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The Correlation between Resilience, Self-efficacy and Illness Perception in Patients with Type 2 Diabetes: A Cross-Sectional Study

ABSTRACT

Background: The present study aims to investigate the correlation between resilience, self-efficacy, and illness perception in patients with type 2 diabetes mellitus in the south of Iran.

Materials and methods: The present study is a cross-sectional work conducted on 405 patients with type 2 diabetes mellitus who were selected via convenience sampling from clinics in the south of Iran, from December 2019 to July 2020. Data were collected using a questionnaire consisting of four sections: a demographics survey, the Connor-Davidson Resilience Scale (CD-RISC), Lev's Self-efficacy Scale, and Broadbent's Brief Illness Perception Questionnaire (BIPQ). Data analysis was performed in SPSS 22 software using descriptive statistics, Pearson correlation, ANOVA, and multiple regression analysis at a p < 0.05 significance level.

Results: The results of the study showed that there were significant positive correlations between the participants' resilience and self-efficacy (r = 0.78, p < 0.001), resilience and illness perception (r = 0.57, p < 0.001), and self-efficacy and illness perception (r = 0.76, p < 0.001).

Conclusions: The findings of the present study show that there is a positive correlation between resilience and self-efficacy and illness perception in patients with type 2 diabetes mellitus. patients with diabetes who can successfully cope with the traumatic conditions caused by their illness and have confidence in their ability to perform self-care activities have a more positive view of the manageability of their condition. Therefore, healthcare policymakers and nurses can use interventions designed to enhance resilience and self-efficacy in order to improve diabetic patients' illness perception and management. (Clin Diabetol 2022, 11; 3: 175–182)

Keywords: resilience, self-efficacy, illness, perception, type 2 diabetes mellitus

Introduction

The rise in the prevalence and frequency of diabetes-related complications has turned the illness into one of the major concerns of the health care system in most societies [1]. The illness is becoming increasingly common worldwide; currently, 171 million people suf-

fer from patients with diabetes throughout the world, which number is estimated to reach 366 million by 2030 [2]. Diabetic patients in Iran account for 1.5–2% of the total population and it is estimated that the treatment costs for this illness will increase to up to 192 billion dollars by 2030 [3]. One of the aspects of the management of the illness by the patient is illness perception [4]. Illness perception is a cognitive phenomenon that describes the general mental image which people have of an illness when confronting the illness or a life-threatening situation [5]. Resilience is another effective factor in the control of patients with diabetes [6]. Research evidence suggests that poor resilience, lack of precise and continuous control of the complications of their illness, and poor self-care behaviors can significantly increase the risk of fatal diabetes complications for patients with diabetes [7]. Self-efficacy is another effective factor in the control of patients with diabetes. The concept of self-efficacy refers to one's beliefs and judgments about his/her abilities in performing tasks and responsibilities [8]. Diabetic patients with high self-efficacy have a better perception of the manageability of their illness. Moreover, patients who have a positive perception of their health status are generally more resilient [9].

Numerous studies have been conducted on patients with diabetes and self-care behaviors in diabetic patients, but there are not many studies that comprehensively examine the effects of resilience and self-efficacy on the illness perception of diabetic patients. A study of factors that affect the mental perception of patients with type 2 diabetes mellitus can help with designing evidence-based care plans and appropriate training programs for patients with diabetes control. Considering the effect of illness perception on the patients' individual behavior and illness control, as well as the role of resilience in their mental adaptation and physical health and the impact of self-efficacy on the quality of life of diabetic patients, the present study investigates the relationship between the resilience and self-efficacy of patients with type 2 diabetes mellitus and their illness perception.

Materials and methods
Study design

This is a cross-sectional study conducted on 405 patients with type 2 diabetes mellitus from the clinics affiliated with Fasa University of Medical Sciences, Fasa, Iran. The study lasted from December 2019 to July 2020. The sample size was calculated based on a pilot study on 10 diabetic patients. It was set at 347, based on following formula (considering $\alpha = 0.05$, $\beta = 0.2$, r = 0.15, effect size = 0.3).

$$N = [(Z\alpha + Z\beta)/C]^2 + 3 = 347$$
$$C = 0.5 * \ln [(1+r)/(1-r)]$$

Although several studies have been performed on diabetic patients, a study addressing the variables of resilience, self-efficacy, and illness perception in diabetic patients was not available. Therefore, the results of the pilot study were used to determine the population of the present study. Considering a 20% attrition rate, the sample size was set at 416.

Out of 416 diabetic patients, 11 partially completed the questionnaires and were thus excluded from the analysis of data. Thus, 405 of the participants completed and returned the questionnaires (response rate was 97.35%). This study was conducted at the diabetic patients' department of Vali-Asr Clinic, affiliated with Fasa University of Medical Sciences. The study population consisted of all the diabetic patients who had been referred to this center and had an active file. The eligible patients (n = 416) referred to the clinic were selected as samples by convenience method. The fourth researcher used a list of the names of the diabetic patients who had an appointment with the endocrinologist at the clinic who met the inclusion criteria. The questionnaires were completed on a self-report basis. The questionnaires of the illiterate patients were filled out by the fourth researcher based on the input of the patients, following a clear explanation of each item. The patients' blood pressure was measured by the fourth researcher using an ALPK2 mercurial sphygmomanometer and a Littmann Classic II stethoscope. All the patients were sitting when their blood pressure was being measured. To test the reliability of the sphygmomanometer, the researchers used the test-retest method: they took the blood pressure of 12 healthy individuals under equal conditions twice with a 3-minute interval. The correlation coefficient of the results was 0.98. The fourth researcher also obtained the last recorded HbA1c of the patients from their medical files. The inclusion criteria were having been diagnosed with type 2 diabetes mellitus by an endocrinologist, being willing to participate, age range of 20 to 65 years, and ability to read and write. Also, patients were excluded on the following criteria: having acute disorders such as neuropathy, diabetic ketoacidosis, having mental and psychological disorders, as well as chronic diseases including liver failure, heart failure, stroke, and cancer.

Data were gathered using a demographics survey, the Conner-Davidson Resilience Scale (CD-RISC), a self-efficacy scale, and an illness perception questionnaire.

The resilience of the subjects was measured using the CD-RISC questionnaire, developed by Conner and

Davidson in 2003. The scale consists of 25 questions scored on a 5-point Likert scale. The score range is from 0 to 100, with higher scores reflecting greater resilience. An assessment of the construct validity of the questionnaire using factor analysis has yielded five factors. Moreover, its convergent and divergent validities have been assessed in various groups [10]. The validity of the Persian version of the resilience questionnaire has been verified by a panel of experts in Iran. The questionnaire was translated into Persian (Farsi) and backtranslated into English to ensure its validity by Mohammadi et al. (2005). Construct validity and factor structure regarding the number of factors were evaluated using LISREL5/8. The indexes of normal fit Index (NFI) and goodness of fit index (GFI) confirmed the satisfactory goodness of fit of the model. Reliability was evaluated through measurement of Cronbach's alpha and Spearman-Brown's split half reliability- the former was found to be 0.669 and the latter was 0.66. [11]. In addition, in the present study, the internal consistency of the questionnaire was found to equal a Cronbach's alpha of 0.94, which confirmed the satisfactory reliability of the scale.

In order to evaluate the self-efficacy of diabetic patients, the researchers used the self-efficacy scale, developed by Lev and Owen (1996). The scale consists of 29 items scored on a 5-point Likert scale. The score ranged from 1 to 5. The validity of the questionnaire has been confirmed in a study by Lev and Owen, the exploratory factor analysis revealed that multiple dimensions of self-care self-efficacy exist and regarding its reliability, the following values of Cronbach's alpha have been reported: 0.93 [12]. This questionnaire has also been translated into Persian and backtranslated into English, and its level of consistency has been calculated. The content validity of the questionnaires was confirmed after translation by 10 faculty members. The overall reliability of the questionnaire has been verified with a Cronbach's alpha of 91%. As for the dimensions of the instrument, the following values have been obtained: stress reduction (0.79), decision making (0.8), and positive attitude (0.87). The score range of the self-care self-efficacy questionnaire was 29–145. The score range of each dimension is as follows: a positive attitude (16–80), stress (10–50), and decision making (3–15). Higher scores reflect better self-efficacy [13]. In the present study, Cronbach's alpha of the self-efficacy scale was found to be 0.9.

Brief Illness Perception Questionnaire (brief IPQ), developed by Broadbent et al. (2006), was used to assess the patients' illness perception. The questionnaire consists of 9 items. Items 1 to 8 are scored on a 10-point Likert scale (None or Very Low = 0; Low = 2–3; Medium = 4–6; Severe = 7–8; Very severe = 9–10). Question 9 is an open-ended question and patients are asked to state the important causes of their illness. Responses to item 9 are analyzed by grouping the causes and descriptive statistics. The score range is from 0 to 80, with higher scores indicating a stronger perception of being threatened by one's illness. Broadbent et al. (2006) have tested the internal reliability of the scale and reported a Cronbach's alpha of 0.89 [14]. In a study conducted to prepare the Persian version of the questionnaire, the content validity of the scale was measured according to the comments of 15 experts and the results were satisfactory. The Cronbach's alpha of the scale has been calculated to be 0.84% and the results of its test-retest reliability, with an interval of 3 weeks, have been reported to be 0.68. Evaluation of the construct validity of the Persian version of BIPQ has been executed via confirmatory factor analysis. The Kaiser-Meyer-Olkin (KMO) index is 0.70, indicating the adequacy of the sample size. The results of exploratory factor analysis (EFA) showed that two main factors (the nature and the recognition of the effect of the disease) explained 59% of the total variance [15]. In the present study, Cronbach's alpha of BIPQ was found to be 0.89. The content validity of all the three questionnaires was evaluated and verified by 7 nurses with experience in caring for diabetic patients, 2 endocrinologists, and 1 clinical psychologist.

Statistical analysis

In the present study, the collected data were analyzed using descriptive tests, Pearson's correlation, ANOVA, and multiple regression analysis in SPSS vs. 22. P-values smaller than 0.05 were considered to be statistically significant. The variables of demographics and underlying characteristics of diabetic patients, resilience, and self-efficacy, which were found to correlate with illness perception ($p < 0.25$), were entered into multiple linear regression with the backward technique. Before executing the analysis of multiple linear regressions, the researchers examined the assumptions of normality of data, homogeneity of variance, and independence of residuals.

Ethical considerations

The present study has been approved by the ethics committee of Fasa University of Medical Sciences, Fasa, Iran (Ethical code: IR.FUMS.REC.1399.015). Before completing the questionnaires, all the participants were informed about the objectives of the study. Written informed consent was obtained from all the participants. The participants were assured of anonymity and confidentiality of their information.

Table 1. The Participants' Demographic and Underlying Variables

Variable	n (%)
Gender	
Female	243 (60)
Male	162 (40)
Marital status	
Single	148 (36.5)
Married	231 (57)
Divorced	26 (6.5)
Educational level	
Illiterate	29 (7.1)
Primary	128 (31.6)
Secondary to diploma	206 (50.8)
Academic	42 (10.5)
Job	
Employed	50 (12.3)
Unemployed	165 (40.8)
Housewife	190 (46. 9)
Place of residence	
Urban	285 (70.4)
Rural	120 (29.6)
Antidiabetic drugs	
One tablet	90 (22.2)
More than one tablet	190 (46.9)
Tablet and insulin	124 (30.7)
Insulin	1 (0.2)
HbA1c	
HbA1c below 42 mmol/mol (< 6.0%)	80 (19.75)
HbA1c between 42 and 47 mmol/mol (6.0–6.4%)	198 (48.88)
HbA1c of 48 mmol/mol (≥ 6.5%)	127 (31.35)
Mean ± SD = 7.29 ± 1.01	

HbA1c — glycated hemoglobin; SD — standard deviation

Results

In the present study, 162 (40%) of the participants were male and 243 (60%) were female. The mean age of the participants was 40.08 ± 9.84 years, the mean of their disease duration was 5.66 ± 3.46 years, and their mean HbA1c was 7.29 ± 1.01. The mean SBP was 120.35 ± 22.73 and the mean DBP was 79.05 ± 12.48.

The participants' demographic and underlying characteristics are listed in Table 1.

The participants' resilience mean score, self-efficacy mean score, and illness perception mean score were found to be 87.39 ± 1.22, 118.08 ± 29.61, and 68.54 ± 2.95 respectively. The results of the correlation test showed that there were significant positive correlations between the participants' resilience and self-efficacy ($r = 0.78$, $p < 0.001$), resilience and illness perception

Table 2. The Correlations between Resilience and Self-Efficacy, Resilience and Illness Perception, and Self-Efficacy and Illness Perception

Resilience	Self-efficacy	R = 0.78	p < 0.001*
Resilience	Illness perception	R = 0.57	p < 0.001*
Self-efficacy	Illness perception	R = 0.76	p < 0.001*

*Pearson correlation coefficient

($r = 0.57$, $p < 0.001$), and self-efficacy and illness perception ($r = 0.76$, $p < 0.001$) (Tab. 2). The correlation between the participants' illness perception scores and their demographic and underlying characteristics are shown in (Tab. 3). In the present study, the relationship between resilience, self-efficacy, and the demographic and underlying characteristics of diabetic patients and their illness perception was explored. The results of regression testing showed that the variable of illness perception correlated with the following: resilience ($r = 0.3$), self-efficacy ($r = 0.5$), age ($r = 0.08$), systolic blood pressure (SBP) ($r = –0.13$), diastolic blood pressure (DBP) ($r = –0.06$), HbA1c ($r = –0.09$), gender ($r = 0.03$), use of anti-diabetic medication ($r = 0.01$), education level ($r = 0.04$), occupation ($r = 0.01$), place of residence ($r = 0.012$), duration of disease ($r = 0.05$), and regular exercise ($r = 0.03$).

The variables of resilience, self-efficacy, age, SBP, DBP, and HbA1c, which had a p-value of smaller than 0.25, were entered into multiple linear regressions with the backward technique. These variables remained in the model and accounted for about 70.81% of the changes in the illness perception variance of diabetic patients (Tab. 4).

Discussion

The present study investigated the correlation between the resilience and self-efficacy of patients with type 2 diabetes mellitus and their illness perception. Self-efficacy was found to be more significantly related to illness perception than resilience. Also, compared to demographic variables and resilience, self-efficacy is a stronger predictor of the illness perception of diabetic patients. One of the findings of the present study was that there was a significant correlation between the participants' demographic and underlying variables and their illness perception. Similarly, a study reports that there is a significant positive correlation between the demographic characteristics of diabetic patients, e.g., age and HbA1c, and their diabetes self-management [16]. The results of another study show that diabetic patients in the age range of 45–65 years have a better perception

Table 3. Correlation between the Participants' Illness Perception Scores and Demographic Characteristics

Demographic variables	Illness perception Means ± SD	P
Age		
20–29	63 ± 1.21	0.021*
30–39	72 ± 1.96	
40–49	58 ± 1.83	
> 50	45 ± 1.43	
HbA1c		
HbA1c below 42 mmol/mol (< 6.0%)	71 ± 2.12	0.025*
HbA1c between 42 and 47 mmol/mol (6.0–6.4%)	105 ± 2.86	
HbA1c of 48 mmol/mol(≥ 6.5%)	51 ± 2.12	
SBP		
Normal (90–119)	63 ± 2.76	0.031*
Elevated (120–139)	58 ± 1.54	
Stage I (140–159)	47 ± 1.32	
Stage II (> 160)	43 ± 1.78	
DBP		
Normal (60–79)	65 ± 2.32	0.034*
Elevated (80–89)	58 ± 1.61	
Stage I (90–99)	49 ± 2.14	
Stage II (> 100)	44 ± 1.87	

*ANOVA test; DBP — diastolic blood pressure; HbA1c — glycated hemoglobin; SBP — systolic blood pressure

Table 4. The Predictor Variables of Illness Perception in Patients with Type 2 Diabetes

Variable	Perception of illness				
	β	SE	Beta	t	P*
Resiliency	0.06	0.009	0.33	7.62	0.001
Self-efficacy	0.10	0.008	0.57	13.05	0.001
Age	0.002	0.003	0.08	0.82	0.008
SBP	−0.008	0.004	−0.13	−2.03	0.021
DBP	0.005	0.007	0.06	0.71	0.027
HbA1c	−0.04	0.01	−0.09	−3.10	0.025

Adjusted R2: 70.81; *Multiple linear regressions; β — standardized (regression) coefficients; DBP — diastolic blood pressure; HbA1c — glycated hemoglobin; SBP — systolic blood pressure; SE — Standard error of the estimate

of their illness [17]. It may be that an increase in age and the corresponding increase in experience correlate with a patient's better perception of his/ /her situation. Another study reports that married patients, and patients with higher education have better illness perception, which results in their better control of blood sugar, close to normal HbA1c levels, suffering fewer diabetes-related consequences, and a lower rate of hospitalization [18]. It can be reasoned that educated patients possess better self-control and can identify the symptoms of their illness more effectively as a result of their better illness perception. It is obvious that a correct understanding of diabetes will have a positive effect on the patients' adher-

ence to diabetes control behaviors, and, thus, their blood glucose control indicators, such as HbA1c, will look better. Also, married patients enjoy more social support than single patients, which results in their having fewer negative responses, e.g., despair and depression, to their illness. They are, therefore, more successful in managing their diabetic patients [19].

The diabetic patients in the present study had a relatively high perception of their illness. According to a study, illness perception is the most influential factor in diabetic patients' self-management. High perception helps patients adapt to the physical, emotional, and social conditions caused by their illness [20]. Low-risk perception and disregard for the consequences of their

behaviors subject patients to complications, including poor problem solving, poor emotional processing, and heightened irritability, which undermine their adherence to self-care instructions and treatment regimen [21]. Accordingly, in order to enable patients to control their own blood sugar and experience fewer consequences as a result of their diabetes patients' perception of their illness should be modified through education and consultation [22].

The participants in the present study were found to have relatively high levels of resilience. Resilient patients are more successful in adopting self-efficacious behaviors, which helps them accept their general healthcare, medication, and management of their symptoms more easily [23]. Patients who view their chronic illness as controllable and treatable are more successful in coping with their illness, have a more positive cognitive and emotional perception of their illness, and have a more optimistic interpretation of their illness and the related conditions [24]. Therefore, it is possible to benefit by improving patients' resilience skills through education to modify perception and improvement self-care behaviors [25].

In the present study, the self-efficacy of diabetic patients was found to be relatively high. Studies show that patients who have a high perception of their capacity to manage their diabetic patients effectively are more highly motivated and active in adhering to their treatment regimens [26, 27]. Patients with higher self-efficacy have better blood sugar management, adherence to treatment, and self-care behaviors in terms of food regimen, exercising; and psychological well-being [28]. Accordingly, it is recommended that healthcare systems use interventions, e.g., education and consultation, to increase self-efficacy in this group of patients.

Another finding of the present study was the existence of a significant positive correlation between resilience and self-efficacy in diabetic patients. The results of a study show that training patients with type 2 diabetes mellitus in resilience leads to their better adherence to self-care, illness management, and desirable treatment outcomes [28]. Similarly, the results of the studies show that self-efficacy and positive coping skills are contributory factors in resilience in diabetic patients. Diabetic patients with good resilience skills tend to improve their daily activities despite the limitations caused by their illness [29, 30]. People with low resilience are not very good at coping with adverse conditions, including the state of having an illness. Improving the resilience of diabetic patients will lead to an increase in their self-efficacy which, in turn, results

in better illness control. People with high resilience are more tolerant when problems occur–instead of accepting failure, they try to find the right solution. Diabetic patients who have high self-esteem and resilience have the ability to deal with the challenges caused by their condition and have the emotional capacity to deal with illness-related stress [31].

Another discovery of the present study was that there was a significant positive correlation between the participants' resilience and illness perception. Likewise, the results of another study show that living with chronic illness requires the ability to adapt to living with the stressors through resilience, which will impact well-being and illness perception [32]. A study shows that effective stress-coping strategies can help diabetic patients experience less stress and depression [33]. Diabetic patients may suffer from mental problems because their perception is affected by changes in their body image due to their new living conditions. Therefore, diabetic patients need multiple coping strategies to deal with the limitations in their daily lives [34]. Exposure to stressful situations may make patients inclined to seek strategies for self-empowerment. Resilience at the time of difficulty or when exposed to risk factors helps patients solve their problems and cope better [35].

The results of the present study also showed that there was a significant positive correlation between the participants' self-efficacy and illness perception. Also, between the variables of self-efficacy and resilience, self-efficacy was a stronger factor in determining the illness perception of patients with type 2 diabetes mellitus. The results of a study show that illness perception has a direct impact on the quality of life and self-efficacy of diabetic patients. According to another study, acceptance and commitment therapy leads to increased self-efficacy and decreased perceived stress in patients with type 2 diabetes mellitus [36]. According to a study, patients who believe in the efficacy of their medication and perceive their illness to be controllable have better treatment acceptance [37]. By improving diabetic patients' illness perception, healthcare experts can reinforce the patients' general self-efficacy, which will enable them to successfully adapt to diabetes and maintain positive health behaviors for long periods.

One of the limitations of the present study is that there may have been some inaccurate responses to the questions because of the participants' possible tendency to choose answers that they believed would attract higher scores. In addition, the researchers did not have access to all the variables which might have an impact on illness perception and, therefore, the

inclusion criteria did not include the patients' duration of having diabetes. It should be used random sampling method and diabetes self-efficacy questionnaire in future studies in order to increase the generalizability of the findings. In addition, single-center, and cross-sectional study. Also, the generalization of this study to other geographical regions is limited. One of the strengths of the present study is that the study results may help healthcare providers select better psychological strategies to improve diabetic patients' illness perception and thus promote their adherence to health behaviors and self-management.

Conclusions

The findings of the present study show that there is a positive correlation between resilience and self-efficacy and illness perception in patients with type 2 diabetes mellitus. Thus, more attention should be paid to the mental health and psychological characteristics of the diabetic population. The findings of the present study support the promotion of resilience and self-efficacy in the patients with diabetes population. They also provide health professionals and policymakers with an increased understanding of how to recognize and foster resilience and self-efficacy skills and self-perception for the improvement of the management of patients with diabetes. It is recommended that illness perception be used as a screening tool to identify patients who are at risk of poor self-management. After identifying them, nurses and other members of healthcare teams can use psychological interventions to improve the patients' coping strategies and enable them to have a better perception of patients with diabetes so that they can develop their self-care behaviors and illness control.

Acknowledgments

Conflict of interests

None declared.

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