



Self-Care Behavior Management And Blood Glucose Control Among Elderly Patients with Diabetes Mellitus

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ARTICLE INFO

Article history:

Received June 10, 2026

Revised July 31, 2026

Accepted August 16, 2026

Available online August 20, 2026

Keywords:

Self-Care Behavior Management,
Blood Sugar Control, Type 2
Diabetes Mellitus

ABSTRACT

Type 2 Diabetes Mellitus is a chronic disease characterized by elevated blood glucose levels due to impaired insulin secretion and function. Controlling blood sugar levels is crucial to prevent complications, but in the elderly, suboptimal blood sugar control is still found due to low self-care behavior. This study aims to analyze the relationship between self-care behavior management and blood sugar control in elderly people with type 2 Diabetes Mellitus at the Limboto Community Health Center, Gorontalo Regency. This study used a quantitative, correlational analytical design with a cross-sectional approach. The study population

was 1,094 people with a sample of 92 respondents selected using a purposive sampling technique. Self-care behavior was measured using the Summary of Diabetes Self-Care Activities (SDSCA) questionnaire which includes diet management, physical activity, medication adherence, blood glucose monitoring, and foot care, while blood sugar control was measured using random blood sugar (GDS) examinations using a glucometer. The results showed that respondents with good self-care behavior management were 26 respondents (28.3%), sufficient category were 36 respondents (39.1%), and poor category were 30 respondents (32.6%). A total of 24 respondents (26.1%) had controlled blood sugar levels and 68 respondents (73.9%) had uncontrolled blood sugar levels. Chi-square analysis showed a significant relationship between self-care behavior management and blood sugar control ($p=0.000$; $p<0.05$). Respondents with better self-care behavior management tended to have better blood sugar control, with 21 of 26 respondents (80.8%) with good self-care having controlled blood sugar levels. These findings demonstrate the importance of strengthening self-care education and mentoring programs in primary health care to improve the ability of the elderly to manage diabetes so that blood sugar control can be maintained optimally.

1. INTRODUCTION

Diabetes mellitus (DM) is a chronic metabolic disorder that requires continuous self-management to maintain blood glucose levels and prevent complications. In addition to pharmacological treatment, self-care behaviors such as dietary management, physical activity, blood glucose monitoring, and medication adherence play an important role in daily diabetes management. Effective self-care enables patients to actively participate in their treatment and maintain better glycemic control. Conversely, inadequate self-care may contribute to poor blood glucose control and increase the risk of diabetes-related complications. Evidence from systematic reviews and meta-analyses has shown that diabetes self-management education (DSME) and self-management support interventions can improve adherence to self-care behaviors, reduce HbA1c levels, and decrease the risk of complications in patients with type 2 diabetes mellitus (T2DM). These findings highlight self-care behavior as an important and modifiable component of chronic disease management.

The importance of self-care in glycemic control has also been demonstrated in previous studies. Juwariah and Priyanto (2021), in a study of patients with T2DM at the Internal Medicine Polyclinic of Delta Surya Hospital, Sidoarjo, reported a significant relationship between self-care behavior and blood glucose stability. Most respondents demonstrated moderate levels of self-

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care, while those with better self-care behaviors tended to have more stable blood glucose levels. Similarly, Agustina et al. (2022) found that many patients had not yet achieved optimal self-care, particularly in dietary management, physical activity, blood glucose monitoring, and medication adherence. Most respondents also had fasting blood glucose levels above the normal range, suggesting that inadequate self-care may contribute to suboptimal glycemic control in patients with T2DM.

The need to strengthen self-care may be particularly important among older adults with T2DM. Aging is accompanied by physiological, cognitive, and social changes that may influence an individual's ability to perform self-care activities consistently. Older adults may also have longer disease duration, multiple comorbidities, polypharmacy, reduced physical capacity, and greater dependence on family or caregivers. Consequently, findings from studies conducted predominantly among general adult populations may not be directly applicable to older adults. Although previous studies have established an association between self-care behavior and glycemic control, research specifically examining this relationship among older adults receiving primary healthcare services remains limited, particularly in Gorontalo Province. In addition, while HbA1c is widely used as an indicator of long-term glycemic control, random blood glucose testing is commonly used in primary healthcare settings because it is relatively simple and feasible for routine monitoring. This creates an important research gap regarding the relationship between self-care behavior and blood glucose control among older adults with T2DM in primary healthcare settings.

This issue is particularly relevant in Gorontalo Regency, which has a substantial burden of diabetes mellitus. According to data from the Gorontalo Provincial Health Office in 2025, 7,529 people with diabetes mellitus were recorded in the province, with Gorontalo Regency reporting the highest number of cases at 3,332. Furthermore, data from the Gorontalo Regency Health Office indicate that Limboto Community Health Center is among the primary healthcare facilities with the highest number of T2DM cases among the 23 community health centers in the regency. These figures demonstrate that T2DM remains an important public health concern and requires sustained management at the primary healthcare level.

Data from Limboto Community Health Center showed that 1,094 patients with diabetes mellitus received health monitoring during 2025. Despite ongoing monitoring, some patients had not achieved adequate blood glucose control. This situation highlights the importance of identifying modifiable factors that may contribute to glycemic control, particularly self-care behavior. In the context of primary healthcare, assessment of self-care activities can provide useful information for developing individualized education and nursing interventions aimed at improving patients' ability to manage their disease.

Preliminary observations conducted by the researchers among five older adults with T2DM at Limboto Community Health Center further supported this concern. Most of the observed participants had not consistently practiced optimal self-care behaviors. They reported infrequent physical activity, difficulty limiting foods high in simple carbohydrates, and a tendency to check their blood glucose only when visiting the community health center. These observations suggest that inadequate self-care may remain an important challenge in diabetes management among older adults. This finding is consistent with Orem's Self-Care Deficit Nursing Theory, which emphasizes that limitations in an individual's ability to meet self-care needs may increase dependence on healthcare services and interfere with effective disease management. Strengthening self-care capacity through education and ongoing support may therefore be an important nursing strategy for improving diabetes management in older adults.

Nevertheless, blood glucose control is not determined by self-care behavior alone. Other factors, including age, duration of diabetes, obesity, type of treatment, comorbidities, educational level, socioeconomic status, and family support, may also influence glycemic control. These factors may act as potential confounders in the relationship between self-care behavior and blood glucose control. Therefore, examining the relationship between these two variables among older adults is important to identify the extent to which self-care behavior is associated with blood glucose control within the context of primary healthcare.

The novelty of this study lies in its specific focus on the relationship between self-care behavior management and blood glucose control among older adults with T2DM at the primary healthcare level, particularly at Limboto Community Health Center, Gorontalo Regency. To the best of the researchers' knowledge, limited evidence is available regarding this relationship among older adults in the region using the Summary of Diabetes Self-Care Activities (SDSCA) questionnaire and random blood glucose measurements as indicators of glycemic control. The findings are expected to provide evidence to support the development of diabetes self-management education, ongoing patient support, and community-based nursing interventions aimed at improving self-care practices and glycemic control among older adults with T2DM.

Based on the above considerations, this study aims to analyze the relationship between self-care behavior management and blood glucose control among older adults with type 2 diabetes mellitus at Limboto Community Health Center, Gorontalo Regency. The findings may serve as a basis for developing more targeted self-management interventions at the primary healthcare level to support glycemic control and reduce the risk of diabetes-related complications.

2. METHOD

This study employed a quantitative, correlational analytical design with a cross-sectional approach. The study was conducted in the working area of Limboto Community Health Center, Gorontalo Regency, from February 9 to March 9, 2026. The cross-sectional design was used to examine the relationship between self-care behavior as the independent variable and blood glucose control as the dependent variable, with both variables measured at the same time. The study population comprised all older adults with type 2 diabetes mellitus (T2DM) registered in the working area of Limboto Community Health Center, totaling 1,094 individuals. A sample of 92 respondents was determined using the Slovin formula with a 10% margin of error and selected using purposive sampling. The inclusion criteria were adults aged ≥ 60 years who had been diagnosed with T2DM, were registered at Limboto Community Health Center, were able to communicate effectively, and were willing to participate by signing an informed consent form. Respondents were excluded if they had cognitive or communication impairments, were receiving inpatient care or experiencing an acute condition during the study period, or did not complete the questionnaire.

Data were collected using a respondent characteristics questionnaire and the Summary of Diabetes Self-Care Activities (SDSCA) questionnaire to assess diabetes self-care behavior. The SDSCA evaluates five main domains of self-care: dietary practices, physical activity, medication adherence, blood glucose monitoring, and foot care. Blood glucose control was assessed using a random blood glucose (RBG) test performed by healthcare workers at Limboto Community Health Center using a glucometer. Blood glucose levels were categorized as controlled when the RBG level was <200 mg/dL and uncontrolled when the RBG level was ≥ 200 mg/dL, based on the criteria applied in this study. Data were analyzed using univariate and bivariate analyses. Univariate analysis was performed to describe respondent characteristics and the distribution of the study variables using frequencies and percentages. Bivariate analysis was performed using the Chi-square test to assess the relationship between self-care behavior and blood glucose control, as both variables were categorized. All statistical analyses were performed using IBM SPSS Statistics version [insert actual version], with a significance level of 5% ($\alpha = 0.05$). A p-value < 0.05 was considered statistically significant.

3. RESULT AND DISCUSSION

Result

Based on the table 1, the characteristics of respondents by age can be seen that the majority of respondents are in the 70–79 age group, as many as 38 people (41.3%). Furthermore, respondents in the 60–69 age group are 31 people (33.7%), while the age group ≥ 80 years is the least, at 23 people (25.0%).

Tabel 1. Respondent Characteristics Based on Age

No	Age Group (years)	Frequency (n)	Percentage (%)
1	Early Elderly (60-69)	31	33.7
2	Middle Elderly (70-79)	38	41.3
3	Late Elderly (≥ 80)	23	25.0
Total		92	100.0

Tabel 2. Respondent Characteristics Based on Gender

No	Gender	Frequency (n)	Percentage (%)
1	Man	49	53.3
2	Woman	43	46.7
Total		92	100.0

Based on the table above, the characteristics of respondents based on gender show that the majority of respondents are male, namely 49 respondents (53.3%).

Tabel 3. Respondent Characteristics Based on Duration of Suffering

No	Long-term DM Suffering	Frequency (n)	Percentage (%)
1	< 5 years	29	31.5
2	5-10 years	33	35.9
3	> 10 years	30	32.6
Total		92	100

Based on the table above, the characteristics of respondents based on the length of suffering show that the majority of respondents have suffered from diabetes mellitus for 5-10 years, namely 33 respondents (35.9%).

Tabel 4. Respondent Characteristics Based on Education

No	Education	Frequency (n)	Percentage (%)
1	Elementary School	21	22.8
2	Junior High School	19	20.7
3	Senior High School	25	27.2
4	College	27	29.3
Total		92	100

Based on the table above, data on respondent characteristics based on education shows that the highest level of education is tertiary education with 27 respondents (29.3%), followed by

high school with 25 respondents (27.2%), elementary school with 21 respondents (22.8%), and junior high school with 19 respondents (20.7%).

Tabel 5. Respondent Characteristics Based on Occupation

No	Work	Frequency (n)	Percentage (%)
1	Work	24	26.1
2	Doesn't work	68	73.9
Total		92	100

Based on the table above, data on respondent characteristics based on occupation shows that the majority of respondents (68 people) were unemployed, while 24 (26.1%) were employed. These results indicate that the majority of respondents in this study were unemployed.

Tabel 6. Distribution of Respondents Based on Self-Care Behavior Management

<i>Self-Care</i> Behavior Management	Frequency (n)	Percentage (%)
Good	26	28.3
Enough	36	39.1
Not enough	30	32.6
Total	92	100

Based on the table above, data on the distribution of respondents based on self-care behavior management was obtained. The results showed that the majority of respondents had self-care behavior management in the sufficient category, namely 36 respondents (39.1%). Furthermore, respondents in the poor category were 30 respondents (32.6%), while the good category was the least, namely 26 respondents (28.3%). These results indicate that the majority of elderly people with type 2 diabetes mellitus have self-care behavior management that is still in the sufficient category.

Tabel 6. Distribution of Respondents Based on Blood Sugar Control

Blood Sugar Control	Frequency (n)	Percentage (%)
Controlled	24	26.1
Not controlled	68	73.9
Total	92	100

The table above shows that the distribution of respondents based on blood sugar control shows that the majority of respondents had uncontrolled blood sugar, 68 respondents (73.9%),

while 24 respondents (26.1%) had controlled blood sugar . These results indicate that the majority of elderly people with type 2 diabetes mellitus still have uncontrolled blood sugar.

Table 7. Self-Care Behavior Management and Blood Sugar Control

<i>Self-Care Behavior Management</i>	Controlled		Not controlled		Total	p-value
	(n)	(%)	(n)	(%)		
Good	21	80.8	5	19.2	26	0,000 (<0.05)
Enough	3	8.3	33	91.7	36	
Not enough	0	0.0	30	100	30	
Total	24	26.1	68	73.9	92	

Based on the table above, bivariate analysis shows that of the 30 respondents who had poor self-care behavior management, all of them had uncontrolled blood sugar levels, namely 30 people (100.0%). In the sufficient self-care category, which amounted to 36 respondents, the majority of respondents had uncontrolled blood sugar levels, namely 33 people (91.7%), and only a small portion had controlled blood sugar levels, namely 3 people (8.3%). Meanwhile, of the 26 respondents who had good self-care behavior management, the majority had controlled blood sugar levels, namely 21 people (80.8%), and a small portion had uncontrolled blood sugar levels, namely 5 people (19.2%). Based on the results of the Chi-Square statistical test to test the significance of the relationship between the two variables, an Asymptotic Significance value (p-value) of 0.000 was obtained. Because the p-value obtained was much smaller than the standard significance value of alpha (α) which was 0.05 ($0.000 < 0.05$), then statistically the decision of the hypothesis test taken was that H_0 was rejected and H_a was accepted. Thus, it can be concluded convincingly that there is a significant and strong relationship between self-care behavior management and blood sugar control in elderly with Type 2 Diabetes Mellitus at the Limboto Community Health Center.

Discussion

Self-Care Behavior Management

Self-care behavior is an essential component of type 2 diabetes mellitus (T2DM) management because it reflects patients' ability to actively manage their condition and maintain glycemic control. In this study, self-care behavior was assessed using the Summary of Diabetes Self-Care Activities (SDSCA), which covers five main domains: dietary management, physical activity, medication adherence, blood glucose monitoring, and foot care. Thus, the findings provide an overall picture of how respondents implemented the recommended self-care practices in their daily management of T2DM rather than focusing on a single aspect of self-care.

Most respondents in this study were classified as having an adequate level of self-care, whereas a smaller proportion demonstrated good self-care. This finding suggests that although many older adults may recognize the importance of diabetes self-management, consistently translating this awareness into daily practice remains challenging. Several factors may contribute to this condition. Age-related physiological changes, limited mobility, declining vision, and reduced cognitive function may interfere with the ability of older adults to perform self-care activities consistently. In addition, educational background, economic circumstances, access to healthcare services, and family support may also influence their ability to maintain appropriate self-care practices.

These findings are consistent with Orem's Self-Care Deficit Nursing Theory, which emphasizes that self-care depends on an individual's physical, psychological, and social capabilities. When these capabilities are insufficient to meet self-care needs, support from

healthcare professionals and family members becomes necessary. This concept is particularly relevant to older adults with T2DM, who may experience age-related limitations that make independent disease management more difficult. Education, guidance, and continuous support may therefore help strengthen their ability to perform self-care activities.

The findings also highlight that diabetes self-care should be viewed as a multidimensional process. Dietary management contributes to regulating energy and carbohydrate intake, while regular physical activity can improve insulin sensitivity. Adherence to prescribed medication is important for maintaining treatment effectiveness, whereas regular blood glucose monitoring helps patients and healthcare providers identify changes in glycemic status. Foot care is also important in reducing the risk of diabetes-related foot complications. Therefore, inadequate implementation of any individual component may affect the overall effectiveness of diabetes self-management.

The present findings are consistent with those reported by Juwariah and Priyanto (2021), who found that patients with better self-care practices tended to have better diabetes control than those with poorer self-care. Similarly, Agustina, Astuti, and Naranti (2022) reported that most patients had moderate levels of self-care, particularly in several aspects of diabetes management, and many had not achieved optimal glycemic control. The consistency between these findings suggests that maintaining self-care practices on a daily basis remains an important challenge in diabetes management. Nevertheless, self-care behavior is only one of several factors that may influence diabetes control. Age, disease duration, educational level, socioeconomic status, family support, comorbidities, and psychological factors may also affect an older adult's ability to maintain self-care practices. Therefore, efforts to improve self-care among older adults with T2DM should not rely solely on individual education but should also involve continuous support from healthcare professionals, family members, and the surrounding social environment. Such a comprehensive approach may help older adults maintain self-care behaviors over time and support better diabetes management.

Blood Glucose Control in Older Adults with Type 2 Diabetes Mellitus

Blood glucose control is an important indicator of diabetes management because it reflects the overall effectiveness of treatment and patients' ability to manage their condition. In this study, blood glucose control was assessed using a random blood glucose (RBG) test and categorized as controlled or uncontrolled according to the criteria applied in the study. The findings showed that a proportion of older adults had not yet achieved adequate blood glucose control, indicating that glycemic management remains a challenge in this population (Wahyudin et al., 2025).

Although most respondents had received antidiabetic treatment, glycemic control is influenced by more than pharmacological therapy alone. Dietary practices, physical activity, medication adherence, blood glucose monitoring, and other aspects of diabetes self-management may all contribute to glycemic outcomes. In older adults, age-related physiological changes, including reduced insulin sensitivity and impaired pancreatic β -cell function, may further complicate glycemic management. Physical limitations and declining cognitive function may also make it more difficult for some older adults to maintain consistent diabetes self-management. Therefore, achieving adequate glycemic control requires a comprehensive approach that addresses both treatment and daily self-management practices.

Good glycemic control is clinically important for reducing the risk of diabetes-related complications. Sustained control of blood glucose is associated with a lower risk of microvascular complications, including retinopathy, nephropathy, and neuropathy, as well as macrovascular complications such as coronary heart disease and stroke. Maintaining appropriate glycemic control may also help preserve functional independence and quality of life among older adults and potentially reduce healthcare utilization associated with diabetes-related complications.

The findings of this study are consistent with those of Agustina, Astuti, and Naranti (2022), who reported that many patients with diabetes mellitus had blood glucose levels above the recommended target, indicating suboptimal glycemic control. Similarly, Juwariah and Priyanto (2021) found that more stable blood glucose levels were associated with better implementation of diabetes self-management. The consistency of these findings suggests that achieving adequate

glycemic control remains a challenge in T2DM, particularly among older adults who may face additional physical, functional, and social barriers to effective disease management.

However, blood glucose control is a multifactorial outcome and should not be attributed to self-care behavior alone (Zainuddin et al., 2024). Other factors, including age, duration of diabetes, body mass index, type of antidiabetic therapy, medication adherence, comorbidities, kidney function, nutritional status, educational level, socioeconomic conditions, and family support, may also influence glycemic status. These factors were not specifically analyzed in the present study and may therefore act as potential confounders. Consequently, the relationship between self-care behavior and blood glucose control should be interpreted within the context of these other factors.

The findings also have implications for diabetes management at the primary healthcare level. Community health centers (Puskesmas) can strengthen diabetes self-management programs through continuous education on dietary practices, age-appropriate physical activity, medication adherence, regular blood glucose monitoring, and foot care. Involving family members may also be beneficial, particularly for older adults who experience difficulties in performing self-care independently. Such interventions may help strengthen self-management practices and support better glycemic control among older adults with T2DM.

3. The Relationship Between Self-Care Behavior Management and Blood Sugar Control

Relationship Between Self-Care Behavior and Blood Glucose Control

The bivariate analysis showed a statistically significant relationship between self-care behavior and blood glucose control among older adults with type 2 diabetes mellitus at Limboto Community Health Center ($p < 0.05$). Older adults with better self-care behavior tended to have better blood glucose control than those with poorer self-care. This finding supports the concept that diabetes management extends beyond pharmacological treatment and depends substantially on patients' ability to consistently perform recommended self-care activities. In this study, self-care was assessed using the Summary of Diabetes Self-Care Activities (SDSCA), which encompasses dietary management, physical activity, medication adherence, blood glucose monitoring, and foot care. The significant association observed in this study suggests that consistent engagement in these activities may contribute to better glycemic management among older adults with T2DM.

The relationship between self-care behavior and blood glucose control can be understood through the contribution of each self-care domain to diabetes management. Dietary management helps regulate caloric and carbohydrate intake and may reduce excessive fluctuations in blood glucose levels. Regular physical activity can improve insulin sensitivity and glucose utilization by skeletal muscle. Adherence to prescribed medication is important for maintaining the therapeutic effect of pharmacological treatment, while blood glucose monitoring provides information about changes in glycemic status and can support timely clinical decision-making (Suardi et al., 2026). Although foot care does not directly lower blood glucose levels, it is an important component of comprehensive diabetes self-management because it helps prevent foot complications that may interfere with mobility and overall disease management. Therefore, effective diabetes self-care involves the consistent implementation of multiple behaviors rather than reliance on a single activity.

The findings of this study are consistent with those of Juwariah and Priyanto (2021), who reported that patients with better self-care practices tended to have more stable blood glucose levels. Similar findings were reported by Agustina, Astuti, and Naranti (2022), who found that inadequate self-care practices were common among patients with diabetes and were accompanied by a high proportion of patients who had not achieved their glycemic targets. The consistency of these findings suggests that self-care remains an important component of diabetes management across different patient populations. However, the present study contributes additional information by focusing specifically on older adults receiving care at the primary healthcare level, a population that may face greater challenges in maintaining self-care because of age-related physical and functional limitations.

The findings may also be interpreted in the context of Orem's Self-Care Deficit Nursing Theory, which emphasizes that an individual's ability to perform self-care depends on their capacity to meet their own health-related needs. Among older adults with T2DM, limitations related to mobility, vision, cognition, physical endurance, or dependence on family members may reduce their ability to consistently perform diabetes self-care activities. In this context, healthcare professionals do not merely provide treatment but also have an important role in identifying self-care deficits and providing appropriate education, guidance, and support. The significant relationship observed in this study therefore reinforces the relevance of self-care as an important focus of nursing interventions for older adults with T2DM.

Nevertheless, the presence of a significant association does not mean that self-care behavior is the only determinant of blood glucose control. Some respondents in this study who demonstrated good self-care behavior still had uncontrolled blood glucose levels. This finding indicates that glycemic control is a multifactorial outcome. Age-related changes in pancreatic β -cell function and insulin sensitivity, longer duration of diabetes, obesity, comorbidities, type and intensity of antidiabetic therapy, medication adherence, kidney function, nutritional status, and psychological factors may all influence blood glucose levels. Consequently, even patients who make considerable efforts to maintain appropriate self-care may experience inadequate glycemic control because of underlying biological or clinical factors.

Conversely, some respondents with less optimal self-care behavior may still have controlled blood glucose levels. This may be related to effective pharmacological therapy, a relatively shorter duration of diabetes, individual differences in metabolic response, or adequate support from family members and healthcare providers. Family support may facilitate adherence to medication, dietary recommendations, health monitoring, and attendance at healthcare visits even when the patient's independent self-care behavior is not optimal (Pauzi et al., 2025). These findings indicate that the relationship between self-care behavior and blood glucose control is complex and should not be interpreted as a simple one-to-one relationship.

Another consideration is that the quality of self-care may be more important than the presence of self-care activities alone. Patients may report performing certain self-care activities but may not perform them at the recommended frequency, intensity, or consistency. For example, occasional physical activity or intermittent dietary restriction may not be sufficient to produce meaningful changes in glycemic status. Similarly, medication adherence may be reported as good while other components, such as dietary management or blood glucose monitoring, remain inadequate. The multidimensional nature of the SDSCA is therefore useful because it allows self-care to be assessed across several domains rather than reducing diabetes self-management to a single behavior.

The characteristics of older adults should also be considered when interpreting these findings. Successful diabetes self-management requires not only knowledge but also the physical ability, motivation, resources, and social support necessary to implement recommended behaviors. Older adults who live alone, have limited mobility, experience visual impairment, or depend on family members for daily activities may face greater difficulties in maintaining self-care. Accordingly, interventions aimed at improving self-care should be tailored to individual capabilities rather than relying solely on standardized health education. A patient-centered approach may be more appropriate, particularly when addressing dietary practices, physical activity, medication use, and regular monitoring (Jusuf et al., 2026).

From a primary healthcare perspective, the significant relationship observed in this study supports the strengthening of diabetes self-management programs at the community health center level. Puskesmas can integrate structured self-care education into routine diabetes services, including education on dietary management, age-appropriate physical activity, medication adherence, blood glucose monitoring, and diabetic foot care. Regular assessment using standardized instruments such as the SDSCA may help healthcare workers identify patients with inadequate self-care and provide more targeted interventions. The Chronic Disease Management Program (Prolanis) may also serve as an appropriate platform for delivering continuous education, monitoring, and behavioral support rather than relying solely on episodic clinical consultations.

Family involvement may further strengthen these interventions (Zainuddin et al., 2023). For older adults, family members can assist with medication schedules, dietary choices, physical activity, blood glucose monitoring, and attendance at routine healthcare visits. Family support is particularly relevant when physical or cognitive limitations reduce the patient's ability to independently perform all aspects of diabetes self-care. Therefore, diabetes management among older adults should be viewed as a collaborative process involving patients, families, and healthcare professionals rather than as an individual responsibility alone.

Despite the statistically significant relationship observed in this study, several limitations should be considered. First, the cross-sectional design allows the variables to be assessed at a single point in time but does not establish a causal relationship between self-care behavior and blood glucose control. Second, self-care behavior was assessed using the SDSCA, which relies on self-reported information and may therefore be subject to recall bias and social desirability bias. Third, the study was conducted at a single community health center, which may limit the generalizability of the findings to older adults with T2DM in other regions with different demographic, socioeconomic, cultural, and healthcare characteristics. In addition, several potential confounding factors, including diabetes duration, body mass index, type of antidiabetic therapy, medication adherence, comorbidities, kidney function, educational level, socioeconomic status, and family support, were not specifically analyzed.

Future studies should consider longitudinal or cohort designs to clarify the temporal relationship between self-care behavior and glycemic control. Multicenter studies involving several primary healthcare facilities would also improve the generalizability of the findings. Further research should incorporate potential confounding variables and, where feasible, use objective measures of glycemic control such as HbA1c in addition to random blood glucose measurements. Such approaches would provide a more comprehensive understanding of how different components of self-care contribute to glycemic outcomes among older adults with T2DM.

Overall, this study demonstrates a significant relationship between self-care behavior and blood glucose control among older adults with T2DM at Limboto Community Health Center. The findings suggest that strengthening self-care may be an important component of diabetes management at the primary healthcare level, although glycemic control is influenced by multiple biological, clinical, behavioral, and social factors. Continuous self-management education, individualized support, and family involvement may therefore be important strategies for improving diabetes management and reducing the risk of complications among older adults with T2DM.

4. CONCLUSION

This study demonstrated a statistically significant relationship between self-care behavior and blood glucose control among older adults with type 2 diabetes mellitus at Limboto Community Health Center, Gorontalo Regency. Older adults with better self-care behavior tended to have better blood glucose control, indicating that consistent implementation of dietary management, physical activity, medication adherence, blood glucose monitoring, and foot care may support glycemic management. However, blood glucose control is multifactorial and may also be influenced by biological, clinical, and social factors. Therefore, strengthening diabetes self-management education, continuous support from healthcare professionals, and family involvement is important to improve self-care practices and support better blood glucose control among older adults with type 2 diabetes mellitus.

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