





## *The Role of Self-Efficacy, Hardiness, and Coping Strategies in Predicting Self-Care Behaviors in Patients with Type 2 Diabetes*

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### Abstract

**Background:** Diabetes is a chronic disease that, without proper care, leads to a rise in blood sugar and, in the long term, disrupts the functions of various tissues and organs of the body. Therefore, self-care seems to be particularly important to reduce the injuries associated with this disease.

**Objectives:** The aim of this study was to investigate the role of coping strategies, self-efficacy, and hardiness in predicting self-care behaviors in patients with type 2 diabetes.

**Methods:** This was a descriptive-correlational study. The statistical population of this study included all patients with type 2 diabetes referred to medical centers in Khomeini Shahr, Isfahan-Iran, among whom 200 subjects were selected by convenience sampling. For data collection, Niknami (2013) self-care, Kubasa (1976) hardiness, Scherer self-efficacy, and Lazarus and Folkman coping strategies questionnaires were used. Data analysis was performed using stepwise multiple regression using SPSS software version 26.

**Results:** The mean (SD) age of the participants was 48.54 (7.62) years, and women constituted 72% of the participants. The results showed that self-efficacy (53%,  $p=0.001$ ) and hardiness (31%,  $p=0.008$ ) had the largest shares in explaining self-care behaviors of patients with type 2 diabetes. The results also showed that coping strategies did not significantly influence the self-care behaviors of patients with type 2 diabetes ( $p<0.05$ ), so it was excluded from the model.

**Conclusion:** According to our findings, self-care behaviors of diabetic patients can be improved by boosting their hardiness and self-efficacy.

**Keywords:** coping strategies, self-care, self-efficacy, hardiness, type 2 diabetes

### Introduction

Diabetes is a chronic disease that, without proper management of blood sugar, can inflict long-term damages to the body and disturb the function of various tissues and organs [1]. More than 90% of the people with diabetes suffer from type 2 diabetes [2], which is one of the most concerning diseases of the 21<sup>st</sup> century, leading to serious social consequences [3]. The disease has long-term complications such as cardiac problems,

cerebral complications, peripheral vascular injury, retinal and eye injuries, kidney damage, autonomic nervous system problems, depression, and amputation (as the strongest predictor of death in patients with type 1 diabetes) [4].

Mental disorders are seen in a considerable ratio of hospitalized patients and are common in patients with diabetes as well [5]. Mental disorders in patients with chronic health conditions are associated with poor quality of life,

lack of cooperation with the health system, and inappropriate use of health services [6]. Self-care, self-efficacy, and adaptation are among the most important indicators of mental health in diabetes patients, so it is necessary for these patients to take appropriate measures to cope with these problems. Diabetic patients have low adherence to dietary and therapeutic regimens and poor control on blood sugar, as well as physical and mental performance, and experience more physical complications and higher rates of referrals to emergency departments and hospitalization. They also spend higher costs on mental health [7]. Evidence shows that the occurrence of complications of diabetes is higher in patients with lower adherence to self-care behaviors and vice versa [8-10].

Diabetes requires special self-care behaviors for patients' entire lifetime [11]. Self-care improves quality of life and metabolic control, minimizes diabetes-associated complications [12], and reduces hospitalization rates and treatment costs. Self-care behaviors encompass taking a healthy diet, engaging in exercise activities, adhering to therapeutic regimens, blood sugar self-monitoring, and foot care [13,14]. Inadequate attention to self-care behaviors leads to an increase in the complications of the disease in patients with diabetes, so adhering to appropriate self-care behaviors can reduce the risk of cardiovascular complications in these patients [15]. Self-care behaviors are effective in controlling blood sugar and managing diabetes complications [16], and poor adherence to self-care behaviors can be considered to be the most important factor predisposing diabetic patients to death [15,17]. Among the factors associated with self-care behaviors are stress coping strategies.

Psychological stress results from the perception and evaluation of an organism from the possible damage caused by exposure to motivating environmental experiences. When people perceive that the environmental demands around them are beyond their own coping capabilities, they may encounter stress. In the psychological models of stress, it is emphasized that events only affect the people who perceive them stressful [18]. If all our needs were met automatically, life would be really easy, but in reality, numerous personal and environmental barriers deprive us of this ideal situation [19,20]. Such barriers require us to adapt

to them, which could lead to stress. Generally, people must feel a little bit of mental pressure in order to properly work and strive. When people's initial attempts to cope with a problem fail, their anxiety increases along with a decrease in the flexibility of their efforts, making other solutions to the problem to be overlooked. For example, a cautious person may become more cautious and eventually withdraw, and an aggressive person may lose control and fearlessly smash everything [21].

It should be noted that patients' participation in the treatment process and their adherence to appropriate self-care behaviors are among the effective factors improving the quality of life and leading to the adaptation of appropriate stress coping strategies. The term self-care has received much attention due to changes in disease patterns from acute to chronic, the change of ideology from treatment to prevention, as well as limited economic resources and to shorten the length of hospitalization. The prevalence of chronic diseases such as diabetes, cardiovascular diseases, and cancer is increasing, especially with age, leading to problems for health care institutions. Therefore, promoting self-care capability is one of the main objectives of treating patients with diabetes [22,23]. Self-efficacy is another important factor for strengthening self-care behaviors in patients with chronic diseases, especially diabetes, enabling them to acquire self-care skills and improve their comfort, functional abilities, and disease course [24-26].

As another factor, it seems that patients' hardiness to be effective in performing self-care behaviors and adopting an appropriate stress management strategy. This parameter was also assessed in the present study. Among the factors affecting individuals' responses to life pressures and stressors, Kobasa stated that hardiness, as a personality trait, affects the relationship between stress and diseases and is one of the main factors creating individual differences in this area. Since then, numerous studies have supported the Kobasa hypothesis and shown that psychological hardiness, as a personality trait, modulates the relationship between stress and diseases. Kobasa declared hardiness as a personality trait acting as a persistence factor and a protective shield in facing life stressful events. Using existential personality theories, Kobasa defined hardiness as a

combination of beliefs about oneself and the world, consisting of the three components of commitment, control, and challenge. In fact, hardiness was perceived as a coherent structure originating from the integrated and coordinated action of these three interrelated components [27]. Commitment is defined as a feeling of the integration of many aspects of life, such as the family, work, and interpersonal relationships. A person with such a feeling has found the meaning and purpose of life, work, and the family. Control refers to the belief that life events and their consequences are predictable, controllable, and modifiable. Fighting means that one believes that change is a routine aspect of life and the fact that the positive or negative situations requiring readjustment provide an opportunity for further growth and learning and should not be seen as threats to one's safety and comfort [28]. Overall, psychological hardiness emphasizes the intrinsic experience and mental perception of humans. Stubborn people possess characteristics such as a noticeable curiosity, a desire to have meaningful experiences, and believing in the effectiveness of available tools, as well as in their own strength, capabilities, and resilience [29].

The dream of diabetes prevention can come true in the near future if adequate research is performed in the field. We see nowadays that people with type 2 diabetes face many problems in terms of self-care behaviors, self-efficacy, hardiness, and disease-related stress, making these patients more vulnerable to psychological problems compared to otherwise healthy people. Considering the role of self-care, self-efficacy, hardiness, and stress coping strategies in diabetes management, we aimed to investigate the role of coping strategies, self-efficacy, and hardiness in predicting self-care behaviors in patients with type 2 diabetes.

### Methods

The present research was a descriptive correlational study. The statistical population of this study included all patients with type 2 diabetes registered in the health centers of Khomeini Shahr in Isfahan, Iran. Among these, 200 people (calculated by G-Power software based on 5% error rate, 90% power, and an average effect size) were randomly selected and

entered the study. The following questionnaires were used to collect data.

**Self-care Behavior Questionnaire:** The self-care behavior questionnaire was developed by Naderi Magham et al. in 2013 [30] to assess self-care behaviors in Iranian patients with diabetes. This questionnaire was designed based on Bandura's theoretical structure of self-efficacy and Tobert and Glasgow self-care questionnaire [31]. This questionnaire contains 17 questions and five subscales: 1- nutrition, 2- physical activity, 3- self-monitoring of blood sugar, 4- foot care, and 5- smoking. The numbers corresponding to the questions of each subscale have been provided below. The validity of this questionnaire in Iran has been verified by Niknami et al. based on content validity and construct validity (exploratory factor analysis), indicating an acceptable validity. Also, the reliability of this questionnaire was assessed using the two methods of internal consistency and retesting. To measure the internal consistency of the questionnaire, Cronbach's alpha coefficient was used for each domain and the whole questionnaire. Cronbach's alpha coefficient of the whole questionnaire was obtained 0.85, and the questionnaire's consistency using the retesting method delivered the 0.81 value [30]. In this study, the reliability of this questionnaire based on Cronbach's alpha coefficient was calculated 0.825.

**Scherer's Self-Efficacy Questionnaire:** This scale includes 17 questions, each of which is scored on a Likert scale from strong disagreement to strong agreement. For scoring the scale, each item is assigned with a score from one to five. Questions 1, 3, 8, 9, 13, and 15 are scored from right to left, and the rest of the questions are scored in reverse. Therefore, the maximum obtainable score on this scale is 85, and the minimum score is 17. This scale has been translated into Persian and validated by Bakhtiari Barati [32]. The reliability of this scale was confirmed based on the internal consistency of questions using Cronbach's alpha coefficient (0.79) as reported in the study of Bakhtiari Barati [32]. In the present study, the reliability of the questionnaire was confirmed by Cronbach's alpha coefficient (0.75).

**Hardiness Questionnaire:** The Kubasa Personal Perspectives Questionnaire was developed by Kubasa (1976) and had 45 items. In a study

conducted by Madi (1994), Cronbach's alpha coefficients, based on the internal consistency, for each scale were as challenge: 0.71, control: 0.84, and commitment: 0.75, and the total score of hardiness: 0.88. In Iran, Elhampour and Ganji [33] examined the psychological traits of this questionnaire and verified the validity of the questionnaire using confirmatory factor analysis based on the three-factor model of commitment, control, and challenge. Also, the reliability of this scale for the commitment, control, and challenge domains was verified with the Cronbach's alpha coefficients of 0.80, 0.57, and 0.61, respectively, and for the total scale of hardiness with the Cronbach's alpha coefficient of 0.68 [33]. In the present study, Cronbach's alpha coefficients for the commitment, control, and challenge domains and the total scale were 0.782, 0.612, and 0.654, and 0.682, respectively.

**Lazarus & Folkman Stress Coping Strategies Questionnaire (CSQ):** This questionnaire contains 66 queries which are scored in a 4-point Likert scale. The questionnaire has eight subscales: 1) direct encounter; 2) keeping a distance; 3) restraint; 4) seeking social support; 5) responsibility; 6) escape-avoidance; 7) planned problem-solving; and 8) positive re-assessment. In Iran, Alipour et al. (2010) reported a reliability coefficient of 0.85 for this questionnaire, and Ghadmagahi & Dejkam [34] reported the internal consistency coefficients (Cronbach's alpha) of the questions ranging from 0.61 to 0.79. The retest validity within a four-week interval was obtained 0.59-0.83. The eight subscales presented in this

questionnaire are categorized into two classes: problem-based strategies (i.e., seeking social support, responsibility, planned problem solving, and positive re-assessment) and emotion-based strategies (direct encounter, keeping a distance, escape-avoidance, and restraint) [34]. In the present study, the reliability of this questionnaire was obtained from 0.651 to 0.782.

Descriptive statistics were used for presenting the data, and stepwise multiple regression was used to assess the goodness of fit of models using structural equation modeling (SEM) parameters and analyze hypotheses

### Results

Most of the participants in this study were women (70%), and the mean age (standard deviation) was 48.54 (7.62) years. The participants' demographic characteristics have been shown in Table 1. One of the routine methods to assess the normality of data is to calculate skewness and kurtosis. As shown in Table 2, the distribution of all variables was normal without significant skewness and kurtosis in graphs.

In this study, the distribution of all variables was normal, and the graphs of none of them showed remarkable skewness or kurtosis. Among the components of stress coping strategies, the positive re-assessment domain had the highest mean score (26.68), and the escape-avoidance domain had the lowest mean score (11.04). Table 2 shows the mean, standard deviation, and normality statistics of variables.

*Table 1: Participants' Demographic Features*

Variables	Mean	SD	P
Age	48.54	7.62	
Blood sugar	214.26	31.45	
Diabetes duration	11.23	4.78	
Gender	Frequency	Percentage	
Female	140	%70	<0.001
Male	60	%30	

Table 2: Descriptive Statistics of the Studied Variables

Variables	Mean	SD	Median	Mode	Kurtosis	Skewness	
Self-efficacy	72.03	8.81	74	75	-0.22	-0.84	
Hardiness	134.84	18.56	139	139	-1.75	0.44	
Stress coping strategies	Restraint	16.46	0.86	16	16	-0.01	-0.80
	Keeping a distance	18.54	1.65	19	19	-0.73	0.34
	Seeking social support	22.99	2.55	23	24	-0.13	-0.83
	Direct encounter	12.39	1.58	12	11	-0.14	-0.67
	Responsibility	13.16	1.51	13	13	-0.05	-1.12
	Escape-avoidance	11.04	1.94	11	10	0.43	0.74
	Positive re-assessment	26.68	2.77	28	28	-0.68	-0.94
Planned problem solving		24.36	25	24	0.18	0.68	
Self-care		70.09	71	73	0.78	0.56	

Table 3 shows the correlation matrix between the research variables. According to the findings of this study, hardiness and self-efficacy were significantly associated with self-care and its subscales ( $p < 0.05$ ). Then, since the assumptions of normality, linearity, and homogeneity of variances, the lack of multiple linearity, and independence of errors between research variables were met, stepwise multiple regression analysis was used, showing a significant multiple correlation of hardiness and self-efficacy with the

self-care domain ( $R = 0.83$ ). The  $R^2$  coefficient showed that 0.68 of the variance of self-care behaviors could be significantly predicted by self-efficacy and hardiness ( $p < 0.001$ ). Our results also showed that the self-efficacy variable with a standard beta coefficient of  $\beta = 0.53$  had the largest share (53%) in explaining the self-care behaviors of patients with type 2 diabetes, followed by hardiness ( $\beta = 0.31$ ) that predicted 31% of self-care behaviors (Table 4).

Table 3: The Correlation Matrix between Studied Variables

Variables	1	2	3	4	5	6	7	8	9	10	11
Self-efficacy	1										
Hardiness	**0.93	1									
Restraint	**0.19	**0.25	1								
Keeping a distance	-0.05	-0.06	** -0.35	1							
Seeking social support	**0.77	**0.82	**0.29	-0.06	1						
Direct encounter	*-0.15	*-0.18	-0.07	*0.17	*0.18	1					
Responsibility	**0.41	**0.30	0.01	** -0.28	**0.27	*-0.14	1				
Escape-avoidance	** -0.71	** -0.70	-0.13	0.02	** -0.60	*0.18	** -0.23	1			
Positive re-assessment	**0.81	**0.85	0.10	-0.08	**0.72	*-0.18	**0.25	** -0.57	1		
Planned problem solving	**0.82	**0.81	-0.05	-0.04	**0.64	*-0.16	**0.45	** -0.56	**0.84	1	
Self-care	**0.82	**0.80	**0.23	-0.12	**0.65	*-0.16	**0.38	** -0.58	**0.67	**0.69	1

\*are significant at .05 level

\*\*are significant at .01 level



**Table 4: Regression Coefficients for Predicting Self-care Behaviors Based on Self-efficacy, Hardiness, and Stress Coping Strategies**

Models	Non-standard coefficients		Beta standard coefficients	t	p	
	B	Standard error				
Model 1	Constant value	20.83	9.31	-	2.24	0.03
	Self-efficacy	0.74	0.04	0.82	19.28	<0.001
Model 2	Self-efficacy	0.49	0.11	0.53	4.66	0.001
	Hardiness	0.14	0.05	0.31	2.70	0.008

**R=0.83 R<sup>2</sup>=0.68 (F(174.10)=39.4,p<0.001)**

### Discussion

The aim of this study was to assess the share of self-efficacy, hardiness, and stress coping strategies in predicting self-care behaviors in patients with type 2 diabetes. Our results showed that self-efficacy and hardiness had determinant roles in predicting self-care behaviors; however, coping strategies did not have noticeable roles in predicting these behaviors. The results of numerous studies support the findings of the present study [35-42], but Collins et al. [43] and Lee et al. [44] have declared conflicting results.

Collins et al. [35], in their qualitative review-based study, noted that in terms of disease coping strategies, patients could be divided into three categories: proactive managers, passive followers, and nonconformists. Proactive managers do not see diabetes as a disease but rather a condition that should be managed. Passive followers; on the other hand, prefer a flexible framework and do not modify their dietary patterns. According to this study, patients' perceptions of self-care fall into different ranges. Actually, a personal feeling of adequacy can be effective in adhering to dietary programs, blood sugar screening tests, and regular exercises. Also, the variables of health value and self-efficacy have been effective in improving the use of self-care coping strategies.

The results of the present study showed that although stress coping strategies were significantly related with self-care, they did not show a significant role in predicting self-care behaviors, which can be due to the dominant and independent effects of self-efficacy and hardiness on such behaviors. However, the results of this study in terms of the impact of self-efficacy on self-care behaviors were in line with the results of

Collins et al. [35]. Nevertheless, self-care and stress coping strategies have different theoretical basics. On the other hand, the recent research was a qualitative study conducted through in-depth interviews, which can be considered in future studies.

In a meta-analysis by Lee et al. [36], 26 studies were evaluated, indicating that the people who used problem-based coping strategies could have had superior physical and psychological health if they were more aware of their illness and had spiritual and religious beliefs, extroverted personality, and more social support from their spouses. Similar to the study of Lee et al., our findings revealed a significant relationship between stress coping strategies and self-care behaviors. Lee et al.; on the other hand, reported that demographic variables played a significant role in predicting self-care behaviors. In this study, although a significant relationship was observed between coping strategies and self-care behaviors, self-efficacy and hardiness had more important roles in predicting self-care behaviors, so in stepwise regression analysis, the predictive share of coping strategies was eliminated.

Self-efficacy improves effective behaviors such as self-care by boosting patients' perception, capability, and confidence in their own abilities, which in turn strengthens the application of effective solutions and increases patients' resilience when dealing with a disease [45,46]. In fact, the relationship between self-efficacy and stress coping strategies leads to different self-care behaviors. Negative self-care behaviors are formed when the patient has negative emotions about and interactions with the illness. In avoidance self-care behaviors, the patient escapes

from the disease due to uncertainty about his/her coping capability against disease-associated stress. Nonetheless, when a person believes in his/her abilities and ignores negative experiences and interactions with the disease, problem-solving approaches are more likely to be used in dealing with the illness and recruiting self-care behaviors. In such situations, individuals try to increase their knowledge and information about the disease, maintain their intrinsic and extrinsic self, enter into positive interactions and relationships with others, and find a meaning for their lives. In addition, they try to reduce the stress caused by the disease, receive more support and care resources, and recruit more effective care behaviors via boosting hardiness to deal with the disease [36,47,48].

### Conclusion

Hardiness and self-efficacy are personality traits that influence recognition, competency, and the coping strategies recruited by patients. These traits, by improving patients' knowledge, provide them with more cognitive and behavioral abilities and resources, leading patients to interpret stressful situations less unpleasantly and exploit more effective coping strategies, such as problem-solving strategies, to deal with them. In such situations, patients show more desirable behaviors and are more confident in perpetrating better self-care behaviors and trying to control, commit, and fight. On the other hand, inadequate hardiness and self-efficacy lead to less confidence in one's abilities, so patients may see themselves unable to control and fight the disease. Consequently, they may perform incompatible behaviors such as avoiding and rejecting self-care behaviors.

The limitations of the present study, similar to other studies performed on specific populations, include the use of self-report questionnaires, conducting the research in a medical environment, and limitations in selecting the diabetic patients who would not refer to the center. Therefore, it is suggested that in future studies, researchers also include people who are inclined to receive treatments and avoid conducting the research in a therapeutic environment to eliminate any source of possible errors.

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### Conflict of interest

There is no conflict of interest.

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