Research Article

25

Doi: 10.4274/vhd.2017.0016
Viral Hepatitis Journal 2018;24(2):25-42

Assessment of Quality of Life of Patients with Chronic Hepatitis B and C Treated with Pegylated Interferon-alpha

Kronik Hepatit B ve Hepatit C'de Pegile İnterferon-alfa Tedavisi Alan Hastalarda Yaşam Kalitesinin Değerlendirilmesi

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ABSTRACT

Objectives: It was aimed to evaluate health-related quality of life of patients with non-cirrhotic chronic hepatitis B (CHB) and chronic hepatitis C (CHC) during interferon therapy with the standard short form-36 (SF-36).

Materials and Methods: This study included all patients who attended the Atatürk University Faculty of Medicine, Department of Infectious Diseases and Clinical Microbiology and outpatient clinics for treatment between June 2008 and June 2010 and met the inclusion criteria. A socio-demographic data questionnaire and SF-36 were administered in all subjects before the interferon therapy and in the third and sixth months of the treatment.

Results: Before the treatment, vitality/energy (p=0.01) and general health (p=0.01) scores in patients with CHB were lower than in controls. In the sixth month of the therapy, physical function (p=0.03), role physical (p=0.011), role emotional (p=0.003) and vitality/energy (p=0.005) scores were significantly lower than in controls. There was a significant difference in physical function (p=0.006), role physical (p=0.006), role emotional (p=0.001) and vitality/energy (p=0.000005) scores before the treatment and physical function (p=0.006), role physical (p=0.013), role emotional (p=0.001), vitality/energy (p=0.000005) and mental health (p=0.041) scores in the third month of the treatment and physical function (p=0.000008), social function (p=0.005), role physical (p=0.0000008), role emotional (p=0.000007), mental health (p=0.001) and vitality/energy (p=0.000005) scores in the sixth month of the treatment between patients with CHC and controls.

Conclusion: Providing guidance and counseling to patients with CHB and CHC about their illness and side effects of the drugs will increase health-related quality of life of patients and will adapt them to their treatment.

Keywords: Chronic hepatitis B, chronic hepatitis C, health-related quality of life, interferon therapy

ÖZ

Amaç: Non-sirotik kronik hepatit B (KHB) ve kronik hepatit C'li (KHC) hastalarda interferon tedavisi süresince kısa form 36 (SF-36) standart formunu kullanarak sağlıkla ilgili yaşam kalitesini değerlendirmek amaçlanmıştır.

Gereç ve Yöntemler: Çalışmaya Haziran 2008 - Haziran 2010 tarihleri tarihleri arasındaki 2 yıllık süre boyunca Atatürk Üniversitesi Tıp Fakültesi, Enfeksiyon Hastlıkları ve Klinik Mikrobiyoloji Anabilim Dalı'na ve polikliniğine başvuran ve çalışmaya dahil edilme kriterlerini karşılayan olgular alındı. Çalışmaya dahil edilen tüm olgulara, interferon tedavisi öncesinde, tedavinin üçüncü ayında ve tedavinin altıncı ayında, sosyo-demografik veri formu ve SF-36 ölçeği uygulandı.

Bulgular: KHB'li hastaların tedavi öncesi enerji (p=0,01) ve genel sağlık (p=0,01) skorlarını; tedavinin altıncı ayında fiziksel fonksiyon (p=0,03), fiziksel rol (p=0,011), emosyonel rol (p=0,003) ve enerji (p=0,005) skorlarını kontrol grubuna göre anlamlı düzeyde daha düşüktü. KHC'li hastaların tedavi öncesi fiziksel fonksiyon (p=0,006), fiziksel rol (p=0,006), emosyonel rol (p=0,001) ve enerji (p=0,000005) skorlarında; tedavinin üçüncü ayında fiziksel fonksiyon (p=0,006), fiziksel rol (p=0,013), emosyonel rol (p=0,001), mental sağlık (p=0,041) ve enerji (p=0,000005) skorlarında; tedavinin altıncı ayında ise fiziksel fonksiyon (p=0,000008), sosyal fonksiyon (p=0,005), fiziksel rol (p=0,0000008), emosyonel rol (p=0,000007), mental sağlık (p=0,001) ve enerji (p=0,000005) skorlarında kontrol grubuna göre anlamlı düzeyde farklı olduğu saptanmıştır.

Sonuç: Hastalara hastalıkları ve ilaçların yan etkileriyle ilgili rehberlik ve danışmanlık hizmetlerinin verilmesi hastaların yaşam kalitelerini artırıp, tedavi uyumunu sağlayacaktır.

Anahtar Kelimeler: Kronik hepatit B, kronik hepatit C, sağlıkla ilgili yaşam kalitesi, interferon tedavisi

Alay H, Özden K, Erol S, Çelik N, Parlak E, Parlak M. Assessment of Quality of Life of Patients with Chronic Hepatitis B and C Treated with Pegylated Interferon-alpha. Viral Hepat J. 2018;24:25-42.

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Introduction

The two most common viruses capable of causing chronic infection in the liver and associated complications are hepatitis B virus (HBV) and hepatitis C virus (HCV) (1). These are also the most important causes of chronic hepatitis in Turkey and other regions of the world. According to the World Health Organization, approximately 350-400 million people worldwide carry the virus and 1-2 million people a year die of HBV infection or complications (2). HCV infection is a widespread and severe health problem worldwide. The global prevalence of HCV infection is 3%, and 210 million people are infected (3). Quality of life is a subjective concept, and difficult to define and measure. Chronic liver disease is generally asymptomatic, but may exhibit systemic symptoms such as fatigue, nausea, pruritus, lack of appetite and psychological disorders. A significant impairment in health-related quality of life (HRQoL) may occur in this patient group (4). The majority of studies of HRQoL in chronic viral hepatitis have been concerned with HCV infection, while the number of studies concerning HBV infection is limited. Several studies of patients infected with HCV have determined a significant decrease in HRQoL compared to controls (5,6). Interferon alpha (IFN-α) is the first cytokine produced by recombinant DNA technology and is used in the treatment of numerous malignant and non-malignant diseases. Diseases treated using IFN-α include hepatitis B and C. Quality of life of patients with chronic hepatitis B (CHB) and chronic hepatitis C (CHC) under IFN therapy is known to be adversely affected (4). The purpose of this study was to evaluate HRQoL scores of naive CHB and CHC patients in the infectious diseases and clinical microbiology clinic before pegylated IFN (PEG-IFN) therapy and at the 3rd and 6th months of treatment and to investigate the effect of IFN therapy on quality of life by comparing these with the scores of healthy controls.

Materials and Methods

Research Type and Sample

Twenty-eight treatment-naive patients with HBV infection with alanine aminotransferase (ALT) levels twice as high as normal for 6 months, hepatitis B surface antigen (HBsAg)+, hepatitis B e antigen (HBeAg)+/-, with HBV-DNA $\geq 10^4$ copies/mL and no clinical findings of cirrhosis, and 23 non-cirrhotic CHC patients, anti-HCV+, with determinable HCV-RNA levels, presenting to and treated in the infectious diseases and clinical microbiology clinic between June 2008 and June 2010 were included in this prospective clinical study. Fifty-one subjects with no underlying chronic disease were enrolled as the control group. All cases were selected from among individuals aged 17-69 years.

The participants were informed about the study at interviews before commencement, and informed consent was received from all. The study was approved by Atatürk University Faculty of Medicine Ethics Committee (approval number: 65/2008). A socio-demographic data questionnaire was used in order to determine subjects' socio-demographic and disease characteristics, and the 36-Item Short Form-36 (SF-36) Health Survey was administered in order to measure quality of life. The face-to-face interview technique was used for data collection. The forms were administered verbally by a researcher, and the subjects were asked to indicate the option best matching their own circumstances.

Definitions Used in the Research

Patient group: Treatment-naive non-cirrhotic patients with HBV infection, with an at least 2-fold increase in ALT levels in the previous 6 months, HBsAg+, HBeAg+/-, HBV-DNA $\geq 10^4$ copies/mL with polymerase chain reaction (PCR) and with necroinflammatory activity ≥ 4 and/or fibrosis ≥ 2 in liver biopsy, and naive patients diagnosed with chronic non-cirrhotic HCV infection, anti-HCV+ and with HCV-RNA capable of determination with PCR were included in the study. Patients with chronic HBV and HCV infection were started on PEG-IFN α-2a therapy.

Control group: Subjects with no underlying chronic disease.

Socio-demographic Data Form

A socio-demographic form consisting of nine questions was employed to determine subjects' sex, marital status, number of children, place of residence, education level, and occupation.

The 36-Item Short Form Health Survey

The SF-36 was developed by the Rand Corporation for assessing HRQoL (7). The form has been translated into Turkish and its validity and reliability have been confirmed (8,9). The scale is a generic, self-report outcome measure. It consists of 36 items measuring eight domains-physical functioning, social functioning, physical role limitations, emotional role limitations, mental health, energy/vitality, bodily pain and general health perception. It can evaluate the positive aspects of health status, as well as negative aspects (10). The SF-36 scoring requires a separate guideline. Subdomain score calculation can be performed with a series of procedures (10). Scores range from 0 (worst possible health) to 100 (best possible health), with higher scores indicating a better quality of life. All sections are scored independently (7).

Application Procedure

Patients presenting to the Atatürk University Faculty of Medicine Infectious Diseases and Clinical Microbiology Clinic between June, 2008 and June, 2010 and meeting the inclusion criteria were enrolled. All subjects enrolled were administered a socio-demographic data questionnaire and the SF-36 before IFN therapy and on the 3rd and 6th months of treatment.

Statistical Analysis

All the study data were coded numerically and subjected to the One-Way Analysis of Variance and the Mann-Whitney U test in a computer environment using the Statistical Package for Social Sciences (SPSS) v.18.0. A p value of less than 0.05 was considered statistically significant.

Results

Socio-demographic Characteristics

Socio-demographic characteristics of the patients are presented in Table 1.

Quality of Life Scores

Physical functioning, social functioning, physical role limitations, emotional role limitations, mental health, energy/vitality, bodily pain and general health perception scores based on responses to the questions in the SF-36 were obtained for the patient group consisting of patients with HBV and HCV and receiving PEG-IFN

therapy and for the control group consisting of healthy adults. Physical functioning (p=0.007), physical role limitations (p=0.008), emotional role limitations (p=0.007), vitality/energy (p=0.001), and general health (p=0.001) scores before treatment in the patient group were statistically significantly lower than in the control group. On the 3rd month of treatment, a statistically significant decrease was observed in the physical role limitations (p=0.03), emotional role limitations (p=0.01) and vitality/energy (p=0.002) scores in the patient group. On the 6th month of treatment, a statistically significant decrease was determined in the physical functioning (p=0.001), physical role limitations (p=0.004), emotional role limitations (p=0.004), mental health (p=0.004) and vitality/energy (p=0.0003) scores. When quality of life scores of patients with CHB and CHC were compared with pre-treatment values, a statistically significant decrease was determined in the emotional role limitations scores (p=0.027) in patients with CHC. A statistically significant decrease was also observed in the physical functioning (p=0.042) and social functioning (p=0.042) scores in patients with CHC on the 6th month of treatment. When we compared the pre-treatment HRQoL scores of patients with CHB and controls, we determined statistically significantly lower vitality/energy (p=0.01) and general health (p=0.01) scores in the patient group than in controls. On the 6th month of treatment, statistically significant differences were determined in the physical functioning (p=0.03), physical role limitations (p=0.011), emotional role limitations (p=0.003) and vitality/energy (p=0.006) scores in patients with CHB. When we compared the pre-treatment HRQoL scores of patients with CHC and controls, we determined statistically significantly lower physical functioning (p=0.006), physical role limitations (p=0.006), emotional role limitations (p=0.001), vitality/energy (p=0.000005), and general health (p=0.003) scores in patients with chronic hepatitis. A statistically significant decrease was determined in physical functioning (p=0.006), physical role limitations (p=0.013), emotional role limitations (p=0.001), mental health (p=0.041) and vitality/energy (p=0.000005) scores in patients with hepatitis C on the 3rd month of treatment. On the 6th month of treatment, statistically significant decreases were observed in physical functioning (p=0.000008), social functioning (p=0.005), physical role

Table 1. Socio-demographic characteristics of the groups

		Groups								p			
		Patient (all)		CHB		CHC		Control					
		Number	%	Number	%	Number	%	Number	%	Patient-control	CHB-CHC	CHB-control	CHC-control
Gender	Female	24	47.1	8	28.6	16	69.6	24	47.1	1	0.778	0.108	0.068
	Male	27	52.9	20	71.4	7	30.4	27	52.9				
Marriage status	Married	37	72.5	20	71.4	17	73.9	42	82.4	0.348	0.691	0.574	0.321
	Single	12	23.5	8	28.6	4	17.4	7	13.7				
	Widowed	2	3.9	0	0	2	8.7	2	3.9				
Place of residence	Province/city	26	51	13	46.4	13	56.5	17	33.3	0.901	0.644	0.858	0.675
	District	9	17.6	6	21.4	3	13	26	51				
	Town/village	16	31.4	9	32.2	7	30.5	8	15.7				
Educational status	Illiterate	9	17.6	2	7.1	7	30.4	6	11.8	0.862	0.082	0.413	0.216
	Literate	5	9.8	2	7.1	3	13	10	19.6				
	Elementary school	22	43.2	15	53.7	7	30.4	19	37.3				
	High school	11	21.6	7	25	4	17.5	12	23.5				
	University	4	7.8	2	7.1	2	8.7	4	7.8				
Occupations	Unemployed	2	3.9	2	7.1	0	0	2	3.9	0.507	0.247	0.237	0.848
	Seasonal agricultural worker	1	2	0	0	1	4.3	2	3.9				
	Employee	6	11.8	3	10.7	3	13	8	15.7				
	Housewife	20	39.2	7	25	13	56.5	18	35.3				
	Worker	2	3.9	2	7.1	0	0	7	13.7				
	Self-employment	10	19.6	8	28.6	2	8.7	6	11.8				
	Student	5	9.8	2	7.1	3	13	2	3.9				
	Other	5	9.8	4	14.3	1	4.3	6	11.8				

CHB: Chronic hepatitis B, CHC: Chronic hepatitis C

limitations (p=0.0000008), emotional role limitations (p=0.000007), mental health (p=0.001) and vitality/energy (p=0.000005) scores. Mean values, standard deviation and p values obtained for all groups in the study before and after 3 and 6 months of treatment are shown in Table 2. Distribution of SF-36 scores by socio-demographic properties of patients is summarized in Table 3. Distribution of SF-36 scores by socio-demographic properties of CHB patients in treatment periods is summarized in Table 4. Distribution of SF-36 scores by socio-demographic properties of CHC patients in treatment periods is summarized in Table 5.

Discussion

Patients with chronic hepatitis are generally asymptomatic, but may also exhibit systemic symptoms, such as fatigue, nausea, pruritus, lack of appetite and psychological disorders. A significant impairment in HRQoL may occur in this patient group. The majority of studies of HRQoL in chronic viral hepatitis have been concerned with HCV infection, while the number of studies concerning HBV infection is limited (4). HRQoL of patients with chronic hepatitis may vary depending on their socio-demographic characteristics. Numerous studies have shown that sex, marital status, education level, occupation and place of residence affect HRQoL of HBV- and HCV-infected patients. In agreement with the previous literature, we determined a significant decrease in female patients with chronic hepatitis (11,12,13,14,15,16,17,18, 19,20). Women with chronic disease are known to receive less social support than men in many parts of the world. In addition, they generally receive medical care later than males; they either have to work, or else have to resume their responsibilities without being fully recovered (21). These may all account for the decrease in HRQoL of female patients with chronic hepatitis. In agreement with previous studies, we determined lower HRQoL scores in individuals infected with HCV (22,23). Being married and having social and individual responsibilities may affect HRQoL. No significant change in HRQoL and only a weak correlation between marital status and HRQoL was observed in married patients

Table 2. Evaluation of short form-36 scores of patients in treatment periods

Before treatment								
	Physical functioning		**Social functioning**		**Physical role**		**Emotional role**	
		p		**p**		**p**		**p**
	Avg. ± SD	**Median; IQR**	**Avg. ± SD**	**Median; IQR**	**Avg. ± SD**	**Median; IQR**	**Avg. ± SD**	**Median; IQR**
Patient	63.1±34	0.007	81.3±25.5	0.472	43.6±46.1	0.008	36.8±34.8	0.007
Control	81.8±23.3	70;60	85±17.8	100;33.33	67.2±42	25;100	55±29.2	25;75
CHB	68.8±34	0.197	82.1±26.4	0.789	52.7±46.8	0.123	46.4±33.8	0.027
CHC	56.3±33.5	90;30	80.2±24.8	88.9;22.2	32.6±43.6	100;75	25±32.9	75;25
CHB	68.8±34	0.05	82.1±26.4	0.613	52.7±46.8	0.168	46.4±33.8	0.28
Control	81.8±23.3	82.5;48.75	85±17.8	100;30.56	67.2±42	62.5;100	55±29.2	25;25
CHC	56.3±33.5	0.006	80.2±24.8	0.451	32.6±43.6	0.006	25±32.9	0.001
Control	81.8±23.3	60;60	85±17.8	100;77.78	67.2±42	0;100	55±29.2	0;75
3rd months of treatment								
Patient	69.1±45.3	0.06	78±30	0.177	48±47.1	0.03	38.2±36.9	0.01
Control	81.8±23.3	80;55	85±17.8	100;44.44	67.2±42	25;100	55±29.2	25;75
CHB	78±30	0.122	80.2±29.5	0.575	52.7±46.3	0.444	44.6±36.2	0.173
CHC	58.3±57.8	90;30	75.4±31.1	88.9;22.22	42.4±48.5	100;75	30.4±36.9	75;25
CHB	78±30	0.573	80.2±29.5	0.389	52.7±46.3	0.168	44.6±36.2	0.192
Control	81.8±23.3	95;41.25	85±17.8	100;41.67	67.2±42	62.5;100	55±29.2	75;75
CHC	58.3±57.8	0.006	75.4±31.1	0.097	42.4±48.5	0.013	30.4±36.9	0.001
Control	81.8±23.3	65;90	85±17.8	100;44.44	67.2±42	0;100	55±29.2	0;75
6th months of treatment								
Patient	59.2±31.6	0.001	76.7±28.8	0.109	31.9±42.4	0.004	23.5±32.9	0.004
Control	81.8±23.3	60;55	85±17.8	88.88;44.44	67.2±42	0;75	55±29.2	0;75
CHB	67.3±27.4	0.042	83.7±23.7	0.042	40.2±44.3	0.124	31.3±36.4	0.064
CHC	49.3±34.1	90;30	68.1±32.5	88.9;22.2	21.7±38.7	100;75	14.1±25.9	75;25
CHB	67.3±27.4	0.03	83.7±23.7	0.824	40.2±44.3	0.011	31.3±36.4	0.003
Control	81.8±23.3	75;52.5	85±17.8	100;30.56	67.2±42	25;100	55±29.2	0;75
CHC	49.3±34.1	0.000008	68.1±32.5	0.005	21.7±38.7	0.0000008	14.1±25.9	0.000007
Control	81.8±23.3	55;55	85±17.8	77.77;55.56	67.2±42	0;25	55±29.2	0;25

with chronic viral hepatitis B in previous studies. In the present study also, no significant changes in HRQoL were determined in this patient group. A low education level is another demographic characteristic that affects HRQoL. As also shown in several studies, HRQoL was statistically significantly affected before and during treatment in our chronic hepatitis patients with a low level of education (13,16). Housewives have been determined to have the lowest scores and clerical workers the highest in all areas of HRQoL (17). Low physical functioning, physical role limitations, general health and emotional role limitations scores have been determined among unemployed patients with CHB and CHC (13). In our study, pre-treatment physical functioning and 3rd month physical role limitations scores in patients with CHB were lower among housewives. Among the patients with CHC, a significant decrease was observed only in the mental health scores in agricultural workers at the 6th month of treatment. The effect of IFN therapy in terms of occupations of patients with chronic viral hepatitis is unclear, and no benchmark has been determined. However, the numerous side-effects of IFN and ribavirin may be described as an adverse physical impact. Lam et al. (11) showed a significant level of variation in HRQol scores in patients with CHB in the categories of physical role limitations, bodily pain, energy/vitality, social functioning and emotional role limitations. In a similar study of patients with hepatitis B and C and healthy controls, Ozkan et al. (13) observed a particularly significant decrease in the physical functioning and mental health domains in patients with HBV infection compared to controls. Several studies have reported lower HRQoL scores in patients with HBV and HCV infection compared to healthy controls (11,12,13,24,25). In the present study, we determined lower HRQoL scores in patients with HBV infection compared to healthy controls. Patients with CHC have more severe and more frequent symptoms of musculoskeletal pain, malaise and fatigue compared with other forms of chronic liver disease (14,26). Several studies have shown a decrease in HRQoL scores in all categories in patients with hepatitis C compared to controls (12,13,22,24). In this

Table 2. Continued

Before treatment								
	Mental health		**Energy**		**Bodily pain**		**General health**	
		p		**p**		**p**		**p**
	Avg .± SD	**Median; IQR**	**Avg. ± SD**	**Median; IQR**	**Avg. ± SD**	**Median; IQR**	**Avg. ± SD**	**Median; IQR**
Patient	59.8±23.3	0.37	39.1±29.8	0.001	59.5±31.8	0.446	45.5±21	0.001
Control	63.8±21.5	60;40	57.9±22.4	30;60	63.8±20.5	55.55;55.55	59.9±18.8	46;27.5
CHB	62.9±24.2	0.3	41.6±33.9	0.516	66.3±33.5	0.093	47.1±22.3	0.562
CHC	56±21.9	64;28	36.1±24.2	60;30	54.2±28.2	66.7;33.4	43.6±19.6	57.5;20
CHB	62.9±24.2	0.865	41.6±33.9	0.01	66.3±33.5	0.712	47.1±22.3	0.01
Control	63.8±21.5	68;36	57.9±22.4	30;63.75	63.8±20.5	77.77;66.67	59.9±18.8	47.25;19.75
CHC	56±21.9	0.284	36.1±24.2	0.000005	54.2±28.2	0.132	43.6±19.6	0.003
Control	63.8±21.5	60;44	57.9±22.4	30;40	63.8±20.5	44.44;44.44	59.9±18.8	45;32.5
3rd months of treatment								
Patient	56.9±24.4	0.127	41±30	0.002	61±29	0.621	54.8±24	0.242
Control	63.8±21.5	64;28	57.9±22.4	45;50	63.8±20.5	66.66;44.44	59.9±18.8	53.5;35
CHB	60.7±25	0.227	45.9±29.9	0.2	65.9±29.8	0.189	56.2±23.8	0.642
CHC	52.3±23.4	64;28	35±29.7	60;30	55.1±27.5	66.7;33.4	53±24.5	57.5;20
CHB	60.7±25	0.569	45.9±29.9	0.06	65.9±29.8	0.758	56.2±23.8	0.476
Control	63.8±21.5	64;24	57.9±22.4	50;50	63.8±20.5	72.22;55.56	59.9±18.8	54.75;35
CHC	52.3±23.4	0.041	35±29.7	0.000005	55.1±27.5	0.229	53±24.5	0.149
Control	63.8±21.5	52;40	57.9±22.4	40;60	63.8±20.5	44.44;55.56	59.9±18.8	53.5;35
6th months of treatment								
Patient	50.9±20.6	0.004	35.6±28	0.0003	52.7±32.5	0.05	56.5±24.8	0.439
Control	63.8±21.5	52;32	57.9±22.4	40;100	63.8±20.5	55.55;55.56	59.9±18.8	62.5;41
CHB	56±20.9	0.05	39.5±28.4	0.279	54.4±32.1	0.695	57.2±26	0.833
CHC	44.7±18.8	64;28	30.9±27.3	60;30	50.7±33.6	66.7;33.4	55.7±23.9	57.5;20
CHB	56±20.9	0.149	39.5±28.4	0.006	54.4±32.1	0.153	57.2±26	0.6
Control	63.8±21.5	60;23	57.9±22.4	45;50	63.8±20.5	50;61.11	59.9±18.8	66;41.88
CHC	44.7±18.8	0.001	30.9±27.3	0.000005	50.7±33.6	0.063	55.7±23.9	0.352
Control	63.8±21.5	48;32	57.9±22.4	30;50	63.8±20.5	55.55;55.56	59.9±18.8	60;40

CHB: Chronic hepatitis B, CHC: Chronic hepatitis C, IQR: Interquartile range, SD: Standard deviation, IQR: Interquartile range, Avg.: Average

Table 3. Distribution of short form-36 scores by socio-demographic properties of patients

Before treatment		Physical functioning		Social functioning		Physical role		Emotional role	
		Avg. ± SD	p	Avg. ± SD	p	Avg. ± SD	p	Avg. ± SD	p
		M; IQR		M; IQR		M; IQR		M; IQR	
Gender	Male	82.7±23.3	0.0003	87.7±18.4	0.03	64.8±42.5	0.03	52.8±29.4	0.02
		(95;26.25)		(100;22.22)		(100;81.25)		(75;50)	
	Female	82.7±33.7		78±24.5		44.8±46.7		38±35.7	
		(65;60)		(77.8;44.4)		(25;100)		(25;75)	
Marriage status	Married	56.6±35.4	0.298	80.8±25.9		36.5±44.3	0.46	33.8±35	0.99
		(80;55)		(89.9;33.3)		(50;100)		(75;75)	
	Single	82.5±24.3		81.5±26.9		64.6±45.8		43.8±35.6	
		(95;20)		(100;22.2)		(100;100)		(75;75)	
	Widow/widower	67.5±10.6		88.9±15.7	0.92	50±70.7		50±35.4	
		(75;22.5)		(88.8;47.26)		(62.5;93.75)		(50;68.75)	
Education	Illiterate	47.3±21.7	0.003	79.3±21.4	0.91	30±39.2	0.01	28.3±35.2	0.02
		(45;35)		(77.8;44)		(0;75)		(0;75)	
	Literate	72.3±27.4		80.7±24.7		58.3±47.9		48.3±33.4	
		(80;40)		(88.9;33.3)		(100;100)		(75;75)	
	Elementary school	72.6±33.3		84.6±23		48.2±46.9		42.7±33.7	
		(85;42.5)		(100;22.22)		(25;100)		(50;75)	
	High school	85±23.3		85±21.6		78.3±34.8		63±23.7	
		(100;30)		(100;22.22)		(100;25)		(75;25)	
	University	83.1±30.5		81.9±15.6		68.8±45.8		40.6±35.2	
		(95;18.75)		(83.35;27.78)		(100;87.5)		(50;75)	
Place of residence	Province/city	66.3±32.7	0.426	85.5±25.3	0.39	51.9±46.3	0.1	46.2±34.4	0.72
		(95;40)		(100;22.22)		(100;100)		(75;50)	
	District	58.9±37.9		72.8±30.5		44.4±48.1		33.3±35.4	
		(75;50)		(77.8;33.3)		(50;100)		(50;75)	
	Town/village	60.3±35.7		79.2±22.9		29.7±44		23.4±32.2	
		(80;48.75)		(88.88;33.32)		(12.5;100)		(25;75)	
3rd month of treatment									
Gender	Male	84.1±26.2	0.01	84.6±23.6	0.18	67.6±42	0.02	55.6±29	0
		(100;25)		(100;24.99)		(100;75)		(75;31.25)	
	Female	65.7±43.6		78±25.9		46.4±47		36.5±36.8	
		(72.5;57.5)		(88.89;41.63)		(25;100)		(25;75)	
Marriage status	Married	68.2±48.4	0.118	79.9±29.6	0.46	44.6±49.3	0.29	35.8±37.1	0.22
		(85;45)		(100;33)		(75;100)		(75;75)	
	Single	83.3±23.9		75±29.6		66.7±35.9		52.1±34.5	
		(100;30)		(89.9;22.22)		(100;75)		(75;75)	
	Widow/widower	0±0		61.1±55		0±0		0±0	
		(36.5;86.25)		(72.22;72.23)		(12.5;81.25)		(0;56.25)	
Education	Illiterate	36±32.2	0.003	74.1±30.2	0.35	16.7±34.9	0.02	20±34.3	0.02
		(35;70)		(77.8;44)		(0;0)		(0;75)	
	Literate	74.7±30.3		84.4±22.1		58.3±47.9		46.7±35.2	
		(90;30)		(100;33.3)		(100;100)		(75;75)	
	Elementary school	83.7±38.6		85.4±21.3		63.4±44.1		51.8±31.8	
		(95;35)		(100;38.87)		(100;87.5)		(75;50)	
	High school	86.5±21.1		81.6±26.3		73.9±38		55.4±30.1	
		(100;20)		(88.9;22.22)		(100;50)		(75;50)	
	University	76.9±34		69.4±30.1		56.3±49.6		43.8±37.2	
		(90;33.75)		(77.78;52.79)		(75;100)		(62.5;75)	
Place of residence	Province/city	64±37.8	0.213	76.9±30.6	0.58	49±46.6	0.33	39.4±36.9	0.63
		(95;35)		(88.9;22.22)		(100;100)		(75;75)	
	District	59.4±45.7		67.9±34.4		30.6±46.4		25±37.5	
		(75;55)		(77.8;44.4)		(50;100)		(50;75)	
	Town/village	82.8±55.2		85.4±26.2		56.3±48.7		43.8±37.1	
		(85;28.75)		(100;30)		(100;100)		(75;75)	

Table 3. Continued

Before treatment		Mental health	p	Energy	p	Bodily pain	p	General health	p
		Avg. ± SD		Avg. ± SD		Avg. ± SD		Avg. ± SD	
		M; IQR		M; IQR		M; IQR		M; IQR	
Gender	Male	65.1±20.5	0.11	53.2±28.5	0.07	69.5±24.1	0	57.5±20.9	0.02
		(68;28)		(50;45)		(77.77;47.22)		(55.5;24.13)	
	Female	58±24		43.2±26.4		52.8±27		47.4±20.2	
		(60;40)		(40;43.75)		(55.57;44.44)		(48.5;33)	
Marriage status	Married	56.1±22.5	0.57	30.9±26.7	0.08	55±31.7	0.03	43.9±21.1	0.88
		(60;36)		(50;50)		(55.6;33.4)		(52.5;26)	
	Single	69.7±25.3		59.2±29.1		74.1±30.1		50±22.2	
		(72;44)		(70;50)		(78.8;44.44)		(48.5;22.5)	
	Widow/widower	68±0		70±14.1		55.6±31.4		48.8±15.9	
		(68;6)		(67.5;18.75)		(38.86;44.45)		(55;22)	
Education	Illiterate	49.6±19.2	0.25	38.7±24.4	0.48	43.7±23.9	0.56	43.4±20.2	0.38
		(52;28)		(40;45)		(44.44;44.5)		(38.8;45)	
	Literate	65.1±22.1		53.3±28.2		63±20.4		54.8±15.9	
		(68;36)		(55;55)		(77.77;33.4)		(52.5;17.5)	
	Elementary school	64.5±22.3		46.6±30.4		62.9±27.8		52.6±22.1	
		(68;38)		(40;55)		(55.6;38.92)		(53.5;24.75)	
	High school	63±22.1		53.3±27.3		69.6±27.1		55.3±24.5	
		(38;28)		(50;30)		(66.7;44.44)		(56;21)	
	University	61±26.8		54.4±20.1		63.9±25.7		59.4±12.3	
		(72;43)		(57.5;36.25)		(55.57;50.04)		(48.8;17)	
Place of residence	Province/city	60.3±24.1	0.36	42.7±29.5	0.44	65.4±32.3	0.1	49.4±21.3	0.09
		(68;40)		(50;40)		(77.77;44.44)		(53.5;28.5)	
	District	56.4±22.8		39.4±39.1		65.4±32.1		44.2±28	
		(60;28)		(50;45)		(55.6;33.4)		(55;26)	
	Town/village	60.8±23.4		33.1±25		46.5±28.8		39.8±15.2	
		(66;35)		(47.5;55)		(50;44.47)		(46.75;15.5)	
3rd month of treatment									
Gender	Male	60.2±24.4	0.95	52.5±27.6	0.24	69.8±22.3	0	60.1±22.3	0.17
		(66;32)		(52.5;32.5)		(77.77;36.11)		(60;31)	
	Female	60.5±21.9		46±27.7		54.2±25.6		54.2±20.4	
		(64;26)		(50;38.75)		(55.6;55.56)		(52.25;24.38)	
Marriage status	Married	54.7±24.3	0.75	38.6±29.9	0.7	59.5±29.4	0.01	55.5±24.2	0.71
		(64;24)		(50;40)		(55.6;33.36)		(57.5;28.5)	
	Single	61.7±26.6		52.5±29		70.4±26.9		55±24.6	
		(64;48)		(55;50)		(77.77;22.22)		(51;16)	
	Widow/widower	70±2.8		15±21.2		33.3±15.7		40.5±18.4	
		(70;7)		(43;63.75)		(32.33;22.21)		(51.75;27.88)	
Education	Illiterate	54.1±21.4	0.36	32±24.8	0.03	43.7±24.7	0.01	46.4±20.2	0.33
		(56;24)		(30;50)		(44.44;44.48)		(42.5;27.5)	
	Literate	66.9±22		55.7±28.5		60.7±23		60.7±15.6	
		(72;28)		(60;35)		(66.66;33.4)		(57.5;22.5)	
	Elementary school	63±22.4		52.9±27.3		66.4±25.3		58.9±22.4	
		(64;30)		(60;45)		(66.66;44.46)		(60;28.5)	
	High school	58.8±25.1		55.2±26.9		69.6±21		59.1±24	
		(68;32)		(60;30)		(66.7;33.29)		(56;16)	
	University	50.5±26		36.3±23.7		59.7±26.5		58.4±20.3	
		(58;49)		(45;43.75)		(50;41.71)		(49.25;42.63)	
Place of residence	Province/city	58.6±25.8	0.26	37.9±31.1	0.49	61.5±26.5	0.54	54.9±23.8	0.67
		(72;32)		(50;45)		(66.66;33.36)		(53.5;21)	
	District	47.6±23.9		37.8±29.9		63±36.9		46.4±25.3	
		(52;32)		(50;40)		(55.6;33.4)		(56;26)	
	Town/village	59.5±22.7		47.8±29		59±30		59.2±23.6	
		(66;30)		(60;37.5)		(77.77;41.7)		(58.75;30.13)	

Table 3. Continued

Before treatment		Physical functioning	p	Social functioning	p	Physical role	p	Emotional role	p
		Avg. ± SD		Avg. ± SD		Avg. ± SD		Avg. ± SD	
		M; IQR		M; IQR		M; IQR		M; IQR	
6th Month of treatment									
Gender	Male	78.2±29	0.005	83.1±23.7	0.31	57.4±44.1	0.06	44.9±33.1	0.08
		(90;30)		(100;24.99)		(75;100)		(50;75)	
	Female	61.8±28.7		78.2±24.7		40.6±46		32.8±35.8	
		(62.5;52.5)		(83.34;33.33)		(12.5;100)		(12.5;75)	
Marriage status	Married	54.5±33.3	0.441	75.1±30.4	0.19	31.1±43.1	0.72	23±33	0.44
		(75;55)		(88.9;33.33)		(50;100)		(50;75)	
	Single	76.3±21.4		85.2±22.4		39.6±43.2		29.2±35.1	
		(90;40)		(88.9;22.2)		(50;100)		(25;75)	
	Widow/widower	45±14.1		55.6±31.4		0±0		0±0	
		(65;46.25)		(61.08;58.34)		(12.5;81.25)		(0;56.25)	
Education	Illiterate	42.3±23.1	0.01	69.6±27.4	0.3	15±28	0.02	16.7±30.9	0.53
		(40;30)		(77.77;44.44)		(0;25)		(0;25)	
	Literate	69.7±32		81.5±28.4		53.3±47.1		43.3±34.7	
		(85;60)		(100;33.3)		(50;100)		(50;75)	
	Elementary school	72.8±29.4		83.5±24.6		52.4±46		43.9±34.8	
		(80;47.5)		(100;38.87)		(50;100)		(75;75)	
	High school	82.2±23.9		85±16.3		64.1±42.5		46.7±33.1	
		(90;30)		(88.88;22.22)		(75;100)		(75;75)	
	University	79.4±27.4		75±25		50±53.5		28.1±33.9	
		(92.5;41.25)		(83.34;27.79)		(50;100)		(12.5;68.75)	
Place of residence	Province/city	56.9±31.7	0.881	78.6±25.7	0.85	32.7±42.9	0.69	22.1±31.1	0.77
		(80;40)		(88.9;22.22)		(75;100)		(25;75)	
	District	57.2±32.5		70.4±32.9		22.2±38.4		25±37.5	
		(70;55)		(88.8;44.4)		(50;100)		(50;75)	
	Town/village	64.1±32.4		77.1±32.6		35.9±45.6		25±22.1	
		(80;47.5)		(100;33.2)		(25;100)		(25;75)	

Table 3. Continued

Before treatment		Mental health	p	Energy	p	Bodily pain	p	General health	p
		Avg. ± SD		Avg. ± SD		Avg. ± SD		Avg. ± SD	
		M; IQR		M; IQR		M; IQR		M; IQR	
6th Month of treatment									
Gender	Male	58.1±22.5	0.72	49.2±26.9	0.35	64.2±26.8	0.02	61.2±23.1	0.14
		(60;28)		(56;36.25)		(66.66;36.17)		(61;32.5)	
	Female	56.5±21.4		44.1±28.4		51.6±27.2		54.8±20.3	
		(56;26)		(47.5;42.5)		(55.57;41.7)		(59.25;23.25)	
Marriage status	Married	48.4±20.8	0.93	34.7±29.8	0.97	52±33.8	0.04	55.4±24.4	0.85
		(56;24)		(50;40)		(55.6;33.4)		(61;27.5)	
	Single	58.3±20.7		40±22.3		60.2±28.2		58.3±28.5	
		(64;40)		(45;45)		(66.7;44.49)		(57.5;31)	
	Widow/widower	52±5.7		25±35.4		22.2±15.7		67.3±12.4	
		(60;20)		(55;58.75)		(27.76;27.75)		(61;20.75)	
Education	Illiterate	46.9±17.1	0.26	28.7±24.5	0.06	44.4±29.7	0.22	50.7±22.9	0.56
		(48;16)		(30;50)		(44.44;44.45)		(62.5;34)	
	Literate	61.9±27.3		52.3±30.3		56.3±22.8		56.6±13.7	
		(68;28)		(55;35)		(66.66;44.67)		(52.5;17.5)	
	Elementary school	58.7±22.3		49.1±28		60.7±28.1		58.6±23.5	
		(60;28)		(50;40)		(55.6;38.94)		(61;31.75)	
	High school	60.7±18.1		52.8±25.8		65.2±25.1		63.1±23.1	
		(64;24)		(50;30)		(66.7;33.36)		(61;21.75)	
	University	51.5±25		40.6±20.6		55.6±32.5		59.4±22.6	
		(58;45)		(37.5;35)		(50;63.90)		(56.25;40.13)	
Place of residence	Province/city	54.6±25	0.44	33.8±28.9	0.54	50.9±31.5	0.55	56.9±23.4	0.51
		(64;24)		(50;45)		(55.6;33.4)		(62.5;21.75)	
	District	39.6±23.5		35.6±21.9		45.7±37.5		46.3±22.8	
		(52;36)		(50;40)		(55.6;33.4)		(57.5;26)	
	Town/village	51.3±22.2		38.4±30.8		59.7±32.2		61.7±27.9	
		(62;28)		(50;47.5)		(61.13;55.56)		(62.5;33.88)	

Avg: Average, M: Median, IQR: Interquartil range, SD: Standard deviation

Table 4. Distribution of short form-36 scores by sociodemographic properties of chronic hepatitis B patients in treatment periods

		Physical functioning		Social functioning		Physical role		Emotional role	
Before treatment		**Avg. ± SD**	**p**	**Avg. ± SD**	**p**	**Avg. ± SD**	**p**	**Avg. ± SD**	**p**
Gender	Male	85.3±16.4	0.00009	88.9±15.3	0.03	68.8±41.3	0.002	56.3±29.1	0.012
	Female	27.5±31.7		65.3±40		12.5±35.4		21.9±33.9	
Marriage status	Married	63.5±35.3	0.202	86.1±24.9	0.215	50±48	0.641	48.8±32.9	0.576
	Single	81.9±28		72.2±29.1		59.4±46.2		40.6±37.6	
Education	Illiterate	17.5±3.5	0.234	77.8±31.4	0.946	50±70.7	0.393	37.5±53	0.389
	Literate	62.5±10.6		94.4±7.9		0±0		12.5±17.7	
	Elementary school	72±36.3		81.5±27.4		48.3±50.4		45±35.6	
	High school	72.1±31.9		84.1±33.2		71.4±36.6		64.3±19.7	
	University	90±7.1		72.2±7.9		75±35.4		37.5±53	
Occupation	Unemployed	97.5±3.5	0.005	77.8±31.4	0.196	100±0	0.113	75±0	0.071
	Employee	88.3±16.1		92.5±12.8		83.3±28.9		75±0	
	Housewife	29.3±33.8		73±36.2		14.3±37.8		21.4±36.5	
	Worker	90±14.1		88.9±15.7		62.5±53		37.5±53	
	Self-employment	78.8±21.2		90.2±16.2		56.2±47.7		53.1±28.1	
	Student	50±49.5		38.9±39.3		25±35.4		12.5±17.7	
	Other	87.5±13.2		94.4±6.4		75±50		62.5±25	
Place of residence	Province/city	74.6±29.1	0.656	66.7±34.3	0.259	77.8±18.4	0.449	36.1±48.6	0.183
	District	59.2±46.1		68.8±34		82.1±26.4		52.7±46.8	
	Town/village	74.6±29.1		90.6±25.6		59.6±45.1		57.7±29.6	
3rd month of treatment									
Gender	Male	90.5±14.4	0.0005	81.7±29.6	0.677	71.3±41.6	0.00005	58.8±29.6	0.00006
	Female	46.9±36.8		76.4±31.1		6.3±11.6		9.4±26.5	
Marriage status	Married	75.5±31	0.49	83.9±26.9	0.299	47.5±49.3	0.359	40±36.6	0.292
	Single	84.4±28.2		70.8±35.6		65.6±37.6		56.3±34.7	
Education	Illiterate	27.5±38.9	0.15	94.4±7.9	0.52	0±0	0.101	0±0	0.085
	Literate	85±21.2		94.4±7.9		0±0		0±0	
	Elementary school	85±27.7		83±23		66.7±43		56.7±32	
	High school	75.7±30.5		74.6±43.9		60.7±49.7		46.4±36.6	
	University	77.5±10.6		50±39.3		25±35.4		37.5±53	
Occupation	Unemployed	100±0	0.051	77.8±31.4	0.881	87.5±17.7	0.025	75±0	0.105
	Employee	81.7±12.6		74.1±44.9		66.7±57.7		75±0	
	Housewife	50.7±38		84.1±23.9		3.6±9.4		21.4±36.6	
	Worker	100±0		88.9±15.7		100±0		75±0	
	Self-employment	88.8±18.1		83.3±35.6		65.6±48.1		50±43.3	
	Student	52.5±46		50±39.3		37.5±17.7		10.7±28.3	
	Other	92.5±15		83.3±26.4		68.8±47.3		75±0	
Place of residence	Province/city	83.1±51.6	0.72	80.3±33.7	0.974	61.5±45.2	0.657	53.8±33.6	0.473
	District	72.5±47.1		77.8±27.2		45.8±51		37.5±41.1	
	Town/village	74.4±33.2		81.5±27.8		44.4±48.1		36.1±37.7	

Table 4. Continued

		Mental health		Energy		Bodily pain		General health	
Before treatment		**Avg. ±SD**	**p**	**Avg. ±SD**	**p**	**Avg. ±SD**	**p**	**Avg. ±SD**	**p**
Gender	Male	67.8±20.4	0.088	51.3±33.9	0.014	76.1±27	0.011	53±21	0.023
	Female	50.5±29.9		17.5±19.8		41.7±37		32.3±19.1	
Marriage status	Married	60.8±21.9	0.488	34±31.8	0.059	65±34.1	0.757	47.6±22.1	0.842
	Single	68±30.4		60.6±33.4		69.4±34		45.7±24.4	
Education	Illiterate	48±5.65	0.282	35±35.4	0.531	16.7±7.9	0.272	18.8±1.76	0.222
	Literate	40±11.3		20±0		55.6±31.4		43±11.3	
	Elementary school	69.9±20.7		44.7±35.3		70.4±32.7		54.7±21.8	
	High school	54.9±33.3		33.6±37.7		71.4±35.1		40.1±25.1	
	University	76±5.7		75±7.1		77.8±31.4		46.8±2.5	
Occupation	Unemployed	72±17	0.234	45±49.5	0.611	83.3±23.6	0.234	41±14.1	0.232
	Employee	74.7±6.1		83.3±15.3		92.6±12.8		35.8±17.6	
	Housewife	56.6±26.4		20±20		44.4±39		46.8±13.1	
	Worker	84±22.6		62.5±17.7		55.6±15.7		49.1±22.1	
	Self-employment	61.5±24.7		28.8±30.6		73.6±32.5		28±29	
	Student	40±45.3		35±49.5		38.9±23.6		70.1±28.8	
	Other	64±23.8		65±34.2		80.6±31.9		41±14.1	
Place of residence	Province/city	30.6±34.9	0.393	68.9±20.5	0.649	32.8±29.7	0.237	50.6±33.4	0.602
	District	46.4±33.8		62.9±24.2		42.6±33.9		66.3±33.5	
	Town/village	64±25.5		46.5±32.4		72.6±31.6		51.6±50.6	
3rd month of treatment									
Gender	Male	63±26.6	0.455	51.5±30.7	0.118	72.2±24.6	0.074	59.5±22.9	0.26
	Female	55±21		31.9±23.9		50±37.1		48.1±25.5	
Marriage status	Married	61.6±22.8	0.773	44.5±29.1	0.704	65±30.2	0.811	56.3±21.5	0.972
	Single	58.5±31.6		49.4±33.5		68.1±30.5		55.9±30.4	
Education	Illiterate	60±5.7	0.462	40±14.1	0.604	33.3±15.7	0.479	41.3±1.8	0.603
	Literate	64±17		35±21.2		72.2±39.3		62.5±17.7	
	Elementary school	68±19.8		54.7±27.7		71.9±30.5		62.2±22.8	
	High school	49.7±36		36.4±38.4		65.1±26.8		47.7±27	
	University	42±31.1		30±35.4		50±39.3		49.8±40.7	
Occupation	Unemployed	72±11.3	0.862	75±7.1	0.73	88.9±15.7	0.716	46±21.2	0.974
	Employee	53.3±28.9		45±35		59.3±39		57.7±38.9	
	Housewife	60.6±15		35.7±23		54±38.2		53.5±21.9	
	Worker	76±33.9		50±28.3		77.8±31.4		58±2.8	
	Self-employment	60.5±34		45±38.5		68.1±22.6		61.3±26.1	
	Student	40±33.9		30±35.4		50±39.3		44.3±48.4	
	Other	64±22.9		57.5±28.7		77.8±27.2		59.9±17.9	
Place of residence	Province/city	64.6±27.4	0.425	46.9±29.1	0.987	70.9±25.5	0.467	62±23.5	0.474
	District	48.7±25		45±32.7		70.4±34.2		48.4±27.2	
	Town/village	63.1±21.5		45±32.8		55.6±33.3		53.1±22.6	

Table 4. Continued

Before treatment									
		Physical functioning		Social functioning		Physical role		Emotional role	
		Avg. ± SD	p	Avg. ± SD	p	Avg. ± SD	p	Avg. ± SD	p
6th month of treatment									
Gender	Male	75.3±28.1	0.112	80.6±26	0.271	48.8±44.8	0.106	36.3±36.7	0.258
	Female	47.5±11		91.7±15.4		18.8±37.2		18.8±34.7	
Marriage status	Married	61.3±26.8	0.062	84.4±82.5	0.806	40±81.9	0.974	28.8±40.6	0.575
	Single	82.5±61.3		81.9±84.4		40.6±40		37.5±28.8	
Education	Illiterate	37.5±37.5	0.325	83.3±83.3	0.369	25±25	0.371	0±0	0.152
	Literate	42.5±42.5		88.9±88.9		0±0		0±0	
	Elementary school	73±73		86.7±86.7		50±50		45±45	
	High school	69.3±69.3		85.7±85.7		46.4±46.4		28.6±28.6	
	University	72.5±72.5		50±50		0±0		0±0	
Occupation	Unemployed	90±14.1	0.539	100±0	0.624	100±0	0.216	75±0	0.215
	Employee	76.7±22.5		74.1±44.9		58.3±52		33.3±38.2	
	Housewife	49.3±10.6		95.2±12.6		21.4±39.3		21.4±36.6	
	Worker	65±35.4		66.7±47.1		12.5±17.7		0±0	
	Self-employment	73.1±33.4		81.9±24.4		46.9±47.1		31.3±37.2	
	Student	62.5±38.9		72.2±7.9		0±0		0±0	
	Other	72.5±35.7		80.6±19		50±45.6		56.3±37.5	
Place of residence	Province/city	72.3±24.6	0.492	87.2±16.3	0.731	44.2±45.8	0.886	32.7±35.9	0.806
	District	55.8±33.4		77.8±30.6		33.3±43.8		37.5±41.1	
	Town/village	67.8±28.1		82.7±29.5		38.9±47		25±37.5	

Table 4. Continued

Before treatment									
		Mental health		Energy		Bodily pain		General health	
		Avg. ± SD	p	Avg. ± SD	p	Avg. ± SD	p	Avg. ± SD	p
6th month of treatment									
Gender	Male	57.2±22.7	0.64	44.8±27.3	0.121	58.3±33	0.309	62.1±25.1	0.113
	Female	53±16.7		26.3±28.3		44.4±29.1		44.8±25.8	
Marriage status	Married	57±37.5	0.697	37.8±53.5	0.622	53.3±43.8	0.793	56.8±56.9	0.894
	Single	53.5±57		43.8±37.8		56.9±53.3		58.3±56.8	
Education	Illiterate	48±0	0.463	15±21.2	0.561	50±7.9	0.78	41.3±37.1	0.66
	Literate	36±39.6		20±28.3		27.8±7.9		45.5±18.4	
	Elementary school	62.1±18.9		45.7±24.6		58.5±35		62.9±24.6	
	High school	52.6±23		38.6±35.8		57.1±35.4		57.2±25.8	
	University	50±19.8		40±42.4		44.4±31.4		41.8±48.4	
Occupation	Unemployed	70±8.5	0.862	70±0	0.713	100±0	0.425	57.5±47.5	0.924
	Employee	61.3±22		40±30		55.6±29.4		60±47.5	
	Housewife	58.3±8		30±28.3		46±31.1		48.7±25.1	
	Worker	56±50.9		25±35.4		66.7±31.4		52.5±28.3	
	Self-employment	59±18.6		44.4±29.5		43.1±37.8		66.5±21.5	
	Student	40±33.9		35±49.5		50±23.6		46.8±41.4	
	Other	43±28.5		40±27.1		63.9±27.8		58.6±21.1	
Place of residence	Province/city	63.4±18.1	0.111	48.5±27.9	0.3	58.1±31.8	0.823	65±22.1	0.243
	District	42±16.3		33.3±26.6		48.1±34.2		43.5±23.7	
	Town/village	54.7±24.1		30.6±29.2		53.1±34.1		55.1±31	

Avg: Average, SD: Standard deviation

Table 5. Distribution of short form-36 scores by sociodemographic properties of chronic hepatitis C patients in treatment periods

		Physical functioning		Social functioning		Physical role		Emotional role	
Before treatment		**Avg. ± SD**	**p**	**Avg. ± SD**	**p**	**Avg. ± SD**	**p**	**Avg. ± SD**	**p**
Gender	Male	63.6±30.6	0.5	84.1±30	0.63	28.6±48.8	0.78	17.9±31.3	0.5
	Female	53.1±35.2		78.5±23.1		34.4±42.7		28.1±34	
Marriage status	Married	48.5±34.8	0.15	74.5±26.3	0.16	20.6±34.5	0.06	16.2±29.2	0.09
	Single	83.8±18		100±0		75±50		50±35.4	
	Widow/widower	67.5±10.6		88.9±15.7		50±70.7		50±35.4	
Education	Illiterate	44.3±17.4	0.67	77.8±25.7	0.53	28.6±36.6	0.27	17.9±27.8	0.53
	Literate	65±44.4		59.3±39		66.7±57.7		50±43.3	
	Elementary school	57.1±43.7		85.7±21		7.14±18.9		14.3±28.3	
	High school	75±26.8		91.7±16.7		50±57.7		37.5±43.3	
	University	45±49.5		77.8±31.4		50±70.7		25±35.4	
Occupation	Seassonal agricultural worker	15	0.23	22.2	0.07	0	0.45	0	0.57
	Employee	40±27.8		85.2±25.7		0±0		0±0	
	Housewife	52.7±35.2		76.9±23.3		34.6±41.5		28.8±33.6	
	Self-employment	97.5±3.5		100±0		50±70.7		37.5±53	
	Student	78.3±17.6		100±0		66.7±57.7		41.7±38.2	
	Other	45		66.7		0		0	
Place of residence	Province/city	58.1±35.1	0.93	80.3±24.9	0.98	44.2±48	0.33	34.6±36.1	0.28
	District	58.3±20.8		77.8±22.2		8.3±14.4		8.3±14.4	
	Town/village	52.1±38.5		81±29.12		21.4±39.3		14.3±28.3	
3rd month of treatment									
Gender	Male	59.3±44.9	0.96	81±27	0.58	42.9±53.5	0.98	32.1±40.1	0.89
	Female	57.8±63.9		72.9±33.2		42.2±48.1		29.7±36.8	
Marriage status	Married	59.7±63.2	0.27	75.2±32.8	0.73	41.2±50.7	0.27	30.9±38	0.41
	Single	81.3±14.9		83.3±11.1		68.8±37.5		43.8±37.5	
	Widow/widower	0±0		61.1±55		0±0		0±0	
Education	Illiterate	17.1±28.6	0.12	61.9±38.9	0.37	14.3±37.8	0.46	10.7±28.3	0.46
	Literate	61.7±53.5		77.8±38.5		66.7±57.7		50±43.3	
	Elementary school	94.3±77.1		87.3±21.7		57.1±53.5		42.9±40.1	
	High school	77.5±21		88.9±12.8		43.8±42.7		25±35.4	
	University	32.5±46		50±39.3		50±70.7		37.5±53	
Occupation	Seassonal agricultural worker	0	0.76	33.3	0.51	0	0.21	0	0.27
	Employee	33.3±57.3		59.3±39		0±0		0 ±0	
	Housewife	58.8±68.9		76.1±33.9		46.2±51.9		34.6±38.9	
	Self-employment	100±0		100±0		100±0		75±0	
	Student	75±10		77.8±0		58.3±38.2		33.3±38.2	
	Other	50		100		0		0	
Place of residence	Province/city	45±39.2	0.15	73.5±28.2	0.13	36.5±46.3	0.08	25±35.4	0.07
	District	33.3±57.7		48.1±44.9		0±0		0±0	
	Town/village	93.6±76.9		90.5±25.2		71.4±48.8		53.6±36.6	

Table 5. Continued

		Mental health		Energy		Bodily pain		General health	
Before treatment		**Avg. ± SD**	**p**	**Avg. ± SD**	**p**	**Avg. ± SD**	**p**	**Avg. ± SD**	**p**
Gender	Male	65.7±21.8	0.165	42.9±26.9	0.39	60.3±29.3	0.32	53±20.3	0.13
	Female	51.8±21.3		33.1±23.2		57.2±27.7		39.5±18.4	
Marriage status	Married	50.6±22.5	0.132	27.4±19.3	0.005	43.1±24.8	0.03	39.4±19.6	0.2
	Single	73±13.2		56.3±22.1		83.3±21.3		58.6±16.3	
	Widow/widower	68±0		70±14.1		55.6±31.4		48.8±15.9	
Education	Illiterate	45.7±19.6	0.496	30±28.1	0.38	42.9±20.7	0.53	39.6±20.9	0.74
	Literate	60±24		45±31.2		66.7±22.2		39.5±23.4	
	Elementary school	54.9±24.2		25.7±16.2		42.9±28.3		40.6±21.7	
	High school	71±10.5		51.3±20.2		66.7±42.6		54.9±18.2	
	University	60±39.6		50±28.3		55.6±31.4		51.3±8.8	
Occupation	Seassonal agricultural worker	36	0.346	10	0.3	66.7	0.21	12.5	0.08
	Employee	62.7±27.2		23.3±5.8		51.9±23.1		56.7±12.6	
	Housewife	50.5±21.5		32.7±25.8		43.6±26.2		36.9±18.2	
	Self-employment	50±19.8		65±21.2		72.2±39.3		66.8±4.6	
	Student	76±14.4		48.3±18.9		77.8±22.2		54.8±17.7	
	Other	80		50		11.1		42.5	
Place of residence	Province/city	56.6±23.1	0.572	38.8±27.2	0.82	58.1±32.4	0.42	47.2±19.3	0.58
	District	66.7±6.1		30±26.5		44.4±11.1		42.5±25.4	
	Town/village	50.3±24.2		33.6±19.7		41.3±22.9		37.3±19.4	
3rd month of treatment									
Gender	Male	41.7±26.2	0.15	36.4±27.2	0.88	73±27.1	0.04	55.1±28.6	0.8
	Female	57±21.2		34.4±31.6		47.2±24.5		52.1±23.4	
Marriage status	Married	46.6±24.1	0.14	31.8±30.3	0.16	52.9±27.9	0.18	54.5±27.8	0.76
	Single	68±13.9		58.8±19.3		75±21		53±7.2	
	Widow/widower	70±2.8		15±21.2		33.3±15.7		40.5±18.4	
Education	Illiterate	52±25	1	14.3±23	0.13	38.1±25.5	0.16	39.8±25.7	0.45
	Literate	53.3±30.6		46.7±41.6		44.4±22.2		56.2±33	
	Elementary school	50.3±24.5		41.4±27.3		60.3±26.3		61.6±24	
	High school	56±25.3		57.5±20.6		77.8±24		63.3±19.7	
	University	52±28.3		22.5±31.8		66.7±31.4		44.3±8.1	
Occupation	Seassonal agricultural worker	20	0.06	0	0.27	44.4	0.32	22.5	0.38
	Employee	25.3±8.3		13.3±23.1		63±32.1		41.2±30.1	
	Housewife	58.5±22		33.1±31.2		45.3±25.8		53.6±25.8	
	Self-employment	66±19.8		65±7.1		66.7±31.4		68.5±7.1	
	Student	64±13.9		55±21.8		70.4±23.1		49.5±1.8	
	Other	24		40		100		91	
Place of residence	Province/city	52.6±23.5	0.85	28.8±31.5	0.21	52.1±25	0.63	47.9±22.9	0.18
	District	45.3±26.6		23.3±20.8		48.1±44.9		42.5±26	
	Town/village	54.9±25.1		51.4±25.4		63.5±27		67.1±24.1	

Table 5. Continued

Before treatment									
		Physical functioning		Social functioning		Physical role		Emotional role	
		Avg. ± SD	p	Avg. ± SD	p	Avg. ± SD	p	Avg. ± SD	p
6th month of Treatment									
Gender	Male	57.9±40.8	0.44	73±35.6	0.64	28.6±48.8	0.59	14.3±28.3	0.99
	Female	45.6±31.5		66±32.1		18.8±34.8		14.1±25.8	
Marriage status	Married	46.5±39	0.67	64.1±34.8	0.28	20.6±38.8	0.54	16.2±29.2	0.72
	Single	63.8±4.8		91.7±5.6		37.5±47.9		12.5±14.4	
	Widow/widower	45±14.1		55.6±31.4		0±0		0±0	
Education	Illiterate	27.9±18.7	0.37	55.6±31.4	0.65	3.6±9.4	0.46	3.6±9.4	0.47
	Literate	65±52.2		66.7±57.7		41.7±52		33.3±38.2	
	Elementary school	56.4±44.3		68.3±34.2		28.6±48.8		21.4±36.6	
	High school	63.8±4.8		88.9±9.1		12.5±25		6.3±12.5	
	University	47.5±31.8		72.2±23.6		50±70.7		12.5±17.7	
Occupation	Seasonal agricultural worker	5	0.49	0	0.15	0	0.55	0	0.72
	Employee	41.7±52		70.4±25.7		0±0		0±0	
	Housewife	44.6±33.9		62.4±33.5		19.2±37		15.4±28	
	Self-employment	80±28.3		94.4±7.9		50±70.7		37.5±53	
	Student	65±5		92.6±6.4		50±50		16.7±14.4	
	Other	70		77.8		0		0	
Place of residence	Province/city	41.5±31.3	0.48	70.1±30.9	0.79	21.2±38	0.5	11.5±21.9	0.34
	District	60±37.7		55.6±38.5		0±0		0±0	
	Town/village	59.3±39.1		69.8±37.2		32.1±47.2		25±35.4	

study, we also determined, in agreement with previous studies, lower HRQoL scores in patients with CHC compared to healthy controls. We observed statistically significant differences in physical functioning, physical role limitations, energy/vitality and general health scores in these patients compared to controls. Pojoga et al. (27) reported that patients with CHB had better general health, social functioning and mental health scores than patients with CHC. Another study showed a significant decrease in HRQoL scores in patients with hepatitis C compared to that in patients with CHB (12). In our study, although HRQoL scores in patients with CHC were lower than those in patients with CHB, the difference was only statistically significant in emotional role limitations scores. Lower HRQoL scores observed in patients with CHC compared to those with CHB may be attributed to symptoms such as lethargy and fatigue being more pronounced in the former and to this then affecting their emotional scores. When we compared the HQRoL scores of patients with CHC during the treatment period with those of the control group, we determined a significant difference. This difference consisted of significantly low physical functioning, physical role limitations, emotional role limitations, mental health and vitality/energy scores in patients with hepatitis C at the 3rd month of treatment and also a significantly lower social functioning score in addition to the other parameters at the 6th. HRQoL in chronic hepatitis is adversely affected during treatment. This may be due to drug side-effects such as fatigue, flu-like findings, such as myalgia, and changes in psychological state, concentration impairment and loss of libido adversely impacting patients' energy and social functioning (28,29). Marcellin et al. (30) investigated HRQoL in patients with CHB and CHC receiving PEG-IFN α-2a therapy and reported better HRQoL scores, particularly in the physical component, in patients with hepatitis B compared to those with hepatitis C. In our study, HRQoL scores during treatment were better in patients with CHB than in those with CHC. The decrease in physical functioning and social functioning scores in patients with CHC at the 6th month was statistically significant. HRQoL during treatment being lower in patients with CHC than in patients with CHB may be associated with the side-effects of combined IFN and ribavirin therapy. We also determined a significant decrease in HRQoL scores during treatment in our patients with CHB compared with the control group. This decrease was statistically significant at the 6th month in physical, physical role limitations, emotional role limitations and energy/vitality scores.

Conclusion

Chronic viral hepatitis is a social health problem in Turkey. Chronic diseases can adversely affect quality of life in various ways. Patients with chronic hepatitis are exposed not only to the chronic effects of the disease, but also to undesirable effects of

Table 5. Continued

Before treatment									
		Mental health		Energy		Bodily pain		General health	
		Avg. ± SD	p	Avg. ± SD	p	Avg. ± SD	p	Avg. ± SD	p
6th month of Treatment									
Gender	Male	41.7±23.4	0.63	30±25.2	0.92	69.8±32.5	0.07	56±28.7	0.97
	Female	46±17.2		31.3±29		42.4±31.5		55.6±22.5	
Marriage status	Married	38.4±17.3	0.008	31.2±30.4	0.95	50.3±34.9	0.33	53.7±26.7	0.75
	Single	68±3.3		32.5±10.4		66.7±28.7		58.4±14.8	
	Widow/widower	52±5.7		25±35.4		22.2±15.7		67.3±12.4	
Education	Illiterate	40±12	0.31	14.3±19.9	0.45	34.9±36	0.66	48.9±28.1	0.7
	Literate	46.7±32.3		40±36.1		51.9±25.7		47±17.8	
	Elementary school	37.7±16.8		38.6±35.8		55.6±32.7		57.9±26.6	
	High school	62±9.5		40±16.8		66.7±28.7		69.9±22.2	
	University	48±33.9		30±0		55.6±62.9		56.3±8.8	
Occupation	Seassonal agricultural worker	12	0.004	0	0.74	22.2	0.61	27.5	0.45
	Employee	22.7±6.1		23.3±20.8		51.9±44.9		49.2±32.1	
	Housewife	44.3±15.6		30±32.1		44.4±33.6		54.1±24	
	Self-employment	58±8.5		40±28.3		61.1±23.6		66.8±9.5	
	Student	69.3±2.3		36.7±7.6		63±33.9		57.8±18.1	
	Other	48		60		100		96	
Place of residence	Province/city	45.8±18.6	0.63	19.2±22.3	0.05	43.6±30.6	0.26	48.7±22.5	0.15
	District	34.7±20.1		40±10		40.7±51.3		52±24.4	
	Town/village	46.9±20.4		48.6±31.8		68.3±29.7		70.2±22.8	

Avg: Average. SD: Standard deviation

IFN treatment and antiviral drugs. Measuring and evaluating quality of life is even more important in this patient group, in which severe decreases may be anticipated. Patients' quality of life is adversely affected by side-effects of treatment. This discomfort caused by treatment may also impair patients' compliance and willingness to continue with therapy. Emotional changes during treatment must be monitored and treatment should be provided when required. Considering the changes occurring in emotional and psychological states, psychiatric evaluation at least once during follow-up may be useful. Provision of counseling and guidance services can improve quality of life of patients with chronic viral hepatitis. Good standardization of HRQoL measures and application to patients with chronic diseases will identify negativities emerging and perhaps also be of assistance in coping with them.

Ethics

Ethic Committee Approval: The study was approved by Ataturk University Faculty of Medicine Ethics Committee (approval number: 65/2008).

Informed Consent: Informed consent was received from all.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: H.A., K.Ö., E.P., Concept: N.Ç., S.E., M.P., Design: S.E., H.A., K.Ö., E.P., Data Collection or Processing: H.A., E.P., Analysis or Interpretation: H.A., K.Ö., M.P., S.E., Literature Search: H.A., K.Ö., E.P., Writing: H.A., K.Ö.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

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