Quality of life in patients with chronic liver disease

Kvalitet života bolesnika sa hroničnom bolešću jetre

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Abstract

Background/Aim. Quality of life is impaired in patients with the chronic liver disease (CLD). Patients with this disease have numerous disabling problems which lead to a reduced health related quality of life (HRQoL). The aim of our study was to evaluate the predictive value of selected socio-demographic and clinical characteristics on HRQoL in Serbian cohort of patients with the CLD. **Methods.** Over a period of one year, we performed a study which included patients with the CLD. We used Short Form Health Survay-36 (SF-36) for assessment of HRQoL. The assessment of depression and anxiety was made by using Hamilton scale of depression and anxiety, while the assessment of fatigue was performed by Fatigue severity scale. **Results.** The study included 103 patients with the CLD. The average values of the overall SF-36 scores were 52.6 ± 20.4, while the mean score of the composite scores were 53.5 ± 19.6 for the Mental component summary and 49.8 ± 21.3 for the Physical component summary. Some domains of HRQoL were significantly affected by following factors: gender, age, employment status, alcohol consumption, depression, anxiety and fatigue. Predictors of physical components of HRQoL were employment, depression and fatigue, and predictors of mental components were depression and fatigue. **Conclusion.** The tested socio-demographic, clinical and behavioral factors have an impact on the HRQoL in patients with the CLD. The most important predictors of HRQoL are behavioral factors suggesting the need for an adequate therapeutic action in order to improve the HRQoL in these patients.

Key words:
liver diseases; hepatic insufficiency; quality of life; serbia; sociological factors; demography; depression; surveys and questionnaires.

Apstrakt

Uvod/Cilj. Kvalitet života je snižen kod bolesnika sa hroničnom bolešću jetre (HBJ). Bolesnici sa ovom bolešću imaju veliki broj onesposobljujućih simptoma što dovodi do redukcije kvaliteta života povezanog sa zdravljem (KŽPZ). Cilj ovog istraživanja bio je evaluacija prediktivne vrednosti sociodemografskih i kliničkih karakteristika na KŽPZ u srpskoj kohorti bolesnika sa HBJ. **Metode.** Sprovedena je studija preseka u trajanju od jedne godine, koja je uključivala bolesnike sa HBJ. Za procenu KŽPZ korišćen je *Short Form Health Survay-36* upitnik (SF-36). Za procenu depresije i anksioznosti korišćene su Hamiltonova skala depresije i anksioznosti, dok je procena zamora vršena skalom težine zamora. **Rezultati.** U studiju je bilo uključeno 103 bolesnika sa HBJ. Prosečna vrednost ukupnog SF-36 skora je bila 52,6 ± 20,4. Vrednosti kompozitnih skorova bili su 53,5 ± 19,6 za mentalni kompozitni skor i 49,8 ± 21,3 za fizički kompozitni skor. Na pojedine domene kvaliteta života utiču: pol, starost, zaposlenje, konzumiranje alkohola, depresija, anksioznost i zamor. Prediktori fizičke komponente kvaliteta života su bili: zaposlenje, depresija i zamor, dok su prediktori mentalne komponente bili depresija i zamor. **Zaključak.** Od ispitivanih sociodemografskih, kliničkih i bihejvioralnih faktora samo pojedini imaju uticaja na KŽPZ bolesnika sa HBJ. Najvažniji prediktori kvaliteta života su bihejvioralni faktori, što ukazuje na potrebu adekvatnog terapijskog delovanja u cilju poboljšanja KŽPZ kod ovih bolesnika.

Ključne reči:
jetra, bolesti; jetra, insuficijencija; kvalitet života; srbija; socijalni faktori; demografija; depresija; ankete i upitnici.

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Introduction

Over the past decades it has been highlighted that physical aspect of health is predominant from physician's viewpoint, while patients emphasize the importance of how they feel and how disease affects their well-being[1]. Integration of the biomedical model of health with socio-medical model (psychosocial and economic components) resulted in the appearance of a new concept – health-related quality of life (HRQoL)[2]. This concept is related to a patient's subjective assessment of physical, mental and social dimensions of well-being and social functioning[3].

HRQoL assessment is carried out using standardized questionnaires which may be generic or specific. The most widely used generic questionnaire is SF-36 (Short Form Health Survay-36)[4]. The various disease-specific questionnaires are available in the field of Hepatology, but most commonly used is CLDQ (Chronic Liver Disease Questionnaire)[5].

It has been well recognized that patients with chronic liver disease (CLD) have deeply affected HRQoL[6–12]. Namely, patients with this disease have numerous problems (depression, anxiety, loss of self-esteem, emotional problems, fatigue, itching, complications of the liver cirrhosis, reduced working capacity, etc.) leading to reduced HRQoL and well-being[1, 2, 13–16].

Although the numerous and heterogeneous studies were conducted in order to find out the influence of the CLD on HRQoL, the majority of these investigations were based on the importance of etiology[1, 6, 14, 15, 17–23] and severity of the CLD[1, 2, 6, 14-16, 19, 20–22, 24–26] on HRQoL. The most often evaluated predictors of HRQoL among cohort of the CLD patients were: gender[6, 12, 14–16, 19–23, 27], age[6, 14, 16, 19–23, 27, 28], ascites[15, 23], hepatic encephalopathy[8, 23], depression and anxiety[16, 18, 21, 26, 28–30] and fatigue[12, 18, 26–28]. Furthermore, the possible influence of level of education, employment and marital status on HRQoL is available from studies conducted on patients with liver transplantation[31] and patients with the CLD using the disease specific questionnaire[16, 19]. On the other hand, there is a shortage of information about the importance of factors such as children status, alcohol consumption, smoking, duration of liver disease and previous gastrointestinal bleeding on the HRQoL of patients with the CLD.

Keeping in mind all mentioned above, the aim of our study was to evaluate the predictive value of selected sociodemographic and clinical characteristics, on HRQoL in Serbian cohort of patients with the CLD.

Methods

Patients

The sampling method and detailed methodology were published previously[30, 32]. We performed a cross-sectional study for a period of one year (October 2009 – October 2010). The study was conducted at the Clinic for Gastroenterology and Hepatology, Clinical Center of Serbia, Belgrade, and included 103 patients with chronic liver disease (chronic hepatitis or cirrhosis). Exclusion criteria

were: age < 18 years, psychiatric disorders, acute complications of the CLD, hepatic encephalopathy (grade > 2) and liver transplantation[30, 32].

Instruments

The SF-36 was used as a general questionnaire[4]. It consisted of 36 questions, grouped into eight domains: Physical functioning (PF), Role physical (RP), Bodily pain (BP), General health (GH), Vitality (VT), Social functioning (SF), Role emotional (RE) and Mental health (MH). In addition to calculating these scores, two composite scores were calculated. Physical component summary (PCS) included domains: Physical functioning, Role physical, Bodily pain and General health, while Mental component summary (MCS) included Vitality, Social functioning, Role emotional and Mental health. The total SF-36 score represented mean value of the PCS and MCS. Higher values denoted better HRQoL.

Behavioral factors

The severities of depression and anxiety were measured using the Hamilton depression scale (HDRS)[33] and Hamilton anxiety scale (HARS)[34]. The Hamilton depression scale included evaluation of 21 symptoms or signs of depression which are graded on a scale ranging from 0 (best score) to 4 (worst score), or from 0 to 2 (for some items). The Hamilton anxiety scale consisted of 14 questions that assessed the level of anxiety (semi-quantitative), where the answers were ranked from 0 (best score) to 4 (worst score). In both Hamilton scales the total score is equal to the sum of individual scores, and higher score indicated higher degree of depression or anxiety. The grade of fatigue was determined by the Fatigue severity scale (FSS)[35]. The FSS scale evaluated 9 claims on the scale from 1 ("strongly disagree") to 7 ("strongly agree"). A total score was equal to the sum of scores for each statement divided by 9. Higher total score indicated higher level of fatigue.

Ethics

The study was approved by the Ethics Committee of the Faculty of Medicine, University in Belgrade (No. 29/I-2).

Statistics

We used methods of descriptive and analytical statistics. Testing the significance of differences was performed by Student's t-test or one-way ANOVA (parametric variable), and χ^2 test, Mann-Whitney U test or Kruskal-Wallis H test (nonparametric variable). In case of statistical significance, post hoc Tukey tests or multiple Kruskal-Wallis tests were used. We used Pearson's or Spearman's correlation coefficients for analyzing correlation. The significant difference was set for $p < 0.05$.

An effect of individual variables on the composite scores (PCS and MCS) was assessed by univariate and hierarchical multivariate regression analysis.

Results

The study was included 103 patients with chronic liver disease, 56 male and 47 females, with average age of 53.8 ± 12.9 years. The largest proportion of patients (71.8%) were unemployed. Most of the patients had the CLD in a stage of liver cirrhosis (77%), usually of alcoholic etiology (35%). The average SF-36 scores were 52.6 ± 20.4. The average MCS was 53.5 ± 19.6, while PCS was 49.8 ± 21.3.

Gender

In comparison to men, the women had significantly lower MCS [t (101) = 2.149; p = 0.034], PCS [t (101) = 2.132; p = 0.035] and scores for the domains: Physical functioning (z = -2.483; p = 0.013) and Mental health [t (101) = 2.459; p = 0.016], as presented in Table 1. For the domains: Role physical (p = 0.148), Bodily pain (p = 0.212), Vitality (p = 0.067), General health (p = 0.549), Social functioning (p = 0.053) and Role emotional (p = 0.238) no significant differences were found.

Age

A statistically significant difference was detect for PCS [F (2.100) = 4.852; p = 0.010] and the scores for the domains Physical functioning [χ^2 (2) = 17.275; p < 0.001] and Bodily pain [χ^2 (2) = 7.359; p = 0.025] (Table 1). Post hoc analysis showed that patients aged ≤ 39 years had higher PCS and sub-score for Physical functioning and Bodily pain compared

to the patients ≥ 60 years. The patients aged 40–59 years had a significantly higher sub-score for Physical functioning and Bodily pain compared to the patients aged ≥ 60 years. In the domains Role physical (p = 0.270), General health (p = 0.648), Vitality (p = 0.077), Social functioning (p = 0.410), Role emotional (p = 0.159), Mental health (p = 0.828) and MCS (p = 0.445) no significant differences were found.

Level of education

Among the patients with different education levels, no difference was found in MCS (p = 0.814), PCS (p = 0.580) as well as in scores for the domains Physical functioning (p = 0.944), Role physical (p = 0.387), Bodily pain (p = 0.135), General health (p = 0.799), Vitality (p = 0.617), Social functioning (p = 0.613), Role emotional (p = 0.715) and Mental health (p = 0.498).

Employment status

The patients with different employment status had a statistically significant difference in scores for the domains Physical functioning [χ^2 (2) = 18.857; p < 0.001], Role physical [χ^2 (2) = 6.145; p = 0.046], Bodily pain [χ^2 (2) = 15.763; p = 0.001], Vitality [F (2,100) = 5.857; p = 0.004] and PCS [F (2.100) = 9.377; p < 0.001] (Table 1).

Post hoc analysis showed that patients who were retired had a significantly lower score in the domains Physical functioning, Role physical, Bodily pain, Vitality, and PCS

Table 1

The values of SF-36 scores between the groups with significant difference in at least one domen

Characteristics	Physical functioning	Role physical	Bodily pain	General Health	Vitality	Social functioning	Role emotion	Mental health	MCS	PCS
					SF-36 score*					
Gender										
male	**67.1** (28.7)	37.5 (43.4)	64.0 (28.4)	41.5 (19.5)	59.1 (22.4)	67.4 (26.9)	47.0 (42.5)	**71.5** (19.0)	**57.3** (19.9)	**53.8** (22.0)
female	**53.5** (28.5)	24.4 (37.4)	56.7 (28.8)	39.3 (16.1)	50.9 (22.2)	56.3 (30.1)	36.8 (42.4)	**61.8** (20.6)	**49.0** (18.6)	**45.0** (19.6)
Age (years)										
≤ 39	**81.0** (19.3)	46.6 (46.1)	**72.8** (28.9)	40.0 (19.2)	64.6 (19.6)	70.0 (30.9)	53.3 (39.4)	69.0 (24.2)	59.4 (21.7)	**61.0** (18.6)
40–59	**65.3** (28.0)	30.7 (39.7)	**63.8** (26.6)	42.1 (18.2)	56.7 (21.8)	59.1 (26.4)	34.6 (41.7)	67.6 (18.2)	52.0 (19.2)	51.7 (20.5)
≥ 60	**46.1** (27.8)	26.3 (40.5)	**51.0** (29.3)	38.4 (17.5)	49.5 (23.7)	63.8 (31.3)	49.0 (43.9)	65.5 (21.7)	53.3 (19.5)	**42.3** (21.2)
Employment										
employed	**74.3** (25.5)	**44.8** (46.4)	**75.3** (26.3)	42.2 (20.4)	**64.3** (20.6)	63.3 (26.0)	48.2 (47.6)	69.1 (19.9)	57.4 (21.4)	**60.2** (20.1)
unemployed	**70.2** (29.6)	**36.0** (40.8)	**65.6** (26.8)	41.8 (17.4)	**59.6** (18.8)	64.0 (30.4)	44.0 (38.1)	70.0 (18.0)	55.9 (17.6)	**54.6** (20.3)
retired	**48.2** (26.2)	**21.4** (35.7)	**49.5** (26.8)	38.8 (17.0)	**47.9** (23.3)	60.9 (30.0)	38.0 (41.9)	64.4 (21.5)	50.0 (19.4)	**41.2** (19.3)
Consuming alcohol										
no	**54.4** (28.9)	22.3 (35.8)	59.7 (30.4)	38.2 (19.0)	53.5 (23.3)	59.8 (31.2)	39.7 (42.0)	63.6 (21.0)	51.0 (19.9)	45.6 (20.4)
yes	**66.3** (28.7)	39.2 (43.9)	61.4 (27.4)	42.4 (17.1)	56.9 (22.0)	64.5 (26.7)	44.6 (43.2)	70.0 (19.3)	55.7 (19.4)	53.3 (21.6)

*Mean (± standard deviations); SF-36 – Short Form Health Survay-36; PCS – Physical component summary; MCS – Mental component summary; Bold – p < 0.05.

compared to the employed patients and in the domains Physical functioning, Bodily pain, and PCS compared to the unemployed patients. In the domains of General health ($p = 0.676$), Social functioning ($p = 0.893$), Mental health ($p = 0.434$), Role emotional ($p = 0.620$) and MCS ($p = 0.221$) no significant differences were found.

Marital status

Patients with different marital status did not differ in scores regarding the domains MCS ($p = 0.618$), PCS ($p = 0.677$), Physical functioning ($p = 0.501$), Role physical ($p = 0.794$), Bodily pain ($p = 0.707$), General health ($p = 0.807$), Vitality ($p = 0.631$), Social functioning ($p = 0.953$), Role emotional ($p = 0.918$) and Mental health ($p = 0.063$).

Children

Among patients who had and those who did not have children there were no statistically significant differences in MCS ($p = 0.289$) and PCS ($p = 0.926$) as well as scores in the domains Physical functioning ($p = 0.983$), Role physical ($p = 0.855$), Bodily pain ($p = 0.598$), General health ($p = 0.728$), Vitality ($p = 0.276$), Social functioning ($p = 0.984$), Role emotional ($p = 0.192$) and Mental health ($p = 0.448$).

Alcohol consumption

Patients who consumed alcohol had significantly higher scores in the domain Physical functioning ($z = -2.124$; $p = 0.034$) (Table 1). As for the domains Bodily pain ($p = 0.759$), Role physical ($p = 0.055$), General health ($p = 0.251$), Vitality ($p = 0.439$), Social functioning ($p = 0.416$), Role emotional ($p = 0.582$), Mental health ($p = 0.114$), PCS ($p = 0.071$) and MCS ($p = 0.229$) no significant differences were found.

Smoking

Among smoking and nonsmoking patients, we found no statistically significant differences in MCS ($p = 0.428$), PCS ($p = 0.889$), Physical functioning ($p = 0.986$), Role physical ($p = 0.884$), Bodily pain ($p = 0.725$), General health ($p = 0.503$), Vitality ($p = 0.504$), Social functioning ($p = 0.208$), Role emotional ($p = 0.495$) and Mental health ($p = 0.830$).

Disease severity

Among the patients with varying severity of the CLD no significant difference was found neither in PCS ($p = 0.742$) and MCS ($p = 0.883$), nor in scores for the domains Physical functioning ($p = 0.764$), Role physical ($p = 0.418$), Bodily pain ($p = 0.355$), General health ($p = 0.979$), Vitality ($p = 0.565$), Social functioning ($p = 0.553$), Role emotional ($p = 0.256$) and Mental health ($p = 0.318$).

Etiology

Among patients with different etiology of the CLD no significant differences were found in PCS ($p = 0.608$), MCS

($p = 0.283$) nor in scores for the domains Physical functioning ($p = 0.181$), Role physical ($p = 0.844$), Bodily pain ($p = 0.728$), General health ($p = 0.766$), Vitality ($p = 0.541$), Social functioning ($p = 0.120$), Role emotional ($p = 0.408$) and Mental health ($p = 0.303$).

Duration of the chronic liver disease

There was no significant correlation between the duration of liver disease and MCS ($p = 0.078$), PCS ($p = 0.700$), Physical functioning ($p = 0.958$), Role physical ($p = 0.159$), Bodily pain ($p = 0.372$), General health ($p = 0.153$), Vitality ($p = 0.439$), Social functioning ($p = 0.303$), Role emotional ($p = 0.112$) and Mental health ($p = 0.058$).

Previous gastrointestinal bleeding

Among patients who had episode of gastrointestinal bleeding and those who did not, no significant differences in MCS ($p = 0.319$), PCS ($p = 0.699$), Physical functioning ($p = 0.965$), Role physical ($p = 0.060$), Bodily pain ($p = 0.589$), General health ($p = 0.687$), Vitality ($p = 0.562$), Social functioning ($p = 0.660$), Role emotional ($p = 0.167$) and Mental health ($p = 0.500$) were found.

Ascites

Among patients with and those without ascites, there were no statistically significant differences in MCS ($p = 0.536$), PCS ($p = 0.392$), and in scores for the domains Physical functioning ($p = 0.987$), Role physical ($p = 0.785$), Bodily pain ($p = 0.655$), General health ($p = 0.831$), Vitality ($p = 0.256$), Social functioning ($p = 0.905$), Role emotional ($p = 0.078$) and Mental health ($p = 0.239$).

Depression and anxiety

HDRS score was significantly correlated with the both composite scores and all sub-scores of the SF-36. The highest correlation was with MCS, while the lowest one was with Social functioning (Table 2).

Anxiety

HARS score was significantly correlated with both composite scores and all sub-scores of the SF-36. The highest correlation was found with Vitality and MCS, while the lowest one was with Bodily pain (Table 2).

Fatigue

FSS score was significantly negatively correlated with both composite scores and all sub-scores of the SF-36. The highest correlation was found with PCS, while the lowest one was with Social functioning (Table 3).

Table 2

Correlation coefficients between the SF-36 and HARS, HDRS and FSS

	SF-36 scale									
Scale	Physical functioning	Role physical	Bodily pain	General Health	Vitality	Social functioning	Role emotion	Mental health	PCS	MCS
HDRS	-0.573[*]	-0.467[*]	-0.392[*]	-0.457[*]	-0.618[*]	-0.339[*]	-0.501[*]	-0.593[*]	-0.610[*]	-0.655[*]
HARS	-0.479[*]	-0.348[*]	-0.289[*]	-0.425[*]	-0.622[*]	-0.304[*]	-0.406[*]	-0.551[*]	-0.542[*]	-0.601[*]
FSS	-0.670[*]	-0.504[*]	-0.394[*]	-0.420[*]	-0.653[*]	-0.338[*]	-0.457[*]	-0.339[*]	-0.681[*]	-0.593[*]

SF-36 – Short Form Health Survay-36; PCS – Physical component summary; MCS – Mental component summary; HARS – Hamilton Anxiety Rating Scale; HDRS – Hamilton Depression Rating Scale; FSS – Fatigue severity scale.
[*]Correlation is significant at the 0.01 level.

Table 3

Hierarchical regression analysis of the Physical component summary

Variable	Model I			Model II			Model III		
	B	SE(B)	β	B	SE(B)	β	B	SE(B)	β
Gender	-5.03	4.05	-0.12	-3.22	3.44	-0.08	-1.83	2.91	-0.04
Age	-0.08	0.19	-0.05	-0.02	0.16	-0.14	0.03	0.14	0.02
Employment									
retired		Reference group			Reference group			Reference group	
employed	16.07	5.68	0.34**	11.85	4.81	0.25*	8.64	4.09	0.18*
unemployed	10.90	5.90	0.22	7.20	4.94	0.15	6.31	4.17	0.13
HARS				0.24	0.46	0.07	0.44	0.39	0.13
HDRS				-1.36	0.31	0.59**	-1.02	0.27	-0.45**
FSS							-4.82	0.77	-0.47**
R^2		0.167**			0.434**			0.601**	
F for change in R^2		4.866**			22.337**			39.511**	

HARS – Hamilton Anxiety Rating Scale; HDRS – Hamilton Depression Rating Scale; FSS – Fatigue severity scale; *$p < 0.05$; ** $p < 0.01$.

Predictors of HRQoL

Hierarchical regression analysis showed that socio-demographic variables (gender, age, employment) explained 16.7% of the variance ($p < 0.01$) of PCS as outcome measure. Addition of the variables "depression and anxiety" in the second model caused an increase of 26.7% in the variance explanation ($p < 0.01$). Furthermore, after adding the "fatigue" in the third block, an additional 16.7% of the variance in PCS was explained ($p < 0.01$). The final model described that gender, age, employment, HDRS, HARS and FSS accounted for 60.1% of the variance in PCS. The results in the final block have shown that employment ($p < 0.05$), depres-

sion ($p < 0.01$) and fatigue ($p < 0.01$) significantly influenced physical dimension of HRQoL (Table 3).

With MCS as dependent variable, the first model, consisting of selected socio-demographic variables, accounted for 6.0% of the variance in the outcome variable. Moreover, depression and anxiety explained additional 39.1% in the total change in MCS in this analysis ($p < 0.01$). Fatigue, in the third model, accounted an additional 10.7% of the variance in MCS ($p < 0.05$). The final model explained 55.8% of the variance in MCS ($p < 0.01$) (Table 4). Among all investigated variables statistically significant impact on the mental component of quality of life was observed only for depression and fatigue (Table 4).

Table 4

Hierarchical regression analysis of the Mental component summary

Variable	Model I			Model II			Model III		
	B	SE(B)	β	B	SE(B)	β	B	SE(B)	β
Gender	-6.28	3.98	-0.11	-4.23	3.14	0.12	-3.20	2.48	-0.08
Age	0.12	0.19	0.08	0.19	0.15	0.12	0.22	0.13	0.14
Employment									
retired		Reference group			Reference group			Reference group	
employed	7.34	5.58	0.17	2.07	4.38	0.05	-0.27	3.98	-0.01
unemployed	6.49	5.79	0.14	2.32	4.50	0.05	-0.27	3.98	-0.06
HARS				-0.16	0.42	0.05	-0.02	0.38	0.01
HDRS				-1.28	0.29	-0.61**	-1.04	0.26	-0.49*
FSS							-3.56	0.75	-0.38**
R^2		0.06			0.451**			0.558**	
F for change in R^2		1.556			33.844**			22.700**	

HARS – Hamilton Anxiety rating scale; HDRS – Hamilton Depression Rating Scale; FSS – Fatigue severity scale; *$p < 0.05$; ** $p < 0.01$.

Discussion

Over the past decade, the various studies have identifed that patients with the CLD had deteriorated HRQoL [1, 8, 12]. In the sample of 103 patients, we tried to explain comprehensively, HRQoL in patients with the CLD. The SF-36 scores were significantly different in patients with different gender, age, employment status and alcohol consumption.

In our study, women had significantly lower HRQoL than men in the domains of MCS, PCS, Physical functioning and Mental health. These results correspond to literature data [12, 14, 20, 27]. The study of Afendy et al. [20] described that women with the CLD had significantly lower scores for the majority SF-36 domains. In patients with cholestatic liver disease, women had significantly poorer scores for the Physical functioning domain [14], whereas women with chronic hepatitis C had significantly worse Physical functioning, Role physical, PCS and MCS [21, 27].

With regard to age, we found that younger patients had significantly better scores for the Physical functioning, Bodily pain and PCS, compared to the older patients, as was expected. Our results are similar to those of Younossi et al. [14], who described that patients younger than 50 years, had higher scores in the domains PCS, Physical functioning and Role physical, compared to the older ones. In the study of Afendy et al. [20], association between age and all scales of SF-36 was found. However, the literature also provides evidence that age has no impact on HRQoL in this patient group [1, 6, 12, 16, 21, 22].

Furthermore, the patients with different employment status had a statistically significant different score for the PCS and several SF-36 domains. These scores were worst in the retired patients. Positive impact of employment on the patient's wellbeing was a reason for all higher scores among the employed patients. The retired patients had affected physical domains of HRQoL, predominantly, and the reason for this may be the fact that the retired elderly patients often suffer from additional comorbidity. This was supported by the fact that the retirees had poorer HRQoL for the same domain (except for Role physical and Vitality) than unemployed patients who were on average younger.

By performing the hierarchical multiple regression analysis, we came to a conclusion that employment was a significant predictor of physical components of HRQoL, but not mental ones. The study of Kim et al. [16] found that the employed patients with liver cirrhosis had better HRQoL than the unemployed and that employment was a significant predictor of HRQoL. The authors explained that disease most commonly affected men in their most productive period of life, and that their employment status was directly associated with their role function at home or at work.

The patients who consumed alcohol had a significantly better score for the Physical functioning domain. The reason for this result was not known.

Previously published studies described that the marital status [16, 19] and level of education [16], did not affect HRQoL in patients with the CLD. Our study confirmed these results. However, Saab et al. [31] described that patients who under-

went liver transplantation, married patients as well as patients who had more than 12 years of education had significantly higher scores for the Physical functioning domain, while there was no difference regarding other scores.

The main difference between our and previously published studies is the impact of the severity of the CLD on HRQoL. The literature contains data that patients with severe disease have worse HRQoL, as measured by SF-36 [2, 10, 20, 23, 25] or CLDQ [6, 14, 19, 22, 24]. According to the SF-36 domains, Sobhonnslidsuk et al. [25] described the significant decline in all domains, Younossi et al. [2] all domains except Vitality, while Les et al. [23] described the significant decline in all domains except General health and Mental health. In our study, we obtained results that indicate that the severity of the disease does not significantly affect any of the SF-36 questionnaire scores. A clear gradient of the reduction in HRQoL score was only registered for the domains Physical functioning and Bodily pain, and perhaps for them the difference would be significant if the sample was higher. It was registered for almost all physical components of HRQoL domains that patients with noncirrhotic or early cirrhotic (Child-Pough A) CLD had higher scores compared to the patients with advanced cirrhosis (Child-Pough C). This regularity did not follow the scores of mental component of HRQoL. Specifically, in our study, scores for MCS and Mental health domains were highest in the patients with advanced cirrhosis, which was previously described [1, 2, 17]. The reason for that was that the clinical progression of the CLD predominantly affects the physical dimension of HRQoL with spared mental dimension [2, 14]. The literature has described that in patients with the CLD-hepatocellular type the increased severity of disease did not follow the deterioration of Bodily pain, Vitality, Role emotional, Mental health and MCS domains [14]. In our cohort, 56.4% were patients with hepatocellular liver disease (alcoholic etiology and other), while only 15.5% of patients had the viral CLD. In the study of Afendy et al. [20], Sobhonslidsuk et al. [25], and Les et al. [23] predominantly viral etiology (42% to 65 %) was presented. Given that our sample was most similar to a sample of Younossi et al. [2], it is possible that it is because of social and cultural differences in our and other cohorts. In addition, in our country, the support program for the patients with the CLD often has no access to modern treatment for this disease group, while liver transplants are under development. This has a negative effect on HRQoL, regardless of the clinical stage of the disease. In our cohort, Child Pough score had no predictive value for PCS and MCS, which was described by Les et al. [23] and Häuser et al. [21]. In our model, the socio-demographic and behavioral factors had predictive value.

The results of our study indicate that patients with different CLD etiology did not differ in any SF-36 score of the questionnaire, which is consistent with previously published studies [1, 6, 15–17, 21].

Depression is a common disorder in patients with the CLD, especially those with chronic hepatitis C [18, 36, 37]. About 60% of patients with the CLD have depression [38]. It is known that the presence of depression may lead to deterioration of physical condition and functioning of a patient [36]. In patients

awaiting for liver transplantation, those who suffer from depression have higher mortality rate than those without depression [37]. The presence of the CLD, knowledge of its stigmata and outcome and social effects of the disease can lead to depression. Also, many patients with the CLD come from population that is vulnerable to appearance of psychiatric disorders. Depression is a negative predictor of HRQoL of patients with the CLD [10, 16, 21, 26], as confirmed by our research. In our predictive model, depression and anxiety were significant predictors of physical and mental components of HRQoL.

Fatigue is a common symptom in patients with the CLD, which has a significant impact on their HRQoL [39]. It is particularly pronounced in some types of the CLD (cholestatic liver disease and hepatitis C) [12, 40]. Analyzed by domains, fatigue affect the most the domains General health, Social functioning and Mental health [12]. Our study confirmed that fatigue is a significant predictor of physical and mental components of HRQoL, which is consistent with previously published results [12, 26, 29, 39, 40]. Since the exact mechanism of fatigue in the CLD is unknown, specific therapy is not available [39]. Because of the significant correlation between fatigue and depression appearing in our and other studies [36], treatment of depression might have an indirect influence on improving HRQoL by reducing fatigue.

Conclusion

The tested sociodemographic, clinical and behavioral factors have an impact on HRQoL in patients with the CLD. The most important predictors of HRQoL are behavioral factors which suggest the need for an adequate therapeutic action in order to improve the HRQoL in these patients.

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