



# Depression and Anxiety in Patients with Hepatitis B and C in a Moroccan Region: A Cross-Sectional Study

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## Abstract

**Introduction:** Hepatitis B and hepatitis C virus infections are a major public health problem in Morocco and around the world. Recent research has shown that patients with chronic viral hepatitis have high levels of anxiety and depression. The aim of this study was to estimate the prevalence of depression and anxiety in patients with chronic viral hepatitis and to identify associated factors. **Methods:** This is a cross-sectional study involving 94 patients followed up for chronic viral hepatitis B or C at the diagnostic center of the Hassan II University Hospital in Fez. The Hospital Anxiety and Depression Scale (HADS) was used to assess depression and anxiety. Participants with a score above 7 were considered depressed or anxious. **Results:** The prevalence of depressive and anxious symptoms was 47.9% and 41.5% respectively. Participants with hepatitis B had higher depression and anxiety scores than those with hepatitis C and the difference was not statistically significant. In multivariate analysis, participants with age  $\geq 50$  years (OR = 5.40, CI95% = (1.75 - 16.68)), low income (OR = 2.81, CI95% = (1.11 - 7.13)) and complications (OR = 3.79, CI95% = (1.31 - 10.94)) had a high risk of depression. The risk of anxiety was higher in participants with age  $\geq 50$  years (OR = 2.76, CI95% = (1.05 - 7.30)) and low monthly income (OR = 4.50, CI95% = (1.80 - 11.22)). **Conclusion:** The high prevalence of psychiatric comorbidities in particular depression and anxiety is an important issue in the management of chronic hepatitis.

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## Subject Areas

Epidemiology, Psychiatry & Psychology, Public Health,  
Hepato-Gastroenterology

## Keywords

Anxiety, Depression, Hepatitis B, Hepatitis C, HADS, Morocco

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## 1. Introduction

Chronic liver diseases include several conditions ranging from hepatitis B virus (HBV) and hepatitis C (HCV) infection, fatty liver (alcoholic and non-alcoholic), cirrhosis and many other less common conditions [1]. HBV and HCV are the main causes of chronic hepatitis [2], and because of the high prevalence and consequences, these diseases have become a major public health problem worldwide [3].

The World Health Organization (WHO) estimates that 130 - 170 million people are infected with HCV (about 2% - 3% of the world population), and the prevalence of HCV in Morocco is 1.93% [4] [5]. In contrast, chronic hepatitis B affects about 400 million people worldwide and causes one million deaths per year, its prevalence is 1.66% in Morocco and 6% are chronic HBV carriers worldwide [6] [7] [8]. Patients with chronic liver disease may suffer from varying degrees of depression and anxiety [9].

The assessment of psychiatric manifestations of hepatitis is important as it has a negative effect on the course of the disease [10]. Depression is one of the leading causes of disability in the adult population and is expected to become the second leading cause of disability in all age groups by 2020 [1]. According to the WHO's State of the World's Mental Health report, the proportion of the world's population suffering from anxiety and depressive disorders is estimated at 3.6% and 4.4% respectively [11]. In Morocco, 4.5% of the population lives with anxiety and depressive disorders [11].

Recent studies have shown a rate of depression in HCV patients ranging from 22.4% to 28% [12] [13] [14] [15] and a rate of anxiety from 15.2% to 24% [12] [13] [14]. Atesci, FC *et al.* (2005) in their study found that inactive HBV carriers were more likely to suffer from depression and anxiety than healthy subjects [16]. Depression and anxiety are mainly due to health-related quality of life impairment and fear of disease complications [17], in addition, depression and anxiety are also induced by the antiviral treatment for HCV which includes interferon and ribavirin [18]. Most of the work on this topic focuses on depression in chronic liver disease [19]-[24] while anxiety in these patients remains little studied [20] [23] [24] [25].

To our knowledge, there is no study that determines the relationship between the occurrence of depression and anxiety in chronic hepatitis in Morocco. Our study, being the first one, aimed to estimate the prevalence and risk factors asso-

ciated with the occurrence of depression and anxiety in patients living with hepatitis B and C in Morocco.

## **2. Methods**

### **2.1. Study and Population**

This is a cross-sectional study including 94 patients followed up in hepatology consultation for chronic viral hepatitis B or C at the diagnostic center of Hassan II University Hospital in Fez, Morocco, from October 2019 to December 2020. The patients who followed or were treated for depressive or anxiety disorders were excluded.

### **2.2. Data Collection**

After obtaining approval from the Ethics Committee of the Hassan II University Hospital in Fez, all the subjects were informed of the conditions related to the study; and have given their informed consent in writing. Anonymity and confidentiality were respected by all participants. Data were collected using pre-established questionnaire including socio-demographic variables: age, gender, residence, marital status, educational level, occupation, monthly income, smoking status, alcohol and substance consumption, as well as clinical variables: medical and surgical history, treatment, complications and risk factors.

### **2.3. Measurement of Anxiety and Depression**

For the assessment of depression and anxiety status, the Hospital Anxiety and Depression Scale (HADS) has been used [26]. The Hospital Anxiety and Depression Scale (HADS) questionnaire was developed to screen non-psychiatric inpatients for anxiety disorders and depressive syndromes. It is a self-report scale that identifies anxiety and depressive disorders. It consists of 14 items: Seven questions concern anxiety (total A) and seven others concern the depressive dimension (total D). For each item, the response is scored from 0 to 3 on a scale according to the intensity of the symptom in the past week. The range of possible scores thus extends for each subscale from 0 to 21, with higher scores corresponding to the presence of more severe symptoms. For each subscale (anxiety and depression), threshold values were determined: 0 - 7: normal; >7 symptoms of depression or anxiety.

### **2.4. Statistical Analyses**

We made a descriptive study of all the variables; frequencies were used for the categorical variables. Means and standard deviations were used for quantitative variables. Bivariate analysis was used to find the association between depression, anxiety and explanatory variables. Classical parametric tests were used to test these associations (Chi-squared test, Student test). The significance threshold was set at 0.05. We performed multiple logistic regression to assess the associations of the independent variables with: depression and anxiety, as the depen-

dent variable. Factors with a p-value  $\leq 0.2$  in the bivariate analysis were included in the model. The data were entered using excel 10 software and the analysis was done with SPSS26 software.

### 3. Results

#### 3.1. Socio-Demographic Characteristics

The socio-demographic characteristics of the participants are shown in **Table 1**.

**Table 1.** Socio-demographic characteristics (n = 94).

Variables	N (%)
<b>Gender (n = 94)</b>	
Male	47 (50.0)
Female	47 (50.0)
<b>Age (Mean <math>\pm</math> SD) (n = 94)</b>	55.69 $\pm$ 13.258
$\geq 50$	65 (69.1)
$< 50$	29 (30.9)
<b>Residency (n = 94)</b>	
Rural	23 (24.7)
Urban	70 (75.3)
<b>Profession (n = 93)</b>	
Employed	34 (36.6)
Unemployed	59 (63.4)
<b>Education level (n = 94)</b>	
Educated	58 (61.7)
Uneducated	36 (38.3)
<b>Marital status (n = 94)</b>	
Married	75 (79.8)
Single	19 (20.2)
<b>Monthly income (Dh)</b>	
$\geq 2000$	51 (55.4)
$< 2000$	41 (44.6)
<b>Medical insurance (n = 94)</b>	
Uninsured	1 (1.1)
Assured	93 (98.9)
<b>Life (n = 94)</b>	
Alone	6 (6.4)
With family or in a relationship	88 (93.6)
<b>Alcohol use (n = 90)</b>	
No	80 (88.9)
Yes	10 (11.1)
<b>Smoke status (n = 93)</b>	
No	70 (75.3)
Yes	6 (6.5)
Ex-smoker	17 (18.3)

A total of 94 subjects participated in the study, with a mean age of  $55.69 \pm 13.258$ , a minimum age of 19 years and a maximum age of 83 years. There was no gender predominance, the majority of participants were married (79.8%), 61.7% were literate and 55.4% had a monthly income of more than 2000 dirhams.

### 3.2. Clinical Features of the Disease

Among the 94 participants, 71.3% had chronic HBV and 28.7% had HCV, the mean duration of the disease was 7.22 years  $\pm 5.63$ , 49.5% had comorbidity, 40.9% had complications of which 37% were cirrhotic and 26.1% represented other complications, 71.7% of the participants were on antiviral treatment. The clinical characteristics of the disease are shown in **Table 2**.

### 3.3. Bivariate Analysis

**Table 3** shows the prevalence and factors associated with depression and anxiety.

#### 3.3.1. Depression

The mean depression score was  $7.90 \pm 6.908$ . 47.9% of the participants suffered from depression. Men had a higher depression score than women (53.3% vs 46.7%) and this difference was not statistically significant ( $p = 0.536$ ). Participants with HBV were more depressed than those with HCV with respective prevalence of 75.6 and 24.4, this difference was not statistically significant ( $p = 0.380$ ), those on antiviral treatment were also more depressed (68.9% vs 31.1%), the difference was not statistically significant ( $p = 0.552$ ), the prevalence of depression was higher among participants aged 50 years and over (57.8%) compared to those under 50 years (42.2%) this difference was statistically significant ( $p = 0.022$ ) and participants with a high monthly income were less depressed (39.5% vs. 60.5%) with a statistically significant difference ( $p = 0.004$ ) (**Table 3**).

#### 3.3.2. Anxiety

The mean anxiety score was  $6.79 \pm 6.302$ . 41.5% of the participants were anxious with a male predominance (51.3% vs. 48.7%) ( $p = 0.834$ ), respondents aged 50 years and above had a significantly higher anxiety score than the age groups below 50 years. The literate had a significantly lower anxiety score than the illiterate (48.7% vs. 51.3%) ( $p = 0.029$ ) and the married were also significantly higher than the single. Participants with a low monthly income were more anxious (65.8% vs. 34.2%) with a statistically significant difference ( $p = 0.001$ ) (**Table 3**).

### 3.4. Multivariate Analysis

Multivariate logistic regression analysis showed that the variables associated with depression were: age  $\geq 50$  years (OR = 5.40, CI95% = 1.75 - 16.68), low monthly income (OR = 2.81, CI95% = 1.11 - 7.13) and presence of complications (OR = 3.79, CI95% = 1.31 - 10.94) (**Table 4**).

**Table 2.** Characteristics of hepatitis B and C.

<b>Variables</b>	<b>N (%)</b>
<b>Disease duration (mean ± SD)</b>	7.22 ± 5.63
≤5 years	39 (42.9)
>5 years	52 (57.1)
<b>Family history of HBV or HCV</b>	
Yes	17 (18.3)
No	76 (81.7)
<b>Type of hepatitis</b>	
HCV	27 (28.7)
HBV	67 (71.3)
<b>Comorbidities</b>	
Yes	46 (49.5)
No	47 (50.5)
<b>Complications</b>	
Yes	38 (40.9)
No	55 (59.1)
<b>Cirrhosis</b>	
yes	34 (37.0)
No	58 (63.0)
<b>Others Complications</b>	
Yes	24 (26.1)
No	68 (73.9)
<b>Virus Transmission</b>	
Blood transfusion	
Yes	7 (7.4)
No	85 (90.4)
Tattoo	
Yes	3 (3.2)
No	89 (96.7)
Risky sexual behavior	
Yes	10 (10.6)
No	74 (78.7)
Dental care	
Yes	38 (40.9)
No	55 (59.1)
<b>Treatment</b>	
Yes	66 (71.7)
No	26 (28.3)

**Table 3.** Prevalence of depression and anxiety in patients with hepatitis B and C according to sociodemographic and clinical characteristics: results of univariate analysis.

Variables	Depression		p-value	Anxiety		p-value
	NO 49 (52.1)	YES 45 (47.9)		NO 55 (58.5)	YES 39 (41.5)	
<b>Age</b>						
≥50	39 (79.6)	26 (57.8)	0.022	43 (78.2)	22 (56.4)	0.024
<50	10 (20.4)	19 (42.2)		12 (21.8)	17 (43.6)	
<b>Gender</b>						
Male	23 (46.9)	24 (53.3)	0.536	27 (49.1)	20 (51.3)	0.834
Female	26 (53.1)	21 (46.7)		28 (50.9)	19 (48.7)	
<b>Residency</b>						
Rural	10 (20.8)	13 (28.9)	0.368	12 (22.2)	11 (28.2)	0.509
Urban	38 (79.2)	32 (71.1)		42 (77.8)	28 (71.8)	
<b>Educational level</b>						
Educated	32 (65.3)	26 (57.8)	0.453	39 (70.9)	19 (48.7)	0.029
Uneducated	17 (34.7)	19 (42.2)		16 (29.1)	20 (51.3)	
<b>Marital status</b>						
Married	40 (81.6)	35 (77.8)	0.642	48 (87.3)	27 (69.2)	0.032
Single	9 (18.4)	10 (22.2)		7 (12.7)	12 (30.8)	
<b>Profession</b>						
Employed	20 (41.7)	14 (31.1)	0.291	21 (38.9)	13 (33.3)	0.583
Unemployed	28 (58.3)	31 (68.9)		33 (61.1)	26 (66.7)	
<b>Monthly income</b>						
≥2000	34 (69.4)	17 (39.5)	0.004	38 (70.4)	13 (34.2)	0.001
<2000	15 (30.6)	26 (60.5)		16 (29.6)	25 (65.8)	
<b>Medical insurance</b>						
Uninsured	0 (0.0)	1 (2.2)	0.479	0 (0.0)	1 (2.6)	0.415
Assured	49 (100)	44 (98.8)		55 (100)	38 (97.4)	
<b>Comorbidities</b>						
No	24 (50)	23 (51.1)	0.915	26 (48.1)	21 (53.8)	0.588
Yes	24 (50)	22 (48.9)		28 (51.9)	18 (46.2)	
<b>Type of hepatitis</b>						
C	16 (32.7)	11 (24.4)	0.380	19 (34.5)	8 (20.5)	0.138
B	33 (67.3)	34 (75.6)		36 (65.5)	31 (79.5)	
<b>Duration of disease</b>						0.462
≤5 ans	17 (35.4)	22 (51.2)	0.130	21 (39.6)	18 (47.4)	
>5 ans	31 (64.6)	21 (48.8)		32 (60.4)	20 (52.6)	
<b>Complications</b>						
Yes	16 (32.7)	22 (50)	0.089	20 (36.4)	18 (47.4)	0.289
No	33 (67.3)	22 (50)		35 (63.9)	20 (52.6)	
<b>Cirrhosis</b>						
Yes	14 (29.2)	20 (45.5)	0.106	18 (33.3)	16 (42.1)	0.391
No	34 (70.8)	24 (54.5)		36 (66.7)	22 (57.9)	
<b>Treatment</b>						
No	12 (25.5)	14 (31.1)	0.552	13 (24.5)	13 (33.3)	0.354
Yes	35 (74.5)	31 (68.9)		40 (75.5)	26 (66.7)	

**Table 4.** Factors associated with depression and anxiety: Multivariate analysis.

Variables	Depression	Anxiety
	Ajusted OR (CI95%)	Ajusted OR (CI95%)
<b>Age</b>		
<50	5.40 (1.75 - 16.68)*	2.76 (1.05 - 7.30)*
≥50	Reference	Reference
<b>Monthly income</b>		
<2000	2.81 (1.11 - 7.13)*	4.50 (1.80 - 11.22)*
≥2000	Reference	Reference
<b>Complications</b>		
Yes	3.79 (1.31 - 10.94)*	
No	Reference	

Abbreviations: OR: Odds Ratio; CI: Confidence Interval, \*p < 0.05.

The variables associated with anxiety in the multivariate logistic regression analysis were: age ≥50 and low monthly income with respectively (OR = 2.76, CI95% = 1.05 - 7.30) (OR = 4.50, CI95% = 1.80 - 11.22) (**Table 4**).

#### 4. Discussion

The present study showed us a high frequency of depression (47.9%) and anxiety (41.5%) in patients with chronic viral hepatitis which is in line with the literature which reports that the prevalence of depression in patients with chronic liver disease ranged from 20% to 70.6% [19] [25] [27] and that of anxiety ranged from 13% to 71.6% [24] [25] [28] [29].

We found a high prevalence of depression and anxiety in patients with HBV compared to those with HCV and the difference was not statistically significant, the same result was reported by Pegah AS *et al.* [30], who when calculating the mean of depression and anxiety, found that it was higher in HBV than in HCV, also a Pakistani study reported a relatively high frequency of anxiety, loss of emotional control and depression in patients diagnosed with hepatitis B [31]. Our results differ from those in the literature, although the different studies are based on one type of hepatitis particularly HCV, some show that hepatitis C is more likely to be associated with psychiatric disorders compared to hepatitis B and other chronic liver diseases [32] [33]. This difference could be explained by the fact that the study was not conducted at the same time, by the use of different measurement scales, by the sociocultural background of the participants and by the characteristics of the disease.

In our study, the age was a factor associated with the risk of depression and anxiety, we found that older patients had a depression and anxiety score that was significantly higher than in younger patients, which would be the negative result of aging on the psychological state of patients with chronic viral hepatitis. In the study by Popović D *et al.* (2015), subjects with chronic liver disease over 50 years of age were more depressed than younger subjects [3], which is in agreement



with our study. The association between age and depression was also described by Krauss *et al.* [12] who report a high level of depression in elderly subjects.

Our results showed that there was no significant difference between the level of depression and anxiety in men and women which is consistent with previous data [23] [24], although the difference was not significant, we found that men were more depressed and anxious than women, this result could be explained by the fact that in Moroccan context, men are socio-economically responsible for the family and chronic illness is perceived as a physical and psychological burden. Our results agree with those of Amany M *et al.* in Egypt who found that men suffered more depression than women however the difference was statistically significant [34] as well as Pegah AS *et al.* report higher mean depression and anxiety in men [30], however Popović D *et al.* [3] had found a higher depression score in women which is also described in other studies [35] [36].

In our study, married people had a significantly higher anxiety score than single people, which could be explained by their greater responsibility for the care of the family. Our results agree with those of Dogar I *et al.* who reported that housewives had higher scores on the anxiety scale [25].

The prevalence of anxiety was significantly higher among the illiterate. This can be explained by the fact that literacy and education give people more knowledge and control over their lives, thus enabling them to better cope with psychosocial and environmental factors. This result is in agreement with another study which reported that the level of anxiety was lower with higher levels of education [37].

In our study, low socio-economic status was significantly associated with a high risk of depression and anxiety. We can say that poverty and financial difficulties with the cost of care may be factors of anxiety and depression in these patients. Popović D *et al.* reported that unemployed patients had significantly higher depression and anxiety scores than employed patients [3].

Disease-related complications were a risk factor for depression. Bianchi *et al.* reported in their study that the psychological status of patients with liver cirrhosis was severely compromised [19], as did Amany M *et al.* reported that decompensated cirrhosis increases the risk of depression by 17.7 times [34]. The occurrence of a complication(s) in these patients makes them feel like they will die soon, which could explain the occurrence of depression.

## 5. Limitations

The present study is limited by the small sample size and possible selection bias. A larger study would help to screen and better identify factors associated with depression and anxiety.

## 6. Conclusion

The high prevalence of psychiatric comorbidities, particularly depression and anxiety, is an important issue in the management of chronic hepatitis. In our

study, the risk factors for the occurrence of depression and anxiety were age and socioeconomic status, and disease-related complications were a risk factor for depression. Taking into account all these psychological aspects could improve the well-being of patients affected by chronic hepatitis B and C.

### Conflicts of Interest

The authors declare no conflicts of interest.

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