Research Article

DOI: 10.4274/vhd.galenos.2025.2025-8-1

Viral Hepat J

Evaluation of Health-related Quality of Life among Patients with Chronic Viral Hepatitis and Non-alcoholic Fatty Liver Disease

Kronik Viral Hepatit ve Alkolsüz Yağlı Karaciğer Hastalığı Olan Hastalarda Sağlıkla İlişkili Yaşam Kalitesinin Değerlendirilmesi

Ayşe Merve Ok Kurt[1], Emine Satır[2], Tuğçe Eşkazan[3], Deniz Eyice Karabacak[4], Enes Ali Kurt[5], Abdullah Sonsuz[3], Billur Canbakan[3], Sebati Özdemir[3], Murat Tuncer[3], İbrahim Hatemi[3]

[1]*University of Health Sciences Türkiye, Kocaeli City Hospital, Clinic of Endocrinology and Metabolism, Kocaeli, Türkiye*
[2]*Acıbadem International Hospital, Clinic of Gastroenterology, İstanbul, Türkiye*
[3]*İstanbul University-Cerrahpaşa, Cerrahpaşa Faculty of Medicine, Department of Internal Medicine, Division of Gastroenterology, İstanbul, Türkiye*
[4]*University of Health Sciences Türkiye, Kocaeli City Hospital, Clinic of Immunology and Allergy, Kocaeli, Türkiye*
[5]*University of Health Sciences Türkiye, Kocaeli City Hospital, Clinic of Gastroenterology, Kocaeli, Türkiye*

ABSTRACT

Objectives: Chronic viral hepatitis may reduce quality of life (QoL). In this study, our aim was to assess the QoL of patients with chronic hepatitis B virus (HBV) infection and to compare these results with those of patients with non-alcoholic fatty liver disease (NAFLD) and chronic hepatitis C virus (HCV).

Materials and Methods: A total of 299 consecutive patients with chronic HBV, 92 patients with chronic HCV, and 64 patients with NAFLD were included. Short form-36 (SF-36), the liver disease symptom index 2.0 (LDSI 2.0), and the sociodemographic data form were completed. Child-Pugh and the model for end-stage liver disease scores were also calculated.

Results: Patients with chronic HCV had the worst scores on the SF-36 and the LDSI 2.0, followed by patients with HBV and NAFLD. Factors associated with QoL were, among patients with HCV, employment status, medical treatment, income level, presence of cirrhosis, and number of comorbid conditions; among patients with HBV, gender and presence of cirrhosis; and among patients with NAFLD, number of children, duration of disease, number of comorbid conditions, and body mass index.

Conclusion: Chronic viral hepatitis had a negative impact on QoL. Patients with chronic HCV had the lowest QoL, followed by patients with chronic HBV and NAFLD.

Keywords: Chronic HCV infection, chronic hepatitis B infection, NAFLD, quality of life

ÖZ

Amaç: Kronik viral hepatit, yaşam kalitesini (YK) olumsuz etkileyebilir. Bu çalışma, kronik hepatit B virüs (HBV) hastalarında YK'yi değerlendirmek ve sonuçlarını alkole bağlı olmayan yağlı karaciğer hastalığı (NAFLD) ve kronik hepatit C virüs (HCV) hastalarıyla karşılaştırmak amacıyla yapılmıştır.

Gereç ve Yöntemler: Çalışmaya 299 HBV, 92 HCV ve 64 NAFLD hastası dahil edildi. Kısa form-36 (KF-36), karaciğer hastalığı semptom indeksi 2.0 (LDSI 2.0) ve sosyodemografik form kullanıldı. Sirozu olan hastalarda Child-Pugh ve model for end-stage liver disease skorları hesaplandı.

Bulgular: Kronik HCV'li hastalar KF-36 ve LDSI 2.0'da en kötü puanları alırken, bunu HBV ve NAFLD'li hastalar izledi. Yaşam kalitesiyle ilişkili faktörler, HCV'de çalışma durumu, tıbbi tedavi, gelir düzeyi, siroz ve ek hastalık sayısı; HBV'de cinsiyet ve siroz; NAFLD'de çocuk sayısı, hastalık süresi, ek hastalık sayısı ve vücut kitle indeksi YK ile ilişkili bulundu.

Sonuç: Kronik viral hepatitler YK'yi olumsuz etkilemektedir. HCV hastalarında YK en düşük, HBV'de orta, NAFLD'de ise en yüksek düzeydedir.

Anahtar Kelimeler: Kronik HCV enfeksiyonu, kronik hepatit B enfeksiyonu, NAFLD, yaşam kalitesi

Address for Correspondence: Ayşe Merve Ok Kurt, MD, University of Health Sciences Türkiye, Kocaeli City Hospital, Clinic of Endocrinology and Metabolism, Kocaeli, Türkiye
E-mail: a.merve52@gmail.com **ORCID ID:** orcid.org/0000-0002-1074-1801

Received: 10.08.2025 **Accepted:** 24.11.2025 **Epub:** 05.01.2026

Cite this article as: Ok Kurt AM, Satır E, Eşkazan T, Eyice Karabacak D, Kurt EA, Sonsuz A, Canbakan B, Özdemir S, Tuncer M, Hatemi İ. Evaluation of health-related quality of life among patients with chronic viral hepatitis and non-alcoholic fatty liver disease. Viral Hepat J. [Epub Ahead of Print]

Introduction

Chronic viral hepatitis is a major cause of chronic liver disease worldwide, posing a substantial healthcare burden (1). Beyond managing the illness itself, patients face socioeconomic and psychological challenges.

Health-related quality of life (HRQoL) refers to the perceived physical, mental, emotional, and social well-being of patients, based on the World Health Organization's holistic perspective introduced in the late 20th century. This concept has gained importance due to increased life expectancy resulting from improved treatments, which, in turn, leads to a higher prevalence of chronic diseases. Today, therapeutic success is measured not only by clinical outcomes but also by its effects on QoL, making HRQoL assessments an essential part of medical research (2,3).

HRQoL tools are generally either generic or disease-specific. Generic tools assess QoL regardless of diagnosis, are applicable to the general population, and allow comparisons between different chronic diseases (4,5). However, they may lack sensitivity to detect subtle, clinically relevant changes linked to treatment or disease progression. Disease-specific tools, in contrast, are often more sensitive to such changes, which may be important for patients and physicians. When used together, these tools provide complementary perspectives on the impact of chronic diseases (6).

Poor QoL may contribute to or result from issues such as poor treatment adherence, missed follow-ups, social withdrawal, and family conflicts. In chronic hepatitis B virus (HBV), treatment often requires prolonged, sometimes lifelong, medication. Uncontrolled treatment discontinuation can have severe consequences. Thus, evaluating HRQoL is crucial for optimal management and follow-up.

This study aimed to assess the QoL in patients with chronic HBV, considering sociodemographic factors and disease subgroups.

Materials and Methods

Consecutive patients aged ≥18 years who were treated at our outpatient clinic between March and June 2016 and who provided informed consent were enrolled. Exclusion criteria included: significant hepatic encephalopathy; Child-Pugh score >10; recent (<1 month) gastrointestinal bleeding or spontaneous bacterial peritonitis; use of lactulose or psychoactive drugs; neurological, psychiatric, or dementing disorders; non-hepatic metabolic encephalopathy; stage 3-4 cardiac failure; stage 4-5 chronic renal failure; severe chronic pulmonary disease; uncontrolled diabetes or hypertension; active malignancy; alcohol intake >50 g/day within the past 3 months; prior portal hypertension shunt or transjugular intrahepatic portosystemic shunt; solid organ or bone marrow transplantation; immunosuppression; other chronic liver diseases; or hospitalization for unrelated conditions within the past month.

This cross-sectional study involved completion of the short form-36 (SF-36), the liver disease symptom index 2.0 (LDSI 2.0), and a 16-item sociodemographic form following brief oral instructions. Questionnaires were completed under physician supervision without interference; additional clinical data (medications, comorbidities) were extracted from records. Child-Pugh and model for end-stage liver disease (MELD) scores for patients with cirrhosis were calculated using same-day laboratory results. Physical component scores (PCS) and mental component scores (MCS) from SF-36 were computed using dedicated software. The study received ethical approval from the İstanbul University-Cerrahpaşa, Cerrahpaşa Faculty of Medicine Ethics Committee (approval no: A-34, date: 03.05.2016).

Short Form-36

Developed by Ware and Sherbourne (7) and adapted for clinical use by the RAND Corporation, the SF-36 was validated in Turkish by Koçyiğit et al. (8). This generic, self-administered tool assesses eight domains over the preceding 4 weeks and summarizes them into PCS and MCS scores (range: 0-100; higher scores indicate better QoL).

Liver Disease Symptom Index 2.0

Developed by Van der Plas et al. (9) and validated in Turkish by Eraydın et al. (10), LDSI 2.0 is a disease-specific instrument with 24 items in two sections: Appendix I comprises 18 questions covering the past week (9 main and 9 supplementary), and Appendix II comprises 6 questions on disease impact since diagnosis. Scores range from 1-5, with higher scores indicating poorer QoL.

The LDSI 2.0 is a disease-specific QoL scale developed for patients with chronic liver disease. The SF-36 is a general QoL scale that is independent of disease. We used both measures to assess disease-specific and overall impairments in QoL. This approach ensures the validity of findings for both specific patient subgroups and the general population and captures subtle and broad changes through the psychometric complementarity among these instruments.

Sociodemographic Data Form

A 16-item form, designed by the research team, was used to collect demographic and socioeconomic data, including marital status, education, occupation, and income level.

Statistical Analysis

Data were analyzed with SPSS 21.0. Descriptive statistics included frequencies, percentages, means, and standard deviations. Normality was assessed using the Kolmogorov-Smirnov test. Pearson's chi-square test was used to compare qualitative data. Non-normally distributed quantitative variables were compared using the Kruskal-Wallis test with post-hoc analysis. Linear regression was used to assess the associations between the independent and the dependent variables. Statistical significance was set at $p<0.05$; 95% confidence interval were reported.

Results

A total of 455 patients were included: 299 with chronic HBV, 92 with chronic hepatitis C virus (HCV), and 64 with non-alcoholic fatty liver disease (NAFLD). Table 1 summarizes the characteristics. The gender distribution differed significantly, with more females in the NAFLD group and fewer females in the HBV group (p<0.001). HCV patients were significantly older than both HBV and NAFLD patients (p<0.001). NAFLD patients had a higher body mass index (BMI) than the other groups (p<0.001). Marital status differed: there were fewer married and more widowed individuals in the HCV group (p=0.003). NAFLD patients had fewer children than HCV patients (p=0.048). HCV patients had lower education levels (p=0.023) (p=0.023), lower employment rates (p=0.043), and lower income levels (p=0.023). Disease duration was longer in patients with HBV and HCV than in patients with NAFLD (p<0.001). HBV patients had fewer comorbidities (p<0.001) but had higher rates of smoking and drug use (p<0.001).

Table 2 shows the results of QoL assessments. PCS were higher in HBV (47.72±9.08) and in NAFLD (50.91±5.91) than in HCV (43.81±9.67). MCS were highest in NAFLD (49.91±6.84), followed by HBV (46.28±9.00) and HCV (42.56±9.66). Appendix I scores were higher in HBV (27.98±8.81) and HCV (30.90±11.37) than in NAFLD (24.41±6.81). Appendix II scores were highest in HCV (12.32±5.04), followed by HBV (10.55±4.54), and lowest in NAFLD (8.33±3.53). Total Appendix scores were highest in the HCV group (43.22±15.30), followed by the HBV group (38.56±12.02) and the NAFLD group (32.73±8.90).

Table 3 presents the assessment tool scores. Subgroup analyses revealed that PCS was lower in cirrhotic HBV and HCV patients than in non-cirrhotic patients. Cirrhotic HBV patients, HCV patients, and treated HCV patients had lower PCS than NAFLD patients. MCS was lower in cirrhotic HCV patients than in HCV patients with virological response; no differences were observed among HBV subgroups. Appendix I scores were higher in cirrhotic HCV patients than in untreated patients or those with a virological response; cirrhotic HBV and HCV patients had lower Appendix I scores than patients with NAFLD. Appendix II scores were higher in cirrhotic than in non-cirrhotic HBV patients; no significant differences were observed among HCV subgroups. Appendix total scores were higher in cirrhotic HBV and HCV patients than in non-cirrhotic counterparts, but lower than in NAFLD patients.

Table 1. Demographic characteristics of study groups

		HBV (n=299)	HCV (n=92)	NAFLD (n=64)
Gender	Male	171 (57.2%)	41 (44.6%)	24 (37.5%)
	Female	128 (42.8%)	51 (55.4%)	40 (62.5%)
Age, mean ± SD		49.5±12.6	60±11.9	51.8±12.4
BMI		27.3±4.4	27.6±4.6	29.741±4.3
Marital status	Married	249 (83.3%)	63 (68.5%)	53 (82.8%)
	Single	27 (9.0%)	9 (9.8%)	6 (9.4%)
	Widow/divorced	23 (7.7%)	20 (21.7%)	5 (7.8%)
Children	No	42 (14.0%)	13 (14.1%)	10 (15.6%)
	Yes	257 (86.0%)	79 (85.9%)	54 (84.4%)
Number of children		2.2±1.7	2.4±1.7	1.9±1.3
Level of education	None	15 (5.0%)	15 (16.3%)	3 (4.7%)
	Elementary	157 (52.5%)	42 (45.7%)	31 (48.4%)
	High school	68 (22.7%)	19 (20.7%)	15 (23.4%)
	University	59 (19.7%)	16 (17.4%)	15 (23.4%)
Duration of education		8.540±4.449	7.480±4.846	8.770±4.468
Employment status	Unemployed	101 (33.8%)	40 (43.5%)	26 (40.6%)
	Employed	131 (43.8%)	24 (26.1%)	24 (37.5%)
	Retired	67 (22.4%)	28 (30.4%)	14 (21.9%)
Financial difficulties	No	176 (58.9%)	52 (56.5%)	40 (62.5%)
	Yes	123 (41.1%)	40 (43.5%)	24 (37.5%)
Monthly income	<300 euro	68 (22.7%)	34 (37.0%)	17 (26.6%)
	300-800 euro	164 (54.8%)	49 (53.3%)	31 (48.4%)
	800-1600 euro	53 (17.7%)	7 (7.6%)	10 (15.6%)
	>1600 euro	14 (4.7%)	2 (2.2%)	6 (9.4%)

BMI: Body mass index, HBV: Hepatitis B virus, HCV: Hepatitis C virus, NAFLD: Non-alcoholic fatty liver disease, SD: Standard deviation

Table 2. The results of the assessment tools according to disease groups

Test name Mean ± SD		HBV (n=299)				HCV (n=92)				NAFLD (n=64)		
		Median	IQR		Mean ± SD	Median	IQR		Mean ± SD	Median	IQR	
SF-36	Physical component score	47.718±9.083	49.5	42.4	54.8	43.809±9.669	44.45	35.75	51.8	50.906±5.906	51.6	47.7
	Mental component score	46.277±9.002	47	39.7	53.5	42.560±9.662	44.35	34.6	49.75	49.905±6.835	52.05	44.4
LDSI 2.0	Appendix I	27.977±8.808	26	22	32	30.902±11.369	29	23	34	24.406±6.807	22	20
	Appendix II	10.552±4.540	9	6	14	12.315±5.038	11	8	16	8.328±3.528	6	6
	Appendix total	38.562±12.019	35	29	45	43.217±15.301	41	31.25	52	32.734±8.897	30	26

SD: Standard deviation, IQR: Interquartile range, SF-36: Short form-36, LDSI 2.0: Liver disease symptom index 2.0, HBV: Hepatitis B virus, HCV: Hepatitis C virus, NAFLD: Non-alcoholic fatty liver disease

Table 3. Assessment tool scores in study groups

SF-36 PCS*	NAFLD>HBV>HCV
SF-36 MCS*	NAFLD>HBV>HCV
LDSI 2.0 Appendix 1**	NAFLD<HBV<HCV
LDSI 2.0 Appendix 2**	NAFLD<HBV<HCV
LDSI 2.0 Appendix total**	NAFLD<HBV<HCV

*: Higher scores indicate better quality of life, **: Higher scores indicate worse quality of life, SF-36: Short form-36, LDSI 2.0: Liver disease symptom index 2.0, HBV: Hepatitis B virus, HCV: Hepatitis C virus, NAFLD: Non-alcoholic fatty liver disease, PCS: Physical component scores, MCS: Mental component scores

Discussion

QoL includes physical, mental, and social well-being. In modern medicine, which primarily focuses on symptom management, QoL assessments enable patients to communicate their experiences and help healthcare providers understand their needs more effectively. This multidimensional approach is particularly important in the management of chronic diseases, where personalised strategies can improve patient outcomes.

Several studies have compared QoL among patients with chronic HBV, HCV, and NAFLD. Younossi (6) evaluated 160 patients with NAFLD, 56 with HBV, and 65 with HCV using both generic and disease-specific tools, reporting that QoL was worst in patients with NAFLD, followed by those with HCV and HBV. That study included cirrhotic NAFLD patients but excluded HCV patients on interferon (IFN) therapy. In a later study of 3,333 patients with NAFLD, 346 with HCV, and 5,982 healthy controls, the worst scores were observed in the HCV group, followed by the NAFLD group and healthy controls (11). Our findings align more closely with the latter, with HCV patients being most affected, followed by HBV and NAFLD patients.

Recent studies published after 2020 have continued to confirm these trends. In a meta-analysis including over 10,000 HBV patients, Fu et al. (12) reported significantly impaired HRQoL, particularly in the physical component domains, compared with healthy controls. Similarly, Zhang et al. (13) demonstrated that fatigue, sleep disturbance, and social isolation are strong mediators of poor QoL in HBV-related cirrhosis, independent of MELD or alanine aminotransferase levels.

In NAFLD, Golubeva et al. (14) and Hwang and Han (15) found that higher BMI, metabolic comorbidities, and advanced fibrosis were associated with lower SF-36 physical functioning and vitality scores. Importantly, weight reductions exceeding 5% resulted in significant improvements in the physical and mental health subdomains, underscoring the dynamic and reversible nature of QoL impairment in metabolic liver disease (16).

In our study, no significant differences were observed between patients with cirrhosis due to HCV and those with cirrhosis due to HBV, suggesting that cirrhosis has a similar impact on QoL regardless of etiology. PCS values in cirrhotic HCV patients were lower than in most other subgroups, including NAFLD. Treated HCV patients also showed poorer PCS, likely reflecting IFN-related adverse effects during the study period. In regression analyses, drug use and cirrhosis were associated with lower PCS and MCS in HCV, while employment was associated with improved PCS and higher income with improved MCS.

Cirrhotic HBV patients also had lower PCS scores than other HBV subgroups and NAFLD patients. A Canadian study of 433 HBV patients found QoL impairment primarily in those with decompensated cirrhosis or HCV coinfection, with no significant differences between compensated patients and those on antiviral therapy (17). In our study, only cirrhotic HBV patients had worse scores. Treated HBV patients had similar QoL to cirrhotic patients, possibly because daily antiviral use serves as a constant reminder of illness. A Korean study of 7,098 HBV patients and 35,090 controls found that higher socioeconomic status and higher education levels were associated with greater QoL impairment among people with HBV (18).

Consistent with these earlier findings, Ibrahim et al. (19) found that even clinically stable HBV carriers report poorer HRQoL and higher fatigue scores than uninfected individuals, despite having normal liver enzymes and no fibrosis.

These data collectively emphasize that the burden of chronic hepatitis extends beyond biochemical or histological markers and significantly impacts psychosocial well-being.

Multivariate analysis in our study showed that female gender negatively affected all QoL domains, while cirrhosis affected all domains except MCS. Education and income were not significant predictors, possibly because only a small proportion (4.7%) of HBV patients had higher monthly incomes (>1,600 EUR), which limited statistical power.

NAFLD patients had the highest QoL scores. A greater number of children were associated with lower PCS and Appendix I scores, whereas longer disease duration was linked to improvements in the LDSI total score. This may reflect both reduced anxiety over time, as disease stability is observed during follow-up visits and a generally low public awareness of NAFLD consequences in Türkiye. Consistent with prior research, higher BMI was associated with worse LDSI total scores.

Study Limitations

This study has certain limitations. First, its cross-sectional design prevents assessment of causality or temporal changes in QoL. Second, the study was conducted at a single tertiary center, which may limit generalizability to broader populations with different socioeconomic or healthcare backgrounds. Additionally, the use of self-reported questionnaires such as SF-36 and LDSI 2.0 introduces potential recall and reporting biases despite physician supervision.

The disease groups also exhibited clinical heterogeneity, including differences in cirrhosis status, treatment exposure, comorbidities, and demographic characteristics, which may have influenced HRQoL outcomes.

Finally, the study did not include a healthy control group, limiting the interpretation of absolute impairment levels compared with the general population.

Conclusion

Overall, both our data and recent literature confirm that chronic HCV has the greatest negative impact on QoL, followed by HBV, while NAFLD patients—particularly those without advanced fibrosis—are relatively less affected. The strong influence of cirrhosis across etiologies emphasizes the need for early diagnosis, effective antiviral or metabolic therapy, and multidimensional care strategies that incorporate patient-reported outcomes to preserve long-term well-being.

Ethics

Ethics Committee Approval: The study received ethical approval from the İstanbul University-Cerrahpaşa, Cerrahpaşa Faculty of Medicine Ethics Committee (approval no: A-34, date: 03.05.2016).

Informed Consent: Who provided informed consent were enrolled.

Footnotes

Authorship Contributions

Surgical and Medical Practices: A.M.O.K., D.E.K., Concept: A.M.O.K., A.S., M.T., İ.H., Design: A.M.O.K., A.S., İ.H., Data Collection or Processing: A.M.O.K., E.S., D.E.K., Analysis or Interpretation: T.E., B.C., S.Ö., Literature Search: A.M.O.K., Writing: A.M.O.K., E.A.K., İ.H.

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

Financial Disclosure: The authors declare no financial support.

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Liver Disease Symptom Index 2.0 (LDSI-2.0)

Original Questionnaire Format (0-4 Likert Scale)

Scoring scale for all items:

0=Not at all

1=A little

2=Moderate

3=Quite a bit

4=Very much

Instruction

During the past 7 days, how much have you been bothered by the following symptoms? Please circle one number (0-4) for each item.

Appendix 1 - Core Symptoms (18 Items)

Itching (pruritus) [0] [1] [2] [3] [4]

Joint pain [0] [1] [2] [3] [4]

Pain or discomfort in the right upper abdomen [0] [1] [2] [3] [4]

Abdominal swelling [0] [1] [2] [3] [4]

Shortness of breath [0] [1] [2] [3] [4]

Muscle cramps [0] [1] [2] [3] [4]

Difficulty concentrating [0] [1] [2] [3] [4]

Memory problems [0] [1] [2] [3] [4]

Fatigue [0] [1] [2] [3] [4]

Sleepiness during the day [0] [1] [2] [3] [4]

Difficulty sleeping at night [0] [1] [2] [3] [4]

Decreased appetite [0] [1] [2] [3] [4]

Nausea [0] [1] [2] [3] [4]

Feeling depressed [0] [1] [2] [3] [4]

Worry related to liver disease [0] [1] [2] [3] [4]

Fear of complications [0] [1] [2] [3] [4]

Yellowing of the skin or eyes (jaundice) [0] [1] [2] [3] [4]

Decreased sexual interest [0] [1] [2] [3] [4]

Appendix 2 - Additional NLV Items (7 Items)

Fluid retention in the legs [0] [1] [2] [3] [4]

Tendency to bruise easily [0] [1] [2] [3] [4]

Muscle weakness [0] [1] [2] [3] [4]

Difficulty performing daily activities [0] [1] [2] [3] [4]

Emotional instability [0] [1] [2] [3] [4]

Social withdrawal [0] [1] [2] [3] [4]

Reduced tolerance for physical activity [0] [1] [2] [3] [4]