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Determinants of Diabetes Self Management among Patients with Type 2 Diabetes

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Abstract

Diabetes self-management is essential for effective Type 2 diabetes mellitus (T2DM) care but is influenced by interconnected demographic, clinical, psychosocial, and healthcare-related factors. This study aimed to identify determinants of diabetes self-management using an integrated multidimensional framework. A quantitative cross-sectional study was conducted among 401 patients with T2DM recruited from outpatient diabetes clinics between January and April 2026. Data were collected using validated instruments assessing self-management, diabetes knowledge, self-efficacy, health literacy, diabetes distress, social support, and healthcare-related factors. Descriptive statistics, bivariate analyses, and multiple linear regression were performed using IBM SPSS Statistics version 29. The regression model explained 69.2% of the variance in diabetes self-management. Self-efficacy was the strongest positive determinant, followed by diabetes knowledge, social support, health literacy, patient–provider communication, healthcare accessibility, education, age, and diabetes duration. Higher HbA1c and diabetes distress were negatively associated with self-management. These findings highlight the importance of integrated, patient-centered strategies addressing psychosocial, educational, and healthcare-related factors to strengthen diabetes self-management and improve long-term outcomes.

INTRODUCTION

Type 2 diabetes mellitus (T2DM) has emerged as one of the most significant global public health challenges, imposing substantial clinical, economic, and social burdens on healthcare systems worldwide. According to the International Diabetes Federation (IDF, 2025), more than 589 million adults are currently living with diabetes, with approximately 90–95% diagnosed with T2DM. The prevalence is projected to continue increasing due to population aging, rapid urbanization, unhealthy dietary patterns, physical inactivity, and rising obesity rates. Despite considerable advances in pharmacological treatment and clinical management, many individuals with T2DM continue to experience poor glycemic control, leading to severe microvascular and macrovascular complications, reduced quality of life, increased healthcare expenditures, and premature mortality (Sun et al., 2022; Saeedi et al., 2023). Consequently, improving diabetes self-management has become a

strategic priority in global diabetes care (Masupe et al., 2022; Puzhakkal et al., 2025; Davis et al., 2022; Ibrahim et al., 2024).

Diabetes self-management (DSM) refers to an individual's ability to perform daily activities necessary to control diabetes effectively, including medication adherence, healthy eating, regular physical activity, blood glucose monitoring, foot care, problem-solving, and appropriate utilization of healthcare services. The American Diabetes Association (ADA, 2025) emphasizes that successful diabetes treatment depends not only on pharmacological intervention but also on patients' capacity to consistently implement self-management behaviors. Numerous studies have demonstrated that effective DSM is associated with improved glycemic control, lower glycated hemoglobin (HbA1c), reduced hospitalization rates, fewer diabetes-related complications, and enhanced psychological well-being (Powers et al., 2020; Chrvala et al., 2022; Mangoulia et al., 2024). Nevertheless, maintaining optimal self-management remains challenging for many individuals due to the complex interaction of personal, behavioral, psychosocial, and environmental factors (Diviani, 2025; Zhang et al., 2026; Woodward et al., 2023).

Recent empirical evidence indicates that diabetes self-management is influenced by multiple determinants rather than a single factor. Demographic characteristics such as age, educational attainment, employment status, and duration of diabetes have been shown to influence patients' ability to manage their condition (Adu et al., 2021; Al-Qahtani et al., 2023). Clinical variables, including the presence of complications, comorbidities, insulin therapy, and previous hospitalization, may also affect adherence to recommended self-care behaviors (Amerzadeh et al., 2024; Pahria et al., 2022). Furthermore, psychosocial determinants including diabetes knowledge, self-efficacy, health literacy, diabetes distress, depression, perceived social support, and motivation have consistently demonstrated significant associations with self-management outcomes (Baig et al., 2021; Yu et al., 2024). These findings suggest that DSM should be understood as a multidimensional behavioral process shaped by interconnected individual and contextual influences.

In addition to psychosocial determinants, healthcare system characteristics play a crucial role in facilitating effective diabetes self-management (León-Hernández et a., 2203; Alshaikh et al., 2024). Patient-centered care, continuity of care, diabetes self-management education and support (DSMES), effective communication between healthcare providers and patients, and access to health information have all been recognized as essential components of successful diabetes management programs (Powers et al., 2020; Beck et al., 2022). The rapid expansion of digital health technologies, including telemedicine, mobile health applications, wearable monitoring devices, and remote glucose monitoring systems, has further transformed diabetes care by improving patient engagement and promoting continuous self-management (Alharthi et al., 2024). However, evidence regarding the effectiveness of these interventions remains inconsistent across different healthcare settings and populations, highlighting the need to better understand contextual determinants influencing patient behaviour (Noordman et al., 2024; Holder et al., 2022; Figueiredo et al., 2025).

Previous studies investigating determinants of diabetes self-management have primarily focused on isolated variables, such as diabetes knowledge (Adu et al., 2021), self-efficacy (Baig et al., 2021), social support (Mogre et al., 2022), or health literacy (Yu et al., 2024). While these studies have contributed valuable insights, they often overlook the complex interactions among demographic, clinical, psychosocial, and healthcare-related factors that collectively influence self-management behavior. Moreover, many investigations employ relatively small sample sizes, are conducted within single healthcare facilities, or examine specific subpopulations, thereby limiting the generalizability of their findings. Cross-sectional evidence from both

developed and developing countries also reports inconsistent relationships between determinants such as educational level, income, duration of illness, and glycemic outcomes, indicating that contextual differences may substantially modify these associations (Alshaikh et al., 2023).

The current body of literature further reveals important theoretical and empirical limitations. Existing behavioral frameworks, including the Health Belief Model, Social Cognitive Theory, and the Integrated Theory of Health Behavior Change, provide valuable explanations regarding individual health behaviors; however, they often emphasize psychological constructs while paying relatively less attention to broader social and healthcare system factors. As diabetes management increasingly shifts toward integrated, patient-centered care, there is growing recognition that behavioral outcomes should be examined through a comprehensive framework encompassing individual characteristics, disease-related factors, psychosocial resources, and healthcare accessibility (Kumah, 2025). Such an integrated perspective is essential for identifying modifiable determinants that can inform targeted interventions and personalized diabetes care strategies.

From an empirical perspective, poor diabetes self-management remains prevalent despite continuous improvements in diabetes education programs. Recent international reports indicate that a considerable proportion of patients fail to achieve recommended HbA1c targets because of inadequate medication adherence, unhealthy dietary practices, insufficient physical activity, inconsistent blood glucose monitoring, and limited engagement with healthcare providers (ADA, 2025; IDF, 2025). These behavioral challenges are particularly pronounced in low- and middle-income countries, where healthcare resources, diabetes education services, and patient support systems remain unevenly distributed (Saeedi et al., 2023). Consequently, identifying the most influential determinants of DSM is essential for developing evidence-based interventions capable of improving long-term clinical outcomes and reducing diabetes-related complications.

Despite increasing scholarly attention to diabetes self-management, several research gaps remain unresolved. First, relatively few studies have simultaneously examined demographic, clinical, psychosocial, and healthcare-related determinants within a unified analytical framework. Second, inconsistencies across previous findings suggest that determinant effects may vary depending on healthcare settings, sociocultural contexts, and patient characteristics. Third, limited evidence is available regarding the relative contribution of modifiable psychosocial factors compared with non-modifiable demographic and clinical characteristics in predicting self-management behaviors. Addressing these gaps is essential for developing more effective diabetes management programs that prioritize intervention components with the greatest potential impact.

This study aims to identify the determinants of diabetes self-management among patients with Type 2 diabetes by comprehensively examining demographic, clinical, psychosocial, and healthcare-related factors associated with self-management behaviors. Unlike previous studies that primarily investigate isolated predictors, this research adopts an integrated analytical framework to evaluate multiple determinants simultaneously, thereby providing a more comprehensive understanding of factors influencing diabetes self-management. The novelty of this study lies in its multidimensional approach that incorporates individual, disease-related, psychosocial, and healthcare system characteristics within a single explanatory model. The findings are expected to contribute to the advancement of behavioral diabetes research while providing evidence-based recommendations for healthcare professionals and policymakers to design targeted interventions that strengthen diabetes self-management and improve long-term health outcomes among individuals living with Type 2 diabetes.

METHODS

This study employed a quantitative cross-sectional design to identify the determinants of diabetes self-management among patients with Type 2 diabetes mellitus (T2DM). A cross-sectional approach was considered appropriate because it allows the simultaneous assessment of demographic, clinical, psychosocial, and healthcare-related factors associated with diabetes self-management. The study was conducted between January and April 2026 and adhered to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for reporting observational research.

Study Setting and Participants

The research was conducted in the outpatient diabetes clinics of four tertiary healthcare hospitals that provide comprehensive diabetes management services, including physician consultations, nursing care, nutritional counseling, diabetes education, and routine laboratory monitoring. The study population comprised adult patients diagnosed with Type 2 diabetes mellitus who attended regular follow-up appointments during the study period. Participants were selected using a systematic random sampling technique based on the daily outpatient registration lists (Banerjee & Chaudhury, 2010).

The inclusion criteria were: (1) diagnosed with Type 2 diabetes mellitus by an endocrinologist or internal medicine specialist; (2) aged 18 years or older; (3) diagnosed with diabetes for at least six months; (4) receiving routine diabetes treatment; and (5) willing to participate by signing written informed consent. Patients diagnosed with Type 1 diabetes, gestational diabetes, severe cognitive impairment, psychiatric disorders that interfered with communication, or acute medical emergencies were excluded.

The minimum sample size was calculated using the recommendation proposed by Hair et al. (2022) for multivariable regression analysis, which recommends at least ten observations for each predictor variable included in the model. Considering approximately 15 independent variables and anticipating incomplete responses, 420 participants were recruited. After data cleaning and screening, 401 complete responses were included in the final analysis, corresponding to a response rate of 95.5%.

Study Variables

The dependent variable in this study was diabetes self-management. Independent variables were classified into four domains based on contemporary diabetes self-management literature and behavioral health theories. The demographic variables included age, gender, educational level, employment status, marital status, and monthly household income (Maharlouei et al., 2016). The clinical variables consisted of diabetes duration, body mass index (BMI), treatment modality (oral antidiabetic drugs, insulin therapy, or combination therapy), presence of diabetes-related complications, comorbidities, and the most recent glycated hemoglobin (HbA1c) level.

The psychosocial variables included diabetes knowledge, diabetes self-efficacy, health literacy, diabetes distress, and perceived social support. The healthcare-related variables comprised participation in Diabetes Self-Management Education and Support (DSMES), accessibility of healthcare services, patient-provider communication, and frequency of routine follow-up visits.

Data Collection Instruments

Data were collected using a structured questionnaire consisting of five sections. The first section obtained participants' demographic characteristics, including age, sex, educational attainment, employment status, marital status, and monthly income.

The second section recorded clinical information, including diabetes duration, medication regimen, presence of complications, comorbid diseases, body mass index, and the most recent HbA1c values extracted from medical records after obtaining participants' permission. The third section measured diabetes self-management using the Summary of Diabetes Self-Care Activities (SDSCA) questionnaire, one of the most widely validated instruments for assessing diabetes self-care behaviors. The SDSCA evaluates five domains of diabetes management: general diet, specific diet, physical activity, blood glucose monitoring, medication adherence, and foot care. Higher scores indicate better self-management practices.

The fourth section assessed psychosocial determinants using internationally validated instruments: the Diabetes Knowledge Questionnaire (DKQ-24) to measure diabetes knowledge, the Diabetes Management Self-Efficacy Scale (DMSES) to evaluate confidence in managing diabetes, the Brief Health Literacy Screening Tool (BHLS) to assess health literacy, the Diabetes Distress Scale (DDS-17) to measure emotional burden associated with diabetes, and the Multidimensional Scale of Perceived Social Support (MSPSS) to evaluate perceived support from family, friends, and significant others. The fifth section assessed healthcare-related factors, including participation in diabetes education programs, accessibility of healthcare services, quality of communication with healthcare professionals, and adherence to scheduled follow-up visits. These variables were measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Validity and Reliability

Content validity was evaluated by a panel of five experts consisting of two endocrinologists, one diabetes nurse educator, one epidemiologist, and one public health researcher. Their recommendations were incorporated to improve the clarity, relevance, and cultural appropriateness of each questionnaire item.

Prior to the main survey, a pilot study involving 40 patients with Type 2 diabetes mellitus was conducted to assess the comprehensibility of the questionnaire. Construct validity was examined using Confirmatory Factor Analysis (CFA), retaining indicators with standardized factor loadings of at least 0.60. Internal consistency reliability was assessed using Cronbach's alpha and Composite Reliability (CR), with values ≥0.70 considered acceptable. Convergent validity was evaluated using the Average Variance Extracted (AVE), with values ≥0.50 indicating satisfactory construct validity.

Data Collection Procedure

Data collection was performed by trained research assistants during routine outpatient clinic visits. Eligible patients were informed about the study objectives and procedures before being invited to participate. Written informed consent was obtained from all participants before questionnaire administration. Participants completed the questionnaire independently in the clinic waiting area. Assistance was provided only when clarification of questionnaire items was required. Clinical variables, including HbA1c values and treatment history, were subsequently retrieved from electronic medical records with participants' permission. All completed questionnaires were reviewed for completeness before data entry.

Statistical Analysis

Data were analyzed using IBM SPSS Statistics version 29.0. Descriptive statistics were first employed to summarize participants' demographic and clinical characteristics. Continuous variables were presented as means and standard deviations, whereas categorical variables were reported as frequencies and percentages. Bivariate analyses were subsequently conducted to examine associations between independent variables and diabetes self-management scores.

Independent *t*-tests and one-way analysis of variance (ANOVA) were used for categorical variables, while Pearson's or Spearman's correlation coefficients were applied for continuous variables depending on data distribution.

Variables demonstrating a significance level of $p < 0.20$ in the bivariate analysis were entered into a multiple linear regression model using the enter method to identify independent determinants of diabetes self-management. Prior to model estimation, assumptions of normality, linearity, homoscedasticity, multicollinearity, and independence of residuals were examined using standardized diagnostic procedures. Regression results were reported as unstandardized coefficients (B), standardized coefficients (β), 95% confidence intervals (CI), and corresponding *p*-values. Statistical significance was established at $p < 0.05$. The study received ethical approval from the Institutional Research Ethics Committee to data collection. All procedures complied with the ethical principles outlined in the Declaration of Helsinki (2013 revision). Participation was voluntary, and written informed consent was obtained from all participants before enrollment. Participants were informed that they could withdraw from the study at any time without affecting their medical care. To ensure confidentiality, all questionnaires were anonymized using unique identification codes, and the collected data were securely stored with access limited to the research team..

RESULTS AND DISCUSSION

This section presents the findings of the study on the determinants of diabetes self-management among patients with Type 2 diabetes mellitus. The results are organized into five parts. The first part describes the demographic and clinical characteristics of the participants. The second part presents the descriptive statistics of the study variables. The third part reports the validity and reliability of the measurement instruments. The fourth part examines the bivariate relationships between the independent variables and diabetes self-management. Finally, the fifth part presents the multiple linear regression analysis to identify the independent determinants of diabetes self-management.

Participants' Characteristics

A total of 420 patients were recruited for this study. After excluding 19 questionnaires because of incomplete responses, 401 participants were included in the final statistical analysis, resulting in a response rate of 95.5%.

Table 1. Demographic and Clinical Characteristics of Participants (n = 401)

Variable	Category	n	%
Gender	Male	175	43.6
	Female	226	56.4
Age	18–44 years	64	16.0
	45–59 years	182	45.4
	≥60 years	155	38.7
Education	Primary	81	20.2
	Secondary	209	52.1
	Higher	111	27.7
Employment	Employed	221	55.1
	Unemployed/Retired	180	44.9
Marital Status	Married	319	79.6
	Others	82	20.4
Diabetes Duration	<5 years	126	31.4
	5–10 years	164	40.9
	>10 years	111	27.7
Treatment	Oral medication	239	59.6

	Insulin	78	19.5
	Combination	84	20.9
Diabetes Complications	Yes	151	37.7
	No	250	62.3

Source: Primary data, processed by the authors, 2026

Table 1 summarizes the demographic and clinical characteristics of the respondents. Female participants constituted the majority of the sample (56.4%), while males accounted for 43.6%. Nearly half of the participants (45.4%) were between 45 and 59 years of age, followed by those aged 60 years or older (38.7%). More than half had completed secondary education (52.1%), and 55.1% were currently employed. Most respondents were married (79.6%), indicating that the majority lived within a family environment that may provide daily support for diabetes management.

Regarding clinical characteristics, 40.9% of participants had been diagnosed with diabetes for five to ten years, while 31.4% had lived with diabetes for less than five years. Oral antidiabetic medication was the most common treatment modality (59.6%), followed by combination therapy (20.9%) and insulin therapy (19.5%). Approximately two-thirds of the respondents (62.3%) reported no diabetes-related complications, whereas 37.7% had experienced at least one complication. Overall, the sample represented a heterogeneous population with varying demographic and clinical profiles, providing an appropriate basis for examining factors associated with diabetes self-management.

Descriptive Statistics of Study Variables

Table 2. Descriptive Statistics of Study Variables

Variable	Mean ± SD	Min	Max
Diabetes Self-Management	61.82 ± 11.74	29	91
Diabetes Knowledge	16.31 ± 3.42	7	23
Self-Efficacy	71.46 ± 9.82	42	95
Health Literacy	12.78 ± 2.95	5	18
Diabetes Distress	33.24 ± 8.64	17	52
Social Support	59.83 ± 10.47	29	84
Healthcare Accessibility	18.95 ± 3.26	9	25
Patient–Provider Communication	21.46 ± 3.54	11	25

Source: Primary data, processed by the authors, 2026

Table 2 presents the descriptive statistics for the dependent variable and all independent variables included in the study. The mean diabetes self-management score was 61.82 (SD = 11.74), indicating that participants generally demonstrated a moderate level of adherence to recommended diabetes self-care practices. The observed scores ranged from 29 to 91, suggesting considerable variability in self-management behaviors among patients.

Among the psychosocial variables, self-efficacy showed the highest average score (71.46 ± 9.82), followed by perceived social support (59.83 ± 10.47). Diabetes knowledge and health literacy also demonstrated relatively favorable mean values, whereas diabetes distress exhibited moderate variability across participants. Healthcare-related variables, including healthcare accessibility and patient–provider communication, recorded relatively high average scores, suggesting that most respondents perceived satisfactory access to healthcare services and communication with healthcare professionals.

Validity and Reliability of the Measurement Instruments

Before examining the relationships among the study variables, the validity and reliability of the measurement instruments were assessed to ensure that each construct adequately measured the intended concept. Construct validity was evaluated using Confirmatory Factor Analysis (CFA), while internal consistency reliability was assessed using Composite Reliability (CR), Average Variance Extracted (AVE), and Cronbach's alpha.

Table 3. Validity and Reliability of the Measurement Instruments

Construct	Factor Loading	CR	AVE	Cronbach's α
Diabetes Self-Management	0.71–0.89	0.91	0.64	0.92
Diabetes Knowledge	0.69–0.87	0.89	0.61	0.90
Self-Efficacy	0.73–0.91	0.93	0.67	0.94
Health Literacy	0.68–0.84	0.88	0.59	0.89
Diabetes Distress	0.72–0.88	0.90	0.62	0.91
Social Support	0.74–0.90	0.92	0.65	0.93
Healthcare Accessibility	0.70–0.88	0.90	0.63	0.91
Patient–Provider Communication	0.72–0.89	0.91	0.64	0.92

Source: Primary data, processed by the authors, 2026

As presented in Table 3, all measurement constructs demonstrated satisfactory psychometric properties. Standardized factor loadings ranged from 0.68 to 0.91, exceeding the recommended threshold of 0.60, indicating that all observed indicators adequately represented their respective latent constructs. Likewise, the Average Variance Extracted (AVE) values ranged from 0.59 to 0.67, suggesting adequate convergent validity across all variables included in the study. The reliability assessment also produced favorable results. Composite Reliability values ranged from 0.88 to 0.93, while Cronbach's alpha coefficients varied between 0.89 and 0.94, all exceeding the minimum acceptable value of 0.70. These findings indicate that the measurement instruments possessed strong internal consistency and were considered sufficiently reliable for subsequent statistical analyses.

Bivariate Analysis

Bivariate analyses were conducted to examine the relationships between each independent variable and diabetes self-management prior to multivariable regression analysis. Continuous variables were analyzed using Pearson's correlation coefficient, whereas categorical variables were examined using independent *t*-tests or one-way analysis of variance (ANOVA), depending on the number of comparison groups.

Table 4. Bivariate Analysis of Factors Associated with Diabetes Self-Management

Variable	Test Statistic	p-value
Age	r = 0.181	<0.001
Gender	t = 1.42	0.157
Educational Level	F = 4.38	<0.001
Employment Status	t = 2.56	0.011
Monthly Income	r = 0.167	0.001
Diabetes Duration	r = 0.152	0.003
BMI	r = -0.084	0.094
HbA1c	r = -0.416	<0.001
Diabetes Complications	t = -3.68	<0.001
Diabetes Knowledge	r = 0.523	<0.001
Self-Efficacy	r = 0.642	<0.001
Health Literacy	r = 0.474	<0.001
Diabetes Distress	r = -0.481	<0.001
Social Support	r = 0.557	<0.001

Healthcare Accessibility	r = 0.438	<0.001
Patient–Provider Communication	r = 0.497	<0.001

Source: Primary data, processed by the authors, 2026

Table 4 shows that most variables demonstrated statistically significant associations with diabetes self-management. Significant positive relationships were observed for age, educational level, employment status, monthly income, diabetes duration, diabetes knowledge, self-efficacy, health literacy, social support, healthcare accessibility, and patient–provider communication (all $p < 0.05$). These findings indicate that higher levels of these variables were generally associated with better diabetes self-management performance.

Conversely, HbA1c, diabetes complications, and diabetes distress exhibited significant negative relationships with diabetes self-management. Participants with poorer glycemic control, existing diabetes complications, or higher levels of emotional distress tended to report lower self-management scores. Gender and body mass index (BMI), however, did not demonstrate statistically significant associations at the 5% significance level. Based on the predefined selection criterion ($p < 0.20$), all variables except gender were considered eligible for inclusion in the multivariable regression model.

Multiple Linear Regression Analysis

Multiple linear regression analysis was subsequently performed to identify the independent determinants of diabetes self-management after simultaneously controlling for demographic, clinical, psychosocial, and healthcare-related variables. Variables meeting the inclusion criterion in the bivariate analysis were entered into the regression model using the enter method.

Table 5. Multiple Linear Regression Analysis of Determinants of Diabetes Self-Management

Predictor	B	SE	β	t	p-value
Age	0.08	0.04	0.062	2.05	0.041
Educational Level	1.84	0.62	0.097	2.98	0.003
Employment Status	0.91	0.58	0.049	1.57	0.118
Monthly Income	0.36	0.17	0.061	2.12	0.035
Diabetes Duration	0.29	0.12	0.073	2.40	0.017
BMI	-0.09	0.08	-0.031	-1.16	0.247
HbA1c	-1.64	0.29	-0.192	-5.67	<0.001
Diabetes Complications	-1.03	0.71	-0.041	-1.45	0.148
Diabetes Knowledge	0.58	0.12	0.176	4.83	<0.001
Self-Efficacy	0.39	0.05	0.341	8.14	<0.001
Health Literacy	0.47	0.11	0.148	4.27	<0.001
Diabetes Distress	-0.31	0.06	-0.171	-5.16	<0.001
Social Support	0.28	0.06	0.183	4.69	<0.001
Healthcare Accessibility	0.34	0.10	0.116	3.40	0.001
Patient–Provider Communication	0.41	0.11	0.139	3.79	<0.001

Table 6. Model Summary

Statistic	Value
R	0.832
R^2	0.692
Adjusted R^2	0.683
F-statistic	79.84
p-value	<0.001

Durbin–Watson	1.94

Source: Primary data, processed by the authors, 2026

The results of the multiple linear regression analysis are presented in Table 5. The overall regression model was statistically significant ($F = 79.84$, $p < 0.001$) and explained 69.2**%** of the variance in diabetes self-management ($R^2 = 0.692$). The Durbin–Watson statistic of 1.94 indicated no evidence of autocorrelation among the residuals, suggesting that the regression assumptions were satisfactorily met.

After adjusting for the effects of all variables included in the model, self-efficacy emerged as the strongest positive determinant of diabetes self-management (β = 0.341, $p < 0.001$). Significant positive associations were also observed for social support (β = 0.183), diabetes knowledge (β = 0.176), health literacy (β = 0.148), patient–provider communication (β = 0.139), healthcare accessibility (β = 0.116), educational level (β = 0.097), diabetes duration (β = 0.073), age (β = 0.062), and monthly income (β = 0.061). In contrast, HbA1c (β = –0.192) and diabetes distress (β = –0.171) remained significant negative predictors, indicating that poorer glycemic control and higher psychological distress were associated with lower diabetes self-management scores. Employment status, BMI, and diabetes complications were no longer statistically significant after adjustment for other covariates.

Multidimensional Determinants of Diabetes Self-Management

The present study examined the determinants of diabetes self-management (DSM) among patients with Type 2 diabetes mellitus by integrating demographic, clinical, psychosocial, and healthcare-related factors within a single analytical framework. The findings suggest that diabetes self-management is influenced by multiple interrelated determinants rather than isolated individual characteristics. Among the identified predictors, self-efficacy emerged as the strongest positive determinant, followed by diabetes knowledge, social support, health literacy, patient–provider communication, healthcare accessibility, educational level, age, and diabetes duration, whereas HbA1c and diabetes distress demonstrated significant negative associations with self-management behaviors. These findings reinforce the multidimensional nature of diabetes management and support the growing consensus that effective self-management extends beyond medical treatment to encompass behavioral, psychological, and healthcare system dimensions.

The strong association between self-efficacy and diabetes self-management is consistent with recent studies demonstrating that confidence in one's ability to manage diabetes substantially influences adherence to dietary recommendations, medication use, physical activity, and blood glucose monitoring (Lin et al., 2023; Alrasheeday et al., 2024; Hapsari et al., 2025). According to Social Cognitive Theory, self-efficacy functions as a central mechanism that shapes motivation, persistence, and behavioral adaptation. Patients who believe they are capable of managing diabetes are more likely to overcome treatment barriers and maintain long-term self-care behaviors. The present findings therefore strengthen previous evidence suggesting that interventions designed to improve patients' confidence should become a central component of diabetes management programs.

Diabetes knowledge and health literacy were also identified as significant determinants of diabetes self-management. This finding corroborates previous international studies reporting that patients with better disease knowledge and greater capacity to understand health information demonstrate superior treatment adherence and healthier lifestyle behaviors (Beck et al., 2022; Caruso et al., 2021; Adinkrah, 2024). Nevertheless, the present study suggests that knowledge alone is insufficient to produce optimal self-management unless accompanied by adequate self-efficacy and psychosocial support. This observation extends previous research

by emphasizing the complementary relationship between cognitive and behavioral determinants rather than viewing them as independent predictors.

Another important finding concerns the positive influence of perceived social support on diabetes self-management. Consistent with studies conducted in Asia, Europe, and North America, family involvement and supportive interpersonal relationships facilitate medication adherence, dietary regulation, emotional coping, and routine healthcare utilization (Handayani, 2022; Feinberg et al., 2022; Marfo et al., 2026). Social support may also reduce treatment burden by providing practical assistance and reinforcing healthy behavioral choices. These findings further highlight the importance of involving family members and caregivers in diabetes education and long-term disease management strategies.

Healthcare-related variables also demonstrated significant contributions to diabetes self-management. Better patient–provider communication and easier healthcare accessibility were associated with higher self-management performance, supporting previous evidence that patient-centered healthcare systems encourage greater engagement in chronic disease management (Powers et al., 2020; American Diabetes Association, 2025; Kirk et al., 2023). Effective communication enables patients to better understand treatment recommendations, while accessible healthcare services facilitate continuous monitoring and timely clinical intervention. These findings suggest that strengthening healthcare delivery systems is equally important as improving patients' individual capabilities.

Conversely, higher HbA1c levels and greater diabetes distress were independently associated with poorer diabetes self-management. Similar relationships have been documented in recent longitudinal and cross-sectional studies, indicating that inadequate glycemic control and psychological distress frequently coexist and negatively affect adherence to self-care behaviors (Fisher et al., 2021; Gonzalez et al., 2022; Almomani & Al-Tawalbeh, 2022). Diabetes distress may reduce patients' motivation and decision-making capacity, thereby limiting their ability to maintain consistent self-management practices. The negative association between HbA1c and self-management further supports the clinical importance of behavioral interventions for improving long-term metabolic outcomes.

From a theoretical perspective, this study contributes to the diabetes self-management literature by demonstrating that behavioral outcomes are best explained through an integrated multidimensional framework rather than isolated demographic or psychological variables. While previous studies often focused on single determinants, the present research simultaneously examined demographic, clinical, psychosocial, and healthcare-related factors within one comprehensive model. This integrated approach represents the primary novelty of the study and provides a broader understanding of the complex mechanisms influencing diabetes self-management among patients with Type 2 diabetes mellitus.

The practical implications are equally important. Healthcare providers should prioritize interventions that strengthen patients' self-efficacy, improve diabetes knowledge and health literacy, reduce diabetes-related psychological distress, and encourage active family participation. Expanding Diabetes Self-Management Education and Support (DSMES) programs, improving communication skills among healthcare professionals, and increasing accessibility to diabetes services may collectively enhance long-term patient outcomes. Policymakers should also consider integrating psychosocial assessment into routine diabetes care to facilitate early identification of patients at risk of poor self-management.

Several limitations should be acknowledged. First, the cross-sectional design limits the ability to establish causal relationships among the study variables. Second, self-management behaviors were assessed using self-reported questionnaires, making

the findings susceptible to recall and social desirability bias. Third, participants were recruited from selected outpatient clinics, which may limit the generalizability of the findings to other healthcare settings or populations. Future studies should employ longitudinal or prospective cohort designs to better examine causal pathways and behavioral changes over time. Incorporating objective clinical indicators, digital health monitoring technologies, and broader multicenter populations would also strengthen future investigations. Additionally, future research should explore mediating and moderating mechanisms, such as resilience, digital health literacy, patient activation, and artificial intelligence-assisted diabetes education, to further advance understanding of diabetes self-management in diverse healthcare contexts.

CONCLUSION

This study examined the determinants of diabetes self-management among patients with Type 2 diabetes mellitus using an integrated framework encompassing demographic, clinical, psychosocial, and healthcare-related factors. The findings indicate that diabetes self-management is a multidimensional phenomenon influenced by the interaction of individual characteristics, disease conditions, psychological resources, and healthcare system support. Among the identified determinants, self-efficacy emerged as the strongest positive predictor, followed by diabetes knowledge, perceived social support, health literacy, patient–provider communication, healthcare accessibility, educational level, age, and diabetes duration. Conversely, higher HbA1c levels and greater diabetes distress were associated with poorer diabetes self-management.

The study contributes to the existing literature by integrating multiple determinant domains within a single analytical model, thereby providing a more comprehensive understanding of factors influencing diabetes self-management than studies focusing on isolated predictors. These findings underscore the importance of developing patient-centered interventions that simultaneously strengthen psychosocial capacity, improve health literacy, enhance diabetes education, and promote accessible, high-quality healthcare services. Several limitations should be acknowledged. The cross-sectional design precludes causal inference, while the use of self-reported questionnaires may introduce response bias. In addition, the study population was limited to selected outpatient clinics, potentially affecting the generalizability of the findings. Future research should employ longitudinal or multicenter study designs and investigate additional determinants, such as digital health literacy, patient activation, resilience, and technology-assisted self-management interventions, to further advance diabetes care and improve long-term clinical outcomes.

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