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The Effect of Stress Inoculation Training (SIT) on Social Dysfunction Symptoms in Diabetic Patients

Mohammad Amiri*[1], Asghar Aghaei [2], Ali Farahani[1], Ahmad Abedi[3]

1. PhD Student, Department of Psychology, University of Isfahan, Isfahan, Iran.
2. Department of Psychology, Khorasgan Branch, Islamic Azad University, Isfahan, Iran.
3. Department of Psychology, University of Isfahan, Isfahan, Iran.

A B S T R A C T

The aim of this study is to determine the effectiveness of stress inoculation training (SIT) on the Symptoms of social dysfunction of diabetic patients. Research method was experimental and statistical population includes 2630 diabetic patients from diabetic center of Isfahan. 16 female and 14 male patients were randomly selected and categorized into two experiment and control groups. The General Health Questionnaire 28 questions (GHQ-28) was administered to both groups before and after intervention. There were 8 females and 7 males in each group. The training group received 90 minute sessions of (SIT) with a 6 day interval but the control group did not receive any. The results show That (SIT) has a significant effect on the average of total scores of depressive symptoms on experiment group in comparison with control group (p<0/006). Education (SIT) can be used as a useful intervention approach for improving social dysfunction symptoms of diabetic patients.

Keywords: Diabetes, social dysfunction, stress inoculation training.

INTRODUCTION

Over the past decades the psychological aspects of diabetes has attracted many experts' attention since diabetes is one of the most challenging chronic diseases in terms of emotional and behavioral aspects(Hauser & Pollets, 1979; N. Van Der Ven, 2003; Vileikyte, Rubin, & Leventhal, 2004). In this disease the patient's motivation plays a crucial role in managing diabetes. People with poor psychological health do not have adequate motivation or emotional strength to manage their diabetes. Psychosocial adjustment is an important factor, yet important result of diabetes care, both in terms of quality of life and treatment effects(Davies, 2010, 2015; F. J. Snoek & Skinner, 2006). Social and psychological aspects influence not only on quality of life, but often play an important role in determining the outcomes of fighting against a chronic disease, especially in diabetes in which, disease management and achieving adequate control greatly depends on individual's psychological and personal factors(Kent et al., 2010).

Stress or psychological pressure has a long history as being one of the most important problems of human being. Stress can play an important role in general health in a way that an attempt to get over stress can affect physical and psychological reactions and therefore it might create health issues(Feldman & Garrison, 1993). Nowadays stress is taken into serious consideration as a hazardous factor and different studies show that people with high stress-

* . Corresponding Author: salarkhan61@yahoo.com

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level have more complaints regarding physical and psychological health issues. Therefore, effective programs should be directed to associate with anti-stress coping skills(Isabel Peralta-Ramirez, Robles-Ortega, Navarrete-Navarrete, & Jimenez-Alonso, 2009). Also, the incidence of each disease is caused by various conditions, including genetics, social interactions, psychological and behavioral characteristics. Hence, Stress is one of the most important psychological factors causing physical disease.

Stress has a negative impact on human health through affecting behavior and body organs, such as cardiovascular, endocrine and immune systems and therefore it causes physical diseases such as heart disease, high blood pressure, digestive diseases, diabetes, skin diseases and other types of disorders(Sarafino & Smith, 2014). Of course, one must say that the relationship between stress and disease is a bilateral engagement. This means that physical disease itself, especially if they are chronic, is considered as one of the biggest stresses and life incidents(Farahani & Abedi, 2016). Among these factors, stress can cause severe negative effects on human health. In general, stress makes a person vulnerable to physical illness, and in long run leads them to death(Adibi et al., 2012).

A number of studies have examined how stress can trigger or aggravate a disease. Najafi, Golestan, and Hashemi (2003) argue that stress can cause or aggravate a disease for two main reasons: The first factor is that in situations with high psychological pressure, complications such as depression and anxiety usually disturb typical patterns of health-related behavior and routines such as balanced eating, sports activities, sleep and adequate rest. The second factor is that in high pressure conditions the immune system of body does not function efficiently. Recent studies show that psychotherapy methods, including cognitive-behavioral psychotherapy is effective in improving physical symptoms and emotional distress of diabetic patients suffering from depression and anxiety(Adibi et al., 2012). Accordingly, close cooperation between diabetic specialists and psychologists has been emphasized. At any given time, about 50% of a society has a chronic disease(Taylor & Sirois, 1995). Dealing with a chronic disease brings the entire family to a difficult situation where they all have to cope with new living conditions and this conformity is time consuming(Hanas, 1998; Swift, 2001). Hence, in addition to following medical instructions, it is important to manage social and psychological aspects of living with a chronic disease(Newman, Steed, & Mulligan, 2004). Diabetes is a chronic disease which its management plays a considerable role in reducing the symptoms. Due to the special nature of this disease, its control requires frequent insulin injections, blood sugar measurement in several times, life style modification and diet changes and these complications themselves could become a source of stress for patients.

"Stress inoculation training (SIT)" is a behavioral-cognitive technique suggested by Canadian psychologist D. H. Meichenbaum and Deffenbacher (1988) who is also one of the founders of cognitive-behavioral therapy. Going through a personal experience he found that behavioral and cognitive methods alone cannot prepare a person to cope with stressful situations. Therefore, integrating behavioral and cognitive approaches he invented an approach to overcome stress(Sharf, 2000). Stress inoculation training is a new cognitive-behavioral intervention composed of elements including Socratic questioning, cognitive restructuring, problem solving, behavioral training, imagery, self-monitoring, self- conducting, self-reinforcement, and endeavor to change the environment. Its goal is not to completely eliminate

stress out of life, since it is neither possible nor necessary, but to provide people with special techniques to handle stress and prevent it. The importance of this issue becomes clearer when pointing to the role of important emotional factors in preventing fast progress of physical disease such as cancer, strokes and psychosomatic diseases(D. H. Meichenbaum & Deffenbacher, 1988). One of the most important factors in diabetes treatment is therapy adherence and blood glucose metabolism control(Pijl et al., 2000).

N. C. van der Ven et al. (2005) examined the impact of cognitive-behavioral therapy on various medical outcomes of 107 patients with type a diabetes divided into two groups of control and experiment. The experimental group received 6 weeks of cognitive-behavioral group therapy.

In an evaluation after three months of intervention, self –efficiency in experiment group increased compared to control group and depression and diabetes complications significantly decreased. However, no significant different between control and experiment group was observed in terms of their blood sugar levels, while same treatment in the study of F. Snoek et al. (2001) showed a significant effect on decreasing blood sugar level in patients with diabetes type 1. N. C. van der Ven et al. (2005) attributes ineffectiveness of their intervention on blood sugar to the short period of intervention and it's disconformity to the individual needs of patients participating in this survey. In the study of Surwit et al. (2002), 72 patients with diabetic type 2 were divided into two groups of control and experiment and their Glycosylated hemoglobin which is an index of blood sugar during 2 to 3 months was measured while their state-trait anxiety, cognitive stress and general health, body mass, dietary intake and their daily activities were being controlled. In the experiment group, stress management including progressive muscle relaxation and other types of cognitive behavioral training was conducted in addition to general diabetic training. The results of follow-up examinations performed at 2, 4, 6, and 12 months after implementation of the study indicate positive and lasting effects of intervention on controlling metabolism and social dysfunction of participants. However, this study failed to determine which type of people make most benefit out of stress control. Adibi et al. (2012) performed a meta- analysis on 88 studies conducted between 1995 to 2006 on psychological aspects of diabetes in order to enhance the outcomes of treatments provided to these patients. This study revealed that in general psychotherapy methods including behavioral- cognitive psychotherapy is effective on physical and emotional symptoms of those diabetic patients suffering from anxiety and depression. Also, close cooperation between diabetic specialists and psychologists was emphasized.

Davazdah emami (2008) conducted a stress management training course for type 2 diabetic patients using only two methods of behavioral-cognitive and relaxation and in the post- experiment, pretest and three months follow-ups found a significant difference between control and experiment groups in terms of long term sugar blood control (Glycosylated hemoglobin), depression and anxiety. However, no difference was observed between these two methods in terms of their effect on quality parameters. Ansari (2006) performed group stress inoculation training according to Meichenbaum method on patients with hypertension and coronary heart and found similar results in terms of significant decrease in symptoms of social dysfunction in experiment group compared to control croup. Overall, studies show that psychological interventions based on behavioral- cognitive principles and stress management has had a significant effect on psychological state of diabetic patients in different countries. In

particular, applying these methods has improved depression and anxiety symptoms in these patients(Adibi et al., 2012). However, not ever study in this field confirms these results and therefore, more accurate studies are needed to be done in this matter due to present contradictions and ambiguities. Particularly, further researches are required in countries like Iran (Esteghamati et al., 2008), in which despite of the high prevalence of diabetes, no study was conducted to reveal the effect of stress inoculation training according to Meichenbaum method on depression in diabetic patients. Therefore, we decided to determine whether stress inoculation training has a significant impact on decreasing social dysfunction symptoms in diabetic patients. The hypothesis of this study is: stress inoculation training decreases the mean scores of social dysfunction in experiment group compared to control group in post-test phase.

METHODOLOGY

This study is experimental using two groups of experiment and control, with a pre-test and post–test. The population of study consisted of 2630 patients who are registered in Diabetic Research Institute of Isfahan city. Statistical sample of this study was initially 40 patients randomly selected from the target population. (Sanaei, 1983) suggests that proper number of counseling-treatment groups (Such as our experiment groups) must be between 10 to 15 individuals. Therefore, due to this suggestion and considering sample fall outs, 20 members were selected for each control and experiment group each one consist of 10 male and 10 female members. In sample run –up, some cases were eliminated from original sample list due to address change and lack of new address. Then, using a random numbers table, the remaining members were systematically divided into two categories of males and females and eventually each category was randomly divided between control and experiment groups.

General Health Questionnaire (GHQ). This questionnaire was developed by Goldberg and Hillier (1979). Also other researchers analyzed the factors of General Health Questionnaire and found results similar to Goldberg and Hillier. For example, Krol, Sanderman, Moum, and Suurmeijer (1994) examined the factor structure of General Health questionnaire in four European countries and found same results as Goldberg and Hillier. In Iran also, (Molavi, 2002) achieved to same results by examining 116 students and analyzing factors of General Health Questionnaire. Rezaei, Salehi, Yousefzadeh Chabok, Moosavi, and Kazemnejad (2011) investigated the psychometric properties of General Health Questionnaire in Iranian population and four factors of the questionnaire in which the greatest part of variance was explained by three first factors. The clinical cutoff point, sensitivity, specificity and classification error respectively were found as 24, 80.0, 99.0 and 10.0. In their study, the criterion validity coefficient was 78.0, the split-half reliability coefficient was 90.0, Cronbach's alpha 97.0 and best cut off point was 24 which are high in terms of psychometric indexes. Criterion validity, construct validity and reliability coefficients obtained by Rezaei et al. (2011) indicate that General Health questionnaire is one of the most valid public health screening tests. In this study, social dysfunction refers to raw score of participants in this questionnaire.

Stress inoculation training. Summary of educational content of sessions include:

1. Session one: Re-conceptualization of the problem, describing stress symptoms and its effect on development of diabetes, explaining the role of stress inoculation training in a better control of stress and decreasing symptoms, homework assignment.

2. Session two: Body relaxation training by using audio CD and without CD, homework assignment and body relaxation practice at home.

3. Session three: Introducing cognitive concepts and the role of thoughts in creating stress and the relationship between thoughts, emotions and behavior, body relaxation, Homework assignment and body relaxation at home practicing.

4. Session four: Challenging stressful thoughts and testing negative thought, self- talking training and identifying the role of negative self-talks in developing stress, body relaxation, homework assignment and body relaxation at home practice.

5. Session five: Concentration and distraction techniques to keep mind away from irresolvable stressful issues plus problem solving training, body relaxation, homework assignment and body relaxation at home practice.

6. Session six: Practicing skills learned in previous sessions with emphasize on applying these skills when dealing with stressful situations to reduce symptoms of disease.

Implementation method. After sampling, all the members selected for study were invited to a pre-test in a single session. In this session all members responded to the general health questionnaires and at the end of the session, subjects were randomly assigned to two groups of control and experiment. Based on this breakdown, experiment group received group stress inoculation training for 6 sessions of 90 minutes with as interval of 6 days. Given that D. Meichenbaum (1996) suggested that the number of training sessions according to the needs of target population should be between one session of one hour for preparing patient for an operation, to forty sessions one hour each for chronic disease treatment, we considered 6 sessions for about 100 minutes each based on investigations and readiness of the group for constant presence. One week after last session, control and experiment groups were invited to a post-test and to re-answer to the questionnaire. Because some of the participants were unable to attend the meeting due to personal problems the remaining subjects were tested individually in two days after the test run. Also, a follow-up test was not possible because participants used to go the diabetic center within a 45 days interval.

RESULTS

Both groups included 7 male and 8 female diabetic patients who hold a diploma degree. Mean age of experiment group was 35.5 years old with 4 married and 11 single members and in the control group the mean age was 40 years old with 14 married and 1 single member. Considering that the purpose of this study was to determine the effect of stress inoculation training on social dysfunction symptoms in diabetic patients, and due to small number of subjects we analyzed the data in general and regardless of gender.

Table 1. Summary of covariance analysis for the two groups of control and experiment in terms of social dysfunction symptoms

	Source of variation	Statistical power	ETA	Significance level	F	Mean square	df	Squares
Social dysfunction	Covariance (pre-test)	24%	0.06	0.2	1.72	11.71	1	11.71
	Group	82%	0.249	0.006	8.93	60.51	1	60.51
	Error	-	-	-	-	6.77	27	182.95

Table 1 shows a significant change in post-test scores of experiment group compared to pre-intervention (pre-test of same group) and to control group in social dysfunction symptoms. Two hypothesizes of homogeneity of regression slopes and linear relationship between scores of covariate variable (pre-test scores) and dependent variable (Post- test scores) were examined and approved. We used covariance analysis. Using covariance method the effect of control variables was removed from dependent variables and then the two groups were compared based on remaining scores.

CONCLUSION

The results of covariance analysis show that after eliminating the effect of control variables, the mean of remaining scores in experiment group is lower than control group. Due to such high impact we can conclude that stress inoculation training has significantly decreased the symptoms of depression in diabetic patients.

Findings of this study in addition to finding of N. C. van der Ven et al. (2005), Ansari (2006) and Adibi et al. (2012) show that psychological interventions decrease the symptoms of social dysfunction in patients with diabetic, hypertension, and coronary heart disease. The results of this study about significant decrease in social dysfunction symptoms after stress inoculation training are then in consistent with findings of studies above. As for the impact of such intervention on social dysfunction symptoms in diabetic patients we can argue that many patients usually lose some of their functional abilities in doing routine works after being diagnosed with diabetes and hence they feel frustrated and show symptoms of social dysfunction. Note that this intervention is a cognitive-behavioral intervention which in its sessions there is an opportunity to identify and challenge automatic negative thoughts and also to identify and correct cognitive errors within one's self, this makes patients to let themselves free of constrains and perfectionist thoughts, to accept having a disease and their inability in doing some activities and to rationally deal with them.

In addition, with the help of problem solving method and by creating a mental order, the patient can find more effective solutions to deal with life circumstances despite of their inabilities and keep up with their routine activities as much as possible. As a result, the frustration feeling will be decreased which in turn will lead to a progress in decreasing social dysfunction symptoms.

The stress coming from a chronic disease like diabetes can be followed with numerous psychological complications such as depression, insomnia, anxiety, physical symptoms and social dysfunction. Stress in its chronic form causes body to be in a constant alert mode and therefore leads to physical and emotional exhaustion. This fact, due to learned helplessness mechanism, leads diabetic patients to stop following the treatment. This helplessness comes from the fact that the person stays in a state between denial and acceptance of disease due to denying his disease in initial phases of diagnosis and having stress about its psychological outcomes. This condition leads to following treatment in the phase of acceptance and not following it in the phase of denial. As a result, the patient cannot achieve to regular control of blood sugar and it teaches him that blood sugar control is not possible by both following and not following the treatment and this is learned helplessness which stress plays an important role in its development. According to the results of studies one can conclude that having constant stress in different situations since disease diagnosis or disease acceptance, eating, exercise , and even watching food and multiple daily tests of blood sugar has an interactive relationship with the level of blood sugar and following medical treatments.

In fact, stress inoculation training alters this interactive relation in favor of patients to a positive direction by decreasing stress level and teaches the patient that he can stop playing a passive role in dealing with stress and instead t use stressful element as a resolvable issue.

Stress inoculation training to diabetic patients will teach patients how to look at stressful situations as resolvable issues and shows them different techniques on how to confront and manage a stressful situation. This will make them feel that they have more control over their environment, to evaluate the situation less threatening, to solve the issue more effectively using coping skills when dealing with similar situations and to avoid negative psychological complications which come from inefficient ways of coping with stress. This will cause them to be more relaxed and decreases the symptoms of social dysfunction.

This intervention helps patients by teaching them how stress affects social, behavioral and cognitive dysfunction symptoms. The negative effect of stress on diabetic patients leads their metabolism to go out of balance and this will cause blood sugar imbalance and it follows up with medicine dosage disconformities in stressful and stress-free situations. In addition, they find out that many of the symptoms of social dysfunction when dealing with stressful situations are natural symptoms and controlling these symptoms can actually prevent their negative effects to be intensified and cause imbalance in blood sugar control system. Also, applying stress inoculation methods in daily life and receiving positive feedback will cause patients to feel competent and will decrease the symptoms of social dysfunction.

Based on physiological point of view one might conclude that fight or escape reaction is a set of biochemical changes which prepares human for dealing with stress. What exactly happens in a fight or escape reaction is that any case of feeling a real or imaginary problem some biochemical changes will happen in body. Cortex (thinking part of the brain) sends warning signals to hypothalamus in stressful situation which is the main driver of stress reaction in the midbrain. The hypothalamus then stimulates the sympathies nerves and a series of changes will appear in the body. Heart beat rate, blood volume and blood pressure raise up and body will start sweating. Blood moves away from digestion system and other body organs towards bigger muscles which can help the person for fight or escape reaction. Hands and feet become cold,

diaphragm and seat muscle cramp and pupil of eye opens up to absorb more light, hearing sense becomes more sensitive, adrenaline glands start to secrete hormones (adrenaline, epinephrine, nor epinephrine). Above all, these hormones cause liver supply to turn to glucose (sugar) in order to provide energy needed for fight or escape reaction and therefore blood sugar is increased. Same mechanism which triggers stress reaction now can shut it down. It means that as soon as the person is convinced that the situation is no longer dangerous, then the brain stops sending warning signals to the brainstems and brainstem itself stops sending frightening messages to nervous system. Three minutes after that the fight or escape reaction will be stopped and the person goes back to normal state. If the message of stopping fight or escape reaction doesn't occur it will cause a chronic stress and as a result stored molecules in liver will continue to break into glucose. Here we can see the importance of stress inoculation training in blood sugar control in diabetic patients. In fact, stress control helps in developing general health of patients and decreases intense blood sugar volatility and this has been proven in different studies.

Also, other findings of this study suggest that the level effectiveness of group stress inoculation training on social dysfunction symptoms shows no significant different in the control and experiment groups among males and females. Since stressful situations exist for both men and women, inability to manage stress can affect both genders and cause or increase social dysfunction symptoms and create psychological issues. However, the issues that might cause stress can be different for each gender, but the purpose of inoculation training is to teach methods of stress management to the people and its Implications for daily life, and it's not a method only for specific stressful situations. Hence, these methods enhance peoples' managerial and coping ability in dealing with stress and provide them opportunities to gain more control over their lives' events and to deal with circumstances in a more effective way. This will help them to decrease social dysfunction symptoms and psychological problems coming from inability to effectively deal with stressful situations will also be reduced.

Therefore, the effectiveness of this method is determined by the way we use it, not the gender of participants. Despite of samples downfall which was a limit to this study, eventually the results of this study indicated that stress inoculation training can be used as a useful intervention tool to decrease the symptoms of social dysfunction in diabetic patients. One the limitations of this study is that we were not able to apply two tools in pre-test and also we did not have re-access to participants to perform follow up tests due to their limited visits at a certain time to the center. Also, according to the findings of this study, we suggest that the effect of stress inoculation training on psychological well-being indexes and also its effect on blood sugar level should be separately examined on patients dependent and non-dependent to insulin.

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