

Study on Short Version of Liver Disease Quality of Life Questionnaire (LDQOL) and Its Reliability and Validity

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Abstract

Objective: To make item analysis on Liver Disease Quality of Life Questionnaire (LDQOL) and to develop a short version questionnaire.

Methods: LDQOL were administered to 256 chronic liver disease patients, item analysis of LDQOL was made and short version of LDQOL was developed based on the results of item analysis. Cronbach's α coefficient of both the original one and the short version one was calculated.

Results: The original questionnaire ceiling effect was from 0-39.6%; flooring effect 0 from 0-34.1%; Cronbach's coefficient from 0.27 to 0.97. The short version scale questionnaire was made up of the 30 items with better ceiling effect (0-29.0%), flooring effect (0); Cronbach's α coefficient (0.92 to 0.98). The correlation coefficient between the original one and that of the short version one was 0.935.

Conclusion: The short version of LDQOL has a higher reliability and good validity.

Keywords: Chronic liver disease; Quality of life; Reliability; Validity

Group two

91 patients with chronic liver disease were recruited in the study with short version LDQOL. The mean age was 42.03 ± 11.37 , 91% were males. The study showed chronic hepatitis B 58 (63.5%), chronic hepatitis C 24(26.4%), alcoholic disease 3(3.3%), autoimmune disease 2 (2.1%). Among them, 62% belonged to Child-Pugh grade A, 26.3% to grade B, 15.3% to grade C.

Introduction

Liver disease quality of life questionnaire (LDQOL) was one of the most popular questionnaires in the world, formed in 2000 by American professor Gralnek et al., used in chronic liver disease patients [1]. It was used even more popular than before especially after 2007 when liver transplant patients get more [2,3]. It has 111 items with 20 different domains. Although it was comprehensive, concluding SF-36 and other liver disease specific items as well, it was so complex with 111 items totally that could not be used well in clinic work [4]. So in our study, we selected items from LDQOL with higher reliability and validity, forming short version one of LDQOL. Then the validity and reliability of the short version one was assessed again. Thus, we can have a simpler questionnaire than before so more doctors can use it.

Methods

Questionnaire

LDQOL: Ian M. Gralnek, American liver disease expert, investigated chronic liver disease patients with an assessment of the progress of quality of life scale test. The scale contains 111 survey items, so called as LDQOL scale. It included the 2nd version of SF-36 health survey scale, which was the core part, added multiple disease-specific dimensions for investigation. SF-36 scale consisted of 8 dimensions, while disease-specific scale contained 12 domains, including liver disease (17 items), the effects of liver disease (10 items), concentration (7 items), memory (6 items), social quality (5 items), negative emotions (4 items), sleepiness (5 items), loneliness (5 items), desperation (4 items), stigma (6 items), sexual functions (3 items), sexual dysfunction (3 items). Many items of the 12 dimensions were collected from investigated patients, published paper or experts of liver disease, which were considered important.

Objects and Methods

Group one

256 patients with chronic liver diseases were surveyed with LDQOL. The mean age was 40.03 ± 13.67 , 91% of them were males. Chronic liver disease was attributed to chronic hepatitis B in 160 participants (62.5%), chronic hepatitis C in 62(24.2%), alcoholic disease in 3(1.3%), autoimmune disease in 3(1.3%). Among them, 59% belonged to Child-Pugh grade A, 23.1% to grade B, 12.1% to grade C.

Shorten form of LDQOL: In our study, we developed LDQOL short form which included 30 items selected from LDQOL. These items had

better reliability and feasibility compared with other items in the same domains

Methods

Items analysis of LDQOL: Calculate the ceiling effect, flooring effect and item to total score Spearman relationship coefficient(r) for each item.

Items selection from LDQOL to form a shorter version of LDQOL: In order to make a shorter form of LDQOL questionnaire, some items should be omitted. Items reserved should comply the following criteria: (1) ceiling effect <20%, (2) flooring effect <20%, (3) Spearman coefficient >0.6.

Reliability analysis of the shorter form of LDQOL questionnaire: To assess the ceiling effect, flooring effect and Spearman coefficient between item and total score of shorten LDQOL questionnaire.

Validity analysis of shorten form of LDQOL: To assess the relationship coefficient (Pearson coefficient r) of scores between LDQOL questionnaire and the shorten one.

Statistics

SPSS 16.0 was used to analyze the data. Ceiling effect and flooring effect and Cronbach's α coefficient was used to assess reliability while Pearson value was used to assess the validity and intern consistence.

Results

Reliability analysis of LDQOL

Most of the items' ceiling effects and flooring effects are less than 20 %, with Cranach's α value more than 0.75 (Tables 1 and 2).

Domains	Mean	SD	Min	Max	Flooring Effect(%)	Ceiling Effect(%)	Cronbach's α (95% CI)
SF-36							
PF	86.59	17.82	10	100	0	23.1	0.910.88-0.94
PR	50.82	42.57	0	100	34.1	31.9	0.860.81-0.90
MF	53.85	43.25	0	100	31.9	39.6	0.77 0.68-0.84
SF	73.42	24.82	10	100	0	24.2	0.750.62-0.83
BP	80.22	20.67	12.5	100	0	37.4	0.810.72-0.88
V	51.53	17.76	7.5	85	0	0	0.640.51-0.75
M	64.93	18.81	12	96	0	0	0.800.73-0.86
OH	53.89	15.12	15	80	0	0	0.330.08-0.52
Liver specific							
LD	80.48	17.61	27.06	100	0	8.8	0.870.83-0.91
EL	79.25	18.87	7.14	100	0	14.3	0.900.86-0.93
C	65.03	23.19	7.14	100	0	16.7	0.920.88-0.95
M	72.99	21.75	0	100	1.1	18.7	0.940.92-0.96
SQ	68.96	14.62	25	100	0	1.1	0.27(.004-0.48
NE	64.9	24.66	0	100	2.2	11	0.740.64-0.82
SL	61.7	17.55	30	100	0	2.2	0.670.54-0.76
L	77.36	18.73	25	100	0	15.4	0.730.63-0.81
D	66.04	21.67	0	100	1.1	7.7	0.720.61-0.80
ST	65.65	24.63	0	100	1.1	14.3	0.880.84-0.92
SF	71.12	24.96	0	100	1.1	5.5	0.850.76-0.91
SD(M)	80.92	23.73	11.11	100	0	25.7	0.910.86-0.95

SD(F)	76.19	35.39	0	100	5.9	17.6	0.970.90-0.99
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Table 1: Reliability of LDQOL; PF: physical function; PR: physical function on role; MF: mood function; SF: social function; BP: body pain; V: vitality or fatigue; M: mental status; OH: overall health; LD: liver disease; EL: the effects of liver disease; C: concentration ; M: memory; SQ: social quality; NE: negative emotions; SL: sleepiness; L: loneliness; D: desperation; ST: stigma; SF: sexual functions; SD(M): sexual dysfunction(male); SD(F): sexual dysfunction (female).

Reliability analysis of Shorten form of LDQOL

Shorten form of LDQOL has better ceiling effect and flooring effect, and better Cronbach's value.

Domain	N of items	Mean score	SD	Min	Max	Flooring effect%	Ceiling effect%	Cronbach's α 95% CI
LD	6	51.21	22.92	10	80	0	0	0.980.97-0.98
EL	3	63.89	29.1	8.33	100	0	23.2	0.950.93-0.97
M	3	63.77	28.68	8.33	100	0	15.9	0.940.91-0.96
SQ	3	64.37	30	8.33	100	0	29	0.960.94-0.97
NE	3	64.13	28.59	8.33	100	0	20.3	0.940.91-0.96
SL	3	62.68	28.32	8.33	100	0	11.6	0.940.90-0.96
L	3	62.68	28.85	16.67	100	0	18.8	0.920.88-0.95
D	3	63.04	28.6	16.67	100	0	18.8	0.950.92-0.97
ST	3	62.32	29.79	8.33	100	0	20.3	0.950.92-0.97

Table 2: Reliability of shorten form of LDQOL; LD: liver disease; EL: the effects of liver disease; M: memory; SQ: social quality; NE: negative emotions; SL: sleepiness; L: loneliness; D: desperation; ST: stigma.

Validity assessment of shorten form of LDQOL

The items are associated with all domains (Tables 3 and 4).

Items	Domains								
	LD	EL	M	SQ	NE	SL	L	D	ST
1.1	0.935**	0.946**	0.952**	0.910**	0.911**	0.957**	0.911**	0.896**	0.928**
1.2	0.939**	0.946**	0.895**	0.964**	0.920**	0.923**	0.906**	0.912**	0.869**
1.3	0.973**	0.974**	0.927**	0.961**	0.959**	0.947**	0.923**	0.914**	0.906**
1.4	0.973**	0.974**	0.927**	0.961**	0.959**	0.947**	0.923**	0.914**	0.906**
1.5	0.951**	0.935**	0.970**	0.961**	0.954**	0.945**	0.924**	0.936**	0.935**
1.6	0.897**	0.853**	0.906**	0.864**	0.931**	0.844**	0.887**	0.893**	0.865**
2.1	0.935**	0.946**	0.952**	0.910**	0.911**	0.957**	0.911**	0.896**	0.928**
2.2	0.939**	0.946**	0.895**	0.964**	0.920**	0.923**	0.906**	0.912**	0.869**
2.3	0.973**	0.974**	0.927**	0.961**	0.959**	0.947**	0.923**	0.914**	0.906**
3.1	0.951**	0.935**	0.970**	0.961**	0.954**	0.945**	0.924**	0.936**	0.935**
3.2	0.897**	0.853**	0.906**	0.864**	0.931**	0.844**	0.887**	0.893**	0.865**

3.3	0.935**	0.946**	0.952**	0.910**	0.911**	0.957**	0.911**	0.896**	0.928**
4.1	0.939**	0.946**	0.895**	0.964**	0.920**	0.923**	0.906**	0.912**	0.869**
4.2	0.973**	0.974**	0.927**	0.961**	0.959**	0.947**	0.923**	0.914**	0.906**
4.3	0.951**	0.935**	0.970**	0.961**	0.954**	0.945**	0.924**	0.936**	0.935**
5.1	0.973**	0.974**	0.927**	0.961**	0.959**	0.947**	0.923**	0.914**	0.906**
5.2	0.951**	0.935**	0.970**	0.961**	0.954**	0.945**	0.924**	0.936**	0.935**
5.3	0.897**	0.853**	0.906**	0.864**	0.931**	0.844**	0.887**	0.893**	0.865**
6.1	0.935**	0.946**	0.952**	0.910**	0.911**	0.957**	0.911**	0.896**	0.928**
6.2	0.939**	0.946**	0.895**	0.964**	0.920**	0.923**	0.906**	0.912**	0.869**
6.3	0.899**	0.893**	0.900**	0.881**	0.894**	0.945**	0.876**	0.879**	0.903**
7.1	0.930**	0.912**	0.930**	0.926**	0.935**	0.891**	0.944**	0.930**	0.919**
7.2	0.908**	0.904**	0.898**	0.894**	0.899**	0.899**	0.925**	0.925**	0.907**
7.3	0.851**	0.846**	0.850**	0.837**	0.844**	0.868**	0.916**	0.850**	0.840**
8.1	0.900**	0.877**	0.906**	0.888**	0.911**	0.882**	0.905**	0.947**	0.916**
8.2	0.929**	0.925**	0.915**	0.924**	0.920**	0.915**	0.930**	0.943**	0.912**
8.3	0.921**	0.907**	0.926**	0.919**	0.923**	0.917**	0.935**	0.962**	0.925**
9.1	0.902**	0.887**	0.915**	0.887**	0.906**	0.896**	0.919**	0.936**	0.956**
9.2	0.900**	0.886**	0.908**	0.900**	0.901**	0.902**	0.905**	0.914**	0.946**
9.3	0.920**	0.917**	0.928**	0.894**	0.911**	0.927**	0.907**	0.905**	0.951**

Table 3: Intern consistence of shorten form of LDQOL LD: liver disease; EL: the effects of liver disease; M: memory; SQ: social quality; NE: negative emotions; SL: sleepiness; L: loneliness; D: desperation; ST: stigma.

Responsibility of shorten form of LDQOL

The responsibility study showed quality of life score with Child-Pugh A was higher than that of B, both A and B are higher than C, The mean difference is significant at the 0.05 level.

Dependent Variable			Mean Difference (I-J)	Std. Error	P	95% Confidence Interval		
						Lower Bound	Upper Bound	conclusion
LD	A	B	35.17083*	1.85824	<0.001	30.606	39.7357	A>B>C
		C	54.54861*	2.35651	<0.001	48.7598	60.3375	
	B	A	-35.17083*	1.85824	<0.001	-39.7357	-30.606	
		C	19.37778*	2.44483	<0.001	13.372	25.3836	
EL	C	A	-54.54861*	2.35651	<0.001	-60.3375	-48.7598	
		B	-19.37778*	2.44483	<0.001	-25.3836	-13.372	
	B	A	44.59375*	2.56961	<0.001	38.2814	50.9061	A>B>C
		C	68.31597*	3.25863	<0.001	60.3111	76.3209	
		A	-44.59375*	2.56961	<0.001	-50.9061	-38.2814	

		C	23.72222*	3.38076	<0.001	15.4173	32.0272	
	C	A	-68.31597*	3.25863	<0.001	-76.3209	-60.3111	
		B	-23.72222*	3.38076	<0.001	-32.0272	-15.4173	
M	A	B	42.47917*	2.44747	<0.001	36.4669	48.4914	A>B>C
		C	68.92361*	3.10374	<0.001	61.2992	76.548	
	B	A	-42.47917*	2.44747	<0.001	-48.4914	-36.4669	
		C	26.44444*	3.22007	<0.001	18.5343	34.3546	
	C	A	-68.92361*	3.10374	<0.001	-76.548	-61.2992	
		B	-26.44444*	3.22007	<0.001	-34.3546	-18.5343	
SQ	A	B	46.48958*	2.53144	<0.001	40.271	52.7081	A>B>C
		C	70.57292*	3.21023	<0.001	62.6869	78.4589	
	B	A	-46.48958*	2.53144	<0.001	-52.7081	-40.271	
		C	24.08333*	3.33055	<0.001	15.9017	32.2649	
	C	A	-70.57292*	3.21023	<0.001	-78.4589	-62.6869	
		B	-24.08333*	3.33055	<0.001	-32.2649	-15.9017	
NE	A	B	43.33333*	2.413	<0.001	37.4057	49.2609	A>B>C
		C	68.05556*	3.06002	<0.001	60.5385	75.5726	
	B	A	-43.33333*	2.413	<0.001	-49.2609	-37.4057	
		C	24.72222*	3.17471	<0.001	16.9235	32.521	
	C	A	-68.05556*	3.06002	<0.001	-75.5726	-60.5385	
		B	-24.72222*	3.17471	<0.001	-32.521	-16.9235	
SL	A	B	43.43750*	2.34138	<0.001	37.6858	49.1892	A>B>C
		C	67.18750*	2.96921	<0.001	59.8936	74.4814	
	B	A	-43.43750*	2.34138	<0.001	-49.1892	-37.6858	
		C	23.75000*	3.08049	<0.001	16.1827	31.3173	
	C	A	-67.18750*	2.96921	<0.001	-74.4814	-59.8936	
		B	-23.75000*	3.08049	<0.001	-31.3173	-16.1827	
L	A	B	44.69792*	2.78386	<0.001	37.8593	51.5366	
		C	66.05903*	3.53034	<0.001	57.3867	74.7314	A>B>C
	B	A	-44.69792*	2.78386	<0.001	-51.5366	-37.8593	
		C	21.36111*	3.66265	<0.001	12.3637	30.3585	
	C	A	-66.05903*	3.53034	<0.001	-74.7314	-57.3867	
		B	-21.36111*	3.66265	<0.001	-30.3585	-12.3637	
D	A	B	44.88542*	2.44707	<0.001	38.8741	50.8967	A>B>C
		C	66.57986*	3.10323	<0.001	58.9567	74.203	
	B	A	-44.88542*	2.44707	<0.001	-50.8967	-38.8741	

		C	21.69444*	3.21954	<0.001	13.7856	29.6033	
	C	A	-66.57986*	3.10323	<0.001	-74.203	-58.9567	
		B	-21.69444*	3.21954	<0.001	-29.6033	-13.7856	
ST	A	B	44.03125*	2.96643	<0.001	36.7441	51.3184	A>B>C
		C	69.53125*	3.76186	<0.001	60.2901	78.7724	
	B	A	-44.03125*	2.96643	<0.001	-51.3184	-36.7441	
		C	25.50000*	3.90285	<0.001	15.9125	35.0875	
	C	A	-69.53125*	3.76186	<0.001	-78.7724	-60.2901	
		B	-25.50000*	3.90285	<0.001	-35.0875	-15.9125	

Table 4: Responsibility of shorten form of LDQOL;* The mean difference is significant at the 0.05 level; LD: liver disease; EL: the effects of liver disease; M: memory; SQ: social quality; NE: negative emotions; SL: sleepiness; L: loneliness; D: desperation; ST: stigma

Discussion

In order to make LDQOL more suitable for clinic, more convenient for doctors and their patients, we edited LDQOL to a shorten form. LDQOL had 111 items and some items were not very good in either reliability or validity, or they were not feasible to Chinese patients, so it was necessary to make a shorten one.

The shortened form in our study had 30 items which will take 10 minutes to finish, so it was much more convenient in clinic work than the original one, which would take 30 minutes to finish.

According to the criteria of a good questionnaire, the Cronbach's value should be more than 0.7, the ceiling effect and flooring effect should less than 20%, and the intern consistency should more than 0.6 [5-8]. From the 111 items of LDQOL, we selected 30 items which met the above criteria. Since for each domain, the least numbers for items to be statistically analyzed was three; we contained three items for each domain at last. Then we assessed the reliability, validity and responsibility of the shorten form and found they were good. Furthermore, both the ceiling effect and flooring effect were better than the original questionnaire (most of the items' value were less than 20%). The Cronbach's α value was better than the original one (most items' Cronbach's α was higher than 0.9)

As to the validity, the total score of LDQOL was related specifically with the total score of shorten LDQOL ($r=0.865$). And the intern consistency was good in the shorten form.

Although LDQOL was set up in 2000, it was widely used in the last 10 years when liver transplant become more popular. It has been translated into several other languages including Korean, Italian or Spanish, but not Chinese yet [9-11]. In this study we assess the reliability, validity and responsibility of the LDQOL and the shorten one; the results showed both had good value.

Furthermore, the shorten form of LDQOL also had good responsibility, which meant it had different QOL scores among patients with different Child-Pugh scores. Child-Pugh A patients had the highest score in the group, Child-Pugh B next, while Child-Pugh C score had the lowest. While some earlier questionnaire could not distinguish different stages of liver disease [12,13], so the shorten form of LDQOL had better responsibility than other ones.

In our clinic, we chose 91 patients to answer the shorten questionnaire. Patients found it was easy to be understood and completed. The items were simple and it was taken not too much time for patients to finish the survey. The average score for each domain ranged from 51.21 to 64.37 in our clinic. The domain with the lowest score was "liver disease" while the domain of the highest score was "social quality".

There are 140 million hepatitis B carriers in China, while among them 93 million were hepatitis B patients. In recent years, the government of China have adopted laws to prohibit discrimination based on results of screening candidates or current workers for hepatitis B. So there may be the reason that the score of "social quality" was higher than "liver disease".

Conclusion

In conclusion, from the results of this study, the feasibility, reliability, responsibility of the short scale was pretty well so it worth widely used.

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