

Translation and Validation of the Persian Version of the Wisconsin Stone Quality of Life Questionnaire

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Purpose: Patients with kidney stones have a lower quality of life (QOL) than healthy patients; however, treatment guidelines neglect their QOL. Wisconsin stone QOL test (WIS-QOL) is the first specific questionnaire for urolithiasis patients. This study evaluated the reliability and validity of the translated Persian version of the WIS-QOL questionnaire in patients with kidney stones.

Material and methods: All patients (> 18 years old) with a history of urolithiasis were included in this cross-sectional. The WIS-QOL questionnaire was translated depending on Hutchinson's guideline. Effects of urolithiasis on the patient's social activity, emotions, disease, and vitality were evaluated. Pearson Correlation and Cronbach's alpha test were used to assess the validity and reliability of the questionnaire. All data were analyzed by SPSS software version 26.0.

Results: Among 154 urolithiasis patients, 94 (61%) were males, and 60 (39%) were females. The mean age was 50.4 years (SD: ± 13.6), and the mean QOL score was 84.7 (SD: ± 21.8). For each question, the numerical value of the Pearson Correlation Coefficient has been compared with the numerical value, and the validity of the questionnaire was confirmed. The overall Cronbach's alpha was 0.94 for all four areas of the questionnaire, so the reliability of the questionnaire in Persian was confirmed.

Conclusion: The present study showed the reliability and validity of the Persian version of the WIS-QOL questionnaire in symptomatic urolithiasis patients. The present study showed the status and impact of urolithiasis on QOL however, longitudinal and prospective studies should be done to specify changes over time.

Keywords: urolithiasis; nephrolithiasis; kidney calculi; health status; wisconsin questionnaire

INTRODUCTION

Urolithiasis is the third most common urological disease, which affects 1-5% of individuals worldwide.⁽¹⁾ About 50 % of urolithiasis patients experience recurrent attacks during the next five years.^(2,3) Previous studies demonstrated that these patients have more physical problems than healthy individuals.⁽⁴⁾ However, patients with urolithiasis have decreased quality of life (QOL) compared with healthy populations. Also, they are more likely to suffer from mental health problems such as depression. Mental disorders are more likely to occur in those who have relapsed kidney stones.^(4,5) However, the treatment guidelines only concern the treatment of kidney stones and neglect the QOL.⁽⁶⁾ Currently, health-related QOL (HRQOL) information has concerned physicians and researchers in the treatment processes of these patients.⁽⁷⁾ Measuring HRQOL gives us relative information about urolithiasis and its effects on patients.⁽⁸⁾ As well as other diseases, the HRQOL affects the treatment option in managing patients with kidney stones. This information can be utilized in choosing current approaches and effective ways of patient monitoring and treatments.⁽⁶⁾ In 2016, the Wisconsin Stone QOL questionnaire (WIS-QOL) was first introduced by Penniston et al. as a specific test

to evaluate QOL in urolithiasis patients.⁽⁹⁾ The translated WIS-QOL questionnaire was previously used in developed countries such as Japan, Germany, France, etc.⁽¹⁰⁻¹²⁾ However, there is no appropriate test in Persian for assessing the urolithiasis patient's QOL. So, the present study evaluates the validity and reliability of the translated version of the WIS-QOL questionnaire in Persian patients with urolithiasis.

MATERIALS AND METHODS

Study population

This cross-sectional study was designed to investigate the reliability and validity of the translated Persian version of the WIS-QOL questionnaire in patients with kidney stones. All older than 18-year-old first-time or recurrent kidney stone formers who presented to the outpatient urology clinic of the Firoozgar hospital from September 2022 until March 2023 were included in this cross-sectional study.

Inclusion and exclusion criteria

A urolithiasis diagnosis was made based on the patient's symptoms, laboratory tests, and imaging findings. Also, patients with previous diagnoses of urolithiasis and who anticipated treatment were included, as well as patients

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Table 1. Patient's characteristics.

Value		Value	Percent (mean ± SD)
Age			50.4 ± 13.6
Gender	Male	94	61
	Female	60	39
History of flank pain	Yes	124	80.5
	No	30	19.5
History of visits to the emergency department	Yes	74	49.4
	No	76	50.6
History of unfortunate events in the last 4 weeks	Yes	122	79.2
	No	32	20.8
History of hospitalization for a reason other than kidney stones	Yes	48	31.2
	No	106	68.8

who previously received medical treatment for urolithiasis. All patients were fluent in the Persian language and literate. Patients who lacked consent to participate in the study, patients with a history of any surgical intervention for urolithiasis, patients who underwent nephrectomy, and patients who had any urological disorder except urolithiasis and had altered mental status were excluded. The patients were assured that if they did not participate in the survey, there would be no problems in their treatment process. The survey was performed by trained interviewers who were not involved with the patient's treatment. The survey, which was printed on paper, was given to the patients to fill out. Iran University of Medical Sciences etc committee approved this study.

Evaluations

Linguistic validation of WIS-QOL in Persian was performed through a multi-step process, as Hutchinson et al. recommended.⁽¹³⁾ First, this questionnaire was translated from English to Persian by two professional and independent native Persian translators (with English as their first foreign language). Then, a consensus meeting was held between the translators and urology specialists to refine the translated text further and make it understandable for patients from different socio-cultural and educational levels. In the third step, the draft text was sent for re-translation by two professional translators. The second consensus meeting was held with translators and experts in the fourth step. Translations were reviewed, and minor changes were made. The second draft was revised to check Persian grammar and spelling.

This questionnaire comprises 28 questions arranged in 4 domains: effect on patient's social activity, emotions, disease, and vitality. The impact on the patient's social activity consisted of eight queries. Nine questions were about emotions, eight were about disease, and three were about vitality. All 28 items had scores ranging from one to five. Domains scores were calculated as the sum of each item. The total WIS-QOL score was calculated as the sum of all 28 questions. Patients were asked about the presence of renal stones, number of renal colic episodes, flank pain or other associated symptoms with urolithiasis, history of presenting to the hospital emergency department, interventions that interfere with their QOL, hospitalization history (except for urolithiasis), medical or surgical treatment for urolithiasis, and experience of unpleasant events during the last one month. Also, they were asked about the family history of urolithiasis, past medical history, and the time of urolithiasis diagnosis.

Statistical analysis

Patients' characteristics were analyzed by descriptive statistics. The mean and the standard deviation were reported for the quantitative variables. Also, qualitative variables were reported as values and percentages. WIS-QOL score was determined as the sum of all 28 item's scores. Total scores were only achieved from wholly filled questionnaires.

The Pearson Correlation test was used to evaluate the validity of the questionnaire, and all the question's scores were analyzed separately. For each question, the numerical value of the Pearson Correlation Coefficient was compared with the standard numerical value in the pre-prepared table based on $DF = 152$.

Cronbach's alpha test (internal consistency) considering each domain separately and all items of four fields together was used to investigate the reliability of the questionnaire. First, the questions were examined in general and then separately for each of the four areas. All data were analyzed by Statistical Package for the Social Sciences (SPSS) software for Windows version 26.0.

RESULTS

Patient's characteristics

Among the 154 urolithiasis patients, 94 (61%) were males, and 60 (39%) were females. The mean age was 50.4 years (SD: 13.6). 80.5 % of patients mentioned urolithiasis-associated pain, and 49.4% were presented to an emergency department during the last four weeks. Patients' characteristics are summarized in **Table 1**.

Descriptive analysis of questionnaire items

All items ranged from 1 to five, and all had the same scale to assess the QOL according to similar variability. Domains scores were calculated as the sum of each item. The total WIS-QOL score was calculated as the sum of all 28 questions. The mean total WIS-QOL score was 84.7, with an SD of 21.8 (ranging from 38 to 133). The mean score for each domain includes the effect on the patient's social activity (26.8 ± 7.9), the impact on emotions (7.3 ± 2.9), the effect on disease (22.7 ± 6.5), and the effect on vitality (27.8 ± 8). A different number of each domain's items justifies the difference between mean scores. (**Table 2**)

Reliability and validity

To examine the validity of the questionnaire, the Pearson Correlation test was used, and the questions were analyzed independently and with total scores. For each question, the numerical value of the Pearson Correlation Coefficient has been compared with the numeri-

Table 2. Scores of the questionnaire.

Area of evaluation	Mean ± SD
Effect on social activities	26.8 ± 7.9
Effect on emotions	7.3 ± 2.9
Effect on disease	22.7 ± 6.5
Effect on vitality	27.8 ± 8
Overall	84.7 ± 21.8

cal value in the pre-prepared table based on $df = 152$. This number was equal to 0.159 for a P -value $> .05$. The totality of the obtained questions is higher than the standard value, and the validity of the questionnaire is confirmed. **Table 3** contains the Pearson correlation coefficient and Normality tests for each item. As shown in **Table 4**, Cronbach's alpha was 0.84 for the effect on social activities, 0.88 for the effect on emotions, 0.83 for the effect on disease, and 0.92 effect on vitality. Also, the overall Cronbach's alpha was 0.94, so the questionnaire's reliability in Persian was confirmed. To show validity, the Content validity Index (CVI) was calculated for all 28 questions of the questionnaire by asking 10 experts, including psychiatrists and psychologists' questions, with 4 items to choose for every question. Each expert should rate each item on a scale, typically 1 to 4 (1 = Not relevant, 2 = Somewhat relevant, 3 = Quite relevant, 4 = Highly relevant). The I-CVI for individual items ranged from 0.80 to 1.00, indicating that the majority of items were considered relevant by most of the experts. The I-CVI is added to **Table 3**. About 3 steps you mentioned in your comment questionnaire were translated, and face validity was accomplished by asking 5 psychiatrists as experts and 5 laypersons who already had experience with renal stones to confirm if the questions of the questionnaire were straightforward,

obvious, incontrovertible and self-explanatory. Another path to show validity was to calculate CVR (Content Validity Ratio) for all 28 questions of the questionnaire by asking 10 experts, including psychiatrists and psychologist's questions about 28 questions of questionnaire to rate each item as "essential," "useful but not essential," or "not necessary." Explanations about the goals of this questionnaire were given to 10 experts before they started in spite of, they were experts themselves. Because of the 10 experts included, a CVR of more than 0.62 was considered acceptable. CVR was added to Table 3, and all items were acceptable. The internal consistency of the questionnaire was assessed using Cronbach's alpha. The overall Cronbach's alpha was 0.960, indicating good reliability. (**Table 3**)

DISCUSSION

Urolithiasis is a common urological disorder with a mean prevalence of about 10% in countries with a high standard of QOL, which has increased during the last 20 years.^(14,15) Due to the chronicity of urolithiasis, the patient's physical and mental status deteriorates with disease progression or associated interventions^(11,16). In addition, a high recurrence rate, patient's inability to attend social affairs, and loss of employment are the other factors reducing patients' QOL and HRQOL.⁽¹⁷⁾ The HRQOL in kidney stone patients is usually assessed using validated questionnaires, such as the SF-36 and the Mental Health Questionnaire. However, disease-specific questionnaires are more appropriate than general questionnaires.⁽¹⁸⁾ In 2016, Penniston et al. took an essential step in the assessment of QOL in urolithiasis patients by developing and proving the validity of the WIS-QOL questionnaire, which is a 28-item dis-

Table 3. The Pearson Correlation Coefficient for all questions, Normality Tests. Internal consistency, Item level Content Validity Index and Content Validity Ratio.

Question number	Pearson Correlation Coefficient	Internal consistency (Cronbach's alpha)	Item level Content validity Index	Content Validity Ratio	Normality Tests Kolmogorov-Smirnov Test	Shapiro-Wilk Test	
1	0.707	0.959	1.00	1.00	0.000	0.000	
2	0.636	0.959	0.90	0.8	0.000	0.000	
3	0.723	0.959	0.90	1.00	0.000	0.000	
4	0.597	0.959	1.00	1.00	0.000	0.000	
5	0.650	0.959	0.80	1.00	0.000	0.000	
6	0.608	0.959	0.90	0.8	0.000	0.000	
7	0.478	0.959	0.80	0.8	0.000	0.000	
8	0.722	0.959	0.80	0.8	0.000	0.000	
9	0.625	0.960	0.90	1.00	0.000	0.000	
10	0.703	0.959	0.80	0.8	0.000	0.000	
11	0.677	0.959	0.80	0.8	0.000	0.000	
12	0.800	0.958	0.90	1.00	0.000	0.000	
13	0.350	0.961	0.80	0.8	0.000	0.000	
14	0.396	0.961	1.00	1.00	0.000	0.000	
15	0.467	0.960	1.00	1.00	0.000	0.000	
16	0.586	0.959	0.80	0.8	0.000	0.000	
17	0.627	0.959	0.90	1.00	0.000	0.000	
18	0.634	0.959	0.80	0.8	0.000	0.000	
19	0.615	0.959	1.00	1.00	0.000	0.000	
20	0.684	0.959	0.90	0.8	0.000	0.000	
21	0.693	0.958	0.80	0.8	0.000	0.000	
22	0.737	0.958	0.90	1.00	0.000	0.000	
23	0.697	0.958	1.00	1.00	0.000	0.000	
24	0.758	0.958	0.80	0.8	0.000	0.000	
25	0.787	0.958	0.90	1.00	0.000	0.000	
26	0.772	0.958	0.80	0.8	0.000	0.000	
27	0.805	0.958	0.90	0.8	0.000	0.000	
28	0.688	0.958	0.80	0.8	0.000	0.000	
				95% Confidence Interval			
				Upper Bound	Lower Bound		
				0.507	0.389		

Table 4. Cronbach's alpha for areas of the questionnaire.

Area of evaluation	Cronbach's alpha
Effect on social activities	0.84
Effect on emotions	0.88
Effect on disease	0.83
Effect on vitality	0.91
Overall	0.94
95% confidence interval	
Upper Bound	Lower Bound
0.585	0.370

ease-specific regional survey instrument with a 5-point Likert scale for each item.⁽⁹⁾ In addition, four subscales assess the emotional impact of kidney stone disease as well as the impact of the health status on social functioning and well-being.

This study evaluated the validity and reliability of the Persian version of the WIS-QOL questionnaire by using standardized translation and validation processes in patients with kidney stones. The present study showed that the Persian version of the WIS-QOL questionnaire is reliable for assessing the QOL in patients with kidney stones. Based on our study, the consistency of this questionnaire was satisfactory for all areas, which indicates strong reliability. This consistency is also present in other translations of this questionnaire. For example, adequate reliability has been reported in the Italian and Spanish versions of the questionnaire, equal to Cronbach's alpha of 0.88 and 0.96, respectively.^(19,20) The validity of the questionnaire was also confirmed in the current study and other studies performed in Asian countries, including China and Korea.^(21,22)

According to the absence of a control group in our study, comparing the values with the normal population is impossible. Still, it is expected that due to pain and disruption of daily and social activities in urolithiasis patients, the average score of the QOL of healthy people in Persian society should be higher.⁽²³⁾ Similar studies in Japan and France showed that QOL scores in urolithiasis patients are lower than the average population.^(10,12) Atalay et al. revealed that performing surgery and removing stones has a significant effect on improving the QOL. Also, they showed increased sensitivity to change and convergent validity of the Turkish version of the WIS-QOL questionnaire. In addition, they revealed no significant difference in the average QOL scores between males and females, although Hesse et al. showed that this difference is substantial between the two groups.^(15,24) This difference can be due to the influence of cultural factors similar to Persian culture, that gender does not have a significant effect on the QOL of the patients.

The present study's limitations include: 1. Another questionnaire was not used to compare the results of the current study; 2. The effectiveness of the WIS-QOL questionnaire has only been evaluated in symptomatic patients. Therefore, it may not be generalizable; 3. A limited number of patients have been assessed. So, studies using the Persian version of WIS-QOL with larger populations are required. 4. The change of QOL through passing time can't be measured with our study. Of course, present study showed the status and impact of urolithiasis on QOL, but longitudinal and prospective studies should be done to specify changes over time.

CONCLUSIONS

In this study, we evaluated the validity and reliability of the translated WIS-QOL questionnaire in Persian, which is approved for patients with a history of kidney stones. Due to the urolithiasis effects on the patient's QOL, a valid and reliable questionnaire is necessary to evaluate the QOL for choosing optimal management.

CONFLICT OF INTEREST

The authors have no relevant financial or non-financial interests to disclose.

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