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Medical adherence in relationship with illness perception and self-control: Patients with type 2 diabetes

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Abstract

Introduction: Effective management of type 2 diabetes largely depends on patients' adherence to treatment recommendations, including medication use, dietary guidelines, physical activity, and blood glucose monitoring. However, adherence is not solely a behavioral matter; it is also significantly influenced by psychological factors, particularly patients' perceptions of their illness and their capacity for self-regulation. This study aimed to examine the relationship between treatment adherence, illness perception, and self-control in patients with type 2 diabetes.

Materials and Methods: This descriptive-correlational study was conducted among 270 patients with type 2 diabetes who attended healthcare centers in District 4 of Tehran between 2022 and 2023. Participants were selected through the convenience sampling method. The research instruments included the Illness Perception Questionnaire, the Treatment Adherence Scale, and the Self-Control Scale. We analyzed the data using Pearson correlation coefficients, multiple regression analyses, and SPSS version 22.

Results: The findings showed that several dimensions of illness perception—such as timeline, treatment control, self-control, concern, and emotional representation—significantly predicted treatment adherence and collectively accounted for 51% of its variance. In addition, self-control was found to be a significant positive predictor, explaining 37% of the variance in treatment adherence, underscoring its essential role in maintaining consistent health-related behaviors.

Conclusion: These results highlight the critical influence of psychological factors in the management of type 2 diabetes. Interventions designed to improve treatment adherence should incorporate components that strengthen self-control and positively reshape patients' perceptions of their illness to enhance health outcomes.

Keywords: Illness perception, Self-control, Treatment adherence, Type 2 diabetes

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Introduction

Diabetes is a heterogeneous group of metabolic disorders characterized by chronic hyperglycemia and impairments in the metabolism of carbohydrates, fats, and proteins (1). Given the absence of a definitive cure for diabetes, the primary goal of treatment is to maintain blood glucose levels within a healthy range (2). In this context, treatment adherence plays a crucial role in disease management.

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However, a substantial proportion of patients with diabetes fail to fully comply with treatment recommendations (3). Although adherence is often regarded as a clinical or behavioral issue, a growing body of research highlights the influence of cognitive, emotional, and psychological factors in the development, regulation, and management of chronic illnesses such as diabetes (4). In recent years, several theoretical frameworks have been developed to explain how patients cope with chronic diseases. Among them, the Common-Sense Model (CSM) has gained prominence (5). According to the CSM, patients' beliefs about their illness—formed through personal experiences, cultural background, and social context—directly influence their health-related behaviors, including adherence to treatment (6). Kim et al. have shown that better illness perception is associated with greater adherence (7).

One key dimension of the CSM is the concept of control. To further clarify its role, Swayer et al. (8) proposed a distinction between personal control (the belief in one's ability to influence the disease) and treatment control (the belief in the effectiveness of medical treatment). These beliefs shape how patients engage with their treatment plans (9). Self-control builds ability to resist immediate temptations in favor of long-term health benefits is particularly critical in the self-management of diabetes. Mortelmans and Goossens confirmed self-control is related to higher adherence (10). Meanwhile Zada et al. showed relationship between illness perception with adherence (11). Considering that recognizing, processing, and responding to health threats are essential for both daily functioning and long-term survival, improving treatment outcomes requires a better understanding of the psychological barriers to adherence (11). Therefore, the present study aimed to examine the relationships between illness perception, self-control, and treatment adherence in patients with type 2 diabetes.

Materials and Methods

The statistical population of this descriptive-correlational study included all patients with type 2 diabetes who referred to medical centers in District 4 of Tehran during the years 2022-2023. Based on James Stevens' recommendation for determining adequate sample size in correlational studies—suggesting a minimum of 15 participants per predictor variable—a sample size of 270 was considered appropriate for the present study (12).

Participants were selected using the convenience sampling from among individuals with type 2 diabetes who attended medical centers in the second half of 2023. Inclusion criteria were: (a) age between 18 and 60 years, (b) confirmed diagnosis of type 2 diabetes by an endocrinologist, (c) at least one year since diagnosis, (d) absence of any chronic disease other than diabetes, (e) no self-reported psychiatric disorders, (f) no current treatment for other physical or psychological conditions, (g) at least a middle school education, and (h) no history of substance abuse. Individuals who were unwilling to participate or submitted incomplete or invalid questionnaires were excluded from the study.

Research instruments

A) Illness Perception Questionnaire (IPQ): This scale assesses patients' cognitive and emotional representations of illness. Broadbent et al. reported a Cronbach's alpha of 0.80 and test-retest reliability over a 6-week period ranging from 0.42 to 0.75 across subscales. Concurrent validity with the Revised Illness Perception Questionnaire (IPQ-R) showed subscale correlations ranging from 0.32 to 0.63 among patients with asthma, diabetes, and renal disease (13). In a localized Iranian validation study, content validity was confirmed by expert review (including university professors and clinical specialists), and the internal consistency was found to be 0.87 (14). In the current study, Cronbach's alpha for the total scale was 0.90.

B) Self-Control Scale – Short Form of Tangney: This scale was developed by Tangney et al. in 2004 to assess self-control as a stable personality trait. The short form demonstrated good psychometric properties. In their standardization study, the authors administered the scale to two independent samples, reporting Cronbach's alpha coefficients of 0.83 and 0.85, respectively (15). In an Iranian study by Sarfaraz (2012), the internal consistency of the scale was also confirmed, with a Cronbach's alpha of 0.80. Subscale reliability was reported as 0.74 for the emotional stability dimension and 0.68 for the discipline dimension (16). In the present study, the Cronbach's alpha coefficient for the total score was 0.88, indicating good internal consistency.

C) Treatment Adherence Questionnaire: This instrument consists of 40 items rated on a 5-point Likert scale ranging from "strongly disagree" to "strongly agree." The total score ranges from 0 to 200, with higher scores indicating greater adherence to treatment. In a study by Seyed Fatemi, Rafiei, Hajizadeh, and Modanloo, the Content Validity Index (CVI) was confirmed, and factor analysis supported the construct validity. All subscales demonstrated Cronbach's alpha coefficients above 0.70 (14). In the present study, the Cronbach's alpha coefficient for the total scale was calculated to be 0.81, indicating acceptable reliability. We used descriptive statistics, Pearson correlation coefficients, multiple regression analyses, and SPSS version 26 for data analysis.

Results

An analysis of demographic characteristics showed that the majority of participants (59.3%) held a high school diploma. Additionally, 10% had completed middle school education, 25.9% held a bachelor's degree, and 4.8% had a higher level of education. In terms of gender, 58.9% of participants were women and 41.1% were men. The majority of participants were married (92%), while 3.7% were single and 4.1% were divorced. The mean age of the participants was 50.81 years (SD= 5.76), and the mean duration of illness was 4.87 years (SD= 2.45). Descriptive statistics for the study variables, including self-control and its subcomponents—impulse control, healthy habits, attention and focus, avoidance of risky behaviors, emotional regulation, and overall self-control—are presented in Table 1. To verify the assumptions for correlation analysis, the normality of data distribution was examined using both skewness and kurtosis values and the Kolmogorov-Smirnov test. All skewness and kurtosis values fell within the acceptable range of -2 to +2, and the Kolmogorov-Smirnov test results confirmed that the data followed a normal distribution.

Table 1. Descriptive indexes

Variable	Mean	SD	Skewness	Kurtosis
Illness perception	63.34	14.59	-0.19	-0.80
Consequences	6.77	2.80	0.16	-0.78
Timeline	8.32	3.61	-0.79	0.29
Self-control	7.90	3.44	.06	-0.84
Treatment control	6.59	2.82	0.07	-0.69
Worry	8.25	3.54	0.07	-0.65
Emotional representations	12.43	2.51	0.06	-0.50
Illness understanding	7.73	3.12	0.09	0.89
Causes	8.04	2.56	-0.80	-0.20
Medical adherence	121.55	7.90	0.14	0.93
Total self-control	37.67	10.47	-0.83	-0.28

Table 2. Pearson correlation between variables

Variable	1	2	3	4	5	6	7	8	9	10
Illness perception	1									
Consequences	0.64*									
Timeline	0.57*	0.42*								
Self-control	0.63*	0.47*	0.30*							
Treatment control	0.74*	0.46*	0.34*	0.67*						
Worry	0.74*	0.46*	0.36*	0.57*	0.90*					
Emotional representations	0.71*	0.48*	0.49*	0.38*	0.49*	0.62*				
Illness understanding	0.33*	0.30*	031*	0.43*	0.47*	0.38*	0.43*			
Causes	0.64*	0.37	0.34*	0.35*	0.47*	0.55*	0.86*	-0.38*		
Medical adherence	-0.60*	-0.62*	-0.41*	-0.40*	-0.45*	-0.51*	-0.56	-0.26*	-0.48*	
Total self-control	-0.58*	-0.49*	-0.53*	-0.60*	-0.59*	-0.62*	-0.49*	-0.41-	-0.69*	0.62*

As shown in Table 2, illness perception was significantly and negatively correlated with treatment adherence (r= -0.60). Significant negative correlations were also observed between treatment adherence and the subdimensions of illness perception, including

duration (r= -0.62), personal control (r= -0.41), treatment control (r= -0.40), nature and concern (r= -0.45), illness coherence (r= -0.51), emotional representation (r= -0.56), and perceived cause of illness (r= -0.26). These findings suggest that higher illness perception scores are associated with lower levels of treatment adherence. To examine the independence of residuals—a key assumption in regression analysis—the Durbin-Watson statistic was calculated. The value obtained was 1.89, which falls within the acceptable range of 1.5 to 2.5, indicating that this assumption was met. Regression analysis results (Table 3) indicated that the subscales of illness perception collectively explained 49% of the variance in treatment adherence. In the first step, outcomes alone accounted for 39% of the variance. By adding emotional representation in the second step, the explained variance increased to 48%. In the third step, the inclusion of illness coherence further increased the explained variance to 49%. These results show that illness perception components are significant predictors of treatment adherence. Among all predictors, the outcomes variable was the strongest, with a standardized beta coefficient (β) of -0.62, indicating a strong negative predictive effect. The standardized (β) and unstandardized (B) coefficients show how much treatment adherence scores change with a one-unit change in the predictor variables.

Table 3. Regression of medical adherence prediction according illness perception

Variable	R	AR2	F	β	t
Model 1 Consequences	0.62	0.39	175.64	-0.62	-13.25*
Model 2					
Consequences	0.69	0.48	126.47	-0.46	-9.21*
emotional representations				-0.34	-6.86*
Model 3					
Consequences				-0.43	-8.40*
emotional representations	0.70	0.49	88.18	-0.27	-4.67*
Illness understanding				-0.14	-2.54*

*P<0.05

Table 4. Regression table medical adherence prediction according self-control

Variable	R	AR2	F	β	t
Self-control	0.61	0.37	161.16	0.61	-12.71*

*P<0.05

Discussion

This study aimed to investigate the relationship between treatment adherence, illness perception, and self-control in patients with type 2 diabetes. The results indicated a significant association between illness perception and treatment adherence. Specifically, patients who perceived their illness more negatively (e.g., as more threatening or less controllable) reported lower adherence to treatment. These findings are consistent with prior research. For example, Al-Harbi et al. (17), in a descriptive study conducted in Saudi Arabia involving 365 patients with type 2 diabetes, found that individuals with lower medication adherence perceived the consequences of the illness more severely and reported stronger emotional reactions. Conversely, patients with higher adherence reported a greater sense of personal control, stronger beliefs in the effectiveness of treatment, and a better cognitive understanding of their disease. Similarly, Zada et al. (11), in a study of 385 patients with various chronic conditions hospitalized in Islamabad, explored the relationship between illness perception, self-care, and treatment adherence. Their findings suggested that positive illness perceptions and a hopeful outlook were associated with higher adherence to treatment regimens. Zhao et al. also reported consistent results in a study of 202 Chinese women with breast cancer. They concluded that illness perception influenced medication adherence both directly and indirectly through beliefs about medications. These studies support the notion that how individuals perceive their illness significantly affects their health-related behaviors (18).

The present findings can be explained within the framework of the self-regulation model of illness, also known as the common-sense model or Leventhal's model. According to this model, individuals form cognitive and emotional

representations of their illness, which guide their coping strategies and adherence behaviors. For example, patients who correctly recognize the symptoms of diabetes (e.g., fatigue, excessive thirst) are more likely to engage in appropriate treatment behaviors. Those who perceive the illness as controllable—especially through lifestyle changes such as diet or physical activity—are more motivated to adhere to treatment recommendations. Furthermore, understanding diabetes as a chronic illness with serious long-term consequences may increase patients' motivation to maintain consistent self-care behaviors. Believing that the disease is manageable and that treatment is effective can also foster a greater sense of personal responsibility and long-term commitment to health. The results also demonstrated a significant positive relationship between self-control and treatment adherence. This finding is consistent with previous research. In Belgium, Mortelmans et al. (10) conducted a study on patients discharged with multi-drug therapy and concluded that enhanced self-management was significantly associated with better adherence to treatment protocols. Similarly, in Iraq, Alwatify (19) examined 189 patients with type 2 diabetes and reported that self-control plays a fundamental role in facilitating treatment adherence. These findings can be interpreted through the lens of several psychological theories. One relevant framework is self-determination theory, which emphasizes the role of intrinsic and extrinsic motivation. According to this theory, individuals who possess strong intrinsic motivation—driven by feelings of competence, autonomy, and relatedness—are more likely to engage in health-promoting behaviors, including adherence to treatment. Self-control may serve as a regulatory mechanism that supports intrinsic motivation by enabling individuals to purposefully manage their treatment-related behaviors. Additionally, social cognitive theory also offers a useful perspective. This theory highlights the importance of self-efficacy—the belief in one's ability to execute specific behaviors—in managing health outcomes. Individuals with higher self-control typically exhibit greater emotional regulation and stress management, which are crucial for sustained adherence to treatment. These skills enhance one's capacity to monitor, plan, and follow through with complex treatment regimens, especially in chronic conditions like diabetes.

Conclusion

These results highlight the critical influence of psychological factors in the management of type 2 diabetes. Interventions designed to improve treatment adherence should incorporate components that strengthen self-control and positively reshape patients' perceptions of their illness to enhance health outcomes.

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Conflict of Interest

The authors declare that they have no conflicts of interest.

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Ethical Considerations

Participants were provided with comprehensive information about the purpose, procedures, and objectives of the study. Written informed consent was obtained from all participants prior to data collection. All necessary measures were taken to ensure the privacy and confidentiality of the participants' information throughout the study. This article is derived from the doctoral dissertation of the first author. The study was approved by the Ethics Committee of Islamic Azad University, Roudehen Branch.

Code of Ethics

IR.IAU.REC.1401-043

Authors' Contributions

All authors contributed equally to the writing of this manuscript. Kajal Rashidi and Farah Lotfi Kashani were responsible for designing the research and preparing the methodology. Kajal Rashidi collected the data. Shahram Vaziri supervised the data analysis process.

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