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Original Article

Effectiveness of Group Cognitive-Behavioral Therapy on Anxiety, Depression and Glycemic Control in Children with Type 1 Diabetes

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Abstract

Introduction:
The present study aimed to investigate the effectiveness of group cognitive behavioral therapy in reducing anxiety and depression and glycemic control in children with type I diabetes.

Materials and Methods:
The study was quasi- experimental with a pre-test, post-test design with control group. For this purpose, 30 children with diabetes were selected from Imam Reza Hospital in Mashhad. The children were randomly assigned into two experimental group (15) and control group (15). The experimental group was undergone eight 2-hour sessions of cognitive-behavioral training. Before and after the intervention, the Multidimensional Anxiety Scale for Children, which included four components of social anxiety, physical symptoms, harm avoidance, and separation anxiety, and Children Depression Inventory was administrated in both groups.

Results:
The findings from the covariance analysis test revealed that depression and anxiety and glycemic control in experimental group was controlled at post-test and depression score in experimental group compared to the control group at post-test was decreased. The findings from the multivariate covariance analysis test between components of, physical symptoms, harm avoidance, separation anxiety, and social anxiety revealed meaningful differences between the two groups in social anxiety post-test score.

Conclusions:
According to the article, cognitive behavior therapy can be effective for depression, anxiety, and blood sugar control in children.

Keywords: Anxiety, Children, Cognitive-behavioral therapy, Depression, Glycemic control.

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Introduction

Diabetes type I is the most common metabolic-endocrine disorder of childhood (1,2). It has hyperglycemia as a common phenotype with type 2 diabetes (3). Depending on the etiology of diabetes, factors involved in the occurrence of hyperglycemia include reduced insulin secretion, decreased glucose utilization, and increased glucose production (4). Type 1 diabetes was called "insulin dependent diabetes mellitus" in the past and occurs in any age but is more common in children and young adults (3,5).

Body of people with type 1 diabetes cannot produce enough insulin (6). Thus, insulin injections are needed to control blood sugar (7). Lack of access to insulin in people with type 1 diabetes can cause their death (8) . Diabetes type 2 (or non-insulin dependent), results from inability of body to produce enough insulin or inability of the optimal use of insulin, a condition called insulin resistance (9,10). This type of diabetes most often occurs in individuals aged over 40 years, overweight, and with a family history of diabetes (11,12) . But unfortunately, it must be admitted that nowadays diabetes rates in younger individuals have increased due to modern lifestyles (3,13). One out of every 600 children is has type 1 diabetes and it is one of four chronic diseases during this period (14) .Diabetes affects every organ in the body and penetrates all layers of patients' lives(15). It requires admission and changes in their lifestyle (16) . Besides the difficulties of medical treatment and continuing attention, the stress for the disease and its effects on patient's life, threatens his mental health so that for example, according to published studies, the incidence of depression in this children has been reported two to three times more than general population and its prevalence is nearly 20 to 30 percent (17). Diabetes in children is more severe than in adults (14). According to medical science, diabetes in children requires insulin injections and they are trained to do the injections 2 to 3 times a day. Sometimes they take 50 to 70 units of insulin infusion(18).

Stress and psychological pressure can aggravate the symptoms and complications of the diseases, especially chronic diseases like diabetes(19). Stress also affects the immune system and makes it be suppressed (20) .Fear, threat, and anger certainly affect the digestive system. When you eat, if your anger gets stimulated, your appetite will be disappeared immediately. Salivary glands cannot secrete and the mouth will become dry. Similarly, the gastric glands, liver and pancreas will be unable to digest food (21).

If child's emotional environment be accompanied by continuous fear or threat, his digestive ability will permanently be harmed and the signs and symptoms of childhood diabetes will occur (22). In these cases, the pancreas does not have a congenital weakness, but because of children's emotional disorders, it has not been allowed to function properly (23) . As a result of these emotional disorders, the child's capacity to deal with various experiences in the future will be greatly affected (24).

Diabetes is a chronic disease, which its management plays an important role in reducing complications of this disease. Controlling the diabetes needs repeated insulin injections, measurement of blood sugar several times, modifying the overall situation of life, and dietary modifications due to the specific nature of the disease (25,26). Therefore, it can become a significant stressor in patients with this disease (27).Depression in children with diabetes can have a significant impact on the prognosis of diabetes and some studies have shown that failure to recognize and treat depression worsens the prognosis in children with diabetes (28,29) . Depression not only leads to psychological and social problems in children with diabetes, but

also may be a risk factor for poor metabolic control in these patients (30). Some researchers have been found a weak to moderate relationship between depression and poorly controlled blood sugar levels in these patients, also some other studies have shown that depression increases the risk of complications and mortality in patients with diabetes (31).

Therefore, the purpose of this study was to investigate the effectiveness of group cognitive-behavioral therapy in reducing psychological stress such as anxiety and depression and glycemic control in children with type I diabetes.

Materials and Methods

The research is applied in terms of purpose and is quasi-experimental with pre-test, post-test and control group in terms of methodology. Research variables include: anxiety, depression, glycemic control in children with diabetes and the independent variable is considered as the effect on cognitive-behavioral group therapy.

The statistical population of the present study is consisted of the children with type 1 diabetes who were treated in Imam Reza Hospital in Mashhad from Azar1391 to Dey 1392. In the present study, 15 people were used for each control and experimental groups. The age range of these people was between 6-14 years. Sampling method was voluntary. (With a random assignment in control and experimental groups).

Multidimensional Anxiety Scale for Children (32) is a self-report instrument with 39 items to assess anxiety factors in the age group of 7-18 years. Retest reliability and internal consistency of the Multidimensional Anxiety Scale for Children were 0/84 and 0/79.

Kovacs Depression Scale (33) is a self-report scale that was designed by Kovacs (1977) to measure cognitive, behavioral, and emotional symptoms in children and adolescents aged 7 to 17. It has 27 questions and each question has three sentences. Retest reliability and internal consistency of the questionnaire was 0/82 and 0/83.

The experiment of cognitive behavioral therapy was hold in the department of psychology clinic, Ferdowsi University of Mashhad[1] in 8 sessions of two hours for the experimental group. The intervals between sessions were three days in a week and the control group was not taught on the control of anxiety, depression and diabetes. Upon the completion of the training program at the end of the eighth session, the Multidimensional Anxiety Scale for Children and Kovacs Depression Scale were completed again as a post-test by both experimental and control groups. In this research, descriptive and inferential statistics were used to explain the research hypotheses. Data analysis was calculated In the area of descriptive statistics (Mancova), mean, standard deviation, minimum and maximum scores obtained in the study variables, and the parametric tests (multivariate covarianceanalysis "Mancova") was used based on statistical software of 21 – SPSS in the inferential analysis.

Results

To investigate the hypothesis, the research, which is based on cognitive behavioral group treatment, leads to the significant reduction of depression in children with type 1diabetes in the experimental group than the control group. Analysis of the test data was performed between the control and experimental groups as well as pre-and post-tests and the results were compared. Research findings show that there is a significant difference between the total score of depression in experimental and control groups, so that the depression rate for children between 6 to 14 years with type 1 diabetes was reduced after the cognitive behavioral therapy training. This suggests the effect of the independent variable on the experimental group.

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Table1: The results of the analysis of univariate covariance related to depression scores.

Effect size	Significance level	F value	Mean of square	Degrees of freedom	Sum of Square	Source of changes
0.21	0.01	7.23	307.65	1	307.65	Pretest
0.35	0.001	14.99	637.84	1	637.84	Group
			42.52	27	114.721	Error
				30	15416	Total

The results show that children in the intervention group had higher skills to deal with difficult situations.

The present findings can be explained by dedicating several sessions of training program to cognitive-behavioral therapy on the subjects of negative mood naming and identification and understanding the causes of depression. During the sessions, the children with type 1 diabetes and depression were shown a variety of emotions such as happiness, sadness, anger, and fear by showing the emotional images and were taught about the internal and external events that cause emotions by stories and asking questions such as what is bothering them. Therefore, it was expected that children have the opportunity to increase their awareness. The research findings support the effectiveness logic of intervention that significantly reduces the depression in children with diabetes. Effects of cognitive behavior training of the negative emotional situations knowledge, means the understanding of how situations provoke the negative emotions and the emotions are adapted with situations. (For example, a child's face who is eating sweets). To explain the finding of this study, it can be said that several sessions were devoted to understanding the relationship between negative emotions and depressed mood. For example, emotional stories were read to the child and were asked to express the cause of these emotions.

According to the hypothesis, cognitive-behavioral therapy led to a significant reduction in anxiety symptoms in children with type 1 diabetes in the experimental group than the control group. Statistical analysis did not confirm the data between the control and experimental groups of four symptoms of anxiety (physical symptoms, social anxiety, separation anxiety, and avoid injury) as well as pre- and post-tests. Thus, there was no a significant difference in anxiety scores between the two groups and there was only a significant correlation between the test and control groups in the component of social anxiety. This suggests the effect of the independent variable on the experimental group.

Table2: Results of multivariate analysis of covariance for the comparison of anxiety symptoms in the control and experimental groups.

Effect size	Significance value	F Value	df error	df hypothesis	Value	Name of test
0.15	0.46	0.92	21	4	0.15	Wilks Lambda

Table3: The results of effects tests between subjects to compare anxiety symptoms in the control and experimental groups.

Effect size	Significant value	Value F	Mean of square	Degrees of freedom	Sum of Square	Statistical Indicators Variable ←
0.02	0.42	0.62	17.22	1	17.22	Physical Symptoms
0.14	0.05	4.01	99.49	1	99.49	Social Anxiety
0.08	0.13	2.34	26.40	1	26.40	Separation Anxiety
0.01	0.62	0.24	4.28	1	4.28	Injury avoid

To increase the ability of children anxiety reduction with diabetes, relaxation training was used to reduce child furious intention and his/her concerns about disease in order to learn how to rely on his/her emotions. In some methods, a collection of exercises was carried out in which any part of the muscles must have been contracted and then released. In a number of other methods, children were taught to portray some relaxing images in their minds, and these relaxing images caused the child to be pleasant.

According to the hypothesis, cognitive behavioral therapy led to a significant reduction in blood glucose levels in children with type 1 diabetes in the experimental group than the control group. According to Table (4), the child's blood sugar levels has significantly decreased in the experimental group than the control group from pre-test to post-test. Therefore, this hypothesis can be confirmed and it can be concluded that cognitive behavioral therapy training has been effective in lowering blood sugar in children.

Table 4: Results of analysis of univariate covariance related to blood sugar.

Effect size	Significance level	F value	Mean of square	Degrees of freedom	Sum of Square	Source of changes
0.67	0.001	55.62	76726.05	1	76726.05	Pretest
0.27	0.004	10.16	14019.06	1	14019.06	Group
			1379.32	27	37241.68	Error
				30	927818	Total

Several aspects of cognitive behavioral therapy training program can help to explain these findings. Firstly, cognitive-behavioral training includes several sessions that focus on controlling behavior, thoughts, and feelings. For example, reading stories that show the consequences of uncontrolled behavior to children. Secondly, the children were given nutrition education to use the right strategy against the harmful food in order to lower the blood sugar. According to Paul Astalard (2002) the increased understanding of the disease, increases the children's ability to understand their own feelings. So they can better predict the behaviors, which lead to increasing their disease. Chance of children's harmful feeding, that results in exacerbation of his/her disease, becomes lower and therefore, they can react appropriately in different situations.

Discussion

The findings showed that the ability of the children with diabetes is influenced by personal beliefs and values that are rooted in family and community culture. Receiving support from the medical team, family, and other children will give them the power to accept the responsibility for disease and so children with type 1 diabetes can overcome the depression and anxiety caused by the disease through this. In addition, results indicate that health care providers are incapable of empowerment of these children. Therefore, the need for psychological services, as an important component of reducing the negative dysfunctional thoughts, and controlling depression and anxiety in these children is essential, so that the children will be capable of controlling depressed thoughts and behaviors with psychological interventions and support of a skilled therapist. Resulting the modification of dysfunctional thoughts, acceptance of the disease will lead to the child's self-control to reduce the blood sugar. overall, children with diabetes experience adverse physical and social events. Therefore, it is very important to consider and pay attention

to the mental health of children with diabetes.

In this study cognitive behavioral therapy for reducing anxiety, depression, and glycemic control in children with type 1 diabetes was used. Results indicate the effectiveness of training in reducing anxiety, depression and glycemic control in children with type 1 diabetes.

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Conclusion

In this study cognitive behavioral therapy for reducing anxiety, depression, and glycemic control in children with type 1 diabetes was used. Results indicate the effectiveness of training in reducing anxiety, depression and glycemic control in children with type 1 diabetes.

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