

# Depression among Patients with Chronic Hepatitis B: A Cross-sectional Study in a Tertiary Hospital of Bangladesh

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Received on: 01 October 2023; Accepted on: 01 November 2023; Published on: 22 December 2023

## ABSTRACT

**Background:** Patients with chronic hepatitis B suffer not only from physical illness. Rather, they often present with the mental health consequences of this chronic disease.

**Objective:** The major objective was to assess the level of depression among patients having chronic hepatitis B.

**Method:** The Department of Hepatology of Bangabandhu Sheikh Mujib Medical University directed this study which was a comparative cross-sectional study during time duration from September 2021 to September 2022. Incidence and grading of depression between patients with chronic hepatitis B and HBsAg negative healthy volunteers were assessed and compared through this study. The association of different variables with depression among chronic hepatitis B (CHB) patients was also measured.

**Results:** Out of 90 patients having chronic hepatitis B, 52 (57.8%) were found to have some degree of depression; whereas among 90 HBsAg-negative healthy controls, 32 (35.6%) were found to have various degrees of depression. The dissimilarity between the two groups was significantly determined ( $p$ -value < 0.05). The majority of the depressed population from both groups had mild degrees of depression, however, the variance was not top the notch ( $p$ -value > 0.05). But the prevalence of moderate depression and moderately severe depression was statistically significant among CHB patients compared to their counterpart controls. Depression among CHB patients was found to be female-predominant.

**Conclusion:** The study has shown a higher prevalence of depression among patients with chronic hepatitis B compared to HBsAg-negative healthy controls.

**Keywords:** Depression, Hepatitis B, Mental health, Patient.

*Euroasian Journal of Hepato-Gastroenterology* (2023): 10.5005/jp-journals-10018-1406

## BACKGROUND

Infection with hepatitis B virus (HBV) is a common name of threat over the world. Worldwide around 240 million people have been suffering chronically from hepatitis B viral infection.<sup>1</sup> Hepatitis B virus infection can progress to multiple life risks like cirrhosis, liver failure and hepatocellular carcinoma. In Bangladesh, around 30% cases of acute hepatitis, 75% cases of chronic hepatitis, 60% cases of liver cirrhosis and 65% cases of hepatocellular carcinoma are caused by infection with HBV.<sup>2-4</sup> Hepatitis B virus ranked as tenth leading cause of death according to records over the world.<sup>5</sup>

Being positive for HBsAg for at least 6 months causes the chronicity of infection. However, chronic hepatitis B (CHB) is a disease where patients can transit different clinical phases with varieties of levels of serum ALT activity, HBV DNA, and HBV antigens.<sup>6</sup>

According to the new biopsychosocial medical model, more attention is encouraged on the impact of psychological factors of physical disease. One of the frequently faced consequences is depression. However, mental health problems are often overlooked and underdiagnosed and the picture is worse in patients with coexistent physical illness. Compared to the precautions taken to reduce the incidence and life risks of hepatitis, attention drawn to addressing the impacts related to the mental health of this disease is not sufficient. Also, there is a scarcity of studies that focuses on psychological implications in patients with HBV infection. Moreover, physicians often ignore the associated psychological issues while

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**How to cite this article:** Rahman M, Noor-E-Alam SM, Rahim MA, *et al.* Depression among Patients with Chronic Hepatitis B: A Cross-sectional Study in a Tertiary Hospital of Bangladesh. *Euroasian J Hepato-Gastroenterol* 2023;13(2):79-83.

**Source of support:** Nil

**Conflict of interest:** Dr Sheikh Mohammad Noor-E-Alam, Dr Md Abdur Rahim are associated as the Editorial Board Members of this journal and this manuscript was subjected to this journal's standard review procedures, with this peer review handled independently of these Editorial Board Members and their research group.

diagnosing physical diseases. One of the contributing factors is that the symptoms of mental health illness may not be overt and can overlap with the symptoms of physical diseases.<sup>7</sup>

With the intermediate incidence of having long-term hepatitis B in our country, mental health consequences with this disease should get more focus and attention because they may have an adverse effect upon the course of the disease.

Multiple factors are responsible for depression in hepatitis patients. Complexity and unpredictability of the course of illness, economic burden, emotional factors, misconceptions, and social stigma are thought to be the causes. Therefore, evaluation and identification of depression among patients with chronic viral hepatitis are a must to enhance the self-confidence of patients in conquering the disease. Accordingly, specific management needs to be combined with other comprehensive therapies in order to improve the overall remission.<sup>8</sup>

## METHODS

This study was a cross-sectional comparative one, starting from September 2021 to September 2022 at the outpatient division of Hepatology, Bangabandhu Sheikh Mujib Medical University. In this study, 90 of the population who were found for HBsAg positive for  $\geq 6$  months were enrolled as cases and 90 healthy volunteers who were negative for HBsAg were enrolled as controls and a purposive method was used for sampling. To assess depression in the case and control group, a validated and Bangla-translated form of the patient health questionnaire (PHQ-9) was used. The questionnaire included 9 questions. Each question had 4 choices (0–3). The maximum score of depression in this questionnaire was 27. Rating starts from 0 to 4 which was taken as no or minimal depression followed by 5–9 as mild depression, 10–14 as moderate depression, 15–19 as moderately severe depression and 20–27 as severe depression. A comparison of the prevalence and severity of depression between the case and control group was done thereafter.

Data collection was done using a preformed data collection sheet which contained the PHQ-9 Questionnaire along with baseline, demographic and clinical data. All information regarding clinical features was recorded in the information collection sheets with written consent from the respondents.

Quantitative data were represented as mean  $\pm$  SD and qualitative data were presented in percentages. All information was entered in SPSS for analysis (version 23.0; IBM Corp). Categorical variables were analyzed by Chi-square test or Fisher's exact test where applicable and continuous variables were analyzed by Student's *t*-test for parametric data and Mann-Whitney *U*-test for non-parametric data. All categorical and continuous variables were analyzed between case and control groups. A satisfied outcome was counted positive when *p*-value was less than 0.05.

### Inclusion Criteria

#### Cases

- Age: >18 years but <75 years
- Patients diagnosed as chronic hepatitis B

#### Control

- Age: >18 years but <75 years
- Healthy volunteers who are HBsAg-negative

### Exclusion Criteria

#### Cases

- Patients on antidepressant therapy
- Patients previously diagnosed with any psychiatric illness or neurological disorder

- Patients respondents with cirrhosis of liver
- Patients with liver failure
- Patients population with disease of liver of etiology other than HBV
- Patients with hepatocellular carcinoma or any other malignancy
- Patients with any other chronic disease
- Pregnancy

#### Controls

- Those with any significant chronic disease
- Pregnancy

#### Depression Severity

0–4: No or minimal depression,

5–9: Mild depression,

10–14: Moderate depression,

15–19: Moderately severe depression,

20–27: Severe depression.

## RESULTS

Table 1 shows socio-demographic variables among the two groups. It was observed that the majority of patients and healthy controls were from younger age-groups. The mean age was  $31.29 \pm 9.88$  years for the chronic hepatitis B (CHB) patient group and  $32.03 \pm 10.68$  years for the control group. The majority of the study population was male in both groups; 68 (75.6%) patients in the CHB group and 60 (66.7%) participants in the control section.

Table 2 shows the differentiation of CHB-positive respondents by mode and duration of diagnosis and treatment history. The majority of patients (51 patients, 56.7%) were diagnosed incidentally, 35 patients (38.9%) were diagnosed after testing because of positive family history of HBV infection and only 4 (4.4%) patients were diagnosed after getting tested because of physical illness. The majority of patients (75 patients, 79%) had a duration of CHB diagnosis of less than 5 years. The mean duration of diagnosis was  $3.09 \pm 3.20$  (0.5–15) years.

Table 3 shows that among ninety CHB patients, 33 (36.7%) patients were on treatment (NUCs).

Table 4 below shows the distribution of CHB patients by biochemical and virological parameters. Regarding that, 55 among 90 patients (61.1%) had an ALT level of  $\leq 40$  U/L, an ALT level of 20 (22.2%) patients in the range of 41–80 U/L and fifteen patients (16.7%) had an ALT level of more than 80 U/L. The mean ALT was  $47.40 \pm 39.55$  U/L. The majority of CHB patients were HBeAg negative (78 patients, 86.7%).

Table 5 shows 23 patients (25.6%) and 22 healthy controls (24.4%) had mild depression; the significance was not evaluated between the two groups (*p*-value 0.863). About 14 patients (15.6%) and 5 healthy controls (5.6%) had moderate depression; 14 patients (15.6%) and 4 healthy controls (4.4%) had moderately severe depression. The differences were evaluated between the two groups (*p*-values 0.029 and 0.013 respectively). Only 1 patient from the CHB group and one participant from the control group had severe depression and the outcome was not satisfied (*p*-value 0.999).

Table 6 shows that among ninety CHB patients, 52 (57.8%) patients were found depressive on the basis of PHQ-9 score. On the

**Table 1:** Classification of study population according to socio-demographic variables (n = 90)

Sociodemographic variables	Case	Control	p-value*
Age (year)			
≤25	33 (36.7)	30 (33.3)	
26–35	33 (36.7)	35 (38.9)	
36–45	18 (20.0)	17 (18.9)	
>45	6 (6.7)	8 (8.9)	
Mean ± SD	31.29 ± 9.88	32.03 ± 10.68	0.628 <sup>c</sup>
Sex			
Male	68 (75.6)	60 (66.7)	0.188 <sup>a</sup>
Female	22 (24.4)	30 (33.3)	
Occupation			
Housewife	15 (16.7)	18 (20.0)	
Service	23 (25.6)	23 (25.6)	
Farmer	6 (6.7)	2 (2.2)	0.049 <sup>a</sup>
Businessman	22 (24.4)	10 (11.1)	
Others	24 (26.7)	37 (41.1)	
Living area			
Village	39 (43.3)	38 (42.2)	
Town	23 (25.6)	22 (24.4)	0.949 <sup>a</sup>
City	28 (31.1)	30 (33.3)	
Marital status			
Married	61 (67.8)	66 (73.3)	0.414 <sup>a</sup>
Unmarried	29 (32.2)	24 (26.7)	
Living with spouse/partner			
Yes	43 (70.5)	48 (72.7)	0.780 <sup>a</sup>
No	18 (29.5)	18 (27.3)	
Monthly income			
Up to 5,000 Taka	3 (3.3)	2 (2.2)	
5,001–10,000 Taka	17 (18.9)	26 (28.9)	0.253 <sup>a</sup>
10,001–20,000 Taka	38 (42.2)	27 (30.0)	
Above 20,000 Taka	32 (35.6)	35 (38.9)	
Personal history			
Alcohol intake	3 (3.3)	1 (1.1)	0.621 <sup>b</sup>
IV drug abuse	0 (0.0)	0 (0.0)	–

<sup>a</sup>Chi-square test was completed to determine the level of significance.  
<sup>b</sup>Fisher's Exact test was completed to determine the level of significance.  
<sup>c</sup>Unpaired t-test was done to evaluate the level of significance. Figure within parenthesis represents percentage

**Table 2:** Differentiation of CHB-positive respondents by mode and duration of diagnosis (n = 90)

Information related to diagnosis of CHB	Frequency	Percent
Duration of diagnosis		
≤1 year	39	43.3
1–5 years	36	40.0
5–10 years	11	12.2
>10 years	4	4.4
Mean ± SD (min–max)	3.09 ± 3.20 (0.5–15.0)	
Reason behind diagnosis		
Incidental	51	56.7
Physical illness	4	4.4
Positive family history	35	38.9

**Table 3:** Distribution of the patients according to treatment history (n = 90)

History of taking NUCs	Frequency	Percent
Positive	33	36.7
Negative	57	63.3
Total	90	100.0

**Table 4:** Distribution of the patients by biochemical and virological parameters

Investigation findings	Frequency	Percent
ALT (U/L)		
≤40	55	61.1
40–80	20	22.2
>80	15	16.7
Mean ± SD (min–max)	47.40 ± 39.55 (6–205)	
HbeAg		
Positive	12	13.3
Negative	78	86.7
Anti-HBe		
Positive	55	61.1
Negative	35	38.9
HBV-DNA (RT-PCR) IU/mL		
Undetected	39	43.3
<2000	17	18.9
2000–20000	10	11.1
>20000	24	26.7
Mean HBV DNA	1.30 × 10 <sup>7</sup> ± 5.56 × 10 <sup>7</sup>	

ALT, alkaline transferase; HBe, hepatitis E; HBV, hepatitis B virus; U/L, units per liter; RT-PCR, reverse transcription-polymerase chain reaction test; SD, standard deviation

**Table 5:** Distribution of the study population according to PHQ-9 score (n = 90)

Depression severity	Case	Control	p-value
No or minimal depression	38 (42.2)	58 (64.4)	0.003 <sup>a</sup>
Mild depression	23 (25.6)	22 (24.4)	0.863 <sup>a</sup>
Moderate depression	14 (15.6)	5 (5.6)	0.029 <sup>a</sup>
Moderately severe depression	14 (15.6)	4 (4.4)	0.013 <sup>a</sup>
Severe depression	1 (1.1)	1 (1.1)	0.999 <sup>b</sup>
Total	90 (100.0)	90 (100.0)	
Mean ± SD	7.36 ± 5.75	4.51 ± 4.44	
Median	6.0	4.0	<0.001 <sup>c</sup>

<sup>a</sup>Chi-square test was done to measure the level of significance. <sup>b</sup>Fisher's exact test was done to measure the level of significance. <sup>c</sup>Mann-Whitney U-test was done to measure the level of significance. Figure within parenthesis indicates percentage

**Table 6:** Distribution of study population by presence of depression

Depression status	Case	Control	p-value*
Not/minimally depressed	38 (42.2)	58 (64.4)	0.003
Depressed	52 (57.8)	32 (35.6)	
Total	90 (100.0)	90 (100.0)	

\*Chi-square test was done to measure the level of significance. Figure within parenthesis indicates percentage

**Table 7:** Association of different variables with frequency of depression among CHB patients ( $n = 90$ )

Variables	No/minimal depression	Depression	<i>p</i> -value
Age (year)			
Mean $\pm$ SD	30.50 $\pm$ 8.11	31.87 $\pm$ 11.03	0.520 <sup>b</sup>
Sex			
Male	34 (50.0)	34 (50.0)	0.009 <sup>a</sup>
Female	4 (18.2)	18 (81.8)	
Monthly income			
Up to 5,000 Taka	1 (33.3)	2 (66.7)	
5,001–10,000 Taka	5 (29.4)	12 (70.6)	0.641 <sup>a</sup>
10,001–20,000 Taka	18 (47.4)	20 (52.6)	
Above 20,000 Taka	14 (43.8)	18 (56.3)	
Living area			
Village	16 (41.0)	23 (59.0)	
Town	8 (34.8)	15 (65.2)	0.538 <sup>a</sup>
City	14 (50.0)	14 (50.0)	
Marital status			
Married	26 (42.6)	35 (57.4)	0.911 <sup>a</sup>
Unmarried	12 (41.4)	17 (58.6)	
Living with spouse			
Yes	21 (47.7)	23 (52.3)	0.263 <sup>a</sup>
No	10 (34.5)	19 (65.5)	
Duration of diagnosis			
Mean $\pm$ SD	2.95 $\pm$ 3.22	3.18 $\pm$ 3.21	0.738 <sup>b</sup>
History of taking NUCs			
Yes	13 (39.4)	20 (60.6)	0.679 <sup>a</sup>
No	25 (43.9)	32 (56.1)	
Family history of HBV infection			
Yes	17 (40.5)	25 (59.5)	0.754 <sup>a</sup>
No	21 (43.8)	27 (56.3)	
HBV DNA level			
$\leq$ 2,000	24 (42.9)	32 (57.1)	
2,000–20,000	4 (40.0)	6 (60.0)	0.984 <sup>a</sup>
>20,000	10 (41.7)	14 (58.3)	

<sup>a</sup>Chi-square test was done to measure the level of significance. <sup>b</sup>Unpaired *t*-test was done to measure the level of significance. Figure within parenthesis indicates percentage

other hand, 32 (35.6%) healthy controls were found to have some degree of depression. The difference was statistically significant between two groups ( $p$ -value 0.003).

Table 7 shows the association of different variables with the prevalence of depression among CHB patients among which only the female sex had a statistically significant association with depression ( $p$ -value 0.009).

## DISCUSSION

The study attempted to assess depression among 90 respondents having chronic hepatitis B and 90 HBsAg-negative healthy volunteers. Among all positive respondents of chronic hepatitis B patients, 57.8% were found to have some degree of depression in comparison to 35.6% HBsAg-negative, depressive controls ( $p$ -value < 0.05). The result is in accordance with a previous study

done in Pakistan in 2012. Recurrence of depression was 58.6% in the CHB group and 37.8% in healthy subjects.<sup>8</sup> The result of our study is also consistent with another study done in Turkey which showed that the incidence of feeling low among CHB-positive respondents was 49%.<sup>9</sup> Other studies showed a prevalence of 68% in Iran and 37.5% in Vietnam.<sup>10</sup> The variation in results in different studies can be justified by the difference in the severity level of HBV progression as well as the difference in the measurement instruments for assessing mental fitness.

The study assessed the severity of depression among both groups. It was found that the majority of the depressed population had a mild degree of depression in both groups (25.6% CHB patients vs 24.4% controls). However, the difference was not significantly remarkable between the case and control groups ( $p$ -value > 0.05). 15.6% of patients and 5.6% of healthy controls had moderate depression; 15.6% of patients and 4.4% of healthy controls had moderately severe depression; the difference between the two groups for both moderate and moderately severe depression had satisfactory results ( $p$ -value < 0.05).

The findings of our study were consistent with that of other existing studies. The study conducted in Pakistan in 2012 illustrated that the majority of depressed CHB respondents (37.9%) had mild depression.<sup>9</sup> A study in Turkey also found that nearly half of depressed CHB patients had mild symptoms.<sup>10</sup>

The study attempted to find the association of different variables with depression among CHB patients. Female patients (81.8%) were found to be more depressive than their male counterparts (50%). The ultimate outcome was positive ( $p$ -value < 0.05). The result is consistent with a study done in Turkey where the female gender was reported as an important contributing factor to the development of depression.<sup>11</sup>

The study could not detect any statistically significant association of depression with other variables like socioeconomic condition, living area, marital status and living status with spouse/partners, family history of HBV infection, mean duration of CHB diagnosis, treatment history, HBV DNA level among CHB patients ( $p$ -value > 0.05). These results of our study were not consistent with previous studies where they found that older age, lower income, and being married, had a positive correlation to having depression.<sup>11,12</sup>

## CONCLUSION

The study has shown a higher prevalence of depression compared to chronic hepatitis B respondents with HBsAg-negative healthy controls. Although the majority of depressed CHB patients were suffering from mild depression, the prevalence of this spectrum was not statistically significantly different from that of mildly depressive HBsAg-negative volunteers. Rather, the prevalence of moderate depression and moderately severe depression was statistically significant among CHB patients compared to their counterpart controls. Depression among CHB patients was found to be female-predominant.

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