as to facilitate association of variables. Clear values for various outcomes were determined before running frequency tests. Pearson's chi-square test was used to evaluate differences between groups for categorized variables. "t" test was used to calculate difference of means for quantitative variables. Normally distributed data were presented as means and standard deviation, or 95% confidence intervals (CI). All tests were performed at a 5% level of significance,

thus an association was significant if the p value was less than 0.05. Continuous variables were expressed as mean standard deviation

(Gaussian distribution) or range and qualitative data was expressed as percentage (Figure 4).

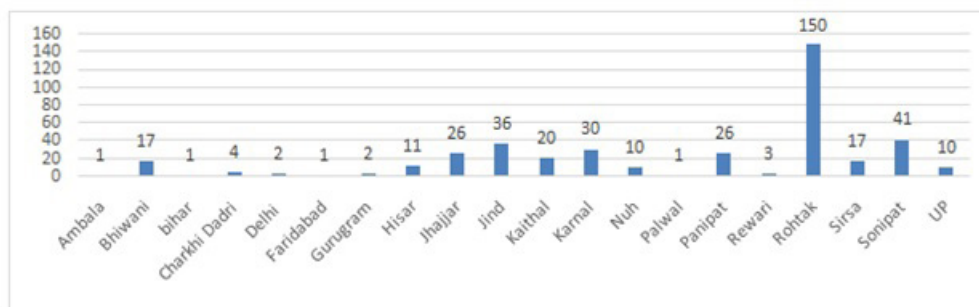


Figure 4: District wise distribution of 409 Patients of Acute Hepatitis –B

## 6. Observations and Results

In this study 409 patients record were reviewed and the information mentioned in the attached proforma was analyzed. Majority of the subjects i.e. 300 (73%) were male and only 109 patients (27%) of the participants were females. There was rural predominance i.e. 343 (83%) of the subjects came from rural areas and only 68 (17%) were having urban background. Out of total 409 patients, 84% of the subjects were married. The age distribution curve was from 7yrs-80 yrs of age but showed a sharp peak between the age group 20 to 50 years as 66% of total patients lie in this age group. At extreme of ages i.e. from 0 yrs-10 yrs & 70 yrs-80 yrs, only 3 (1%) patients were found to be having acute hepatitis B. More than one third i.e.150 patients (36.6%) were from Rohtak district alone but it could not be inferred that this district is having highest prevalence but the institute where we conducted this study is located here, thus due to easy accessibility, patients came for treatment. The most striking thing noticed on data

analysis was that districts like Sonapat (41 i.e. 10.02%), Jind (36 i.e. 8.80%), Karnal (30 i.e.7.33%), Panipat (26 i.e. 6.35%), Kaithal (20 i.e. 4.88%) which showed significant proportion of cases of acute hepatitis B, is already having high prevalence of hepatitis C [12]. The districts bordering Punjab were having more prevalence in comparison to other parts.

In our sample of patients history of dental procedures (96 patients, 23.47%), previous surgery (71 patients, 17.35%) and tattooing ( 52 patients,12.71% ) appeared as major risk factors. The history of intake of alternative medications was found in 51 (12.46 %) patients and 70 (17.11%) patients had history of alcohol intake. Chronic Hepatitis C and Human immunodeficiency virus (HIV) was found in 2 (0.48%) & 5 (1.22%) patients respectively. There were no risk factors found in 62 (15.15%) patients. Surprisingly no patient admitted for intravenous drugs abuse which can be due to willful hiding of information for personal reasons (Figure 5).

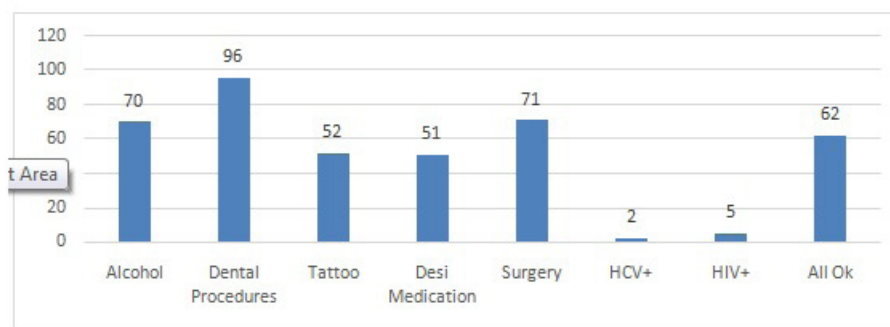


Figure 5: Risk Factors of 409 Patients of Acute Hepatitis B

## 7. Discussion

HBV infection has likely been endemic in many populations for centuries but now more number of cases are being diagnosed to be suffering from HBV infection and related morbidity & mortality. One of the most important reason for diagnosing of more number of cases of acute hepatitis B is more frequent testing of complete viral screen i.e. HbsAg, anti HCV antibody and anti HIV antibody test in patients of acute viral hepatitis which was not done in past prac-

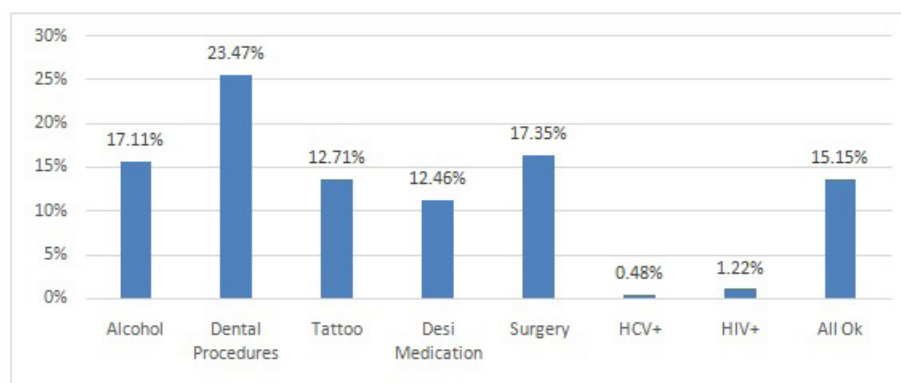
tice of dealing with such patients. The reasons for diagnosing more cases of acute hepatitis B can be attributed to increase testing for HbsAg in jaundice patients. Moreover other important factors for detecting more patients of acute hepatitis B is due to HbsAg testing before surgery as Pre-anesthetic check up, in pregnant females, increased voluntary blood donation and screening camps for Hepatitis B & C. However, the wave of increased acute hepatitis B can also be attributed to widespread availability of injectable therapies, that

too without proper safety precautions and the illicit use of injectable drugs. In our study we found that infection is more prevalent in the young adults. There is a sharp peak in the younger age group 20 to 50 years. There are very few patients in the extremes of age groups that are less than 10 years and more than 70 years. The reason for very low percentage of cases in below ten years of age group can be due to effective implementation of hepatitis B National immunization program under which for last four years, majority of the newborns born in India are started on hepatitis B vaccination at the time of birth. Regarding less number of cases of acute hepatitis B in older age group i.e. above 70 yrs, can be attributed to lower exposure to risk factors, in view of remaining predominantly at home in safe surroundings.

We assume a temporal association between the risk factors such using unsterilized needles, syringes, and equipment and the high incidence of patients from these areas as compared to the others. Determining the incidence of HBV infection (i.e., the rate of newly acquired infections) is difficult because significant percentage of acute infections is asymptomatic and most countries do not systematically collect data on cases of acute disease. Even in countries with well-established surveillance systems, acute disease reporting systems underestimate the incidence of HBV.

Because of the wide variety of human activities that involve the potential for percutaneous exposure to blood or blood-derived body fluids, there are numerous other biologically-plausible modes of

transmission besides those with clearly-demonstrated epidemiologic associations with infection. These include cosmetic procedures (tattooing, body-piercing), intranasal drug use, and religious or cultural practices such as ritual scarification, circumcision, acupuncture, and cupping. We found that tattooing and history of minor or major surgeries were risk factors in the sample studied. We assume that percutaneous exposure through minor routes of transmission like multiple uses of unsafe injections and procedures by private practitioners and dental surgeons, respectively, sharing of shaving kits, and visiting roadside barbers have played an important role in HBV transmission in these areas. Multiple sexual partners and intravenous drug use. Drug abuse are insignificant in this sample, may be due to willful hiding of information by patients due to personal reasons and stigma associated with the same. Thus, most of the HBV-related disease burden in developed countries has resulted from injection drug use, receipt of transfusions before donor screening, and high-risk sexual activity. In contrast, most of the disease burden in developing countries is related to receipt of unsafe therapeutic injections and contaminated blood. Characterizing the epidemiology of HBV infection in individual countries is crucial to developing and implementing effective preventive measures. In some, ensuring safe blood supplies and health-care related procedures are the highest priorities. In others, priorities need to focus on preventing injecting drug use, improving access to drug treatment, harm reduction counseling, and testing to identify HCV-infected persons for medical evaluation and management (Figure 6).



**Figure 6:** Percentage wise data of 409 Acute Hepatitis-B Patients

## 8. Conclusion

The burden of acute hepatitis B infection is more in the males especially in the rural areas. The reason for this could be lack of awareness, hygiene and shortage of health facilities. The young adults are the most affected. To tackle this problem from increasing further it is very important to organize public awareness and health education campaigns targeting healthcare providers, private practitioners, and the public. In order of the prevalence of disease we can formulate strategies and prioritize the district that is Kaithal, Karnal, Jind, Panipat, Sonapat etc. according to the decreasing incidence the

most important risk factors are use of unsterilized needles and other equipment. Tattooing has emerged as a major player here. It is a common practice and it is imperative to make people aware of the risks associated with it.

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