

SHORT-TERM IMPACT OF A STRESS MANAGEMENT AND HEALTH PROMOTION PROGRAM ON PERCEIVED STRESS, PARENTAL STRESS, HEALTH LOCUS OF CONTROL, AND CORTISOL LEVELS IN PARENTS OF CHILDREN AND ADOLESCENTS WITH DIABETES TYPE 1: A PILOT RANDOMIZED CONTROLLED TRIAL

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Background: Parents of children and adolescents with diabetes type 1 (DT1) usually experience high stress levels, as they have to cope with multiple demands in their everyday life. Different complex interventions have been implemented, which sometimes have led to opposite results.

Objective: The purpose of this study was to assess stress levels in parents of children and adolescents with DT1 and to evaluate the effectiveness of a stress management program (progressive muscle relaxation combined with diaphragmatic breathing) in reducing perceived and parenting stress, increasing internal locus of control, promoting healthy lifestyle, and normalizing cortisol levels.

Study Design: Randomized controlled trial.

Methods: A total of 44 parents were randomly assigned to the intervention group (performing relaxation for eight weeks, $n = 19$) and control group ($n = 25$). Pre-post measurements included cortisol levels, lifestyle characteristics, perceived stress, perception of health, and parenting stress.

Results: A statistically significant decrease in perceived

stress (from 27.21 to 19.00, $P = .001$), as well as in parenting stress (from 85.79 to 73.68, $P = .003$), was observed in the intervention group. A statistically significant difference was found in perceived stress between the two groups after the intervention ($D_{mean} = 6.64$, $P = .010$). No significant difference was revealed between or within the groups in cortisol levels. Significant improvement was reported by the subjects of the intervention group in various lifestyle parameters.

Conclusions: Relaxation techniques seem to have a positive impact on stress and on various lifestyle factors in parents of children and adolescents with DT1. Future research on long-term benefits of an intervention program comprising of various relaxation schemes is warranted.

Key words: Diabetes type 1, cortisol, parenting stress, perceived stress, stress management

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BACKGROUND

Diabetes type 1 (DT1) is a chronic and progressive disease that has been on the increase during the last decades.¹ It requires dramatic lifestyle changes for both patients and their parents. DT1 is associated with several short- and long-term complications. Given the aforementioned, in the case of impaired glucose control, DT1 sets the perfect ground for increased stress levels within family members, causing disruptions in diabetes management and leading to early onset of several complications.²

Such lifestyle imposes restrictions on activities; causes discomfort and fear of the future; and may result in a continuous stimulation due to economic problems associated with the therapy. Parents usually feel guilt as they seek the causes of the disease and hold high expectations for scientific progress that may lead to more effective medical treatment.³⁻⁷ In addition, parental caregiving quality increases as children grow and face different challenges.

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Childhood is considered to be a happy stage of life, when everything is simple and life problems are minor. DT1 complicates this fragile developmental stage both physically and mentally. The quality of life for parents with diabetic children deteriorates very rapidly¹¹ as they are constantly concerned with feeding issues,⁸ hospitalizations,^{9,10} ongoing caring responsibilities, and their children's resistance to insulin therapy. Adolescence is another strenuous stage¹² during which patients are faced with a complex set of developmental changes and changing disease demands. Their diabetes-coping style varies considerably and is influenced by family's stress levels.¹³

In summary, DT1 patients and their families are under chronic stress.^{14,15} Rearing a diabetic child also places considerable stress on marriages. One parent may blame the other about genetics, distribution of diabetes management responsibilities, and how that might impact the glycemic control of the child.¹⁶

Chronic stress has been associated with anxiety disorders, mood disorders,¹⁷ addiction disorders,¹⁸ and premature aging.¹⁹ Chronic stress affects the whole family and, consequently, the aforementioned effects can be demonstrated in family members. Moreover, chronic stress is associated with chronic hypercortisolemia, which worsens glycemic control in diabetic patients.²⁰

In the light of the evidence presented so far, there is a pressing need to assess the developmental, behavioral, and psychosocial history of children with diabetes and their families. Assessments should be performed at the time of diagnosis and periodically thereafter. If problems are identified, early interventions, such as stress management programs, should be implemented.²¹

Stress management programs have been used by parents of children with DT1, including (a) relaxation^{22,23}; (b) behavioral family counseling²⁴; and (c) specific behavioral and cognitive strategies, such as empowerment, goal setting, or cognitive restructuring.^{23,24} Several studies have shown that relaxation techniques and meditation practices have a positive impact on biomarkers of stress regulation, such as cortisol secretion.²⁵ In addition, cognitive-behavioral stress management intervention may be effective in regulating stress biological markers.²⁶ Common relaxation techniques, like progressive muscle relaxation and diaphragmatic breathing, have a positive effect on stress reduction.^{27-30,32} However, the combined implementation of these techniques in parents of children and adolescents with DT1 has not been extensively studied. Progressive muscle relaxation assists one to relax various body muscle groups and learn how to release accumulated tension. It is considered to be an effective therapeutic option for reducing state anxiety and psychological distress and improving psychological health and quality of life of psychiatric patients and patients with physical illness.²⁷⁻³⁰ Diaphragmatic breathing is a practice that can be useful in educating people about a more effective way of breathing in comparison to thoracic breathing—irregular and fast breathing is regulated, and blood pressure and cardiovascular function are positively affected. Clinical data have shown a reduction in systolic blood pressure in healthy populations.³¹ In addition,

studies report both short- and long-term effects of diaphragmatic breathing exercise on asthma quality of life.³²

The goal of this study was to assess the perceived stress levels of parents of children and adolescents with DT1 and to evaluate the effectiveness of a stress management program. In particular, we aimed to estimate: (a) stress levels of parents of children and adolescents with DT1, (b) effects of intervention on stress levels (as assessed by psychometric tools and biomarkers), and (c) effects of intervention on health-related lifestyle factors.

METHODS

Study Design

The present study was a randomized controlled trial designed to evaluate the effectiveness of a stress management program, including relaxation techniques (progressive muscle relaxation and diaphragmatic breathing). The study protocol was submitted to the Ethics Committee Department of the Pediatric Hospital, "Agia Sofia," for approval before the implementation of the study.

Flow and Participants

Upon admission to the Diabetes Center, parents (i.e., the dominant parental figure who accompanied the child during their visit to the hospital and had the main responsibility for their care) were interviewed by the first author for the purpose of checking for eligibility (see below). Information on psychiatric medication, diagnosis of major or minor psychiatric illness (e.g., neurosis, psychosis, personality disorders, and mood disorders), participation in psychological or psychiatric sessions, and previous implementation of relaxation techniques was based on self-reports in the course of a face-to-face interview. This did not include complete medical history information as it was not meant to be a typical psychiatric interview.

Of the 360 subjects assessed for eligibility, 280 were excluded. Overall, 157 refused to participate and 123 did not meet the inclusion criteria. The 80 participants who met the criteria and signed the informed consent document were first randomized (by using the web random number generator www.random.org) and then assigned to intervention and control groups by a fellow researcher (Figure 1). The final sample of the study consisted of 44 individuals of both the sexes. Table 1 shows baseline characteristics of participants. A total of 42 parents were recruited from the Diabetes Center of the Pediatric Hospital, "P. & A. Kyriakou," and two parents from the Diabetes Center of the Pediatric Hospital, "Agia Sofia." The following inclusion criteria were used:

- (a) Patient age being less than 18 years.
- (b) Children should meet all criteria for diagnosis of DT1; yet, they should not have been diagnosed in the last six months (in order to avoid confounding stress-control connections due to the "honeymoon period," i.e., insulin secretion by the remaining healthy beta-cells).
- (c) Parents should have never been diagnosed as psychiatric patients. Consequently, they should not be on any psychiatric medication.

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