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Original Article

The effectiveness of cognitive-function stress management training in glycemic control in children and in mental health of mother caring for child with type 1 diabetes mellitus

Mozhdeh Saghaei^{a,1}, Pouya Omidi^{a,1}, Elham Hashemi Dehkordi^{b,*}, Parvin Safavi^c

^a General practice, Shahrekord University of Medical Sciences, Shahrekord, Iran

^b Department of Pediatric Endocrinology, Child Growth and Development Research Center, Research Institute for Primordial Prevention of Non-communicable Disease, Isfahan University of Medical Sciences, Isfahan, Iran

^c Department of Pediatrics Psychiatry, Shahrekord University of Medical Sciences, Shahrekord, Iran

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ABSTRACT

Aim: The study was aimed to evaluate the effectiveness of a training course of cognitive-behavioral stress management in glycaemia regulation in children with type 1 diabetes mellitus as well as in mental health status of their mothers.

Materials and methods: Fifty children with type 1 diabetes mellitus and their mothers were selected and randomly assigned into two groups. A group of mothers (n=25; as experimental one besides their children) passed a course, eight 2-h sessions, on the cognitive-behavioral and stress management, and the control group received the usual care. To evaluate the effectiveness of the intervention, before and after holding the course, glycosylated hemoglobin (HbA1C) test was done on both groups of children, and also some information was collected from the mothers through interview and the DASS (depression, anxiety, stress scale) and PSI (parenting stress index) questionnaires.

Results: After the intervention, HbA1c level decreased in the experimental group. Feeling of depression, anxiety and stress was significantly lower than the control group. Furthermore, training for parenting stress management positively affected on the sense of demanding, reinforcement, and adaptability in child domain and also on attachment, competence, depression, relationship with spouse and family health in parent domain.

Conclusion: The intervention program was significantly effective in reducing the amount of HbA1c in diabetic children, and also reduced the intensity of psychosocial problems such as depression, anxiety and stress in the mothers caring for children with type 1 diabetes.

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1. Introduction

Diabetes mellitus is a systematic metabolic dysfunction leading to inappropriate metabolism of carbohydrates, fats, and proteins [1]. It was estimated that individuals suffering from diabetes would be increased from 171 million in 2000 to 366 million by 2030 [2]. Moreover, diabetes prevalence in childhood to mid-adolescence is predicted to have an increase of approximately two times from 2005 to 2020 in Europe [3].

The eastern Mediterranean and Middle East are the areas with the highest prevalence of diabetes [4,5]. It has been predicted that 75% of the individuals with diabetes would be in the developing countries by 2025 [6]. For example, diabetes population demonstrated a dramatic increase of 300% during 15 years in Iran (from 4 million in 1987 to 12 million in 2002) [7].

In the individuals with type 1 diabetes mellitus, due to an unknown reason, Langerhans B cells are disrupted, decreasing insulin level [8]. This type of diabetes is one of the most common chronic diseases in children and could be potentially lifelong threatening [9], thereby illustrating malfunction in the body organs, life style, personality and behavior, emotion distress and psychiatric problems in the children and families, especially parents [10,11], and this is a reason the doctors would have to treat not only the child but also the parents, particularly the mothers [12,13]. Hence, parents have an important responsibility to

* Corresponding author.

E-mail addresses: mozhdeh67_saghaei@yahoo.com (M. Saghaei), pouya52002@yahoo.com (P. Omidi), hashemielham@ymail.com (E.H. Dehkordi), safavi_p@yahoo.com (P. Safavi).

¹ These authors contributed equally to this work.

improve self-care in children with diabetes from early diagnosis [14], and also scientific literature show that families play an important role in controlling blood glucose in children [9]. Undoubtedly, the regulation of blood glucose in children with diabetes mellitus will improve the symptoms and reduce treatment costs [15]. Therefore, home management and control of diabetes immediately after diagnosis will postpone possible vascular changes for two decades, if not, these changes would be occurred within 2.5–3 years after diagnosis [16].

Given the main role of cognitive function and psychiatric reactions in families, especially mothers as the primary caregivers, in successful treatment and control of diabetes, psychotherapeutic intervention such as cognitive behavioral therapy and stress management could reduce and prevent psycho-social complications, and then managing their stress [17,18]. Therefore, the present study was aimed to evaluate the effectiveness of stress management through cognitive-behavioral therapy in controlling the blood glucose of children with type 1 diabetes mellitus as well as in mental health of their mothers.

2. Material and methods

The study was done in the Aram Consultation Center in Shahrekord city in Iran. Two groups of children suffering from type 1 diabetes mellitus besides their mothers (experimental and control ones; $n=25$ for each one; with 9.27 ± 2.56 and 9.12 ± 1.86 years old, respectively) were evaluated. The percentage of female children in the experimental and control groups were 72% and 64%, respectively. The parents had secondary to high education levels in both groups. All of the diabetic candidates were randomly selected and a written consent was gained from the mothers. The importance of the study was firstly explained for the mothers and the following biochemical assessment and screening tools were carried out: glycosylated hemoglobin test (Hb A1C) on diabetic patients as well as depression, anxiety, stress scale (DASS), and parenting stress index (PSI). DASS is a self-report questionnaire designed by Lovibond in 1995 and consisting 42 multiple-choice questions related to depression, anxiety and stress. The possible answers are “never”, “sometimes”, “often”, and “almost always” with the scores of 0, 1, 2, and 3, respectively, and the total score (within the range of 0–42) represents the estimated level of depression, anxiety, and stress. PSI is applied to evaluate parenting stress based on children and parents characteristics and also various situations directly related to parenting. The index is scored according to Likert methods as absolutely agree to strongly disagree (ranging from 1 to 5). PSI for parents with child domain consists of forty-seven items and six scales including adoptability (11 items), acceptability (7 items), demandingness (9 items), mood (5 items), distractibility/hyperactivity (9 items), reinforces parent

(6 items) and for ones with parent domain consists of 54 items and 7 scales including depression (9 items), attachment (7 items), role restriction (7 items), competence (13 items), isolation (6 items), spouse/partner relationship (7 items), health (7 items) and total stress (19 voluntary items). Having undergone a pre-assessment, a group of mothers ($n=25$, as experimental ones) were trained to intervene in diabetes management through sessions of cognitive behavioral therapy held by psycho-therapists, and the control one was remained untrained. Both trained and untrained mothers answered the questionnaires before and after the intervention and HbA1c test was done on children after the intervention. The educational diabetes management sessions were held for eight 2-h ones during two months. The sessions were dealt with the following issues: the first, introducing the factors causing stress and the effects of stress on blood glucose as well as educating self-relaxation and diaphragmatic breathing; the second and third, relationship between thinking and emotion and how to recognize illogical thoughts and also to reassess the thoughts and challenge them as a way to change illogical thinking; the fourth, anger management; the fifth, problem solution; the sixth, communication and self-presentation; the seventh, time management; and eighth, review the skills taught in the previous sessions. The trained mothers practically applied the taught issues at home to their diabetes children and reported on how they had done.

3. Statistical analysis

The acquired data was coded using SPSS software (version. 22) and descriptive statistics (frequency, central tendency, standard deviation) and analysis statistics (t-test, paired t-test, K2 test) were conducted, and all results are presented as the mean \pm standard deviation (S.D.). Significant differences were determined between the experimental group and the respective control group ($P < 0.05$).

4. Results

Measurements of HbA1c level significantly decreased in the children received the diabetes management intervention from their educated mothers ($P=0.002$), i.e., the blood parameter statistically changed in the experimental group undergone the intervention (before, 10.1 ± 1.91 ; and after, 8.81 ± 1.71), while no significant change was observed in the control group (before, 10 ± 2.16 ; and after, 9.74 ± 1.78). Moreover, the amount of HbA1c in the children received the parental intervention sessions was significantly lower than the control group.

Cognitive behavioral therapy and stress management significantly reduced depression, anxiety, and stress in mothers of children suffering from type1diabetes mellitus (Table 1). The

Table 1

The average scores for depression, anxiety, and stress (DASS) in two groups of mothers (Control group; without stress management education, and experimental group; educated one) with diabetes mellitus children before and after an educational stress management sessions.

Variant		Mean \pm S.D		T-test (P-value)
		Control group	Experimental group	
Depression	Before intervention	16.04 \pm 1.81	15.04 \pm 1.33	0.751
	After intervention	15.24 \pm 0.9	9.44 \pm 0.73	
T-paired test (P-value)		0.779	0.027 *	0.015*
Anxiety	Before intervention	11.44 \pm 1.3	12.44 \pm 0.95	0.723
	After intervention	10.76 \pm 0.74	6.84 \pm 0.48	
P-value		0.803	0.047 *	0.032*
Stress	Before intervention	19 \pm 1.65	19.8 \pm 1.87	0.95
	After intervention	23.76 \pm 6.88	12.67 \pm 0.63	
P-value		0.788	0.02*	0.003*

Data are means \pm S.D. Asterisk (*) indicates a statistically significant difference between the control group and the experimental group and also between the experimental group before and after the educational stress management course.

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