

## The Effectiveness of Stress Immunization Teaching on Reducing Stressful Psychological Feelings and Blood Glucose Control in Patients with Type 2 Diabetes

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**Abstract:** The results of some studies show that there are some psychological problems in people with diabetes, such as depression. The effectiveness of Stress immunization teaching on reducing stressful psychological feelings, stress, self-negative labeling and lack of self confidence. In order to determine the effectiveness of stress immunization teaching on reducing stressful psychological feelings and blood sugar control in patients with type 2 diabetes, the study was done in Tonekabon diabetics association. This is a pretest-posttest study with control group. 750 patients with diabetes comprise the study samples. Among the given sample, 275 were randomly selected and were evaluated by filling a questionnaire and taking their FBS test among whom 24 people were singled out in 2 groups of experimental and control groups. The therapeutic treatment (stress immunization teaching) was conducted in 8 sessions for the experimental group along with two preliminary and final analyses for both groups. The patients under study were selected randomly and those with grade over 21 and their inclination to take part in the study were included in the study. This feeling was reviewed, by the Marghan's measure for feeling of emotional pressure. Also, by performing the blood sugar test, the extent of their blood sugar was recorded. Among them people who had the highest emotional pressure were selected and randomly divided into two groups, each consist of 12 patients. They were given consultant. After the end of interferences, they were tested again. Obtained data were studied by SPSS soft ware 10th edition and ANCOVA covariance statistical test. There are some meaningful differences between the pre-and post test level of psychological pressure. The results of the blood sugar test were also indicating the reduction of the level of blood sugar and reaching optimal level of blood sugar control and blood sugar control in people with diabetes type 2.

**Key words:** Stress immunization • Blood glucose • Patients • Diabetes

### INTRODUCTION

Diabetes is the body malfunctioning in consuming and changing the carbohydrates into the body energy. Diabetes develops when insulin (the regulator hormone for blood glucose) is not produced enough, or body tissues do not respond properly [1].

Because diabetes is a specific kind of disease, it is essential for patients to be monitored when the disease is diagnosed, therefore, special follow-up services will be very important. Another issue in this training program is giving enough awareness to the patient and giving them the required information to meet their needs [2].

Anyone who notices his being diabetic, or after test results and exposures to different treatments gets awareness of his diabetes, will be under severe series of distressing thoughts and will be confused. Everyone suffering from the diabetes on the early days and months

of his disease awareness will suffer from insomnia, mental fatigue and lack of happiness and interested in social work. Doctors must describe symptoms, treatment process and the necessary considerations for the patient and explain possibilities to control the symptoms [3].

Diabetic patients should be required to grasp information about their diet, exercise, psychological pressure control, medication use and health tips and to fully get them followed. Today, the significance of this issue is extremely important, as some researchers believe a person with diabetes should be his doctor and physician roles are as advisors; in diabetes, the prevention and continuous control is of primary importance [3].

All persons are prone to Diabetic damages in their life. Experts are looking for the times that human are entangled with diabetes. So, it is important to talk about diabetes and its sensitivity and risk factors and also what is causing it [1].

Different reasons have been known for reducing the production of insulin by the pancreas and every person may suffer from one of these following diabetes diseases [4]. One of these factors is maternal age that is those female more than 35 years are two times more likely prone to give birth to children with diabetic disorder. Another major cause can be related to hereditary factor which has been proven in twins. Scientists at California University in San Francisco discovered a new gene that produces a lot of protein, this protein make these cells resistant to insulin and the same proteins may be causing the expanding of diabetes all over the body.

Obesity can be another reason for causing diabetes. Approximately 85 percent of type 2 diabetics are overweight. An individual with a normal weight requires 50 units of insulin daily and an overweight person needs 120 units of insulin daily. Another major factor is infection. For example, mumps virus attacks the pancreas to create diabetes [2].

Short-term difficulties of diabetes include hypoglycemia, Ketoacidosis, Hyperosmolar Coma. Long-term diabetes include vision problems, renal problems, complications of the nervous – motion system and automatic reflections and heart -vascular problems [1].

Diabetes has a high prevalence in the world. A glance at the records in all countries it can be said that both developing countries and rich and prosperous societies have a high prevalence of diabetes [4].

Diabetes as a major non- epidemic diseases caused a cost of about 8 percent of the total health budgets in developed countries. From 1374 to 1404, the number of diabetic adult in developed countries will increase 170 percent from 84 million to 228 million people. Most people with diabetes in 1404 in developed countries will be the elderly over 65 years old, while in developing countries, most patients will be middle-aged that is 45 to 64 years old and this implies the fact that about 170 million people in the next 30 years in developing countries will suffer from diabetes in their best life time [5].

These predictions should make planning for health programs in all countries, especially in developing countries. Based on statistics, in 1377 the number of diabetic patients in Iran was three million people and based on the predictions during these 30 years the number will be three times more. So, the most important reason for conducting this research is prevention treatment using non pharmacological treatment [3].

Considering that the stress causes a break in the optimal control of diabetes and it seems that one of the effective methods in diabetic control is removing stress

and reduction of emotional problems related to the disease. Therefore, the psychological aspects of diabetes have played an important and special role in medical research and psychotherapy treatments [6].

The factors and facilitators which are under study for diabetes is different types of stress. Although stressful events are related with diabetes, but proving a direct connection between stress and diabetes is difficult. This issue may explain this fact that people, because of some stressful events go to a doctor and accidentally is diagnosed diabetic [6].

Today, In general, all psychologists agree that if human psychological needs is not satisfied due to preventing or dealing with lack of desired conditions, the stress and anxiety will appear and this kind of pressure will never vanish unless satisfied [7].

Today, Psychological pressure (stress) is outstandingly evident more than any other time. However, diseases such as ulcer, rheumatic arthritis and diabetes are the consequences of mental pressure; all the given cases are likely enough to certify the existence of stress in today's living which gives credit to wasting people, dreams and aspirations which are not met and children who are frustrated and deprived [8].

Stress plays a Dual (double) role of cause and effect in relation to diabetes, which means on one hand it increases glucose and consequently increases hemoglobin (HbA1C) that requires frequent times to get medication or insulin injection and on the other hand is considered to be one of diabetes complications [9].

According to clinical reports, a large number of diabetic people in spite of having the pharmacologic interventions and medical problems are facing lots of other problems in controlling diabetes. Based on psychological aspects, the results of studies indicate that these patients compared with healthy people have such symptoms of depression, anxiety, physical symptoms, interpersonal sensitivity, feeling of guiltiness, impaired body image, reduced confidence and their negative labeling [10].

In his review about ways to deal with the psychological and social properties of diabetes, Meichenbaum conducted a research on 100 juveniles suffering from diabetes and made it clear that 6 percent of the patients were suffering from loneliness and anxiety and the rest were involved with depression [11].

In another study which was conducted on other subjects aged between 9 to 18 years, it was estimated that 62 percent of patients had anxiety and stress symptoms and others were frustrated and depressed [5].

Other researches designed to investigate the efficacy of coping skills, calming down techniques and rebuilding the confidence and self-expression examined 85 of diabetic samples. Based on the result it was estimated that 80 to 85 percent of people did not learn the stress-coping skills and were anxious and depressed in stressful conditions [12] in his study on 200 adolescents with diabetes, Sartippour found that the following symptoms appeared frequently: the anxiety and fear to be involved in social matters as a person with diabetes, the inability to manage their current situation, the appalling image of diabetes in their mind, the hope for having miracle, a companion which ruined their life and being different from other adolescents [5] in explaining the common goal of the current research it can be said that the psychological pressure is the most toxic, comprehensive and destructive force of today society. This phenomenon compared to every other infective organism is more aggressive, more debilitating and more global. Current goals of the treatment include alleviating the symptoms effect, avoiding complications of acute glanders acidosis, protecting the patients from the side-effects of the treatments and preventing the long-lasting effects of the disease.

Solving all the related mal-functioning of the body on sugar (carbohydrate) metabolism forming diabetes may be the key to preventing symptoms outbreak. The Best way to maintain the diabetic people healthiness is controlling the normal ranges of the patients' blood sugar or keeping it at a normal or close to normal range. The Fundamental objective of treatment is to prevent the side-effects of glanders acidosis hypoglycemia that threaten the lives of the patients [6].

Many research findings show that variables such as stress in diabetes, adequacy of behavioral and compatibility style are related to metabolic control of diabetes in these patients. Beliefs and negative attitudes toward diabetes are considered to be cognitive problems among individuals who are unable to control their diabetes. So, It seems that psychological interventions could help such patients control their blood sugar levels effectively [13].

In this regard, few studies on adults with diabetes have been conducted, for example Mark et.al found that the application of cognitive – behavioral program in groups reduced fear and prevent disease growth, although little change in blood sugar levels was observed (14). Fosbury et.al investigated the effects of cognitive analytic therapy in adults with diabetes. The results

showed that a significant improvement in controlling the level of blood HBALC was obtained compared with the control group [15].

In addition to these findings, the Lustman et.al investigated the effect of immunization teaching against stress in depressed patients with type 2 diabetes. Results obtained from the study indicated the effectiveness of teaching this technique in controlling the disease [16].

Weist *et al.* studied the effects of psychological and social treatment on children and adolescents. The results of the study pointed to the fact that the appropriate family environment has an important effect on metabolic control of diabetic patients and emphasizes techniques such as self –expression to guide the behavior and propose other special techniques [17] in a study conducted by Liayd et.al with the help of HADS (Hospital Anxiety and Depression Scale) on type I and II diabetic patients to investigate the prevalence of psychological symptoms, the level of psychological services and simultaneous HbA1C test, it was found that patients had symptoms of depression and anxiety [18].

Ross et.al investigated the fact that whether controlling the psychological effect of the stress and anxiety would lead to diabetes control correspondingly for this purpose, five teenage girls with diabetes ranging from 15 to 18 years old who had poor metabolic control underwent a six-month period control in the hospital. The results showed that improved control on stress and anxiety had a very positive effect in regulating the diabetes control [19].

According to the recent findings from different studies about adults with diabetes, especially diabetes Type 2, the psychological interventions remarkably affects in controlling blood glucose level on one hand and reducing emotional reactions like mental pressure, anxiety and depression on the other hand. Because in our country, most diabetic patients resort to special diets or medication to treat their problem are thus cognitive therapy techniques for controlling stress and blood glucose levels in diabetic patients have not been very well-tested. Therefore, the current study has tried to test and confirm other complementary health treatments.

## MATERIALS AND METHODS

The study was an experimental pretest - post test type with control group. The sample population included all patients with diabetes in Tonekabon who summed up

to 750 men and women. All diabetic patients were members of Diabetes association in Tonekabon and their disease has been approved by physician checking. 350 people were randomly selected and psychological pressure feeling questionnaires and blood sugar test were conducted and 30 people who scored higher than 21 on psychological pressure feeling questionnaire and their blood sugar levels was high were chosen. Due to the drop in the number of subjects for their not accepting the company and lack of cooperation, the entire sample participating in this study was 24 patients in the two groups.

The Evaluation for both groups was conducted in two stages. The first stage was before medical intervention and the second stage of evaluation was at the end of treatment for both groups.

The evaluation consisted of the two tests implementation, one of which was related to the psychological pressure feeling and the other was blood sugar level. The immunization teaching against the group stress was performed in ninth stages for nine weeks each of which lasted for an hour and a half for the experimental group. Two sessions of the initial and final evaluation for the control group was also established.

#### **Summary of the Terms and Discussion Topics**

**First Session:** It was the introductory session and getting familiarity with the group members. Recognizing the cognition, goals and expectations of group members, making regulation, establishing relationship based collaboration, telling the reason for choosing members and identifying the sample.

**Second Session:** Presenting the meeting objectives, discussing the psychological pressure caused by different jobs, noting the role of thoughts and beliefs in the incidence of psychological pressure, discussing the symptoms of psychological pressure, teaching Alice 's ABC and implementing the mental conceptualization.

**Third Session:** Reviewing and discussing the previous session points, discussing the consequences and problems related to jobs psychological pressure and its effects on job wearing-down and dissatisfaction, providing muscle relaxation training and assigning homework.

**Fourth Session:** Reviewing and discussing the previous session points, reviewing the assigned homework,

teaching the role of thoughts and beliefs in the incidences of feeling and behavior, explaining the Beck Cognitive therapy, implementing the cognitive rehabilitation with the Beck approach and assigning homework.

**Fifth Session:** Reviewing and discussing the previous session points, reviewing the assigned homework, challenging the automatic and recorded negative and giving.

**Sixth Session:** Reviewing and discussing the previous session points, reviewing the assigned homework, discussing the practicality of implementing a combination of muscle relaxation and challenging automatic thoughts, teaching problem-solving and giving homework.

**Seventh Session:** Reviewing and discussing the previous session points, reviewing the assigned homework, implementing the stop-thinking skill, conceptualization of mental imaging and giving homework.

**Eighth Session:** Reviewing and discussing the previous session points, reviewing the assigned homework, implementing the positive self-assertion technique and practicing and combining it with other techniques and assigning homework.

**Ninth Session:** Reviewing and discussing the previous session points, reviewing the assigned homework, reviewing the effectiveness of the offered techniques, encouraging the members to use the techniques and continuing them, conducting post-testing and finishing sessions.

It should be noted that in both control and experimental group, no drawback was observed. The first two sessions were allocated to the first stage of teaching immunization against stress (Conceptualization). The 5 sessions after were allocated to the second stage of teaching immunization against stress (application and Prevention). And the last two sessions were allocated to the third stage of teaching immunization against stress.

In order to collect data, the following measures were taken:

- In order to assess the psychological pressure, Markham psychological pressure questionnaire was used. This questionnaire has 36 questions and those who score higher than 21 show signs of stress more than average which necessitates treatment.

- In order to evaluate blood sugar level, the blood sugar test was done in Pars laboratory in Tonekabon by lab experts. The normal range of blood glucose level is between 110-70 and those above 110 and especially above 150 show the signs of chronic diabetes regarding the ethical considerations in this study, patients were randomly selected and Markham questionnaire had been carried out on them and those who score above the 21 were talked to and the necessary explanations about the process of therapy sessions were given to them and eventually a total of 30 people All accepted to attend the meetings and even they let us capture movies all of which are available at request., Research variables in the study included:

**Independent Variables: Stress Immunization Teaching: (SIT):** This method is part of Mickenbam treatment which is mostly focusing on prevention. This method is therefore based on the fact that anxiety caused by the incompatibility triggered by the pressures between the individuals and resources and equipments for coping with pressure. Stress immunization teaching (SIT) (SIT), includes educational teaching, Socratic reasoning for cognitive rehabilitation, problem solving, relaxation training, behavioral and mental conceptualization practice, self-assertion, self-control training, self-training and taking steps to change the environment (Mickenbam, 1986).

**Dependent Variables: Psychological Pressure:** It is the physical, mental and chemical reaction of the body against events that cause fear, excitement, confusion, anger or feeling of danger.

**The Type 2 Diabetic Patient's Blood Sugar:** In these patients, there is no dependence on insulin but the main factor is obesity and as their blood sugar increases, the fat and blood pressure increases, too. In this type of

diabetes, insulin secretion is not the main problem, but the cells resistance to insulin is of high importance. The approximate amount of insulin in the blood is 70 to 110 mg in one ml of blood which will be determined by laboratory. In this study, all patients' blood sugars before the treatment intervention and during the weekly routines were tested like the way the patients did before participating in the experiment. But for data analysis, the blood glucose levels was tested before the intervention treatment and after the treatment period which was considered as the criterion were the. Blood sugar test was performed in Pars laboratory in Tonekabon. The patients in both Experimental and control groups did not to receive other drugs except for their normal diet and occasional vegetables nourishment (such as nettle).

For describing data, the descriptive statistical methods of Mean and Standard deviation were used and for analysis of the inferential data, the statistical method of covariance (ANCOVA) through SPSS software was used.

## RESULTS

In this study, 24 diabetic patients in two groups of 12 in experimental and control group which were analyzed and discussed after the intervention and the demographic data are presented in Table 1.

In the present study, descriptive data (mean, standard deviation), the pretest scores and post-test scores for both control and experimental groups are shown in Table 2.

On the first hypothesis "Stress immunization teaching is effective on reducing psychological pressure feeling in type II diabetic patients" based on the covariance statistical tests due significant F, research finding also showed that 99 percent of Stress immunization teaching is effective on reducing psychological pressure feeling in type II diabetic patients (Table 2).

Table 1: Demographic characteristics of experimental and control groups

		Experimental group					Control group				
		gender		education			gender		education		
Groups											
The age range	number	male	female	Under diploma	Diploma and upper	number	male	female	Under diploma	Diploma and upper	
30-35	3	1	2	-	2	2	1	1	-	1	
35-40	2	-	2	1	2	3	2	2	-	3	
40-45	2	1	1	1	1	3	-	2	2	1	
45-50	3	1	2	2	1	2	1	1	2	1	
50-60	2	1	1	2	-	2	1	1	2	-	

Table 2: mean, standard deviation), the pretest scores and post-test scores for both control and experimental groups

Groups	Variables	Pre-test		Post test	
		Mean	SD	Mean	SD
Experimental	Psychological pressure feeling	26.83	2.58	9.92	1.50
	Blood sugar	199.50	56.54	149.42	52.17
Control	Psychological pressure feeling	24.08	1.73	21.67	1.61
	Blood sugar	199.25	58.93	201.17	54.64

Table 3: Results of covariance analysis on reducing psychological pressure feeling for experimental and control groups

Statistical indexes	Psychological pressure feeling post test	
	Experimental	control
Number	12	12
Mean	9.92	21.67
Standard deviation	1.51	1.61
F	Evaluated F=146.587 F table =8.02 df =(1,22)	

Table 4: Results of covariance analysis on reducing blood sugar level for experimental and control groups

Statistical indexes	Psychological pressure feeling post test	
	Experimental	Control
Number	12	12
Mean	149.42	201.17
Standard deviation	52.18	54.64
F	Evaluated F=25.714 F table=8.02 df=(1,22)	

On the second hypothesis "Stress immunization teaching is effective on reducing blood sugar level in type II diabetic patients" based on the covariance statistical tests due significant F, research finding also showed that 99 percent of Stress immunization teaching is effective on reducing blood sugar level in type II diabetic patients (Table 3).

## DISCUSSION

Based on the results from this research, it was determined that Stress immunization teaching is effective on reducing psychological pressure feeling in type II diabetic patients.

Regarding the above-mentioned points, the research conducted by Zettler et.al on diabetic patients showed that stress immunization teaching reduces psychological pressure in diabetic patients that was in line with the current research.

Also, the research conducted by Snok et.al on diabetic insulin dependent patients showed that immunization teaching and cognitive behavioral therapy played an important role in reducing patients' tensions which produced that same results like the current research [13].

But the research done by Plate et.al on type II diabetic patients demonstrated that stress immunization teaching in the post-test was the same for both experimental group and control group and the average differential scores of experimental group and the control group on pre-test and post-test was not significant ( $P > 0.05$ ) [15].

Since stress immunization teaching in groups directly focuses on the thoughts, feelings and interpretation of events surrounding each individual's life and also emphasizes the present time, therefore it significantly reduces the psychological pressure feeling and This effect can be due to changes in patient beliefs and

attitudes toward diabetes on one hand and increasing skills in dealing with stress and managing the patient on the other hand.

The results of second hypothesis showed that stress immunization teaching was effective in reducing blood sugar level in type II diabetic patients.

The research done by Deborah on type II diabetic patients showed that the behavioral treatments like teaching self-controlling and immunization teaching could reduce the negative feelings of the patients and have a considerable impact on reducing the blood sugar level in these patients which was similar to this research [18] on the other hand, the research done by Lustman et.al " the cognitive and behavioral therapy on depression in type 2 diabetic patients" showed that these kinds of teaching not only improved the diabetic patients depression, but also low blood sugar level was observed in these patients after the teaching period [22, 8].

The above mentioned research results in line with the researches conducted by Stein and Charles, Surridge et.sl, Day, Hinkle and Wolf showed that stress immunization teaching has effectively reduced the blood sugar level in type II diabetic patients [19, 9, 15,20, 21].

In line with the above- mentioned points and the results of stress immunization teaching, each individual with the help of a counselor and group members learned how to control their blood sugar and based on Beck cognitive approach on triple cognitive elements such as: selective attention (Sampling), Enlargement and optional inferencing. Each of these elements can be altered during the training course. In this study, we attempted to change the subjects' style of living, weight control, sufficient exercise and nutrition and give diabetic patients a Better understanding and compatibility with their personal life, continue a better life and in fact they should live with diabetes and not to live for it and thus we achieved an optimal blood sugar level in these individuals. The interesting point here is that the opinions of diabetic people changed positively and had a better compatibility with the disease and the life expectancy improved in these people and this can be due to increasing the self-confidence and changing attitude.

Therefore, regarding the results of the study it is suggested that the techniques of stress immunization teaching such as assertiveness training, compatibility with the psychological pressure, problem-solving skills and positive self-expression are the key and effective factors in improving the stress management in patients with type 2 diabetes.

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