



Appraisal of effectiveness and comparison of parent-child interaction therapy and parent management training on symptom improvement of ADHD among boys with ADHD

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Abstract

Parenting a child who has ADHD presents most parents with many challenges. The aim of study was to appraise the effectiveness and comparison of parent-child interaction therapy (PCIT) and parent management training (PMT) to mothers in symptom improvement of 8-10 year old boys with ADHD in Urmia. A quasi-experimental pretest-posttest design with a control group was used. The population consisted of all mothers of 8-10 year old boys with ADHD in Urmia in 2012 who were referred to the counseling and treatment centers and their children received ADHD combined type diagnosis. Children who had the highest scores in Conner's Rating Scale (teachers & parents) were considered as ADHD patients that 45 patients were selected by convenience sampling method and were assigned randomly into two experimental groups (n=15) and a control group. Then, experimental groups were trained by Eyberg's PCIT and Patterson's PMT during 9 sessions which were held once a week. The control group received no intervention. In order to collect the study's data Conners Scales and the SWAN Rating Scale for ADHD were used. Data analysis was done by analysis of covariance with SPSS-16 software. The results showed that the difference between pretest and posttest scores of control group is equal to $F=185.23$ that it is significant ($p<0.01$). Results of Tukey's test showed that there was significant difference between the PCIT and PMT at level of 0.05 and this effect was stronger for PCIT group. Overall, it can be concluded that both of the programs were effective in relieving the ADHD symptoms but the PCIT was more effective.

Keywords: ADHD, Parent-Child Relations, Programs, parent training

Introduction

According to Diagnostic and Statistical Manual of mental disorders, 5th edition (DSM-V) attention deficit/hyperactivity disorder is comprehensive set of inattentive or hyperactive behaviors/impulsivity which can hamper the social, academic or occupational performance and its major features are deficit in attention, hyperactivity and impulsivity. Persistent pattern

of inattention and hyperactivity is much more severe and frequent than what is observed in other children at similar developmental level [1]. This disorder has 3 subsets of attention deficit, hyperactivity/impulsivity and the combined type. The disorder's prevalence is 5% to 15%. ADHD basically affects the patient's cognitive and behavioral

performance [2] and many symptoms of the disorder sustain throughout life [3,4]. For many ADHD children's behavioral patterns no single cause can be found but some findings indicate noticeable influence of family and environment on the symptom's incidence and severity [5-7]. Negativism, defiant child, highly controlled by parents, and sibling fights are characteristic of family mutual relations in these children [8]. In addition, these children's parents have more stress, poor performance and also have more aggressive behaviors [9]. In this regard, Dortaj and Mohammadi [10] in their study found that in many aspects of family functioning such as communication, role, emotional companionship, controlling behavior and emotional involvement are weaker than other families and have more unhealthy practice. It seems that, Parents of children with ADHD, compared to parents of children without ADHD, are less adaptive in coping with behavioral problems and their coping styles are inefficient and ineffective [11]. Considering the evidence, behavioral interventions through parents can reduce inappropriate behaviors and annoying signs in children with ADHD. Changing the parents' method of ordering and responding to the children's cooperation has positive effects on children's behavior [12].

Parent-child Interaction therapy (PCIT) is one of the approaches which have been focused on improvement of relationships and systems of family's interactions. This is a family-centered approach which was designed to treat severe behavioral problems in children. PCIT method suggests that negative parent-child interaction pattern may play an important role in children's harmful behavior [13]. During PCIT therapists guide the parents while they have interaction with their children. In this way, therapist guides the parents directly and practically in sessions when both parents and children are present and teach parents some strategies to encourage their children's positive behaviors. Researches have shown that parents can learn more effective parenting techniques for decreasing the children's behavioral problems and the quality of parent-child interaction could be improved as a result of PCIT [14]. This method was

designed by Eyberg in 1970s as method of treatment the children with severe behavioral problems [15].

In a study Chaffin [14] suggested that by using this method parents learn more effective methods for relieving their children's behavioral problems and the parent-child interaction's quality could be improved. In this regard, Wagner and McNeil [16] showed that training parents by using this method is effective in the treatment of ADHD because in this method time is dedicated to parents to practice behavioral management skills and special communication. Parent-Child Interaction Therapy (PCIT) is performed in two-stage approach. The first phase Child - Directed Interaction (CDI) is the child-directed interaction and the second phase Parent - Directed Interaction (PDI) is the parent-centered interaction [17]. There are many studies which confirm the effectiveness of PCIT in reducing the children's behavioral problems and these positive effects would be retained for 6 years after treatment [18,19]. The behavioral parent-child interaction programs are the most common and most successful treatment approaches which are associated with the disruptive behaviors of children with ADHD and most of the parents are satisfied with it. Several studies have reported the effectiveness of this treatment in changing mood, reducing disruptive behaviors and improving the problems of these children and their families [13,20]. Many studies have indicated that this treatment is also effective in improving children's social anxiety [21], children's externalizing disorders [22], decreasing the influence of abuse and domestic violence [23], increasing adjustment in children with autistic spectrum disorders [24], reducing depression in pre-school children and enhancing their emotional growth [25]. Parents also reported that the positive, long-term effects of PCIT are maintained. This period has been reported up to 6 years [26]. Parent management training (PMT) is another family-centered treatment which focuses on parents' behavioral styles [27]. The aim of this treatment is to encourage parents to involve

in children's problems and cooperate actively in treatment and reducing their behavioral problems. More precisely, the program attempts to develop parents' effective skills and improve their self-efficiency [28].

Barkley is one of the first people who pointed out the necessity of parents' behavior management training in treatment children with ADHD. His technique is a generally similar approach that is used for other disorders in children with difference that the hyperactive children's specific problems are considered in this technique. Program for children with ADHD was described by Barkley emphasizes on behavioral control through its results especially the reinforcement, extinction and punishment elements. The program emphasizes on variety of parents' specialized skills [29]. In PMT parents are taught how to increase their positive interactions with the children, how to decrease conflicts and avoid improper parenting methods [30]. Evidences suggest that behavioral parent training programs are introduced as an appropriate strategy for treating the children with behavioral problems and the increasing use of this strategy [31]. Results of different studies show the positive impact of PMT in improvement of ADHD symptoms in children and adolescents [32,33].

In addition, PMT method has been found useful in treating, reducing the symptoms and improving oppositional defiant disorder [34], Asperger syndrome [35], depression and anxiety in mothers of children with ADHD [36]. Although these two methods have some similarities and parents are the addressees in both of them but they have fundamental differences. PCIT has been designed for treating the behavioral problems of children with obvious and disruptive behavioral problems such as conduct disorder, oppositional defiant disorder and ADHD [14]. Its purpose is to help parents who want to manage their children's behavior effectively. In this method special time is dedicated to parents for learning behavioral management skills and special communications in treatment and counseling centers to make them capable of performing the

same methods at home. Furthermore, PCIT is more methodological and has more emphasis on cognitive techniques such as learning, reasoning, problem finding and problematic behavior explanation than using behavioral techniques [21]. While PMT teach parents how to influence their children's behaviors. In this educational technique, parents use all behavioral management principles and emphasize on communicational skills. Parents learn method of communicating and demanding children without conflict arising between parents and children. This training is based on behavioral principles and emphasizes on decreasing or increasing the desired behavior as a result of the way parents' reaction to that behavior [31]. According to what has been said, the aim of present study was to investigate the appraisal of effectiveness and comparison of PCIT and PMT to mothers in symptom improvement of 8-10 year old boys with ADHD in Urmia to recommend the more efficient methods to therapists, parents and psychologists.

Method

This study was quasi-experimental with a pretest-posttest design and control group. The study's population consisted of all 8-10 year old boys' mothers 2012 who were referred to counseling and treatment centers and received the diagnosis of attention deficit/hyperactivity combined type. In order to choose the study's participants all educational-treating centers and psychiatric hospitals in Urmia were checked and the names of the boy students who were received ADHD combined type diagnosis by the child psychiatrist were gathered and were selected as sample. From the population of 100 people who had received the diagnosis of ADHD combined type, some had other problems such as emotional disorders and a number of parents didn't accept to cooperate for participating in the study that finally 60 individuals remained. From this group, the individuals were chosen whose children received only ADHD combined type diagnosis and had no

other disorder, aged 8 to 10, were enrolled in one of public elementary boy schools in Urmia, live with both parents and didn't use any medicine. Mothers had 2 children on average. After invitation of mothers and getting consent form and planning for training sessions some mothers avoided attending the sessions and some others didn't finish the sessions to the end. Finally, 45 participants remained as sample that was divided randomly to two experimental groups (n=15) and control group. Then, both experimental groups (mothers of boys with ADHD) received PCIT and PMT and control group received no intervention. Both treatments were taught during 9 sessions which were held once a week in group form for 1 to 1.5 hours. Following instruments were used in order to collect data:

Conners Comprehensive Behavior Rating Scales: This scale was used to diagnose emotional problems to choose the only patients with attention deficit/hyperactivity in sample. The long version of Conners Rating Scale (for teachers) which has 39 items measures 3 domains of Classroom Behavior, Group Participation and Attitude toward Authority. Teachers score items on a Likert-type scale with 4 grades. So the scores vary from zero (never/rarely) to 3 (totally true/almost always). Filling in the scale takes 10 to 15 minutes. The subscales containing hyperactivity (17 items), conduct problems (13 items), emotional overindulgent (8 items), anxiety-passivity (6 items), antisocial (5 items), and day dreaming-attention problem (4 items) are examined. Conners reported the test-retest reliability of 72% to 92% during one month to one year for the teacher's form and the reliability of 70% for teacher's scoring. Cronbach's alpha has been reported 61% to 95% for this scale [37].

Rating Scale for ADHD (SWAN): The questionnaire has 18 items based on DSM-IV criteria in 2 parts and contains 9 phrases. Phrases 1-9 consist of inattention 9 symptoms and 10-18 phrases have the 9 hyperactivity and impulsivity symptoms inside them. The 7-point grading score is used in the questionnaire in a way that the normal behavior stands in

the middle of the spectrum and zero score belongs to it. Positive scores (1 a bit below average, 2 below average, and 3 much lower than average) refers to behavioral problems and negative scores (1 slightly above average, 2 above average, 3 much higher than average) belongs to absence of behavioral problems. Whatever individual's score is lower in this rating so it can be concluded that symptoms are more. This form is completed by teachers. The reported Cronbach's alpha is 0.96 for the attention deficit subscale, 0.95 for hyperactivity and .96 for the combined disorder. The test-retest coefficient calculated for 102 patients (31 boys and 71 girls) after 5-6 weeks and the obtained coefficient was 75% for attention deficit, 63% for hyperactivity and 74% for the combined disorder. The inter-correlation was reported 90% between the two subscales [38].

One or two months after program's completion a supportive session is usually held to solve problems that parents would encounter in following the learned parenting skills during the program's 9 sessions. Table 1 shows procedure of PCIT.

It should be noted that, depending on the severity of the problem and necessity, these two stages can take between 20-12 sessions. In the current study treatment was conducted within 13 sessions. In the first sessions, the treatment's basic principles were presented to parents and logical bases were discussed. In the child-centered interaction step parents learn to guide children indirectly during playing time by using PRIDE skills. Therapist accompanies parents all through the session and corrects their behavior whenever it's necessary. Therapist helps parents to ignore children's inappropriate and replace it with a new concept from the perspective of the child's behavior and attempt to change it. At parent-centered interaction step, direct guiding and shaping the child's behavior will be put on agenda. At this step they get familiar with inappropriate styles of controlling behavior and learn that it's necessary to give obvious orders to their children and have special expectations.

Parents would learn how to use positive and negative reinforcement. In this research, written guidance was prepared for parents to let them have reliable source to refer while getting acquainted with treatment's procedure. Sessions for a group of 15 people was formed by mothers of children with ADHD. Briefings were held for all 15 persons at one time and parent-child

interaction therapy training sessions were conducted for every 5 persons separately. So a room was considered and a toy or the child's favorite activity was chosen too. Then mother started to play with her child. The interaction style was observed and corrected by the trainer. Covariance analysis (ANCOVA) and SPSS-16 software were used for analyzing the data.

Table 1 Sessions of PMT & procedure of PCIT

Sessions of PMT	
Plan	Sessions
1 st session	Introducing children's disorder to their parents
2 nd session	1. Understanding the parent-child interaction and behavior management principles 2. Describing four-factor model of parent-child conflict 3. analyzing the principles of behavior management
3 rd session	Creating and increasing the parents' attention to children
4 th session	Paying attention to child's positive behavior: parents learn to pay attention positively to appropriate social behavior and pay no attention to inappropriate behavior when child is playing independently.
5 th session	Creating token economy system at home: while performing token economy system at home has so many expectable, immediate results, it has been designed to enhance parents' attention to children's appropriate and compatible behaviors
6 th session	Fining and depriving: parents learn how to take the token in order to punish the child for non-compliance and minor disobeying of rules
7 th session	Generalizing the method of depriving to other behaviors
8 th session	1. Reviewing the child's bad behavior in public 2. Using all the principles that were taught in previous sessions to control the child's bad and inappropriate behavior in public
9 th session	1. Controlling the child's future behavioral problems and managing problems 2. Discussing the joint ways of working with school staffs
Procedure of PCIT	
Steps	Way of performance
Step1 Enhancing communication (child-directed interaction)	1. Concentrating on educational structure and secure attachment 2. Adjusting parent-child relationships 3. Teaching PRIDE skills: Praise, Reflection, Imitation, Description, Enthusiasm
Step2 Discipline and obedience (parent-directed interaction)	Teaching strategies to parents to give direct and obvious orders to children and prepare stable results for what is done or what is not done by children

Results

The mean age of mothers participating in the study was 30.3 (SD=5.6) and mean age of children was 9.2 (SD=1.3). Mothers had been spent an average of 8 years of education (SD 6.6) and 5% of them were working outside home. In order to compare the two methods, first of all the mean and standard deviation scores of the 3 groups are mentioned at SWAN posttest. The PCIT group's mean

score (75.69) is higher than the score of PMT (75.27).

Results of Levene's test are showed, the error variance is homogenous in all groups because obtained score for F is 0.31 which is not significant. So covariance analysis can be used to analyze the data. The results of covariance analysis for ADHD symptoms are presented in Table 2:

Table 2 *The results of the between experiments and control groups' covariance analysis*

	Sum of squares	Degrees of freedom	Mean of squares	F	Significance degree	Eta-squared
Hyperactivity	16830.93	2	8415.46	246.39	0.000	0.42
Attention deficit impulsivity	19606.29	2	9803.15	255.47	0.000	0.40
Hyperactivity's error variance	22745.99	2	11372.99	428.44	0.000	0.49
Attention deficit's error variance	1400.47	41	34.15			
Impulsivity's error variance	1573.26	41	38.37			
	1088.34	41	26.54			

The results of hyperactivity, attention deficit and impulsivity's covariance analysis (Table 2) indicated that obtained F for the groups is significant at level of $p < 0.01$ so it can be concluded that there is a significant difference between the control group and experimental groups' mean scores. In other words, using PMT and PCIT improve hyperactivity, attention deficit and impulsivity's symptoms. Based on the obtained results there is a significant difference between the adjusted mean scores of experimental

group and control group with $F=246.39$ in hyperactivity, $F=255.47$ in attention deficit, $F=428.44$ in impulsivity and the degree of freedom equal to 2 in significance degree of 0.99. Eta-squared shows that by using pretest covariate due to the changes in group membership (control or experimental) 42% of hyperactivity, 40% of attention deficit and 49% of impulsivity can be explained. In other words, these changes caused by participation in the training program.

Table 3 *The comparison results of pretest and posttest's mean scores of parent management group, parent-child interaction therapy training and control group*

	Sum of squares	Degrees of freedom	Mean of squares	F	Significance degree	Eta-squared
Pretest	1.50	1	1.50	0.03	0.86	0.001
Group	18874.64	2	9437.32	185.23	0.000	0.900
Error	2088.89	41	50.94			
Total	188331	45	34.15			

As Table 3, difference between the pretest and posttest scores for two experimental groups and control group is equal to $F=185.23$ which means

that the difference between the 3 groups of PMT, parent-child interaction therapy training and control is significant at $p < 0.05$.

Table 4 *Evaluation of the difference between the mean scores of the 3 groups of parent management, parent-child interaction therapy and control further*

	Source of changes	Mean changes	Significance degree
Parent management group	Parent-child interaction therapy group	0.33	0.992
	Control group	43.46	0.000
Parent-child interaction therapy group	Parent management group	0.33	0.992
	Control group	43.80	0.000
Control group	Parent management group	43.46-	0.000
	Parent-child interaction therapy group	43.80-	

As Table 4, Tukey's test indicates that there is a significant difference at $p < 0.05$ level between the two methods; PCIT training and PMT. The difference is in favor of PCIT training which shows

that this method is more effective in comparison with PMT. Difference between the pretest and posttest's scores and also the difference between the effectiveness of groups are shown in Figure 1.

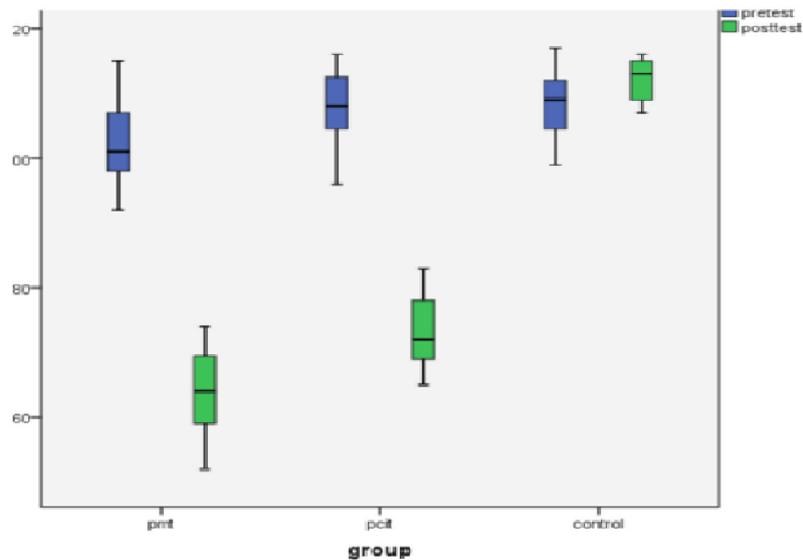


Figure1 Pretest and posttest's scores of different groups

As it is shown in figure 1, there is a visible difference between pretest and posttest's scores in 3 groups. The difference is higher in PCIT group than the PMT group.

Discussion

The purpose of this study was to compare the effectiveness of two methods of PCIT and PMT on development of ADHD symptoms in children. The results showed that PMT method can reduce the symptoms of this disorder. In this regard, Skreitule et al. [39] suggested that PCIT which is basically behavioral program can be the most popular and most successful treatment approach in relation to children's inappropriate behaviors and most of the parents are satisfied with it. Evidences indicate that parents' behavioral training programs have been introduced as one the most appropriate strategies to treat children with behavioral problems and using this strategy is increasing [32]. Different researches show the positive impact of PMT on improving the symptoms of ADHD in children and adolescents [33-35]. Sadeghi et al. [40] examined the effect of parent management training on the family function of the children with attention deficit/hyperactivity. The results showed that there was significant improvement in family functions.

Accordingly, it can be concluded that PMT method is more effective in helping the parents of ADHD children. PCIT has been shown effective in the study in reducing ADHD symptoms too. This finding is consistent with several results of studies which showed that this method can improve the symptoms of the disorder by improving the quality of parent-child relationship [13, 20]. In addition, in this method a special time is dedicated to parents to practice special communication skills and behavioral management skills, make right decisions about the reasons of children's behaviors through reasoning and thinking, react reflectively and have consistent behavior and parenting strategies [26,27].

The results of the comparison of the two methods suggest that PCIT is more effective. Among other treatment interventions, parents have the major role in treating the children's antisocial behaviors. Thus solving the parenting problems, specifically mothers', leads to mental health improvement and better performance in the role of parents [16]. PCIT that was designed to improve the quality of parent-child interaction and decrease the number of disruptive behaviors has been strongly supported by so many

researches. This is not only true about children with ADHD, but also about other childhood disorders and problematic families' difficulties [22-24,16]. Parents who attended the training sessions reported that positive impacts remained 1 to 6 years after treatment's completion [27]. According to a research about quality of parent-child interaction in 67 pre-school boys with ADHD, mothers' behaviors were the best predictor of hyperactivity in children. Transversal studies also showed obvious differences between parent-child interactions in hyperactive children group comparing with normal children. Mothers of children with ADHD have more negative and imperative interaction and are less responsive to children's needs [9]. Therefore, the ways mothers communicate with children with ADHD can be changed by modifying family behavior patterns. Adjusting the quality of mother-child relationships seems necessary at the first step. Since mothers spend more time with their children, the quality of the interaction can be considered as a milestone in shaping the children's long term behavioral bases. Studies have shown that as a result of PCIT, parents learn more effective parenting techniques to reduce child behavior problems and improve the quality of parent-child relationships [14]. The most common reported behavioral consequences of PCIT methods includes: 1; Reduction in the frequency of children's behavioral problems in relationships with parents and teachers (94% of studies). 2; Increasing parents' satisfaction (53% of studies). 3- Decreasing inattention and hyperactivity are observed at home by mothers and at school by teachers (29% of studies). 4- Decreasing negative behaviors in children are seen in clinical observations (24% of studies). 5- Decreasing qualitative reduction in the symptoms of the children who are identified with the diagnostic and statistical manual of mental disorders as children with disruptive behavioral disorders (24% of studies).

The low educational level of mothers was the main limitation of the present study which caused difficulty understanding concepts related two training methods and also drop of

subjects is affected on the generalizability of the results.

According to the results, it is suggested that other studies can examine the effectiveness of PCIT and PMT on girls with ADHD and compare its results with the boys'. It is recommended that future researches can study and also address adolescents with Attention Deficit / Hyperactivity. It is also suggested that in future studies socio-economic status and parental educational level are entered into the research process, as well as control variables and it can be studied in larger populations.

Conclusion

Based on the findings it can be concluded that both PCIT and PMT are effective in improving the parent-child relationships qualitatively and reducing symptoms of ADHD. But PCIT is more effective than PMT. The probable reason is that PCIT has greater focus on mothers' inefficient attitudes about parenting styles and treating children.

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Contributions

Study design: FMM

Data collection and analysis: NN, RH,

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Conflict of Interest

"The authors declare that they have no competing interests."

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