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Original Paper

The Role of Personality Factors in Predicting Resilience and Coping Styles of Patients With Type 2 Diabetes: A Cross-sectional Study

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ABSTRACT

Introduction: Diabetes is a serious, progressive, and costly disease that creates many limitations for its patient. Diabetes disrupts a person's psychological and social adjustment and coping strategies, resulting in psychological complications for the patients.

Objective: This study aims to determine the role of personality traits in predicting resilience and coping strategies of patients with type 2 diabetes living in Bushehr City, Iran.

Materials and Methods: This cross-sectional study was performed on 120 patients with diabetes who were referred to healthcare centers in Bushehr. They were selected through the convenience sampling method. The study data were collected using the Connor-Davidson Resilience Scale, 60-item Neuroticism-Extraversion-Openness Personality Inventory, and Coping Strategies Questionnaire. In addition, descriptive statistics and linear regression tests were employed to interpret the data.

Results: About 60.8% of the participants were female, and more than 90% were married and lived in urban areas. Based on the study's results, there is a significant positive association between neuroticism and emotion-oriented (B=2.68, 95% CI; -0.666 to 4.701, P=0.01) and avoidance (B=2.60, 95% CI; -0.961 to 4.248, P=0.002) coping strategies. The results illustrated that neuroticism predicted resilience in patients with type 2 diabetes (B=-6.186, 95% CI; -11.632 to -0.741, P=0.026;), and the model predicted 9% of resilience (Adjusted R2=0.096).

Conclusion: According to the results of the present study, most patients with type 2 diabetes had neuroticism, which could decrease their resilience. Therefore, due to the increasing trend of diabetic patients in Iran, and considering the etiological factors, it is necessary to pay attention to the psychological and personality components of these patients to know and adapt more to their physical and mental conditions.

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Highlights

- Conscientiousness and responsibility were the lowest personality traits in patients with type 2 diabetes.
- Most patients used emotion-oriented and avoidance-oriented coping strategies.
- Patients with neuroticism personalities tend to adopt emotion-oriented strategies and have lower levels of resilience.

Plain Language Summary

Type 2 diabetes is a chronic disease that can disrupt a person's psychological and social adjustment. Therefore, the present study was conducted to investigate the role of personality factors in predicting the resilience and coping styles of patients with type 2 diabetes. Patients with type 2 diabetes had higher personality traits of neuroticism and openness but lower conscientiousness. Also, the results showed that most participants used emotion-oriented and avoidance coping strategies. Married people used problem-oriented strategies more. Patients with neurotic personalities used problem-oriented strategies less often, and they demonstrated little resilience. Neurotic personality type predicts resilience in type 2 patients.

Introduction

Noncommunicable diseases (NCDs) tend to be chronic and result from a combination of genetic, physiological, environmental, and behavioral factors [1]. Among NCDs, diabetes is a major, extensive, and costly public health problem [2]. The World Health Organization statistics show that the number of people with diabetes has increased, and the prevalence of this disease is increasing faster in low- and middle-income countries than in high-income countries [3]. In Iran, the prevalence of diabetes in 2011 among people aged 25-70 years was 11.9%. By 2030, more than 9 million people will be suffering from the disease [4]. People with diabetes live with many limitations, such as frequent insulin injections, high pharmaceutical supply costs, a special diet, recurrent infections, repeated hospitalizations due to disease complications, as well as problems like infertility, family relationships, sexual health, and employment [5, 6]. All of these factors can ultimately damage the psychological health of the patients [5]. Therefore, the risk of developing chronic diseases is related to various psychological factors and behavioral and physiological risks [7].

Considering the prevalence of psychological complications among people with diabetes, physicians should pay attention to psychological variables, especially supportive variables [8]. Resilience is one of the psychological components that play a prominent supporting role and has been conceptualized as one of the main bases for motivation, excitement, and behavior. Resilience is a factor in adapting to adversity; in other words, it enables the individual to adapt successfully to the environment, despite threatening conditions [9].

Long-term exposure to diabetes stressors and their self-management activities leads to fatigue and depression in patients, and the disease is extremely affected by a person's ability to respond to these stressors [10]. In addition, resilience and positive emotions strengthen the person to effectively deal with the disease and its complications [11]. Coping strategies are among the skills that provide stability against damage, problems, and diseases. Coping strategies, a person applies affect not only mental health but also physical well-being [12]. Each person shows a specific emotion and behavior when dealing with stressors depending on their personality traits [12]. In this regard, personality traits are important factors for adaptation to stressful situations [13].

In Iran, the study's results suggested that the higher the neuroticism of the elderly, the lower their self-confidence, and also, the more their desire for new experiences, extraversion, responsibility, and adaptation increased, the more confident they become to practice self-care [14]. Also, another study proved that diabetics' extroversion and conscientious personality traits have a positive relationship with blood glucose control in patients with type 2 diabetes [15]. On the contrary, Cheng et al. reported conscientiousness as the only effective factor for developing type 2 diabetes [16]. There is little research on the relationship between personality traits and resilience in patients

with type 2 diabetes, except for a few studies that have assessed features related to emotional instability in people with diabetes [17, 18]. Therefore, the current study explores the role of personality traits in predicting resilience and coping strategies of patients with type 2 diabetes living in Bushehr City, Iran.

Materials and Methods

This study is cross-sectional, and the research population included all people with diabetes referred to the healthcare centers in Bushehr, Iran, in the north of the Persian Gulf. The subjects were selected by convenience sampling method. The data collection process lasted for two months in the summer of 2018. Health centers were selected from different regions in the north, south, west, east, and center of the city. Health centers in each region were selected based on the higher referral of patients.

The inclusion criteria were as follows: having type 2 diabetes (non-insulin-dependent); being over 18 years old; having been diagnosed with the disease during the last year; lacking severe psychological disorders (self-report), serious medical condition such as chronic kidney disease, cancer, blood disorders (self-report), drug addiction, gestational diabetes; and being willing to participate in the research. This information was obtained based on health records and patients' reports. The exclusion criterion was returning an incomplete questionnaire.

To calculate the sample size, assuming a predictor variable for coping strategies and a predictor variable for resilience using the green formula (N=104+K), the minimum sample size was estimated at 107. To increase the study's validity and consider potential dropouts, the sample size was chosen to be 120.

The study instruments were the demographic information form, Connor-Davidson Resilience Scale (CD-RISC), 60-item Neuroticism-Extraversion-Openness Personality Inventory (NEO-PI), and Coping Strategies Questionnaire (CSQ). Notably, the variables of resilience and coping strategies were considered predictive, while personality traits were regarded as the criterion variable.

Connor and Davidson developed the 25-item CD-RISC in 2003 [19]. The items are scored on a 5-point Likert scale (never, low, moderate, high, and extremely high), where a response of never is scored zero and a response of extremely high is scored four. The minimum and maximum scores are 0 and 100, respectively. A high score on this scale reflects strong resilience. The validity and reliability of this tool have been confirmed by Hosseini et al. in Iran [20].

The NEO five-factor inventory (NEO-FFI) with 60 items was developed by Costa and McCrae [21]. The instrument evaluates 5 factors: neuroticism, extraversion, openness, conscientiousness, and agreeableness. The items are scored on a 5-point Likert scale (completely disagree=0 to completely agree=4). The validity and reliability of this tool have been confirmed by Garousi Farshi et al. in Iran [22].

Endler and Parker developed CSQ in 1990 to determine how people handle their problems [23]. It includes 48 items and evaluates three coping styles: problem-oriented, emotion-oriented, and avoidance. Problem-oriented coping is defined as controlling emotions and planning for stepwise problem-solving. In an emotion-oriented coping style, the individual focuses on the emotions raised from the situation instead of focusing on the problem itself, attempting to reduce negative emotions instead of solving the problem. On the other hand, avoidance coping involves trying to avoid stressors. In this questionnaire, items are scored on a 5-point Likert scale from never (1 score) to very much (5 score). Therefore, the minimum and maximum scores of the tool are 16 and 80, respectively, where a higher score indicates using the coping strategy more often. The validity and reliability of this tool have been confirmed by Ghoreyshirad et al. in Iran [24].

The samples completed the questionnaires in the presence of the researcher in a quiet place. In addition, explanations about the questions were provided where required. For the illiterate subjects, the questionnaire was read out and explained to them by the researcher.

Data analysis was performed in SPSS software, version 22 using descriptive statistics (percentage, frequency, mean and standard deviation, and domain) and multiple linear regression tests to determine the role of personality traits in predicting resilience and coping strategies of patients with type 2 diabetes. Furthermore, a P-value less than 0.05 was considered statistically significant.

Results

Results showed that 60.8% of the samples were female, and most were married (92.5%). In addition, 85.8% had a high-school diploma or lower education. Their Mean±SD age was 56.69±11.48 years with an age range of 24-84 years. Their Mean±SD duration of diabetes was 1.81±0.66 years with a range of 1-3 years (Table 1).

Table 1. Mean scores of coping styles and resilience to separate demographic variables (n=120)

Variables		No. (%)	Mean±SD			
			Problem-oriented	Emotion-oriented	Avoidance-oriented	Resilience
Gender	Man	47(39.2)	43.86±7.29	51.75±5.53	51.04±4.67	31.31±13.98
	Female	73(60.8)	45.38±6.78	50.79±4.83	50.30±3.63	37.79±14.25
Marital Status	Single	4(3.3)	43±2.82	51.50±2.12	51±4.24	44.50±20.50
	Married	111(92.5)	45.13±7.00	51.19±5.08	50.56±3.98	35.43±14.31
	Deceased	5(4.2)	38.40±4.61	50.20±7.12	50.80±6.30	29.60±16.59
Education	High-school diploma or lower education	103(85.8)	43.88±6.70	51.10±5.23	50.20±4.01	35.59±14.41
	Associate degree	3(2.5)	48.61±7.72	50.61±4.43	51.09±4.50	34.33±16.22
	Bachelor's degree and higher	14(11.7)	44.63±5.66	52.54±5.53	52.54±2.97	35.27±12.00
Location	Urban	116(96.7)	44.78±6.96	51.33±5.07	50.59±4.04	34.75±13.69
	Rural	4(3.3)	45.50±8.69	46±3.36	50.25±4.99	51.75±26.09
Job	Governmental	14(11.8)	47.21±6.04	50.07±4.59	50±3.01	33.78±15.63
	Self-employment	35(29.4)	42.91±6.09	51.50±5.02	50.64±4.82	33.67±15.17
	Housewife	61(51.2)	45.08±7.59	51.44±5.14	50.82±3.96	35.36±13.23
	Retired	9(7.6)	46.88±6.79	50.55±6.04	49.33±3.12	43.66±17.53

The results indicated that patients with type 2 diabetes had more openness (38.26±4.52) and neuroticism (35.97±6.87), while conscientiousness was lower in these patients (30.19±4.21) compared to other personality traits. The Mean±SD resilience score of the participants was 35.43±14.2 with a range of 5-77. Moreover, the results showed that the participants employed the emotion-oriented (51.09±5.09) and avoidance (50.47±4.20) coping strategies more often, compared to the problem-oriented coping strategies (44.89±6.92).

To investigate the relationship between demographic factors and personality traits with coping strategies, we used multivariate linear regression. According to the results, neuroticism was the only personality trait that could predict problem-oriented coping strategies in patients with type 2 diabetes (B=-4.38, 95% CI; -6.883 to 1.880, P=0.001). Moreover, different personality traits explained only 22% of problem-oriented strategies. Among the demographic traits of the subjects, there was a significant relationship between marital status and problem-oriented coping strategies (P=0.046). In terms of predicting emotion-oriented coping strategies by personality traits, neuroticism was the only personality type that could predict emotion-oriented strategies in patients with type 2 diabetes (B=2.68, 95% CI; -0.666 to 4.701, P=0.01). Furthermore, different personality types explained only 7% of emotion-oriented strategies, and there was no significant relationship between the demographic traits of the participants and emotion-based strategies. Regarding the assessment of prediction of avoidance coping strategies by personality traits, only the variable of neuroticism could predict avoidance coping strategies in type 2 diabetes (B=2.60, 95% CI; -0.961 to 4.248, P=0.002). Moreover, different personality types explained only 4% of avoidance coping strategies, and there was no relationship between demographic characteristics and avoidance strategies (Table 2).

The results indicated that the neuroticism personality trait predicted resilience in patients with type 2 diabetes. In addition, the variables of gender and place of residence played a significant role (Table 3). The predictor variables in the model explained about 9% of the changes in the resilience variable (Adjusted R2=0.096).

Table 2. Results of the adjusted of multiple linear regression of demographic variables and personality factors on coping strategies (N=120)

Variables	Coping Strategies	B	SE	β	t	P	95% CI	
							Lower	Upper
Age	Problem-oriented	-0.10	0.71	-0.17	-1.48	0.14	-0.246	0.035
	Emotion-oriented	0.004	0.05	0.009	0.06	0.94	-0.112	0.120
	Avoidance	0.01	0.04	0.03	0.22	0.82	-0.087	0109
Gender	Problem-oriented	1.26	1.33	0.08	0.94	0.34	-1.382	3.906
	Emotion-oriented	-0.33	1.08	-0.03	-0.30	0.76	-2.473	1.814
	Avoidance	0.61	0.88	0.07	0.69	0.49	-1.136	2.357
Education	Problem-oriented	0.70	0.49	0.16	1.41	0.16	-0.287	1.696
	Emotion-oriented	-0.24	0.41	-0.07	-0.60	0.55	-1.066	0.571
	Avoidance	0.13	0.34	0.05	0.39	0.69	-0.550	0.826
Marital status	Problem-oriented	-2.77	1.37	-0.17	-2.02	0.46	-5.499	-0.056
	Emotion-oriented	-1.11	1.12	-0.09	-0.98	0.32	-3.350	1.125
	Avoidance	-0.39	0.90	-0.04	-0.44	0.65	-2.192	1.394
Location	Problem-oriented	-2.02	3.26	-0.05	-0.61	0.53	-8.511	4.462
	Emotion-oriented	-4.30	2.62	-0.15	-1.64	0.10	-9.503	0.903
	Avoidance	0.33	2.11	0.01	0.15	0.87	-3.862	4.536
Duration of infection	Problem-oriented	1.32	0.93	0.12	1.41	0.16	-0.533	3.175
	Emotion-oriented	0.37	0.75	0.04	0.50	0.61	-1.122	1.881
	Avoidance	-0.08	0.61	-0.01	-0.13	0.89	-1.296	1.131
Job	Problem-oriented	-0.30	0.77	-0.03	0.39	0.69	-1.827	1.227
	Emotion-oriented	0.58	0.61	0.09	0.94	0.34	-0.643	1.816
	Avoidance	0.37	0.50	0.07	0.73	0.46	-0.631	1.371
Neuroticism	Problem-oriented	-4.38	1.26	0.30	3.47	0.001	-6.883	1.880
	Emotion-oriented	2.68	1.01	-0.25	-2.64	0.01	-0.666	4.701
	Avoidance	2.60	0.82	-0.31	-3.14	0.002	-0.961	4.248
Extraversion	Problem-oriented	-1.05	1.26	-0.07	-0.83	0.40	-3.555	1.447
	Emotion-oriented	0.09	1.02	0.009	0.08	0.93	-1.941	2.121
	Avoidance	-0.14	0.82	-0.01	-0.17	0.86	-1.781	1.493
Openness	Problem-oriented	-1.30	1.44	-0.08	-0.89	0.37	-4.169	1.570
	Emotion-oriented	1.18	1.17	0.10	1.009	0.31	-1.146	3.514
	Avoidance	1.01	0.95	0.10	1.05	0.29	-0.893	2.914

Variables	Coping Strategies	B	SE	β	t	P	95% CI	
							Lower	Upper
Agreeableness	Problem-oriented	-2.97	1.79	-0.14	-1.66	0.99	-6.530	0.572
	Emotion-oriented	2.08	1.43	0.14	1.45	0.14	-0.762	4.937
	Avoidance	2.20	1.15	0.18	1.90	0.06	-0.099	4.503
Conscientiousness	Problem-oriented	1.20	2.02	0.05	0.59	0.55	-2.812	5.230
	Emotion-oriented	-1.78	1.62	-0.10	-1.90	0.27	-5.022	1.446
	Avoidance	0.97	1.37	0.06	0.70	0.48	-1.761	3.708
Constant number	Problem-oriented	51.05	10.32	-	4.94	0.00	30.562	71.546
	Emotion-oriented	57.30	8.41	-	6.81	0.00	40.607	74.006
	Avoidance	44.30	7.12	-	6.21	0.00	30.159	58.443

Discussion

The results of this study suggested a significant negative relationship between neuroticism and problem-oriented coping strategies, which explained the decrease in the use of problem-oriented coping strategies caused by increased neuroticism. Therefore, among the personality traits, only neuroticism could predict problem-oriented strategies in the participants. Moreover, our findings indicated a significant positive association between neuroticism and the prediction of emotion-oriented and avoidance coping strategies in the patients. A study in Iran reported that patients with neuroticism applied emotion-oriented strategies

Table 3. Results of the adjusted of multiple linear regression of demographic variables and personality factors on resilience (N=120)

Variables	B	SE	β	t	P	95% CI	
						Lower	Upper
Age	-0.001	0.15	-0.001	-0.01	0.99	-0.308	0.305
Gender	6.03	2.90	0.21	2.08	0.04	0.278	11.794
Education	0.53	1.08	0.06	0.48	0.62	-1.627	2.690
Marital Status	-2.21	2.98	-0.07	-0.74	0.46	-8.137	3.716
Location	14.47	7.11	0.19	2.03	0.04	0.362	28.612
Duration of infection	3.85	2.03	0.17	1.89	0.06	-0.185	7.890
Job	1.42	1.67	0.08	0.84	0.39	-1.904	4.746
Neuroticism	-6.18	2.74	-0.22	-2.25	0.02	-11.632	-0.741
Extraversion	2.03	2.74	0.07	0.74	0.46	-3.416	7.478
Openness	1.59	3.14	0.05	0.50	0.61	-4.654	7.843
Agreeableness	-3.98	3.89	-0.09	-1.02	0.30	-11.715	3.751
Conscientiousness	1.37	4.41	0.02	0.31	0.75	-7.380	10.133
Constant number	10.66	22.48	-	0.47	0.63	-33.961	55.286

to solve their problems [25]. In a study conducted in France by Verges et al., researchers found that type A personality, characterized by competition and the need for success, was significantly less common in type 2 diabetics with diabetic foot ulcers [26].

The results of this study are in line with their results. In studies by Amiri et al. [27] and Kameli et al. [28] on female cancer patients and male addicts, all participants had higher neuroticism and resorted to emotion-oriented coping strategies, thereby experiencing mood disorder symptoms more severely. People with chronic diseases or high-risk behaviors (e.g. addiction) more often apply emotion-based strategies in handling stressful situations. However, we justified our findings based on the fact that most participants had a low level of education and were female, which could affect the results due to differences in the male and female genders in terms of lifestyle, social education, and socialization in society and family. The findings of another study also indicated a positive relationship between education level and complications of diabetes, and the researchers found that these patients had a low quality of life [29].

Our findings are not consistent with the results obtained by Ramandi et al., which showed no significant relationship between problem-oriented coping strategies and psychological symptoms of diabetic patients, such as neuroticism [30]. This inconsistency between the results might be attributed to the selection of patients with type 1 and type 2 diabetes in the mentioned study. Meanwhile, there are higher rates of obsessive-compulsive disorder in patients with type 1 diabetes compared to patients with type 2 diabetes [31]. Therefore, this factor might have affected the results and the difference between the results of these studies. NEO-PI was used in the present study, whereas Ramandi et al. employed the SCL-90-R, which evaluates and presents only the symptoms of the last week. Therefore, the symptoms may change during the previous weeks. However, we assessed the personality traits of patients with diabetes. A study shows that many people think of personality as being fixed and unchangeable [7]. This difference can be a reason for the discrepancy in results.

In another study, Esmaeili et al. reported a significant relationship between neuroticism and resilience in patients with multiple sclerosis [32]. In a study in Ireland, McDonnell et al. found that participants with higher levels of neuroticism tended to have lower levels of resilience that predicted symptoms of depression [33]. Moreover, Mansouri et al. found a direct relationship between the mentioned personality trait and resilience. They also found a significant positive association between extraversion and resilience [34]. In a study conducted during the COVID-19 pandemic, the results showed that neuroticism was inversely related to resilience. People with neurotic personality traits were less resilient and more vulnerable to coronavirus crisis stressors [35]. The present study showed that most patients with diabetes had a neurotic personality type, which could reduce the amount of resilience. Patients with diabetes mostly apply emotion-based coping strategies in dealing with this disease and other life problems. There was a direct relationship between neuroticism and emotion-oriented coping strategies. The results indicated that as the number of diabetic patients is growing in Iran, besides paying attention to etiological factors, it is necessary to consider the psychological and personality components of these patients and to better understand and adapt to their physical and mental conditions.

This study, like most research studies, has its limitations. Since the study was cross-sectional, a causal relationship between variables cannot be concluded from the findings; thus, longitudinal studies are recommended to overcome this limitation. The data in this study were collected self-reportedly so that self-report bias may occur. It is suggested that qualitative studies be conducted to examine in more depth the feelings, experiences, and beliefs of diabetic patients, especially in the field of its psychological aspects. In addition, having no psychological disorders among the subjects was only based on self-report, which can also increase bias. Therefore, it is suggested that in future studies, tools for diagnosing mental disorders be used to assess mental disorders in patients, and then patients with eligible conditions be included in the study.

Recognizing the relationship between psychological components such as personality and internal diseases (e.g. diabetes) can justify applying psychological interventions in these patients. Since diabetes imposes much stress on the patient and their family, it is necessary for psychiatric nurses to instruct these patients in problem-solving and problem-oriented methods so that they can play a role in improving their mental and physical health through controlling stress. Although diabetic patients have different personality traits, which determine their coping strategies and resilience, they can be changed and improved with education, and it is necessary to focus on this issue in patients' treatment plans.

Ethical Considerations

Compliance with ethical guidelines

The current study was approved by the Research Council of Bushehr University of Medical Sciences (code of ethics: IR.BPUMS.REC.1397.043). The participants delivered their written informed consent ahead of conducting the study. The researchers adhered to ethical considerations by obtaining informed consent from the participants and assuring them that their personal information would be kept confidential. Furthermore, participation in the study was voluntary, and the participants could leave at any stage.

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Authors' contributions

The chief investigator, project supervisor, the principal student investigator and oversight of the project design: Masoud Bahreini; Project designer: Yaghoub Rashedi and Reza Nemati, with advice from Kamran Mirzaei and Hakimeh Vahedparast; Providing statistical advice for the design data collection, analysis, and randomization: Kamran Mirzaei; Preparing the initial writing after all authors approval: Reza Nemati. All authors read, revised, and approved the final article.

Conflict of interest

The authors declared no competing interest.

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