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# The effectiveness of self-control and communication skills on emotional regulation, perceived pain severity and self-care behaviors in diabetic neuropathy

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## **Abstract**

**Introduction:** The purpose of this study was to examine the effectiveness of self-control training and communication skills on emotional regulation, perceived pain severity and self-care behaviors in diabetic patients with neuropathy.

**Materials and Methods:** The research sample of this clinical trial consisted of 30 cases (15 in experimental and 15 in control group) who had diabetic neuropathy and referred to the health center of Mashhad, Shahid Ghodsi Health Center. The instruments used in this study included the Graces Emotion Disorders (DERS), McQueen Pain Questionnaire (MPQ), self-care behaviors questionnaire for Tubert and Glasgow's diabetic patients. Data analyzed by descriptive statistics and analytical statistics (covariance analysis) and SPSS software.

**Results:** Based on the findings, self-control training and communication skills are effective significantly on emotional regulation, perceived pain severity and self-care behaviors in diabetic patients with neuropathy ( $P < 0.000$ ).

**Conclusion:** Self-control training and communication skills can be used in combination with medical treatment and psychological therapy to increase improvement in patients with diabetic neuropathy.

**Keywords:** Diabetic neuropathy, Emotional regulation, Perceived pain, Self-care behaviors, Self-control

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Diabetes mellitus is a chronic disease that is characterized by malformation in the metabolism of glucose due to drawbacks in the production or use of insulin hormone (1). In the category of psychiatry, diabetes is included in the category of psychiatric illnesses. In this category of diseases, the role of behavioral pattern and psychological stress in the incidence and persistence of physical illnesses is discussed, which is one of the most important structures affecting emotional regulation and perceived pain severity of these individuals and self-care behaviors (2). It affects all types of nerves including peripheral nerves (sensory-motor), auto nerve and spinal nerves (3). Symptoms of neuropathy are different and depend on the type of nerve involvement. If the motor nerves are involved, the patient will no longer be able to perform his actions (4). Diabetic nerve neuropathy is a common and debilitating disorder of diabetic patients, which causes many discomforts and a decrease in quality of life. Since the disease is chronic and non-curable and affects many aspects of everyday life, it requires long-term care and treatment, so that life-style lifestyle changes may be necessary (5). Diabetic nerve neuropathy also has psychological complications in addition to dangerous physical complications. Depression is one of these mental and emotional complications. Anxiety is also very common in people with all of the five patients suffering from depression (6). Self-control and communication skills are one of the skills of thinking that helps patients to learn to control their feelings and behaviors in order to make a good decision, as well as to reduce impulsive and effective coping with frustration. Self-control in psychology teaches that a person enhances his spiritual ability so that when the mind decides, the spirit can not resist. Therefore, self-control is seen in adapting the reaction to action in

accordance with time, place, and rational condition (7). Effective communication is a verbal and non-verbal relationship between two or more people, in which individuals can express their beliefs, desires, needs and excitements, and somehow feel satisfied (8). The emotional regulation is not just to suppress undesirable excitement, but to always show one's excitement in a calm condition (9). The goal of regulating excitement plays an important role in our compatibility with stressful life events. The setting of emotions is a sign of physical and mental health. Excitement plays an important role in various aspects of life, such as adaptation to changes in life and stressful events. Basically, excitement can be regarded as a biological response to situations that make it an important or challenging opportunity, and these biological responses are accompanied by the response we give to environmental events (10). Based on the existing components, the main thrills are fear, surprise, anger, hatred, discomfort and joy, and another type of excitement is a combination of thrills that are a combination of the main thrills (11). Pain is a complex, multifaceted, and subjective experience. The report of the pain depends on several factors, including the cultural context, previous experiences, the meaning and concept of the situation in which the person is located, personality variables, attention, the level of arousal, excitement, and reinforcement congregations. The severity of pain is undoubtedly the most important aspect of pain, and various methods have been developed to evaluate it. There is a strong interest in developing reliable and valid methods for pain assessment and many efforts have been made in this area (12). Self-care behavior is a key concept in promoting health and is an exercise in which each person uses his knowledge, skill and

ability as a source to care for his health independently (13). Self-care covers the areas of health promotion, lifestyle modification, disease prevention, symptom assessment, health care, disease treatment, and rehabilitation (14). Self-care goals are aimed at increasing the motivation of individuals, increasing the level of health literacy, improving the quality of life, self-confidence in individuals and lifestyle modification (15).

Supervision of behavioral change through self-control education involves three stages: 1. Monitoring and strengthening target behavior, 2. Self-monitoring, self-directed behavior, self-modeling and self-control, 3. Natural control of behavior through the effects of natural environment (16). Multivariate self-care program for diabetic nerve neuropathy usually involves determining blood glucose, diet, exercise, medication and body weight control and training (17). Diabetic nerve neuropathy involves life-long self-care behaviors. One of the most important factors in controlling the disease, improving the process and outcome of treatment in diabetic patients is compliance with treatment and treatment regimens (18).

Stress management training can be effective in reducing depression and even controlling blood glucose in diabetic patients with type 2 diabetes. This type of training is recommended as part of comprehensive diabetes care and treatment (19). A significant percentage of patients with diabetic nerve neuropathy have psychiatric problems. The findings also suggest the need for psychological evaluation of these patients for early diagnosis and, if necessary, the addition of psychological treatments to common therapies (20) showed that the level of self-care behaviors among the participants in this study is not favorable and multiple factors of demographic variables to

psychological variables affect self-care behaviors in diabetes. Given the predictive power of the structures of this study, it is anticipated that other structures from different theories are also effective in self-care behaviors (21). Research on diabetics and their self-efficacy showed that self-efficacy in diabetic patients was not at the desired level and needs to be promoted in self-care programs (22). Stress management training can be helpful as part of comprehensive care for patients with diabetes nerve neuropathy (23). Individual, social, and economic factors can effect the quality of life in patients with diabetes nerve neuropathy (24). The findings also found that controlling the emotions by diabetics reduced the incidence of complications of diabetes effecting the blood vessels associated with heart disease and stroke and blood vessels associated with kidney disease, eye diseases and neuropathy from 13% to 28% (25).

Accordingly, the purpose of this study was to investigate the effectiveness of self-control education and communication skills on emotional regulation, perceived pain severity and self-care behaviors caused by nerve neuropathy in diabetic patients.

### **Materials and Methods**

After approval by obtaining a referral from the Islamic Azad University of Science and Research Branch of Neishabour to the Health Department of Mashhad University of Medical Sciences, the provincial health center, after obtaining the necessary permissions and coordinating with the Health and Treatment Center of Shahid Qodsi, sampling was carried out in Mashhad, regarding the importance of ethical considerations, the researchers received written consent from the participants and they were asked to answer their demographic data in full before answering the questionnaires (age, sex,

marital status, duration of disease, educational level, weight, year of birth, center case, type of neuropathy, paresis, muscle weakness, limb pain, impotence, behavioral disorder, etc.) were completed before the test. In both groups, the questionnaires were completed. Communication skills for the experimental group were delivered as lectures, questions and answers, and group discussions and tools. The samples included 30 diabetic patients with diabetic neuropathy in the mentioned health center were randomly assigned to intervention and control groups. Major inclusion criteria of the study included patients who confirmed and noted the symptoms of neuropathy in the case. Patients with type 2 diabetes who have most of the symptoms, such as pain, paresthesia, pain in the limbs and legging at night, patients with both sexes, disease duration more than five years, patients who are on special age domain as 47 years or older are allowed to enter the study because the diabetic nerve neuropathy occurs at an advanced age. The major exclusion criteria included patients with type 1 diabetes, patients who have not filed a case at the health center, patients who have not been diagnosed with neuropathy in the case and the patients who were younger than 47 years, as the neuropathy of the diabetic does not occur at an early age. A pre-test was performed from 15 patients in the experimental group and simultaneously, 15 patients in the control group were pre-test. After the work, both post-test groups were taken. The type of clinical trial study was registered and approved at the Iranian Center for Clinical Trials (IRCT) with code of IRCT20171228038109N2.

Research instrument

A) *Emotion Regulation Disorders Questionnaire (DERS)*: In the present study, this questionnaire, designed by Kim Graz,

was first designed and evaluated in 2004 to assess emotional regulation disorders. This questionnaire is a self-report indicator, which is more exhaustive than the tools available for emotional regulation. It has 36 scales and 6 subscales which concluded: subscales of non-acceptance of emotional responses that are inquiries, 11,12,21,23,25,29/ disruptions in targeting behaviors, as in questions 13,18,20,26,33/ impairment of impulse control, which is related to the questions 3,14,19,24,27,32/ lack of emotional awareness, which is related to questions 2A,6A,8A,10,17,18,20A,26,33/ limit on strategies of excitement with questions 15,16,as 22A,28,30,31,35,36 and subscales lack of transparency emotional as questions 1A,4,5,7A and 9 measured and question mark as to reverse scored. Cranbach's alpha method was used to determine the reliability of the emotional adjustment disorder questionnaire, which was equivalent to 77%, which indicates the acceptable coefficients of the questionnaire. Higher scores represent more difficulty in setting up excitement. Grace has validated the validity of this questionnaire by 93%, and its reliability has been calculated by Cronbach's and Dvoras alpha, which is 86% and 80% respectively, which indicates the acceptable coefficients of the emotional adjustment questionnaire, its score is correlated with Zakarman's excitement score and positive correlation. There is a significant difference between them, which indicates that the emotional regulation questionnaire was considered necessary ( $P=43\%$ ,  $R=26\%$ ,  $N=59$ ).

B) *McQueen Pain Questionnaire (MPQ)*: Based on the classification of Melzac and Casey, it is based on the pain experience (26). A group of researchers finds it an appropriate alternative to scales that measure pain only in terms of its differential sensory-perceived size. The questionnaire

has three parts independent of each other: A: The current pain intensity is a descriptive one, similar to the verbal scale of pain and has six descriptors as follows: 1) No-pain, 2) Mild, 3) Uncomfortable, 4) Forerunners, 5) Terrible, and 6) Deadly. B: Full-length image of a person facing and behind which the patient should use its location to mark their pain on the shape. C: The pain grading index has 78 attributes, and these attributes are arranged in an inequality in the form of 20 groups. Most of the emphasis was on the patient. 42 sensory attributes, 14 emotional dimensional attributes and 5 lateral cognitive attributes of pain. The remaining 17 traits are classified as different groups. These 20 sets of goals aim at measuring individuals' perceptions of sensory perception, emotional perception, pain perception, and pain assessment (27). If the respondent does not know any of the terms according to his description of pain, a zero score is awarded. To obtain the score for each dimension, the sum of the points of that score is added together and we calculate the total score of the individual questions in order to obtain the overall score. The higher score indicates the higher perception of pain in the responder and vice versa. In Dorkin's research, the validity of this questionnaire has been approved. Its reliability was also calculated using Cronbach's alpha. Alpha's coefficient for all dimensions was between 83% and 87% (28).

*C) Self-care behaviors questionnaire for diabetic patients:* The questionnaire was developed by Tubert and Glasgow (1994), which allows the subjects to report the quality of their self-care activities over the past seven days (29). The questionnaire includes questions about following a healthy diet, correct and timely medication administration, self-monitoring of blood glucose, regular physical activity and foot care. The instrument is a reliable report that

in the original version has four aspects of personal management on dietary diabetes, exercise, blood glucose monitoring and injection (in the new version, five aspects are diet, exercise, blood glucose testing, foot care and smoking) in the past seven days. How to rate this scale is that a person who has not self-care behaviors in the past seven days in the fields mentioned above has a zero score and a person who takes care of the day in full for seven days receives score of 7, and the other person will score between 0 and 7 on the basis of all the days that he or she carries care. The grading method is based on the 5-point Likert spectrum which includes five subscales: 1-Nutrition, 2-Physical activity, 3- Self-monitoring of blood sugar, 4- Foot care and 5- Tobacco use.

For all of the above, high scores represent good self-esteem according to this questionnaire by Niknami et al. In 2013 with the aim of measuring and measuring self-care behaviors in patients with diabetes, based on the theory of Bandura self-efficacy construct and Tobber and Glasgow Self-Care Questionnaire (1994), a questionnaire was developed. The range of scores in this questionnaire varies between 17 and 85, based on the 5-degree Likert spectrum. Its validity has been evaluated by Niknami and colleagues in various ways such as face validity, content validity and construct validity, factor analysis and exploration. Also, its reliability has been evaluated using two methods of internal consistency and retest. Cronbach's alpha coefficient was used for each field and the entire questionnaire. The Cronbach's alpha coefficient for the whole questionnaire was 85% and the reliability of the questionnaire was tested by a re-test method, which was reported as 81%. The higher scores in the questionnaire show the higher self-care behaviors in diabetic patients (30). The baseline data in

one of the researches showed internal consistency with acceptable Cronbach's alpha coefficients for diet (64%), exercise (83%), and blood glucose (80%). However, the coefficient for insulin injection was low. In a research study (31), reliability, validity and normative data of the seven related studies were collected and revealed that the Tubert and Glasgow questionnaire was a reliable indicator for self-management of diabetes (32).

**Results**

In this research, the effectiveness of self-control training and communication skills on emotional regulation, perceived pain severity and self-care behaviors on 30 diabetic patients with nerve neuropathy at the Shahid Ghodsi Center for Comprehensive Health Services in Mashhad were studied. Demographic characteristics of patients are shown in Table 1.

**Table 1.** Descriptive data of the educational level

	Number	Illiterate	Under the diploma	Diploma	Associate degree	Bachelor	MA
Experimental Group	15	3	3	2	3	3	1
Control group	15	2	2	7	1	3	0

In Table 1 and 2, descriptive information about age and duration of illness and educational level has been reported. The emotional regulation, the severity of perceived pain and the level of self-care behaviors are dependent variables that were evaluated among the sample of the study, which included 30 people. The mean of emotional regulation in the experimental group was 140.13 and 122.46 in the pretest and control group was 131.46 in the pretest and 133.86 in the post-test. The mean of perceived pain severity in the experimental group was 33.06 in the post-test and 46.73 in the pre-test and control group 48.33 in the pre-test and 47.60 in the post-test.

Variable	Group	Mean	Number	SD	Min	Max
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The mean of the self-care behaviors in the experimental group in the pre-test 34.46 and 48.46 in the post-test and in the control group in the pre-test 37.26 and 36.36 in the post-test. Therefore, in Table 3, the statistical indicators including the mean, standard deviation, minimum and maximum values for this variable were presented.

**Table 2.** Descriptive data of age and duration of disease

Age	Experimental group	62.46	15	8.40	48	76
	Control group	60.13	15	10.70	47	78
Duration of the disease	Experimental group	9.40	15	4.51	4	17
	Control group	8.46	15	3.27	4	16

**Table 3.** Descriptive statistics of emotional regulation variable, perceived pain severity and self-care behaviors

Variable	Group	Test	Number	Mean	SD	Min	Max
Emotion regulation	Experimental	Pre-test	15	140.13	11.43	117	157
		Post-test	15	122.46	10.04	100	140
	Control	Pre-test	15	131.46	8.87	116	147
		Post-test	15	133.86	7.33	117	143
The severity of perceived pain	Experimental	Pre-test	15	46.73	7.12	30	56
		Post-test	15	33.06	6.98	19	46
	Control	Pre-test	15	48.33	6.58	40	62
		Post-test	15	47.60	6.74	38	60
Self-care behaviors	Experimental	Pre-test	15	34.46	4.65	25	44
		Post-test	15	48.46	5.89	35	56
	Control	Pre-test	15	37.26	6.18	27	47
		Post-test	15	36.36	6.70	23	47

In Table 4, the results of normalization tests for each group in both control and experimental groups were presented in two stages: pre-test and post-test along with the amount of Kolmogorov-Smirnov statistics. According to the results of Table 4, it is seen that for all the variables studied in the two

groups, the control and the test in two stages of pre-test and post-test, the value of P-value is greater than 5%. Therefore, the assumption of the normalization of variables in the groups and the stages has been confirmed.

**Table 4.** Kolmogorov Smirnov test related to the variables of the research

Variable	Group	Test	Kolmogorov-Smirnov statistics	Significance level	Result
Emotion regulation	Experimental	Pre-test	0.664	0.770	Normal
		Post-test	0.573	0.898	Normal
	Control	Pre-test	0.513	0.955	Normal
		Post-test	0.498	0.996	Normal
The severity of perceived pain	Experimental	Pre-test	0.517	0.952	Normal
		Post-test	0.399	0.997	Normal
		Control	Pre-test	0.661	0.776
	Post-test		0.669	0.763	Normal
	Self-care behaviors	Experimental	Pre-test	0.476	0.977
Post-test			0.614	0.846	Normal
Control		Pre-test	0.629	0.824	Normal
		Post-test	0.527	0.944	Normal

In Table 5, the results of the experimental tests for variables in both the control and experimental groups, along with the amount of Levine's statistics, are presented. It should

be noted that in the homogeneity test of Levin's variances, the corresponding P-value is larger than the level of 5%.

**Table 5.** Levine test

Variable	Levine's statistics	Degree of freedom 1	Degree of freedom 2	P	Result
Emotion Regulation	0.138	1	28	0.714	Homogeneous
The severity of perceived pain	1.139	1	28	0.295	Homogeneous
Self-care behaviors	2.850	1	28	0.102	Homogeneous

Based on the results, the significance level for all variables is greater than %5, so with a probability of %95, the homogeneity assumption of the slope of the regression lines is observed. Also, considering the result of the box test, a significant level ( $\alpha=0.872$ ) was greater than the critical level ( $\alpha=\%5$ ), with the probability of %95 homogeneity of the variance-covariance matrices.

The result of multivariate covariance analysis and Wilkes Lambda statistic was significant. As a result, there is a significant difference between the two experimental and control groups in terms of the average moderated dependent variable (emotional regulation, perceived pain severity and self-care behaviors) with a %99 probability, so it can be said that between the experimental group and at least one control group.



According to Table 6, there is a significant difference between the research groups and the amount of significant level obtained (0.000) is smaller than the alpha value corrected by Benfrony ( $\alpha=0.05$ ). Consequently, with the probability of 99% self-control training and communication

skills on emotional regulation, perceived pain severity and Self-care behaviors are effective in diabetic nerve neuropathy patients. The effect of Eta squared is about 72% of emotional regulation, 87% of perceived pain severity and about 84% of self-care behaviors.

**Table 6.** Results of the covariance analysis test

Variable	Source of change	Sum of squares	Degree of freedom	Average of squares	The statistics F	Effect size Eta	Significance level
Emotion Regulation	Group	1639.71	1	1639.71	66.69	72%	0.000
	Error	614.66	25	24.57			
The severity of perceived pain	Group	890.19	1	890.19	177.15	87%	0.000
	Error	125.62	25	5.025			
Self-care behaviors	Group	1057.69	1	1057.69	137.37	84%	0.000
	Error	192.47	25	7.699			

**Discussion**

The package of this study was based on the Practical Guide to Behavioral Self-Conduct Strategies Training, as well as the Communication Teaching Therapeutic Package (33,34), which was performed over a 10 weekly 90-minute session on the experimental group. The questionnaires used in this study were Tubert and Glasgow Self-Care Questionnaire, McGill Pain Questionnaire, and Graz's Thriller Adjustment Questionnaire. The research was conducted on a sample of 30 subjects (15 cases in experimental group and 15 cases in control group) with diabetic nerve neuropathy in Mashhad. The results showed that after adjusting the pretest scores, the difference between the post-test scores of both experimental and control groups was significant for the emotional adjustment. In the other words, self-control training and communication skills with respect to the

average of difficulty in emotional regulation in the pre-test stage compared to the average of difficulty in the emotional regulation of the control group caused a significant decrease in difficulty in the emotional regulation in the experimental group. The effect or difference level showed that 72% of the differences in the post-test scores in the emotional regulation in diabetic neuropathy were related to the effect of self-control education and communication skills, and this resulted in the average post-test scores of difficulty in emotional regulation of the experimental group is less than the control group. As a result, the decrease in the mean scores of the experimental group compared to the control group in the post-test in difficulty in emotional regulation due to the acquisition of self-control, educational intervention and communication skills in the experimental group. In a study titled "effectiveness of communication skills

training on emotional adjustment of conflicted couples" showed that communication skills training has an effect on the emotional adjustment of couples who are conflicting, which is consistent with the result of this research (35). In another study titled "comparison of the effectiveness of communication skills training and problem solving skills on emotional cognitive impression in secondary high school students in Miami", both communication skills training and problem solving skills had a positive effect on cognitive-emotional regulation (36). Also, the difference in the effectiveness of problem-solving skills in comparison with communication skills was significant and the results of this study were consistent with the results of this study. In a study titled "the effect of self-control training on emotional well-being and prevention of recurrence among addicted people", self-control training has increased the strategies of positive excitement regulation, emotional recognition and emotional processing, and reduction of negative emotion control strategies, emotional deficits and tempting beliefs in the experimental group compared to the control group at the post-test stage. This finding is consistent with the result of this study (37). In a research titled "relationship between emotion regulation and cognitive self-control" in subjects with substance dependency, cognitive self-control with negative components of emotion regulation and external control source had a positive relationship with positive components of emotion regulation and internal control source (38). In the explanation of the results obtained in this hypothesis, according to the theoretical and research suggestion of emotion regulation, there are many indications that emotional regulation is related to success or failure in various areas of life (39). The study of literature and

psychological studies show that emotion regulation is an important factor in determining health and having a successful performance in social interactions and the defect in emotional regulation is associated with the inbound and outburst disorders (40). Therefore, it can be stated that the presence of the component in the training of self-control skills and communication skills, especially communication skills have had the ability to influence social interactions, which has led to increased emotional regulation in these individuals. According to the results, after the adjustment of the pre-test scores, the difference between the post-test scores of the two experimental and control groups is significant for the severity of perceived pain. In other words, self-control training and communication skills with regard to the mean perceived pain severity in the pre-test stage compared to the mean perceived pain severity of the control group, significantly decreased the perceived pain severity of diabetic neuropathy in the experimental group. The effect or difference level showed that %87 of the differences in the post-test scores of the perceived pain severity in diabetic neuropathy were related to the effect of self-control education and communication skills, and the mean scores of the post-test were the perceived pain severity in the experimental group, less than the control group. As a result, the decrease in the mean scores of the experimental group compared to the control group in the post test was the perceived pain severity due to the acquisition of self-control training and communication skills in the experimental group. In a research entitled "effectiveness of cognitive therapy, mindfulness on perceived pain severity and performance limitations in women with chronic pain in the aging process", found that age is primarily related to perceived pain severity and performance limitation in patients with

chronic pain. Also, cognitive therapy of mental presence has been effective on the perceived pain severity, which is consistent with the result of this research (41). In a research on the effect of cognitive-behavioral therapy on the severity of pain and mental health of women with chronic low back pain referring to specialized clinics in Tehran, cognitive-behavioral therapy was effective on pain severity and mental health. The findings of this study were consistent with the results of the present research. The psychological models of chronic pain, such as avoidance fear model, show that the way people interpret or respond to their pain is an important determinant of pain experience (42). Catastrophic pain is an exaggerated and negative trend toward actual or predicted pain experience (43) which increases the severity of pain, disturbances and disability in patients with chronic pain (44). Hence, teaching self-control skills and communication skills leads to an increase in negative feelings about indigestion, and this expression of emotion to pain alone can reduce the negative impact of this experience and thus the individual experiences less pain.

According to the results, after the modification of the pre-test scores, the difference between the post-test scores of the two experimental and control groups was significant for the self-care behaviors variable. In other words, self-control training and communication skills with respect to the mean of self-care behaviors in the pre-test stage compared to the mean of self-care behaviors in control group significantly increased the self-care behaviors of diabetic neuropathy in the experimental group. The effect or difference level showed that 84% of the differences in the post-test scores of self-care behaviors in diabetic neuropathy were related to the effect of self-control education and

communication skills, and the mean scores of post-test self-care behaviors were higher in the experimental group. As a result, the increase in the mean scores of the experimental group compared to the control group in the post-test of self-care behaviors was due to self-control educational intervention and communication skills in the experimental group. In a study titled "the effect of Orem's self-care pattern education on communication performance of nursing students", Orem self-care model education was effective on the communication performance of nursing students. The findings of this study are consistent with the results of this research. In a research on the effectiveness of education problem and self-care attitudes and quality of life in type 2 diabetic patients, the educational program has been based on the knowledge of self-care attitude and effective life quality. The findings of this study are consistent with the results of this study. Patients with diabetes, due to the consequences of illness and treatment, will face changes in self-care behaviors to deal with their illnesses (45). These people are constantly exposed to tensions and stress, due to the constraints imposed by their illness, hence reducing the level of agony, increasing stress and tensions, reduces their level of hope and, as a result, abandon their behaviors they can be cared for, but with the training of self-control skills, components and the points in which they are taught to these patients, the change in the above components leads to an increase hope in patients, which hopefully at the end leads to motivation and further efforts are being made to implement self-care programs for these patients.

Among the limitations available to the researcher, some of them are following:

1. The information and data were collected through subject self-reporting and by a questionnaire, which is always influenced by

several influential factors such as respondents' tendency to provide community-friendly responses. 2. Another limitation is the absence of a follow-up period in the current study. Due to the chronicity of diabetes and the limited duration of the disease, and the need to pay particular attention to self-care behaviors and there is a shortage of follow-up period. 3. Insomnia and, consequently, the inability of some patients to attend training sessions and an intruder voice outside the sessions that were related to other clients to the clinic; 4. The lack of similar research in the country and even abroad was one of the most important limitations. The research is not feasible to compare the results of this study with the results of similar studies.

Suggestions for future research: 1. It is suggested that further investigations should be held at interim intervals over a longer period of time. 2. It is suggested that researchers should be advised to evaluate the effect of time on the amount of preservation of therapeutic outcomes. Researchers in future research can follow the samples as long as preferably six months. 3. It is recommended that therapists and researchers recommend future research and evaluation by independent individuals who are not aware of the research objectives, thereby reducing the potential misjudgment of the data obtained. 4. It is suggested that future research into the broader statistical society be investigated. 5. It is suggested that other interventions be conducted with different approaches and compared. 6. Future studies suggest that patients with diabetic nerve neuropathy should be considered at a wider level. 7. It is suggested that the study be conducted in other communities and compare the results with each other.

Recommendation for use: 1. It is suggested that self-control strategy and communication skills be used in diabetes centers and clinics

as a strategy for changing the behavior of affected patients; 2. Using different educational methods for better informing the community. Including providing educational programs and distributing them from the media. 3. Considering the effect of self-control training and communication skills and changing the behavior of patients in this study, educators in health centers can be trained by self-control training methods and learned the communication skills.

### **Conclusion**

Generally, in the first place, in diseases like diabetes, heart disease, etc., the first line is self-care because without self-care behaviors, therapeutic treatments will not be practically accountable, and since these patients can not tolerate more accurate diets, exercise and whatever they are included in their self-care plan, and are tense due to the nature of the illness and the unknown consequences of that disease and can not manage and regulate their negative emotions properly and as a result, their symptoms and physical manifestations, such as pain, may show a high sensitivity, which can lead to increased perceived pain. Therefore, considering the importance of the relationship between the factors of self-control training and communication skills with self-care behaviors, adjustment of excitement and perceived pain severity, these trainings have been able to perfectly improve the above components and, as a result, self-control training and communication skills as factors influencing therapeutic outcomes and strong predictors for the treatment of these patients alongside medical therapy as complementary therapies.

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