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RESEARCH ARTICLE

PSYCHOMETRIC PROPERTIES OF THE CHRONIC LIVER DISEASE QUESTIONNAIRE IN PATIENTS WITH CHRONIC LIVER DISEASE

Ferya Celik[1], Hicran Bektas[1], Zobair Younossi[2]

[1] Akdeniz University Faculty of Nursing, Antalya, Turkey
[2] Inova Health Systems, Virginia, the United States

ORCID: F.C. 0000-0002-2473-192X; H.B. 0000-0002-3356-3120; Z.Y. 0000-0001-9313-577X

Corresponding author: Ferya Celik, **E-mail:** feryacelik@gmail.com
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ABSTRACT

Purpose: Chronic liver disease (CLD) is a major public health problem worldwide and it leads to increase in morbidity and mortality. This study aimed to evaluate the psychometric properties of Chronic Liver Disease Questionnaire (CLDQ) in Turkish patients with CLD.
Material and Methods: The study was conducted in the methodological research design. Using a convenience sampling method 235 patients with CLD in a Akdeniz University. The instrument's psychometric properties were examined to determine factor analysis, criterion-related validity, internal consistency, interrater reliability and construct validity.
Results: The patients average age was 55.48±12.02 years. Viral hepatitis was the most common etiology of CLD (53.6%). The total sample had a mean CLDQ score of 4.73±1.12.
The factor analysis revealed that the scale consists of six sub-dimensions. No item was removed from the original scale. Cronbach's alpha coefficient was found as 0.93. According to the results of the confirmatory factor analysis of the Turkish version of CLDQ, that six sub-dimensions consisting of 29 items was confirmed.
Conclusion: Valid and reliable measurement tools are needed to evaluate health related quality of life (HRQoL) in patients with liver disease. Chronic Liver Disease Questionnaire is a valid and reliable measurement instrument.
Keywords: Chronic liver disease, CLDQ, nursing care, reliability, validity.

INTRODUCTION

Chronic liver disease (CLD) is a major public health problem worldwide and it leads to increase in morbidity and mortality (1). Chronic liver disease which leads to fibrosis, cirrhosis, hepatocellular carcinoma, multiple organ failure, liver transplantation. Therefore, necessary preventive and therapeutic measures should be taken before chronic liver diseases progress until the end stage. Although the major causes of CLD are preventable and treatable, CLD account for approximately 2 million deaths per year worldwide (2, 3). Besides an increased risk of mortality, CLD can cause reduced health-related quality of life (HRQoL) (4). Patients with CLD have abdominal, muscle, and/or joint pain, lack of appetite, and complications related to liver cirrhosis, such as ascites, variceal bleeding, hepatic encephalopathy, and emotional problems (5). In her study, Fabrellas states that nurses have paid little attention to do research about quality of life of patients with liver diseases unfortunately, compared to other chronic diseases, especially diabetes mellitus, cardiovascular diseases, and chronic pulmonary diseases (6). Although patients with CLD are vulnerable and at risk of death, it is surprising that such little attention has been paid to describing their

symptom prevalence and HRQoL (7). Hence, reliable measurement tools are needed for nursing interventions and symptom management. In order to be able to use measurement tools reliably in symptom management, these measurement tools need to be adapted to the culture in question.

Assessment of HRQoL is important for patients with CLD. Across the worldwide, studies on HRQoL of patients with CLD have used generic and disease specific questionnaires. Generic questionnaires are applicable to all types of chronic diseases and provide a global assessment of HRQoL (8). Reliable and adapted to culture questionnaires are needed to evaluate HRQoL. Generic surveys enable comparisons between many chronic diseases, but they might not be sensitive enough to catch changes that are clinically significant due to the development of the disease or treatments for these ailments. Unlike generic questionnaires, disease specific questionnaires may be more responsive to disease-related changes and determine the effect of a disease's symptoms on a patient's health and the effects of therapy (9). Disease spesific questionnaires are potentially powerful tools for evaluating the functional, physical, psychological status, emotional, and cognitive functioning, presenting gains of treatment and reflecting patients' ability to return to a normal lifestyle in CLD patients (9, 10).

To the best of our knowledge, the Chronic Liver Disease Questionnaire (CLDQ) is the first disease specific HRQoL instrument developed for patients with CLD (11). The CLDQ is a simple and brief instrument with good responsiveness in several stages of liver disease (12). The questionnaire has already been adapted and validated for the Brazilian, Bengali, German, Japan, Persian, Sinhala, Swedish, Greek, and Spanish population (13-21) In addition, it has also been adapted to disease groups such as Hepatitis C, and NASH (22, 23). However, there was no reported translation or validation of the CLDQ to the Turkish language in the literature. Thus, this study aimed to evaluate HRQoL, and obtain the psychometric properties of the culturally adapted of Chronic Liver Disease Questionnaire (CLDQ) in Turkish patients with CLD.

MATERIAL AND METHODS

Translation and adaptation of the CLDQ

The translation-back-translation methodology was used for the adaptation following the Guidelines for Translating and Adapting Tests (24). First, three bilingual translators (proficient in English and Turkish) independently translated the English language version of CLDQ into Turkish. Then, two translators (proficient in English and Turkish) performed back-translations independently. The questionnaire was reviewed and modified by a team of 10 competent expert, whom of two of them gastroenterologist, others of them academic members in the nursing faculty, whether the translation had been suitably adjusted for the spesifics of the Turkish medical and caring systems and culture. After expert panel, a draft of the Turkish version of CLDQ was formulated. Experts evaluated each item of the final version of the CLDQ over 10 points. Then Kendall's w coefficient was calculated. The experts judgments showed that the correlation between the items on the questionnaire were quiet good ($p<0.05$) (25). As a result of the language adaptation, the Turkish version of the CLDQ was found to be comparable with the original version of the CLDQ. After the language translation stage, the questionnaire was applied to five patients with CLD to test its understandability. These patients were not included in the study. These patients did not give any suggestions or corrections about the questionnaire at this stage.

Design and Participants

According to studies on questionnaire adaptation, the sample size can be 5–10 times the number of items in the questionnaire (25). There are 29 items in this questionnaire, this questionnaire was applied to a total of 235 patients with CLD agreeing to participate in this study. The study was conducted in the gastroenterology inpatient clinic and the outpatient clinic of Akdeniz University, between November 24th, 2016, and April 5th, 2017. None of the patients had an adverse or side effect because of this study. The patients who had been diagnosed with CLD for at least 6 months, who were 18 years old or over, literate, had no other psychiatric or emotional problems, language or cognitive difficulties, and Child Turgotte Pugh Score A and B. We excluded the patients who have liver tumors, liver transplantation, and Child Turgotte Pugh Score C. The Child Turcotte Pugh Score was indicator of severity of liver disease. The Child Turgotte Pugh Score includes some variables like ascites, hepatic encephalopathy, INR, total bilirubin, and albumin. Each variable was three severity categories between 1-3 points in the Child Turcotte Pugh Scoring System. As the severity of the illness increasing, the Child Turcotte Pugh Score

increased. Received high scoring from this questionnaire was a bad indicator of quality of life (2). When the patients experience decompansation symptoms such as ascites, hepatic encephalopahy, their Child Turgotte Pugh score gets into C and their general status impaired. We thought patients who have impaired general status cannot answer the questionnaires properly. Furthermore, patients have liver tumors and/or liver transplantation need to complicate treatment methods like this chemotherapy, immunsupressive. Both these diseases and treatment methods inpaired general health status, emotional status, or other organ functions. Those who patients might have experience severity symptoms and cannot answer the questionnaires properly. For this reason, we excluded patients who have Child Turgotte Pugh score C, liver tumors and/or liver transplantation. It took approximately 10 minutes to fill out the questionnaire. Most of the patients easily filled out the questionnaire. It took approximately 10 minutes to fill out the questionnaire. Most of the patients easily filled out the questionnaire.

Data Collection

Data collected in face-to-face interviews using CLDQ, The Liver Disease Symptom Index 2.0, Socio-demographic and clinical data questionnaire at Akdeniz University Hospital.

Chronic Liver Disease Questionnaire

The CLDQ is the first disease specific HRQoL instrument developed for patients with CLD. It is a 29-item self-report questionnaire, consisting of six subdimension, which include abdominal symptoms, fatigue, systemic symptoms, activity, emotional function and anxiety. All items ask for the symptoms during the previous two weeks. The overall ICC value of original CLDQ is 0.59 (11).

The Liver Disease Symptom Index 2.0

The Liver Disease Symptom Index 2.0 (LDSI 2.0) was used to determine the validity of the CLDQ in this study. It was developed by Van Der Plas et al. (2004) (26) and adapted to the Turkish population by Eraydin et al. (2014) (27). All items ask for the symptoms during the previous week, and a lower score indicates a better HRQoL. The value of Cronbach's α is 0.91 (27).

Socio-Demographic and Clinical Data Questionnaire

The socio-demographic and clinical data questionnaire prepared by the researchers as a result of literature survey (14-16, 19). It evaluated socio-demographic information including age, gender, etiologies of the CLD, history of decompensation symptoms.

Statistical Methods

We performed all statistical analyzes after cleaning the extreme data. For continuous data, means and standard deviations were recorded; for categorical variables, frequencies and percentages were reported. Also, descriptive statistic was used including t-test and variation analysis. For factor analysis, the sample size should be adequate. For the evaluating sample adequate, Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy value and Bartlett's Test were performed to evaluate whether the sample was large enough. Determine whether the sample size is adequate for factor analysis using the KMO test. KMO should be more than 0.60. The null hypothesis must be rejected (p 0.05) if there is a strong chance that at least some of the variables in the correlation matrix are correlated. This is determined via Bartlett's test. If so, this means that there is a high correlation between the variables and the data set shows a multivariate normal distribution (25). These results indicate that the sample was adequate for factor analyses. In terms of the sampling adequacy, KMO value was found as 0.92, and Bartlett's Test of value was 6089.5 ($p<0.001$). The principal component analysis and direct oblimin rotation were used in factor analysis. To determine the internal consistency of reliability, Cronbach's alpha was used. Interrater reliability was calculated using the intraclass correlation coefficient (ICC). Agreement between CLDQ and LDSI 2.0 were assessed by calculating the Pearson correlation coefficient. To confirm of factor structure, we conducted confirmatory factor analysis (CFA). All analyses were performed using SPSS Statistic Software (v. 23.0; IBM Corporation, Armonk, NY, USA) and IBM SPSS AMOS (v. 21.0; IBM Corporation Software Group, Somers, NY, USA) and the significance level was set to 0.05.

Table 1. Socio-demographic and clinical data characteristics of all patients

Socio-demographic and clinical data characteristics (N=235)	Number (n)	Percentage (%)
Age in years ($\bar{X}$=55.48±12.02)		
≤44	49	20.9
45-59	89	37.9
≥60	97	**41.2**
Gender		
Male	119	**50.6**
Female	116	49.4
Duration of the CLD (months)		
6 -12	34	14.5
13 -24	28	11.9
25 and over	173	**73.6**
Etiologies of the CLD		
Viral hepatitis	126	**53.6**
Liver cirrhosis	105	**44.7**
Others	4	1.7
History of decompensation symptoms*		
Ascites		
Encephalopathy	119	**50.8**
Variceal bleeding	48	24.1
	32	16.1
CTP grade (in cirrhotic patients)		
A	21	20.0
B	84	80.0

*Calculated according to the percentage value
CLD, Chronic Liver Disease; CTP, Child Turcotte Pugh

Ethical considerations

Permission to translate and use the CLDQ in Turkish population was granted by authors of the questionnaire. The research was approved by the Akdeniz University, Clinical Research Ethics Committee (REDACTED) (2012 KAEK-20/20.07.2016-429) and director of the studied hospital in Akdeniz University (26708535-903.99). The participants were informed about the research, and their written consents were obtained prior to filling out the questionnaires. Every procedure was carried out in line with the Helsinki Declaration.

RESULTS

Sociodemographic data

A total of 235 patients with CLD were interviewed and consented to participate in this study. The patients average age was 55.48±12.02 years of age. The lowest age was 21 and highest age was 77. The majority of patients were male (50.6%). Viral hepatitis was the most common etiology of CLD (53.6%; Chronic hepatitis B (CHB) n=92, Chronic hepatitis C (CHC) n=34) while 44.7% of patients had liver cirrhosis. Patients with nonalcoholic steatohepatits and alcololic liver disease formed the other participants. The majority of the patients with CLD had previously experienced decompensation (ascites, hepatic encephalopathy, variceal bleeding); 50.8% of these patients had experienced ascites, 24.1% had experienced encephalopathy and 16.1% had experienced variceal bleeding. However, all patients were in a compensated state when the data were being gathered.

According to Child Turcotte Pugh Scoring, 20% of the cirrhotic patients were classified as Child A, while 80% of the cirrhotic patients were classified as Child B (Table 1). The total sample had a mean CLDQ score of 4.73±1.12. Patients without cirrhosis had the best quality of life ratings. In terms of quality of life, the Child A group outperformed the Child B group. We performed one-way Anova test to determine significance level. Qulity of life score has significant difference levels between the three groups ($p<0.001$) (Table 2).

Table 2. Quality of life scores of patients with CLD

	Non-cirrhotic patients	Patients in Child A group	Patients in Child B group	Total	F	p
Scoring from the CLDQ	5.34±0.9	4.28±0.19	3.91±0.8	4.73±1.12	2.64	p<0.001

CLD, Chronic Liver Disease; CLDQ, Chronic Liver Disease Questionnaire

Psychometric properties of CLDQ

Explaratory Factor Analysis

Explanatory Factor Analysis (EFA) revealed six factors with an eigenvalue of 1, which explained 73.14% of the cumulative variance. In addition, exploratory factor analysis was confirmed by Horn's parallel analysis. These analyses confirmed that the factor structure was the same as the original CLDQ. In most of the items, the highest factor loadings were on the original factors. The loading weights, obtained with the EFA, are shown in Table 3. As seen in Table 3, five items loaded on Factor 1 (fatigue), eight items loaded on Factor 2 (worry), three items loaded on Factor 3 (abdominal symptoms), six items loaded on Factor 4 (systemic symptoms), four items loaded on Factor 5 (emotional function), and three items loaded on Factor 6 (activity), and when any item is deleted, no increase in Cronbach's alpha value is observed.

Item 14 about having limited diet had almost equally higher loading on two subdimensions, namely the 5th subdimension (emotional function) and 6th subdimension (activity). As suggested in the studies of the principal component analysis, when the factor loadings are very close and stacked under multiple factors (Stevens, 2002), one needs to review the original questionnaire and its factor loadings to determine which subdimension the item should load on. As a result, the item 14 about having limited diet in the original questionnaire was included in the "activity" (6th) subdimension in the Turkish version of CLDQ. In the Turkish version of the CLDQ, "fatigue" subdimension is completely same as the original.

Items numbered 10 about feeling anxious, 12 about unhappy and 24 about depressed were grouped under the "anxiety" subdimension in the Turkish version of the CLDQ, while they were originally grouped under the "emotional function" subdimension in the original version of the CLDQ. The item 6 about having shortness of breath was in the "abdominal symptoms" subdimension in the Turkish version of the CLDQ, while it was under the "systemic symptoms" subdimension in the original CLDQ. The items 16 about having difficulty sleeping at night and 20 about falling asleep were grouped under the "systemic symptoms" subdimension in the Turkish version of the CLDQ, while they were under the "emotional function" subdimension in the original version of the CLDQ. The item 7 about not been able to eat as much as you would like was under the "emotional function" subdimension in the Turkish version of the CLDQ, while it was in the "activity" subdimension in the original version of the CLDQ. The item 5 about abdominal pain was under the "activity" subdimension in the Turkish version of the CLDQ, while it was under the "abdominal symptoms" subdimension in the original version of the CLDQ.

Criterion-related validity

Criterion-related validity was evaluated by correlation between Turkish CLDQ and LDSI 2.0. Pearson's correlation coefficient was used to correlate the scores with each other. All results were considered statistically meaningful at $p<0.05$ (Table 4).

Internal Consistency

Internal consistency was assessed through Cronbach's alpha scores. According to the statement, the reliability level anticipated for the research-useable measurement tools is 0.70 or higher (25, 28). Considering the internal consistency of the subdimension and reliability of the Turkish version of the CLDQ, the total Cronbach's alpha was 0.95. All subdimension, except the "activity" subdimension, met the minimum reliability criterion (>0.70) for the Cronbach's alpha coefficient. Cronbach's alpha values ranged from 0.53 to 0.93. Internal consistency was found to fulfill acceptable internal reliability standards for the sample (Table 5).

Table 3. Factor structure of the Turkish version of the CLDQ

Items	Items in the subdimensions of the Turkish version of the CLDQ						Corrected item total correlation	Cronbach's alpha if item deleted
	Factor 1 Fatigue	Factor 2 Worry	Factor 3 Abdominal symptoms	Factor 4 Systemic symptoms	Factor 5 Emotional function	Factor 6 Activity		
Item 4 (Feeling sleepy)	0.85						0.547	0.933
Item 2 (Tired)	0.74						0.739	0.931
Item 11 (Decreased energy)	0.58						0.716	0.931
Item 8 (Decreased strength)	0.55						0.742	0.931
Item 13 (Feeling drowsy)	0.49						0.613	0.932
Item 22 (Worrying about symptoms)		0.91					0.714	0.931
Item 10 (Feeling anxious)		0.88					0.625	0.932
Item18 (Worrying about family)		0.84					0.700	0.931
Item 25 (Worrying about health status)		0.83					0.665	0.932
Item 28 (Worrying about never feeling any better)		0.83					0.582	0.932
Item12 (Feeling unhappy)		0.78					0.689	0.931
Item 24 (Feeling depressed)		0.78					0.634	0.931
Item 29 (Concerning about liver transplant)		0.53					0.455	0.931
Item 1 (Feeling of abdominal bloating)			0.88				0.600	0.931
Item 17 (Feeling of abdominal discomfort)			0.85				0.648	0.932
Item 6 (Having shortness of breath)			0.66				0.494	0.931
Item 21 (Having muscle cramps)				0.70			0.533	0.930
Item 20 (Falling asleep)				0.50			0.597	0.931
Item 16 (Having dfficulty sleeping at night)				0.56			0.645	0.930
Item 23 (Having a dry mouth)				0.54			0.598	0.932
Item 3 (Having bodily pain)				0.48			0.576	0.931
Item 27 (Having itching)				0.41			0.300	0.932
Item 15 (Having be irritable)					0.66		0.45	0.931
Item 26 (Having concentrating problems)					0.65		0.597	0.932
Item 19 (Having swings mood)					0.61		0.612	0.930
Item 7 (Not been able to eat as much as you would like)					0.42		0.576	0.931
Item 5 (Abdominal pain)						0.68	0.398	0.930
Item 9 (Having trouble lifting or carrying heavy objects)						0.51	0.597	0.930
Item 14 (Having limited diet)						0.39	0.45	0.933
Variance Explanation Ratios (%)	47.09	8.27	5.09	4.76	4.19	3.70		

CLDQ, Chronic Liver Disease Questionnaire

Table 4. Correlations between the CLDQ, LDSI 2.0 and theirs subdimensions

CLDQ LDSI 2.0	Abdominal symptoms	Fatigue	Systemic symptoms	Activity	Emotional function	Anxiety	Totaly
Itch	-0.30**	-0.26**	-0.47**	-0.33**	-0.26**	-0.38**	-0.42**
Joint pain	-0.44**	-0.51**	-0.71**	-0.55**	-0.46**	-0.40**	-0.61**
Pain in right upper abdomen	-0.41**	-0.28**	-0.37**	-0.46**	-0.29**	-0.26**	-0.40**
Sleepiness during day	-0.41**	-0.75**	-0.42**	-0.49**	-0.48**	-0.39**	-0.59**
Worry about family situation	-0.46**	-0.50**	-0.42**	-0.47**	-0.47**	-0.77**	-0.66**
Decreased appetite	-0.68**	-0.49**	-0.36**	-0.57**	-0.45**	-0.40**	-0.57**
Depression	-0.54**	-0.62**	-0.52**	-0.53**	-0.54**	-0.77**	-0.74**
Jaundice	-0.28**	-0.26**	-0.26**	-0.29**	-0.28**	-0.31**	-0.34**
Extra items (six items)	-0.57**	-0.57**	-0.43**	-0.64**	-0.60**	-0.46**	-0.63**
Total	-0.72**	-0.75**	-0.69**	-0.76**	-0.69**	-0.74**	**-0.88****

** Correlation is significant at 0.001.
CLDQ, Chronic Liver Disease Questionnaire; LDSI, Liver Disease Symptom Index

Interrater reliability

Interrater reliability was evaluated with test-retest scores and ICC. For this purpose, the Turkish version of the CLDQ was re-applied to 60 patients. The test-retest of the Turkish CLDQ was performed after two to three weeks. The test-retest correlation coefficient average for the Turkish version of the CLDQ was 0.79 ($p<0.001$, Table 5). The test-retest correlation coefficient ranged from 0.48 to 0.89. Overall ICC of the Turkish version of the CLDQ was 0.88 ($p<0.001$). ICCs ranged from 0.65 to 0.94. Although the Cronbach's alpha of the "activity" subdimension was low (0.57), test-retest reproducibility was good according to an ICC of 0.79 and test-retest correlations ($r= 0.66$, $p<0.001$) (Table 5).

Construct validity

Confirmatory factor analysis was used to evaluate the construct validity. For the 29 items in the CLDQ's original form, CFA was conducted, and fit indices were assessed. The model fit indexes of CLDQ were calculated as $\chi2/df = 2.320$, GFI = 0.910, CFI = 0.961, RMSEA = 0.075, according to the analysis results (Table 6). As a result of the CFA, the model fit values of the 29 items in the Turkish form of CLDQ were at an acceptable level. Standardised coefficients of the CLDQ were presented in Figure 1. According to the results of the CFA of the Turkish version of CLDQ, that six sub-dimensions consisting of 29 items was confirmed.

DISCUSSION

According to the EFA, the final version of the Turkish CLDQ matched well with the original CLDQ. Specifically, EFA revealed that the Turkish version of the CLDQ is divided into six subdimensions, same as the original English version of the CLDQ. Recently, however, statistics studies suggested that items with factor loadings greater than 0.30 should not be removed from the questionnaire (29). In this study, each item had a factor loading greater than 0.30; therefore, none of the items were removed from the questionnaire. Other studies also found six subdimensions, namely the fatigue, emotional function, worry, abdominal symptoms, activity, and systemic symptoms (13, 15-21, 23). Unlike our findings, Mucci et al. (16) also found six subdimensions, but the sixth subdimensions was called preoccupation, instead of worry. However,

Table 5. Reliability analyses of the Turkish version of the CLDQ

	Mean	Standart deviation	Cronbach's alpha	Test-retest realibility		
				Corelation coefficient	P value*	ICC
Abdominal	5.41	1.64	0.86	0.52	<0.001	0.67
Fatigue	3.97	1.45	0.93	0.82	<0.001	0.90
Systemic Semptoms	4.99	1.31	0.81	0.67	<0.001	0.79
Activity	5.61	1.18	0.53	0.66	<0.001	0.79
Emotional Function	5.44	1.18	0.74	0.48	<0.001	0.65
Worry	4.08	1.35	0.95	0.89	<0.001	0.94
TOTAL	**4.73**	**1.12**	**0.93**	**0.79**	**<0.001**	**0.88**

***** Correlation is significant at 0.001.
CLDQ, Chronic Liver Disease Questionnaire; ICC, Intraclass Correlation Coefficient

Ferrer et al. (2006) (14) found seven subdimensions. The first six subdimensions were like the original version of the CLDQ, but their seventh subdimension was the sleep. Younossi et al. found four subdimensions covering 29 items (22).

There were other differences in the subdimension of the Turkish version compared to the original CLDQ. The question "How much of the time during the last two weeks has shortness of breath been a problem for you in your daily activities?" loaded on the systemic symptoms subdimension in the original version of the CLDQ, whereas it loaded on the abdominal symptoms subdimension in our study. This difference may be due to the percentage of the patients that have cirrhosis in our study and those who had experienced decompensation symptoms, particularly ascites, which can lead to shortness of breath. Ascites in patients with advanced liver disease can affect breathing, and patients with ascites can experience shortness of breath (30, 31).

Two other items "How much of the time during the last two weeks have you had difficulty sleeping at night?" and "How much of the time during the last two weeks have you been unable to fall asleep at night?" loaded on the emotional function subdimension in the original version of the CLDQ but loaded on the systemic symptoms subdimension in our study. Sleeping is perceived as an effective factor in maintaining homeostasis, which is necessary for growth in Turkish culture (32). We believe that sleeping problems loaded on the systemic symptoms subdimension due to this reason.

The question "How much of the time during the last two weeks have you experienced abdominal pain?" loaded on a different subdimension. This question loaded on the abdominal symptoms subdimension in the original version of the CLDQ but loaded on the activity subdimension in our study. This may be due to the perceived in Turkish patients with CLD and its effects on their activities of daily living. Patients who experienced abdominal pain have restricted activities and ability to move (33). Therefore, abdominal pain was grouped under the activity subdimension in our study. Finally, the question "How much of the time during the last two weeks have you not been able to eat as much as you would like?" loaded on the activity subdimension, in the original version of the CLDQ, but loaded on the emotional function subdimension in our study. We believe that this is also due to the cultural differences. In Turkish culture, eating is an important activity that gives pleasure to people, and food is served to celebrate the happy moments by organizing a dinner gathering with families and friends (34, 35). The fact that the patients who are not able to eat may feel unable to fully participate in these important family occasions may explain why this question is loaded on the emotional function subdimension. The correlations between the CLDQ

Table 6. CLDQ fit indices (36)

Fit indices	Perfect fit indices	Acceptable fit indices	Model value
χ2/df	χ2 /df < 2	2 < χ2/df < 5	**2.320**
GFI	0.95 ≤ GFI ≤1	0.90 ≤ GFI ≤0.95	**0.910**
CFI	0.95 ≤ CFI ≤1	0.95 ≤ CFI ≤0.90	**0.961**
RMSEA	0 ≤ RMSEA ≤0.05	0.05 ≤ RMSEA ≤0.08	**0.075**

subdimension and Turkish version of the LDSI 2.0 subdimensions were acceptable, which indicate the predictive validity of this questionnaire. The predictive validity of the CLDQ was also confirmed in other studies (11, 15, 19, 21).

Overall, the Cronbach's alpha was excellent at 0.93. However, the activity subdimension had the lowest Cronbach's alpha value of 0.53. It can be as a result of the few items (three) (25). This result may be due to the three item loadings on this subdimension; as suggested by Sipahi et al., (29) decreased number of items loaded on a factor leads to the lower reliability coefficient, which its acceptable lower limit is 0.60 (29). Ranawaka et al. (17) also found similar results, where the Cronbach's alpha value of the activity subdimension was 0.48 (17). In addition, Pappa et al. (20) stated in their study that the activity subdimension had the lowest Cronbach's alpha value of 0.74. Undeniably, however, this factor needs further exploration. Morever we analysed “cronbach’s alpha if item deleted” values of every item. When any item is deleted, no increase in Cronbach's alpha value is observed, and therefore we did not removed any item from original CLDQ.

The test-retest correlation coefficient was 0.79 in our study ($p<0.001$), with a test-retest correlation coefficient ranging from 0.48 to 0.89 per subdimensions. In this study, we found that the emotional functions subdimension had the lowest coefficient (0.48). This result is understandable, as emotional functions are unstable and easily affected by other environmental changes. Overall ICC of the Turkish version of the CLDQ was 0.88 ($p<0.001$). Mucci et al. (2013) (16) found slightly higher ICC than our results since the time between first and second application ranged from 1 to 15 days in their study. Their higher results may be due to the short time interval. Yet, our ICC results were higher than the original version of the CLDQ. In the original study, ICC analysis was carried out to test the reliability after six months of the original administration for test-retest analysis (11). In this study, test-retest analysis was carried out after two or three weeks. The time duration was a well-established interval since the progression of the disease is likely to remain stable during this interval. The optimal time frame is thought to be between two and four weeks in order to balance out any bias and inconsistencies brought on by the disease's course. Six-month period in the original study might be too long, which may cause lower results. In the Spanish version of the CLDQ, the retest was applied two weeks after the first test application (14). Their results (0.90) were similar to the results of this study. According to the reliability analysis results of our study, the questionnaire was found to be reliable.

CLD is causing the quality of life of the patients to be adversely affected for a long time. So that the symptoms experienced in the CLDQ are determined by reliable questionnaire and symptom management should done effectively. Interestingly, HRQoL scoring in the Turkish version of the CLDQ showed significant differences in terms of the Child-Turcotte-Pugh Scoring groups. Patients without cirrhosis had the best quality of life ratings. Child A group outperformed Child B group in terms of test scores. The results of Tanaka et al. (21) were similar to ours. The Child B group had the lowest scores in all participants (21). The previous studies also had similar results (13, 14, 17). In their study, Pappa et al. (20) reported that patients with Child A group had better HRQoL compared to the patients in Child B or C groups. However, our results were similar to that of reported by Tanaka et al., in which the Child B group had the lowest scores (21). Other researchers have also reported similar findings, suggesting that the Turkish version of the CLDQ measures HRQoL well within the cirrhotic-patient population (13, 14, 17).

In this study, we performed CFA to test the factor structure of the CLDQ. The model fit indexes of CLDQ

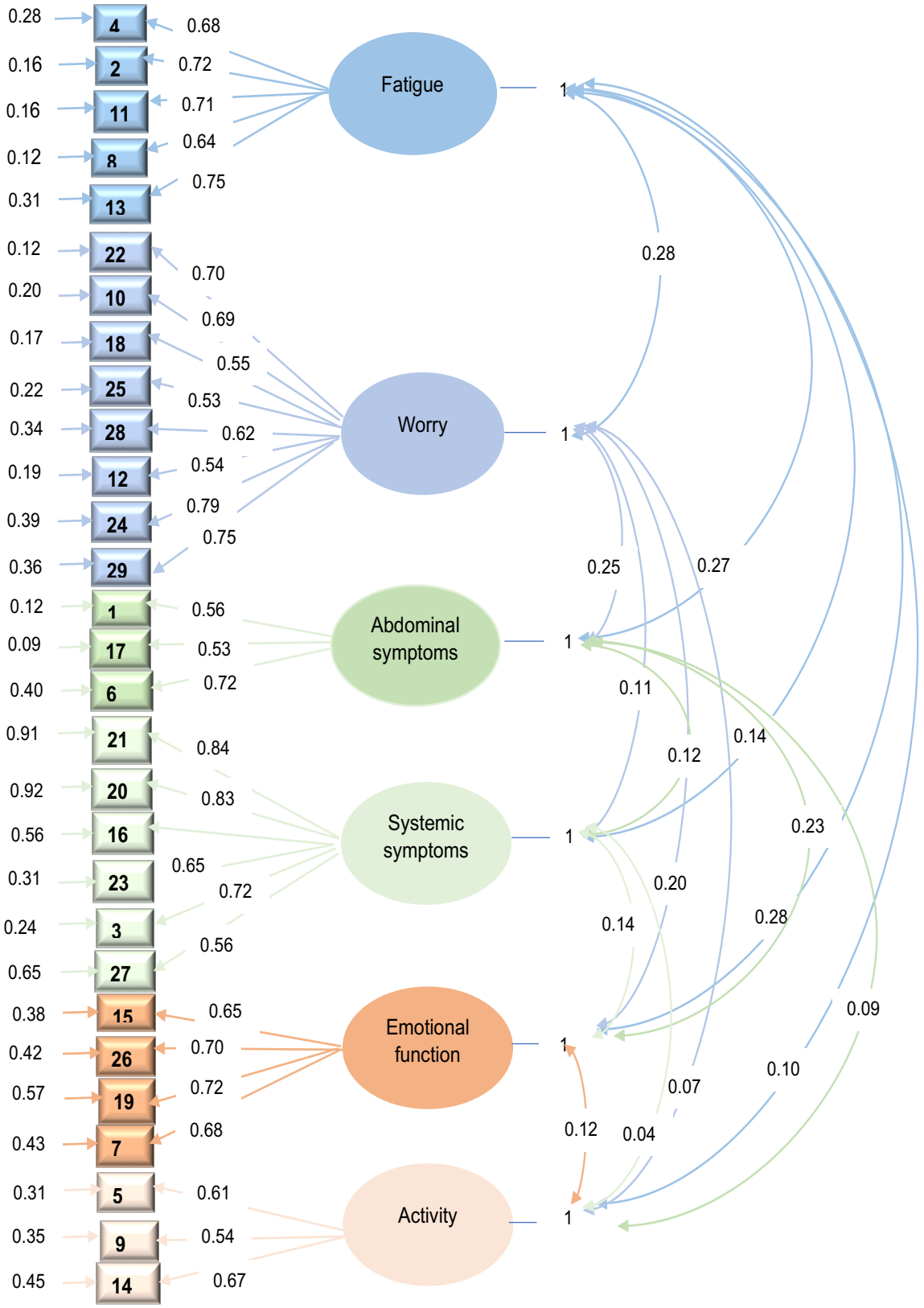

Figure 1. Standardised coefficients

were calculated as $\chi 2/df = 2.320$, GFI = 0.910, CFI = 0.961, RMSEA = 0.075, according to the analysis results. According to CFA results of the CLDQ, the models of fit indexes were adjusted acceptably (38). Since CFA was not performed in determining the psychometric properties of the original scale (11), no comparison was made. Moreover, the other studies in which to test reliability and validity of CLDQ have not reported CFA results (13, 14, 16, 18, 20, 22, 23). The CFA was not applied in the many studies and therefore, no comparisons could be made in this respect.

The study had a couple limitations. First limitation is that the cultural differences we suggested as the reasons why certain items loaded on different factors than the original CLDQ. Since lack of results of CFA of other studies, we could not compare our results of CFA. This was our last limitation.

CONCLUSION

In conclusion, the validity and reliability of the CLDQ were confirmed in the Turkish population, and it will be a useful HRQoL tool in assessing the effects of CLD. HRQoL of non-cirrhotic patients was better than patients with liver cirrhosis. Also, patients in the Child Turgotte Pugh Score A group had better HRQoL than patients with Child Turgotte Pugh Score B group. We recommend researcher should conduct trials to determine quality of life of patients with CLD. According to result of these trials, medical treatment and nursing care should be organized and individualized in accordance with the symptoms, using a multidisciplinary team approach and suitable instruments. In this study, some items loaded on different factors than the original CLDQ. Further studies are needed to confirm the differences we found, where several items loaded differently than the original CLDQ, which we believe is due to cultural differences. Furthermore, studies in which conduct CFA is needed to compare our results.

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