

## **Clinical Profile and Treatment Patterns of Chronic Hepatitis B Patients in Bangladesh: A Cross-Sectional Study**

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### **ABSTRACT**

Chronic hepatitis B virus (HBV) infection remains a significant health concern in Bangladesh due to challenges in timely diagnosis and limited access to sustained treatment.

A total of 584 people diagnosed with chronic HBV were part of this study. All data were collected by face to face interview and chi-square tests were applied to identify any relationships between age, gender, clinical state, serological status, treatment history and whether patients stick to the follow-up treatment.

Statistically significant associations were found between gender and clinical status ( $\chi^2(8, N=584) = 589.22, p < 0.0001$ ), age group and treatment status ( $\chi^2(12, N=584) = 596.95, p < 0.0001$ ), and follow-up status and treatment ( $\chi^2(6, N=584) = 587.1, p < 0.0001$ ). Other variables such as occupation, education and blood test results are also linked with the type of treatment or the clinical condition. Pregnancy status, however, did not show any significant association with treatment decisions ( $\chi^2(1, N=198) = 0.00, p = 0.9644$ ).

It was found that most patients did not present with symptoms and that treatment options were inconsistently followed by various populations and patient groups. Therefore, it is important to ensure better access to tests and regular follow-up plans that can help patients have better outcome

**Keywords:** *Chronic Hepatitis-B, Cross sectional, Tertiary, Treatment patterns, Bangladesh.*

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## INTRODUCTION

Hepatitis B virus (HBV) infection remains a formidable global public health challenge, affecting over 296 million individuals worldwide, with significant morbidity and mortality attributed to its chronic complications, including cirrhosis and hepatocellular carcinoma (HCC) (1). Despite the availability of effective antiviral therapies and preventive vaccines, hepatitis B virus (HBV) continues to disproportionately impact populations in low and middle-income countries due to delayed diagnosis, suboptimal surveillance, and inconsistent access to treatment (2). Since healthcare resources in Bangladesh are not evenly distributed, having chronic hepatitis B virus results in extra challenges for the health system and calls for a thorough evaluation at each institution to create the best care strategies (3).

People with hepatitis B virus infection may be asymptomatic or develop various diseases like chronic hepatitis, cirrhosis or even liver failure (4,5). The disease course is modulated by several host, viral, and environmental factors, including age at infection, viral replication status, immune response, and coexisting medical conditions (6,7). Consequently, the approach to management requires nuanced assessment of serological markers, liver function, comorbidities, and life circumstances such as pregnancy or immunosuppressive therapy (8,9).

There are hardly any studies in Bangladesh that describe how hepatitis B virus affects patients in real-life situations (10,11). It is very important to understand demographics, the stages of disease, viral status and treatment approaches to guide scaled-up interventions, improve follow-up routines and help patients in the long run [10]. In addition, analyzing factors that prevent good monitoring, for example, economic barriers, limited diagnostics and missing follow-up treatments, can lead to better organization of hospital care (12,13).

This study gives a cross-sectional view of patients with chronic hepatitis B who were evaluated at a hepatitis clinic in gastroenterology department in Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka which is the only one and largest referral center in the country. We aimed to review patient characteristics, see how they were treated, measure the outcomes of treatment, look for patterns in the disease stages and other disorders and check if there were any gaps in ongoing monitoring and care. Gathering data from a high-referral center in this study can inform how chronic hepatitis B virus is managed and give useful guidance to other hospitals in South Asia.

## MATERIALS & METHODS

Categorical variables such as age group, gender, clinical status, treatment status, family history, pregnancy status, occupation, source of infection, education level and follow-up adherence were examined through chi-square tests for association. All analyses were conducted in R software (version 4.x), with p-values  $<0.05$  considered statistically significant. Frequency tables were saved and results printed to console to validate internal consistency. Where applicable, data were stratified (e.g., pregnancy analysis limited to female patients) to ensure appropriate comparison.

This was a descriptive, cross-sectional observational study conducted at the Hepatitis Clinic of the Department of Gastroenterology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh. Patients with viral hepatitis and chronic liver diseases from across the country are referred to the clinic for specialized care.

A total of 584 patients diagnosed with chronic hepatitis B virus (HBV) infection were included in this analysis. Over a specific period (2020-2024), data were taken from all patients visiting the clinic using a convenience sampling method. Individuals were eligible for the study if they were at least 18 years old, had a confirmed HBsAg-positive test and were either receiving evaluation or monitoring at the clinic, regardless of treatment. Patients co-infected with hepatitis C virus (HCV), hepatitis D virus (HDV), or HIV were excluded, although formal HDV status testing was not performed due to logistical constraints.

Patient information was extracted from clinical records and electronic databases maintained by the department. Data were entered and cross-verified by a team of trained clinical researchers.

The team gathered as many clinical and virological data as possible for every patient being evaluated. Clinical status at presentation was categorized into asymptomatic carrier, compensated or decompensated chronic liver disease (CLD), and hepatocellular carcinoma (HCC). The probable cause of infection was found by checking what people reported and reviewed their medical histories for past blood transfusions, related medical contact or similar issues in the family. Detailed serological and virological profiling was performed, including HBeAg status, presence of anti-HBc and anti-HBs antibodies, along with classification according to the natural history of hepatitis B virus (HBV) infection-distinguishing between chronic infection and chronic hepatitis. Therapeutic history was meticulously documented, noting any previous or current administration of antiviral agents such as entecavir, tenofovir disoproxil fumarate (TDF), or tenofovir alafenamide (TAF), as well as any prior use of interferon-based therapies. Furthermore, special attention was given to patients belonging to specific populations, including those with comorbid conditions like chronic kidney disease (CKD), inflammatory bowel disease (IBD), or rheumatologic disorders, in addition to pregnant women, to ensure a holistic understanding of disease burden and

management strategies across diverse clinical contexts. All patient data were de-identified to maintain confidentiality. The study was conducted in accordance with the institutional guidelines of Bangabandhu Sheikh Mujib Medical University (BSMMU) and followed the ethical principles outlined in the Declaration of Helsinki. Formal informed consent was taken from the institutional review board and all patients.

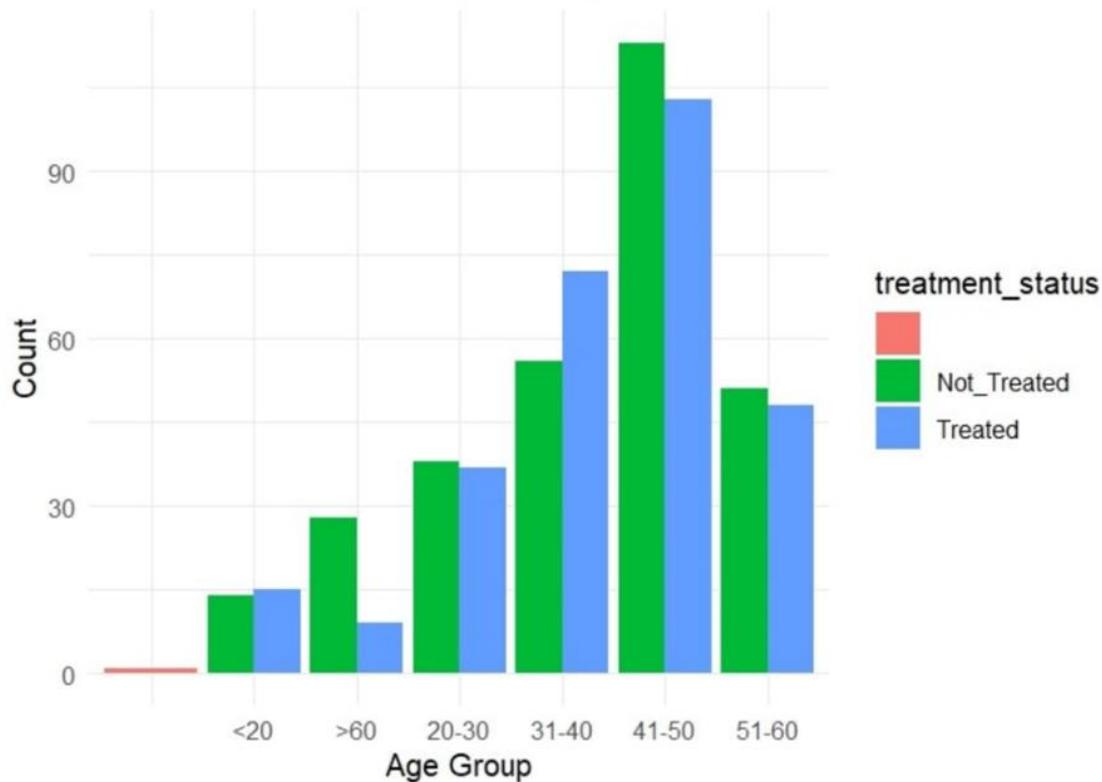
To summarize the data, descriptive statistics were used for demographics, disease details, treatment protocols and other conditions. Categorical data were expressed as frequencies and percentages. Numerical data were stratified by clinically relevant categories (e.g., age groups, hepatitis B virus phase). Statistical analysis was conducted using Microsoft Excel and R (a programming language for statistical computing and data visualization) for basic tabulation and visualization.

## RESULTS:

The study included 584 Bangladeshi patients with chronic hepatitis B infection. The sample comprised 338 males (57.9%) and 246 females (42.1%). Age distribution was diverse: 5% (n=29) were under 20 years, 13% (n=75) were between 20-30 years, 22% (n=128) were between 31-40 years, 37% (n=216) were aged 41-50, and 17% (n=99) were over 51-60 years and 6% (n=37) were over 60 years. (Table-1) (Figure-1)

**Table 1: Treatment status by age group**

Age group	V1	Not Treated (n)	Treated(n)
	1	0	0
<20	0	14	15
>60	0	28	9
20-30	0	38	37
31-40	0	56	72
41-50	0	113	103
51-60	0	51	48



**Figure 1: Treatment status by age group**

Regarding occupation, the most common groups included housewives (19%, n=110), students (15%, n=87), businessmen (12%, n=70), and self-employed individuals (11%, n=64). Other common professions mentioned were laborers, drivers, farmers, tailors, office workers and healthcare providers. (Table-2)

**Table 2: Occupational variability of chronic hepatitis**

Occupation	V1	Asymptomatic(n)	Chronic Liver Disease Compensated(n)	Chronic Liver Disease Decompensated (n)	Hepatocellular carcinoma (HCC) (n)
	1	0	0	0	0
Babysitter	0	11	2	0	0
Barber	0	19	2	1	0
Businessman	0	61	6	3	0
Caretaker	0	8	2	2	0
Carpenter	0	3	0	0	0
Cleaner	0	10	1	2	0
Doctors	0	6	0	0	0
Driver	0	21	0	1	1
Electrician	0	9	1	0	3
Farmer	0	9	2	0	0
Guard	0	7	0	1	1
Housewife	0	98	9	3	0
Laborer	0	26	1	1	1
Mechanic	0	5	3	1	1
Nurse	0	8	1	0	0
Office worker	0	32	0	2	1
Self employed	0	55	6	3	0
Shopkeeper	0	17	0	0	0
Student	0	87	0	0	0
Tailor	0	9	2	0	0
Teacher	0	13	2	2	0

Most patients (88%, n=514) were asymptomatic at presentation, 62 individuals with chronic liver disease, out of which (40) had compensated liver disease and 22 had decompensated liver disease. Hepatocellular carcinoma (HCC) was confirmed in 8 patients. About (12%, n=70) of the patients were diagnosed with Chronic Liver Disease & Hepatocellular carcinoma, 17%(n=100) with HBeAg Negative Chronic Hepatitis, 28%(n=164) with HBeAg Negative Chronic Infection, 15%(n=90) with HBeAg Positive Chronic Hepatitis and 27%(n=160) with HBeAg Positive Chronic Infection. (Table-3).

**Table 3: Clinical Spectrum of Liver Disease Stratified by Serological Status**

Serological status	V1	Asymptomatic(n)	Chronic Liver Disease Compensated(n)	Chronic Liver Disease Decompensated(n)	Hepatocellular carcinoma(n)
	1	0	0	0	0
Chronic Liver Disease Hepatocellular carcinoma (12%, n=70)	0	54	11	5	0
HBeAg Negative Chronic Hepatitis (17%, n=100)	0	92	6	1	1

HBeAg Negative Chronic Infection (28%, n=164)	0	122	20	15	7
HBeAg Positive Chronic Hepatitis (15%, n=90)	0	86	3	1	0
HBeAg Positive Chronic Infection (27%, n=160)	0	160	0	0	0

Of the total 584, 48.64% (n=284) were on antiviral therapy, with entecavir being the most frequently prescribed drug (87%, n=247). Tenofovir disoproxil fumarate (TDF) was used in 11.3% (n=32) of cases, and tenofovir alafenamide (TAF) in 1.2% (n=3). Two patients had prior interferon therapy.

The probable source of infection was unknown in 69% (n=403) of cases. Among known sources, family history (16.09%, n=94), blood transfusion (8%, n=46), spousal transmission (2.4%, n=14), healthcare exposure (2.05%, n=12), and surgical or dental procedures (1.6%, n=9) were identified. A small percentage (1.02%, n=6) reported barber-associated transmission (Table-4).

**Table 4: Treatment Status by Source of Hepatitis B Virus Infection**

Source of infection	V1	Not Treated(n)	Treated(n)
	1	0	0
Barber	0	3	3
Blood Transfusion	0	23	23
Family History	0	45	49
Healthcare Worker	0	4	8
Spouse	0	8	6
Surgery/Dental	0	3	6
Unknown	0	214	189

Among 246 female patients, 26 were pregnant at the time of presentation. Of these, seven were switched to TDF during pregnancy, and 14 continued breastfeeding while on treatment. Neonatal prophylaxis with HBV vaccination and immunoglobulin was recommended, but follow-up data on infant outcomes were unavailable.

A subset of 27 patients had occult HBV (HBsAg-negative but anti-HBc positive). Those 10 who had non-protective anti-HBs titers were excluded from further investigation since fibroscan was not available.

Significant results were observed in a number of chi-square tests (Table-5). Gender was significantly associated with clinical status ( $\chi^2$  (8, N=584) = 589.22, p < 0.0001). Age group was linked with treatment status ( $\chi^2$  (12, N=584) = 596.95, p < 0.0001) (Figure-1). Follow-up status and treatment status also showed a strong association ( $\chi^2$  (6, N=584) = 587.1, p < 0.0001). Significant associations were also found between treatment and variables such as clinical status, occupation, source of infection, serological status, and education level. Important associations were also found between treatment and different variables such as clinical status, occupation, infection source, serological status and education level. No significant association was found between pregnancy status and treatment ( $\chi^2$  (1, N=198) = 0.00, p = 0.9644).

**Table 5: Chi-square association of variables**

Variable1	Variable2	ChiSquare	p_value
Gender	Clinical_status	$\chi^2$ (8, N=584) = 589.22	< 0.0001
age_group	treatment_status	$\chi^2$ (12, N=584) = 596.95	< 0.0001
family_history	treatment_status	$\chi^2$ (4, N=584) = 585.55	< 0.0001
clinical_status	treatment_status	$\chi^2$ (8, N=584) = 588.39	< 0.0001
occupation	clinical_status	$\chi^2$ (84, N=584) = 708.91	< 0.0001
source_of_infection	treatment_status	$\chi^2$ (14, N=584) = 588.91	< 0.0001

serology_status	clinical_status	$\chi^2(20, N=584) = 659.46$	< 0.0001
education_level	treatment_status	$\chi^2(12, N=584) = 586.52$	< 0.0001
follow_up_status	treatment_status	$\chi^2(6, N=584) = 587.1$	< 0.0001
pregnancy_status	treatment_status	$\chi^2(1, N=198) = 0$	0.9644

## DISCUSSION:

This study highlights the characteristics of patients with chronic hepatitis B in terms of their age, diseases and therapies in a tertiary care system in Bangladesh. The fact that numerous patients are asymptomatic reveals how quietly the condition can spread and reminds us why regular screening is important. Treatment seeking varied according to their demographic and clinical characteristics and strong associations were identified between treatment status and age, gender, adherence to follow-up checkup, occupation, education and serological results.

Evidence from these studies matches previous research in low- and middle-income countries that show many people are asymptomatic and can go a long time without diagnosis (14,15). Entecavir is the main treatment chosen in line with international practices because it works well and has a strong resistance profile (16,17). Nevertheless, a minimal use of tenofovir-based therapies and the shortage of data on pregnant women and those with occult HBV suggest there are holes in care and diagnostic services.

According to previous studies, supporting patients by improving structure in follow-up visits and education can help control HBV better (18,19). Just like in other countries, this study emphasizes that using demographic and serological information helps make better decisions about treatment. Unlike in some other international contexts, differences in treatment depending on pregnancy have not been found.

Such gap in treatment for those with different levels of education and occupations might suggest issues related to health literacy, limited access to health and social barriers. Since adhering to follow-up visits is linked with effective treatment, communities and health facilities should work on strategies to prevent people from dropping out of care.

New studies are more often emphasizing individual approaches to HBV management that include virus monitoring and charting the advance of fibrosis (20). Adding fibroscan, HBV DNA quantification and HDV screening to standard protocols can lead to better patient care. Furthermore, taking care of special groups such as pregnant women and those with occult infections needs multidisciplinary and integrated strategies.

To conclude, the research agrees with global results on chronic HBV care, but also show that local access to diagnosis, ongoing treatment and follow-up are major issues. Fixing these issues with proper policy and clinical changes can bring about much better outcomes for patients in Bangladesh and in places with similar condition.

## CONCLUSION:

Our study provides a comprehensive analysis of patients with chronic hepatitis B treated at tertiary level hospital in Bangladesh, denoting the countries strengths and acknowledging its flaws in current hepatitis B virus care. The results indicate that chronic HBV is often underdiagnosed and tends to be asymptomatic in most of the times which means proactive screening is very important. Despite not having much healthcare infrastructure, around 40% patients started on antiviral therapy, mainly with entecavir.

Notable associations were found between treatment and demographic, clinical and follow-up status & it shows where we need optimization for a better outcome. It was clear that women of childbearing age and those with occult HBV infection were not receiving adequate testing and follow-up. So, we need to develop specialized strategy for these patient groups. The results reinforce structured follow-up and comprehensive care plans for the patients for more effective diagnosis and management of HBV.

The study's findings improve regional recognition of HBV management and indicate a greater need for more access to laboratory tests, better patient educations and better systems for proper followup. Adopting these measures in national health policies allows Bangladesh to develop HBV control approaches that are more efficient, fair and sustainable.

## Strengths and Limitations of the Study:

A major strength of this study is its wide range of participants and its attention to demographic, medical and treatment details, letting us observe how chronic hepatitis B is managed in Bangladesh closely. Because of meticulous face to face data collection, it was possible to easily and accurately find and gather patient records. As these patients were referred to this hospital from clinics and hospitals from all over the country, they represent the picture of chronic hepatitis B in Bangladesh & possibly this south Asian region as infection and treatment are merely same in this area. Chi-square tests made it possible to detect various important associations between different variables.

On the other hand, there are a number of limitations of this study. Since the design is cross-sectional, it is difficult to show how one variable causes the other. Moreover, using only this tertiary care center for convenience sampling could lead to biased results that do not apply to hospitals in other places in Bangladesh. Certain important diagnostic data such as levels of HBV DNA and details about HDV involvement, were sometimes missing for patients which might have helped in making better decisions about their treatment.

### **Implications of the Study Results:**

The results show it is crucial to consider certain facts when caring for patients with chronic hepatitis B in resource-limited countries like Bangladesh. The fact that many cases are asymptomatic and that certain groups are more at risk means that screening should focus more and be adjusted to each community's needs. The link between getting treatment and continuing follow-up highlights how important it is to improve these monitoring and retention processes for patients.

Seeing little relationship between pregnancy and treatment means clinicians are following set recommendations; yet, not having postnatal follow-up data points out an issue in coordinating maternal and infant care. Likewise, the fact that fewer people use tenofovir-based therapies, despite their worldwide importance, may point to some issues with drug availability or doctor decisions that should be examined further.

Recognizing factors including education and occupation associated with treatment disparities underlines the need for taking precise steps such as education campaigns and additional socioeconomic support. Adding HBV DNA quantification and fibroscan to standard checkups could lead to better decisions for treatment and better results for patients. These challenges should be met by making capacity building, providing access to diagnoses and setting up follow-up facilities a priority for healthcare management.

### **Recommendations for Future Research:**

To overcome existing limitations and gain a more thorough understanding of Hepatitis B Virus treatment outcomes, future research should prioritize broader, multi-center studies that incorporate longitudinal follow-up designs. Expanding datasets to encompass variables such as HBV DNA levels, precise liver fibrosis staging, and patterns of antiviral resistance would enable a more refined and nuanced understanding of treatment results. In addition to virological and clinical markers, future research should also consider including data on co-infections (such as HDV, HCV, and HIV), liver enzyme levels, complete blood counts, and metabolic panels to provide a holistic assessment of the patient's health status throughout the treatment duration. This approach will permit the identification of predictive biomarkers and the development of tailored treatment strategies, leading to optimized patient care and improved outcomes. By understanding the interplay between these factors, clinicians can make more informed decisions about treatment initiation, modification, and duration, ultimately improving patient outcomes and reducing the risk of disease progression. Furthermore, integrating advanced molecular techniques like next-generation sequencing could offer detailed insights into viral mutations and drug resistance mechanisms, leading to the development of novel therapeutic targets and personalized treatment strategies.

In addition to quantitative data, qualitative studies are crucial for capturing the complex interplay of patient and provider perspectives concerning treatment adherence, the impact of stigma, and the multifaceted barriers to care that affect individuals living with HBV. Digital ways of reminding patients or following up with them using telemedicine may greatly help patients remember their treatment and do well.

Evaluating public health campaigns, coordination of maternal and infant services and use of HBV vaccines can show if they reduce spread and result in better patient outcomes. When these insisted practices are followed, they can give ideas for appropriate and goal-oriented actions that support HBV care and prevention in Bangladesh and similar places.

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