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Validity and Reliability of the Indonesian Version of Diabetes Quality of Life Brief Clinical Inventory in Patients with Type 2 Diabetes at Primary Care

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Abstract

Background: Type 2 diabetes (T2DM) has a significant impact on patients' quality of life (QoL), including physical, psychological, social, and economic aspects. However, a culturally and linguistically adapted Diabetes Quality of Life Brief Clinical Inventory (DQoL-BCI) for Indonesian patients remains limited. A validated Indonesian version of this instrument is necessary to ensure accurate assessment and effective interventions for diabetes management.

Objective: This study aimed to assess the validity and reliability of the Indonesian version of the Diabetes Quality of Life Brief Clinical Inventory (DQoL-BCI) among patients with T2DM in primary care.

Methods: A cross-sectional study was conducted among 30 T2DM patients at a primary health care center in Singkawang City, West Borneo, Indonesia. Data were collected through interviews. The DQoL-BCI, a 15-item questionnaire, was used to measure QoL, with responses rated on a 5-point Likert scale. Construct validity and internal consistency were assessed using Pearson's r and Cronbach's alpha.

Results: All items showed Pearson's r values greater than 0.361, indicating an adequate correlation with the overall scale and thus validating the items. The highest Pearson's r values were for satisfaction with the time to determine sugar levels (0.688) and sex life (0.680). The Cronbach's alpha coefficient for all items was 0.887, exceeding the minimum requirement of 0.70, demonstrating excellent internal consistency.

Conclusion: The Indonesian version of the DQoL-BCI is a valid and reliable instrument for measuring the QoL in individuals with T2DM in primary care settings.

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INTRODUCTION

Diabetes mellitus (DM), particularly type 2 diabetes (T2DM), significantly impacts patients' quality of life (QoL), affecting multiple domains such as physical, psychological, social, and economic well-being[1]. Studies have shown that diabetes causes physical limitations, including difficulties in daily activities, walking, and sleeping, which are common among patients [2,3]. The chronic nature of diabetes and its complications, such as diabetic neuropathy, further exacerbate these physical limitations, leading to pain, discomfort, and impaired mobility, which are common complaints among patients [4,5]. The psychological impact is also profound, with many patients experiencing low self-esteem, depression, sadness, anger, and worry, often associated with the diagnosis and management of the disease [6–8]. The emotional burden is compounded by the economic stress associated with managing diabetes, as many patients struggle with the financial costs of treatment, which can hinder their ability to receive appropriate care [2,9]. Socially, diabetes affects patients' relationships and social interactions, with many reporting loss of sexual interest and relationship dysfunction [6,10]. Ongoing education and management of blood glucose levels are critical in improving QoL, as patients who are more educated about their condition and its management tend to have better outcomes [11,12].

Effective management of diabetes requires not only clinical intervention but also a comprehensive understanding of how the condition impacts a patient's daily life and overall satisfaction. The Diabetes Quality of Life-Brief Clinical Inventory (DQoL-BCI) is a tool designed to assess these aspects, providing valuable insights into the lived experiences of diabetic patients. Standardized questionnaires, such as DQoL-BCI, have been instrumental in determining QoL among patients with diabetes, providing valuable insights into the multifaceted impact of the disease. These tools have highlighted the need for a holistic approach to diabetes management that addresses the physical aspects and the psychological and social challenges patients face [13,14].

Although the DQoL-BCI is reliable and valid in various settings, there is a significant gap in the availability and validation of an Indonesian language version of this instrument. To the authors' knowledge, the lack of a culturally and linguistically adapted DQoL-BCI specifically for patients with type 2 diabetes may limit the ability of healthcare providers to accurately assess and manage the impact of diabetes on QOL in this demographic group. Therefore, developing and validating an Indonesian language version of the DQoL-BCI is imperative. Thus, this study aimed to assess the validity and reliability of the Indonesian version of the DQoL-BCI among patients with type 2 diabetes in a primary care setting.

METHODS

This cross-sectional study was performed among patients with type 2 diabetes at primary health care in Singkawang City, West Borneo, Indonesia. This location was chosen due to its diverse patient population and accessibility to diabetes care. The data were collected through face-to-face interviews with the author. Based on medical records, thirty patients in this study

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were diagnosed with T2DM at the primary care center and underwent outpatient treatment with their family members at a community health center. The patients in this study were selected by following criteria for this study were individuals: 1) Patients diagnosed with T2DM; 2) patients who came to primary health care as routine treatment patients at a community health center; 3) aged 20-75 years; 4) willing to be research respondents voluntarily; 5) not pregnant or breastfeeding; 6) do not have complications that interfere physically, mentally, and emotionally; and that assessed by general practitioner 7) can be invited to cooperate in observations or surveys. The ethics clearance number is 108/UN.27.06.6.1/ KEP/EC/2021, granted by Universitas Sebelas Maret on 13 December 2021.

The DQoL questionnaire is a specific and commonly used questionnaire to measure QoL in diabetes patients. Burroughs first developed this questionnaire in 2004, consisting of 46 questions. Then, this instrument was created again in a shorter form, namely the Diabetes 37 DQoL-BCI, composed of 15 questions [15]. The DQoL-BCI is a short version designed to be easily administered to patients with type 1 and 2 diabetes. The DQoL-BCI helps identify patient problems that can affect QOL and diabetes control.

The DQoL-BCI is a reliable, valid, and short questionnaire that estimates QoL for patients with type 1 or 2 DM. The Greek version of the DQoL-BCI presents satisfactory content and high construct validity, while high values for Cronbach's alpha index (0.95) reveal excellent internal consistency[16]. The DQoL-BCI consists of two general formats, one indicating the frequency of negative impacts of DM itself or diabetes treatment, and the other highlighting patient satisfaction with treatment and QoL [15]. The questionnaire consists of 15 elements used to estimate patient satisfaction and the level of disease monitoring and self-care attitudes of patients regarding their health status and QoL [16]. Answers to the question elements (items) are rated on a 5-point Likert scale ranging from 1 ("very satisfied" or "never") to 5 ("very dissatisfied" or "constantly"). The total score ranges from 15 to 75. Higher scores indicate a negative perspective on the frequency of problems and the level of dissatisfaction, while lower scores imply a satisfactory QoL [15]. Construct validity was measured by referring to Pearson's r-table correlation value, and reliability was calculated by referring to Cronbach's alpha coefficient. Pearson's R table value must be >0.361, and Cronbach's alpha coefficient must be more than 0.70.

The translation process using Beaton guidelines consists of 5 stages: forward, synthesis, backward translation, expert review, testing, and validity/ reliability test. Initially, DQoL-BCI was translated into two Indonesian versions for bilingual speakers (English-Indonesian). Second, the researcher synthesizes the results of the translation forward. Next, two English language experts re-translated the questionnaire into an English version. Two experts on diabetes, consisting of two physicians, reviewed the Indonesian and original versions.

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RESULTS

Table 1. Characteristics of the Subject

Variables	Respondents (n=30)	
	n	%
Age		
< 50 years old	14	46,7
≥ 50 years old	16	53,3
Sex		
Female	23	76,7
Male	7	23,3
Level of Education		
Primary School	12	40,0
Secondary School	6	20,0
High School	8	26,7
University	4	13,3
Marital Status		
Single/Widow	2	6,7
Married	28	93,3
Occupation		
Housewife	12	40,0
Private	10	33,3
Civil Cervant	4	13,3
Farmer	4	13,3

Source: Azmiardi, 2022

A total of 30 respondents were observed; the majority were aged 50 years and over, as many as 16 people or 53.3%, while 14 people or 46.7% were under 50 years old. Female respondents dominated this group with 23 people or 76.7%, while male respondents were only seven people or 23.3%. Regarding education level, most respondents had an elementary school education, with as many as 12 people (40.0%), followed by respondents who graduated from high school (as many as six people or 20.0%). Eighteen people, or 26.7%, completed their education up to the high school level, and only four people, or 13.3%, reached university-level education.

Most respondents were married, as many as 28 people or 93.3%, while only two people, or 6.7%, were single or widowed/widowed. Regarding occupation, most respondents were housewives, as many as 12 people or 40.0%. A total of 10 people, or 33.3%, work in the private sector, four people, or 13.3%, are civil servants, and four people, or 13.3%, work as farmers. From this data, it can be interpreted that the respondents observed were mostly women aged over 50 years, married, and low-educated, with jobs dominated by the role of homemakers or working in the private sector.

Table 2 shows Pearson's R-value and Cronbach's alpha coefficient in the DQoL-BCI. Pearson's r value indicates the correlation between items with the overall scale, while Cronbach's alpha coefficient measures the scale's internal consistency. This study reports one overall Cronbach's Alpha score (0.887), a standard approach for assessing the reliability of a validated scale. All items in the table show Pearson's R values greater than 0.361, the

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minimum required limit. This indicates that each item has an adequate correlation with the overall scale, indicating the validity of the items in measuring the intended aspects of the QoL of people with diabetes.

Table 2. Pearson's r value and Cronbach's alpha coefficient for all DQoL-BCI items

Items	Pearson's R-value	Overall Cronbach's Alpha
Seberapa puas Anda dengan pengobatan diabetes yang sedang Anda jalani?	0,468	0,887
Seberapa puas Anda dengan waktu yang dibutuhkan untuk mengelola diabetes Anda?	0,508	0,887
Seberapa sering Anda memilih makan sesuatu yang seharusnya tidak Anda konsumsi daripada memberi tahu seseorang bahwa Anda memiliki diabetes?	0,586	0,887
Seberapa sering Anda khawatir akan melewatkan pekerjaan karena diabetes?	0,549	0,887
Seberapa puas Anda dengan waktu yang dibutuhkan untuk memeriksa kadar gula darah Anda?	0,688	0,887
Seberapa puas Anda dengan waktu yang Anda habiskan untuk berolahraga?	0,585	0,887
Seberapa sering Anda mengalami tidur yang buruk karena diabetes?	0,490	0,887
Seberapa puas Anda dengan kehidupan seksual Anda?	0,680	0,887
Seberapa sering Anda merasa bahwa diabetes membatasi karier Anda?	0,452	0,887
Seberapa sering Anda merasakan nyeri akibat pengobatan diabetes Anda?	0,590	0,887
Seberapa puas Anda dengan beban yang ditimbulkan diabetes terhadap keluarga Anda?	0,553	0,887
Seberapa sering Anda merasa tidak sehat secara fisik?	0,561	0,887
Seberapa sering Anda khawatir akan pingsan karena diabetes?	0,508	0,887
Seberapa puas Anda dengan waktu yang Anda habiskan untuk pemeriksaan rutin diabetes Anda?	0,585	0,887
Seberapa puas Anda dengan pengetahuan Anda tentang diabetes?	0,452	0,887

** The original version is attached in the supplementary file. Souce: Azmiardi, 2022*

In detail, the highest Pearson's r value was found in the item "How satisfied are you with the time it takes to determine your sugar level?" with a value of 0.688, followed by "How satisfied are you with your sex life?" with a value of 0.680. This shows that both items strongly correlate with the overall scale, reflecting an essential factor in the QoL of people with diabetes. Furthermore, the lowest Pearson's r value was "satisfaction with diabetes knowledge" (0.452). In addition, the Cronbach's alpha coefficient is 0.887. This is well above the minimum threshold of 0.70, indicating that the DQoL-BCI scale has excellent internal consistency. This coefficient indicates that the items in this scale consistently measure the same concept, namely the QoL of people with diabetes.

DISCUSSION

The results of Pearson's r and Cronbach's alpha coefficients for all items in the DQoL-

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BCI indicate strong validity and reliability of the instrument. Each item showed a Pearson's R value above the threshold of 0.361, confirming a significant correlation with the overall scale. This suggests that each item effectively captures relevant aspects of QoL for individuals with diabetes. Specifically, the items "How satisfied are you with the time it takes to check your blood sugar?" and "How satisfied are you with your sex life?" showed the highest Pearson's r values (0.688 and 0.680, respectively), underscoring their essential role in assessing the overall QoL of people with diabetes. Furthermore, the uniform Cronbach's alpha coefficient of 0.887 across all items exceeded the recommended minimum of 0.70, indicating excellent internal consistency. This high internal consistency suggests that the DQoL-BCI is reliable, as its items consistently measure the intended construct without significant redundancy[17]. A high Cronbach's alpha value is essential to ensure that the scale provides consistent and reproducible results across administrations, enhancing its utility in clinical and research settings.

These findings are consistent with previous research on the reliability and validity of QoL measures for chronic conditions, including diabetes. For example, the Turkish version (DQOL-BCI-TR) showed excellent internal consistency (Cronbach's alpha = 0.90) and test-retest reliability (ICC = 0.98), with a three-factor structure explaining 68.7% of the variance, making it a reliable tool for Turkish patients with T2DM [18]. Similarly, the Urdu version (DQOL-BCI-U) showed satisfactory Cronbach's α of 0.866 (test) and 0.850 (retest) and ICC >0.80 for all items, with a seven-factor structure explaining 69% of the variance, confirming its validity for the Urdu-speaking population [19]. The Malaysian version also showed good reliability and stability, with a four-factor structure explaining 50.9% of the variance and a negative correlation with the EQ-5D-3L utility score, indicating its effectiveness in assessing QOL among Malaysian T2DM patients [20]. In Poland, the DQoL-BCI was validated with a Cronbach's alpha of 0.76 and a Pearson's test-retest correlation coefficient of 0.96, indicating strong construct validity through correlations with the EQ-5D and DSC-R scale [21].

In addition, the DQOL-BCI has been used to compare QoL among patients using different insulin delivery methods, revealing that Continuous Subcutaneous Insulin Infusion (CSII) users scored significantly better on the satisfaction with treatment subscale compared to Multiple Dose Injection (MDI) users, highlighting the importance of diabetes self-management education and multidisciplinary care[16]. The DQOL-BCI is a powerful and versatile tool that has been successfully adapted and validated across cultural contexts, providing valuable insights into the QoL of diabetes patients and supporting clinical decision-making and patient care (16). The implications of this study indicate that the Indonesian version of the DQoL-BCI can be used in clinical practice to assess the quality of life of diabetes patients and develop more targeted treatment strategies.

This study has several strengths. First, it rigorously validated the Indonesian version of the DQoL-BCI using a structured translation and adaptation process. Second, the study applied standard statistical methods, including Pearson's correlation coefficient and Cronbach's alpha, to confirm the questionnaire's

construct validity and internal consistency. This demonstrates its reliability for assessing the quality of life in Indonesian patients with T2DM. Third, this research fills a critical gap in diabetes care by providing a validated instrument for Indonesian-speaking patients, which can help healthcare professionals evaluate and improve diabetes management strategies.

Despite its strengths, this study has some limitations. The sample size was relatively small, which may have affected the generalizability of the findings. Additionally, the study was conducted in a single primary healthcare center in Singkawang City, West Borneo, Indonesia, which may limit the applicability of the results to other regions with different socio-cultural and healthcare system characteristics. Future studies should consider conducting longitudinal assessments and exploring the predictive validity of the DQoL-BCI in broader Indonesian populations.

CONCLUSION

The DQoL-BCI is a valid and reliable questionnaire for assessing QoL in individuals with Type 2 Diabetes. These results indicate that the DQoL-BCI is a valid and reliable instrument for measuring the QoL of people with diabetes, with all items contributing significantly to the overall scale and showing high internal consistency

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