Original Article

A case-control study on the temperament and Psychological mood of patients with chronic Hepatitis B

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ABSTRACT
Objective: To evaluate the personality and temperament traits in patients with chronic hepatitis B in comparison to healthy subjects and to determine whether there is a relation between personality trait and level of anxiety or depression.
Materials/Subjects and Method: This was a case-control study in which 67 patients who had been under follow-up with diagnosis of chronic hepatitis B and 103 aged-matched healthy subjects were included. Study participants were asked to complete three self-report questionnaires— Temperament and Character Inventory (TCI) to define personality traits, Beck Depression Inventory (BDI) and Beck Anxiety Inventory (BAI) to evaluate presence and severity of depression and anxiety.
Results: Total and sub-scale scores of five out of seven dimensions of TCI—reward dependence, persistence, self-directedness, cooperativeness, and self-transcence— were significantly higher in Group 1 than Group 2. Total BDI and BAI scores were significantly higher in Group 1 than Group 2 .Significantly more patients had a BDI score of 17 or over in Group 1 than Group 2. There was no significant correlation between total scores of TCI dimensions and total BAI or BDI scores except weak correlations between harm avoidance or self-directedness and total BAI or BDI scores.
Conclusion: In terms of personality trait, patients with chronic hepatitis B exhibit higher reward dependence, persistence, self-directedness, cooperativeness, and self-transcendence from healthy population. The personality traits of patients should be considered during the management of hepatitis B in order to optimize treatment outcome and to prevent development of new mental health problems during the course of the disease.

Keywords: hepatitis B, temperament, personality, depression, anxiety

INTRODUCTION

Chronic hepatitis B virus infection is a global public health problem affecting more than 350 million people worldwide in spite of expanded immunization programs (1, 2). Almost one third of the world's population is estimated to be infected with the hepatitis B virus (3). About 25% of all carriers develop serious liver diseases such as chronic hepatitis, cirrhosis, and primary hepatocellular carcinoma, causing more than one million deaths every year (3). Hepatitis B remains an important cause of global mortality and morbidity. Being a chronic severe disease, chronic hepatitis B has also negative psychological impact on patients, which contributes to the poor prognosis.

Previous reports indicated higher prevalence of depression, anxiety, and mood disorders among hepatitis B patients, particularly in those with more severe forms of the disease, than general population (4-7). Poor psychological state of patients with chronic hepatitis B negatively affects patients' compliance to treatment and regardingly treatment outcome, and quality of life. Recent studies even suggested that psychological stress plays a role in the course of hepatitis B virus-related immune-pathogenesis (8). Therefore, multidisciplinary management including psychiatric counseling should be treatment of choice in patients with chronic hepatitis B (9).

It is well-known that individual personality characteristics determine the subject's power to cope with stress factors like chronic diseases (10, 11). However, the personality and temperament traits of patients diagnosed with chronic hepatitis B and its effect on depression and anxiety levels have not been studied so far.

Therefore, in this study, we aimed to evaluate the personality traits in patients with chronic hepatitis B in comparison to healthy subjects. We used Temperament and Character Inventory (TCI) for evaluation of personality trait of study participants. We also aimed to determine the anxiety and depression status of patients which were evaluated by Beck Anxiety Inventory (BAI) and Beck Depression Inventory (BDI), respectively, and whether there is a relation between personality trait and level of anxiety and depression.

MATERIALS AND METHODS

Study Design and Groups

This was a case-control study in which patients who had been under follow-up with diagnosis of chronic hepatitis B in the Department of Infection in Kahramanmaras Sutcu Imam University School of Medicine and in the Department of Clinical Microbiology and Infectious Diseases in Necmettin Erbakan University Meram Faculty of Medicine between December 2013 and May 2014, and healthy subjects were included in the case group (Group 1) and control group (Group 2), respectively. The control group was chosen among the patients without any chronic illness, admitted to outpatient clinic of the Family Medicine and Infection. Inclusion criteria for Group 1 were the

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		Group 1 (hepatitis B patients) (n=67)	Group 2 (healthy controls) (n=103)	Total (n=170)
Sex	Male	30 (44.8%)	53 (51.5%)	83 (48.8%)
	Female	37 (55.2%)	50 (48.5%)	87 (51.2%)
Age (years)		46.0±11.3	42.2±15.2	43.7±13.9
Marital status	Married	44 (65.6%)	70 (67.9%)	114 (67.1%)
	Single	19 (28.4%)	24 (23.3%)	43 (25.2%)
	Divorced/widowed	4 (6%)	9 (8.7%)	13 (7.6%)
Living place	Village	13 (19.4%)	25 (24.3%)	38 (22.4%)
	Town	22 (32.8%)	28 (27.2%)	50 (29.4%)
	City	32 (47.8%)	50 (48.5%)	83 (48.8%)
Education	Illiterate	20 (29.9%)	37 (35.9%)	57 (33.5%)
	Read and write	12 (17.9%)	19 (18.5%)	31 (18.2%)
	Primary school	31 (46.3%)	30 (29.1%)	61 (35.9%)
	High school	4 (6%)	17 (16.5%)	21 (12.4%)
Occupation	Working	35 (53.7%)	68 (66.0%)	103 (60.6%)
	Not working	32 (47.7%)	35 (33.9%)	67 (39.4%)

Data are presented as n (%) or mean±standard deviation.
p>0.05 for difference between Group 1 and 2 for all variables.

age of 18–65 years and diagnosis of chronic hepatitis B according to the Practice Guidelines of the American Association for the Study of Liver Diseases (AASLD) 2009 (12), and treatment with an oral antiviral agent (e.g. lamivudin, telbivudin, tenofovir, entecavir) for a minimum of 6 months.

Patients who have serious physical conditions (e.g. diabetes mellitus, congestive heart failure, debilitating neurological and rheumatologic conditions) , chronic conditions leading to immune system disorders (e.g. chronic diseases, malignancy, collagen tissue disease), positivity for human immunodeficiency virus, hepatitis C virus, or hepatitis D virus, symptoms of decompansated liver cirrhosis, history for treatment with pegylated interferon, ongoing suicidal thoughts, mental retardation, dementia or who have been under treatment with psychotropic drugs in the last month, being pregnant, were excluded from the study. Group 2 constituted of age- and sex-matched healthy subjects who had no psychiatric disease history.

The study was approved by the Institutional Ethics Committee of Kahramanmaras Sutcu Imam University School of Medicine and conducted in accordance to the latest version of Helsinki Declaration. All of the study participants were informed about the study and signed consent form before any study-related procedure.

Study Instruments

Socio-demographic data forms containing age, education, gender, marital status, residing place, smoking history, alcohol abuse, presence of other medical disorders were completed by the patients.

Study participants were asked to complete three self-report questionnaires—TCI to define personality traits, BDI and BAI to evaluate presence and severity of depression and anxiety. The questionnaires were completed alone or with the help of relatives in cases where the participant had inadequate education or was unable to understand the questions.

TCI is a 240-item questionnaire devised by Cloninger et al. (13). Cloninger's model examines the character dimension by 3 scales: Self-directedness (SD, total of 44 items), Cooperativeness (C, total of 42 items), and Self-transcendence (ST, total of 33 items). These scales are investigated by 5 subscales for SD as Responsibility (SD, 8 items), Purposefulness (SD2, 8 items), Resourcefulness (SD3, 5 items), Self-acceptance (SD4, 11 items), and Congruence (SD5, 12 items); 5 subscales for C as Social acceptance (C1, 8 items), Empathy (C2, 7 items), Helpfulness (C3, 8 items), Compassion (C4, 10 items), and Integrated conscience (C5, 9 items); 3 subscales for ST as Self-forgetfulness (ST1, 11 items), Trans-identification (ST2, 9 items), and Spiritual acceptance (ST3, 13 itens). Also examines the temperament dimension by 4 scales: Novelty seeking (NS,

total of 40 items), Harm avoidance (HA, total of 35 items), Reward dependence (RD, total of 38 items), and Persistence (P, 8 items). These scales are studied by, 4 subscales for NS as Exploratory (NS1, 11 items), Impulsiveness (NS2, 10 items), Extravagance (NS3, 9 items), and Disorderliness (NS4, 10 items); also 4 subscales for HA as Anticipatory worry or Pessimism (HA1, 11 items), Fear of uncertainty (HA2, 7 items), Shyness (HA3, 8 items), and Fatigability (HA4, 9 items); 3 subscales for RD as Sentimentality (RD1, 10 items), Attachment (RD3, 8 items), and Dependence (RD4, 6 items); no subscale for P (12, 15, 22).Each of these dimensions except persistence has sub-scales, and each question is answered as true or false. Psychometric studies showed high validity and reliability of Turkish version of TCI (14, 15).

BDI and BAI are among the most widely used psychometric tests for measuring the severity of depression and anxiety, respectively. Both are 21-item inventories that measure characteristic attitudes and symptoms of depression or anxiety (16, 17). Total scores of BDI and BAI range from 0 to 63, higher scores indicating more severe depression or anxiety symptoms. For BDI, a score of 0_13 indicates no depression, 14-19, mild depression, 20-28 moderate depression, 29-63 severe depression. For BAI, a score of 0-17 indicates no anxiety, 18-24 moderate anxiety, and ≥25 severe anxiety. The reliability and validity of Turkish versions of BDI and BAI have been shown previously (18, 19).

Statistical Analysis

For the analysis, the SPSS software package for Windows (Statistical Package for Social Sciences, version 16 SPSS Inc., Chicago, Illinois, USA) was used. Demographics of the participants and total and subscale scores of study instruments were summarized by using descriptive statistics (e.g. mean, standard deviation, frequency, percentage). Study groups were compared by independent samples Mann-Whitney U test for continuous data and by chi-square test for categorical variables. Spearman's correlation analysis was performed to evaluated the correlation between TCI, BAI and BDI scores. Statistical level of significance was defined as p<0.05.

RESULTS

Demographics

Group 1 consisted of 67 patients with hepatitis B (30 males, 37 females; mean age 46.0±11.3), and Group 2 was composed of 103 healthy subjects (50 females, 53 males; mean age 42.2±15.2 years) (Table 1). Among the groups, there were no statistically significant differences with regard to age, sex, marital status, living place, education, and occupation (p>0.05 for all, Table 1).

TCI Scores

Total and sub-scale scores of five out of seven dimensions of TCI—reward dependence, persistence, self-directedness, cooperativeness, and self-transcence—were significantly higher in Group 1 than Group 2 (p<0.05 for all, Table 2). Total scores of the remaining two dimensions, which are novelty seeking and harm avoidance, did not show significant difference between study groups, however, scores of one sub-scale of novelty seeking (exploratory) and one of harm avoidance (fear of uncertainty) were significantly higher in hepatitis B patients compared to healthy subjects (Table 2).

Table 2: *Temperament and Character Inventory (TCI) scores of study groups*

TCI dimensions	Group 1 (hepatitis B patients) (n=67)	Group 2 (healthy controls) (n=103)	p[a]
Novelty seeking			
Exploratory	6 (2-9) -9%	5 (1-9)-4.9%	*<0.001*
Impulsiveness	3 (0-6) -4.5%	3 (0-7)-2.9%	0.884
Extravagance	3 (0-8)- 4.5%	4 (0-9)-3.9%	*0.002*
Disorderliness	3 (0-8)-4.5%	3 (0-8)-2.9%	0.976
Total	15 (8-26)-22.4%	16 (4-25)-15.5%	0.839
Harm avoidance			
Anticipatory worry	5 (0-9)-7.5%	5 (1-10)-4.8%	0.782
Fear of uncertainty	4 (0-7)-5.9%	3 (0-7)-2.9%	*<0.001*
Shyness	3 (0-7)- 4.5%	3 (0-7) -2.9%	0.596
Fatigability	4 (0-9)- 5.9%	3 (0-7) -2.9%	0.084
Total	16 (4-28)-23.9%	15 (6-24)-14.6%	0.31
Reward dependence			
Sentimentality	8 (1-10)-11.9%	4 (0-7)-3.9%	*<0.001*
Attachment	4 (0-8)- 5.9%	3 (0-7) -2.9%	*<0.001*
Dependence	2 (0-5)-2.9%	2 (0-9)-1.9%	0.220
Total	14 (5-22)-20.9%	9 (0-19)-8.7%	*<0.001*
Persistence	5 (0-8)-7.5%	3 (0-7)-2.9%	*<0.001*
Self-directedness			
Responsibility	4 (1-8)-5.9%	4 (0-8)-3.9%	*0.054*
Purposefulness	6 (1-8)-9%	4 (0-8)-3.9%	*<0.001*
Resourcefulness	2 (0-5)-2.9%	3 (0-5) -2.9%	*0.022*
Self-acceptance	5 (1-10)-7.5%	4 (1-11) -3.9%	*0.013*
Congruence	8 (0-11)-11.9%	5 (0-12) -4.8%	*<0.001*
Total	25 (8-40)-37.3%	19 (3-40)-18.4%	*<0.001*
Cooperativeness			
Social acceptance	6 (1-8)- 9%	3 (0-8)- 2.9%	*<0.001*
Empathy	3 (0-7)- 4.5%	2 (0-7)- 1.9%	*0.001*
Helpfulness	5 (2-7)-7.5%	4 (1-7)- 3.9%	*<0.001*
Compassion	8 (1-10)- 11.9%	5 (1-10)- 4.8%	*<0.001*
Integrated conscience	7 (1-9)-10.4%	4 (1-9)- 3.9%	*<0.001*
Total	29 (7-38)-43.3%	18 (7-39)-17.5%	*<0.001*
Self-transcendence			
Self-forgetfulness	6 (1-11)- 9%	5 (0-10) - 4.8%	*0.001*
Trans-identification	5 (0-9)- 7.5%	4 (0-8) - 3.9%	*<0.001*
Spiritual acceptance	8 (0-12) 11.9%	5 (0-12) - 4.8%	*<0.001*
Total	19 (7-29)-28.4%	14 (2-28)-13.6%	*<0.001*

[a]Independent samples Mann-Whitney U test. p < 0.05: statistically significant; p < 0.001: statistically very significant.
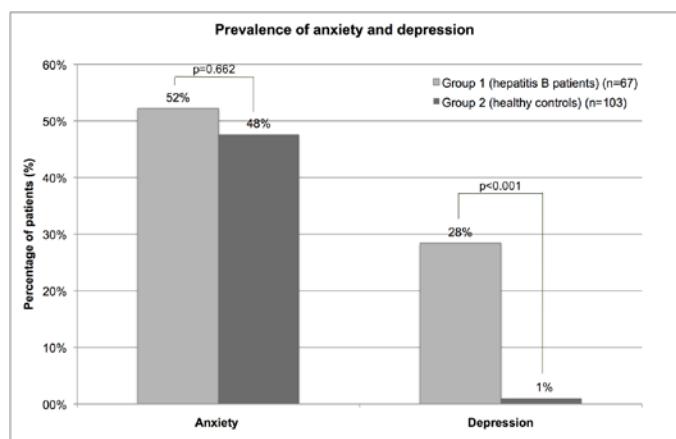Data are presented as median (min-max) and %

Figure 1: *Prevalence of anxiety (total BAI score ≥17) and depression (total BDI score ≥17) among study groups*

BAI and BDI Scores

Total BDI and BAI scores were significantly higher in Group 1 than Group 2 (p=0.029 and p=0.001, respectively, Table 3). When total BDI score was evaluated, 20 out of 170 study patients (11.8%) had a score of 17 or over without any significant difference between male and female participants (10.0% vs. 13.9%, respectively, p=0.301). Significantly more patients had a BDI score of 17 or over in Group 1 than Group 2 (28.4% vs. 1.0%, respectively, p<0.001). On the other hand, according to BAI scores, 84 of 170 study participants (49%) had anxiety, and there was no significant difference between hepatitis B patients and healthy subjects in terms of anxiety prevalence (52.2% vs. 47.6%, respectively; p=0.662) (Figure 1).

Table 3: *Beck Depression Inventory (BDI), and Beck Anxiety Inventory (BAI) scores of study groups*

	Group 1 (hepatitis B patients) (n=67)	Group 2 (healthy controls) (n=103)	p[a]
Total BAI score	12 (0-44)	10 (0-16)	*0.029*
Total BDI score	11 (0-34)	8 (0-19)	*0.001*

[a]Independent samples Mann-Whitney U test.
Data are presented as median (min-max).

Table 4: *Spearman's correlation coefficient (r$_s$) and significance (2-tailed) for the correlation between total scores of TCI dimensions and BAI/BDI scores in hepatitis B patients (Group 1, n=67)*

	Total BAI score	Total BDI score
Total scores of TCI dimensions		
Novelty seeking	rs=-0.020 p=0.874	rs=0.110 p=0.374
Harm avoidance	rs=0.245 *p=0.046*	rs=0.305 *p=0.012*
Reward dependence	rs=-0.088 p=0.477	rs=0.067 p=0.590
Persistence	rs=-0.169 p=0.170	rs=-0.145 p=0.241
Self-directedness	rs=-0.322 *p=0.008*	rs=-0.244 *p=0.047*
Cooperativeness	rs=-0.226 p=0.066	rs=-0.077 p=0.534
Self-transcendence	rs=-0.099 p=0.425	rs=-0.133 p=0.284
Total BAI score	-	rs=0.416 *p=0.001*

Correlation between TCI, BAI, and BDI Scores

Among chronic hepatitis patients, there was no significant correlation between total scores of any TCI dimensions and total BAI or BDI scores except a weak positive correlation between harm avoidance score and BAI score (rs=0.245, p=0.046) or BDI score (rs=0.305, p=0.012) and weak negative correlations between self-directedness and BAI score (rs=-0.322, p=0.008) or BDI score (rs=-0.244, p=0.047) (Table 4).

DISCUSSION

This is the first study on the temperament-personality trait of patients with chronic hepatitis B in comparison to healthy subjects. The main finding of the study was that patients with chronic hepatitis B exhibit a different personality trait from healthy population. There was- a weak positive correlation between harm avoidance and BDI, BAI - a weak negative correlation between self directedness and BDI, BAI. We also showed that anxiety and depression scores were higher in patients with chronic hepatitis B.

The temperament-personality trait of patients with chronic hepatitis B may help to predict ability of patient to cope with disease and to guide the decision making process of individualized treatment options such as psychotherapy for temperament and character issues.

In literature, some personality traits such as high harm avoidance and low self-directedness has been reported to be associated with chronic diseases (20). TCI is a commonly used valid instrument to identify personality profiles (13, 21). In the present study among the TCI dimensions, reward dependence, persistence, self-directedness, cooperativeness, and self-transcendence scores were higher in patients with chronic hepatitis B compared to age-matched heatlhy subjects. Thus, patients with chronic hepatitis B exhibit a different personality trait from healthy population. However, personality trait of patients with chronic hepatitis B was not similar to the patients with chronic diseases, which was high harm avoidance and low self-directedness (20).

Some TCI dimensions as high reward dependence, harm avoidance, persistence and low self directedness have been known to be related with anxiety and mood disorders (22, 23).

Tanaka et al. (24) reported that BDI score was significantly correlated with harm avoidance and self-directedness in both patients with eating disorders and controls. Castelli et al. (25) studied a cohort of 204 patients with hepatitis C infection and found that low self-directedness dimension of TCI may predict depression during management of hepatitis. On the other hand there is a long-standing discussion on the relation between anxiety/depression and personality trait, no specific personality trait related with the patients' level of depression or anxiety had been determined by Cloninger et al. (26). Therefore we determined the depression and anxiety level of hepatitis B patients in comparison to control group and evaluated their association with TCI dimensions in entire study population. We found that anxiety (BAI) and depression (BDI) scores were higher in patients with chronic hepatitis B. This finding was in line with previous studies indicating higher prevalence of depression and anxiety among hepatitis B patients than general population (4-7). Although, personality trait had no or weak correlation with anxiety and depression scores indicating that high TCI scores recorded in hepatitis B patients were independent of the patients' level of depression or anxiety similarly Cloninger and et al suggested. Neverthelesshigher harm avoidance, persistence and reward dependence scores may be the cause of anxiety and depression levels of hepatit B patients. In this regard longitudinal studies will shed light on the subject.

The main limitations of the study that needs to be noted were the small sample size and cross-sectional study design that precludes us reaching a definitive conclusion on the role of personality trait in the mood of patients with chronic hepatitis B. **The other limitation was the face to face psychiatric interview was not carried out with patients.** However, this is the first study in literature on the personality traits of patients with hepatitis B in comparison to heathy subjects and shows that personality trait of hepatitis B patients differs from healthy subjects. The findings of this study and the cause and effect of personality trait in hepatitis B patients should be confirmed by further prospective studies comparing patients with different personality traits for development of mood disorders.

In conclusion, in terms of personality trait, patients with chronic hepatitis B exhibit higher reward dependence, persistence, self-directedness, cooperativeness, and self-transcendence from healthy population. Chronic hepatitis B patients had high prevalence of depression and anxiety, but personality trait of patients had no or weak correlation with anxiety and depression scores. The personality traits of patients should be considered during the management of hepatitis B in order to optimize treatment outcome and to prevent development of new mental health problems during the course of the disease.

CONFLICT OF INTEREST DISCLOSURE

Authors declared no conflicts of interest.

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