



# Quality of Life of Chronic Hepatitis C Patients and Its Associated Factors

Hoo Jeung Cho<sup>a</sup>, Euna Park<sup>b</sup>

<sup>a</sup>Clinical Research Center, Pusan National University Hospital, Busan, Korea

<sup>b</sup>Department of Nursing, Pukyong National University, Busan, Korea

**Objectives:** This study aimed to investigate the factors affecting the health-related quality of life (HRQOL) of patients with chronic hepatitis C (CHC).

**Methods:** This study is based on a descriptive survey and involved 125 gastroenterology outpatients visiting a university hospital in South Korea as the participants. HRQOL was assessed using the Liver Disease Quality of Life 1.0, which consisted of Short Form-36 (SF-36) and the Liver Disease Targeted Scale. Data were collected from December 2015 to April 2016, which were then analyzed through multiple regression analysis.

**Results:** HRQOL had a statistically significant correlation with age, sex, educational level, living type, employment status, monthly income level, and comorbidity status. This study showed that age > 51 years, female sex, high educational level, living alone, unemployment status, low monthly income, and presence of comorbidity had negative effects on the HRQOL of patients with CHC ( $R^2 = 8.7\%–34.6\%$ ).

**Conclusion:** Based on the result of this study, intervention for patients with CHC needs to be developed to enhance their HRQOL. The findings can serve as a useful reference for nursing personnel in the development of therapeutic plans to upgrade the care of CHC patients.

**Key Words:** chronic hepatitis C, health, patient, quality of life

Corresponding author: Euna Park  
E-mail: soundness@pknu.ac.kr

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## INTRODUCTION

Hepatitis C has been one of the most serious chronic infectious diseases in recent years and, is estimated to infect approximately 130 million–150 million people globally [1] or about 3% of the world population [2]. In Korea, 2,141 men and 2,111 women were infected in 2011, with similar prevalence in both sexes; however, more men were infected than women in their 40s and 50s, and more cases were reported in the older population than its younger counterpart [3]. Meanwhile, liver disease is the eighth cause of death in Korea [4].

Many factors can cause liver disease, including hepatitis virus infection, alcohol drinking, presence of fatty liver, and drug abuse, of which the most important cause is hepatitis virus infection [5]. Several types of hepatitis viruses exist, but types A, B, and C are the most common in Korea [6]. Although effective vaccines can prevent infection with type A and B viruses [6], an effective vaccine for hepatitis C virus remains to be developed [7], which indicate that attention should be paid to its infection routes or prevention measures. A total of 15%–30% patients with chronic hepatitis C (CHC) develop cirrhosis or liver cancer within 20 years [1], and the incidence of liver cancer in cirrhosis patients with CHC reaches 1%–4% each year [2].



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CHC has diverse clinical presentations, which range from the absence of manifestations to the presence of whole body symptoms, including fatigue and decreased appetite. As the disease progresses, complications, including jaundice, ascites, and hepatic encephalopathy, can develop [1]. Patients who are aware that CHC can progress to cirrhosis or liver cancer were found to experience social isolation, anxiety, and psychological distress, which negatively affected their social lives and family relationship [8]. Furthermore, some CHC patients consider their disease shameful and filthy due to the social stigma that hepatitis C infection is acquired through drug abuse, including narcotics, and risky sexual behaviors [9]. Studies also suggested that these patients are concerned that they may infect the people around them owing to the lack of knowledge on the disease process of hepatitis C [9]. Moreover, they can have bad relationship with their family or be isolated from society because of physical tiredness or feelings of powerlessness [10]. As such, CHC is found to widely affect the patients' personal and family lives and even the society in general, indicating that efforts need to be made to improve their health-related quality of life (HRQOL).

The HRQOL is a concept that refers to the effects of health on the quality of life [11]. Considering that HRQOL is an indicator of the health conditions of patients with CHC [12], it can be useful in the establishment or evaluation of nursing plans for these patients.

This study aims to identify the HRQOL of CHC patients and its associated factors and provide the basic data necessary for the development of nursing interventions for these patients.

## MATERIALS AND METHODS

### 1. Study design and participants

This descriptive study was conducted to identify the HRQOL of CHC patients and its related factors. Patients who were diagnosed with CHC and received treatment as outpatients of the Department of Gastroenterology of Pusan National University Hospital in Busan, Korea from December 2015 to April 2016 were selected as an accessible population. After explaining the purposes and contents of this study to the participants, consent forms were collected from those who agreed with the study's objectives. Among the 140 patients who agreed to participate, 15 patients were excluded owing to insufficient responses, and 125 patients were eventually selected as the participants for the final analysis.

### 2. Ethical consideration

Ethical approval of the study was granted by the Institutional

Review Board (IRB) of Pukyong National University in South Korea (1041386-20151228-HR-020-03). All study participants were informed about the contents and objectives related to this study. Furthermore, they were also notified that the results would be solely used for the purposes of the study. The participants then agreed to participate in the study and signed the informed consent forms.

### 3. Study tool

The Liver Disease Quality of Life (LDQOL) 1.0 instrument, which was developed by Gralnek et al [13], was used to measure the HRQOL of CHC patients. The LDQOL has a hybrid form composed of Short Form-36 (SF-36) and Liver Disease Targeted Scale (LDTS).

As part of the LDQOL, SF-36 is an instrument that measures the general HRQOL. A Korean version of the SF-36 [14], which was developed by Ware and Sherbourne [15] and tested for reliability and validity, was used. It consists of a total of 36 items across 8 domains: 4 physical and 4 mental domains. The physical domains include physical functioning (10 items), physical role limitations (4 items), pain (2 items), and general health (6 items). The mental domains comprise vitality (4 items), social functioning (2 items), emotional role limitations (3 items), and mental health (5 items) [14].

As part of the LDQOL instrument developed by Gralnek et al [13], a Korean version of LDTS was utilized in this study, which was translated by Kim et al [16]. The LDTS consists of 75 items across 12 domains. The 12 domains include liver disease-related symptoms (17 items), disruptive daily life due to liver disease (10 items), concentration (7 items), memory (6 items), sexual function (3 items), sexual problem (3 items), sleep (5 items), loneliness (5 items), hopelessness (4 items), social relationship quality (5 items), health concern (4 items), and shamefulness (6 items) [16].

An addition, all 7 items on general characteristics, including age, sex, religious affiliation, living arrangement, educational level, employment status, and monthly income level, were also examined using questionnaires. Furthermore, 4 items on disease-related characteristics, including the presence of comorbidity, diagnosis of cirrhosis, administration of hepatitis C treatment, and infection route, were also investigated using clinical charts.

### 4. Statistical analysis

The collected data were analyzed through IBM SPSS Statistics for Windows (IBM Co., Armonk, NY, USA). The participants' general and disease-related characteristics were analyzed with frequency and percentage, whereas the HRQOL was assessed with mean and standard deviation. The associated factors that affect the HRQOL of the participants were analyzed through

multiple regression.

## RESULTS

### 1. Participants' general and disease-related characteristics

In terms of general characteristics, the mean age of the par-

**Table 1.** Participants' general and disease related characteristics (n = 125)

Characteristic	Category	Data
Age (y)		59.01 ± 9.49
	≤ 50	30 (24.0)
	≥ 51	95 (76.0)
Sex	Male	66 (52.8)
	Female	59 (47.2)
Religion	Yes	84 (67.2)
	No	41 (32.8)
Living type	Couple	49 (39.2)
	Family (with children)	47 (37.6)
	Single	29 (23.2)
Educational level	Below high school	103 (82.4)
	Above college degree	22 (17.6)
Employment status	Employed	48 (38.4)
	Self-employed	23 (18.4)
	Unemployed	54 (43.2)
Monthly income (×10 <sup>3</sup> KRW)	Below 2,490	76 (60.8)
	2,500–5,000	30 (24.0)
	Above 5,000	10 ( 8.0)
	Others	9 ( 7.2)
Comorbidity	Yes	64 (51.2)
	No	61 (48.8)
Cirrhosis	Yes	40 (32.0)
	No	85 (68.0)
Treatment	Yes	62 (49.6)
	No	63 (50.4)
Infection route	Unknown	69 (55.2)
	Tattoo or piercing	5 (4.0)
	Contaminated syringe	26 (20.8)
	Acupuncture or bloodletting	20 (16.0)
	Others	5 (4.0)

Values are presented as mean ± standard deviation or number (%). KRW, Korean won.

ticipants, was 59.01 years, of whom 76.0% were aged 51 years or older. Furthermore, men account for 52.8% of the total study participants, which is slightly higher than the proportion of women; 67.2% had religion; 39.2% lived only with their spouse, which is slightly higher than the proportion of living with children (37.6%); 82.4% had an educational level of up to high school or below; 43.2% were unemployed; and 60.8% had a monthly income of 2,490,000 Korean won (KRW) or below (Table 1).

With regard to the disease-related characteristics, 51.2% of the participants presented with comorbidity; 68.0% had no cirrhosis; 49.6% did not received treatment; and 55.2% were not aware of the infection route (Table 1).

### 2. HRQOL level of the participants

The total average SF-36 score of the participants was 72.77. Pain and vitality had the highest and lowest scores at 83.84 and 51.90, respectively (Table 2).

**Table 2.** Liver Disease Quality of Life degree (n = 125)

	Variable	Mean ± SD	Range
SF-36	Total	72.77 ± 14.68	28.0–98.4
	Physical functioning	82.76 ± 15.39	16.7–95.8
	Role limitation-physical	81.60 ± 21.77	6.3–100.0
	Bodily pain	83.84 ± 20.72	22.5–100.0
	General health	55.03 ± 16.96	16.7–95.8
	Vitality	51.90 ± 23.02	0.0–100.0
	Social functioning	79.00 ± 21.51	25.0–100.0
LDTS	Role limitation-emotion	80.27 ± 23.37	0.0–100.0
	Mental health	67.80 ± 20.32	10.0–100.0
	Total	72.34 ± 10.85	40.1–94.5
	Liver disease symptoms	85.73 ± 13.02	37.7–100.0
	Effects of liver disease	76.22 ± 11.54	31.0–100.0
	Concentration	89.71 ± 13.22	46.4–100.0
	Memory	89.77 ± 11.28	50.0–100.0
	Social interaction quality	72.56 ± 13.12	45.0–100.0
	Health distress	68.90 ± 20.07	25.0–100.0
	Sexual functioning	58.42 ± 21.59	0.0–100.0
Sexual problems (n = 66)	Sexual problems (n = 66)	71.01 ± 24.38	0.0–100.0
	Sleep	71.64 ± 18.68	10.0–100.0
	Loneliness	75.32 ± 16.43	30.0–100.0
	Hopelessness	63.60 ± 18.24	25.0–100.0
	Liver disease stigma	79.90 ± 18.42	25.0–100.0

SD, standard deviation; SF-36, Short Form-36; LDTS, Liver Disease-Targeted Scale.

The total average LDTS score of the participants was 72.34. Memory and sexual functioning had the highest and lowest scores at 89.77 and 58.42, respectively (Table 2).

### 3. The factors that affect the HRQOL

A multiple regression analysis was performed to investigate the factors affecting the HRQOL. The independent variables included age, sex, educational level, living arrangement, employment status, and monthly income level (general characteristics) and presence of comorbidity (disease-related characteristics). A significant difference between the independent variables of SF-36 and LDTS was found based on the univariate analysis.

In the LDTS, age of 51 years or older affected sexual problems ( $\beta = -0.43, p < 0.001$ ). Female sex affected vitality ( $\beta = -0.18, p = 0.049$ ) and sexual problem ( $\beta = -0.35, p < 0.001$ ) in the SF-36 and LDTS, respectively. In terms of educational level, university graduation or above affected hopelessness ( $\beta = 0.21, p = 0.031$ ) in the LDTS. For the living arrangement, living alone affected concentration ( $\beta = -0.18, p = 0.046$ ), sexual problem ( $\beta = -0.15, p = 0.042$ ), and loneliness ( $\beta = -0.29, p = 0.001$ ) in the LDTS. Having no occupation affected physical functioning ( $\beta = -0.19, p = 0.047$ ) for the employment status in the SF-36. For the monthly income level, an income of 2,490,000 KRW or less affected physical functioning ( $\beta = -0.20, p = 0.034$ ), vitality ( $\beta = -0.31, p = 0.001$ ), and mental health ( $\beta = -0.26, p = 0.008$ ) in the SF-36 and concentration ( $\beta = -0.28, p = 0.004$ ) in the LDTS. The presence of comorbidity affected pain ( $\beta = -0.23, p = 0.009$ ) and general health ( $\beta = -0.22, p = 0.016$ ) in the SF-36 and hopelessness ( $\beta = -0.21, p = 0.022$ ) in the LDTS. The explanatory power was 8.7% to 34.6% (Table 3).

## DISCUSSION

This study was conducted to determine the measures necessary to improve the HRQOL level of CHC patient' by identifying their HRQOL and its associated factors. This study is expected to be helpful in the establishment of a more specific health management plan or improvement of the quality of life of these patients.

The HRQOL of CHC patients was checked using the SF-36 and LDTS scores. Across the entire 8 SF-36 domains, pain and vitality had the highest and lowest scores, respectively. The participants of this study showed a lower quality of life in the general health, vitality, social functioning, and mental health subareas of the SF-36 than the patients with CHC and general liver disease of the previous studies [17,18]. Additionally, participants of this study had lower HRQOL than the CHC patients who were taking DAA products of a previous study [19]. This finding indi-

Table 3. Influencing variables of SF-36 and LDTS subareas (n = 125)

Variable	SF-36				LDTS				
	PF $\beta$ (p)	BP $\beta$ (p)	GH $\beta$ (p)	VT $\beta$ (p)	MH $\beta$ (p)	Concentration $\beta$ (p)	Sexual problems $\beta$ (p)	Loneliness $\beta$ (p)	Hopelessness $\beta$ (p)
Age ( $\geq 51$ y) <sup>a</sup>							-0.43 (< 0.001)		
Sex (female) <sup>a</sup>				-0.18 (0.049)			-0.35 (< 0.001)		
Education level (above college) <sup>a</sup>									0.21 (0.031)
Living type (single) <sup>a</sup>						-0.18 (0.040)	-0.15 (0.042)	-0.29 (0.001)	
Employment status (unemployment) <sup>a</sup>	-0.19 (0.047)								
Monthly income ( $\geq 2,490 \times 10^3$ KRW) <sup>a</sup>	-0.20 (0.034)								
Comorbidity (yes) <sup>a</sup>									
B	103.06	99.08	60.59	67.86	70.40	97.41	144.90	69.72	53.36
SE	7.76	10.51	8.87	11.40	10.50	6.80	17.56	8.44	9.40
Adj. R <sup>2</sup>	0.152	0.143	0.087	0.182	0.111	0.119	0.346	0.120	0.115
F (p)	4.17 (< 0.001)	3.95 (0.001)	2.70 (0.013)	4.95 (< 0.001)	3.21 (0.004)	3.39 (0.002)	10.38 (< 0.001)	3.42 (0.002)	3.30 (0.003)

SF-36, Short Form-36; LDTS, Liver Disease-Targeted Scale; PF, physical function; BP, bodily pain; GH, general health; VT, vitality; MH, mental health; KRW, Korean won; B, unstandardized regression coefficients; SE, standard error;  $\beta$ , unstandardized regression coefficients; Adj. R<sup>2</sup>, adjusted R square.  
<sup>a</sup>Treated as dummy variables.

cates that the participants had decreased quality of life in relation to the mental domain, including vitality, social functioning, and mental health and physical domain, such as general health. This result is supported by that of a previous study, which found that patients diagnosed with type B or C hepatitis can have mental health problems; in particular, patients with hepatitis C have a lower quality of life in relation to psychological health than those with hepatitis B [20]. Therefore, interventions on the improvement of HRQOL that focus on psychological aspects need to be provided to the participants.

The average scores of the LDTS subareas for the participants of this study were 58.42–89.77. These scores are similar to those of previous studies that involved chronic hepatitis B patients [9,21] but are relatively higher than those of a study by Gralnek et al [13] that included patients with progressive chronic liver disease. These results can be attributed to the fact that the participants of Gralnek et al [13] have less healthy conditions than those of this study. Among the LDTS subareas, sexual functioning and hopelessness in particular had the lowest scores in relation to the quality of life of the participants of this study, which are lower than the scores of the CHC patients of the previous studies [9,21]. This difference is associated with the fact that the participants of this study are older (average age of 59.01 years) than those of the previous studies [9,21]. Attention should also be given to the sexual problem of CHC patients considering that the occurrence of CHC results in changes in sexual life (58%), low libido (68%), and decreased sex frequency (74%) [22] and they want to hide the disease from their spouses when diagnosed with CHC due to psychological shock [23]. These patients consider CHC a disease that threatens their lives, causes anxiety, and provides extreme stress [23]. Additionally, many cases were reported where patients experience psychosis or depression relation to the diagnosis of CHC [20]. Therefore, a nursing intervention that reflects the psychological needs of the CHC patients should be developed.

A multivariate analysis was conducted to identify the factors that affect the HRQOL of CHC patients. The result showed that these factors included sex, employment status, monthly income level and presence of comorbidity in SF-36 and age, sex, educational level, living arrangement, monthly income level, and presence of comorbidity in LDTS. Gao et al [18] suggested that

the disease negatively affects the physical functioning, vitality, and mental health of women. Meanwhile, Kim et al [21] showed that lower monthly income negatively affects vitality and mental health. These findings are similar to the results of the present study. Lower monthly income is associated with the participants' employment status, a related factor in this study that seems to have affected the HRQOL. Patients consider their disease more seriously if the factors that were confirmed to reduce SF-36 scores were present, including female sex, unemployment, low monthly income, and presence of comorbidity [24]. Thus, the development of nursing intervention that considers such factors is necessary.

Considering that only few studies have been conducted on the factors associated with LDTS subareas in Korea, a comparison between the present and a foreign study [17] that utilized an instrument similar to LDTS was made. The result showed that female sex and low monthly income negatively affected the LDTS score. Given that the financial burden related to the cost of hepatitis C treatment can act as a negative factor, the financial condition of the participants needs to be considered, and sex-specific psychological support needs to be provided.

This study provides the basic data on CHC to medical professionals by identifying the HRQOL of CHC patients and its associated factors. Further research on the understanding of CHC acquired through various clinical experiences is proposed. Additionally, this study is significant in that it confirmed the need for the development of a nursing intervention to improve the HRQOL of CHC patients.

## CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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