A Structural Model to Explain Quality of Life Based on Early Maladaptive Schemas and the Mediating Role of Self-Care in Female Patients with Type 2 Diabetes

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A r t i c l e   I n f o

A B S T R A C T

Objective: The objective of this study was to propose a structural model explaining the quality of life based on early maladaptive schemas and the mediating role of self-care in female patients with type 2 diabetes.

Methods: This descriptive-correlational study employed structural equation modeling. The statistical population included all female patients with type 2 diabetes in Tehran who visited medical centers in 2021. The sample consisted of 250 female patients with type 2 diabetes from Tehran in 2021, selected through convenience sampling based on inclusion and exclusion criteria. Data were collected using the short form of the World Health Organization Quality of Life Questionnaire (WHO, 1996), the short form of the Young Schema Questionnaire (Young, 1998), and the Diabetes Self-Care Activities Questionnaire (Toobert et al., 2000). Data analysis was conducted using structural equation modeling and Pearson correlation methods with SPSS.22 and AMOS.22 software.

Findings: Fit indices indicated a good fit of the proposed model with the data: PCFI = 0.655, PNFI = 0.661, CMIN/DF = 2.90, RMSEA = 0.089, IFI = 0.917, CFI = 0.914, GFI = 0.903. The highest coefficient (-0.47) was related to the pathway from the domain of impaired autonomy and performance to quality of life. The determination coefficient for the marital relationship quality variable in the proposed structural model was 0.889, indicating that exogenous variables could predict 89% of the changes in quality of life, which is considered strong.

Conclusion: It can be concluded that the structural model explaining quality of life based on early maladaptive schemas and the mediating role of self-care in female patients with type 2 diabetes was well-fitted.

Keywords: quality of life, early maladaptive schemas, self-care, diabetes.

1. Introduction

Diabetes is a significant health challenge that extensively affects the daily lives of patients (Lingvay et al., 2022). The growing prevalence of this chronic disease demands special attention; the World Health Organization has termed it a silent epidemic (Gurung et al., 2020). In 2018, diabetes affected approximately 382 million people worldwide, and this number is expected to rise to 592 million by 2035. In Iran, the prevalence was reported at 9.9% in 2018 and is predicted to reach 10.1% by 2035 (Cannon et al., 2020). Given the increasing prevalence of diabetes in Iran, studying this disease in Iranian patients is crucial (Esmaeil Ian et al., 2023). Diabetes is a chronic condition that impacts all aspects of a person's life, and its management requires fundamental lifestyle changes (Pitt et al., 2021).

Living with diabetes presents numerous daily challenges, such as daily insulin injections, dietary restrictions, regular exercise, and frequent monitoring of biochemical markers for patients and their families (Enayati Shabkolai et al., 2023). The chronic nature of this disease imposes a significant financial burden on individuals, families, and society. Additionally, complications such as peripheral neuropathy, nephropathy, heart attacks, peripheral vascular problems, depression, and amputations lead to high disability and mortality rates, and can even reduce patients' life expectancy and quality of life (Goli, 2024; Nazari et al., 2023). Inadequate control of diabetes decreases quality of life and places a substantial burden on global public health, leading to death, disability, and significant economic costs (Rahimi et al., 2023).

In the past decade, health psychology has focused on the pathology and risk factors of poor mental and physical health in diabetes, demonstrating that chronic diseases are closely associated with individual characteristics and psychological qualities. One of the most critical psychological components related to physical health and chronic diseases is schemas (Rada et al., 2022). Early maladaptive schemas are the oldest and deepest cognitive components, consisting of unconditional beliefs and feelings about ourselves, formed from the interaction of a child's innate temperament with dysfunctional experiences with parents, siblings, and peers in early life. These schemas serve as patterns for processing subsequent experiences (Khanjari & Khajevand, 2020). Early damaging experiences, such as unmet needs, victimization, excessive need satisfaction, and identification with significant others, contribute to the formation of early maladaptive schemas (Afsar et al., 2023).

Diabetic patients face numerous physical and psychological problems such as depression, anxiety, disability, inactivity, and obesity, ultimately leading to a reduced quality of life. Therefore, quality of life is of particular importance in diabetes and its treatment (Prajapati et al., 2018). Quality of life is defined as individuals' and groups' perceptions and feelings that their needs are met and that they have opportunities to achieve their goals and desires. It is a multidimensional intrinsic factor combining cognitive aspects (satisfaction) and feelings of happiness. The World Health Organization defines it as each individual's perception of their life, values, goals, standards, and personal interests (Thiel et al., 2017).

One variable that improves the condition of patients with type 2 diabetes is self-care behaviors (Mogre et al., 2019). Appropriate self-care behaviors enhance capabilities, better daily activities, and independence, making patients more capable of social functions and more hopeful for life, ultimately leading to a better quality of life (Mutyambizi et al., 2020). Patient education aims to empower them by providing necessary information about diabetes and self-care skills, enabling them to make important health decisions. Education is part of the nursing group's duties and an essential factor for patients to improve quality of life and reduce treatment costs (Guo et al., 2021). Therefore, this study aimed to propose a structural model explaining the quality of life based on early maladaptive schemas and the mediating role of self-care in female patients with type 2 diabetes.

2. Methods

2.1. Study design and Participant

This study employed a descriptive-correlational research design utilizing structural equation modeling. The statistical population included all female patients with type 2 diabetes in Tehran who visited medical centers in 2021. The sample consisted of 250 female patients with type 2 diabetes from Tehran in 2021, selected through convenience sampling based on inclusion and exclusion criteria. According to Klein, if structural equation modeling is used, approximately 15 samples are needed for each observable variable. Additionally, a minimum sample size of 200 is defensible (Klein, 1998). The criteria for selecting participants included a diagnosis of type 2 diabetes by a specialist, being female, aged 30 to 50 years, having an A1C level of less than 9, a minimum of one year of diabetes history, an education level from diploma to master's degree, and no chronic diseases or

psychological disorders as confirmed by a psychologist. Failure to answer all questionnaire items and lack of cooperation were considered exclusion criteria.

In this study, initial negotiations were conducted with medical centers in Tehran. After obtaining the necessary approvals and signing ethical agreements, participants were selected. Participants were informed about the overall process and, if they agreed to participate, were provided with initial information about the study. They then completed the research questionnaires. Ethical considerations included: 1) providing participants with written information about the study, with voluntary participation, 2) assuring participants that all information would be confidential and used for research purposes, and 3) maintaining privacy by not recording participants' names.

2.2.   Measures

2.2.1.   Quality of Life

The short form of the World Health Organization Quality of Life Questionnaire consists of 26 items assessing four dimensions of quality of life: physical health, psychological health, social relationships, and environmental health (WHO, 1996). The reliability of the scale, as reported by its developers, showed a Cronbach's alpha coefficient ranging from 0.73 to 0.89 for the four subscales and the overall scale. In Iran, Nasiri and Razaviyeh (2006) translated this scale into Persian and reported its validity and reliability, with a Cronbach's alpha coefficient of 0.84 indicating good internal consistency (Abdi, 2024; Mirzaian Gizehroud et al., 2022; Parsaiezadeh et al., 2024). In this study, the questionnaire's reliability was reported with a Cronbach's alpha coefficient ranging from 0.72 to 0.85 for the four subscales and the overall scale.

2.2.2.   Early Maladaptive Schemas

Young Schema Questionnaire (Short Form): This is a subset of 75 items from the original 205-item version developed by Young in 1998 to measure early maladaptive schemas. The questionnaire uses a Likert scale ranging from 1 to 6. In the first comprehensive study, Young, Klosko, and Weishaar (1986) reported Cronbach's alpha coefficients

ranging from 0.83 to 0.96 for each early maladaptive schema and test-retest reliability coefficients from 0.53 to 0.82 in a non-clinical population. The questionnaire was standardized in Iran by Ahi, Mohammadi-Far, and Basharat at Tehran universities, with internal consistency measured by Cronbach's alpha coefficients of 0.97 for women and 0.98 for men (Hadiyan et al., 2023; Lotfihaqiqat et al., 2021). In this study, the reliability of the questionnaire was reported with Cronbach's alpha coefficients ranging from 0.76 to 0.82.

2.2.3.   Self-Care

Developed by Toobert and colleagues in 2000, this questionnaire consists of 10 items assessing self-care activities in areas such as diet, physical activity, medication use, blood glucose monitoring, foot care, and non-smoking for diabetes. The items are scored on an eight-point Likert scale from 0 to 8, with higher scores indicating better self-care behaviors. The content validity of the instrument was confirmed, and its reliability was calculated with a Cronbach's alpha coefficient of 0.68 (Jano & Mamodkhan, 2019). In Iran, Borhani-Nejad et al. (2017) reported a Cronbach's alpha coefficient of 0.77 for its reliability (Rezvani et al., 2022; Sidi et al., 2022). In this study, the questionnaire's reliability was reported with a Cronbach's alpha coefficient of 0.79.

2.3.   Data Analysis

Descriptive statistics such as mean and standard deviation were used to organize and summarize the data. Inferential statistics, including structural equation modeling and Pearson correlation methods, were used for data analysis with SPSS.22 and AMOS.22 software.

3.   Findings and Results

In this study, 250 women with diabetes, with an average age of 42.08 years and a standard deviation of 5.25 within the age range of 35-50 years, were examined. Table 1 reports the descriptive statistics (mean, standard deviation, skewness, and kurtosis) of the research variables.

Table 1

Descriptive Statistics (Mean and Standard Deviation) of Research Variables (N=250)

Variable	Mean	Standard Deviation	Range	Skewness	Kurtosis
Quality of Life	69.10	16.02	26-130	0.143	0.411
Self-Care Behaviors	35.47	13.02	3-70	-0.342	-0.069
Domain of Disconnection and Rejection	86.44	26.58	25-150	0.016	-0.060
Domain of Impaired Autonomy and Performance	67.75	16.79	20-120	0.016	-0.060
Domain of Various Constraints	35.83	9.77	10-60	-0.073	-0.390
Domain of Other-Directedness	47.18	10.08	13-58	0.153	0.666
Domain of Over-Vigilance and Inhibition	34.57	7.79	10-59	0.020	1.101

According to Table 1, since the skewness and kurtosis values of all research variables are between -2 and 2, it can be concluded that the data follow a normal distribution.

Table 2 shows the Pearson correlation coefficients between the research variables.

Table 2

Correlation Matrix Between Predictor, Mediator, and Dependent Variables in the Proposed Research Model

Research Variables	1	2	3	4	5	6	7
Quality of Life	1						
Self-Care Behaviors	0.47**	1					
Domain of Disconnection and Rejection	-0.80**	-0.48**	1				
Domain of Impaired Autonomy and Performance	-0.34**	-0.14**	-0.43**	1			
Domain of Various Constraints	-0.71**	-0.32**	-0.67**	-0.48**	1		
Domain of Other-Directedness	-0.67**	-0.47**	-0.73**	-0.21**	-0.41**	1	
Domain of Over-Vigilance and Inhibition	-0.67**	-0.25**	-0.47**	-0.37**	-0.73**	-0.37**	1

**p < .01

Fit indices indicated a good fit of the proposed model with the data: PCFI = 0.655, PNFI = 0.661, CMIN/DF = 2.90, RMSEA = 0.089, IFI = 0.917, CFI = 0.914, GFI = 0.903. Therefore, the proposed model has a desirable fit.

The highest coefficient (-0.47) was related to the pathway from the domain of impaired autonomy and performance to quality of life, and the lowest coefficient (-0.11) was related to the pathway from the domain of other-directedness to

adherence to treatment. The R^2 index shows the explained variance of endogenous latent variables. Cohen (1992) described R^2 values of 0.26, 0.13, and 0.02 as strong, medium, and weak in structural equations, respectively. The determination coefficient for the marital relationship quality variable in the proposed structural model was 0.889, indicating that exogenous variables could predict 89% of the changes in quality of life, which is strong.

Table 3

Standardized Coefficients of Direct Pathways in the Proposed Model with Mediator

Pathway	Beta	Standard Error	Critical Ratio	p
Self-Care Behaviors → Marital Relationship Quality	0.352	0.095	4.560	< 0.001
Domain of Disconnection and Rejection → Marital Relationship Quality	-0.389	0.087	-2.096	0.003
Domain of Impaired Autonomy and Performance → Marital Relationship Quality	-0.370	0.032	-2.398	0.009
Domain of Various Constraints → Marital Relationship Quality	-0.404	0.080	-2.254	0.005
Domain of Other-Directedness → Marital Relationship Quality	-0.287	0.161	-3.587	0.006
Domain of Over-Vigilance and Inhibition → Marital Relationship Quality	-0.311	0.201	-2.664	0.002
Domain of Disconnection and Rejection → Self-Care Behaviors	-0.231	0.087	-2.986	0.003
Domain of Impaired Autonomy and Performance → Self-Care Behaviors	-0.198	0.032	-2.261	0.002
Domain of Various Constraints → Self-Care Behaviors	-0.263	0.080	-3.115	0.003
Domain of Other-Directedness → Self-Care Behaviors	-0.240	0.161	-2.352	< 0.001
Domain of Over-Vigilance and Inhibition → Self-Care Behaviors	-0.192	0.201	-2.112	0.002

The results of the direct relationships of research variables in the proposed model showed that all path coefficients were statistically significant across the sample. The standardized coefficients of all paths are listed in Table 3. To examine the questions related to the direct relationships of variables, the findings of the direct hypotheses (pathways) are initially reviewed using the standardized coefficients of the paths in the final research model. According to the results, the direct effect of the domain of disconnection and rejection on quality of life is -0.404. This means that the domain of disconnection and rejection explains 40% of the variance in the quality of life variable. The direct effect of the domain of impaired autonomy and performance on quality of life is -0.287. This means that the domain of impaired autonomy and performance explains 29% of the variance in the quality of

life variable. The direct effect of the domain of various constraints on quality of life is -0.311. This means that the domain of various constraints explains 31% of the variance in the quality of life variable. According to the results, the direct effect of the domain of other-directedness on quality of life is -0.231. This means that the domain of other-directedness explains 23% of the variance in the quality of life variable. The direct effect of over-vigilance on quality of life is -0.198. This means that the domain of over-vigilance explains 20% of the variance in the quality of life variable. According to the results, the direct effect of self-care on quality of life is 0.352. This means that self-care behaviors explain 35% of the variance in the quality of life variable. Table 4 presents the results of the bootstrap method for indirect relationships in the macro program.

Table 4

Estimated Indirect Pathways in the Model Using Bootstrap

Pathway	Estimate	Upper Limit	Lower Limit	p	CI
Disconnection and Rejection → Self-Care Behaviors → Quality of Life	-0.153	-0.245	-0.132	0.016	0.95
Impaired Autonomy and Performance → Self-Care Behaviors → Quality of Life	-0.141	-0.124	-0.101	0.021	0.95
Various Constraints → Self-Care Behaviors → Quality of Life	-0.174	-0.154	-0.118	0.005	0.95
Other-Directedness → Self-Care Behaviors → Quality of Life	-0.109	-0.139	-0.098	0.043	0.95
Over-Vigilance and Inhibition → Self-Care Behaviors → Quality of Life	-0.123	-0.153	-0.089	0.038	0.95

The results showed that the indirect effect of the subscales of early maladaptive schemas on marital quality of life through self-care behaviors is significant, as the bootstrap test results for the indirect effect showed that the upper and lower bounds of this path coefficient did not include zero. Therefore, the mediating role of self-care behaviors in the present study was confirmed.

4. Discussion and Conclusion

The aim of this study was to propose a structural model explaining quality of life based on early maladaptive schemas and the mediating role of self-care in female patients with type 2 diabetes. The results of the direct relationships of research variables in the proposed model showed that all path coefficients were statistically significant across the sample. The results of this study are consistent with prior findings (Cannon et al., 2020; Foretz et al., 2019; Guo et al., 2021; Gurung et al., 2020; Lingvay et al., 2022; Mogre et al., 2019; Mutyambizi et al., 2020; Pitt et al., 2021; Prajapati et al., 2018; Rada et al., 2022; Safikhani, 2022; Thiel et al., 2017).

In explaining this finding, it can be said that the activation of early maladaptive schemas (through facing the limitations and stresses caused by the disease) produces a vast amount of negative and unpleasant emotions, leading individuals to use maladaptive coping styles to cope with the disturbed emotions caused by the activation of schemas. Since individuals feel comfortable with their schemas and need cognitive coordination, they fight for the survival and continuation of their schemas, one of the mechanisms being the use of maladaptive coping styles (Rada et al., 2022). Following the use of maladaptive coping strategies, they experience more psychological distress, reducing their quality of life. Early maladaptive schemas are related to the processes by which individuals assess and cope with stressful and problematic events. In other words, individuals with maladaptive schemas use maladaptive coping strategies (emotion-focused coping) when facing issues, resulting in a lower quality of life.

According to the results, the direct effect of the domain of disconnection and rejection, the domain of impaired autonomy and performance, various constraints, other-directedness, and over-vigilance on quality of life is

significant. This means that these domains explain the quality of life variable. The results of this study are consistent with prior studies (Aloi et al., 2020; Ashian, 2015; Roelofs et al., 2016; Saadati et al., 2017).

In explaining this finding, it can be said that some diabetic patients develop some of these schemas and maladaptive coping strategies to deal with the problems and negative life events experienced during childhood. Although schemas function well during childhood, their use in later years is maladaptive because the perception of the world is not the same as during childhood (Saadati et al., 2017). The presence of these schemas in adulthood leads to coping with problems in maladaptive ways, threatening individuals' well-being and quality of life. The activation of early schemas leads to negative evaluations of events and interpretations of stimuli as negative and threatening. This causes individuals to negatively evaluate stressful situations and their ability to cope with them, resulting in involvement in a passive and maladaptive coping strategy (such as emotion-focused coping) (Mutyambizi et al., 2020). Individuals use maladaptive coping strategies when they perceive the stressful situation as uncontrollable and unmodifiable. On the other hand, the activation of early maladaptive schemas produces a vast amount of negative and unpleasant emotions, leading individuals to use maladaptive coping styles to cope with the disturbed emotions caused by the activation of schemas. Since individuals feel comfortable with their schemas and need cognitive coordination, they fight for the survival and continuation of their schemas, one of the mechanisms being the use of maladaptive coping styles. Following the use of maladaptive coping strategies, they experience more psychological distress, reducing their psychological quality of life. Thus, early maladaptive schemas result in a lower psychological quality of life by forcing individuals to use maladaptive coping strategies (emotion-focused coping). Individuals with maladaptive schemas expect their need for security and affection to be unmet, and they may protect themselves from feelings of rejection and insecurity through an ineffective coping strategy, contributing to their lower psychological quality of life.

According to the results, the direct effect of self-care on quality of life is significant. This means that self-care behaviors explain the quality of life variable. The results of this study are consistent with prior findings (Ahmadi & Valizadeh, 2021; Aliakbari dehkordi et al., 2021; Chin et al., 2021; da Rocha et al., 2020; Durante et al., 2019; Eydi et al., 2020; Freedland et al., 2015; Hekmatpour et al., 2019; Jalali et al., 2023; Khoshkhoo et al., 2021; Mahdi et al., 2016; Motamedi & Taherian, 2022; Riegel & Dickson, 2008; Salimi et al., 2015; Solhi et al., 2017).

In explaining this finding, it can be said that, based on previous research, the main principle in self-care is the patient's participation and acceptance of responsibility so that many complications of the disease can be controlled through self-care behaviors. As a result, self-care activities can lead individuals toward maintaining health and well-being, increasing their adaptation, and reducing disability and treatment costs. Health promotion seeks to improve health conditions to enhance the quality of life as desired by individuals. One factor that can contribute to this is self-care in patients (Aliakbari dehkordi et al., 2021). Self-care is a self-learned regulatory function in humans based on individuals' ability to perform self-care activities. Self-care is a strategy to cope with life events and stresses, leading to healthy aging and independence. These behaviors include specific activities that alleviate disease symptoms and maintain and promote patients' health. Thus, self-care behaviors significantly impact patients' quality of life (da Rocha et al., 2020). Therefore, self-care behaviors affect patients' quality of life. Moreover, based on the findings of this study, it can be said that enhancing self-care behaviors, such as regular and proper exercise, taking medications, following a regular diet, and adhering to specialists' recommendations, can significantly reduce the progression of the disease and potential risks, alleviate patients' pain, and improve their physical function and role performance at work or home, thus relating self-care behaviors to quality of life.

5.   Suggestions and Limitations

The results of this study are limited to all diabetic patients in Tehran and may not be generalizable to diabetic patients in other regions. The lack of sufficient research in this area in our country posed a challenge for this study. The complexity and abundance of the dimensions of the research variables, and consequently the large number of questionnaire items, led to fatigue and frustration among some respondents. The cross-sectional and non-experimental nature of this study is a limitation that restricts causal conclusions. Another limitation of the present study is the self-report nature of the tools used. Future studies should consider the role of negative life stressors, as understanding the various pathways leading to quality of life within the stress-vulnerability framework is essential.

Qualitative research in this area is also recommended. Since health literacy results from education and learning, health education through media and the internet is suggested. Media, as the most accessible communication tool, plays a significant role in promoting health and self-care behaviors and adherence to treatment through health promotion programs and education. Based on the findings of this study, understanding health concepts in improving self-care and adherence to treatment and coping strategies in patients with type 2 diabetes is crucial. Therefore, it is suggested that health organizations provide readable, understandable, and relevant educational resources on health and healthy lifestyles for the community, utilizing health information to empower individuals, especially diabetic patients, in health and treatment. It is also recommended that educational organizations and institutions create opportunities to enhance self-care, adherence to treatment, and coping strategies in patients with type 2 diabetes, with the necessary planning and financial support, to increase public health literacy and provide health information to the general public, thereby empowering individuals in decision-making and maintaining health.

Authors' Contributions

Authors contributed equally to this study and it was derived from the doctoral thesis of the first author.

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

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

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