

# Reduced Quality of Life in Patients with Chronic Viral Liver Disease as Assessed by SF12 Questionnaire

Neda Svirtlih<sup>1</sup>, Sladjana Pavic<sup>2</sup>, Dragica Terzic<sup>3</sup>, Dragan Delic<sup>1</sup>, Jasmina Simonovic<sup>1</sup>, Eleonora Gvozdenovic<sup>1</sup>, Ivan Boricic<sup>4</sup>

1) Institute for Infectious and Tropical Diseases, Clinical Centre of Serbia, Medical Faculty, University of Belgrade; 2) Clinical Centre of Uzice, Department for Infectious Diseases, Uzice, Serbia; 3) Clinical Centre of Podgorica, Department for Infectious Diseases, Podgorica, Montenegro, 4) Institute of Pathology, Medical Faculty, University of Belgrade, Serbia

## Abstract

**Background & Aim.** Quality of life may be reduced in patients with chronic liver diseases. The purpose of this study was to assess the impact of chronic viral liver disease on health-related quality of life (HRQOL). **Patients and methods.** Quality of life was prospectively investigated in 227 patients with chronic viral liver disease and 75 controls. The generic Short Form 12 questionnaire was applied to measure the HRQOL. Mental and physical component scores were expressed as numeric and categorical values (presence/absence of disability). The electronic database (SPSS for Windows) was used for statistical analysis with 95% confidence intervals. **Results.** Mental and physical numeric and categorical scores for the absence of disability were significantly worse in patients compared with controls. Patients were a negative predictive factor for the absence of disability on both mental and physical components while the physical component was the significant factor in multivariate regression analysis ( $p=0.000$ ). There was no difference in HRQOL scores among patients with hepatitis C or B virus infection. Mental and physical numeric scores were lower in patients with cirrhosis. Liver cirrhosis predicted lower components of the absence of disability in comparison to chronic hepatitis more influencing the physical component ( $p=0.003$ ). **Conclusions.** Chronic viral liver disease reduces and predicts a lower quality of life in comparison to a healthy population impairing more the physical component. Hepatitis viruses do not influence differently the quality of life. Liver cirrhosis has a higher negative impact on the quality of life than chronic hepatitis, especially relating to a physical component.

## Key words

Quality of life - chronic hepatitis – cirrhosis - hepatitis C virus - hepatitis B virus

## Introduction

Health-related quality of life (HRQOL) refers to the subjective assessment of patients regarding the physical, mental and social dimensions of well-being. It has become an important measure in clinical and epidemiological studies in gastroenterology and hepatology [1, 2]. Generally, three main types of instruments are used for HRQOL measurement, namely global, generic, and disease specific. According to literature reports, quality of life may be reduced in chronic liver diseases of various etiologies [3, 4].

In this study we evaluated the impact of chronic viral liver disease (CLD-V) on the HRQOL using the generic questionnaire. Additionally, we investigated whether HRQOL in patients with CLD-V differs in relation to the viral etiology and severity of the disease.

## Patients and methods

### Selection of the patients

We analyzed a total of 302 persons in a randomized prospective study: consecutively hospitalized 227 treatment-naïve patients with CLD-V (mean age  $39 \pm 11.3$  years, range 16-66, males 146) and 75 controls with similar socio-demographic characteristics (mean age  $33 \pm 10.82$  years, range 21-60; males 39). Among patients, 167 were infected with hepatitis C virus (HCV) and 60 with hepatitis B virus (HBV). Age of patients with HCV chronic liver disease (CLD-C) ranged from 16-66 years (mean  $39 \pm 11$ ), and with HBV chronic liver diseases (CLD-B) from 19-66 years (mean  $42.5 \pm 12$ ). Patients were hospitalized in tertiary (Belgrade and Podgorica) and secondary (Uzice) referral centers from January 2005 to December 2006. Data of employment as well on marital status were collected. Patients were classified based on histopathology and/or clinical aspects into two groups depending on the progression of the disease: with chronic hepatitis (184 patients) and with

Received: 17.08.2008 Accepted: 20.11.2008

J Gastrointestin Liver Dis

December 2008 Vol.17 No 4, 405-409

Address for correspondence:

Prof. Neda Svirtlih, MD, PhD  
Institute for Infectious and Tropical  
Diseases, Clinical Centre of Serbia  
Medical Faculty University of Belgrade  
Belgrade, Serbia  
E-mail: nedasch@drenik.net

liver cirrhosis (43 patients). Patients with extreme ascites, encephalopathy grade 2 or more, and other co-morbidity (i.e. congestive heart failure, psychiatric conditions, diabetes mellitus, hepato-pulmonary syndrome etc) were excluded from the study. Presence of hepatitis B surface antigen and anti-HCV antibodies with positive serum HCV RNA allowed the diagnosis of CLD-B and CLD-C, respectively. Percutaneous liver biopsy was performed in 162 patients and samples were evaluated blindly. Liver tissue samples were stained routinely and the Ishak scoring system was used for grading and staging [5].

The study was conducted with the approval of the University Ethics Committee.

### HRQOL measurement

Each person gave an informed consent and completed a self-administered HRQOL generic questionnaire, the Medical Outcomes Study Short Form 12 (SF-12). This 12-item questionnaire summarizes two scales describing mental well-being (the mental component summary - MCS) and physical well-being (the physical component summary - PCS) [6]. Instead of five decimal places for the MCS and the PCS, we used a simpler numeric scoring method (rounded whole integer scoring system for each answer) [7]. Both scales were calculated as numeric and two categorical values e.g.,  $>50$  = absence of disability;  $\leq 50$  = presence of disability. In general, lower scores on the MCS and the PCS indicated greater disability.

### Statistics

Normal distributed parametric data were calculated using Student's t-test. Non-normal data were compared by Mann-Whitney test or Kruskal-Wallis test. Non-parametric variables were calculated by Chi-square or Fisher's exact test. Significant variables were introduced into a univariate logistic regression model and further multivariate analysis was done. A p value  $<0.05$  and  $<0.01$  was considered to be significant for univariate and multivariate analysis, respectively. All analyses were performed using the electronic database organized in SPSS for Windows (version 11.0) statistical package and results are presented with 95% confidence intervals (95% CI).

## Results

### Characteristics of the patients with chronic viral liver disease

Statistical analysis of socio-demographic characteristics between patients with CLD-C and CLD-B showed significant differences for the following variables: total age, age  $\leq 40$  yrs, and marital status. Patients with CLD-C were younger as compared to patients with CLD-B ( $p = 0.009$ ). Significantly, a higher frequency of age  $\geq 40$  yrs (63.3 % vs. 43.7%,  $p = 0.011$ ) and married patients (61.7% vs. 40.1%,  $p = 0.004$ ) was found in CLD-B group in comparison to the CLD-C group.

### Quality of life in patients with chronic viral liver diseases in comparison to controls

Results of numeric mental and physical scores of the

SF-12 in patients with chronic viral disease and controls are presented in Table I. Significantly lower total scores were found in patients with CLD-V in comparison to controls for mental and physical numeric components of the SF-12 ( $p < 0.001$  for both scores).

**Table I.** Numeric scores of the SF-12 in patients with CLD-V and controls

Test score	Patients (N=227) Mean $\pm$ SD; range	Controls (N=75) Mean $\pm$ SD; range	p*
Mental	43.01 $\pm$ 11.95; 13-66	49.64 $\pm$ 9.85; 22-65	0.000 Z = -4.340**
Physical	45.07 $\pm$ 9.57; 21-67	53.15 $\pm$ 6.47; 34-64	0.000 t = -4.137***

\*Significance of total scores ( $p < 0.05$ ); \*\*Mann-Whitney test, \*\*\*Student's t-test

Analyzing the mental and the physical component categorical scores for the absence of disability (scores  $> 50$ ), significant differences in frequency were found between patients and controls (33.5% vs. 66.7% and 40.5% vs. 77.3%, respectively;  $p = 0.000$ , for both components).

The univariate regression analysis revealed the patients as the significant negative predictive factor for both mental and physical components of the absence of disability in comparison to controls ( $p = 0.000$ , Exp(B)= 0.252, 0.145-0.438 and  $p = 0.000$ , Exp(B) = 0.185, 0.100-0.341, respectively). The physical component was the significant variable in multivariate analysis ( $p = 0.000$ , Exp(B)= 0.268, 0.137-0.524).

Comparison of mental and physical numeric scores of the HRQOL between patients and controls depending on age distribution (10 yrs-difference) is presented in Table II.

**Table II.** Quality of life depending on age distribution between patients and controls

Age (yrs)	p MCS*	p PCS**
20-29	0.310; Z=-1.015	0.004; Z=-2.856
30-39	0.077; Z=-1.766	0.009; Z=-2.605
40-49	0.586; Z=-0.586	0.162; Z=-1.397
$\geq 50$	0.000; Z=-3.972	0.000; Z=-4.356

\*significance of the mental component numeric score (MCS) ( $p < 0.05$ ); Mann-Whitney test; \*\*significance of the physical component numeric score (PCS) ( $p < 0.05$ ); Mann-Whitney test

Significant differences were found for the mental component only in the category of age over 50 yrs, while the physical component was different in all categories except for age 40-49 yrs.

### Quality of life in patients with chronic viral liver disease depending on the etiology

Results of numeric mental and physical scores of the SF-12 in patients with chronic liver disease with different viral etiology are presented in Table III.

There were no significant differences in both mental and physical numeric scores ( $p > 0.05$ , for both scores) between patients with CLD-C and CLD-B.

**Table III.** Numeric scores of the SF-12 in patients with CLD-B

Test score	CLD-C (N=167)	CLD-B (N=60 pts)	p*
	Mean ± SD range	Mean±SD range	
Mental	43.02 ± 12.25; 13- 60	42.97 ± 11.20; 24- 62	0.386, Z = - 0.867**
Physical	45.68 ± 9.43; 21- 63	43.95 ± 9.83; 23- 67	0.106, t = -1.625***

\*Significance of total scores ( $p < 0.05$ ), \*\*Mann-Whitney test,

\*\*\* Student's t- test

Analysis of mental and physical categorical scores of the absence of disability (scores  $> 50$ ) did not show a significant difference in frequency between patients with CLD-C and patients with CLD-B ( $p > 0.05$  for both scores).

### Quality of life in patients with chronic viral liver disease depending on the progression of the disease

Results of mental and physical numeric scores in patients with and without liver cirrhosis are presented in Table IV.

Statistical analysis showed significantly lower mental and physical total numeric scores in patients with cirrhosis in comparison to patients without cirrhosis ( $p < 0.001$  for both scores). Analysis of mental and physical component scores in patients with and without cirrhosis showed significant differences in frequency in the category of the absence of disability (7% vs. 39.7% and 9.3% vs. 47.8%, respectively;  $p = 0.000$  for both scores).

**Table IV.** Numeric scores of the SF-12 in patients with and without liver cirrhosis

Test score	Cirrhosis (N=43 pts)	No cirrhosis (N=184 pts)	p*
	Mean ± SD range	Mean±SD range	
Mental	34.40 ± 8.805 (22- 56)	45.02 ± 11.704 (13- 66)	0.000; Z = -5.349**
Physical	37.28 ± 8.467 (21- 63)	46.89 ± 8.896 (23- 67)	0.000; t = -6.432***

\*Significance of total scores ( $p < 0.05$ ); \*\*Mann-Whitney test,

\*\*\* Student's t- test

The univariate regression analysis revealed cirrhosis as the significant negative predictive factor for both mental and physical components of the absence of disability ( $p = 0.000$ , Exp(B)= 0.111, 0.033-0.374 and  $p = 0.000$ , Exp(B)= 0.112, 0.1038-0.326, respectively). The physical component was the significant variable in multivariate analysis ( $p = 0.003$ , Exp(B)= 0.182, 0.060-0.552).

## Discussion

This study presents our preliminary results of the quality of life in patients with chronic viral liver disease. In the investigation we used a simple questionnaire, the generic questionnaire with 12 items. This questionnaire is easy for understanding and takes patients a short time to answer. Recent studies demonstrated the validity of these 12-items

in reproducing the SF-36 summary scales in 9 European countries and Australia [8, 9].

The cohort in this study consisted of patients with chronic liver disease of two viral etiologies, HCV and HBV. Analysis of socio-demographic characteristics showed higher frequency of older and married patients with CLD-B in comparison to CLD-C patients. These data suggest that the younger age of CLD-C patients is linked with their behavior regarding intravenous drug abuse as the most important route of early HCV transmission. Interestingly, our results did not demonstrate that etiology influenced the clinical presentation of the disease, i.e., chronic hepatitis vs. liver cirrhosis. Since a progression of CLD-C is more rapid in older age, we expected a less number of patients with advanced liver disease in this younger group [10, 11]. Unfortunately we had little data regarding the time of infection in the majority of our patients to discuss about this assumption in details. In addition, our finding of numerous married CH-B patients is probably a coincidence with their older age.

Our results show that quality of life is reduced in patients with CLD-V in comparison with healthy persons. Total scores of mental and physical numeric components in patients were significantly lower in patients than in controls. A lower frequency of patients compared to controls was demonstrated also in the categorical scores concerning the absence of disability of both the mental component (33.5% vs. 66.7%) and the physical component (40.5% vs. 77.3%). Also, the group of patients calculated in the regression analysis was revealed as the negative predictive factor for quality of life for both components. These results are in agreement with previous reports that quality of life is impaired as expected in patients with chronic viral infection of the liver in comparison to healthy persons [3, 4, 12-15].

There are several reports demonstrating a physical component more diminished than a mental component of the quality of life in chronic liver disease, mostly in association with already established liver cirrhosis [14, 16, 17]. Our data also showed more impairment of the physical than the mental component of the SF-12 although the majority of patients were without cirrhosis. It is possible that exclusion of patients with mental co-morbidity and cognitive impairment in this investigation (patients with antidepressive therapy, advanced encephalopathy, etc.) was the reason for lower physical than mental score in non-cirrhotic patients in our study [18, 19]. Another explanation may be because of a greater number of patients with CLD-C in comparison to CLD-B, as HCV per se gives rise to physical symptoms reducing the quality of life of infected patients [20]. Our results also demonstrated that older age has an important negative impact on both components although calculation of comparative data among age groups showed more influence of age on impairment of physical than mental health.

We analyzed whether mental and physical HRQOL scores are different among patients with chronic HCV and HBV liver disease. We found no significant differences in scores between these groups. Generally, literature data show a worse score of viral C than viral B chronic hepatitis patients

although the impact of HBV on quality of life has not been fully explored [20-22]. Finding a poorer quality of life in patients with HCV as compared to HBV chronic infection was explained by possible various mechanisms of the viruses to impair the HRQOL. An increase of cognitive dysfunction, depression and fatigue was reported in relation to presence of HCV replication in the central nervous system [23-25]. On the contrary, various host and environment-related factors rather than viral, such as intravenous drug abuse, important for HCV infection were found to have significant impact on the HRQOL level [26, 27]. The recent development of the hepatitis B quality of life instrument will be helpful in future clinical practice and clinical trials in this infection [28].

Finally, we found that both total mental and physical numeric and categorical scores of the quality of life were significantly decreased in cirrhosis as compared to patients with less severe liver disease. Additionally, as already mentioned, established cirrhosis was more predictable for the physical than the mental component of the quality of life. An added explanation for this finding could be that the majority of the patients with cirrhosis were older than 40 yrs (90%,  $p=0.000$ , data not shown) that may aggravate the physical condition of these patients. This strong negative association between cirrhosis and the impairment of the HRQOL has been recently reported [14, 16, 17, 29]. Future investigations taking into consideration the follow-up of the quality of life over a longer period, the assessment of the quality of life in relation with antiviral therapy [30], and the use of disease specific questionnaires (i.e. for chronic liver disease) [31] will be more useful in the evaluation of the HRQOL.

The limits of the present study are the disparity in sample sizes of patients and controls and the diversity in age among groups, which might have contributed to some bias in revealing differences in HRQOL.

In **conclusion**, our preliminary investigation confirms that quality of life is reduced in patients with chronic viral liver disease in comparison with healthy persons independent of B or C viral etiology. A lower quality of life is further influenced by ageing and worsening of the disease severity especially affecting a physical component.

## Conflicts of interest

None to declare.

## References

- Borgaonkar MR, Irvine EJ. Quality of life measurement in gastrointestinal and liver disorders. *Gut* 2000; 47: 444-454.
- Younossi ZM, Guyatt G. Quality-of-life assessment and chronic liver disease. *Am J Gastroenterol* 1998; 93: 1037-1041.
- Martin LM, Sheridan MJ, Younossi ZM. The impact of liver disease on health-related quality of life: a review of the literature. *Curr Gastroenterol Rep* 2002; 4: 79-83.
- Gutelling JJ, de Man RA, van der Plas SM, Schalm SW, Busschbach JJ, Darlington AS. Determinants of quality of life in chronic liver patients. *Aliment Pharmacol Ther* 2006; 23: 1629-1635.
- Ishak K, Baptista A, Bianchi L, et al. Histological grading and staging of chronic hepatitis. *J Hepatol* 1995; 22: 696-699.
- Ware J Jr, Kosinski M, Keller SD. A 12-item Short-Form Health Survey: construction of scales and preliminary test of reliability and validity. *Med Care* 1996; 34: 220-233.
- Andrews G. A brief integer scorer for the SF-12: validity of the brief scorer in Australian community and clinic settings. *Aust N Z J Public Health* 2002; 26: 508-510.
- Gandek B, Ware JE, Aaronson NK, et al. Cross-validation of item selection and scoring for the SF-12 Health Survey in nine countries: results from IQOLA project. *International Quality of Life Assessment. J Clin Epidemiol* 1998; 51: 1171-1178.
- Sanderson K, Andrews G. The SF-12 in the Australia population: cross-validation of item selection. *Aust N Z J Public Health* 2002; 26: 343-345.
- Serra MA, Rodriguez F, del Olmo JA, Escudero A, Rodrigo JM. Influence of age and date of infection on distribution of hepatitis C virus genotypes and fibrosis stage. *J Viral Hepat* 2003; 10: 183-188.
- Ryder SD, Irving WL, Jones DA, Neal KR, Underwood JC; Trent Hepatitis C Study Group. Progression of hepatic fibrosis in patients with hepatitis C: a prospective repeat liver biopsy study. *Gut* 2004; 53: 451-455.
- Bonkovski HL, Woolley J M. Reduction of health-related quality of life chronic hepatitis C and improvement with interferon therapy. The Consensus Interferon Study Group. *Hepatology* 1999; 29: 264-270.
- Younossi ZM, Boparai N, Price LL, Kiwi ML, McCormick M, Guyatt G. Health-related quality of life in chronic liver disease: the impact of type and severity. *Am J Gastroenterol* 2001; 96: 2199-2205.
- Park CK, Park SY, Kim ES, et al. Assessment of quality of life and associated factors in patients with chronic viral liver disease. *Taeahan Kan Hakhoe Chi* 2003; 9: 212-221.
- Kang SC, Hwang SJ, Lee SH, Chang FY, Lee SD. Health-related quality of life and impact of antiviral treatment in Chinese patients with chronic hepatitis C in Taiwan. *World J Gastroenterol* 2005; 11: 7494-7498.
- Arguedas MR, DeLawrence TG, McGuire MG. Influence of hepatic encephalopathy on health-related quality of life in patients with cirrhosis. *Dig Dis Sci* 2003; 48: 1622-1626.
- Marchesini G, Bianchi G, Amodio P, et al; Italian study group for quality of life in cirrhosis. Factors associated with poor health-related-quality of life of patients with cirrhosis. *Gastroenterology* 2001; 120: 170-178.
- Gallegos-Orozco JF, Fuentes AP, Gerardo Argueta R, et al. Health-related quality of life and depression in patients with chronic hepatitis C. *Arch Med Res* 2003; 34: 124-129.
- Hauser W, Zimmer C, Schiedermaier P, Grandt D. Biopsychosocial predictors of health-related quality of life in patients with chronic hepatitis C. *Psychosom Med* 2004; 66: 954-958.
- Foster GR, Goldin RD, Thomas HC. Chronic hepatitis C virus infection causes a significant reduction in quality of life in the absence of cirrhosis. *Hepatology* 1998; 27: 209-212.
- Bondini S, Kallman J, Dan A, et al. Health-related quality of life in patients with chronic hepatitis B. *Liver Int* 2007; 27: 1119-1125.
- Pojoga C, Dumitraşcu DL, Pascu O, Grigorescu M, Radu C, Damian D. Impaired health-related quality of life in Romanian patients with chronic viral hepatitis before antiviral therapy. *Eur J Gastroenterol Hepatol* 2004; 16:27-31.
- Forton DM, Taylor-Robinson SD, Thomas HC. Cerebral dysfunction in chronic hepatitis C infection. *J Viral Hepat* 2003; 10: 81-86.
- McAndrews MP, Farcnik K, Carlen P, et al. Prevalence and significance of neurocognitive dysfunction in hepatitis C in the absence of correlated risk factors. *Hepatology* 2005; 41: 801-808.

25. Laskus T, Radkowski M, Adair DM, Wilkinson J, Scheck AC, Rakela J. Emerging evidence of hepatitis C virus neuroinvasion. *AIDS* 2005; 19 (Suppl 3): S140-144.
26. Dalgard O, Egeland A, Skaug K, Vilimas K, Steen T. Health-related quality of life in active injecting drug users with and without chronic hepatitis C virus infection. *Hepatology* 2004; 39: 74-80.
27. Helbling B, Overbeck K, Gonvers JJ, et al. Host-rather than virus-related factors reduce health-related quality of life in hepatitis C virus infection. *Gut* 2008; 57: 1597-1603.
28. Spiegel BM, Bolus R, Han S, et al. Development and validation of a disease-target quality of life instrument in chronic hepatitis B: the hepatitis B quality of life instrument, version 1.0. *Hepatology* 2007; 46:113-121.
29. Younossi ZM. Chronic liver disease and health-related quality of life. *Gastroenterology* 2001; 120: 305-307.
30. Pojoga C, Dumitraşcu DL, Pascu O, Grigorescu M. The effect of interferon alpha plus ribavirin on health-related quality of life in chronic C hepatitis. The Romanian experience. *J Gastrointestin Liver Dis* 2006;15:31-35.
31. Younossi ZM, Guyatt G, Kiwi M, Boparai N, King D. Development of a disease specific questionnaire to measure health related quality of life in patients with chronic liver disease. *Gut* 1999; 45: 295-300.