The psychometric properties of Indonesian Version of WHO Quality of Life 100 in tuberculosis patients

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OPEN ACCESS

Jurnal Keperawatan Padjadjaran (JKP)

Volume 12(2), 135-143
© The Author(s) 2024
http://dx.doi.org/10.24198/jkp.v12i2.2500

Article Info

Received : February 12, 2024
Revised : May 07, 2024
Accepted : June 04, 2024
Published : August 14, 2024

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Citation

Yuliyanti, S., Azzam, R., Rayasari, F., Susanti, H,D., Astuti A W, W., Saadulloh, D., & Yunitri, N. (2024). The psychometric properties of Indonesian Version of WHO Quality of Life 100 in tuberculosis patients. *Jurnal Keperawatan Padjadjaran, 12*(2), 135-143. http://dx.doi.org/10.24198/jkp.v12i2.2500

Website

http://jkp.fkep.unpad.ac.id/index.php/jkp

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E-ISSN: 2442-7276
P-ISSN: 2338-5324

Abstract

Background: Tuberculosis has an impact not only on physical health but also on psychological well-being and economic and social status, as well as causing stigma, which results in a decreased quality of life. Quality of life assessment can improve nurses' understanding of patients' burdens, disease processes, and needs during treatment, which will help design appropriate tuberculosis intervention programs.
Purpose: This study was to obtain a valid and reliable Indonesian version of the WHOQOL-100 instrument for tuberculosis patients.
Methods: This study is a psychometric study. According to the WHO guidelines, the original WHOQOL-100 instrument was translated using a forward and backward procedure. Two hundred and seventy-four tuberculosis patients treated at PMI Bogor Hospital completed the questionnaire. Construct validity was tested using exploratory factor analysis with principal component analysis and varimax rotation, and reliability using Cronbach's alpha test on the WHOQOL-100 instrument.
Results: WHOQOL-100 Indonesia version has six domains, with 17 facets, and most questions have a loading factor ≥ 0.4. Of the 100 items, 31 were extracted that were related to freedom, physical safety and security, health and social care, participation and opportunities for relaxation activities, physical environment, and transportation. The overall valid question item reliability test results are α = 0.816.
Conclusion: This study produced a shorter version of the English version of the WHOQOL-100 instrument, valid and reliable for use in Indonesia.

Keywords: reliability, tuberculosis, validity, WHOQOL-100

Introduction

The assessment of the quality of life among individuals with tuberculosis has become an emerging issue that demands attention. People who are affected by tuberculosis undergo significant changes in various aspects of their lives. Tuberculosis patients often experience stigma and discrimination from those around them due to the nature of the disease (Endria, 2019). Moreover, the prolonged therapy regimen leads to substantial changes across multiple dimensions, including their physical condition, psychological well-being, social life, work, and financial situation (Ashutosh, 2019).

As per the Global Tuberculosis Report of 2023, Indonesia ranked as the second-highest country worldwide in terms of the number of tuberculosis patients (WHO, 2023). Acquiring a comprehensive understanding of the quality of life among tuberculosis patients could prove beneficial for the

government in formulating effective, long-term health programs (Hammouda et al., 2023). Such insights could guide the development of targeted interventions and strategies to improve the well-being and outcomes of individuals grappling with tuberculosis.

Various tools have been created to assess the quality of life among individuals with and without health issues. So far, instruments developed by the World Health Organization (WHO) - either the 100-item version (WHOQOL-100) or the briefer version (WHOQOL-BREF) - have been widely utilized in research and clinical contexts. These instruments encompass all dimensions of quality of life, including physical, psychological, social relationships, environment, and spiritual dimensions. Despite WHOQOL-BREF being the concise iteration of WHOQOL-100, it has displayed dependable efficacy with robust psychometric properties across numerous studies. However, specific investigations have indicated superior outcomes in the social dimension when employing the WHOQOL-100 (O'Carroll et al., 2000).

The WHOQOL-100 has been translated into 28 different languages, including Arabic, Cantonese, Croatian, Czech, Danish, Dari, Dutch, Australian English, French, German, Hindi, Hungarian, Italian, Japanese, Kiswahili, Korean, Lithuanian, Norwegian, Polish, Portuguese Brazil, Portuguese Portugal, Russian, Serbian, Sinhala, Spanish Mexico, Spanish Spain, Swedish and Turkish (WHO, 2024). However, as of now, there is no available Indonesian version of this instrument. Developing an Indonesian version of the WHOQOL-100 would undoubtedly prove valuable for research and clinical practice. This adaptation could facilitate a more comprehensive assessment of the quality of life, catering specifically to the Indonesian population and contributing to more accurate and culturally relevant evaluations.

Materials and Methods

This is a psychometric study to evaluate the validity and reliability score of WHOQOL-100. The research was conducted from March 2023 to August 2023 at PMI Bogor Hospital, Indonesia.

Study sample

Two hundred and seventy-four participants diagnosed with tuberculosis who sought treatment at the inpatient and outpatient care at PMI Bogor Hospital from May to June 2023 were included in this study. The convenience sampling method focuses on selecting subjects or sample units that are easy to reach, used without complicated selection procedures (Golzar et al., 2022).

Patients were included in the study if they met the following inclusion criteria: (1) Age ≥ 18 years, (2) Diagnosis of tuberculosis documented in their medical records, (3) Currently undergoing tuberculosis treatment, (4) Proficient in active communication in Indonesian, (5) Literate, and (6) Willing to participate as respondents. Conversely, patients were excluded if they met any of the following criteria: (1) Having medical conditions that impede their understanding and/or completion of the questionnaire, (2) Suffering from cognitive function disorders that hinder their comprehension and/or questionnaire completion, or (3) Experiencing reality impairment disorders that obstruct their understanding and/or questionnaire completion.

The WHOQOL-100 consists of 100 items. Therefore, this study employs 274 participants. This figure is more than 200 participants, qualifying for high-quality factor analysis (Jung & Lee, 2011).

Instrument WHOQOL-100

The WHOQOL Group collaboratively designed the WHOQOL-100 quality of life assessment with 15 international field centers. This comprehensive instrument underwent rigorous testing and validation across 38 different countries to ensure its cross-cultural applicability.

The WHOQOL-100 encompasses six major domains with 25 facets, each consisting of four items, resulting in 100 items for a thorough evaluation of an individual's quality of life. This comprehensive structure allows for a detailed assessment of an individual's quality of life across various dimensions.

The physical domain consists of three facets, including pain-discomfort, energy-fatigue, and sleep-rest. The psychological domain consists of nine facets, positive feelings, thinking, learning, memory and concentration, self-esteem, body image and appearance, and negative feelings. The domain of level of independence consists of four facets including mobility, activities of daily living, dependence on medication and medical aids, and work capacity. The domain of social relationships consists of the facets of personal relationships, social support, and sexual activities. The environmental domain consists of the facets of freedom-safety-physical security, home environment, financial resources, health-social care (accessibility and quality, opportunities to acquire new information and skills, participation and opportunities for leisure/recreational activities, physical environment (pollution/ noise/ traffic/ climate), and transportation. And the domain of spirituality/religion/personal beliefs had a facet of perceived health in general.

Procedure

The research commenced with an initial step of seeking permission from the WHOQOL group via email. Upon obtaining formal authorization to proceed with the study, we initiated the process of translating the WHOQOL-100 instrument from its original language into Indonesian. This translation endeavor was undertaken by two highly qualified translators, each possessing a minimum of a postgraduate education level and proficiency in both the original language and Indonesian. Importantly, these translators worked independently to ensure

Table 1. Characteristics of respondents (n=274)

Characteristic	Mean (SD) N (%)	Mean (SD) N (%)
	Tes and re test	Factor Analysis
Age, mean (SD)	49.44 (15.72)	49.59 (15.69)
Duration of TB treatment in month	6.54 (3.12)	6.53 (3.10)
Gender		
Male	66	197 (71.9)
Female	34	77 (28.1)
Education		
Low education level	17	246 (89.8)
High education level	20	28 (10.2)
Marital status		
Single/widow/widower	24	45 (16.4)
Married	76	229 (83.6)
Occupation		
Laborer	44	133 (48.5)
Entrepreneur	14	44 (16.1)
Employee	20	30 (10.9)
Unemployed	22	67 (24.5)
Monthly income		
< Rp 1.500.000,00	10	18 (6.6)
Rp 1.501.000,00 – Rp 2.500.000,00	6	183 (66.8)
Rp 2.501.000,00 – Rp 3.500.000,00	17	61 (22.3)
> Rp 3.500.000	10	12 (4.4)

Table 2. Cronbach's coefficient alpha values of Indonesian version WHOQOL-100 among Tuberculosis patients (n=274)

Domain	Cronbach's Alpha Values	
	Original language(100 items)	Indonesian language (68 items)
Overall	0.920	0.920
Physical	0.693	0.693
Psychological	0.594	0.594
Level of Independence	0.229	0.387
Social Relationships	0.694	0.721
Environmental	0.852	0.891
Spiritual	0.764	0.764

the accuracy and reliability of the translation. Subsequently, an expert panel consisting of experts, translators, and researchers collaborated to refine and consolidate the best possible translation of the instrument into Indonesian. During this phase, four representatives from the target population completed the questionnaire and provided feedback on the Indonesian version of the WHOQOL-100. Finally, a back translation process was conducted by one different professional translator. This step involved re-translating the instrument from Indonesian back to its original language to assess its linguistic stability.

The convenience sampling method allows researchers to take samples according to the situation, conditions, time availability, and ease of data collection. The instrument testing phase involved 274 participants. The first stage involved 41 participants, and, two weeks later, continued with 233 samples. The research focused on evaluating the validity and reliability scores of the Indonesian version of the WHOQOL-100 instrument.

Table 3. Factor analysis of Indonesian version WHOQOL-100 among Tuberculosis patients (n=274)

WHOQOL-100 original version		WHOQOL-100 Indonesian version		
Domain Factors	**Items**	**Domain Factors**	**Items**	**Factor analysis**
Physical		**Physical**		
Pain & discomfort	1.1	Pain & discomfort	1.1	0.68
	1.2		1.2	0.83
	1.3		1.3	0.80
	1.4		1.4	0.81
Energy & fatigue	2.1	Energy & fatigue	2.1	0.87
	2.2		2.2	0.87
	2.3		2.3	0.63
	2.4		2.4	0.86
Rest & sleep	3.1	Rest & sleep	3.1	0.65
	3.2		3.2	0.82
	3.3		3.3	0.68
	3.4		3.4	0.78
Psychological		**Psychological**		
Positive feelings	4.1	Positive feelings, dignity & learn	6.1	0.68
	4.2		6.2	0.87
	4.3		4.3	0.79
	4.4		5.3	0.84
			4.4	0.85
			7.1	0.71
Thought, learn, memory, & concentration	5.1	Thought, learn, memory, concentration, & negative feeling	5.2	0.86
	5.2		5.4	0.77
	5.3		8.1	0.55
	5.4			
Self esteem	6.1	Self esteem& happy	4.2	0.80
	6.2		6.4	0.79
	6.3		4.1	0.59
	6.4			
Body image & performance	7.1	Body image, performance& self confident	7.2	0.85
	7.2		7.3	0.83
	7.3		6.3	0.58
	7.4		7.4	0.57
Negative feelings	8.1	Negative feelings	8.3	0.93
	8.2		8.4	0.92
	8.3		8.2	0.55
	8.4			
Confidence level		**Confidence level**		
Mobility	9.1	Mobility	9.3	0.90
	9.2		9.4	0.78
	9.3		9.1	0.71
	9.4			

Cont. Table 3. Factor analysis of Indonesian version WHOQOL-100 among Tuberculosis patients (n=274)

WHOQOL-100 original version		WHOQOL-100 Indonesian version		
Domain Factors	**Items**	**Domain Factors**	**Items**	**Factor analysis**
Confidence level		**Confidence level**		
Daily acitivity	10.1			
	10.2			
	10.3			
	10.4			
Drug consumption & life support	11.1	Drug consumption & life support	11.2	0.90
	11.2		11.3	0.89
	11.3		11.1	0.83
	11.4		11.4	0.85
Work capacity	12.1	Work capacity& activity	12.4	0.89
	12.2		12.2	0.84
	12.3		12.1	0.83
	12.4		10.3	0.73
			10.1	0.71
			12.3	0.66
			9.2	0.56
			10.4	0.52
			10.2	0.52
Social relationship		**Social relationship**		
Personal relationship	13.1	Personal relationship	13.1	0.72
	13.2		13.3	0.77
	13.3		15.2	0.76
	13.4			
Social support	14.1	Social support	14.2	0.85
	14.2		14.4	0.81
	14.3			
	14.4			
Social activity	15.1	Social activity	15.1	0.87
	15.2		15.3	0.84
	15.3		14.1	0.60
	15.4			
Environmental		**Environmental**		
Freedom & safety	16.1			
	16.2			
	16.3			
	16.4			
Surround environment	17.1	Surround environment and opportunity to gain information	17.1	0.96
	17.2		17.2	0.76
	17.3		17.4	0.94
	17.4		20.2	0.61

Cont. Table 3. Factor analysis of Indonesian version WHOQOL-100 among Tuberculosis patients (n=274)

WHOQOL-100 original version		WHOQOL-100 Indonesian version		
Domain Factors	Items	Domain Factors	Items	Factor analysis
Environmental		Environmental		
Financial	18.1	Financial	18.4	0.95
	18.2			
	18.3			
	18.4			
Healthcare & Social	19.1			
	19.2			
	19.3			
	19.4			
Opportunity to gain information	20.1			
	20.2			
	20.3			
	20.4			
Participation & leisure	21.1			
	21.2			
	21.3			
	21.4			
Physical environment	22.1			
	22.2			
	22.3			
	22.4			
Transpportation	23.1			
	23.2			
	23.3			
	23.4			
Spiritual	24.1	Spiritual	24.1	0.87
	24.2		24.2	0.67
	24.3		24.3	0.87
	24.4		24.4	0.88

Data analysis

The data analysis was performed in SPSS 20 (Sreejesh et al., 2014). The internal consistent reliability of WHOQOL-100 was assessed using Cronbach's alpha test (Kalfoss et al., 2021). Construct validity testing was conducted using exploratory factor analysis (EFA) with the principal component analysis and varimax rotation to accurately measure the intended construct (Sreejesh et al., 2014; Wehner et al., 2020). The process of assessing construct validity through factor analysis follows three steps: (1) defining the analysis variables across six domains, (2) initially deriving factors through the Bartlett test of sphericity and Measure of Sampling Adequacy (MSA) assessment, where variables with an MSA value ≥ 0.5 signal predictability and the need for deeper examination; during this phase, variables are screened based on a factor loading criterion of ≥ 0.4 to. A factor loading ± 0,3 – 0,4 is minimally acceptable, and (3) refining the factors through rotation, consolidating items into final extractions, including those that may overlap with other factors (Samuels, 2017).

Results

Demographic characteristics

The results of this study depict the Indonesian version of the WHOQOL-100 instrument that has gone through the stages following WHO standards for psychometric research.

In this study, the data yielded an average age of respondents of 49.59 years with a standard deviation of 15.686 years. The youngest age was 21 years, and the oldest age was 81 years. The average duration of treatment was 6.53 months with a standard deviation of 3.097 months. The minimum duration of treatment was one month, and the maximum duration of treatment was 12 months. The majority of respondents were male (71.9%), with low education level (78.1%), married (83.6%), laborers (48.5%) with monthly income in the range of Rp 1.501.000,00 to Rp 2.500.000,00 (USD 110 to USD 180) (66.8%) (Table 1).

Internal consistency reliability

The Cronbach's alpha of the Indonesian version WHOQOL-100 total and subscale is provided in Table 2. The level of reliability of a research variable or construct can be seen from the results of the Cronbach alpha statistical test. A variable or construct is said to be reliable if the Cronbach's alpha value is>0.6. From Table 2, it can be seen that the overall physical, psychological and spiritual domains have the same Cronbach's alpha value as the original version, while the domains of the level of independence, social relationships and the environment have a stronger Cronbach's alpha value in the Indonesian version than the original version.

Construct validity

The original WHOQOL-100 questionnaire in English comprises 100 items designed to assess the quality of life. However, in the Indonesian version used in this study different items were applied. The Kaiser-Meyer-Olkin (KMO) measure of adequacy for TB patients was found to be 0.80, referring to Shrestha (2021) who stated that KMO 0.80 is adequate. The exploratory factor analysis (EFA) for TB patients was conducted using principal component analysis followed by varimax rotation. While all six domains displayed favorable factor loadings (>0.4), certain items within the psychological, social relationship, and environmental domains were subsequently removed from the analysis (Table 3).

Among the six domains, three domains in the adapted WHOQOL-100 underwent substantial revisions compared to the original version. In the psychological domain, one question was omitted, leading to the emergence of five distinct factors: positive feelings, thinking and learning, memory and concentration, self-esteem, and body image and appearance, accompanied by an additional negative factor. The domain assessing independence level, unlike its English counterpart with four factors, now comprises three factors: mobility, dependence on medications and medical aids, and work capacity, because rotation of items on the daily life activities faces entails clustering on other facets. In the social relationship domain, which previously consisted of 12 items, after analysis four items were excluded and integrated into three factors—personal relationships, sexual activity, and social support. It is because the four items have factor loading < 0.4, which means that items do not meet the requirements of factor analysis. Within the environmental domain, 26 items were eliminated, because items have factor loading < 0.,4, leaving two factors represented by the remaining five questions in the Indonesian version of WHOQOL-100. Meanwhile, all questions in the physical, spiritual, and general domains retained their validity.

Discussion

This study represents a pioneering effort to assess the psychometric properties of the Indonesian version of WHOQOL-100 with a substantial cohort of tuberculosis patients in Indonesia. Notably, this study has contributed to the establishment of a WHO standard for similar research endeavors. The Indonesian adaptation of WHOQOL-100 demonstrated remarkable reliability. This study uses factor analysis which functions to reduce a number of original variables into a new variable with a smaller number. Furthermore, the research findings underscore that the number of domains aligns with the WHO's original version. Although the number of facets or factors was different, this discovery validates the construct validity of this instrument for measuring the quality of life of individuals living with tuberculosis.

This study has revealed that the construct validity of the Indonesian version of WHOQOL-100 does not entirely align with the original version, particularly in the Confidence Level and Environmental domains. In the Confidence Level domain, the daily activity factors were removed, and a majority of the items were reallocated to the Work Capacity factor because participants perceived that their daily activities are working. It is worth noting that a significant proportion of tuberculosis patients in this study were engaged in manual labor occupations. Being infected with tuberculosis significantly affects their productivity (Alene et al., 2021). Furthermore, the requirement for prolonged daily medication adds to the physical challenges faced by tuberculosis patients (Wang et al., 2020). Consequently, their quality of life appears to be more closely tied to how the disease impacts their work capacity rather than their daily activities.

In the Environmental domain, the study identified two factors out of the original six: home environment and financial resources. Indonesian individuals living with tuberculosis tend to place less emphasis on factors such as freedom and physical safety and instead prioritize spiritual aspects (Suhendra Agung et al., 2021; Suratmini & Berliana Togatorop, 2023). In contrast to this, as per the Indonesian version of WHOQOL-100, they perceive the surrounding environment and financial resources as representative factors contributing to the quality of the Environment domain. The remaining items were found to be closely related to access to

information and have rotated and clustered into the home environment factor. This unique observation may be influenced by the distinct cultural context in Indonesia. Indonesian society is characterized by collectivism, placing significant emphasis on collective goals, harmony, cohesion, and cooperation (Van Der Kroef, 1953). This is in contrast to Western cultures, which often lean toward individualism. In Indonesian society, engaging in conversations with peers of the same age is often considered a form of recreation. This cultural aspect is reflected in the study's demographic data, which indicates an average respondent age of 49.59 years, placing them in the early elderly category. With advancing age, opportunities for outdoor activities or recreation tend to decrease. Furthermore, elderly individuals often become recipients of care within their families, leading them to spend more time with their family members and relatives (Silverstein & Giarrusso, 2010).

The items and factors within the social relationships and spiritual domains remained consistent with the English version. Indonesian culture places significant importance on social relationships and spirituality, viewing them as integral aspects of life. In times of illness, individuals often seek solace in their social connections and tend to draw closer to God, whom they regard as the creator of all beings.

The strength of this study is that all types of services at PMI Hospital Bogor were conducted for research respondents, including inpatient and outpatient care. Respondents were used in all different phases of treatment: intensive and advanced phases with pulmonary and extra-pulmonary TB diagnoses. All of this is to ensure the generalizability of the findings or results of the study. The WHOQOL-100 Indonesian version provides new insights into how disease impairs or impacts the subjective well-being of a person. The limitation is that the study was conducted in one hospital, a larger study is needed to provide more representation of respondents with TB in Indonesia.

Conclusion

This study discovered a strong level of internal consistency reliability in the Indonesian adaptation of WHOQOL-100. Despite the divergence in factor structures from the original version, all six dimensions of the WHO's quality of life are still effectively measured through the 68 items of this instrument. Thirty-two items extracted can be covered by other items and proven by the results of the construct validity test with a value of Kaiser Meyer Olkin (KMO)> 0.5. These findings underscore the importance of considering validity concerns when employing the Indonesian version of WHOQOL-100 to evaluate the quality of life among individuals living with tuberculosis.

The study suggests that doing a more comprehensive follow-up study, specifically focusing on ethnic and regional variations, might be beneficial in order to include a more diverse range of people with tuberculosis in Indonesia

Declaration of Interest

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Acknowledgment

We would like to thank the World Health Organization for granting permission for the WHOQOL-100 to be translated into Indonesian, dr. Nancy Sovira, Sp.P and all those involved in this study who cannot be mentioned one by one.

Funding

The author received no financial support for the research, authorship, and/or publication of this article.

Data Availability

Data will be made available on request

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