

Original Article

The relationship between diabetes related distress and self-care on the quality of life of patients with type 2 diabetes mellitus: A cross-sectional study

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Abstract

Background: Type 2 diabetes mellitus is a chronic metabolic disease characterized by hyperglycemia that may lead to various complications and reduced quality of life. Psychological factors, particularly diabetes-related distress, and behavioral factors such as self-care play important roles in influencing patients' quality of life.

Objective: To examine the relationship between diabetes-related distress and self-care with the quality of life among patients with type 2 diabetes mellitus at Bulu Lor Primary Health Center, Semarang, Indonesia.

Methods: A quantitative cross-sectional study was conducted among 75 patients with type 2 diabetes mellitus selected using purposive sampling. Data were collected in April 2025 using the Diabetes Distress Scale (DDS), Summary of Diabetes Self-Care Activities (SDSCA), and Diabetes Quality of Life (DQOL) questionnaire. Data were analyzed using the Spearman rank correlation test.

Results: Most respondents were aged ≥ 60 years (85.3%), female (65.3%), and had completed primary school education (34.7%). Diabetes-related distress was moderately and negatively correlated with quality of life ($r = -0.432$; $p < 0.001$), indicating that higher diabetes-related distress was associated with lower quality of life. Self-care showed a moderate positive correlation with quality of life ($r = 0.476$; $p < 0.001$), indicating that better self-care was associated with higher quality of life.

Conclusion: Higher diabetes-related distress was moderately associated with lower quality of life, whereas better self-care was moderately associated with higher quality of life among patients with type 2 diabetes mellitus. Because this study employed a cross-sectional design and unadjusted bivariate analysis, causal relationships and independent associations cannot be established.

Background

Type 2 diabetes mellitus is classified as a chronic disease and remains a significant global health problem (Raditya et al., 2022). This condition arises due to metabolic disorders that result in either insufficient insulin production or ineffective insulin utilization, leading to persistent hyperglycemia (Saragih, Simanullang, & Karo, 2022). Common clinical manifestations include polyuria, polydipsia, polyphagia, and unexplained weight loss (Paulina, Sani, & Witriyani, 2021). If not properly managed, prolonged hyperglycemia can lead to serious health consequences.

The prevalence of type 2 diabetes mellitus continues to increase globally and nationally, posing a major challenge to healthcare systems. Indonesia is among the countries with a high burden of diabetes, with a growing number of diagnosed and undiagnosed cases each year (Retnoningrum et al., 2024). This rising prevalence highlights the need for comprehensive management strategies that not only focus on

glycemic control but also address the broader impact of the disease on patients' lives.

Type 2 diabetes mellitus has the potential to cause various long-term complications, including kidney disease, neuropathy, diabetic foot ulcers, and cardiovascular disorders (Salahudin & Amelia, 2024). These complications significantly contribute to increased morbidity, mortality, and healthcare costs. In particular, diabetic foot ulcers are among the most common and severe complications, often leading to prolonged hospitalization and even amputation if not properly managed.

In addition to physical complications, type 2 diabetes mellitus also imposes a considerable psychological burden on patients. The need for lifelong disease management, including strict dietary regulation, medication adherence, and lifestyle modifications, can lead to stress and emotional distress (Makalew, Rompas, & Katuuk, 2021). Stress has been shown to negatively affect patients' quality of life and may also interfere with

glycemic control, creating a vicious cycle that worsens disease outcomes (Laili et al., 2024).

Quality of life is an essential indicator in the management of chronic diseases, encompassing physical, psychological, and social dimensions (Salahudin & Amelia, 2024). One of the key factors influencing quality of life in patients with diabetes is self-care. Self-care refers to an individual's ability to perform daily disease management activities, including dietary control, regular physical activity, blood glucose monitoring, and adherence to prescribed medications (Basir, Paramatha, & Agustin, 2022). Effective self-care practices are crucial in preventing complications and improving overall well-being (Maruf & Palupi, 2021).

Despite the importance of stress management and self-care, many patients still experience challenges in implementing optimal self-care behaviors, particularly at the primary healthcare level. Puskesmas Bulu Lor Kota Semarang, as one of the frontline healthcare facilities, serves a substantial number of patients with type 2 diabetes mellitus. Preliminary observations indicate that many patients experience difficulties in managing stress and maintaining consistent self-care practices, which may ultimately affect their quality of life. However, studies examining the relationship between Diabetes Related Distress, self-care practices, and quality of life in this specific setting are still limited. Therefore, this study was conducted to analyze the relationship between Diabetes Related Distress and self-care practices with the quality of life among patients with type 2 diabetes mellitus at Puskesmas Bulu Lor Kota Semarang.

Methods

Study Design

This study employed a quantitative approach using a cross-sectional design to examine the relationship between Diabetes Related Distress and self-care with the quality of life among patients with type 2 diabetes mellitus at a single point in time. A cross-sectional design was chosen because it allows researchers to assess multiple variables simultaneously and determine the relationships between variables efficiently within a relatively short period. This design is particularly suitable for identifying associations between Diabetes Related Distress, self-care behaviors, and quality of life without requiring long-term follow-up. Additionally, considering the practical constraints in primary healthcare settings such as

limited time, resources, and accessibility of respondents, the cross-sectional approach provides a feasible and effective method for obtaining relevant data from patients in Puskesmas Bulu Lor, Semarang City.

Sampling

The target population of this study consisted of patients diagnosed with type 2 diabetes mellitus who received healthcare services at Puskesmas Bulu Lor, Semarang City. Based on medical records from the last three months prior to the study, the estimated number of patients with type 2 diabetes mellitus visiting the health center was approximately 110 individuals. Data collection for this study was conducted in April 2025. The sample size was determined using a formula for correlation studies (correlational design), with the assumption of a moderate correlation ($r = 0.30$), a significance level (α) of 0.05, and a statistical power ($1-\beta$) of 0.80. Based on these assumptions, the minimum required sample size was calculated to be 67 respondents. To anticipate potential non-response or incomplete data, an additional 10% was added, resulting in a final sample size of 75 respondents.

A purposive sampling technique was applied to select participants who met the inclusion criteria. The inclusion criteria were patients aged ≥ 19 years with a confirmed diagnosis of type 2 diabetes mellitus who were able to communicate effectively. The exclusion criteria included patients with severe complications such as heart disease and hypertension that could affect their general condition and responses. Respondents were recruited consecutively during their visits to the health center until the required sample size was achieved. All eligible patients were approached and invited to participate in the study. A small number of eligible patients declined participation due to personal reasons; however, the final number of respondents met the predetermined sample size requirement, ensuring adequate statistical power for the analysis.

Instruments

Data were collected using a structured questionnaire consisting of four sections: demographic data, Diabetes Related Distress, self-care behavior, and quality of life. Demographic data included respondents' code, initials, date of

birth, sex, and educational level to describe the characteristics of the participants.

Diabetes Related Distress was measured using the Diabetes Distress Scale (DDS) developed by Polonsky et al. and adapted into Indonesian by Arifin et al. (2017). The DDS consists of 17 items covering four domains: emotional burden, physician-related distress, regimen-related distress, and interpersonal distress. Responses were measured using a 6-point Likert scale ranging from 1 (no problem) to 6 (a very serious problem). The total score was calculated by averaging all items, with higher scores indicating higher levels of stress. The scores were categorized as low distress (<2.0), moderate distress ($2.0-2.9$), and high distress (≥ 3.0). The validity test showed item-total correlation values ranging from 0.41 to 0.98, and the reliability test indicated a Cronbach's alpha ranging from 0.78 to 0.83, demonstrating good internal consistency.

Self-care behavior was assessed using the Summary of Diabetes Self-Care Activities (SDSCA) questionnaire. This instrument consists of 17 items covering five domains: diet, physical activity, foot care, medication adherence, and blood glucose monitoring. Each item was scored based on the number of days (0–7 days) the activity was performed over the past week. Higher scores indicate better self-care behavior. The total score was categorized into good and poor self-care based on the mean value (64.87), where scores above the mean indicate good self-care and scores equal to or below the mean indicate poor self-care. If the data were not normally distributed, the median was used as the cut-off point. The validity test showed item-total correlation values ranging from 0.363 to 0.728, and the reliability test demonstrated a Cronbach's alpha of 0.855, indicating high reliability.

Quality of life was measured using the Diabetes Quality of Life (DQOL) questionnaire, which consists of 22 valid items adapted into Indonesian. The instrument includes four domains: physical health, psychological well-being, social relationships, and environmental aspects. Each item was rated using a Likert scale, with total scores ranging from 22 to 88. Higher scores indicate better quality of life. The scores were categorized into three levels: low (<44), moderate ($44-65$), and high (≥ 66), based on the mean (55) and standard deviation (11). The validity test

showed item-total correlation values ranging from 0.375 to 0.699, and the reliability test demonstrated a Cronbach's alpha of 0.844, indicating good internal consistency.

Data Analysis

Univariate analysis is a method used to describe the characteristics of each variable in the study (Norfai, 2022). In this study, univariate analysis was used to present the distribution of respondents' characteristics, including age, sex, educational level, Diabetes Related Distress, self-care behavior, and quality of life among patients with type 2 diabetes mellitus.

The data were presented using frequency distribution tables, percentages, as well as mean and standard deviation to provide a comprehensive overview of each variable.

Bivariate analysis is a statistical method used to examine the relationship between two variables (Norfai, 2022). In this study, the variables were measured using ordinal scales derived from Likert-type questionnaires. Therefore, a non-parametric test, namely the Spearman Rank correlation test, was used to analyze the relationships between variables.

The interpretation of the analysis was based on the correlation coefficient (r) to determine the strength of the relationship and the direction of the relationship, whether positive (+) or negative (-), with a level of statistical significance set at $p < 0.05$.

Ethical Consideration

This study was conducted in accordance with ethical principles for research involving human participants. Ethical approval was obtained from the Institutional Ethics Committee on March 18, 2025, with approval number 012/III/EC/P3M/STIKES/2025.

Prior to data collection, all respondents were informed about the purpose, procedures, and potential risks of the study. Written informed consent was obtained from all participants before their involvement in the study. Participants were assured of the confidentiality and anonymity of their personal information, and all data were used solely for research purposes. Additionally, respondents were informed of their right to

withdraw from the study at any time without any consequences.

Results

Based on the findings, respondent characteristics included age, gender, education level, Diabetes Related Distress, self-care, and quality of life. Table 1 presents the distribution of respondents'

characteristics and study variables among patients with type 2 diabetes mellitus. The findings show that the majority of respondents were older adults (64 respondents; 85.3%), female (49 respondents; 65.3%), and had a primary school education (26 respondents; 34.7%).

Table 1. Characteristics of Respondents and Distribution of Study Variables

Variables	Category	n	%	Mean
Age	Adults (19–59 years)	11	14.7	
	Older adults (≥60 years)	64	85.3	
Gender	Male	26	34.7	
	Female	49	65.3	
Education Level	No formal education	9	12.0	
	Primary school	26	34.7	
	Junior high school	16	21.3	
	Senior high school	21	28.0	
	Higher education	3	4.0	
Diabetes Related Distress (DDS)	Mild distress	14	18.7	1,95
	Moderate distress	43	57.3	
	High distress	18	24.0	
Self-Care (SDSCA)	Poor	33	44.0	1,56
	Good	42	56.0	
Quality of Life (DQOL)	Low	10	13.3	1,93
	Moderate	60	80.0	
	High	5	6.7	

In terms of Diabetes Related Distress measured using the Diabetes Distress Scale (DDS), the majority of respondents experienced moderate distress (43 respondents; 57.3%). This suggests that most patients face a moderate psychological burden related to chronic disease management, including long-term treatment and concerns about complications.

Regarding self-care behavior assessed using the Summary of Diabetes Self-Care Activities (SDSCA), most respondents demonstrated good self-care practices (42 respondents; 56.0%). This indicates

that more than half of the patients are able to perform adequate self-management behaviors such as diet control, medication adherence, physical activity, and blood glucose monitoring.

For quality of life measured using the Diabetes Quality of Life (DQOL) instrument, the majority of respondents reported a moderate level of quality of life (60 respondents; 80.0%). This reflects that patients are generally able to adapt to their condition, although limitations in physical, psychological, and social aspects are still present.

Table 2. Relationship Between Diabetes Related Distress and Quality of Life

Variables	n	r	95% CI	p-value
Diabetes Related Distress – Quality of Life	75	-0.432	-0.601 to -0.228	<0.001
Self-Care – Quality of Life	75	0.476	0.278 to 0.634	<0.001

Table 2 shows that both Diabetes Related Distress and self-care are significantly associated with the quality of life among patients with type 2 diabetes mellitus. Diabetes Related Distress demonstrate a moderate negative correlation with quality of life, indicating that higher stress is related to poorer quality of life. This suggests that psychological burden plays an important role in influencing patients' overall well-being.

In contrast, self-care shows a moderate positive correlation with quality of life, indicating that better self-care practices are associated with improved quality of life. Patients who are able to effectively manage their diet, physical activity, medication adherence, and blood glucose monitoring tend to have better physical and psychological conditions.

Discussion

The findings revealed that most respondents were older adults, which is consistent with previous studies showing that the majority of patients with type 2 diabetes mellitus are in the older age group (Sari et al., 2024). Aging is associated with a decline in physiological functions, particularly in insulin production and sensitivity. In older adults, body cells—especially muscle and fat cells—become less responsive to insulin, resulting in impaired glucose uptake and increased blood glucose levels (Fatria, Maidar, & Arifin, 2022). This condition places older adults at higher risk of developing and experiencing complications of diabetes. Recent evidence also highlights that age is a significant determinant of health-related quality of life, where increasing age is often associated with declining physical function and greater disease burden (Teli et al., 2023).

The predominance of female respondents in this study is in line with previous research indicating that most patients with type 2 diabetes mellitus are women (Kriswiastiny et al., 2022). Hormonal factors such as estrogen and progesterone play a role in influencing insulin sensitivity. Additionally, pre- and post-menopausal conditions can contribute to increased fat accumulation, which may lead to insulin resistance and metabolic dysfunction (Mahayutha et al., 2024). Furthermore, recent studies suggest that gender differences may also influence psychological responses, coping strategies, and health behaviors, which can ultimately affect quality of

life among patients with diabetes (Díaz et al., 2023).

Regarding educational level, most respondents had only completed primary school. This finding is consistent with previous research showing that the majority of diabetes patients have low educational backgrounds (Arfania, 2021). Education level is closely related to health literacy, access to healthcare services, and socioeconomic status. Lower education levels are associated with limited knowledge about disease management, lower access to healthcare, and higher Diabetes Related Distress, all of which can increase the risk and severity of type 2 diabetes mellitus (Darmawan, Revina, & Yulianti, 2023). In addition, recent evidence emphasizes that patient empowerment and health literacy are key factors influencing self-management and quality of life in individuals with diabetes (Díaz et al., 2023).

The results also showed that most respondents experienced moderate Diabetes Related Distress. This finding is consistent with previous studies indicating that the majority of type 2 diabetes patients experience moderate stress (Khoirudin et al., 2024). The stress experienced by patients is often related to the long-term demands of disease management, including lifelong treatment, fear of complications, and the need for lifestyle adjustments. Physiologically, stress triggers the release of hormones such as cortisol, adrenaline, and noradrenaline, which can increase blood glucose levels and reduce insulin sensitivity, thereby worsening the condition of patients with diabetes (Ludiana et al., 2022). Recent systematic reviews also confirm that psychological distress and mental health problems significantly contribute to poorer quality of life among patients with type 2 diabetes mellitus (Alzahrani et al., 2023). Additionally, factors such as sleep disturbances have been shown to exacerbate stress and negatively impact overall well-being (Laverty et al., 2023).

In terms of self-care, most respondents demonstrated good self-care behaviors. This finding is supported by previous research showing that many patients with type 2 diabetes have good self-care practices (Zaura et al., 2021). Effective self-care includes dietary management, regular physical activity, medication adherence, routine blood glucose monitoring, and foot care. Proper self-care plays an important role in controlling

blood glucose levels, maintaining body weight, and reducing the risk of complications (Fauzia et al., 2025; Indah et al., 2023). Evidence from recent systematic reviews also highlights that diabetes self-management is strongly associated with improved health outcomes and better quality of life (Tarigan et al., 2023). Moreover, interventions promoting self-care have been shown to improve psychological well-being and reduce depressive symptoms in patients with diabetes.

The majority of respondents reported a moderate quality of life, which is consistent with previous studies (Fitriana et al., 2022). A moderate quality of life reflects patients' ability to adapt to their condition, adhere to treatment, and receive sufficient support from family and the environment. Quality of life is an important indicator of treatment success in diabetes management, reflecting how well patients can maintain daily functioning and overall well-being (Mulyani et al., 2023). Recent studies further emphasize that quality of life should be considered a key outcome in diabetes care, as it encompasses physical, psychological, and social dimensions of health (Suniyadewi et al., 2023; Alzahrani et al., 2023).

The findings of this study indicate that Diabetes Related Distress are associated with the quality of life of patients with type 2 diabetes mellitus. Stress contributes to a decline in quality of life by increasing psychological burden and affecting both mental and physical health. Patients with diabetes often experience stress due to anxiety about complications, lifelong treatment, and changes in daily activities (Erda et al., 2020; Irawati & Subekti, 2022). This is further supported by recent evidence showing that diabetes-related distress is a major determinant of reduced quality of life and should be addressed in clinical management (Alzahrani et al., 2023).

Furthermore, this study found that self-care is associated with quality of life in patients with type 2 diabetes mellitus. Effective self-care reduces both physical and psychological symptoms, enhances patients' confidence, and provides a sense of control over their condition. As a result, it improves emotional well-being and mental stability, ultimately leading to a better quality of life (Kendek et al., 2023; Siregar et al., 2022). Recent studies also confirm that self-care and patient empowerment play a crucial role in

improving quality of life and long-term health outcomes (Tarigan et al., 2023; Duarte-Díaz et al., 2023).

Overall, these findings emphasize the importance of integrating stress management and self-care interventions in diabetes care. Addressing both psychological and behavioral aspects is essential to improve not only clinical outcomes but also the overall quality of life of patients with type 2 diabetes mellitus.

Conclusion and Recommendation

Higher diabetes-related distress was moderately associated with lower quality of life, whereas better self-care behavior was moderately associated with higher quality of life among patients with type 2 diabetes mellitus at Bulu Lor Primary Health Center, Semarang. These findings emphasize the importance of addressing diabetes-related distress and promoting self-care behaviors as part of comprehensive diabetes management. However, because this study employed a cross-sectional design and unadjusted bivariate analysis, causal relationships and independent associations cannot be established. Future studies using longitudinal designs and multivariable analyses are recommended to further clarify these relationships.

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Declaration of conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

Declaration on the Use of AI

The authors used artificial intelligence (AI) tools solely to assist in language editing and improving the clarity of the manuscript. All content, data analysis, and interpretations presented in this study are the original work of the authors.

Data Availability Statement

Data sharing is not applicable to this article.

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