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Structural Model of Quality of Life Based on Early Maladaptive Schemas and the Mediating Role of Self-Care in Women with Type 2 Diabetes

Faezeh. Sarabi Hosseinzadeh[1], Gholamreza. Sharifirad[2*], Nader. Monirpour[3]

[1] PhD Student, Department of Psychology, Qom Branch, Islamic Azad University, Qom, Iran
[2] Professor, Department of Psychology, Qom Branch, Islamic Azad University, Qom, Iran
[3] Associate Professor, Department of Psychology, Qom Branch, Islamic Azad University, Qom, Iran

*** Corresponding author email address**: dr.sharifirad@gmail.com

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A B S T R A C T

Objective: The aim of the present study was to explain the structural model of quality of life based on early maladaptive schemas and the mediating role of self-care in women with type 2 diabetes.

Methods: This research is classified as descriptive-correlational using structural equation modeling. The statistical population included all women with type 2 diabetes in Tehran who visited healthcare centers during 2021. The sample comprised 350 women with type 2 diabetes in Tehran in 2021, selected through convenience sampling based on inclusion and exclusion criteria. Data were collected using the World Health Organization Quality of Life Brief Questionnaire, the Young Schema Questionnaire-Short Form, and the Diabetes Self-Care Activities Questionnaire. Data were analyzed using structural equation modeling and Pearson correlation statistical methods with SPSS.22 and AMOS.22 software.

Findings: The results showed the fit indices were PCFI=0.655, PNFI=0.661, CMIN/DF=2.90, RMSEA=0.089, IFI=0.917, CFI=0.914, and GFI=0.903, indicating a good fit of the proposed model with the data. The highest coefficient (-0.47) was attributed to the pathway from the domain of impaired autonomy and performance to quality of life.

Conclusion: The coefficient of determination for the quality of marital relationship variable in the proposed structural model was 0.889, indicating that exogenous variables could predict 89% of the variations in quality of life, which is a strong prediction.

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

1. Introduction

Diabetes is a significant health challenge that widely affects the daily lives of those afflicted (Lingvay et al., 2022). The rising trend of this chronic disease requires special attention; the World Health Organization has referred to it as a silent epidemic (Gurung et al., 2020). In 2018, diabetes affected approximately 382 million people worldwide, and it is expected that by 2035, this number will increase to 592 million. In Iran, the prevalence of diabetes was reported to be 9.9% in 2018, with projections indicating it will rise to 10.1% by 2035 (Cannon Christopher et al.,

2020). Given the increasing prevalence of diabetes in Iran, examining the disease in patients within the country is of great importance. Diabetes is a chronic disease that affects all aspects of an individual's life, and its management and control require fundamental changes in the patient's lifestyle (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. The chronic nature of this disease imposes a significant financial burden on the individual, family, and society. Additionally, complications such as peripheral neuropathy, nephropathy, heart attack, peripheral vascular problems, depression, and amputations result in high disability and mortality rates, potentially reducing patients' life expectancy and quality of life (Divers, 2020). Indeed, poor diabetes control significantly reduces quality of life, imposing a substantial burden on global public health, leading to death, disability, and considerable economic costs (Foretz et al., 2019).

In the past decade, health psychology has focused on the pathology and risk factors associated with poor physical and mental health in diabetes. It has been shown that chronic diseases are closely related to individual characteristics and psychological qualities, with schemas being one of the most important psychological components associated with physical health and chronic diseases (Rada et al., 2022). Early maladaptive schemas are the oldest and deepest cognitive components, consisting of unconditional beliefs and feelings about oneself, arising from the interaction of the child's inherent temperament with dysfunctional experiences with parents, siblings, and peers during early life. These schemas serve as patterns for processing subsequent experiences. Early adverse experiences such as unmet needs, being victimized or harmed, excessive need gratification, and identification with significant others lead to the formation of early maladaptive schemas (Rada et al., 2022).

Diabetic patients face numerous physical and psychological issues such as depression, anxiety, disability, inactivity, and obesity, ultimately leading to a reduced quality of life. Consequently, in the context of diabetes and its treatment, quality of life holds special significance (Prajapati et al., 2018). Quality of life is defined as individuals' and groups' perceptions and feelings that their needs are met, and they have opportunities to achieve their desires and goals. It is an intrinsic multidimensional factor, combining cognitive factors (satisfaction) and feelings of happiness. The World Health Organization defines it as each individual's perception of their life, values, goals, standards, and 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 activity performance, and independence in the patient, making them more capable in social functions, more hopeful for life, and ultimately enjoying a better quality of life (Mutyambizi et al., 2020). Educating the patient aims to empower them by providing necessary information about diabetes and self-care skills, enabling them to make important health decisions. Patient education is part of the nursing group's duties and an essential factor for the patient to improve quality of life and reduce treatment costs (Guo et al., 2021). The aim of the present study was to explain the structural model of quality of life based on early maladaptive schemas and the mediating role of self-care in women with type 2 diabetes.

2. Methods

2.1. Study Design and Participants

This research is classified as descriptive-correlational using structural equation modeling. The statistical population included all women with type 2 diabetes in Tehran who visited healthcare centers during 2021. The sample comprised 200 women with type 2 diabetes in 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 required for each observed variable. Additionally, a minimum sample size of 200 is defensible (Klein, 1998). In this study, 20 observed variables were examined, and based on Klein's theoretical foundations for sample selection, 15 samples were considered for each component, requiring 200 subjects. The criterion for selecting obese individuals in this study was the diagnosis of type 2 diabetes by a specialist physician. Inclusion criteria were: diagnosis of type 2 diabetes based on a physician's diagnosis, age range between 30 and 50 years, A1C level less than 9, at least one year of diabetes history, education level from high school diploma to master's degree, and no chronic diseases or psychological disorders confirmed by a psychologist. Failure to respond to all questionnaire items and lack of cooperation were considered exclusion criteria.

In the present study, initial negotiations were conducted with Tehran healthcare centers, and after obtaining the consent of the center authorities and receiving permission

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and signing an ethical contract by the researcher, the sample group members were selected. Participants were then provided with general explanations about the study process, and if they agreed to participate in the research, they were given initial information about the study, and the research project questionnaires were distributed for completion. Ethical considerations for the study included: 1) All individuals received written information about the research and participated willingly. 2) Participants were assured that all information was confidential and used only for research purposes. 3) To maintain privacy, participants' names and surnames were not recorded.

2.2. Measures

2.2.1. Quality of Life

This questionnaire has 26 items that assess four dimensions of individuals' quality of life, including physical health, psychological health, social relationships, and environmental factors (World Health Organization, 1996). Regarding scale reliability, the results reported by the creators of the WHO Quality of Life scale indicated Cronbach's alpha coefficients between 0.73 and 0.89 for the four subscales and the entire scale. In Iran, Nasiri and Razavi (2006) translated this scale into Persian and reported its validity and reliability. The Cronbach's alpha coefficient of 0.84 indicated good internal consistency (Mirzaian Gizehroud et al., 2022; Tayebmanesh & Saadati, 2023). In this study, the reliability of this questionnaire was reported using Cronbach's alpha between 0.72 and 0.85 for the four subscales and the entire scale.

2.2.2. Early Maladaptive Schemas

A subset with 75 items from the 205-item original version was developed by Young in 1998 to measure early maladaptive schemas. This questionnaire is based on a Likert scale, with responses ranging from 1 to 6. In the first comprehensive study, Young, Klosko, and Weishar (1986) reported Cronbach's alpha coefficients for each early maladaptive schema between 0.83 and 0.96 and test-retest reliability in a nonclinical population between 0.53 and 0.82. The normalization of this questionnaire in Iran was conducted by Ahi, Mohammadi Far, and Besharat at Tehran universities; internal consistency using Cronbach's alpha was 0.97 for women and 0.98 for men (Razavi, 2024; Sara Aman Alah Khani, 2024). In this study, the reliability of this questionnaire was reported using Cronbach's alpha between 0.76 and 0.82.

2.2.3. Self-Care

This questionnaire was developed by Tobert et al. in 2000 with 10 items to assess self-care activities in areas such as nutrition, physical activity, medication use, blood sugar monitoring, foot care, and non-smoking regarding diabetes. Items are scored on an eight-point Likert scale from zero to eight, with higher scores indicating more self-care behaviors. The content validity of the tool was confirmed, and its reliability was calculated using Cronbach's alpha, resulting in a coefficient of 0.68. In Iran, Borhani Nejad et al. (2017) reported its reliability using Cronbach's alpha as 0.77 (Pourhossein et al., 2024; Sidi et al., 2022). In this study, the reliability of this questionnaire was reported using Cronbach's alpha as 0.79.

2.3. Data analysis

In this study, descriptive statistics such as mean and standard deviation were used to organize, summarize, and describe the characteristics of the subjects and research variables. In inferential statistics, structural equation modeling and Pearson correlation statistical methods were used for data analysis with SPSS.22 and AMOS.22 software.

3. Findings and Results

In this study, 200 women with diabetes, with a mean age of 42.08 years and a standard deviation of 5.25, were examined within the age range of 35-50 years. 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 the Research Variables (N = 200)

Variable	Mean	SD	Min-Max	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

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Domain of Impaired Autonomy and Performance	67.75	16.79	20-120	0.016	-0.060
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

Based on the contents of Table 1, considering that the skewness and kurtosis values of all research variables are between -2 and 2, it can be concluded that the data are normally distributed. Table 2 shows the Pearson correlation information between the research variables.

Table 2

Correlation Matrix between Predictor, Mediator, and Dependent Variables in the Proposed 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 Other-Directedness	-0.71	-0.32	-0.67	-0.48	1		
Domain of Over-Vigilance and Inhibition	-0.67	-0.47	-0.73	-0.21	-0.41	1	
Domain of Other-Directedness	-0.67	-0.25	-0.47	-0.37	-0.73	-0.37	1

p<0.01 for all correlations

The model fit indices showed that PCFI=0.655, PNFI=0.661, CMIN/DF=2.90, RMSEA=0.089, IFI=0.917, CFI=0.914, and GFI=0.903 indicate a good fit of the proposed model with the data. Therefore, the proposed model has a good fit. Table 3 shows the parameters (standardized coefficients) related to the direct effects of variables on each other in the proposed research model. The highest coefficient (-0.47) is assigned to the pathway from the domain of impaired autonomy and performance to quality of life, and the lowest coefficient (-0.11) belongs to the pathway from other-directedness to treatment adherence. The R^2 index shows the amount of explained variance of endogenous latent variables. Cohen (1992) described R^2 values of 0.26, 0.13, and 0.02 in structural equations as strong, medium, and weak, respectively. The coefficient of determination for the quality of marital relationship variable in the proposed structural model is 0.889, indicating that exogenous variables can predict 89% of the changes in quality of life, which is a strong prediction. The results of the direct relationships between research variables in the proposed model show that all path coefficients were statistically significant in the overall sample.

Table 3

Standardized Coefficients of Pathways in the Proposed Model with Mediator

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

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To examine the questions related to direct relationships between variables, using the standardized path coefficients in the final research model, the findings of the direct hypotheses (paths) are first reviewed. 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 impaired limitations on quality of life is -0.311. This means that the domain of impaired limitations explains 31% of the variance in the quality of life variable. According to the results in Table 4-6, 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 vigilance on quality of life is -0.198. This means that the domain of vigilance explains 20% of the variance in the quality of life variable. According to the results in Table 3, 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.

4. Discussion and Conclusion

The aim of the present study was to explain the structural model of quality of life based on early maladaptive schemas and the mediating role of self-care in women with type 2 diabetes. The results of the direct relationships between research variables in the proposed model show that all path coefficients were statistically significant in the overall sample. The results of the present study are consistent with the prior findings (Ahmadi et al., 2019; Aloi et al., 2020; Ashian, 2015; Rada et al., 2022; Saadati et al., 2017).

In explaining this finding, it can be said that chronic diseases, including diabetes, have complex origins, gradual onset, and unpredictable severity and improvement, requiring patient participation in self-care. This disease is associated with numerous short-term and long-term complications, many of which are irreversible. The morbidity and mortality caused by these complications are major health and treatment issues worldwide, leading to a focus on investing in diabetes control (Mogre et al., 2019; Mutyambizi et al., 2020). Keeping blood sugar levels optimal is the foundation of diabetes care and reduces the occurrence of diabetes complications. The International Diabetes Federation recommends that patients use self-care and treatment adherence measures for optimal blood sugar control. These measures include following a healthy diet, taking medications regularly, regular physical activity, and blood sugar monitoring. Therefore, educating these patients about self-care to reduce disease-related problems seems essential, and if the patient does not want or is unable to control their disease, no assistance can be provided (Thiel et al., 2017). Self-care in diabetes is one of the most important factors for controlling the disease. Empowerment and acceptance of the situation are personality factors that affect patients' conditions and increase their ability to cope with problems, including diseases. According to the research conducted, the most important factor underlying the mortality of diabetic patients is the lack of self-care (Pitt et al., 2021). On the other hand, these individuals' perceived ability to cope with stress is low. Thus, when faced with a disease like diabetes, instead of focusing on effective behaviors for disease control and preventing complications, such as following the doctor's recommendations regarding self-care behaviors and lifestyle changes, they focus on the symptoms of the disease and its negative consequences, leading to a kind of mental preoccupation that, through increased stress and anxiety, reduced physical activity, and increased risky behaviors such as overeating and alcohol and smoking consumption, reduces their quality of life by avoiding social relationships.

Diabetic patients who use problem-focused coping strategies typically take responsibility for solving problems when faced with stressful situations, seek accurate information about the problem, ask for help from others when needed, and have an optimistic outlook on getting things done and solving problems. Therefore, they experience lower levels of diabetes-related stress (Guo et al., 2021; Gurung et al., 2020). Consequently, choosing a problem-focused coping style in response to disease-related stress can reduce the psychological stress impact on the mental health of diabetic patients and lead to reduced disease stress. Diabetic patients who use problem-focused strategies approach this disease realistically and logically. These individuals utilize past experiences, are more realistic, and are more likely to gather information and consult with others to solve their problems, which helps them adapt to the disease (Divers, 2020; Foretz et al., 2019). According to research in this field, individuals who use problem-focused coping strategies think more about positive aspects rather than negative and dark aspects, which likely helps them

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strengthen their adaptive spirit and reduce stress caused by diabetes.

Additionally, it can be said that the activation of early maladaptive schemas (through facing the limitations and stresses caused by the disease) generates a vast amount of negative and unpleasant emotions, and individuals use maladaptive coping styles to deal with the disturbed emotions caused by schema activation. Since individuals feel comfortable with their schemas and need cognitive coherence, they fight for the survival and continuation of their schema, and one of the mechanisms they use is maladaptive coping style (Rada et al., 2022). As a result of using maladaptive coping strategies, they experience more psychological distress, and their quality of life decreases. Early maladaptive schemas are related to the processes by which individuals evaluate and cope with stressful and problematic events. In other words, individuals with maladaptive schemas use maladaptive (emotion-focused) coping strategies when faced with problems, leading to a lower quality of life.

Based on the results, the direct effect of the domain of disconnection and rejection, the domain of impaired autonomy and performance, impaired limitations, other-directedness, and vigilance on quality of life is significant. This means that the domain of disconnection and rejection, the domain of impaired autonomy and performance, impaired limitations, other-directedness, and vigilance explain the quality of life variable. The results of this study are consistent with the prior research (Dickhaut & Arntz, 2014; Giesen-Bloo et al., 2006; Goli et al., 2016; Kaveh et al., 2011; Kindynis et al., 2013; Mohammad Nezhady & Rabiei, 2015; Pourjaberi et al., 2023; Pourzabih et al., 2016; Ramezani et al., 2023; Roelofs et al., 2015; Roelofs et al., 2016).

In explaining this finding, it can be said that some diabetic patients develop some of these schemas and maladaptive coping strategies to face problems and negative life events during childhood. Although schemas function well in childhood, their use in later years is maladaptive because the perception of the world is not similar to childhood (Mohammad Nezhady & Rabiei, 2015). The presence of these schemas in adulthood leads to maladaptive ways of coping with problems and threatens adaptive ways of well-being and quality of life. The activation of primary schemas leads to negative evaluations of events and the interpretation of stimuli as negative and threatening. This causes individuals to negatively evaluate the stressful situation and their ability to cope with it, leading them to engage in a passive and maladaptive coping strategy (such as emotion-focused coping) (Roelofs et al., 2016). Individuals use maladaptive coping strategies when they perceive the stressful situation as uncontrollable. On the other hand, the activation of early maladaptive schemas generates a vast amount of negative and unpleasant emotions, and individuals use maladaptive coping styles to deal with the disturbed emotions caused by schema activation. Since individuals feel comfortable with their schemas and need cognitive coherence, they fight for the survival and continuation of their schema, and one of the mechanisms they use is maladaptive coping style. As a result of using maladaptive coping strategies, they experience more psychological distress, and their psychological quality of life decreases. Thus, early maladaptive schemas result in lower psychological quality of life by compelling individuals to use maladaptive coping strategies (emotion-focused coping). Individuals with maladaptive schemas expect their needs for security and love to be unmet, and they may protect themselves against feelings of rejection and insecurity through an ineffective coping strategy, which contributes to their lower psychological quality of life.

Based on 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 the previous research (Alho et al., 2022; Aliakbari dehkordi et al., 2021; da Rocha et al., 2020; Jalali et al., 2023; Mahdi et al., 2016; Nagelkerk et al., 2006; Schmitt et al., 2014; Solhi et al., 2017).

In explaining this finding, it can be said that, according to previous research, the main principle in self-care is the patient's participation and acceptance of responsibility to control many disease complications through self-care behaviors. Consequently, self-care activities can lead to better health and well-being, increase individual adaptability, and reduce 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 influence this is self-care in patients (da Rocha et al., 2020). Self-care is a strategy for adapting to life events and stress that leads to healthy aging and independence. These behaviors include specific activities through which disease symptoms are alleviated, and patients' health can be maintained and improved. Thus, self-care behaviors significantly impact patients' quality of life (Solhi et al., 2017). Accordingly, it affects the quality of life of patients. Also, based on the results of this study, enhancing self-care behaviors such as regular and proper exercise,

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taking medications, following a regular diet, and adhering to specialist recommendations can significantly reduce disease progression and potential risks for the individual, alleviate patients' pain, and improve their physical function and role performance at work or home. Therefore, self-care behaviors are related 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 areas. The lack of sufficient research in this field in our country complicated the study. The complexity and abundance of research variables and the resulting large number of questionnaire items caused some subjects to feel tired and frustrated during their responses. The cross-sectional and non-experimental nature of this study is one of the research limitations that restrict causal conclusions. Another limitation of this study is the self-report nature of the tools used. Considering the role of negative life stressors in future studies is suggested because it can help understand the various ways and pathways leading to quality of life within the stress-vulnerability model framework. It is recommended to conduct qualitative research in this area as well. Considering that health literacy results from literacy, education, and learning, health education through media and the Internet is suggested. Media, as the most widely used communication tools, with their health promotion programs and education on self-care behaviors and treatment adherence, play a significant role in promoting a healthy lifestyle and changing behavioral patterns. Based on the findings of this study, understanding health concepts in improving self-care and treatment adherence and coping strategies in patients with type 2 diabetes is of great importance. It is suggested that health organizations provide readable, easy-to-understand, and relevant educational resources on health and healthy living topics for the community. Using health information, they can control the health of the community, especially diabetic patients, thus empowering individuals in health and treatment. In line with the present study, it is also suggested that educational organizations and institutions create opportunities to enhance self-care, treatment adherence, and coping strategies in patients with type 2 diabetes and plan necessary measures, including financial support, to increase public culture regarding health literacy and provide health information to the general public, thereby strengthening individuals in decision-making and health maintenance.

Authors' Contributions

All authors have contributed significantly to the research process and the development of the manuscript. This article is derived from the first author's doctoral dissertation.

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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