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Self-Compassion Reduces the Destructive Effects of Perceived Stress on Psychological Well-Being and Self-Care Behaviors: Results from Type II Diabetes Mellitus Patients

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Abstract

Objective: This study investigated the mediating role of self-compassion in the relationship of perceived stress with physiological well-being and self-care behaviors among patients suffering from type II diabetes mellitus (T2DM).

Materials and Methods: In this descriptive, cross-sectional study, 369 patients with T2DM were selected through purposive and consecutive sampling from the cities of Rasht and Rezvanshahr (Northern Iran) in 2020-21. The participants completed the perceived stress scale (PSS-4), summary of diabetes self-care activities (SDSCA) questionnaire, Ryff's scale of psychological well-being (RSPWB), and self-compassion scale (SCS-SF). The data were processed through structural equation modeling (SEM) in AMOS-24. Bootstrapping was carried out in MACRO to analyze the mediating relationships.

Results: The perceived stress had a negative and significant correlation with self-compassion (r= -0.456), psychological well-being (r= -0.699), and self-care behaviors (r= -0.671) (For all cases $P< 0.01$). In addition, self-compassion had a positive and significant relationship with psychological well-being (r= 0.760) and self-care behaviors (r= 0.657) ($P< 0.01$). The modified structural model had the desired fitting with the collected data (CFI= 0.955, RMSEA= 0.079, χ^2/df= 2.842). Following the bootstrapping analysis, self-compassion significantly mediates the relationship between perceived stress, psychological well-being ($P< 0.0001$), and self-care behaviors ($P< 0.0001$).

Conclusion: Self-compassion can serve as a shield against and reduce the destructive effects of stress on the psychological well-being and self-care behaviors of diabetic patients. The beneficial effects of self-compassion can be used in diabetic psychotherapy protocols to improve psychological well-being and self-care behaviors.

Keywords: Stress, Psychological, Self-compassion, Diabetes type 2, Self-care

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Introduction

Following the International Diabetes Federation (IDF) report in 2019, the number of diabetic patients in 138 countries in the world exceeds 422 million (with a prevalence rate of 3.8%). This number is expected to increase to 578 million (4.4%) in 2030. Even though the prevalence of diabetes is rising worldwide, its prevalence rate in the Middle East and Iran is significantly greater than in Europe and has a growing trend (1).

This disease can cause long-term complications such as deteriorating psychological health, inability to adhere to a proper diet and medication therapy, increased mortality rate, and high healthcare costs (2). Several studies have suggested that, in addition to physical disease and amputation, this condition increases the risk of psychological symptoms and disorders. For example, Abrahamian et al. (3) argued that there is a negative relationship between psychological disorders and diabetes mellitus, which has a negative impact on metabolic control and micro and macroangiopathic complications. It has now been discovered that this disease is the underlying cause of behavior problems and that psychological and social factors play an essential role in their management (4). Reducing diabetic patients' ability to control their disease, on the other hand, exacerbates their psychological problems and traps them in a vicious circle. Patients' psychological reactions can exacerbate these problems (which have a negative impact on the experience of diabetic symptoms) (5).

Per the systematic studies over the past 25 years, the psychological well-being of the majority of diabetes patients is affected (6). According to the previous studies (7), psychological well-being plays a vital role in the quality of life of diabetic patients. Psychological well-being refers to an individual's positive feelings about themselves and their lives. It includes variables like life satisfaction, the absence of depression, as well as positive moods and emotions (8).

The decrease in psychological well-being and the rising emergence of psychological symptoms in each diabetic patient gradually increases the severity of their symptoms and aggravates their physical conditions. Thus, identification and treatment of the psychological well-being of patients with type II diabetes mellitus (T2DM) can considerably influence the process of treating the symptoms of their disease (9). Psychological well-being has a significant relationship with type II diabetes complications, controlling the blood glucose and death rate. Psychological well-being boosts self-efficacy and stimulates motivation for self-care behaviors (6).

One significant difference between diabetes and other chronic diseases is that the patient is expected to control the preponderance part of their diabetes. Disease management and self-care behaviors are two of the most important medical requirements for controlling diabetes, especially type II diabetes (2). Self-care behaviors are carried out consciously and inhibitingly by the patients upon developing a positive and particular attitude towards the self and their diseases (10), which includes the activities that each individual considers essential to preserve their life, health, and welfare and performs them. Diabetes self-care includes a wide range of activities such as blood glucose monitoring, diet modifications, exercising, taking medications on time, and feet examination, all of which necessitate a considerable change in lifestyle (11). Per the studies, the most crucial factor causing death in diabetic patients is the lack of self-care. However, the studies demonstrated lower self-care levels in most diabetic patients, which does not guarantee improvement in their physical and psychological status (12,13).

Diabetes-related stress causes physical symptoms as well as unpleasant psychosocial complications, making treatment and control more difficult. It is followed by critical factors

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such as changes in hormone levels, and it might cause the onset or exacerbation of diabetes (14). One of the most severe problems that diabetes patients face is stress (15). Stress is a collection of an organism's non-specific reactions to any urge for adjustment. Perceived stress is a psychological state or process in which individuals assume their bodily and psychological well-being to be in jeopardy. Furthermore, perceived stress is influenced by a person's understanding and interpretation of circumstances and incidents (16). Studies suggested that perceived stress is quite common among diabetic patients and is associated with undesirable metabolism control (17). When faced with an abnormal disorder or a stressful situation, either chronic or acute, diabetic patients react by increasing the activity of both their autonomic nervous system (ANS), also known as the vegetative nervous system, (hypothalamus, adrenal glands, and sympathetic nerves) and glands-nervous system of hypothalamus-pituitary-adrenal axis (HPA). The first system, i.e., adrenergic, gets adjusted in chronic stress. However, when faced with acute stress and emotional situations, the secretion of the hormones of the second system, i.e., cortisol, increases (14).

Per the stress-management training program results in patients with type II diabetes, there was a considerable decrease in the glycated hemoglobin level of patients after the interventions (18). In addition, it was indicated that high occupational stress, low social support, and long work hours effectively increased the development of diabetes in Japanese men (19). Additionally, it has been reported in several studies that there is a direct relationship between stress and glycated hemoglobin levels (20,21). Moreover, patients' perceived stress levels might predict the emergence of self-care behaviors (22). Stressful events may disrupt diabetic patients' self-care and health-preserving activities. These patients delay their insulin doses, do not test their blood glucose accurately, and are hesitant about exercising. This is critical since diabetes is a self-deception disease, and stress may disrupt self- management behaviors (23).

Numerous studies have confirmed the link between perceived stress and psychological well-being (24-27). Perceived stress reduces the emotional stability of individuals, which has a destructive impact on psychological well-being (28). Additionally, psychological well-being is positively related to life satisfaction, happiness, hope, and self-efficacy and is negatively associated with perceived stress (29).

Self-compassion is among the factors influencing treatment adherence, and it is linked to self-care behaviors (30) and diabetic patients' psychological well-being (31). Self-compassion is defined as being open to new experiences and being affected by the suffering of others in such a manner that the individual makes their problems and suffering tolerable. In addition, this concept means understanding that other people experience similar experiences and problems that occur in their life (32,33). Per the investigations, an individual capable of being properly self-compassionate enjoys a higher level of psychological health and well-being (34-37). Accordingly, the studies stated that self-compassion directly relates to psychological well-being (38) and self-care behaviors such as a healthy diet and physical activities (31). Moreover, it was revealed that individuals with higher levels of self-compassion can effectively set healthier goals and make every effort to accomplish their goals (including medical treatment follow-up and adhering to medical orders), plus assess the paths to accomplish their goals (40).

Furthermore, the investigations indicated the direct relationship of self-compassion with self-care behaviors (40-42). It signifies that diabetic patients with self-compassion gently persuade themselves regarding changing their life and correcting their harmful and undesirable behavioral patterns (43). In light of these findings, it is argued that self-compassion can be regarded as an emotional regulation strategy among various methods,

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which does not avoid irritating and undesirable experiences, yet the effects are accepted kindly (44).

As a result, this study aims to see whether the self-compassion variable can mediate the relationship between perceived stress and patients' psychological well-being and self-care behaviors. In other words, this study finds out if self-compassion protects patients from the negative consequences of perceived stress. In this regard, the researchers (41) revealed that perceived stress and self-compassion are significant predictors of self-care behaviors. The connection between perceived stress and self-care behaviors is moderated by self-compassion. Figure 1 was established in accordance with the study's objectives. In this model, perceived stress is considered as an exogenous variable, self-compassion as mediating variable, and psychological well-being and self-care behaviors as endogenous variables.

Materials and Methods

This study's statistical population comprised all women and men with T2DM in Rasht and Rezvanshahr in 2020-2021 who had an active medical record at diabetes-related medical diagnosis and laboratory centers and had had their medical record for more than six months. Each patient obtained a final diagnosis of T2DM from their internists, and the records confirming their diseases were available in their patient history. The research sample comprised 368 men and women suffering from T2DM, which all were selected through purposive and consecutive methods from two centers, i.e., A. Simorgh Specialized Diabetes Clinic in Rasht, B. Medical laboratory of Dr. Gholamhossein in Rezvanshahr. The purposive sampling was carried out due to two reasons. First, the research was competent in encouraging the cooperation of specialists, studying patients' medical records and archives, and selecting the respective participants from the centers mentioned above. Second, the centers above are excellent medical references in the center and western Guilan, respectively. These centers gather a varied range of patients from different economic and social backgrounds, as well as the required data bank used for this research. This study was conducted at the centers mentioned above from March 2020 to February 2021. In accordance with the inclusion and exclusion criteria, 368 patients were selected for the study by nonprobability and consecutive sampling after providing informed consent. At least 200 samples are required to undertake structural equation modeling (SEM) (45).

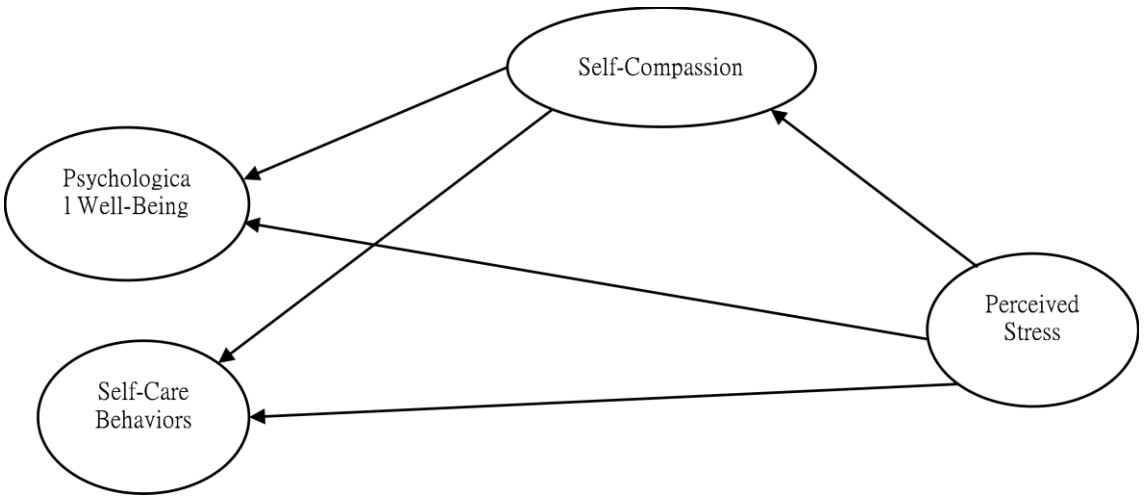


Figure 1. A conceptual model of the mediating role of self-compassion in the relationship of perceived stress with physiological well-being and self-care behaviors in patients suffering from T2DM

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Inclusion criteria

Ability to read and write, age ranging from 40-70, diagnosed with T2DM by an internist at least six months before the study, availability of HbA1c tests conducted within less than three months for each patient, which confirms their diabetes, and informed consent of participants.

Exclusion criteria

Records of receiving consultation regarding their stress, reluctant to complete the tests, simultaneous chronic physical diseases such as broken bones, brain stroke, multiple sclerosis (MS), epilepsy, and other physical and neurological disabling diseases (per records mentioned in the medical record), concurrent chronic psychological diseases such as delusional disorder, schizophrenia, bipolar disorder (per records mentioned in the medical record), and patients' reluctance to participate in the research.

Procedure

Considering the inclusion and exclusion criteria, and after carrying out routine collaboration with the experts of the admission unit of Simorgh Specialized Diabetes Clinic in Rasht, and B. Medical laboratory of Dr. Gholamin in Rezvanshahr, the questionnaire relating to demographic information was completed by diabetic patients attending the respective centers with the researcher's assistance. The main questionnaires were then sent to the participants who met the criteria. The aims and procedures of the tests were explained to the patients and their companions at the beginning of the assessment. They were assured that the information would remain confidential. They were then reminded that their decision not to engage in the study would have no effect on the therapy procedure. AMOS-24 was used to process the data through the SEM method. Bootstrapping was used in MACRO to analyze the mediating relationships.

Measures

Summary of diabetes self-care activities (SDSCA) questionnaire

Tubert and Glasgow (46) developed the SDSCA. This questionnaire comprises 15 questions that examine the quality of patients' self-care within seven days. There are 5 questions on keeping to a diet, 2 questions about exercising, 3 questions about regulating blood glucose, 4 questions about foot care, and 1 question about smoking. The responses to this questionnaire are provided to help patients in reporting the scope of their activities throughout the previous week. The responses vary from zero to seven days per week. A score of zero signifies a failure to carry out self-care behaviors within the past seven days, and a score of seven signifies carrying out self-care behaviors within the last seven days. Regarding self-care in diabetic patients, Zareban et al. (47) obtained the Cronbach's Alpha to be 0.89%.

Perceived stress scale (PSS-4)

The 4-item PSS-4 was proposed to examine situations that require a short scale or phone interview (48). These four questions consist of two positive (two questions) and negative (two questions) factors. They are used to measure the situations in individuals' lives referred to as stressful. The positive factors include questions 2 and 3, and the negative factors include questions 1 and 4. It is scored based on the 5-point Likert scale including never, very little, sometimes, a lot, and very much, which are scored as 0, 1, 2, 3, and 4, respectively. The researchers reported the Cronbach's alpha to be 0.60 for PSS-4 in America (N=2387) (48).

Ryff's scales of psychological well-being (RSPWB)

This research used the 18-item RSPWB. This test is a self-report tool, and its responses range from absolutely agree to absolutely disagree in a 6-point continuum (1 to 6). A higher score signifies better psychological well-being. 10 questions are scored directly,

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and 8 questions are scored in reverse (50). The highest score signifies higher psychological well-being. Per Cronbach's alpha, the reliability of RSPWB was reported from 0.72 and 0.89 for the components of well-being (self-acceptance, positive relations with others, autonomy, purpose in life, personal growth, and environmental mastery) (50).

Self-compassion scale short form (SCS-SF)

The 12-item SCS-SF was designed by Raes, Pommier, Neff, and Van Gucht (51). The extended version of this scale was designed in 26 items in 2003. This scale SCS-SF comprises 6 double-faceted factors: self-kindness, self-judgment, common humanity, feeling of isolation, mindfulness, and over-identification. This scale was scored based on a 5-point Likert scale, i.e., ranging from 1 to 5 (never=1 to always=5). The minimum and maximum scores are 12 and 60, respectively. Obtaining a higher score is an indication of higher self-compassion (51). Neff and Germer (2013) obtained the Cronbach's alpha for this scale to be 0.86 in Taiwan and Thailand and 0.95 in America. The Cronbach's alpha for its Persian version was achieved to be 0.91 (53).

Ethical considerations

The Organizational Ethics Committee of Biomedical Study of the Islamic Azad University, Rasht Branch, investigated and approved the research proposal. (Ethic code: IR.IAU.RASHT.REC.1400.002).

Results

Table 1 displays the descriptive indicators for the variables in this study, including mean and standard deviation (SD).

Table 2 shows the information about the Pearson correlation coefficient of perceived stress with psychological well-being, self-care behaviors, and self-compassion.

Table 1. Descriptive indicators (mean and SD) of the research variables in patients with T2DM (n=368)

Characteristic	M±SD	Min-Max	Skeewness	Kurtosis
Perceived Stress	8.08 (±2.99)	0-15	-0.230	-0.473
Self-Compassion	41.51 (±7.72)	24-56	-0.232	-1.123
Self-kindness	7.54 (±1.47)	5-10	-0.545	-0.639
Self-judgment	6.27 (±0.97)	2-9	-0.198	1.467
Common humanity	6.99 (±2.04)	3-10	-0.293	-1.315
Isolation	7.85 (±2.10)	2-10	-0.770	-0.606
Mindfulness	6.53 (±1.53)	4-10	-0.200	-0.972
Over identified	6.41 (±1.96)	2-10	-0.026	-0.985
Psychological Well-Being	75.48 (±7.27)	59-101	0.465	0.074
Autonomy	13.59 (±1.63)	8-17	-0.619	0.758
Environmental mastery	12.97 (±1.84)	8-18	0.297	0.043
Personal growth	13.81 (±1.99)	9-18	0.066	-0.478
Positive relations with others	11.03 (±2.06)	7-17	0.484	0.142
Purpose in life	12.86 (±1.67)	8-18	-0.021	-0.051
Self-acceptance	11.28 (±2.08)	6-17	0.256	-0.545
Self-care activities	58.77 (±11.60)	34-87	0.201	-0.502
Diet	4.28 (±0.91)	1-6.80	-0.089	-0.342
Exercise	1.31 (±1.59)	0-7	1.407	1.228
Blood glucose testing	3.72 (±1.29)	1-7	-0.031	-0.424
Insulin and anti-diabetic pill	6.48 (±0.65)	4-7	-1.066	0.737
Foot care	5.01 (±1.46)	0.75-10.25	-0.140	0.158
Smoking	0.82 (±0.38)	0-1	-1.703	0.905

Table 2. Matrix of correlation of perceived stress with psychological well-being, self-care behaviors, and self-compassion

Variable	1	2	3
1-Perceived stress	-		
2-Self-compassion	-0.456**	-	
3-Psychological well-being	-0.699**	0.760**	-
4-Self-care activities	-0.671**	0.657**	0.648**

****P< 0.01**

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Given the correlation results reported in Table 2, the perceived stress has a negative and significant relationship with self-compassion (r= -0.456), psychological well-being (r= -0.699), and self-care behaviors (r= -0.671) ($P< 0.01$). Moreover, self-compassion had a positive and significant relationship with psychological well-being (r= 0.760) and self-care behaviors (r= 0.657) ($P< 0.01$).

This research employed structural equation modeling to examine the fitting of the relationship. Before using this statistical method, it is essential to analyze its assumptions. Per Kline's (45) proposal, the single-variable normal hypotheses were tested and confirmed by estimating the kurtosis and skewness of scores. Considering the range of tilt and elongation of variables in the ±2 interval, the single-variable normality was confirmed. The Mardia standardized kurtosis coefficient and the critical ratio are used to examine the multivariable normality. Per the proposal by Blunch (54), the scores below 5 for the critical ratio are regarded as a failure to violate the multivariable normality. In this research, the Mardia coefficient was obtained to be 2.684, and the critical ratio was obtained to be below 5. Therefore, the assumption of the multivariable normality is met. To investigate the absence of the multivariable outlier data, the Mahalanobis d-squared method was examined. The level of significance below 0.05 is an indication of outlier data. With regard to this method, 47 outlier data were identified. In addition, the assumption of the absence of multicollinearity was assessed via tolerance and variance inflation factor (VIF). There was no deviation from multicollinearity in any of the amounts of the tolerance and VIF statistics calculated for the research variables in this analysis. Therefore, according to the investigation of the statistical presumptions, the SEM is an appropriate method to assess the fitting of a model. The maximum likelihood (ML) method was used to estimate the parameters.

Table 3 shows the results of the fitting indicators of the proposed and modified model related to the all samples of the T2DM patients. The fitting of the proposed model was examined before assessing the structural coefficients. The fitting of the proposed model was evaluated based on the introduced fitting indices. Considering that the CMIN/DF was below 5 and RMSEA was below 0.1, the fitting of the proposed model is confirmed (55, 56). To promote the model, first, the factor loading below than 0.4, including the observed variables (judging, independence, blood glucose control, insulin injection, intake of antidiabetic pills, and smoking), were eliminated. Second, the final model of the research was developed by drawing a correlation between the covariance errors. The results of the fit indices demonstrate that after the modifications, the final research model has a good fit.

The R^2 index manifests the variance determined for the hidden endogenous variables. Cohen (57) described the values of R^2, 0.26, 0.13, and 0.02 in the SEM as strong, moderate, and poor, respectively. The coefficient of determination of the modified structural model's psychological well-being and self-care behaviors amounted to 0.891 and 0.902, respectively. Accordingly, it indicates that the extraneous and mediating variables, i.e., perceived stress and self-compassion, can predict 89% of changes in psychological well-being and 90% of self-care behaviors in

Table 3. The fitting indicators of the proposed, modified, and final model*

Indices / Models	χ^2	df	*P*	χ^2/df	RMSEA	PNFI	CFI	PCFI	IFI	GFI
Primary model	500.360	148	0.001	3.381	0.086	0.737	0.890	0.770	0.891	0.842
Improved model	312.334	73	0.001	4.279	0.101	0.723	0.922	0.739	0.922	0.862
Final model	181.397	63	0.001	2.879	0.079	0.648	0.955	0.661	0.955	0.920

*Abbreviations; CMIN/DF: Chi-square/degree-of-freedom ratio; RMSEA: Root Mean Square Error of Approximation; PCFI: Parsimonious Comparative Fit Index; GFI: Goodness of Fit Index; PNFI: Parsimonious Normed Fit Index; IFI: Incremental Fit Index; CFI: Comparative Fit Index. Acceptable rate of Fit indices: PNFI, PCFI (>.5), CFI, IFI, GFI (>.9), RMSEA (<0.05 good,0.05-0.08 accept, 0.08-0.1 marginal), χ 2/df (<3 good, <5 acceptable) (45).

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patients with T2DM, which is regarded as strong. In addition, the coefficient of determination of self-compassion amounted to 70%, which is strong. Table 4 shows the standardized path coefficients, and Figure 2 displays the final research model.

According to the estimated indicators, the results indicated the fitting of the structural relationship of perceived stress with psychological well-being and self-care behaviors through the mediating role of self-compassion in patients with T2DM. Table 4 shows the results of direct relations of research variables in the final model (modified) and the final model's standardized coefficients of all paths and critical amounts.

Table 5 shows the results of mediating relations using the bootstrapping test in

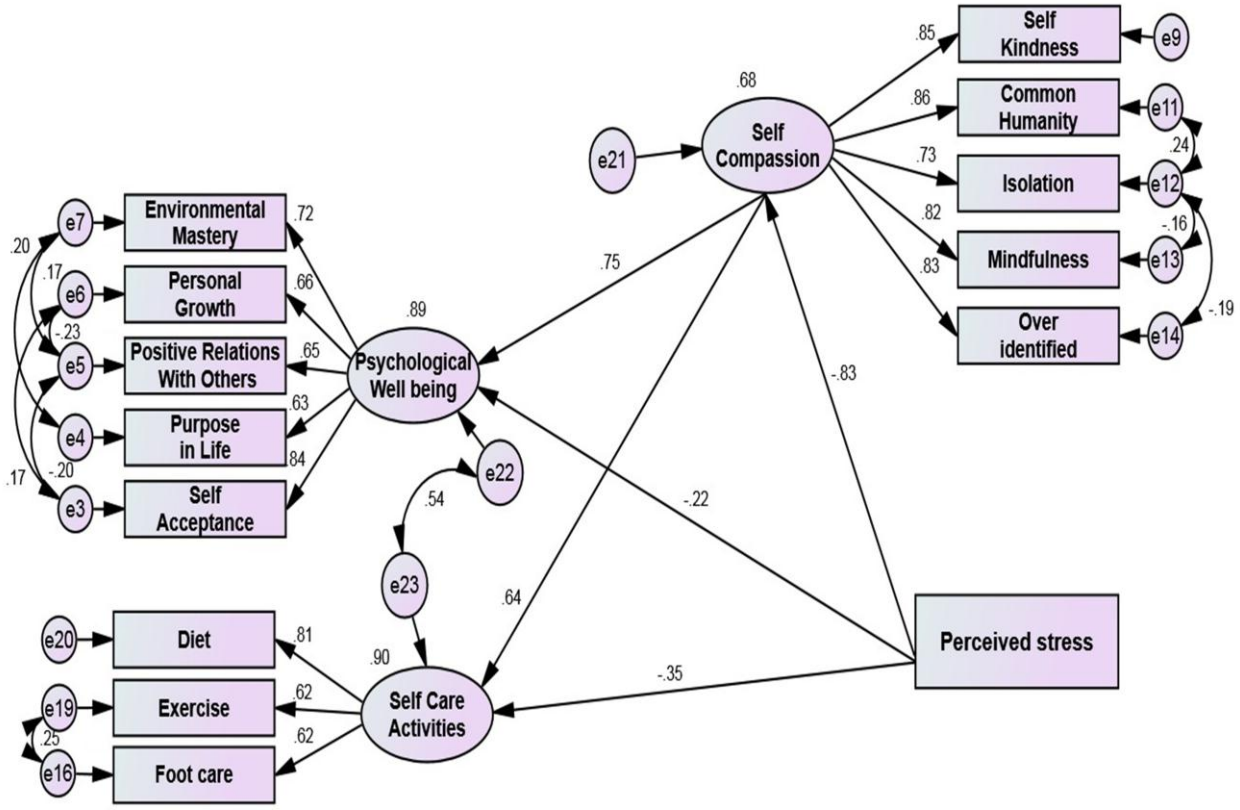


Figure 2. Standardized coefficients of the final model concerning the structural relationship of perceived stress with psychological well-being and self-care behaviors through the mediating role of self-compassion in patients with T2DM

Table 4. The standardized coefficients of paths of the final model (modified)

Path	Coeff	SE	C.R.	*P*
Perceived stress → self-compassion	-0.826	0.018	-18.432	< 0.01
Perceived stress → psychological well-being	-0.223	0.038	-3.405	< 0.01
Perceived stress → self-care activities	-0.354	0.022	-4.435	< 0.01
Self-compassion → psychological well-being	0.751	0.107	9.949	< 0.01
Self-compassion → self-care activities	0.636	0.063	6.903	< 0.01

Table 5. Results of bootstrap for indirect path of final model

Pasths	Data	Boot	Bias	SE	*P*	95%CI Lower	95%CI Upper
Perceived stress → self-compassion → psychological well-being	-0.4396	-0.4396	-0.0000	0.0387	0.0001	-0.5171	-0.3642
Perceived stress → self-compassion → self-care activities	-0.2787	-0.2865	-0.0078	0.0502	0.0001	-0.3764	-0.1804

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Preacher and Hayes' (58) MACRO program to test the mediating paths. The final model has two indirect or mediating paths (Figure 2). The bootstrapping technique was used to determine the significance of the mediating relation and the indirect impact of the independent variable on the dependent variable through mediation.

In accordance with Table 5, zero is outside the confidence distance and is significant. Therefore, self-compassion plays a mediating role in the relationship of perceived stress with psychological well-being and self-care behavior. Thus, it deducts -0.4396 and -0.2865 units from the relationship of perceived stress with psychological well-being and self-care behaviors respectively.

Discussion

The results suggested that self-compassion plays a mediating role regarding the relationship between perceived stress and psychological well-being. In other words, self-compassion reduces the destructive effects of perceived stress on the psychological well-being of diabetic patients. Per these findings, self-compassion can be regarded as a mechanism that reduces the harmful effects of perceived stress on psychological well-being. This finding corresponds to a part of the results of the previous studies (24-27).

When individuals experience positive emotions, they feel more secure and capable of coping with stress. Consequently, they will perceive that situation as positive. Positive emotions have a constructive effect on coping strategies when faced with stress, and it plays a vital role in improving their psychological health. Considering that perceived stress is a negative emotion, it is decreased by improving the individual's health, and as a result, the psychological well-being is expected to be reduced. Consequently, it is logical that perceived stress has a destructive effect on psychological well-being. However, when self-compassion is included in this relation, the destructive effects of the perceived stress on psychological well-being are reduced. To enjoy self-compassion, individuals must not fiercely criticize themselves due to their failures or inability to meet standards. Self-compassion provides people with the emotional comfort to view themselves clearly without fear of self-blame, allowing them to observe precisely and alter problematic thinking patterns. As a result, self-compassion does not lead to passivity (37).

Individuals with greater levels of self-compassion reported better psychological health than those with lower levels of self-compassion. They nurture positive emotions, motivation, and hope to further endeavors instead of hopelessness and avoid the effects of failure and isolation (51). Finally, all these factors reduce perceived stress and improve psychological well-being. The results of this study matched those of previous studies (34-36,38,44).

The results indicated that self-compassion mediates the relationship between perceived stress and self-care behaviors. In other words, self-compassion reduces the destructive effect of perceived stress on the self-care behaviors of diabetic patients. Per this finding, self-compassion can be regarded as a mechanism to reduce the harmful effects of perceived stress on self-care behaviors. Perceived stress or psychological pressures cause practical changes in the body's internal environment, such as changes in the process of the majority of hormones like cortisol. If it continues for a lengthy period, it may result in various physical or psychological disorders. Different types of stress impact the process of hormone secretion, particularly cortisol and catechol secretion, increasing the concentration of these two groups of hormones, and these two groups of hormones have a significant role in increasing plasma glucose. Stressful events cause disruption in self-care and health-preserving behaviors in diabetic patients. These patients postpone their insulin injections, do not test the blood glucose accurately, and are reluctant to do exercise. This is quite crucial since diabetes is a self-deception disease, and stress can cause disruption in self-deceptive behaviors (23).

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On account of their innate concerns regarding the possibility of facing a dangerous situation, individuals with higher levels of stress forget self-care regarding some types of food or drug intake, which affects their blood glucose. Stress has adverse effects on health, especially in diabetic patients. It can disrupt the control of diabetes by directly affecting diet, exercise, or other self-management behaviors. On the other hand, it was specified that a healthy lifestyle and higher ability to manage stress is associated with the considerable increase of improvement of self-care behaviors. This part of the finding corresponds to the results of the previous studies (18-22).

When self-compassion is introduced to this relationship, the negative effects of perceived stress on self-care behaviors are minimized, and individuals' self-care behaviors may improve. Self-compassion has a positive role in the health and health-related behaviors of diabetic patients. Self-compassion enables individuals to be kinder to themselves instead of judging themselves, support themselves against disease, perform more healthy behaviors, and increase their self-care and protective behaviors (39,41). On the other hand, self-compassion, self-kindness, and shared humanity have a relationship with reducing negative emotions in patients. It can predict adherence to treatment and self-care behaviors. Accordingly, it can be argued that self-compassion constituents components that can affect individuals' ability to record emotions and use the information to direct thoughts and actions, and influence individuals in emotional regulation (43).

The limitations of this study include conducting the research merely on T2DM patients. It does not include all diabetic patients. Thus, generalizing the results of this research to all diabetic patients must be carried out with caution. In addition, the questionnaires were self-report, and patients might have estimated their problems more than or less than what they actually are. This research was carried out on diabetic patients aged 40 to 70, and it cannot be generalized to other groups. Given the importance of self-compassion in the psychological health of diabetic patients, future research should look at the impact of self-compassion interventions on diabetes patients' glucose control. Such study should also consider its effectiveness in association with psychological and exercise-based interventions.

Conclusions

Self-compassion can help improve psychological well-being and self-care behaviors, and also provide a basis for reducing stress in T2DM patients. Self-compassion, and especially effectively dealing with stress, which is regarded as a life skill, can be influential in providing, preserving, and promoting diabetic patients' psychological well-being, reducing the negative effects of perceived stress, and strengthening psychological health and self-care behaviors.

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Conflict of Interest

The authors report no conflicts of interest

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