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Original Article (Pages: 8737-8744)

Effect of Mother's Emotion Regulation Strategies Training on the Symptoms of Children with Attention Deficit/Hyperactivity Disorder

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Abstract

Background: Attention-deficit/hyperactivity disorder (ADHD) as the most common behavioral disorder of childhood, can affect all aspects of a child's life and their families. The aim of this study was to investigate the effectiveness of mother's emotion regulation strategies training on the symptoms of children with attention-deficit/hyperactivity disorder.

Materials and Methods: We conducted a quasi-study among mothers with ADHD children (ranged age between 4 and 12 years) in the pediatric clinic of Ibn-e-Sina psychiatric hospital, affiliated to the Mashhad University of Medical Sciences, Iran. Forty-four eligible mothers were randomly allocated to one of two parallel groups; the intervention group (n = 22) was trained for the emotion regulation (eight 90-minute sessions), and control group (n = 22). The Conner's Parents Rating Scales-Revised Short version (CPRS-R: S) was administered to assess symptoms of ADHD children by mothers. The data were analyzed using SPSS software (version 16.0).

Results: The mean value of mothers' age was 34.7 ± 4.1 years in intervention group and 37.2 ± 6.4 years in control group. The results of independent t-test revealed no significant difference in mean of hyperactivity scores between the two groups before intervention (P>0.05), and a significant difference immediately and one month after the intervention (P<0.05). One-way ANOVA test results showed that the intervention group was significantly different in terms of hyperactivity scores in three different times (P = 0.007).

Conclusion: Finding of this study showed that mother's emotion regulation strategies training can be effective in reducing hyperactivity scores in children with ADHD.

Key Words: Attention Deficit Hyperactivity Disorders, Children, Mother.

*Please cite this article as: Kamali A, Vaghee S, Aemmi SZ. Effect of Mother's Emotion Regulation Strategies Training on the Symptoms of Children with Attention Deficit/Hyperactivity Disorder. Int J Pediatr 2018; 6(12): 8737-44. DOI: **10.22038/ijp.2018.33121.2924**

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Received date: Apr.14, 2018; Accepted date: Jul. 22, 2018

1- INTRODUCTION

Attention-deficit/hyperactivity disorder (ADHD) as the most common neurodevelopmental and behavioral disorder of childhood affects 3–7% of school-aged children and is often co-morbid with other mental health disorders. The varying levels of hyperactivity, inattention, and impulsivity, substantially affects their cognitive performance and impairs the relationships of these children with others and interferes with the normal and daily functioning of them (1-4). Care of these children is a challenging issue and their repeated requests from parents can increase incompetence feeling, depression, psychological stress and pressure for their parents (5), and the whole family is at risk of increasing negative consequences such as physical and mental health problems and negative experiences. In fact, parenting is a very important responsibility, and it seems very difficult in conditions in which the child has symptoms of irritability, negative mood, neglect, non-obedience, aggression and failure to perform the duties at home, the serious problems of these children confer various negative effects on the family's system and the health of their parents (6).

Emotion is considered as a bio-cognitive reaction to important or challenging situations in life that have an important role in adapting to life changes and stressful events. The ability of emotion expression by a person is called emotional regulation. Control and regulation of emotion in individuals includes all conscious and subconscious strategies applied to increase, maintain and reduce the emotional, behavioral and cognitive components of an emotional response and help with one's awareness and ability to understand emotions, accept emotions, ability to control impulsive behaviors and behave according to desired goals to achieve personal and conditional goals. Any forms of the impairments in emotion regulation can make a person vulnerable to mental disorders (7). Emotion instability in mothers with children with behavioral disorder causes the mother to experience behavioral instability, poor control over her emotions, chronic feelings of absurdity and mood swings, frequent and severe responses to emotional stimuli and disruption the interpersonal relationships (8). Improvement in parental skill for being better able to manage challenges pertaining to their children may affect the consequences of ADHD children and their parents (9). Given these issues and problems that families and especially mothers of children with ADHD are faced with, a comprehensive education is needed in order to be able to make positive changes in their attitude and behavior regarding these children. The finding of previous studies suggested that evaluating and addressing parental emotion regulation especially mothers in interventions can reduce the coercive parenting (2, 10), and inattention, hyperactivity, oppositional defiance, and emotional ability in a child (2). This study aimed to evaluate the effectiveness of mother's emotion regulation strategies training on the symptoms of Iranian children with attention-deficit/hyperactivity disorder.

2- MATERIALS AND METHODS

2-1. Design and Sample

A quasi-study was conducted on 44 mothers with ADHD children aged 4 to 12 years old, referring to the pediatric clinic of Ibn-e-Sina psychiatric hospital, affiliated to the Mashhad University of Medical Sciences, Iran, from January 2015 to March 2016. The sample size was estimated based on a previous study (6), and a total of 20 mothers was estimated to be required in each group.

$$n= (z^2_{(1-\alpha/2)} + z^2_{(1-\beta)} \times (s_1^2 + s_2^2) / (m_1 - m_2)^2= ((1.96+1.28) \times ((4.02)^2+ (2.83)^2)/ (11.55-14.6)^2) =20$$

The inclusion criteria were:

For children: Confirmed diagnosis of ADHD by the psychiatrist, passed at least six months of disease diagnosis, the age range 4-12 years, do not have another psychiatric disorder (conduct and mood disorder and mental retardation [MR]), and lack of chronic physical illness (cardio and renal disease, epilepsy, cancer, cerebral palsy). *For mothers*: The age range 22-50 years, have the General Health Questionnaire (GHQ) score higher than 23 in the mental health test, have literacy in reading and writing, have the primary role in caring of the child, be a resident of Mashhad, lack of psychiatric illness and the use of drugs for it, non-use of drugs, lack of previous participation in the emotion training course, lack of chronic medical conditions (heart disease, cancer, chronic kidney disease), and lack of crisis experience in the last six months (divorce, loss of close relative or husband).

Mothers were excluded if neuroleptic or antidepressant drugs were used during research, there was a situational crisis for the mother during the study, absence of mother in more than one training session, failure to complete the homework tasks for more than one session by the mother, and having a mental or physical disorder in the spouse or other offspring of family. A total of 44 mothers was selected consecutively and randomly (random numbers table) divided into two groups: intervention (n = 22), and control (n = 22). Considering the limited number of participants in the training sessions, the intervention group was divided into two groups with 12 mothers and training programs were held for each group two days of the week at 10 AM (Saturday and Tuesday for the first group, Sunday, and Wednesday for the second group) separately.

2-2. Data Collection

The catechistic baseline was completed based on medical records and interviews with mothers, who included: gender, age, the rank of birth, disease duration, drug treatment for children and age, education level, occupation, number of children and economic status of the family for mothers. The Conner's Parents Rating Scales-Revised Short version (CPRS-R:S) with 27 questions and 5 subscales including five factors (conduct problems, learning problems, psychosomatic, impulsive-hyperactivity, and anxiety) (11), was used to assess the severity of ADHD child in this study. Each item is rated on a four-point Likert scale and the range of scores in this scale is from 0 (not at all) to 3 (very much). The scale has undergone validity and reliability testing in several studies (12, 13). The alpha coefficient was 0.86 in the present study (inner consistency).

The General Health Questionnaire (GHQ) as a self-administered screening device was used for identifying minor psychiatric disorders in the general population (14). The GHQ-28 is a 28-item (short form) measure of emotional distress in medical settings and assesses somatic symptoms (items 1-7), anxiety and insomnia (items 8-14), social dysfunction (items 15-21) and severe depression (items 22-28). Each item can also be rated on a four-point Likert scale giving a potential score of 0–84, with higher scores representing greater distress.

The validity and reliability of the Persian version were assessed in several studies (15-17). For the general health score of the mother, the alpha coefficient was 0.90 in the present study (inner consistency). We used this scale for assessing the general health of mothers. In the intervention group, eight 90-minute sessions of emotion regulation strategies training (cognitive-behavioral training) were conducted based on James Gross's model (18) for the intervention group's mothers. Post-training evaluation based on Conner's parents rating scales was performed immediately after the training sessions and one month later in the intervention and control group.

The content of the training sessions was shown in **Table.1**. Each session included the subject and purpose, the session order, the assignment, and the feedback.

2-3. Ethical Considerations

The research objectives and process were explained to all the mothers of the children and written informed consent was obtained. All the mothers were informed that it was a voluntary participation and they had the right to withdraw at any time. The protocol was registered by the Iranian Registry of Clinical Trials (IRCT. 2016072029011N) and the Research Ethics Committee of Mashhad University of Medical Sciences approved the study process (ID- code. 941593).

2-4. Data Analysis

The mean and standard deviation were used to describe the quantitative variables, whereas percentages were used to describe the qualitative variables. The normality of the data distribution was examined using the Kolmogorov-Smirnov test. We used the non-parametric tests for the data, which were not normally distributed. Independent t-test was used to compare the mean difference in hyperactivity score between intervention and control group at each stage of the study, and the one-way analysis of variance (ANOVA) was performed to compare the hyperactivity scores among the control or intervention group in three different times. Statistical analyses were performed at a confidence level of 0.05 using the SPSS software (version 16.0).

Table-1: The content of the training sessions for Interventional group**.**

Sessions	Contents	Task
First	Familiarity and communication of the members with each other start a mutual relationship between the group leader (researcher) and the members (mothers), expression of the framework and rules of participation in the group.	Note a particular event or think about an event, in an emotional state (sadness, worry, fear, hatred, feelings of guilt, etc.)
Second	Select a position and provide the emotion training.	Record the emotions according to self-multiply dimensions (provocative event, physical changes, facial expressions and desires for action).
Third	Choose the position and assessment of emotional vulnerability and emotion skills of members.	Complete the daily reports of self-emotion by focusing on individual skills in changing and regulation of the emotions.
Fourth	Modify the position and make a change in the provocative emotion position.	Do a positive activity each day according to the goals list. Action to resolve the interpersonal problems.
Fifth	Extend the attention and teaching the attention changing skills.	Do a variety of the thinking control skills and attention change (learned skills) during the week, when faced with certain emotional states such as sadness, anger, and fear and assess the impact of each skill on a scale of 0-10.
Sixth	Cognitive evaluation and change of cognitive assessments.	During the week whenever they faced a certain emotional state such as sadness, anger, and fear, consider the role and effect of the content of their thoughts and mental processing on increasing and reducing the emotional response and measure the effect of increasing and decreasing the mind on their emotional responsiveness.
Seventh	Modify the response and change the behavioral and physiological consequences of emotion.	Apply the emotion expression skill and modify the response when engage in emotion experiences.
Eighth	Assessment and application of training.	The action steps were determined by the members themselves and planned for the application in real life.

3- RESULTS

The mean value of mothers' age was 34.7 ± 4.1 years in intervention group and 37.2 ± 6.4 years in control group; 79.5% of whom were housewives and 56.8% had under diploma education. The study children's mean age was 8.1 ± 2.3 years in intervention group and 7.3 ± 2.1 years in control group and 86.4% of them were boys (**Table.2**). Kolmogorov–Smirnov test showed that the distribution of data was normal and there was no statistically significant difference between the intervention and control groups, in terms of individual characteristics and demographic variables (P>0.05). The results of independent t-test revealed no significant difference in mean of hyperactivity scores between the two groups before intervention (P=0.31). On the basis of the results of this test, there was a significant difference between the two groups in the mean of hyperactivity scores immediately and one month after the intervention (P<0.05). One-way ANOVA test results showed that the intervention group was significantly different in terms of hyperactivity scores in three different times (P = 0.007). As shown in **Table.3**, the changes in hyperactivity scores were not significantly different among the three-times in control group (F = 0.7, P = 0.72).

Table-2: The characteristics baseline of the mothers with ADHD children

Variables		Group Number (%) or Mean (SD)		P-value
		Intervention	Control	
Mothers' age (year)		34.7 (4.1)	37.2 (6.4)	0.12
Children's age (year)		8.1 (2.3)	7.3 (2.1)	0.23
Gender of child	Girl	5 (22.7)	1 (4.5)	0.19
	Boy	17 (77.3)	21 (95.5)	
Rank of birth		1.4 (0.6)	1.8 (1.2)	0.37
Disease duration (year)		3.7 (2.4)	3.3 (1.7)	0.47
Drug treatment	Yes	11 (50.0)	12 (54.5)	1.00
	No	11 (50.0)	10 (45.5)	
Maternal education	Under diploma	11 (50.0)	14 (63.7)	0.61
	High school education	8 (36.4)	5 (22.7)	
	College education	3 (13.6)	3 (13.6)	
Maternal occupation	Housewives	17 (77.3)	18 (81.8)	0.70
	Part-time employees	5 (22.7)	3 (13.6)	
	Full-time employees	0 (0.0)	1 (4.5)	
Number of children		2.0 (0.7)	2.6 (1.7)	0.47
Economic status of family	Low	9 (40.9)	9 (40.9)	1.00
	Medium	13 (59.1)	13 (59.1)	
	High	0 (0.0)	0 (0.0)	

SD: Standard deviation.

Table-3: Evaluate the hyperactivity score in the intervention and control groups

Hyperactivity score	Before intervention Mean (SD)	After intervention Mean (SD)	One month after the intervention Mean (SD)	P-value (ANOVA) F
Intervention group	77.0 (13.7)	67.0 (18.9)	65.9 (10.5)	0.007 8.0
Control group	75.1 (7.4)	72.3 (7.0)	73.6 (13.9)	0.72 0.7
P-value (independent t-test)	0.31 2.1	0.04 156.0	0.01 101.5	

SD: Standard deviation.

4- DISCUSSION

The present study focused on determining the effect of mother's emotion regulation strategies training on the symptoms of children with ADHD. The findings indicated a significant difference in disorder symptoms of children between the two groups after intervention. In other words, emotion regulation strategies training to mothers reduced the hyperactivity scores in intervention group children. In a review of other studies, use of parent training program, especially for mothers in treatment plans for ADHD children and their families can improve the parenting style, mother-child relationship, and decrease maternal depression, anxiety, stress, and children's misbehavior (19), reduce the behavioral problems of children and prevent stress in child-parent relationship (5), improve mother's mental health and decrease externalizing behavior in their children (6), reduce negative parent-child interactions and parenting stress, reactivity response to the children's problematic characteristics (20), and ADHD symptoms of children (20, 21). Moreover, reduction in the emotional lability, ADHD and oppositional defiant disorder symptoms in children, improvement in the parents' emotional socialization (8), reduction in the disruptive behaviors of children with hyperactivity (22), improvement in the mental health (8, 23) and reduction of the stress of mothers with ADHD children (23), and improvement in both clinical and Parental emotion regulation training interventions should be considered as an important part of the treatment of ADHD children.

6- CONFLICT OF INTEREST: None.

7- ACKNOWLEDGEMENT

The present research was based on a master's thesis entitled "The effects of emotion regulation training to mothers of children with hyperactivity/attention deficit on the mothers' mental health and level disorder in children referred to Ibn-e-Sina Hospital Mashhad" (code: 941593). The authors express their gratitude to all mothers who cooperated with them in this research.

direct observational measures of ADHD behaviors of children are also observed (24, 25). The results of systematic review and meta-analyses indicated that behavioral parent training as an effective intervention can improve child behavior, parenting behavior and parenting perception of these children (26, 27), reduce parental stress and enhance parental confidence (28). Considering the important and effective role of parents, especially mothers, in the caring and management of ADHD children; guidelines recommend providing group parent-training/education interventions to improve parenting competence and outcomes for these children (1).

4-1. Limitations of the study

Our study has a number of limitations. The individual differences of mothers (education level, cultural difference, etc.) might also affect the results. We tried to use randomization and control group to minimize these differences. Also, in this study, we assessed the ADHD symptoms of a child using the parent's version of this tool, the use of teacher version (27) for school-aged child assessment is recommended for future studies.

5- CONCLUSION

The results from this study demonstrated the mother's emotion regulation strategies training can be effective in reducing the symptoms of children with ADHD aged 4 to 12 years.

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