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ORIGINAL PAPER

Assessment of the quality of life in type 2 diabetes patients – a comparative study of WHOQOL-BREF and DQOL instruments

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ABSTRACT

Introduction and aim. Type 2 diabetes mellitus (T2DM) is a prevalent health issue that significantly impacts the quality of life of patients. Evaluating quality of life in T2DM patients is crucial for understanding the broader effects of the disease and improving patient care. This study aims to evaluate and compare the effectiveness of the WHOQOL-BREF and DQOL instruments in measuring the quality of life of T2DM patients.

Material and methods. A descriptive quantitative study was conducted from March to June 2023 at Puskesmas Wanadadi 1 Banjarnegara. The sample consisted of 195 T2DM patients selected using purposive sampling based on the following inclusion criteria: diagnosed with T2DM for at least one year, aged 30-70 years, willing to participate, and able to complete the questionnaires. Data were collected using the WHOQOL-BREF and DQOL questionnaires and analyzed descriptively.

Results. The analysis revealed that the WHOQOL-BREF and DQOL instruments provided comprehensive insights into the quality of life of T2DM patients. The WHOQOL-BREF was particularly effective in assessing physical and environmental domains ($p<0.05$), while the DQOL was more sensitive to diabetes-specific concerns and psychological well-being ($p<0.05$).

Conclusion. Both the WHOQOL-BREF and DQOL are effective in evaluating the quality of life of T2DM patients, each offering unique strengths in different domains. The findings suggest that a combined use of these instruments could provide a more holistic understanding of the quality of life impacts in T2DM patients, guiding more targeted interventions to improve patient outcomes.

Keywords. DQOL, quality of life, type 2 diabetes mellitus, WHOQOL-BREF

Introduction

Type 2 diabetes mellitus (T2DM) is a growing health issue commonly encountered in society and is one of the four major non-communicable diseases of global concern. Over the past decade, there has been a significant increase in the prevalence of this disease, highlighting its seriousness.[1] T2DM, also known to the public as a blood sugar disease, is a chronic condition characterized by elevated blood sugar levels due to a dysfunctional metabolic system and the inability to produce insulin as needed.[2]

According to the World Health Organization (WHO), quality of life is defined as an individual's perception of their position in life within the context of the culture and value systems in which they live, and in relation to their goals, expectations, standards, and con-

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cerns.[3] Generally, there are six aspects used to measure quality of life: physical health, psychological well-being, level of independence, social relationships, environment, and spirituality.[4,5] Living with T2DM can negatively impact the quality of life of patients, whether or not complications are present.[6,7] Spousal support encompasses all forms of positive behavior and attitudes provided to individuals who are ill or experiencing health problems, offering physical and psychological comfort, accelerating recovery, enhancing immunity, and reducing stress and psychological disorders.[8,9]

Improving the quality of life for T2DM patients requires consistent motivation and support from close relatives and good social interactions. Tangible support for DM patients is also crucial to achieving the desired health outcomes.[10,11] One study reports that among 59% of respondents who had suffered from T2DM for more than five years, 53% had a moderate quality of life.[12] Meanwhile, members of the diabetes community at Ngrambe Health Center had a better quality of life compared to non-members, with 70% of community members having a good quality of life compared to 52.5% of non-members with poor quality of life.[13] Another study also showed a relationship between social support and the quality of life of T2DM patients.[14] The results revealed a negative relationship between emotional distress and quality of life, and a positive relationship between social support and the quality of life of elderly T2DM patients.

Although numerous studies have investigated the quality of life in T2DM patients, there is a notable gap in the literature regarding a direct comparison between the two most commonly used quality of life measurement instruments, WHOQOL-BREF and DQOL.[15] Most studies employ only one of these instruments without comparing their effectiveness and reliability in assessing the quality of life among the T2DM population.[1] Additionally, existing research often fails to provide an in-depth understanding of how each instrument identifies specific aspects of quality of life most affected by T2DM.[16,17]

This study aims to fill this knowledge gap by directly comparing WHOQOL-BREF and DQOL in assessing the quality of life in T2DM patients. By evaluating these two instruments comprehensively, this research hopes to reveal valuable information about the strengths and weaknesses of each instrument, as well as their relative contributions to understanding the quality of life in T2DM patients. The results of this study can offer clearer guidance for healthcare practitioners in choosing the most appropriate instrument for measuring quality of life in the T2DM population. Furthermore, this research focuses on the T2DM patient population in a specific region, providing important local perspectives within a global context.

Aim

This study aims to evaluate and compare the effectiveness of two commonly used quality of life instruments, WHOQOL-BREF and DQOL, in measuring the quality of life in patients with type 2 diabetes mellitus (T2DM). Additionally, this research seeks to identify specific aspects of quality of life that are most affected by T2DM, and how these two instruments measure and reflect changes in these aspects.

Material and methods

Study design

This study uses a descriptive quantitative approach, aimed at providing a more detailed description of certain symptoms or phenomena. The research design is a predetermined strategy to achieve the research objectives and serves as a guideline in the implementation of the study. This design is used to determine the quality of life of patients with T2DM in Banjarnegara, Central Java.

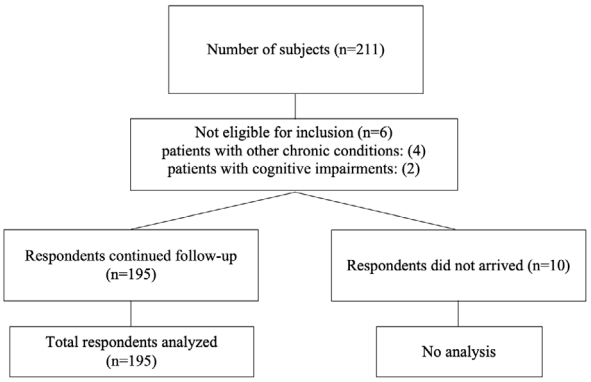

Fig. 1. Flow diagram for participant assignment in this study

This study was conducted from March to June 2023, with the sample criteria being patients with T2DM. Some of the inclusion criteria for determining the sample are patients diagnosed with T2DM for at least one year, aged 30-70 years, willing to participate and provide written consent, patients actively participate in activities and health checks at routine health services every month, are able to read and write, and patients who have stable diabetes conditions without major changes in treatment or complications in the last three months, and able to understand and complete the questionnaires. The exclusion criteria include patients with severe diabetes complications (e.g., severe diabetic neuropathy, diabetic ketoacidosis, or retinopathy leading to blindness), patients with other chronic conditions that significantly affect quality of life (e.g., advanced cancer, chronic heart failure), patients who have recently experienced an acute condition or undergone major surgery in the last three months, female patients who are pregnant, and patients with cognitive impairments or mental health conditions that interfere

with their ability to complete the questionnaires. The total number of respondents was 195 patients

Instruments

The instruments used in this study are the WHOQOL-BREF questionnaire and the DQOL questionnaire, which are used to measure the quality of life of T2DM patients. Primary data were obtained directly from T2DM patients in the form of quality of life data. Secondary data were taken from medical records, including information on gender, occupation, age, and duration of T2DM. WHOQOL-BREF can be completed by the patient himself (self-administered) or through an interview guided by researchers. Each item is rated on a 5-point Likert scale, from 1 (very dissatisfied) to 5 (very satisfied). A total score was calculated for each domain, which was then converted to a 0-100 scale for ease of interpretation. Higher scores indicate better quality of life. Statistical analysis can be performed to compare scores between groups, such as in your study comparing patients with T2DM. The Cronbach's alpha coefficient value for the WHOQOL-BREF instrument consists of the Physical Domain 0.82, the Psychological Domain 0.78, the Social Relations Domain 0.76, and the Environmental Domain 0.79. Overall, Cronbach's alpha values for the WHOQOL-BREF instrument are often above 0.70, indicating a good level of reliability.

The WHOQOL-BREF is a shortened version of the WHOQOL-100, designed to broadly assess the quality of life in four domains: physical, psychological, social relationships, and environment. Although not exclusively measuring sleep quality, the questionnaire includes relevant questions about sleep within the physical and psychological domains. The questionnaire encompasses several parameters, including questions about satisfaction levels with various aspects of life, evaluations of physical and psychological health, and satisfaction with social relationships and the environment. The final score or assessment results of the WHOQOL-BREF can be calculated by combining the responses to all questions. Domains are not given a score, if ≥ 20% of questions were not answered by respondents.[18]

The Diabetes Quality of Life Questionnaire (DQOL) is an assessment tool used to measure the impact of diabetes on an individual's quality of life. The DQOL questionnaire consists of several parameters including Feelings about diabetes management, impact of diabetes on daily life, discomfort caused by diabetes, concerns about the development of diabetes complications, and concerns about dependence on others in managing diabetes. The Diabetes Quality of Life (DQOL) instrument is an assessment tool specifically designed to measure the quality of life in diabetes patients. This instrument was developed by the Diabetes Control and Complications Trial (DCCT) and is widely used in research and clinical practice to understand the impact of diabetes and its treatment on patients' quality of life. DQOL consists of 46 items divided into four main domains, namely satisfaction, impact, worry, and social/vocational concerns. DQOL can be filled in by the patient himself (self-administered) or through interviews guided by researchers. Each item is rated on a 5-point Likert scale, from 1 (never) to 5 (always). A total score was calculated for each domain, with lower scores indicating better quality of life. DQOL scores allow researchers to identify specific areas of a patient's life most affected by diabetes, so that more appropriate interventions can be designed.[12] The Cronbach's alpha coefficient values for the DQOL instrument are satisfaction 0.82, impact 0.76, worry 0.77, and social/vocational concerns 0.78. Overall, Cronbach's alpha values for the DQOL are usually above 0.75, indicating that this instrument has good internal consistency.

Data analysis

The sample in this study was taken using purposive sampling, a technique with criteria determined by the researcher. Data obtained from the questionnaires will be analyzed descriptively to provide a detailed overview of the quality of life of T2DM patients at Puskesmas Wanadadi 1 Banjarnegara. The analysis is performed to observe the frequency distribution and relationships between the variables studied, such as age, gender, occupation, and duration of the disease, with quality of life. We used IBM SPSS version 26 software (Armonk, NY, USA) for the statistical analysis of the research results.

Ethical approval

This study has received ethical approval from the Health Research Ethics Committee with number 037.6/II.3.AU/F/KEPK/II/2023. All respondents were given complete information about the study's purpose and procedures, and their participation was voluntary. The researcher ensures the confidentiality of respondents' personal data and that it is only used for the purposes of this study. Written consent from each respondent was obtained before data collection began.

Results

The study involved 195 respondents who met the criteria. The data collection process took a considerable amount of time given the large number of respondents, and the questionnaires were administered twice, using both the WHOQOL-BREF and DQOL. All respondents actively participated. Data such as age, body mass index, and duration of diabetes were tested for normality, and the results indicated non-normal distribution with the Kolmogorov-Smirnov test ($p<0.05$). The majority of respondents were unemployed women with a monthly income of less than 500,000 IDR, as shown in Table 1. Statistical analysis using the Spearman rank

test revealed differences in the analysis using WHOQOL-BREF and DQOL, particularly in respondents' body mass index and schedule blood sugar checks. Other variables showed significant correlations, such as monthly income, living at home, age, and duration of diabetes ($p<0.05$), as shown in Table 2.

Table 1. Characteristic of respondent (n=195)

	n	%	Median (Min-Max)	Mean±SD
Sex				
Male	65	33.3		
Female	130	66.7		
Work				
Yes	101	51.8		
No	94	48.2		
Income or salary (IDR)				
< 500.000	118	60.5		
500.000–1.000.000	61	31.3		
> 1.000.000	16	8.2		
Stay at home				
Alone	80	41.4		
With family	115	58.6		
Schedule blood sugar checks				
Yes	72	36.9		
No	123	63.1		
Age			55 (42–63)	53.5±9.62
Body mass index			22 (17–27)	21.8±3.31
Long duration of DM (Month)			7 (1–25)	8.5±4.74
WHOQOL-BREF			72 (54–92)	71.6±10.8
DQOL			35 (22–48)	33.2±9.29

Table 2. Results of spearman test (n=195)

	WHOQOL-BREF		DQOL	
	r	p	r	p
Sex	0.057	0.430	0.029	0.692
Work	0.071	0.323	0.010	0.890
Income or salary (IDR)	0.230	0.017	0.030	0.019
Stay at home	0.170	0.032	0.289	0.014
Schedule blood sugar checks	0.058	0.422	0.122	0.008
Age	0.171	0.015	0.294	0.018
Body mass index	0.027	0.706	0.170	0.033
Long duration of DM (month)	0.277	0.028	0.185	0.023

Table 3. Results of Comparative Analysis WHOQOL-BREF and DQOL instruments (n=195)

	Mean ± SD		Std Error Mean	t	p
	WHOQOL-BREF	DQOL			
Physical	65.3±10.2	72.1±9.8	6.8	8.12	<0.001
Psychological	63.7±11	70.5±10.5	6.7	7.54	0.001
Social relation	60.4±12.5	68.3±11.7	7.9	6.89	<0.001
Environtmental	62.9±10.8	69.8±10.2	6.9	7.22	<0.001

Discussion

The higher prevalence of T2DM in women can be explained by several biological and social factors. Biologically, women tend to have different body fat distribution compared to men, which can increase insulin resistance and the risk of type 2 diabetes.[19] Additionally, hormonal changes that occur during pregnancy (gestational diabetes) can increase the risk of developing T2DM later in life. Socially, women often bear more responsibility for household management and family care, which can limit the time and resources available for maintaining their own health.[20,21] These factors can contribute to an unhealthy lifestyle and an increased risk of T2DM.

Low income in T2DM patients is often associated with decreased physical ability and activity as they age. Economic status plays a crucial role in determining individuals' access to the resources needed to maintain health, such as nutritious food, medications, and medical care. Low income limits patients' ability to obtain the necessary care to manage their diabetes effectively. Dependence on uncertain support from children and family adds a layer of uncertainty to patients' lives.[22,23] Support from family and loved ones is essential in managing chronic diseases like diabetes. However, uncertain dependence can create additional stress and uncertainty, negatively impacting patients' quality of life. Low income and dependence on family assistance have a direct impact on various aspects of quality of life measured by WHOQOL-BREF and DQOL. WHOQOL-BREF encompasses dimensions of physical health, psychological well-being, social relationships, and the environment.[24] Low income can affect all these dimensions by limiting access to healthcare, increasing psychological stress, reducing opportunities to participate in social activities, and restricting the ability to create a healthy and safe living environment.[25]

The variables of age and duration of T2DM have been proven to be relevant and correlated with the quality of life of patients, both when measured using WHOQOL-BREF and DQOL. This finding can be explained through several theoretical concepts relevant to the management of chronic diseases and quality of life.[26] As individuals age, various aspects of physical and mental health tend to decline. In DM patients, aging is usually accompanied by an increased risk of diabetes-related complications such as cardiovascular disease, neuropathy, nephropathy, and retinopathy. The theory of biological aging explains that as individuals age, bodily functions decline, which affects their ability to manage chronic diseases such as diabetes.[27]

The WHOQOL-BREF questionnaire includes dimensions of physical and psychological health that are highly relevant to the effects of aging. In older patients, decreased physical function can lead to limited mobility, pain, and increased dependence on others, all of which have a negative impact on quality of life. Psychologically, aging is also often associated with an increased risk of depression and anxiety, which can further worsen diabetes management and quality of life.[15,28]

The duration of suffering from DM is also an important variable that affects quality of life. The longer someone lives with diabetes, the greater the likelihood

of experiencing chronic complications that can worsen quality of life. The theory of adaptation to chronic illness suggests that while individuals may learn to adapt to their illness over time, long-term exposure to the physical and psychological stressors of diabetes can gradually decrease quality of life.[29]

DQOL is more specific in capturing the nuances of living with diabetes over time. For example, variables such as the time required for blood sugar checks and the frequency of routine monitoring are highly relevant to patients who have lived with diabetes for a long time.[30] The longer time spent managing diabetes, the greater the burden felt by the patient, which can affect aspects of quality of life measured by DQOL, including physical discomfort, concerns about complications, and the burden of daily diabetes management.[10]

Research findings indicate significant differences in correlation tests measuring quality of life using WHOQOL-BREF and DQOL, particularly in the variables of blood sugar monitoring status and body mass index. In the DQOL questionnaire, these variables have a greater influence, which becomes even more relevant when further analyzed in the context of the time required to measure blood sugar levels. This item is not found in the WHOQOL-BREF questionnaire. Additionally, DQOL includes supportive items such as the frequency of routine check-ups or monitoring, which are not integrated into WHOQOL-BREF.[17]

The DQOL questionnaire is specifically designed to measure aspects of quality of life unique to diabetes patients. Blood sugar monitoring status and body mass index are crucial variables affecting daily diabetes management. Regular blood sugar monitoring and body mass index tracking are key components in effective diabetes management, as they are directly related to the risk of diabetes complications and the stability of the patient's health condition.[31]

In DQOL, items related to the time required to measure blood sugar levels are highly relevant because regular and rapid measurements provide the necessary information for immediate adjustments in diabetes management. For instance, patients can take corrective actions for hypoglycemia or hyperglycemia based on quick blood sugar test results. This is vital in preventing acute and chronic complications that can impact quality of life.

In this study, we compared two main instruments, WHOQOL-BREF and DQOL, to assess the quality of life of T2DM patients. Each instrument has advantages and disadvantages that are described based on the domains measured. The WHOQOL-BREF instrument has the advantage that in the physical domain it provides a comprehensive picture of daily activities, dependence on drugs and treatments, as well as other physical aspects such as energy, mobility and sleep. This is important for understanding the impact of diabetes on general physical health. In the psychological domain, this instrument covers emotional aspects such as self-image, emotional status, and self-esteem, which are especially relevant for patients with chronic conditions such as diabetes. The social domain measures social support and the quality of personal relationships, which are important aspects of chronic disease management. while the environmental domain examines external factors such as financial resources, safety, and access to health services, providing a holistic view of quality of life. The disadvantage of the WHOQOL-BREF is that the instrument is designed for the general population and does not specifically capture the impact of diabetes on quality of life. Does not focus on specific aspects of diabetes such as concerns about complications or day-to-day diabetes management.

The advantage of the DQOL instrument is that it specifically assesses patient satisfaction with diabetes management, including medical care and glucose control, providing in-depth insight into the effectiveness of care. The impact domain, already focused on the impact of diabetes on daily activities and social functioning, provides specific information about how diabetes affects the patient's life. the worry domain, measures patient concerns about diabetes complications and related health problems, which is important for understanding the psychological burden of diabetes, and the social/vocational Concerns domain assesses the impact of diabetes on social interactions and work opportunities, important aspects for the quality of life of patients who are still actively working or interacting in society. Based on these advantages, DQOL still has disadvantages, namely that it does not cover several aspects measured by WHOQOL-BREF, such as environmental factors and physical safety, and although it is very detailed in the diabetes aspect, DQOL does not provide a holistic picture of overall quality of life.

Based on Table 3, it can be concluded that the DQOL instrument provides better results in assessing the quality of life of T2DM patients compared to the WHOQOL-BREF. The significant differences between these two instruments indicate that the DQOL is more sensitive in capturing specific aspects of quality of life that are affected by diabetes. Therefore, DQOL can be considered a more effective tool to evaluate the quality of life of T2DM in the context of this study.

DQOL better assesses physical aspects relevant to T2M conditions, such as glucose management and the physical impact of diabetes complications. Higher scores on the DQOL reflect that patients feel their quality of life is better in physical terms when assessed with this instrument. The DQOL is also more sensitive

in measuring the psychological impact of diabetes, including anxiety, depression, and stress related to managing chronic disease. The DQOL's ability to capture these psychological nuances makes it a better tool for evaluating patients' emotional well-being.

In the social domain, the DQOL appears to be more effective in evaluating the impact of diabetes on social interactions and the support patients receive from family and friends. This is important because social support is a key factor in managing chronic disease. DQOL also better measures specific environmental aspects related to diabetes patients' quality of life, such as access to health care, financial resources, and physical environments that support disease management.

DQOL also includes items regarding the frequency of routine check-ups or monitoring, which is an essential aspect of diabetes management. Routine check-ups allow for early detection of complications, adjustment of treatment, and evaluation of the effectiveness of diabetes management. The absence of this item in WHOQOL-BREF suggests that this questionnaire may be less sensitive in capturing the nuances of quality of life influenced by the frequency and efficiency of medical monitoring in diabetes patients.

Conclusion

The WHOQOL-BREF quality of life questionnaire is more comprehensive as it covers various aspects of quality of life, including physical health, psychological well-being, social relationships, and the environment. However, it is not specifically designed for patients with diabetes. On the other hand, the DQOL is recommended for measuring the quality of life in diabetes patients, as its name suggests. It is specifically designed for diabetes patients, making it better suited to capture the unique aspects of living with diabetes. This questionnaire covers various relevant aspects such as diabetes management, discomfort caused by diabetes, and concerns about complications.

Declarations

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Author contributions

Conceptualization, A.R. and K.N.; Methodology, A.R. and P.A.W.S.; Validation, S.W. and K.N.; Formal Analysis, P.A.W.S. and K.N.; Investigation, A.R.; Resources, A.R. and P.A.W.S.; Data Curation, P.A.W.S.; Writing – Preparation of Original Draft, A.R. and P.A.W.S.; Writing – Review & Editing, A.R. and P.A.W.S.; Visualization, P.A.W.S.; Supervision, A.R. and S.W.

Conflicts of interest

All author declare have no conflict of interest.

Ethics approval

This study was approved by the local ethics committee (Health Research Ethics Committee in Universitas Muhammadiyah Gombong, date: February 9, 2023 decision number: 037.6/II.3.AU/F/KEPK/II/2023).

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