

CLINICAL AND LABORATORY PROFILE OF PATIENTS WITH HEPATITIS B INFECTION ATTENDING THE OUTPATIENT DEPARTMENT OF A TERTIARY CARE HOSPITAL IN NORTHEAST INDIA

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ABSTRACT

Objective: The objective of this study was to analyze the clinical and laboratory profile of patients with hepatitis B infection-attending outpatient departments of tertiary care hospitals in northeast India.

Methods: This was a cross-sectional study conducted in the outpatient department of a tertiary care medical institute situated in northeast India. Eighty patients infected with hepatitis B (on the basis of serological markers) were included in this study on the basis of predefined inclusion and exclusion criteria. Demographic details such as age, gender, and socioeconomic status of all the patients were noted. A detailed history was taken including any history of intravenous drug use, tattooing, sexual contacts, history of blood transfusions, and familial liver disease. Clinical and laboratory profiles (liver function test and serological markers) of all the patients were studied. Ultrasound imaging was done in all the cases. $p < 0.05$ was taken as statistically significant.

Results: Out of 80 studied cases, there were 49 (61.25%) males and 31 (38.75%) females. The mean age for males and females was 32.30 ± 8.03 and 34.70 ± 13.52 years, respectively. There was no significant difference in mean age between males and females ($p = 0.3218$). Mother-to-child transmission was evenly distributed with 7 males (8.75%) and 9 females (11.25%) affected. Other risk factors, such as dental implants and surgeries, showed a lower prevalence, with dental implants impacting 2 males (2.5%) and 3 females (3.75%) and surgeries concerning 5 males (6.25%) and 3 females (3.75%). Majority of the patients (52.5%) were asymptomatic and were found to be hepatitis B surface antigen (HBsAg) positive incidentally. HBsAg was positive in all cases. 12 (15%) patients showed the presence of hepatitis B e antigen suggestive of high infectivity. Anti-HBc and anti-HBe were positive in 68 (85%) patients each. Hepatomegaly was seen in 23 cases (28.75%) on ultrasound. Moderate fibrosis on elastography was seen in 2 (2.5%) cases.

Conclusion: In cases of hepatitis B the majority of the patients remained asymptomatic and in many cases no risk factor for hepatitis B virus infection could be identified. It is therefore important to screen the general population for hepatitis B infection.

Keywords: Hepatitis B, Clinical presentation, Laboratory profile, Serology.

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INTRODUCTION

Hepatitis B virus (HBV) infection is a major global health problem, leading to significant morbidity and mortality worldwide. Approximately 350–400 million of the global population is having chronic hepatitis B infection. Regions such as Indian sub-continent, sub-Saharan Africa, and central Asia have a higher prevalence of hepatitis B infection as compared to other regions of the world [1]. In India, the prevalence of HBV is a major public health concern. India accounts for a large fraction of the global HBV burden. The prevalence of hepatitis B in the general population of India varies widely with estimates ranging from 2% to 8%, depending on the geographical region and the study population [2]. This variability in prevalence is even more pronounced in the North Eastern states of India which is a region characterized by diverse ethnic groups and unique socioeconomic conditions. The North Eastern states have been reported to have a higher prevalence of HBV compared to the national average [3].

The risk factors associated with hepatitis B infection are multifaceted and include both behavioral and environmental components. Transmission of HBV can occur through parenteral exposure to infected blood or body fluids, sexual contact with an infected individual, and vertical transmission from mother to child during childbirth. In the North Eastern states of India, the high prevalence of HBV is reported to be secondary to the use of unsterilized needles for tattooing and

acupuncture [4]. Clinically, hepatitis B infection can present in a wide array of manifestations, ranging from asymptomatic or mild forms to acute or chronic hepatitis, cirrhosis, and hepatocellular carcinoma (HCC). The clinical presentation often depends on the age at the infection and the immune status of the individual. Many patients remain asymptomatic and unaware of their infection status [5].

The evaluation of patients with hepatitis B infection includes biochemical tests, serological markers, and imaging. Biochemical tests such as serum bilirubin, serum glutamic-oxaloacetic transaminase (SGOT), serum glutamic pyruvic-transaminase (SGPT), alkaline phosphatase, and serum albumin are essential for assessing liver injury and function. Serological markers such as hepatitis B surface antigen (HBsAg), hepatitis B e antigen (HBeAg), and antibodies against these antigens provide information about the phase of infection and the patient's immune status toward the virus [6]. Imaging also plays an important role in the assessment of liver status and the detection of complications. Ultrasound is commonly used for the initial evaluation of the liver structure and to screen for the presence of space-occupying lesions such as HCC. Advanced imaging techniques such as elastography can assess liver fibrosis non-invasively and provide valuable information about the extent of liver damage. Other advanced imaging tests, including computed tomography and magnetic resonance imaging, are utilized for detailed assessment of liver pathology and for the staging of liver cancer [7].

Complications of chronic hepatitis B infection are severe and include cirrhosis, liver failure, and HCC. The development of these complications is influenced by various factors, including the duration of infection, viral load, and coinfections with other hepatotropic viruses such as hepatitis C and D. Cirrhosis resulting from chronic HBV infection can lead to liver failure characterized by jaundice, ascites, and variceal bleeding. HCC is a primary malignancy of the liver and is one of the leading causes of cancer-related deaths worldwide with HBV infection being a major risk factor [8].

Vaccination against HBV is the most effective measure to prevent infection and is recommended for all newborns and high-risk individuals. However, once infected the management of hepatitis B infection involves a multidisciplinary approach that includes antiviral therapy, regular monitoring for disease progression, and screening for HCC. Antiviral medications such as pegylated interferon- α , nucleotide or nucleoside analogs such as lamivudine, telbivudine, adefovir, entecavir, and tenofovir can effectively suppress HBV replication, reduce liver inflammation, and prevent disease progression to cirrhosis and HCC. The decision to initiate antiviral therapy is based on a combination of factors, including HBV DNA levels, liver enzyme levels, and the presence of cirrhosis or liver cancer [9].

We undertook this cross-sectional study to analyze the clinical and laboratory profile of patients with hepatitis B infection attending outpatient departments of tertiary care hospitals in northeast India.

METHODS

This was a cross-sectional study conducted in the outpatient department of a tertiary care medical institute situated in northeast India. Eighty patients infected with hepatitis B (on the basis of serological markers) were included in this study on the basis of predefined inclusion and exclusion criteria. The duration of the study was 1 year. Informed and written consent was obtained from adult patients and parents or guardians if the age of the patient was <18 years before enrolling them in this study. Confidentiality of the patients was strictly maintained. The sample size was calculated on the basis of pilot studies done on the clinical profile of patients infected with hepatitis B. Keeping power (1-beta error) at 80% and confidence interval (1-alpha error) at 95%, the minimum sample size required was 70 patients; therefore, we included 80 cases in this study.

Demographic details such as age, gender, and socioeconomic status of all the patients were noted. A detailed history was taken including any history of intravenous drug use, tattooing, sexual contacts, history of blood transfusions, and familial liver disease. Patients were asked history of symptoms suggestive of hepatic involvement such as jaundice, fatigue, and abdominal discomfort. Physical examination was done with an emphasis to detect hepatomegaly, splenomegaly, and signs of chronic liver disease such as spider angiomas and ascites. Serological tests for HBsAg, HBeAg, anti-HBc, and anti-HBsAg, to determine infection status and immunity were done in all cases. Quantitative HBV DNA levels were measured using polymerase chain reaction to assess viral replication and guide therapeutic decisions. Liver function tests and ultrasound imaging of the abdomen were also done in all cases.

Statistical analysis was done using SPSS version 21.0 software. Quantitative data were presented as mean and standard deviation. Qualitative data were presented with incidence and percentage tables. For quantitative data, an unpaired t-test was applied and for qualitative data, the Chi-square test was used. $p < 0.05$ will be taken as statistically significant.

Inclusion criteria

The following criteria were included in the study:

1. Patients diagnosed with hepatitis B infection on the basis of serological tests
2. Age above 12 years
3. Those who gave written and informed consent to be part of the study.

Exclusion criteria

The following criteria were excluded from the study:

1. Cases in whom patient or guardian refused consent to be part of the study
2. Age <12 years
3. Patients on drugs likely to cause hepatic injury such as methotrexate, isoniazid, and valproic acid.
4. Patients having uncontrolled systemic conditions such as diabetes or hypertension, autoimmune diseases
5. Patients with primary hepatic malignancies or hepatic metastasis.

RESULTS

Out of 80 studied cases, there were 49 (61.25%) males and 31 (38.75%) females. There was a male preponderance in cases with anemia with a M: F ratio of 1:0.63 (Fig. 1).

The analysis of age distribution showed that the most common age group among males was 30–40 years (30.00%) while females were most represented in the 20–30-year age group (12.50%). The mean age for males and females was 32.30 ± 8.03 and 34.70 ± 13.52 years, respectively. Statistical analysis showed no significant difference in mean age between males and females ($p = 0.3218$), with a 95% confidence interval ranging from -2.3915 to 7.1915 (Table 1).

The analysis of risk factors among 80 patients showed that the largest group, which consisted of 20 males (25%) and 14 females (17.5%), had no identified risk factors. Mother-to-child transmission (MTC) was evenly distributed with 7 males (8.75%) and 9 females (11.25%) affected. Other risk factors, such as dental implants and surgeries, showed a lower prevalence, with dental implants impacting 2 males (2.5%) and 3 females (3.75%), and surgeries concerning 5 males (6.25%) and 3 females (3.75%). Alcoholic liver disease (ALD) was exclusively observed in 4 males (5%), and intravenous drug use (IVDU) was reported in 2 males (2.5%), with no females recorded. Abortion was listed as a risk factor for 1 female (1.25%). Ten (12.50%) individuals were having history of chronic alcoholism (Fig. 2).

The analysis of patients on the basis of signs and symptoms showed that the majority of the patients (52.5%) were asymptomatic and were found to be HBsAg-positive incidentally. The most common complaint in symptomatic patients was fatigue (27.5%) followed by abdominal discomfort (20%) and loss of appetite (18.75%). The other common complaints were hematuria (17.50%), jaundice (16.25%), and abdominal distension (15%) (Fig. 3).

The analysis of hematological parameters of the studied cases showed that the majority of patients had hemoglobin levels >12 g% (77.50%), platelet counts more than 1.5 lakhs per cubic millimeter (71.25%), and

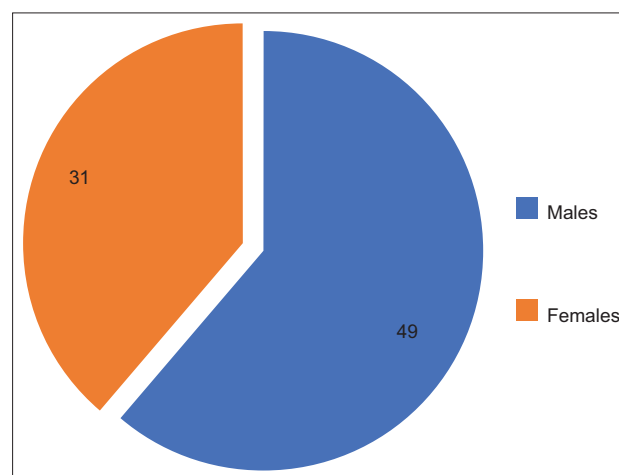


Fig. 1: Gender distribution of studied cases

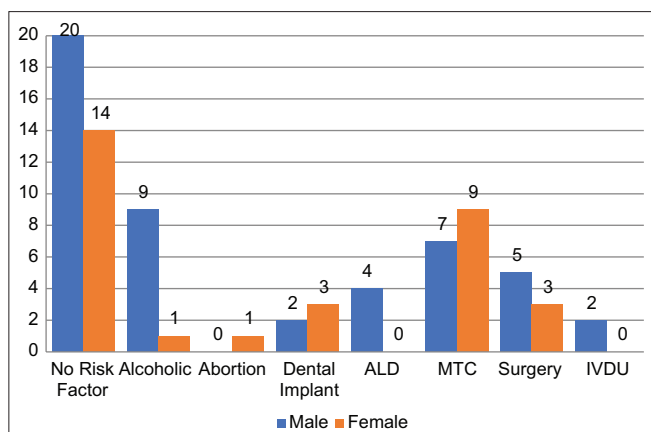


Fig. 2: Risk factors in studied cases

total bilirubin levels below 2 mg/dL (88.75%), indicating a relatively stable liver function and effective hematopoiesis in the majority of the cases. Conversely, elevated levels of SGOT (70.00%) and SGPT (67.50%) were observed in a significant portion of the population, suggesting the presence of hepatic stress or injury in a substantial number of patients. The majority of patients had serum albumin levels above 3.5 g% (83.75%) and prothrombin times <18 s (81.25%), further supporting the notion of maintained hepatic function in the majority. However, serum creatinine levels indicated renal impairment in a notable fraction of the cohort, with 43.75% of patients exhibiting levels >1 mg%. Alkaline phosphatase levels were elevated (>180 U/L) in 16.25% of patients (Table 2).

The analysis of serological markers of the patients showed that HBsAg was positive in all cases. 12 (15%) patients showed the presence of HBeAg suggestive of high infectivity. AntiHbC and anti HBe were positive in 68 (85%) patients each (Table 3).

Ultrasonography of the abdomen was done in all cases. In 34 cases (42.5%), there was no significant abnormality. Hepatomegaly was seen in 23 cases (28.75%). Chronic liver disease was noted in 11 patients (13.75%), with a smaller subset presenting with cirrhosis (5 patients, 6.25%) and fatty liver (4 patients, 5%). Additional findings included ascites in 17 cases (21.25%), splenomegaly in 14 cases (17.5%), and portal hypertension in 12 patients (15%). Elastography was done in selected cases. Moderate fibrosis on elastography was seen in 2 (2.5%) cases (Fig. 4).

Analysis of the prescription pattern of these cases showed that an overwhelming majority (86.25%) was receiving tenofovir disoproxil fumarate whereas the remaining 11 (13.75%) patients were on entecavir.

DISCUSSION

The clinical and laboratory profiles of patients with hepatitis B infection offer important insights into the epidemiology, disease progression, management strategies, and outcome [10]. Understanding the clinical and laboratory profiles enables the treating physician in identifying the most vulnerable groups within the population, the common modes of transmission, and the challenges faced in the diagnosis and treatment of hepatitis B. Such understanding is important for designing prevention programs as well as improvement of treatment protocols to reduce the incidence and impact of hepatitis B infection [11].

In our study, there was a notable gender disparity with a higher incidence in males (61.25%, n=49) compared to females (38.75%, n=31), indicating a male preponderance. This trend was particularly pronounced in cases of anemia, where the male-to-female ratio stood at 1:0.63.

Table 1: Gender-wise comparison of age groups in studied cases

| Age | Males | | Females | |
|------------------|------------|------------|-------------|------------|
| | Number | Percentage | Number | Percentage |
| <20 years | 2 | 2.50 | 4 | 5.00 |
| 20-30 years | 19 | 23.75 | 10 | 12.50 |
| 31-40 years | 24 | 30.00 | 11 | 13.75 |
| 41-50 years | 3 | 3.75 | 3 | 3.75 |
| 51-60 years | 1 | 1.25 | 2 | 2.50 |
| Above 60 years | 0 | 0.00 | 1 | 1.25 |
| Total | 49 | 61.25 | 31 | 38.75 |
| Mean age (years) | 32.30±8.03 | | 34.70±13.52 | |

p=0.3218; 95% CI=-2.3915-7.1915 (Not significant)

Table 2: Hematological profile of studied cases

| Hematological parameter | Range | Number of patients | Percentage |
|--|------------|--------------------|------------|
| Hemoglobin (g%) | <12 | 18 | 22.50 |
| | >12 | 62 | 77.50 |
| Platelet count (×10 ⁴ /cmm) | <1.5 lakhs | 23 | 28.75 |
| | >1.5 lakhs | 57 | 71.25 |
| Total bilirubin (mg/dL) | <2 | 71 | 88.75 |
| | >2 | 9 | 11.25 |
| Alkaline phosphatase (U/L) | >180 | 13 | 16.25 |
| | <40 | 24 | 30.00 |
| SGOT (IU/L) | >40 | 56 | 70.00 |
| | <40 | 26 | 32.50 |
| SGPT (IU/L) | >40 | 54 | 67.50 |
| | <40 | 26 | 32.50 |
| Serum albumin (g%) | <3.5 | 13 | 16.25 |
| | >3.5 | 67 | 83.75 |
| Prothrombin time (s) | <18 | 65 | 81.25 |
| | >18 | 15 | 18.75 |
| Serum creatinine (mg%) | <1 | 45 | 56.25 |
| | >1 | 35 | 43.75 |

SGOT: Serum glutamic-oxaloacetic transaminase, SGPT: Serum glutamic-pyruvic transaminase

Table 3: Serological profile of studied cases

| Serological Markers | No of cases | Percentage |
|---------------------|-------------|------------|
| HBsAg | 80 | 100.00 |
| HBeAg | 12 | 15.00 |
| Anti-HBs | 0 | 0.00 |
| Anti-HBc | 68 | 85.00 |
| Anti-HBe | 68 | 85.00 |

HBsAg: Hepatitis B surface antigen, HBeAg: Hepatitis B e antigen, Anti-HBc: Anti-hepatitis B core antigen, Anti-HBe: Anti-hepatitis B e-antigen

Age-wise, males were most commonly found in the 30-40-year age group, accounting for 30.00% of male patients, while females were predominantly in the 20-30-year age bracket, representing 12.50% of female patients. The mean age was calculated to be 32.30 years (±8.03) for males and 34.70 years (±13.52) for females, indicating that on average, male patients were slightly younger than female patients. However, statistical analysis (p=0.3218) revealed that the difference in mean ages between males and females was not significant, supported by a 95% confidence interval ranging from -2.3915 to 7.1915.

Osasona *et al.* conducted a study to analyze the types of atypical HBV serologic profiles (AHBSP) across clinical cohorts of patients with HBV infection [12]. The prevalence of AHBSP was 27% (n=76). The mean age of patients was 35.7±11.2 years. The gender distribution involved 183 females (65.6%) and 96 males (34.4%). The mean age of cases with hepatitis B was found to be similar to our study; however, unlike our study, this study showed a female preponderance. Similar mean age was also reported by the authors such as Desai *et al.* [13] and Nitin *et al.* [14].

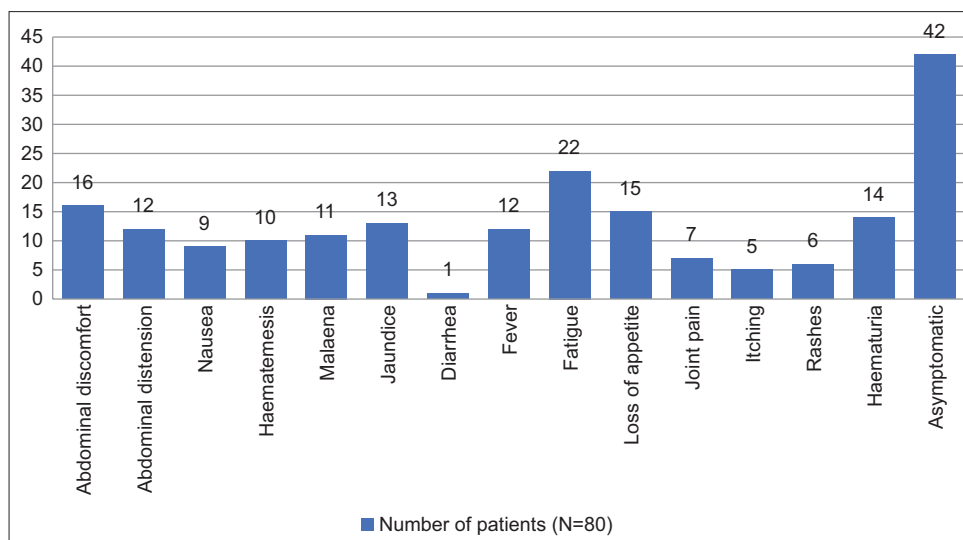


Fig. 3: Clinical presentation of studied cases

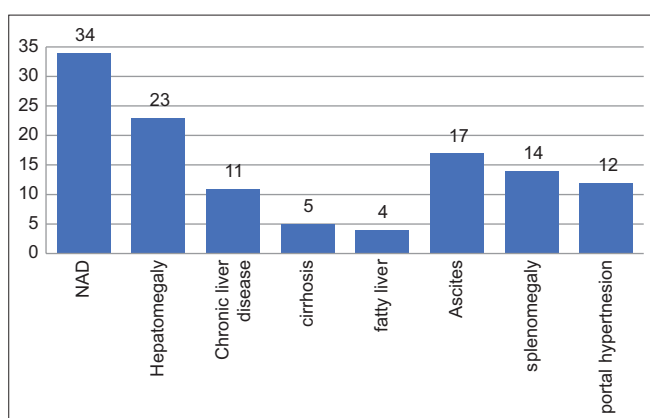


Fig. 4: Ultrasonography of the cases with hepatitis B

In our study, 25% of males and 17.5% of females had no identifiable risk factors, highlighting the possibility of unidentified routes of transmission or underreported risk factors. MTC was noted in 8.75% of males and 11.25% of females, indicating a relatively even distribution across genders. The prevalence of other known risk factors such as dental implants and surgeries was lower. History of surgery was present in 6.25% of males and 3.75% of females. ALD was present exclusively in males (5%), and IVDU was reported only in males (2.5%). Abortion was identified as a risk factor in a small number of cases, specifically in 1.25% of females. In addition, 12.5% of the cohort had a history of chronic alcoholism, which could contribute to liver disease progression. In terms of clinical presentation, the majority of patients (52.5%) were asymptomatic, with HBsAg detected incidentally, suggesting that many individuals with hepatitis B infection may not present classic symptoms and hence could unknowingly transmit the virus. In the context of risk factors for hepatitis B infection particularly in developing countries, MTC is found to be a significant risk factor. Similarly, the authors such as Mehboobi *et al.* reported dental procedures to be one of the important risk factors [15]. Similar risk factors were also reported by the authors such as Khetsuriani *et al.* [16] and Taye *et al.* [17].

In this study, 77.5% of patients had hemoglobin levels above 12 g%, 71.25% platelet counts over 1.5 lakhs per cubic millimeter, and 88.75% showing total bilirubin levels below 2 mg/dL. Serologically, all patients were HBsAg positive, with a notable presence of anti-HBc and anti-HBe markers (85%). Ultrasonography identified liver abnormalities in a significant number of cases, including hepatomegaly (28.75%)

and signs of chronic liver disease (13.75%). Kumar *et al.* conducted a study to analyze clinical profile of hepatitis B-positive cases [18]. The authors found that abdominal discomfort, fever, and fatigue were common presenting complaints. About 65% of patients had icterus, 55.5% were found to have hepatomegaly, and 35% of patients had non-clinical signs. Serum bilirubin and alanine transaminase levels were significantly higher in symptomatic patients (60%). Ascites (22%) and portal hypertension (13%) were common features seen on ultrasound. Similar characteristics of patients with hepatitis B were also reported by the authors such as Nau *et al.* [19] and Duah A [20].

CONCLUSION

The majority of the patients with hepatitis B infection remain asymptomatic. Moreover, in the majority of the patients, no risk factor could be identified. In many cases, these patients slowly progress toward complications such as cirrhosis and its consequences. It is therefore important to screen the general population for hepatitis B infection.

CONFLICT OF INTEREST

None.

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