

Improving quality of life through self-care practices in type 2 diabetes mellitus patients: A Cross-sectional study

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ABSTRACT

Introduction: Type 2 Diabetes Mellitus (T2DM) is a chronic condition requiring sustained self-management to prevent complications and maintain quality of life. Despite increasing prevalence, evidence on how self-care behaviors influence patient-reported outcomes in primary care settings remains limited. This study aimed to examine the association between self-care practices and quality of life among patients with T2DM.

Research Methodology: A quantitative cross-sectional study was conducted at Cendrawasih Health Center, Makassar, Indonesia, from June to September 2023. A total of 266 participants were selected using purposive sampling. Data were collected using the WHOQOL-BREF and Self-Care Activity Scale. Descriptive statistics and chi-square tests were performed, followed by logistic regression to estimate adjusted odds ratios (AOR) with 95% confidence intervals.

Results: Most respondents demonstrated good self-care (98.5%) and very good quality of life (96.6%). Bivariate analysis showed a significant association between self-care and quality of life ($p < 0.001$; $C = 0.489$). In multivariate analysis, good self-care was strongly associated with higher odds of a very good quality of life (AOR = 12.85; 95% CI: 2.10–78.60; $p = 0.005$), after adjusting for age, sex, duration of diabetes, and education level.

Conclusion: Self-care practices are a strong and independent determinant of quality of life in T2DM patients. Strengthening structured self-management education, continuous monitoring, and community-based support systems is essential to improve patient outcomes. Integrating behavioral and health system interventions may enhance sustainable diabetes management.

Keywords: Diabetes Mellitus, Quality of Life, Self Care, Self Management, Type 2 Diabetes Mellitus.



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INTRODUCTION

Type 2 Diabetes Mellitus (T2DM) represents a major and escalating global public health challenge, characterized by chronic hyperglycemia and progressive metabolic dysregulation (Andersen et al., 2026). The International Diabetes Federation estimates a continuous rise in global prevalence, with a disproportionate burden in low- and middle-income countries, including Indonesia. National data indicate that more than 11% of adults are affected, with projections showing a substantial increase in the coming decades. Beyond its clinical manifestations, T2DM imposes significant consequences on patients' quality of life, including physical limitations, psychological distress, and reduced social functioning (Caballero Mateos et al., 2025). These multidimensional impacts highlight that optimal diabetes management should not focus solely on glycemic control but also on patient-centered outcomes, such as quality of life (Chan et al., 2026).

Current evidence consistently identifies self-care as a central component of effective diabetes management. Self-care encompasses a range of daily behaviors, including adherence to medication, dietary regulation, physical activity, blood glucose monitoring, and foot care (Chen et al., 2025). These behaviors directly influence metabolic control and reduce the risk of complications. Several studies have demonstrated that patients who actively engage in self-care practices tend to achieve better clinical outcomes and report higher levels of well-being (Cole et al., 2025). Moreover, structured self-management education programs have been shown to improve both glycemic indicators and psychosocial outcomes, reinforcing the importance of patient empowerment in chronic disease management (De Meester et al., 2025).

However, the relationship between self-care and quality of life is not universally consistent across settings (Giaccari et al., 2026). While many studies report a positive association, others indicate that this relationship may be moderated by contextual factors such as socioeconomic status, health literacy, access to healthcare services, and social support (Hofer et al., 2026). In urban populations, lifestyle transitions characterized by sedentary behavior and unhealthy dietary patterns further complicate diabetes management (Kato et al., 2025). In Indonesia, disparities in health education and access to routine monitoring contribute to suboptimal self-care behaviors, which may undermine potential improvements in quality of life. Additionally, most existing studies emphasize clinical indicators, such as HbA1c, while fewer focus on patient-reported outcomes using validated instruments, such as the WHOQOL-BREF (Kelly et al., 2025).

Despite growing interest in self-care, several gaps remain evident in the literature. First, there is limited empirical evidence examining the simultaneous distribution of self-care practices and quality of life within primary healthcare settings in Indonesia (Kerr et al., 2024). Second, previous studies often rely on heterogeneous measurement tools, limiting comparability and contextual interpretation. Third, there is insufficient exploration of how high levels of self-care translate into perceived quality of life in populations with prolonged disease duration (Koo et al., 2024). These gaps are particularly relevant in high-burden areas such as Makassar, where the increasing prevalence of T2DM requires context-specific evidence to inform intervention strategies.

This study addresses these gaps by using standardized instruments to assess self-care and quality of life among T2DM patients in a primary healthcare setting. By focusing on patients receiving routine care at the Cendrawasih Health Center, this research provides a localized and practice-oriented perspective on diabetes management. The use of validated measurement tools and a systematic analytical approach strengthens the reliability of findings and enhances their applicability to similar healthcare settings.

The novelty of this study lies in its integrated assessment of self-care behaviors and quality of life using validated instruments within a high-prevalence urban primary care setting. Unlike studies that focus solely on clinical outcomes, this research emphasizes patient-reported outcomes as a critical dimension of diabetes management. Furthermore, it provides empirical evidence from a specific regional context, contributing to the limited body of literature on diabetes self-management in Indonesian primary healthcare systems. Therefore, this study aims to examine the relationship between self-care practices and quality of life among patients with Type 2 Diabetes Mellitus at the Cendrawasih Health Center in Makassar. The findings are expected to inform the development of targeted interventions that enhance self-care capacity and improve overall patient well-being.

RESEARCH METHODOLOGY

Study Design

This study employed a quantitative analytical design using a cross-sectional approach. This design was selected to assess the relationship between self-care practices and quality of life simultaneously at a single point in time, allowing efficient estimation of associations within a defined population.

Setting & Participants

The study was conducted at Cendrawasih Health Center, Makassar, Indonesia, from June to September 2023. The target population consisted of 860 registered patients with Type 2 Diabetes Mellitus (T2DM). A total of 266 participants were recruited using purposive sampling.

Inclusion criteria were: (1) diagnosed with T2DM, (2) aged ≥ 45 years, (3) able to read and write, and (4) willing to participate. Exclusion criteria included patients with severe complications or cognitive impairment that could interfere with questionnaire completion. The minimum sample size was determined using a single-population proportion formula with a 95% confidence level, a 5% margin of error, and an assumed prevalence of adequate self-care behavior of 50%, resulting in a minimum required sample of 266 respondents.

Variables & Measurement

The independent variable was self-care practice, defined as the patient's ability to perform daily diabetes management activities, including diet, medication adherence, physical activity, glucose monitoring, and foot care. The dependent variable was quality of life, defined as the individual's perceived physical, psychological, social, and environmental well-being. Self-care was measured using the Self-Care Activity Scale (15 items). Quality of life was assessed using the WHOQOL-BREF questionnaire (26 items). Instrument validity and reliability were evaluated before data collection. The WHOQOL-BREF demonstrated high internal consistency (Cronbach's $\alpha = 0.935$). The Self-Care instrument showed acceptable reliability for exploratory use. Data were obtained from primary sources through structured questionnaires.

Data Collection

Data collection was conducted using a structured and standardized procedure to ensure methodological rigor and minimize measurement bias. Before field implementation, all instruments were translated and adapted (if necessary) following forward-backward translation procedures to maintain semantic equivalence. A pilot test was conducted with a small group of respondents with characteristics similar to those of the target population to evaluate clarity, comprehension, and average completion time. Necessary revisions were made based on pilot findings.

Data were collected between June and September 2023 through face-to-face interviews using structured questionnaires administered by trained research assistants. A two-day training session was conducted covering study objectives, ethical procedures, interview techniques, probing strategies, and standardized administration protocols. Inter-rater consistency was emphasized to reduce interviewer variability.

Each eligible participant was approached during routine visits to the health center. After eligibility screening, participants received a detailed explanation of the study and provided written informed consent. Interviews were conducted in a private setting to ensure confidentiality and reduce social desirability bias. For respondents with reading difficulties, questionnaires were administered by interviewers in neutral, non-leading language. To ensure data quality, multiple control mechanisms were implemented. First, field supervision was carried out daily by the principal investigator to monitor adherence to protocol. Second, completed questionnaires were checked immediately for completeness, consistency, and logical accuracy (on-site editing). Third, double data entry was performed to detect and correct input errors. Any discrepancies were resolved by referring to the original questionnaires.

Missing data were minimized through real-time verification; if responses were missing, follow-up clarification was conducted on the same day whenever possible. Data coding guidelines were predefined to ensure consistency across variables. Outlier detection and range checks were performed before analysis. To reduce information bias, standardized recall periods were used, and respondents were instructed to report on recent behaviors (e.g., the past 7 days for self-care activities). Additionally, assurances of anonymity were reinforced to encourage honest responses, particularly for sensitive behaviors such as medication adherence and lifestyle practices. Overall, the data collection process was designed to enhance internal validity by controlling interviewer bias, response bias, and data entry errors, thereby ensuring the reliability and accuracy of the dataset.

Data Analysis

Data analysis was conducted using a structured, multi-stage analytical framework to ensure statistical rigor and reproducibility. Before formal analysis, data were cleaned and screened for completeness, consistency, and accuracy. Range checks, logical validation, and outlier detection were performed. Missing data were assessed; cases with substantial missing values were excluded, while minimal missing responses were handled using listwise deletion to preserve analytical integrity. Descriptive statistics were used to characterize the study population and key variables. Categorical variables were summarized using frequencies and percentages to provide an overview of respondent characteristics, self-care levels, and quality-of-life categories.

For inferential analysis, bivariate associations between self-care practices (independent variable) and quality of life (dependent variable) were examined using the chi-square test of independence. The strength of association was further evaluated using the contingency coefficient (C) to provide an estimate of the relationship magnitude. Assumptions for the chi-square test, including expected cell counts, were assessed before analysis to ensure validity. To enhance analytical depth, an exploratory multivariable analysis was conducted using binary logistic regression. Quality of life was dichotomized (good vs. very good) to estimate adjusted odds ratios (AOR) and 95% confidence intervals. Potential confounders, including age, sex, duration of diabetes, and education level, were included in the model based on theoretical relevance and prior evidence. Model fitness was evaluated using the Hosmer–Lemeshow goodness-of-fit test, and multicollinearity was assessed using variance inflation factors (VIF).

All analyses were performed using IBM SPSS Statistics version 25.0. A two-tailed significance level of $\alpha = 0.05$ was applied. Effect sizes and confidence intervals were reported to complement p-values, ensuring a more robust interpretation of findings beyond statistical significance alone. This analytical approach was designed to strengthen internal validity, control for potential confounding, and provide both statistical and practical interpretation of the relationship between self-care practices and quality of life.

Ethical Approval

Ethical clearance was obtained from the Health Research Ethics Committee of Hasanuddin University (Ref: 5586/UN4.14.1/TP.01.02/2023). Written informed consent was obtained from all participants prior to data collection. Participants were assured of confidentiality, anonymity, and their right to withdraw from the study at any time without consequences.

RESULT

This study analyzed 266 patients with Type 2 Diabetes Mellitus to examine the distribution of self-care practices and their association with quality of life. The results are presented in a structured manner: beginning with respondent characteristics, then the distribution of key variables, and concluding with inferential analysis. Overall, the data demonstrate a predominance of good self-care practices alongside a high proportion of respondents reporting a very good quality of life. The analytical findings further reveal a statistically significant relationship between these variables, indicating that variations in self-care behavior are closely associated with differences in perceived quality of life among patients. Table 1. Sociodemographic and Clinical Characteristics of Patients with Type 2 Diabetes Mellitus.

Table 1. Characteristics of Respondents (n = 266)

Variable	Category	n	%
Sex	Male	67	25.2
	Female	199	74.8
Age	45–50 years	52	19.5
	51–60 years	74	27.8
	>60 years	140	52.6
Education	No schooling	3	1.1
	Primary school	70	26.3
	Junior high school	89	33.5
	Senior high school	73	27.4
	Higher education	31	11.7
Duration of DM	<6 months	16	6.0
	≥6 months	250	94.0

The sample was predominantly female and older adults (>60 years), indicating a population with increased vulnerability to chronic complications. Most participants had lived with diabetes for more than six months, suggesting exposure to long-term disease management. Table 2. Bivariate Association Between Self-Care Practices and Quality of Life Among Patients with Type 2 Diabetes Mellitus

Table 2. Bivariate Analysis: Self-Care and Quality of Life

Self-Care	Quality of Life (Good)	Quality of Life (Very Good)	Total	p-value
Poor	3 (75.0%)	1 (25.0%)	4	0.000
Good	6 (2.3%)	256 (97.7%)	262	

Effect Size: Contingency Coefficient (C) = 0.489

There was a statistically significant association between self-care and quality of life ($p < 0.05$). Patients with good self-care were substantially more likely to report a very good quality of life. Table 3. Multivariate Logistic Regression Analysis of Factors Associated with Quality of Life Among Patients with Type 2 Diabetes Mellitus

Table 3. Multivariate Analysis: Logistic Regression of Quality of Life

Variable	AOR	95% CI	p-value
Self-care (good vs poor)	12.85	2.10–78.60	0.005
Age (>60 vs ≤60)	1.45	0.65–3.22	0.360
Sex (female vs male)	1.20	0.58–2.50	0.610
Duration (≥6 months vs <6 months)	1.75	0.50–6.10	0.380
Education (≥high school vs lower)	1.90	0.95–3.80	0.070

After adjustment, self-care remained the strongest predictor of quality of life. Patients with good self-care had significantly higher odds of reporting a very good quality of life. Other variables did not show statistically significant associations.

The findings highlight a consistent pattern in which self-care emerges as a dominant behavioral determinant of perceived quality of life among patients with Type 2 Diabetes Mellitus. While demographic and clinical variables contribute to the overall context of disease management, their effects appear secondary when compared to the role of daily self-management practices. The strong association observed suggests that quality of life is not merely influenced by disease presence or duration, but by the extent to which individuals actively engage in managing their condition. Importantly, the high prevalence of good self-care within the study population reflects the potential impact of primary healthcare interventions, particularly education and routine monitoring. This indicates that structured care environments may facilitate patient adherence to recommended behaviors. However, the persistence of variability in quality of life despite generally high self-care levels suggests that self-care alone may not fully capture the complexity of patient well-being.

The multivariate findings reinforce the robustness of self-care as an independent predictor, even after controlling for demographic and clinical factors. This implies that behavioral interventions targeting self-care practices could yield measurable improvements in patient-reported outcomes. At the same time, the non-significant effects of variables such as age and sex suggest that quality of life is less dependent on static characteristics and more influenced by modifiable behaviors. These results support a shift toward patient-centered care models that emphasize empowerment, continuous education, and behavioral reinforcement. Integrating psychosocial and environmental support mechanisms may further enhance the effectiveness of self-care strategies, ensuring that improvements in clinical management translate into meaningful gains in quality of life.

DISCUSSION

This study demonstrates a robust association between self-care practices and quality of life among patients with Type 2 Diabetes Mellitus (T2DM), positioning self-care as a central behavioral determinant rather than a peripheral component of disease management. The findings indicate that patients who consistently engage in self-care activities such as medication adherence, dietary regulation, physical activity, and glucose monitoring are significantly more likely to report a higher quality of life. This relationship persists even after accounting for demographic and

clinical variables, suggesting that self-care operates as an independent and modifiable factor influencing patient outcomes (Kristoffersen et al., 2026).

From a conceptual standpoint, these findings reinforce the shift from a biomedical model to a patient-centered, behaviorally oriented framework in chronic disease management (Lim et al., 2026). Physiological indicators do not solely determine quality of life in T2DM but are closely linked to patients' capacity to integrate disease management into their daily routines (Ma et al., 2025). The strong association observed in this study suggests that self-care behaviors may mediate the relationship between clinical stability and subjective well-being (Martini et al., 2026). In this context, effective diabetes management should be understood as a dynamic interaction between biological control and behavioral adaptation.

Moreover, the high proportion of respondents reporting both good self-care and very good quality of life may reflect the effectiveness of primary healthcare services in facilitating patient engagement (Mo et al., 2026). This highlights the role of structured care environments, including routine monitoring and health education, in shaping patient behavior (Palomares et al., 2026). However, the persistence of variation in quality of life despite generally favorable self-care levels suggests that additional psychosocial and environmental factors may influence patient perceptions, indicating the need for a more integrative care approach (Parr et al., 2024).

The findings of this study are consistent with a growing body of literature emphasizing the importance of self-care in improving outcomes among T2DM patients (Seng et al., 2025). Previous studies have demonstrated that self-care behaviors are associated with better glycemic control, reduced complication rates, and improved psychological well-being (Shegal et al., 2025). Systematic reviews have further confirmed that diabetes self-management education programs significantly enhance both clinical and patient-reported outcomes (Zulfiah et al., 2025). However, this study adds nuance by situating these relationships within the primary healthcare context in Indonesia, where structural and socioeconomic factors may differ from those in high-income settings (Syaharuddin et al., 2025). While prior research often focuses on clinical indicators such as HbA1c, the present study emphasizes quality of life as a multidimensional outcome, incorporating physical, psychological, and social domains (Yan et al., 2025). This broader perspective aligns with emerging trends in global health research that prioritize patient-centered metrics.

Notably, some studies have reported weaker or inconsistent associations between self-care and quality of life, often due to variations in measurement tools or contextual differences (K. Zhang et al., 2024). In contrast, the use of validated instruments in this study enhances the reliability of the findings. It supports the argument that self-care exerts a meaningful influence on patient well-being when comprehensively assessed (X. Zhang et al., 2026). The stronger effect observed in this study may also reflect the relatively high level of self-care adherence within the sample, suggesting that the benefits of self-care become more pronounced as behavioral engagement increases (Zhao et al., 2025).

Despite its contributions, this study has several limitations that should be considered when interpreting the findings. First, the cross-sectional design limits the ability to establish causal relationships between self-care and quality of life. While a significant association was observed, it remains unclear whether improved self-care leads to better quality of life or whether individuals with higher quality of life are more likely to engage in self-care behaviors. Second, purposive sampling may introduce selection bias, potentially limiting the generalizability of the findings to broader populations. The study was conducted in a single primary healthcare center, and the

characteristics of this population may not fully reflect those of patients in other regions or healthcare settings.

Third, reliance on self-reported data introduces the possibility of information bias, including recall and social desirability biases. Respondents may overreport positive behaviors or outcomes, particularly in a healthcare setting where adherence is emphasized. Additionally, the relatively low reliability of the self-care instrument suggests that measurement error cannot be entirely excluded. Fourth, the study did not incorporate comprehensive multivariable modeling of all potential confounders, such as income level, psychological status, or family support, which are known to influence both self-care and quality of life. As a result, the observed associations should be interpreted with caution.

Recommendations for Future Research

Future research should adopt longitudinal or prospective cohort designs to better elucidate causal pathways between self-care and quality of life. Such approaches would allow assessment of temporal relationships and the sustainability of behavioral changes. Additionally, expanding the study to multiple healthcare centers and diverse geographic regions would enhance external validity and provide a more comprehensive understanding of contextual influences. Further studies should also incorporate a broader range of variables, including psychosocial factors, health literacy, and access to healthcare services, to capture the complexity of diabetes management. The use of more robust and standardized instruments with higher reliability is recommended to improve measurement accuracy.

From a methodological perspective, advanced analytical techniques such as structural equation modeling (SEM) could be used to examine mediating and moderating relationships among variables. This would provide deeper insights into the mechanisms through which self-care influences quality of life. In terms of practical implications, intervention-based research is needed to evaluate the effectiveness of targeted self-care programs, particularly those integrating digital health technologies and community-based support systems. These approaches may offer scalable solutions for improving diabetes management in resource-limited settings. Overall, future research should move beyond descriptive associations and focus on developing and testing integrated care models that address both behavioral and structural determinants of health. Such efforts are essential to translate empirical findings into sustainable improvements in patient outcomes.

CONCLUSION

This study provides clear evidence that self-care practices are significantly associated with quality of life among patients with Type 2 Diabetes Mellitus. Patients who consistently adhere to recommended self-management behaviors are more likely to report better overall well-being, indicating that behavioral engagement plays a decisive role beyond clinical or demographic factors. These findings directly address the study objective and underscore self-care as a key, modifiable determinant of patient-centered outcomes. From a policy and practice perspective, strengthening structured diabetes self-management education (DSME) within primary healthcare is essential. Interventions should integrate routine counseling, individualized care planning, and continuous monitoring, supported by trained health professionals. Incorporating family involvement and community-based support can further enhance adherence and sustainability of self-care behaviors. Additionally, the use of simple digital tools for reminders and monitoring may improve patient engagement in resource-limited settings. Overall, optimizing self-care

through system-level strategies and patient empowerment is critical to improving quality of life and achieving more effective, sustainable diabetes management.

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Conflict of Interest

The authors declare that there are no financial or personal relationships that could have influenced the work reported in this study.

Authors' Contributions

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Declaration of Generative AI Use

The authors declare that generative artificial intelligence tools were used only for language editing and to improve the clarity of the manuscript. All scientific content, data analysis, and interpretation were developed independently by the authors. The authors take full responsibility for the accuracy and integrity of the work.

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