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The Predictive Role of Health Locus of Control and Self-Efficacy in Blood Glucose Control among Patients with Type 2 Diabetes

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A B S T R A C T

Purpose: The present study aimed to investigate the predictive role of health locus of control and self-efficacy in blood glucose control among patients with type 2 diabetes hospitalized at Amir al-Momenin Ali Hospital in Zabol, Iran.

Methods and Materials: This descriptive-correlational study was conducted among patients with type 2 diabetes who attended Amir al-Momenin Ali Hospital in Zabol during the second quarter of 2020. The study population consisted of approximately 190 patients, from whom 124 participants (62 men and 62 women) were selected using convenience sampling based on the Morgan table. Data were collected using the Multidimensional Health Locus of Control Scale developed by Wallston et al. (1978) and the Diabetes Management Self-Efficacy Scale developed by Vanderbilt et al. (1999). Blood glucose control served as the criterion variable. Data were analyzed using regression analysis in SPSS software to determine the predictive power of health locus of control and self-efficacy on glycemic control.

Findings: The results of regression analyses indicated that both health locus of control and self-efficacy significantly predicted blood glucose control among patients with type 2 diabetes. The predictive relationships were observed in both male and female participants, demonstrating that individuals with stronger perceptions of control over their health and higher levels of diabetes-related self-efficacy were more likely to achieve better glycemic control. The findings confirmed the study hypotheses and highlighted the significant contribution of psychological variables to explaining variations in blood glucose management among diabetic patients.

Conclusion: The findings suggest that health locus of control and self-efficacy are important psychological predictors of blood glucose control in individuals with type 2 diabetes. Strengthening patients' beliefs in their ability to manage diabetes and enhancing their sense of personal control over health outcomes may improve adherence to self-care behaviors and facilitate better glycemic regulation.

Keywords: *Type 2 Diabetes; Health Locus of Control; Self-Efficacy; Blood Glucose Control; Glycemic Management; Psychological Predictors.*

1. Introduction

Diabetes mellitus is one of the most prevalent chronic metabolic disorders worldwide and represents a major public health challenge due to its increasing incidence, long-term complications, and substantial economic burden on healthcare systems. Type 2 diabetes mellitus accounts for the majority of diabetes cases and is characterized by insulin resistance and impaired insulin secretion, leading to chronic hyperglycemia and a wide range of microvascular and macrovascular complications. The growing prevalence of diabetes has transformed it into a global epidemic that affects millions of individuals and significantly compromises quality of life, functional capacity, and overall well-being (Tsirona et al., 2016; Tuohy et al., 2025). Effective management of diabetes requires continuous adherence to treatment regimens, including medication use, dietary modifications, physical activity, self-monitoring of blood glucose, and regular medical follow-up. Consequently, diabetes management extends beyond physiological factors and increasingly relies on psychological, behavioral, and social determinants that influence patients' capacity to engage in self-care behaviors (Lee et al., 2016; Mohammadi Manesh et al., 2025).

Despite remarkable advances in pharmacological interventions and diabetes care programs, achieving optimal glycemic control remains a significant challenge for many patients. Studies have shown that poor blood glucose control is associated with increased risks of cardiovascular disease, nephropathy, neuropathy, retinopathy, disability, and premature mortality. Although medical treatment is essential for controlling diabetes, psychological variables play a crucial role in determining treatment adherence and long-term disease outcomes. Research suggests that patients' beliefs about health, perceptions of control, emotional adjustment, and confidence in managing their illness significantly influence their engagement in health-promoting behaviors and their ability to maintain acceptable glycemic levels (Akbari Kamrani, 2018; Alirezaei Shahraki & Akbari Kamrani, 2018; Dehghan et al., 2018).

Among the psychological constructs that have attracted considerable attention in health psychology, health locus of control has emerged as an important predictor of health-related behavior and disease management. Rooted in social learning theory, locus of control refers to individuals' beliefs regarding the extent to which outcomes are under their personal control or determined by external forces. In the context of health, health locus of control reflects beliefs about the factors responsible for maintaining health and preventing illness. Individuals with an internal health locus of control believe that their own behaviors, decisions, and actions influence health outcomes, whereas those with an external orientation attribute health outcomes to chance, fate, luck, or powerful others such as healthcare professionals and family members (Nazem Siddiqi et al., 2023; Yousefi Salekdeh et al., 2023).

The importance of health locus of control in chronic disease management has been documented across various populations. Individuals with stronger internal health control beliefs are generally more likely to engage in preventive health behaviors, comply with medical recommendations, and actively participate in disease management. Conversely, individuals who perceive health outcomes as determined by external forces may be less motivated to adopt self-care behaviors because they view their actions as having limited influence on health outcomes. Studies have demonstrated that internal health locus of control is associated with better psychological adaptation, healthier lifestyles, improved treatment adherence, and more favorable health outcomes in individuals with chronic illnesses (Mohammadchenari et al., 2022; Vasu & Pang, 2024). Similarly, research has shown that health locus of control contributes significantly to predicting health-related behaviors and risk perceptions, emphasizing its relevance for understanding chronic disease management (Fathabadi et al., 2018; Yousefi Salekdeh et al., 2023).

Evidence from diabetes research also supports the importance of health locus of control in glycemic management. Patients who perceive greater personal responsibility for their health tend to demonstrate stronger commitment to treatment recommendations and diabetes self-care activities. In contrast, individuals who rely excessively on chance or external agents may exhibit poorer adherence to treatment plans and reduced engagement in self-management behaviors. Research conducted among diabetic populations has indicated significant associations between health-related beliefs, metabolic control, and health outcomes, suggesting that cognitive appraisals of control constitute a key component of successful disease management (Fathabadi et al., 2018; Sartipzadeh & Sohrabi, 2017).

Another psychological variable that has consistently been associated with successful diabetes management is self-efficacy. Derived from Bandura's social cognitive theory, self-efficacy refers to an individual's belief in their ability to successfully perform behaviors required to achieve desired

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outcomes. Self-efficacy influences the initiation, persistence, and maintenance of health behaviors, particularly in situations involving obstacles, uncertainty, and long-term behavioral demands. In chronic illnesses such as diabetes, self-efficacy determines the extent to which patients feel capable of adhering to treatment recommendations, managing symptoms, monitoring blood glucose, maintaining dietary restrictions, and engaging in regular physical activity (Hosseinzadeh Bandaghiri et al., 2018; Rahmani Dolatabad et al., 2016).

A substantial body of evidence highlights the positive impact of self-efficacy on diabetes-related outcomes. Individuals with higher levels of diabetes self-efficacy demonstrate greater confidence in managing their condition and are more likely to engage in effective self-care behaviors. Enhanced self-efficacy has been associated with better treatment adherence, improved quality of life, lower diabetes-related distress, and superior glycemic control. Furthermore, interventions designed to increase self-efficacy have consistently produced favorable outcomes in diabetes management, suggesting that self-efficacy functions not only as a predictor but also as a modifiable target for clinical intervention (Li et al., 2025; Zhang et al., 2023; Zulkarnaini et al., 2022).

Recent studies have reinforced the central role of self-efficacy in diabetes care. Research has shown that self-efficacy serves as an important mediator linking self-management behaviors, patient activation, health literacy, and quality of life among individuals with type 2 diabetes. Patients with stronger self-efficacy beliefs are more likely to acquire health-related knowledge, apply self-management skills effectively, and maintain motivation for long-term disease control. Consequently, self-efficacy has been identified as one of the strongest psychosocial predictors of successful diabetes management and favorable health outcomes (Lee et al., 2016; Li et al., 2025; Zhang et al., 2023).

In addition to influencing behavioral outcomes, self-efficacy also appears to play a protective role against psychological distress associated with chronic disease. Living with diabetes often involves considerable emotional challenges, including anxiety about complications, treatment burden, lifestyle restrictions, and concerns regarding future health. Studies indicate that individuals with higher self-efficacy experience lower levels of emotional distress and demonstrate better psychological adaptation to chronic illness. Conversely, reduced self-efficacy has been associated with depressive symptoms, impaired illness perceptions, and diminished self-management capabilities among patients with type 2 diabetes (Derese et al., 2024; Verdecias et al., 2023).

Psychological well-being more broadly has been recognized as a significant determinant of diabetes outcomes. Mental health problems such as anxiety, depression, and chronic stress may interfere with adherence to treatment regimens and contribute to poor glycemic control. Research has demonstrated that interventions targeting psychological functioning can improve both mental health and metabolic outcomes among diabetic patients. For example, acceptance and commitment therapy, biofeedback-relaxation interventions, and other psychological approaches have been shown to reduce emotional distress and improve blood glucose regulation among individuals with diabetes (Hor & Manshaei, 2017; Seydi & Naderi, 2016; Seydi et al., 2016). Likewise, studies examining mental health, quality of life, and psychosocial adjustment among patients with type 2 diabetes have highlighted the interconnected nature of psychological functioning and disease management (Mirseififard & Moradi, 2018; Shafiei & Nasiri, 2020).

Another important consideration in diabetes management involves demographic and gender-related differences. Research suggests that men and women may differ in their psychological characteristics, health beliefs, self-management practices, and responses to chronic illness. Gender-specific differences have been reported in self-efficacy, psychosocial adjustment, and diabetes self-management behaviors, indicating that psychological predictors of glycemic control may not operate identically across demographic groups (Tseng et al., 2022). Understanding these differences is important for designing personalized interventions and identifying factors that contribute to successful disease management among diverse patient populations.

Although previous research has independently examined the roles of health locus of control and self-efficacy in diabetes outcomes, relatively few studies have simultaneously investigated their predictive contributions to blood glucose control within clinical populations. Moreover, evidence from Iranian populations remains limited, particularly among hospitalized patients with type 2 diabetes who may experience greater disease severity and more complex management challenges. Given that blood glucose control is influenced by a combination of medical, behavioral, and psychological factors, examining the relative contributions of health locus of control and self-

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efficacy may provide valuable insights into the mechanisms underlying successful diabetes management and inform the development of psychologically informed interventions.

Considering the increasing prevalence of type 2 diabetes, the substantial burden associated with poor glycemic control, and the growing recognition of psychosocial determinants of health outcomes, identifying psychological predictors of blood glucose regulation represents an important area of investigation. Health locus of control and self-efficacy are theoretically grounded constructs that have demonstrated meaningful associations with health behaviors, treatment adherence, psychological adjustment, and chronic disease outcomes. Understanding how these variables contribute to blood glucose control may help healthcare professionals develop more comprehensive and patient-centered approaches to diabetes management.

Therefore, the present study aimed to investigate the predictive role of health locus of control and self-efficacy in blood glucose control among patients with type 2 diabetes attending Amir al-Momenin Ali Hospital in Zabol.

2. Methods and Materials

2.1. Study Design and Participants

This study employed a correlational research design to investigate the predictive role of health locus of control and self-efficacy in blood glucose control among patients with type 2 diabetes. The target population consisted of all patients diagnosed with type 2 diabetes who were referred to Amir al-Momenin Ali Hospital in Zabol, Iran, during the second quarter of 2023. Based on hospital records, the average number of patients attending the hospital during this three-month period was approximately 190 individuals. According to the Morgan sampling table, a sample of 124 participants was considered adequate for the study. Therefore, 124 patients (62 men and 62 women) were selected using convenience sampling. After obtaining the necessary permissions from the relevant authorities, including the University of Medical Sciences and the hospital administration, the researchers accessed the list of hospitalized patients diagnosed with diabetes. The diagnosis of type 2 diabetes was confirmed through both medical record reviews and interviews with participants. The inclusion criteria consisted of a confirmed diagnosis of type 2 diabetes, absence of severe psychiatric disorders and other major physical illnesses, basic literacy skills sufficient to complete the questionnaires, and willingness to participate in the study through informed consent. Participants were excluded if they submitted incomplete or invalid questionnaires, had a history of substance or alcohol dependence, or were unable to understand and respond to the Persian-language assessment instruments.

2.2. Measures

The Multidimensional Health Locus of Control Scale (MHLC), developed by Wallston and colleagues in 1978, was used to assess participants' beliefs regarding the determinants of their health status. The instrument is designed to identify whether individuals perceive their health outcomes as being primarily controlled by internal factors, influential others, or chance. The scale consists of three major dimensions: Internal Health Locus of Control (IHLC), which measures the extent to which individuals believe that their own behaviors and actions influence their health; Powerful Others Health Locus of Control (PHLC), which assesses beliefs that health is controlled by significant others such as healthcare professionals or family members; and Chance Health Locus of Control (CHLC), which evaluates beliefs that health outcomes are determined by luck, fate, or chance. The MHLC includes 18 items distributed equally across the three subscales, with responses recorded on a six-point Likert scale. The questionnaire generally requires approximately 10–14 minutes to complete. Previous psychometric evaluations have demonstrated acceptable levels of reliability, with Cronbach's alpha coefficients reported for the internal, chance, and powerful others dimensions. The instrument has been widely used in health psychology research and has shown satisfactory validity for assessing health-related control beliefs in clinical populations.

The Diabetes Management Self-Efficacy Scale, developed by Vanderbilt and colleagues in 1999, was employed to evaluate participants' confidence in managing various aspects of diabetes care. The instrument contains 20 items assessing perceived capability in maintaining dietary recommendations, engaging in physical activity, adhering to prescribed medications, and monitoring blood glucose levels. Responses are rated on an 11-point Likert scale ranging from 0 ("cannot do at all") to 10 ("certainly can do"), resulting in a total possible score ranging from 0 to 200, with higher scores indicating greater diabetes self-efficacy. Factor analytic studies using varimax rotation have identified four primary dimensions within the scale, including nutrition management, physical activity, medication adherence, and blood glucose monitoring.

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Previous reliability analyses have demonstrated acceptable internal consistency and test–retest reliability across all dimensions. Validation studies conducted among Iranian patients with type 2 diabetes have reported a reliability coefficient of approximately 0.83 for the overall scale, supporting its suitability for assessing diabetes-related self-efficacy within this population.

Blood glucose control was evaluated using clinical indicators routinely employed in diabetes management, including Fasting Blood Sugar (FBS) and Blood Sugar (BS) measurements. Fasting Blood Sugar was obtained after an overnight fasting period and served as a primary indicator of glycemic regulation, with normal values generally ranging between 70 and 100 mg/dL. In addition, non-fasting Blood Sugar measurements were collected from participants' medical records. These indicators provided objective clinical measures of glycemic control and were used as the criterion variables in the predictive analyses. Lower blood glucose levels within recommended clinical ranges were considered indicative of better diabetes management and glycemic control.

2.3. Data Analysis

Data analysis was performed using the Statistical Package for the Social Sciences (SPSS), version 23. Descriptive statistics, including means, standard deviations, frequencies, and percentages, were calculated to summarize participants' demographic and study variables. Inferential statistical analyses were conducted using regression analysis to examine the predictive contributions of health locus of control and self-efficacy to blood glucose control. Regression models were employed to determine the extent to which psychological factors could explain variations in glycemic outcomes among patients with type 2 diabetes. Statistical significance was evaluated using conventional probability levels, and the results were interpreted to identify the relative predictive strength of the independent variables in explaining blood glucose control among male and female patients.

3. Findings and Results

Descriptive statistics were calculated to provide an overview of the study variables, including dimensions of health locus of control, diabetes self-efficacy, and fasting blood glucose levels among male and female patients with type 2 diabetes. The results are presented in Table 1.

Table 1

Descriptive Statistics of Health Locus of Control, Self-Efficacy, and Fasting Blood Glucose by Gender

Variable	Gender	Minimum	Maximum	Mean	SD
Internal Health Locus of Control	Male	20	30	25.06	3.01
	Female	20	29	23.53	2.53
External (Chance) Health Locus of Control	Male	22	32	26.80	3.31
	Female	20	32	26.61	3.69
Powerful Others Health Locus of Control	Male	16	26	20.77	3.16
	Female	16	27	20.95	3.01
Diabetes Self-Efficacy	Male	53	103	73.70	11.12
	Female	51	94	67.40	11.62
Fasting Blood Glucose (mg/dL)	Male	140	423	242.54	54.68
	Female	178	392	258.43	49.75

As shown in Table 1, male participants reported slightly higher levels of internal health locus of control (M = 25.06, SD = 3.01) compared with female participants (M = 23.53, SD = 2.53). Mean scores for external health locus of control were relatively similar across genders. The lowest mean scores were observed for the powerful others dimension of health locus of control in both males (M = 20.77, SD = 3.16) and females (M = 20.95, SD = 3.01), suggesting a comparatively weaker tendency to attribute health outcomes to influential others such as physicians or family members. In addition, male participants demonstrated higher self-efficacy scores (M = 73.70, SD = 11.12) than female participants (M = 67.40, SD = 11.62). Regarding glycemic status, females exhibited a higher mean fasting blood glucose level (M = 258.43, SD = 49.75) than males (M = 242.54, SD = 54.68), indicating poorer blood glucose control among female participants.

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To examine the predictive role of health locus of control dimensions and self-efficacy in fasting blood glucose levels, a multiple regression analysis was conducted. The results are presented in Table 2.

Table 2

Multiple Regression Analysis Predicting Blood Glucose Control from Health Locus of Control and Self-Efficacy

Predictor	β	t	p
Internal Health Locus of Control	-0.496	-6.19	< .001
Chance Health Locus of Control	-0.105	-1.54	.120
Powerful Others Health Locus of Control	0.021	0.31	.750
Diabetes Self-Efficacy	-0.730	-6.88	< .001

Model Statistics: $R^2 = .459$, $F(4,119) = 25.21$, $p < .001$

The overall regression model was statistically significant, $F(4,119) = 25.21$, $p < .001$, accounting for 45.9% of the variance in fasting blood glucose levels ($R^2 = .459$). Among the predictor variables, internal health locus of control emerged as a significant negative predictor of blood glucose levels ($\beta = -0.496$, $t = -6.19$, $p < .001$), indicating that patients who perceived greater personal control over their health tended to report lower blood glucose levels. Diabetes self-efficacy also significantly predicted blood glucose control ($\beta = -0.730$, $t = -6.88$, $p < .001$), demonstrating that higher confidence in diabetes self-management was associated with better glycemic outcomes. In contrast, chance health locus of control ($\beta = -0.105$, $t = -1.54$, $p = .120$) and powerful others health locus of control ($\beta = 0.021$, $t = 0.31$, $p = .750$) did not significantly contribute to the prediction of blood glucose levels. These findings indicate that personal beliefs regarding self-control over health and confidence in diabetes management play a substantial role in predicting glycemic control among patients with type 2 diabetes.

4. Discussion and Conclusion

The present study aimed to investigate the predictive role of health locus of control and self-efficacy in blood glucose control among patients with type 2 diabetes. The findings demonstrated that the overall regression model was statistically significant and that psychological variables explained a substantial proportion of the variance in fasting blood glucose levels. Specifically, internal health locus of control and self-efficacy emerged as significant predictors of blood glucose control, whereas chance health locus of control and powerful others health locus of control did not significantly predict glycemic outcomes. Furthermore, separate analyses by gender revealed that internal health locus of control significantly predicted blood glucose levels among both men and women, while self-efficacy independently accounted for a considerable proportion of variance in blood glucose control in both groups. These findings underscore the importance of psychological determinants in diabetes management and suggest that patients' beliefs regarding personal control and their confidence in managing diabetes play critical roles in achieving favorable glycemic outcomes.

One of the most important findings of the study was the significant negative association between internal health locus of control and blood glucose levels. Patients who believed that their health outcomes were largely influenced by their own behaviors and actions tended to exhibit lower fasting blood glucose levels. This finding is consistent with the theoretical foundations of health locus of control, which propose that individuals with stronger internal control beliefs are more likely to assume responsibility for their health, engage in preventive behaviors, and adhere to treatment recommendations. Individuals who perceive themselves as active agents in managing their health are generally more motivated to monitor their symptoms, follow dietary restrictions, participate in physical activity, and comply with medical advice. Consequently, these behaviors contribute to improved metabolic outcomes and better glycemic control (Fathabadi et al., 2018; Nazem Siddiqi et al., 2023).

The observed relationship between internal health locus of control and blood glucose regulation aligns with previous studies conducted in both health and chronic disease contexts. Research has consistently shown that individuals with stronger internal control beliefs exhibit healthier lifestyles, greater adherence to treatment protocols, and better health outcomes compared with individuals who attribute health outcomes to external factors. Studies examining health locus of control among patients with chronic conditions have reported similar findings, indicating that internal control beliefs facilitate adaptive coping

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strategies and enhance patients' willingness to engage in self-management behaviors (Mohammadchenari et al., 2022; Vasu & Pang, 2024). Likewise, Fathabadi and colleagues reported that health locus of control significantly contributes to predicting diabetes risk and health-oriented lifestyle behaviors, supporting the notion that beliefs about personal control are closely linked to diabetes-related outcomes (Fathabadi et al., 2018).

Another notable finding was that chance health locus of control and powerful others health locus of control did not significantly predict blood glucose levels. This result suggests that merely believing that health outcomes are determined by luck, fate, healthcare providers, or other influential individuals may not be sufficient to influence glycemic regulation. Although healthcare professionals undoubtedly play an important role in diabetes management, successful control of blood glucose requires continuous self-regulation and active patient involvement in daily disease management. Patients who rely predominantly on external factors may be less likely to develop the personal responsibility and behavioral consistency necessary for long-term diabetes control. Similar conclusions have been reported in studies examining external locus of control, where reliance on chance or external agents was associated with reduced engagement in health-promoting behaviors and weaker treatment adherence (Poodat, 2016; Yousefi Salekdeh et al., 2023).

The results also demonstrated that self-efficacy was the strongest predictor of blood glucose control in the overall regression model. Patients with higher levels of diabetes-related self-efficacy exhibited significantly lower blood glucose levels, indicating superior glycemic management. This finding is highly consistent with Bandura's social cognitive theory, which emphasizes that individuals' beliefs about their capabilities strongly influence their motivation, persistence, and behavioral performance. Diabetes management requires the execution of numerous complex behaviors on a daily basis, including medication adherence, dietary regulation, exercise participation, blood glucose monitoring, and symptom management. Individuals who believe they possess the necessary skills and abilities to perform these behaviors successfully are more likely to maintain effective self-care practices over time, ultimately leading to improved metabolic outcomes (Hosseinzadeh Bandaghiri et al., 2018; Rahmani Dolatabad et al., 2016).

The present findings corroborate extensive empirical evidence regarding the role of self-efficacy in diabetes management. Previous studies have consistently identified self-efficacy as a central determinant of self-care behaviors, treatment adherence, and quality of life among patients with type 2 diabetes. Lee and colleagues demonstrated that self-efficacy functions as a key mechanism linking health literacy with self-care activities and health-related quality of life among diabetic patients (Lee et al., 2016). Similarly, recent research has revealed that self-efficacy mediates the relationship between diabetes self-management abilities and patient activation, indicating that confidence in one's abilities enhances engagement in disease management behaviors and contributes to better health outcomes (Zhang et al., 2023). Furthermore, Li and colleagues found that self-efficacy exerts both direct and indirect effects on quality of life through health literacy, emphasizing the central role of self-efficacy in diabetes adaptation and management (Li et al., 2025).

The findings are also consistent with intervention studies that have demonstrated the effectiveness of programs aimed at improving self-efficacy among diabetic patients. Educational and behavioral interventions that enhance patients' confidence in managing their disease have been shown to improve adherence to treatment regimens, increase self-care activities, and reduce glycemic indicators. For example, diabetes self-management education programs have been found to significantly strengthen self-efficacy and facilitate more effective disease control among individuals with diabetes (Zulkarnaini et al., 2022). Similarly, research examining self-care behaviors among diabetic patients has highlighted self-efficacy as one of the strongest predictors of successful self-management and health maintenance (Mohammadi Manesh et al., 2025).

Another important aspect of the findings concerns the relationship between psychological functioning and metabolic control. The present study supports the growing body of literature suggesting that psychological variables influence not only emotional well-being but also physiological health outcomes. Diabetes management is inherently stressful and requires continuous behavioral effort. Patients with low self-efficacy or limited perceptions of personal control may experience feelings of helplessness, frustration, and reduced motivation, which can interfere with effective disease management. Conversely, individuals who possess strong self-efficacy beliefs and internal control orientations may be more resilient when facing challenges and setbacks associated with chronic disease management. Such individuals are more likely to persist in health-promoting behaviors despite obstacles, resulting in

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improved glycemic outcomes over time (Derese et al., 2024; Verdecias et al., 2023).

The current findings are also consistent with studies emphasizing the importance of psychological well-being in diabetes care. Previous investigations have demonstrated significant associations between mental health, emotional adjustment, and blood glucose regulation. For example, psychological interventions such as acceptance and commitment therapy and biofeedback-relaxation techniques have been shown to improve psychological functioning while simultaneously reducing blood glucose levels among diabetic patients (Hor & Manshaei, 2017; Seydi & Naderi, 2016; Seydi et al., 2016). These findings suggest that cognitive and emotional factors may influence physiological outcomes through their impact on treatment adherence, self-care behaviors, and stress regulation. Furthermore, studies examining quality of life and psychological well-being among patients with type 2 diabetes have highlighted the significant contribution of psychological resources, including self-efficacy, to successful disease adaptation (Mirseififard & Moradi, 2018; Shafiei & Nasiri, 2020).

The gender-specific analyses conducted in the present study revealed that both internal health locus of control and self-efficacy significantly predicted blood glucose control among men and women. Although some differences in explanatory power were observed across genders, the overall pattern of findings was remarkably consistent. These results suggest that the beneficial effects of internal control beliefs and self-efficacy are not limited to a specific gender group but rather represent universal psychological resources that support effective diabetes management. This finding is compatible with previous research indicating that despite gender differences in psychosocial experiences and self-management behaviors, self-efficacy remains an important determinant of diabetes outcomes across demographic groups (Tseng et al., 2022).

The descriptive findings of the present study also provide meaningful insights. The comparatively lower scores observed for the powerful others dimension of health locus of control may suggest reduced reliance on healthcare providers or external support systems among hospitalized diabetic patients. Such a pattern could indicate limited engagement with professional recommendations or a tendency to view disease management as independent of external guidance. While this interpretation should be approached cautiously, it highlights the importance of strengthening collaborative relationships between patients and healthcare providers to promote treatment adherence and effective self-management. Previous diabetes control programs have emphasized the importance of patient education, healthcare support, and active participation in disease management for improving glycemic outcomes (Akbari Kamrani, 2018; Alirezaei Shahraki & Akbari Kamrani, 2018).

Overall, the findings of the present study provide strong support for the importance of psychological variables in understanding diabetes outcomes. The results indicate that internal health locus of control and self-efficacy are significant predictors of blood glucose control and suggest that patients who perceive greater personal control over their health and possess stronger confidence in their ability to manage diabetes are more likely to achieve favorable glycemic outcomes. These findings contribute to the growing literature emphasizing the integration of psychological assessment and intervention within comprehensive diabetes care programs and highlight the need for healthcare providers to address cognitive and motivational factors alongside traditional medical treatment approaches.

Several limitations should be considered when interpreting the findings of this study. First, the cross-sectional correlational design prevents the establishment of causal relationships between the study variables. Second, the use of convenience sampling from a single hospital limits the generalizability of the findings to broader populations of patients with type 2 diabetes. Third, self-report questionnaires were used to assess health locus of control and self-efficacy, which may be influenced by social desirability bias and response inaccuracies. In addition, other potentially influential factors such as duration of illness, socioeconomic status, treatment adherence, family support, and comorbid psychological conditions were not controlled and may have affected blood glucose outcomes.

Future studies should employ longitudinal and experimental designs to clarify the causal mechanisms linking health locus of control, self-efficacy, and glycemic control. Researchers are encouraged to investigate additional psychosocial variables such as resilience, coping strategies, diabetes distress, health literacy, and social support as potential mediators or moderators of these relationships. Comparative studies involving different age groups, cultural backgrounds, and healthcare settings would further enhance understanding of the psychological determinants of diabetes management. Moreover, intervention-based research examining the effectiveness of programs designed to

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strengthen internal health locus of control and self-efficacy may provide valuable evidence for clinical practice.

Healthcare professionals should incorporate psychological assessment into routine diabetes care and identify patients with low self-efficacy or weak perceptions of personal control over health outcomes. Educational programs should be designed to strengthen patients' confidence in managing their condition and to encourage greater personal responsibility for health-related behaviors. Diabetes management interventions should include components aimed at enhancing problem-solving skills, goal setting, self-monitoring, and behavioral self-regulation. In addition, multidisciplinary healthcare teams should provide ongoing support and counseling to help patients develop the psychological resources necessary for effective long-term disease management and improved glycemic control.

Authors' Contributions

All authors significantly contributed to this study.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

In this study, to observe ethical considerations, participants were informed about the goals and importance of the research before the start of the interview and participated in the research with informed consent.

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