

Original Article

Psychometric Properties of the Persian Version of the World Health Organization's Quality of Life Questionnaire (WHOQOL-100)

Masoud Karimlou PhD¹, Farid Zayeri PhD^{2*}, Masoud Salehi PhD³

Abstract

Background: In recent decades there has been increasing focus on developing and localizing quality of life (QOL) instruments in different societies. In this study, we aim to translate WHO's Quality of Life WHOQOL-100 questionnaire into the Persian language and assess the validity and reliability of the translated version.

Methods: We used a forward-backward procedure to translate the questionnaire. A pilot sample of 60 university students was recruited to assess the repeatability and construct validity of the instrument. To assess the construct validity, 60 university students filled out both the WHOQOL-100 and WHOQOL-BREF questionnaires. Then, 500 healthy and 500 disabled individuals were randomly selected using a multi-stage sampling technique. The internal consistency of the Persian version of the WHOQOL-100 was evaluated using Cronbach's alpha in the sample. In addition, a multiple linear regression model was utilized for assessing the discriminant validity of this instrument, adjusting for different confounders.

Results: Test-retest analysis of data from the pilot sample showed that the Persian version of the WHOQOL-100 has acceptable repeatability (ICCs for all six domains were higher than 0.7). In addition, computation of the correlation between the domains of WHOQOL-100 and WHOQOL-BREF showed satisfactory construct validity. Analyzing the data from 500 healthy and 500 disabled persons revealed that all domains of WHOQOL-100 met the minimum level of acceptable internal consistency. Multiple regression results showed acceptable discriminant validity for all domains of the Persian version, except for the spiritual domain.

Conclusion: In general, the Persian version of the WHOQOL-100 had satisfactory reliability and validity for assessing QOL of Iranian people. However, we recommend further research for challenging the problem of the spiritual domain.

Keywords: psychometric properties, reliability, validity, WHOQOL-100

Introduction

In recent years, there has been increasing focus on quality of life (QOL) as an important measure in evaluation of health policies and medical interventions.¹ However, because of the variation of the culture of the people assessed, there are several definitions and standards for assessing QOL in different societies, and even within a given society.²

The World Health Organization Quality of Life Group defines QOL as "individuals' perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns".^{3,4} Regarding this definition, most experts in medical sciences believe that QOL is a multi-dimensional and subjective concept.^{5,6}

In earlier decades, a variety of instruments have been developed for assessing QOL in different societies. Therefore, most are appropriate only in their relevant populations. However, some are rather culture free and could be translated into other languages for use in different societies after convenient development and localiza-

tion.² Among these instruments, WHOQOL-100 is one of the most popular questionnaires to evaluate different aspects of QOL. The WHOQOL-100 is a multidimensional, multilingual, and generic instrument developed in more than 15 international centers.^{2,7-14}

Some of the World Health Organization (WHO) QOL instruments (such as WHOQOL-100 and WHOQOL-BREF) were previously developed for different societies and cultures. The psychometric properties of these instruments have been confirmed as acceptable in most of these populations.¹⁰⁻¹³ The WHOQOL-BREF consists of four domains (physical health, psychological health, social relationships, and environmental health) and 26 items. The WHOQOL-100 questionnaire is a more detailed instrument for assessing the level of QOL among different populations with the addition of two additional domains (level of independence and spiritual) to the WHOQOL-BREF. The WHOQOL-100 has 25 different facets and each facet consists of four items.

Recently, the psychometric properties of the WHOQOL-BREF questionnaire was assessed in a general population in the Islamic Republic of Iran,¹⁵ but no published report or manuscript exists that assessed the validity and reliability of the WHOQOL-100 in any Iranian population. Therefore, we decided to conduct a cross-sectional study in order to assess the validity and reliability of the WHOQOL-100 in two different populations: healthy adults and disabled people.

Materials and Methods

The questionnaires

Authors' affiliations: ¹Department of Biostatistics and Computer, University of Social Welfare & Rehabilitation Sciences, Tehran, Iran, ²Department of Biostatistics, Faculty of Paramedical Sciences, Shahid Beheshti University of Medical Sciences, Tehran, Iran, ³Department of Statistics and Mathematics, Faculty of Management and Medical Informatics, Tehran University of Medical Sciences, Tehran, Iran.

Corresponding author and reprints: Farid Zayeri PhD, Department of Biostatistics, Faculty of Paramedical Sciences, Shahid Beheshti University of Medical Sciences, Qods Square, Darband Street, Tehran, Iran.

Tel: +98-212-270-7347, Fax: +98-212-272-1150, E-mail: fzayeri@yahoo.com

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The WHOQOL-100 questionnaire was developed by the World Health Organization as a cross-cultural instrument for assessing QOL separate from a specific disease. The current 100 item self-administrated version of the WHOQOL-100 was extracted from a 235 item preliminary version by pilot testing in 15 different centers. This version of the WHOQOL-100 consists of six domains (physical, psychological, level of independence, social relationships, environment, and spirituality), 24 facets and 96 items. In addition, global QOL and general health can be assessed by another facet (with four items).^{5,7,13,16} This instrument has been translated into more than 20 languages.¹⁷ Studies from different communities have reported appropriate validity and reliability for the original and translated versions of this instrument.^{2,18-20} In this study, the facets were scored through summative scaling. Equally, each item contributes to the facet score and each facet contributes to the domain score. All facets and domain scores were transformed to construct a scale from 0 to 100. Higher scores show a better QOL.⁷ Generally, respondents report their QOL during the previous two weeks.¹¹

The WHOQOL-BREF is another well-known instrument for evaluating QOL status in different communities. The WHOQOL-BREF was developed collaboratively in different centers throughout the world, and has been widely field-tested. This multilingual, multicultural, and generic QOL instrument has 26 items and four domains (physical health, psychological health, social relationships, and environmental health) derived from the WHOQOL-100. Each item is rated on a 5-point Likert scale (with no overall score) and higher scores show better quality of life status.^{6,12} The psychometric properties of the WHOQOL-BREF have been previously evaluated in different cultures and societies.^{15,21-23} Also, in another study, the Persian version of the WHOQOL-BREF has been developed for the Iranian population.¹⁵

Translation

In the present study, we used a forward-backward translation procedure to develop the Persian version of the questionnaire. In this procedure, the original English-language version of the questionnaire was first translated into Persian (the Iranian language) by two experienced Iranian health experts, separately. If there was any difference between two translations, the problem was resolved through discussion with the translators to yield a provisional forward translation. To check the adequacy of the first translation, the initial Persian version was translated back into English by two independent translators whose mother language was English and had no previous knowledge of the questionnaire. The original and back-translated versions were discussed in a bilingual expert panel to resolve the discrepancies. In the next step, a provisional version of the Persian questionnaire was provided and a sample of 60 healthy persons was randomly selected to pilot test this version. Regarding the results of this pilot study, the final version of the Persian questionnaire was confirmed after revising the difficult to understand and confusing questions.^{5,6,24}

Study population and data collection

The study population consisted of healthy inhabitants aged 18 years and above in Tehran, the capital of the Islamic Republic of Iran, who stated to have no chronic (long-lasting, persistent or recurrent medical condition such as diabetes, cardiovascular disease, amputee, and autoimmune disease) or acute disease, and disabled people (patients with problems in upper or lower limbs, vertebra

or musculoskeletal system, who were in the same age group) who had been referred to the Health Treatment and Rehabilitation Center of the Iranian Red Crescent Society. Patients with psychiatric disorders or mental disability were not recruited. This study was approved by the Ethics Committee of the University of Welfare and Rehabilitation. All participants gave verbal informed consent.

To select a random sample of 500 healthy people, we used a multi-stage cluster sampling technique. The city of Tehran consists of 22 municipal districts. We divided each district into several blocks according to the municipal maps provided by the Statistics Center of Iran. In the first stage, a number of blocks were randomly selected in each district using a systematic sampling method. In the next stage, we chose a number of households in each selected block using a random sampling technique. In each district, the size of the selected blocks was proportional to the population size of that district. After selecting the first house as the index of the block by random sampling, houses on the right side of the index house were selected to fulfill the computed sample size in each block. In addition, a simple random sampling technique was utilized to select 500 disabled individuals who had been referred to the above-mentioned center from April 2007 to April 2008. We used interviews instead of the self-administered method for avoiding selection bias in illiterate individuals and reducing the number of missing data. All interviews were carried out by a trained team of interviewers in the house of the selected healthy sample or in the Health Treatment and Rehabilitation Center of the Iranian Red Crescent Society for the disabled persons.

Additionally, to assess certain aspects of the validity and reliability of the WHOQOL-100, we recruited a pilot sample of 60 students at the University of Welfare and Rehabilitation to the study.

Statistical analysis

For descriptive purposes, we presented distribution frequency tables for categorical variables and mean \pm SD for quantitative data in both the pilot and study samples.

Analysis of the pilot sample data

Reliability (repeatability)

To evaluate the repeatability of the WHOQOL-100, we used the test-retest method. To do this, 60 university students completed this instrument twice (at two-week intervals). The intra-class correlation (ICC) coefficients were computed for describing the relationship between domains and facets of these two measurements. To interpret the obtained coefficients, we considered values below 0.4 as poor reliability, values above 0.7 as excellent reliability, and values between 0.4 and 0.7 as fair to good reliability.²⁵

Construct validity

For assessing the construct validity of the WHOQOL-100, the above-mentioned 60 university students filled out both the WHOQOL-100 and WHOQOL-BREF questionnaires. Then, Pearson's correlation coefficient was computed for evaluating the relationship between different domains of these instruments.

Analysis of the study sample

Reliability (internal consistency)

We calculated the Cronbach's alpha to assess the internal consistency of the different domains of the WHOQOL-100 questionnaire for the total study sample (500 healthy and 500 disabled individuals).

Discriminant validity

To check the discriminant validity of the WHOQOL-100, we used the independent samples *t*-test and multiple linear regression modeling. In the regression analysis, we compared the scores of the healthy and disabled samples by adjusting the effect of confounder variables such as age, sex, educational level, and marital status.

Results

Results of the pilot sample data

In the first step, 60 university students (30 males and 30 females) with a mean±SD age of 22.78±2.67 were recruited to the study as the pilot sample. The mean±SD time required for completing the WHOQOL-100 was 17.2±4.3 for these participants (range: 10 to 26 minutes). In addition, this population completed the WHOQOL-BREF in a range of 3 to 12 minutes (with a mean of 6.5 and standard deviation of 2.8).

Reliability (repeatability)

Table 1 shows the obtained ICC values for assessing the repeatability (stability) of the WHOQOL-100. These results demonstrate acceptable reliability values for all domains of the Persian version of the WHOQOL-100. As evident in this table, the ICCs for all domains were in the range of excellent reliability. In addition, the ICCs for the 25 facets of the instrument ranged from 0.57 to 0.83 with a median of 0.71.

Construct validity

We calculated the Pearson's correlation coefficients between different domains of the WHOQOL-100 and WHOQOL-BREF (Table 2). The maximum observed correlation was related to the physical domains of these two instruments ($r=0.759$, $P<0.001$). The minimum significant correlation was related to the physical health domain of the WHOQOL-BREF and the psychological domain of the WHOQOL-100 ($r=0.268$, $P=0.037$). From this table, one can conclude that all the non-significant correlations were related to dissimilar domains of these two questionnaires.

Results of the study sample

We recruited and interviewed a total sample of 1000 persons (500 healthy and 500 disabled people) to the study. The mean±SD age of the total sample was 35.45±12.79 years. The mean±SD ages of the healthy and disabled individuals were 35.09±12.75 and 35.88±12.86 years, respectively ($P=0.326$). There was no significant difference between other characteristics of these two groups. Table 3 shows additional details about the different characteristics of the healthy and disabled samples. In the disabled people group, 196 persons (39.2%) had problems in their upper limbs, 162 persons (32.4%) in their lower limbs, 82 persons (16.4%) in their vertebra and 60 persons (12.0%) had musculoskeletal problems.

Table 4 displays the descriptive statistics for different domains of the WHOQOL-100 in the healthy, disabled and total study samples. These results demonstrate that the highest level of quality of life was related to the spiritual domains in both the healthy and disabled persons. Also, this domain had the highest variation among

Table 1. Assessing the reliability of different facets and domains of the Persian version of WHOQOL-100 ($n=60$).

		ICC	P*	95% CI
Facet	Pain and discomfort	0.579	<0.001	0.726–0.381
	Energy and fatigue	0.610	<0.001	0.748–0.421
	Sleep and rest	0.632	<0.001	0.763–0.452
	Positive affect	0.611	<0.001	0.749–0.423
	Thinking, learning, memory and concentration	0.585	<0.001	0.730–0.389
	Self-esteem	0.676	<0.001	0.794–0.510
	Body image and appearance	0.719	<0.001	0.823–0.569
	Negative affect	0.799	<0.001	0.875–0.684
	Mobility	0.821	<0.001	0.889–0.716
	Activities of daily living	0.692	<0.001	0.805–0.531
	Dependence on medication or treatments	0.628	<0.001	0.759–0.445
	Working capacity	0.788	<0.001	0.868–0.668
	Personal relationships	0.679	<0.001	0.795–0.515
	Social support	0.676	<0.001	0.793–0.510
	Sexual activity	0.731	<0.001	0.831–0.586
	Physical safety and security	0.787	<0.001	0.868–0.666
	Home environment	0.713	<0.001	0.819–0.561
	Financial resources	0.713	<0.001	0.771–0.465
	Health and social care: accessibility and quality	0.643	<0.001	0.770–0.467
	Opportunities for acquiring new information and skills	0.771	<0.001	0.857–0.643
	Participation in and opportunities for recreation/leisure activities	0.739	<0.001	0.836–0.597
	Physical environment (pollution, noise, traffic, climate)	0.642	<0.001	0.770–0.646
	Transportation	0.741	<0.001	0.720–0.373
	Spirituality/religion/personal beliefs	0.829	<0.001	0.894–0.727
	Overall quality of life and general health	0.659	<0.001	0.782–0.486
Domain	Physical	0.816	<0.001	0.886–0.709
	Psychological	0.771	<0.001	0.883–0.670
	Level of independence	0.785	<0.001	0.874–0.691
	Social relationship	0.837	<0.001	0.900–0.740
	Environment	0.759	<0.001	0.849–0.626
	Spirituality/religion/personal beliefs	0.829	<0.001	0.895–0.728

* Two-tailed *P*-value.

Table 2. Correlation matrix for different domains of WHOQOL-100 and WHOQOL-BREF (n=60).

		WHOQOL-100					
		Physical	Psychological	Level of Independence	Social relation.	Environment	Spirituality/religion.
WHOQOL-BREF							
Physical health	r*	0.759	0.268	0.694	0.465	0.358	0.456
	P**	<0.001	0.037	<0.001	<0.001	0.005	<0.001
Psychological health	r	0.354	0.739	0.603	0.589	0.550	0.671
	P	0.006	<0.001	<0.001	<0.001	<0.001	<0.001
Social relationships	R	0.216	0.195	0.427	0.665	0.541	0.484
	P	0.098	0.132	0.001	<0.001	<0.001	<0.001
Environmental health	R	0.081	0.017	0.297	0.297	0.683	0.413
	P	0.537	0.896	0.020	0.020	<0.001	0.001

*Pearson's correlation coefficient , **Two-tailed P-value

Table 3. Characteristics of the study sample.

Characteristic		Healthy	Disabled	Total	P-value
Sex	Male	267 (53.4%)	288 (57.6%)	555 (55.5%)	0.102
	Female	233 (46.6%)	212 (42.2%)	445 (44.5%)	
Marital status	Single	294 (58.8%)	279 (55.8%)	573 (57.3%)	0.628
	Married	176 (35.2%)	188 (37.6%)	364 (36.4%)	
	Widow/separated	30 (6.0%)	33 (6.6%)	63 (6.3%)	
Educational level	Elementary	59 (11.8%)	44 (8.8%)	103 (10.3%)	0.266
	Secondary	261 (52.2%)	263 (52.6%)	524 (52.4%)	
	Academic	180 (36.0%)	193 (38.6%)	373 (37.3%)	

Table 4. Descriptive statistics for domains of the Persian version of WHOQOL-100.

Sample	Domain	Number	Mean	SD	Min-max
Total	Physical	1000	13.015	2.26	18.67-6.00
	Psychological	1000	12.354	1.05	16.00-9.00
	Level of independence	1000	13.619	2.08	18.25-5.50
	Social relationship	1000	12.830	1.87	17.33-6.33
	Environment	1000	12.501	1.81	18.38-6.88
	Spirituality/religion/personal beliefs	1000	14.649	3.44	20.00-4.00
Healthy	Physical	500	13.534	2.25	18.33-6.67
	Psychological	500	12.456	1.08	15.20-9.40
	Level of independence	500	14.061	2.75	18.25-8.00
	Social relationship	500	12.982	1.83	17.33-6.67
	Environment	500	12.705	1.76	17.25-7.38
	Spirituality/religion/personal beliefs	500	14.646	3.38	20.00-4.00
Disabled	Physical	500	12.496	2.15	18.67-6.00
	Psychological	500	12.252	1.01	16.00-9.00
	Level of independence	500	13.176	2.28	18.25-5.50
	Social relationship	500	12.678	1.90	17.33-6.33
	Environment	500	12.296	1.86	18.38-6.88
	Spirituality/religion/personal beliefs	500	14.652	3.51	20.00-4.00

the different domains of the WHOQOL-100. Additionally, both the healthy and disabled samples had the lowest scores of quality of life in the psychological domain.

Reliability (Internal consistency)

The internal consistency indices for the six domains of the WHOQOL-100 instrument are presented in Table 5. Regarding these findings, one can conclude that all the domains of the WHOQOL-100 met or exceeded the minimum level of acceptable internal consistency of 0.7. For the total sample, the maximum level of the obtained reliability was related to the social relationship domain (Cronbach's alpha=0.902).

Discriminant validity

In order to assess the ability of the Persian version of this instru-

ment in differentiating between healthy and disabled persons (discriminant validity) we used two different statistical methods, the independent samples *t*-test and multiple linear regression analysis. Table 6 shows the obtained results from these analyses. These findings noted statistically significant differences between healthy and disabled individuals in most of the WHOQOL-100 facets. Moreover, the healthy and disabled persons showed significant differences in different domains of this instrument, with the exception of spirituality/religion/personal beliefs. Adjusting for confounding variables such as age, sex, marital status, and educational level of the participants, the multiple linear regression analysis results confirmed the obtained findings by the independent samples *t*-test.

Discussion

Table 5. Cronbach's alpha for different domains of the Persian version of WHOQOL-100.

Domain	Healthy (n=500)	Disabled (n=500)	Total (n=1000)
Physical	0.855	0.894	0.885
Psychological	0.864	0.922	0.899
Level of independence	0.897	0.860	0.879
Social relationship	0.913	0.895	0.902
Environment	0.750	0.809	0.785
Spirituality/religion/personal beliefs	0.845	0.906	0.886

In recent years, numerous studies have focused on the development of different QOL assessment instruments such as WHOQOL-BREF,^{22,23,26-30} WHOQOL-100^{2,13,17-19} and SF-36.³¹⁻³⁴ Since the psychometric properties of the Persian versions of the WHOQOL-BREF and SF-36 have been previously evaluated in other surveys,^{15,35-37} we concentrated on developing the Persian version of the WHOQOL-100 questionnaire. The WHOQOL-100 is a well-documented scoring system that has been widely used as a QOL assessment tool for the general population and different sub-communities (such as different diseases). Our study used the guidelines presented by other researchers and the WHO's study groups.^{16,24,38,39} The following text contains a brief discussion about the obtained results.

Reliability

In the present study, we used the intra-class correlation coefficient for assessing the repeatability (stability/reproducibility) of the Persian version of the WHOQOL-100. Our findings (Table 1) showed acceptable ICC values (>0.7) for all domains of the WHOQOL-100. In addition, different facets of this instrument showed excellent or fair to good repeatability using the test-retest approach (with ICCs ranging from 0.579 for the pain and discomfort facets to 0.829 for the spirituality/religion/personal beliefs facet). These results were in agreement with other research in different populations. For instance, field testing of the WHOQOL-100 instrument in a sample of 144 Canadian people showed the test-retest reliability of 0.86 for physical, 0.78 for psychological, 0.91 for independence, 0.87 for social relationships, 0.77 for environmental and 0.60 for spiritual domains.⁴⁰ An assessment of the test-retest reliability of the US version of this instrument in 250 homeless substance-dependent veterans revealed ICC values of 0.78, 0.79, 0.85, 0.71, and 0.78 for the physical, psychological, independence, environmental, and spiritual domains, respectively.¹⁷ In the middle aged population of Kaunas, a city in Lithuania, the test retest reliability for different domains of the WHOQOL-100 was between 0.64 and 0.89.⁴¹ In Portugal, a study on 289 patients and 315 healthy individuals showed the test-retest reliability range from 0.67 to 0.86 in all domains.⁴² In addition, an evaluation of the test-retest reliability of the Greek version of the WHOQOL-100 questionnaire using the independent sample *t*-test indicated no statistically differences in domain mean scores between the test and retest administrations of this instrument.⁴³

The Cronbach's alpha coefficient was higher than 0.7 for different domains of the Persian version of the WHOQOL-100 in both the healthy and disabled cases (Table 5). Therefore, a satisfactory internal consistency could be concluded for this version of the WHOQOL-100. Researchers in other countries also reported acceptable internal consistency for other versions of this instrument. In Canada, the reported Cronbach's alpha values for the physical,

psychological, independence, environmental, and spiritual domains were, respectively, 0.77, 0.79, 0.89, 0.71, 0.80, and 0.89.⁴⁰ In the homeless substance-dependent veterans in the US, researchers reported the Cronbach's alpha of 0.91, 0.93, 0.93, 0.87, 0.92, and 0.91 for the physical, psychological, independence, environmental, and spiritual domains, respectively.¹⁷ For the Chinese and Hindi versions of the WHOQOL-100, the obtained alpha coefficients were higher than 0.7 for all domains of this instrument.^{2,18} In a British population, reported alpha values ranged from 0.87 to 0.95 for different domains of the WHOQOL-100.¹¹ In addition, ranges included 0.64 to 0.84 for a Dutch outpatient sample.¹⁹ Based on the selected sample, different internal consistencies were reported for the US version of this instrument. For a normative data from a healthy population, the alpha coefficients ranged from 0.83 to 0.91.⁴⁴ However, the reliability of this version of the WHOQOL-100 was reported between 0.53 and 0.76 in an African-American population.²⁰ In the middle-aged Lithuanian population of Kaunas city, this instrument displayed acceptable Cronbach's alpha that ranged between 0.77 and 0.89.⁴¹ For the Greek version of the WHOQOL-100 instrument, internal consistency index resulted in values ranging from 0.50 to 0.90 for the physically ill, from 0.65 to 0.90 for the mentally ill, and 0.40 to 0.90 for healthy individuals.⁴³ Finally, alpha coefficients between 0.76 and 0.95 were reported in a study on psychometric properties of the WHOQOL-100 instrument in diabetic patients in Croatia.⁴⁵

Validity

To assess the construct validity of the WHOQOL-100 questionnaire, it is common to use this instrument concurrently with different well-known QOL questionnaires such as SF-36,¹⁴ WHOQOL-BREF,^{30,46} Beck Depression Inventory,⁴² Brief Symptom Inventory,⁴² General Quality of Life Inventory (GQOLI),² General Health Questionnaire (GHQ-28),⁴³ Symptoms Check List-90 (SCL-90), and the Perceived Social Support Scale (PSSS).¹⁹ Because of the wide range of the applied questionnaires in these studies and the variety of correlations between different domains of these questionnaires and the WHOQOL-100, we did not present the reported correlation coefficients. However, by reviewing the reported values for construct validity in these studies, we can conclude that the WHOQOL-100 domains highly (or at least fairly) correlated with similar domains of the utilized instruments which means acceptable construct validity of the different versions of the WHOQOL-100.^{2,14,17,19,42,44,46-48} In the present study, we evaluated the construct validity of the Persian version of the WHOQOL-100 by computing Pearson's correlation coefficients between different domains of this instrument and domains of the WHOQOL-BREF. We found positive correlations between all domains, but some were not statistically significant. As expected, the correlations between similar domains of these two instruments were considerably

Table 6. The comparison of different facets and domains of WHOQOL-100 between healthy and disabled participants.

Facet	Healthy		Disabled		P-value*	P-value**
	Mean	SD	Mean	SD		
Pain and discomfort	13.18	3.15	11.75	2.77	<0.001	<0.001
Energy and fatigue	13.71	2.15	13.47	2.02	0.069	0.065
Sleep and rest	13.71	3.34	12.27	3.27	<0.001	<0.001
Positive affect	11.03	2.45	12.02	2.21	<0.001	<0.001
Thinking, learning, memory and concentration	13.22	2.61	13.07	2.57	0.360	0.337
Self-esteem	12.00	2.40	13.21	2.32	<0.001	<0.001
Body image and appearance	13.13	2.39	12.60	2.37	<0.001	0.004
Negative affect	11.42	2.36	11.37	2.24	0.731	0.913
Mobility	13.88	3.08	12.86	2.34	<0.001	<0.001
Activities of daily living	11.81	2.06	11.74	2.11	0.596	0.799
Dependence on medication or treatments	15.94	2.92	14.67	3.50	<0.001	<0.001
Working capacity	14.62	3.11	13.44	3.66	<0.001	<0.001
Personal relationships	13.73	2.57	13.79	2.69	0.718	0.563
Social support	11.55	3.40	12.31	3.59	0.001	0.002
Sexual activity	12.57	2.49	11.94	3.07	<0.001	<0.001
Physical safety and security	13.05	2.94	12.82	2.19	0.161	0.996
Home environment	12.67	2.36	12.46	3.45	0.261	0.438
Financial resources	12.58	2.23	11.98	2.74	<0.001	0.681
Health and social care: accessibility and quality	11.73	2.78	12.36	2.97	0.001	<0.001
Opportunities for acquiring new information ...	11.74	2.81	10.59	2.67	<0.001	0.003
Participation in and opportunities ...	10.14	2.80	12.34	2.16	<0.001	<0.001
Physical environment	12.07	2.33	12.89	3.50	<0.001	<0.001
Transportation	13.12	3.08	14.65	2.88	<0.001	<0.001
Spirituality/religion/personal beliefs	14.65	3.39	14.66	3.50	0.888	0.915
Overall quality of life and general health	13.98	2.89	13.63	3.19	0.069	0.112
Domain						
Physical	13.53	2.25	12.50	2.15	<0.001	<0.001
Psychological	12.46	1.08	12.25	1.02	<0.001	<0.001
Level of independence	14.06	1.76	13.18	2.29	<0.001	<0.001
Social relationship	12.98	1.83	12.68	1.19	<0.001	<0.001
Environment	12.70	1.76	12.30	1.86	<0.001	<0.001
Spirituality/religion/personal beliefs	14.65	3.39	14.66	3.50	0.888	0.915

*P-value based on independent samples t-test, **P-value based on multiple linear regression analysis.

higher than dissimilar domains. Overall, the domains were not highly correlated; instead, most of the significant correlations were in the moderate range. The physical and psychological domains of the WHOQOL-100 had no significant correlation with the social and environmental domains of the WHOQOL-BREF. In general, the obtained results show satisfactory construct validity for the Persian version of the WHOQOL-100.

For assessing the discriminant validity of the WHOQOL-100, researchers have compared different sub-populations (such as healthy people and patients, or patients with different diseases) in their studies. For example, to evaluate the discriminant validity of the Chinese version of the WHOQOL-100, Li et al. compared the obtained mean scores by patients with hypertension, stroke, schizophrenia, end-stage renal disease, head and neck cancer, and breast cancer. They found significant differences among all domains and facet mean scores of this questionnaire using the ANOVA test.² For the British version of the WHOQOL-100, Skevington reported that scores of the questionnaire could discriminate between sick and healthy people.¹¹ In Canada, the discriminant validity of the WHOQOL-100 was assessed in 144 healthy and ill individuals. The obtained results confirmed that this instrument could discriminate between these two populations.⁴⁰ In an assessment of the discriminant validity of this instrument in Portugal the independent sample *t*-test revealed significant differences for all domains with the exception of spirituality, in healthy and ill people.⁴² In this study, we used the independent sample *t*-test and multiple linear regression analysis for assessing the discriminant validity of the Persian version of the WHOQOL-100. Regarding the results of these analyses, we found significant differences between healthy

and disabled groups in all domains of this questionnaire, except for the spirituality/religion/personal beliefs domain. This indicates that the Persian version of this instrument has an acceptable discriminative validity. The non-significant difference between the healthy and disabled groups in the spiritual domain may be due to complicated religious and cultural beliefs in Islamic countries like Iran.

Conclusion

In recent years, the WHOQOL-100 has undergone acceptable worldwide testing on its psychometric aspects. In the present study, we assessed the psychometric properties of the Persian version of the WHOQOL-100 questionnaire. In general, our findings show that this instrument has an acceptable validity and reliability. Therefore, this questionnaire can be considered as a reliable instrument for assessing QOL in Iranian people.

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