



The Family-Centered Efficacy of Cognitive-Behavioural and Motor Treatment on Clinical Symptoms and Executive Functions In ADHD Children

Rahim Davari ^{1*}, Bagher Ghobari Bonab ², Javad Mahmoudi-Gharai ³, Gholamali Afrooz ⁴

¹ Psychology Department, Islamic Azad university , Science and Research Branch Tehran , Iran

² Psychology Department, Islamic Azad university , Science and Research Branch Tehran, Iran

³ Faculty of Psychiatry ,Medical Sciences University, Tehran , Iran

⁴ Faculty of Psychology, Tehran University , Tehran, Iran

E-mail: dr.davari_rahim@yahoo.com

(Received April 2015; Published June 2015)

ABSTRACT

This study was to investigate the efficacy of the family base-integrative program designing of cognitive behavioral and motor therapy on clinical symptoms and executive functions in elementary school children with (ADHD). Thereafter 44 children (22 experimental group, 22 control group) were selected through purposive sampling method and parents of experimental group underwent 40 sessions of integrative therapy. CANTAB and IVA tests were administered as the pre-test and post-test for the children in experimental and control groups. The results which were supported by MANCOVA revealed that applying the family base-integrative therapy was effective in the reduction of the symptoms of hyperactivity and attention deficit (of clinical symptoms) and improve the shifting and flexibility of attention, spatial span, spatial working memory and spatial planning (of executive functions), but there was not effective impulsiveness of clinical symptoms and motor control and planning of executive functions. This study confirmed that the family-centered integrative program of cognitive behavioral and motor therapy has a positive effect on clinical symptoms and executive functions in children with ADHD.

Keywords: Attention Deficit/Hyperactivity Disorder(ADHD)- Clinical Symptoms- Executive Functions - Cambridge Neuropsychological test Automated Battery(CANTAB) - Integrated Visual and auditory(IVA)

DOI:10.14331/ijfpss.2015.330050

INTRODUCTION

Attention Deficit/Hyperactivity Disorder (ADHD) is the most common behavioral disorders of childhood. The prevalence Level of ADHD based on population surveys in most cultures, Approximately in 5% of children and 2.5% of adults are estimated (DSM-V,2013). Clinical Signs of the disorder, Included attention deficit, hyperactivity and impulsivity(It can be as a combination means synchronization of attention deficit patterns, and Hyperactivity-impulsivity). The attention deficit as a distraction and Deviate from the

task, inability to stay focused, clear irregularity, lack of attention to detail and forgetting is manifested in behavior, And hyperactivity and impulsivity as motor activity or excessive moving, Impulsive and excessive speech , inability to be patient, inability to postpone satisfaction, and impulsive harassment in conversations, games, or other activities is determined. According to (Barkley, 1997) problems of effected with this disorder is related to executive functions Included of working Verbal memory, internalization of speech, self-regulation of emotions and impulses, and planning that is the result of their inability to behavioral

inhibition. This disorder is relatively stable in early adulthood and in a significant number of infected children, relative problems is continuing to Adulthood. This disorder in infected children with decrease in academic performance, and social exclusion is associated, and those infected with this disorder compared with non-infected children, with more likeness are suffer injuries and in adolescence infected to conduct disorder and in adulthood become infected to personality disorder(V.2013).Variety of biological Etiology, cognitive, behavioral, social, and environmental for this disorder has been proposed and in this regard various drug treatment, behavioral, Cognitive-behavioral, and social, treatment and environmental interventions have been used. In each of the mentioned treatment method, despite some successes that have been reported, success have not been completed. Drug treatment is probably one of the most important ways of treating this disorder (Harrison, geder, et al. quoted from (Dadsetan, 2008)). However, a problem that occurs in drug treatment is that the drug effect was for Short term and transient and with the discontinuation of drug the Signs will return again. The Review of the research related to the use of Stimulant drugs by Seyfer 1992 showed that in infected, drug consumption by 70% and the use of the placebo by 10 to 40 percent have positive effects (Barkley & Cunningham, 1978). One of the non-drug treatments of ADHD, is behavioral treatments (Kendall, 1995). Techniques used in this method are varied that the Predominant methods include Cognitive restructuring, cognitive self-regulation, problem solving, Modeling, behavioral independence and playing role (Goldstein & Goldstein, 1998). Cognitive-behavioral treatment for infected to this disorder have been reported effective in many studies (Schottelkorb & Ray, 2009). A meta-analysis of 110 studies published in various behavioral treatments show that the size of Beneficial effect of the intervention has been existed (Fabiano et al., 2009) Nevertheless, Toplak M.E and his colleagues have been reported the sizes of Small effect for cognitive and behavioral interventions. Some researchers such Abikoff, H believe that although cognitive training, have significant and positive aspects, however, research findings, not approved its usefulness for these children. One of the things that people with ADHD facing numerous problems is motor skills. Almost 51 percent of children with ADHD suffer from motor problems (Kadesjö & Gillberg, 1998; Piek et al., 2004) reported that the signs of Attention Deficit is strong predictors for the motion problems. ADHD People like People with Developmental coordination disorder have common features such as weakness in motor skills, academic, social and emotional and there is a close association between these two disorders(Christiansen, 2000). One of the features that is more prominent in both disorders is weakness in motor skills. These people as a clumsy and poor in motor coordination have been described that in the fine and coarse movements are also faced with some problems(Schoemaker, Ketelaars, Van Zonneveld, Minderaa, & Mulder, 2005). In other words, the inability to control waste movement or hyperactivity is another problem that mainly in the behavior of ADHD people can be seen and this problem is the serious obstacles to their attention and learning process (Afrooz,

2010). In this context, given the motor problems of ADHD people, one of the newest Non-Drug Treatment Methods for controlling the waste movement of this group that has been proposed is motor treatment.

As the research has shown extensively, Treatments based on movement and exercise on a regular basis can have Substantial impact on mental health along with physical health ("International Society of Sport Psychology," 1992). Public reports of mental health of America suggest that without activity will lead to a deterioration of mental health of people and physical movements often relieve the Signs of Attention Deficit. Therefore, by Considering the wide range of cognitive and behavior disorders which often are Characteristics of these children, And since none of the treatments of ADHD alone are not effective and considered acceptable, (Allen, 1980), Therefore, considerable research has been done on the combination of several methods And showed significant effectiveness compared to individual and separate treatments .For example, the combination of drug treatment, cognitive, and behavioral in treatment of hyperactivity has shown considerable effectiveness (Brown, Wynne, & Medenis, 1985).

In the present study, cognitive-behavioral treatment and motor treatment as an integrated is designed and as a new non-drug treatment for children with ADHD have been introduced. As Stallard (2009) has stated aim of CBT is to promote cognitive and behavioral skills through increasing self-awareness, facilitate better self-perception, and improve self-control on them. In this approach attempts to identify self-destruction thoughts and beliefs that are clearly negative, biased and self-criticism, and also by using techniques such as self-monitoring, training, Positive recognition, balanced and functional, replace negative thoughts and beliefs. In this method, after detecting cognitive and behavioral impairment, new techniques for problem-solving skills and appropriate behavioral methods are taught and then test and evaluated and reinforced, and when Pleasant feeling gradually replaced with initial unpleasant feelings, Greater understanding of the causes and nature of the behavior occurs and with establishment of new cognitive and behavioral skills possibility to deal more appropriately with difficult situations are also provided. And as Freed berg stated, children's cognitive treatment is based on Here and now approach and due to the pragmatism of children, practical learning for them is better and more refreshing and through connecting the adaptive communication skills with concrete and tangible actions, children for Recalling and performing the desired behavior are prepared in different situations. For movement therapy, studies of neurological motor activities have shown that Movement and exercise influence on the growth of brain cells. Motor activity increases blood flow in the cortex, increases dopamine and nor epinephrine in the brain and in the primary motor areas and sensorimotor of the frontal brain (regions associated with executive functions), And also during physical activity, brain beta-endorphin concentration showed a significant increase(John & Ratey, 2008). Accordingly, and given that the Cognitive - behavioral therapy mainly seek to change the Cognitive - behavioral foundation and infrastructure, providing it integrated with

motor treatment, can establish and sustain adaptive patterns of behavior in aspects of motor and have double effectiveness on improvement of problems of people with this disorder since infected children have Maximum time of communication and diverse interaction In most situations with their parents and within the family, Therefore, equip family members (especially mothers) to cognitive-Behavioral treatment techniques and Empower them for the comprehensive treatment, continuous and effective towards their children is considered as an important and effective step in Effectiveness of Treatment. Accordingly, in the present study integrated cognitive-behavioral treatment, and motor as family-centered is designed. The research purpose of this study is to investigate the effectiveness of the Family Base-Integrative Program Designing of Cognitive Behavioral and Motor Therapy on Clinical Symptoms (Hyperactivity, Attention deficit, impulsiveness) and Executive Functions (Shifting and flexibility of attention, Spatial span, Spatial working memory and Spatial planning, memory and Spatial planning) in Elementary School Children With Attention Deficit/Hyperactivity Disorder (ADHD). The research hypothesis is that the Family-Centered Integrative Program Designing of Cognitive Behavioral and Motor Therapy is effectiveness on Clinical Symptoms (Hyperactivity, Attention deficit, impulsiveness) and Executive Functions (Shifting and

flexibility of attention, Spatial span, Spatial working memory and Spatial planning, memory and Spatial planning) in children with attention deficit hyperactivity disorder and effective.

RESEARCH METHOD

The present study is quasi-experimental type of pretest-posttest with control group. Statistical population of this study of elementary school children with ADHD in Tehran in 2014. The sample consisted of 44 children in the third and fourth grade who purposefully selected and randomly divided into two groups of 22 person (A total of 44 Person) were divided into test and control group, And each of the groups with the visual and auditory Continuous Performance test of Sandford and Turner for clinical signs and CANTAB for executive functions, pre-tested, then parents of children in the test group for 40 session during 21 weeks (each week 2 days and each day 4 session for 45 minutes) were treated under integrated cognitive-behavioral, and motor treatment. After completion of treatment sessions, the mentioned tests were administered to children, data were analyzed at 0.05 error level with Multivariate analysis of covariance and in the software package of SPSS (version XVI)is analyzed.

Session	Content
1	Familiarity with parents and their children and parents acquiring awareness about the process of treatment sessions and attracting their cooperation.
2	Mother's familiarity with the nature of motor therapy for child.
3	Mother's familiarity with ADHD (Causes-epidemiology-Symptoms-Problems-Evolutionary line and treatment).
4	Mother's Familiarity with physical activities and improve children's motor skills(Gross motor skills).
5	Familiarity with Cognitive-behavioral approach: involves identifying approach and assessing the impact of the approach in the treatment of ADHD.
6	Parents training and Skill acquisition in the performing the activity of walking as normal and as Carts.
7	Study the maladaptive thoughts of parents and familiarity with right thoughts related to the children.
8	Parents training and Skill acquisition in performing Activity of gliding, crawling, running, skipping and jumping by the child.
9	Study the Parent-child behavioral interaction: Includes complete the self-Evaluation form of the behavior of adults.
10	Parents training and Skill acquisition in implementing activities for turning children around, rolling Children on the mattress.
11	Considering the Incorrect behaviors of mothers and their familiarity with the correct behaviors.
12	Parents training and Skill acquisition in performing agility activities as Rhythm.
13	Mother's familiarity with the strengths and weaknesses of the child. Talk about how to deal with the weaknesses and strengths of the child.
14	Parents training and Skill acquisition in performing Modulation activity (Oscillatory activity from fast to slow).
15	Familiarity with the problem solving skills (The identification of the problem and Finding Solutions, selecting the best solution and evaluation).
16	Parent's training and Skill acquisition in performing slow activities of jogging or simulation methods with turtles.
17	Familiarity with communication skills includes expressing short phrases, efficient, effective, Direct and unambiguous, consistent of words and feelings.
18	Review the provided skills and promoting the parents skills.

-
- 19 Parent's familiarity with Positive communication skills such as short phrases, active listening and Provide feedback.
 - 20 Parents training and Skill acquisition in performing physical awareness activities.
 - 21 Management Relaxation training, mental symptoms, emotional, and signs of body language and different tone of voice.
 - 22 Parents training in performing Balance and coordination activities.
 - 23 Intervention programs and strengthen techniques or multiplier of adaptive behaviors to parents. Training the intervention programs or enhancing adaptive behaviors to parents.
 - 24 Parents training and skills in performing coordination and balance activities.
 - 25 Training programs and intervention techniques. Attenuator or regressive of adaptive behaviors to parents. Weakening or reducing the adaptive behavior of the parents.
 - 26 Training Parents in performing fine motor activities.
 - 27 Review the Strengthen or regressive techniques of adaptive behavior and parent's necessity to consider target behavior.
 - 28 Parent's skill acquisition in performing fine motor activities.
 - 29 Parent's familiarity with reinforcement table.
 - 30 Training activities to improve the small program and motor sequence-training Imitative activities.
 - 31 Parent's familiarity with graphs of "stop, think and apply the plan and providing grants from the reinforcement table.
 - 32 Parent's skill acquisition in performing activities to improve small program and motor sequence and training Imitative activities.
 - 33 Review the proposed strategies, Necessity to provide Reinforcement for the continuation of behavior and Necessity to gradually eliminate it.
 - 34 Parent's skill acquisition in performing treasure hunting activities.
 - 35 Performing the graphs of "stop, think and apply the plan based on the cooperation of the entire family.
 - 36 Parent's skill acquisition in performing. Circumvention of obstacles activities
 - 37 Promote the transfer level of skills to children by parents through modeling and role playing.
 - 38 Parent's training and skill acquisition in the implementation of the road map and timetable.
 - 39 Overview of what has been taught in previous sessions.
 - 40 Practice skills and an overview of what has been taught in previous sessions.
-

Methodology

Sandford And Turner Test

This test (Sandford & Turner, 2004) can detect disorders of attention deficit and hyperactivity. Performing test needs maintaining attention during successive assignments and inhibition of impulsivity response. This test with computer is programmed and in the two methods of visual and auditory is provided for participants. The sequence and order of offering the items (seeing or hearing number 1 or 2) is irregular and participants must by seeing or hearing the item immediately press the mouse button. Sandford and Turner by using the retest method, report reliability coefficient of 75% for this test. In the study of validity, this test was performed in people with and without ADHD and Validity coefficient of 92% was obtained. Means that in 92% Items , this test is able to correctly diagnose this disorder. The reported coefficient suggests the ideal validity of this test.

Fourth Edition of CANTAB (2011)

This test is independent of language and through the touch screen evaluate cognitive ability of individuals. In this study the screening Motor test (screening test no 1), large and small

circle test (screening test no 2), tests of executive function, working memory and planning is used.

A-Motor screening test for Mental and emotional bodies readiness and reduce anxiety of participants to deal with the test is designed. Also performing this test provides context of participant's familiarity with a computer touch-screen system. This test should be performed at the beginning of the test sessions for participants. This test simultaneously screening persons with visual, motor and cognitive disorder. Big/Little Circle (BLC) test, provide preparation of participants for performing set of changes within and between dimensions test. Accordingly, should Performed before this test.

B-The executive function tests, working memory and planning.

1-Set of Intra-Extra Dimensional changes:1-set of Intra-Extra Dimensional changes. This measures learning and reversible system.

2-Stockings of Cambridge. This test is a tool for measuring working memory and spatial planning and measure performance of the frontal brain. Performing of the test is like this that the participants have to touch the ball in the bottom

of the screen, and regulate them exactly the same with the given pattern at the top of the screen. By Touching the Balls Their position is moving. In more difficult Steps participants in order to be able to regulate the ball like a pattern should Plan a bit in their mind, and with several calculated movement will be able to simulate the model. The time taken to complete the activities and movements known as capacity planning.

3. One Touch Stockings (OTS). This test is exactly the same as the Stockings of Cambridge except that all activities that in Stockings of Cambridge (touch) is done manually, do it subjectively.

4. Spatial Span-this test is to measure a person's working memory capacity.

5. Spatial Working Memory. This test measure participants ability to maintenance spatial data, manipulating recalling items in working memory, and exploration strategies used by participants. In study the reliability of CANTAB, Fourth Edition (2011), the retest method is used and Reliability

coefficient of 64 to 75 in Sub-components of executive functions is obtained. In the study of validity, test in people with and without ADHD and people with frontal lobe damage is done and at 92% was able to identify correctly that Suggests this test is valid.

RESEARCH FINDING

As seen in the table 2, students scores in mean, standard deviation, variance, skewness and kurtosis were presented in two phases of the study (pre-test and post-test). The result of the table shows the performance of the experimental group at the post-test was better than pretest. The data shows that the Mean of experimental group has increased in attention deficit and impulsivity and decreased in hyperactivity in the posttest representing the scores difference between the pre-test and post-test.

Table 2. Descriptive indexes of the clinical symptoms parameters

Variable	Group	Pretest					Post test					
		N	Mean	Standard deviation	Variance	Skewness	Kurtosis	Mean	Standard deviation	Variance	Skewness	Kurtosis
Hyperactivity	Experimental	22	115.00	19.27	371.43	0.132	-0.421	100	56.630	3206.93	0.740	-0.178
	Control	22	114.77	29.38	863.04	0.970	0.776	135.68	46.14	2129.27	-0.099	-1.122
Attention deficit	Experimental	22	60.00	14.80	219.05	0.291	-0.812	93.86	41.23	1699.84	0.110	-1.408
	Control	22	62.950	20.22	20.21	0.746	0.751	57.95	34.77	33.77	0.602	-1.128
Impulsiveness	Experimental	22	97.77	42.19	1780.09	0.026	-1.078	109.23	83.40	1666.75	1.458	1.679
	Control	22	96.14	37.67	1418.88	0.667	-0.748	86	60.09	3111.71	1.045	-0.004

Table 3. Descriptive indexes of the Executive Functions parameters

Variable	Group	Pretest						Post test				
		N	Mean	Standard deviation	Variance	Skewness	Kurtosis	Mean	Standard deviation	Variance	Skewness	Kurtosis
Shifting flexibility and attention	Experimental Control	22	56.73	17.40	302.78	0.301	-0.498	36.05	26.53	704.04	1.306	0.529
			54.09	13.33	177.71	0.480	0.763	59.77	19.55	382.09	0.464	0.506
Spatial span	Experimental Control	22	12.59	5.21	27.11	0.366	-1.043	7.59	6.74	45.40	1.194	0.083
			11.82	4.46	19.87	0.264	-0.926	13.64	4.87	23.76	0.021	-1.032
Spatial working memory	Experimental Control	22	82.73	20.28	411.25	0.773	0.741	49.09	29.32	859.51	1.667	1.816
			81.59	13.92	193.77	0.48	-0.944	79.77	35.17	1236.85	0.35	-1.181
planning and motor control	Experimental Control	22	7.05	3.60	12.10	1.408	1.515	7.50	7.80	60.83	1.584	-1.559
			6.95	3.44	11.85	0.366	-1.301	10.18	9.46	89.49	0.571	-1.192
spatial planning	Experimental Control	22	9.64	4.24	17.96	0.576	-0.593	12.32	5.06	25.65	0.197	-0.494
			9.36	4.25	18.05	0.525	-0.363	9	5.19	26.95	0.377	-1.597

The result table 3 shows the better performance of the experimental group at posttest than the pretest. The data show that the Mean of experimental group has increased In planning and motor control and spatial planning and decreased in the Shifting and flexibility of attention, Spatial span, and Spatial working memory in the post-test. Before performing a multivariate analysis of covariance, Necessary

conditions for the application of this method was evaluated. Therefore, the normal distribution using the Kolmogorov-Smirnov test and homogeneity of variances using Levin and homogeneity of regression were evaluated using analysis of covariance, and all variables at the level of 0/05 were acceptable. Due to verify assumptions, using multivariate analysis of covariance is permitted.

Table 4. The results of multivariate analysis of covariance (MANCOVA) treatment efficacy on clinical symptoms and executive functions

Effect	Value	Hypothesis df	Error df	F	Sig	Parital Eta Squared	Observed power
Hotelling trace	2.17	8	27	7.32	0.0001	0.68	1

The results presented in table 4 shows that the elimination of the pre-test effect (covariate or sphericity of

pre-test effect), a significant difference exists between the control and experimental groups in clinical symptoms and

executive functions. Therefore, the effectiveness of the Family Base-Integrative Program Designing of Cognitive Behavioral and Motor Therapy on Clinical Symptoms and

Executive Functions of Elementary School Children With Attention Deficit/Hyperactivity Disorder(ADHD) can be confirmed.

Table 5. The results of multivariate analysis of covariance (MANCOVA) treatment efficacy on clinical symptoms and executive functions

Source	Dependent Variable	Sum of squares	df	Variance	F	Sig	Partial Squared	Eta	Observed power
Covariate	Clinical symptoms	Hyperactivity	4293.49	1	4293.49	1.67	0.133	0.30	0.66
		Attention deficit	3224.18	1	3224.18	2.37	0.033	0.38	0.83
		Impulsiveness	1362.79	1	1362.79	0.44	0.901	0.10	0.18
		Shifting and flexibility of attention	998.86	1	998.86	1.69	0.128	0.31	0.66
Covariate	Executive functions	Spatial span	79.14	1	79.14	2.35	0.034	0.38	0.83
		Spatial working memory	2541.84	1	2541.84	2.74	0.016	0.42	0.89
		planning and motor control	143.78	1	143.78	2.51	0.025	0.40	0.86
		spatial planning	60.94	1	60.94	3.05	0.009	0.44	0.92
Group	Clinical symptoms	Hyperactivity	13990.13	1	13990.13	5.46	0.025	0.13	0.62
		Attention deficit	16635.96	1	16635.96	12.23	0.001	0.026	0.92
		Impulsiveness	5699.38	1	5699.38	1.85	0.182	0.05	0.26
		Shifting and flexibility of attention	6445.34	1	6445.34	10.95	0.002	0.24	0.89
Group	Executive functions	Spatial span	422.14	1	422.14	12.56	0.001	0.27	0.93
		Spatial working memory	10546.21	1	10546.21	11.38	0.002	0.25	0.90
		planning and motor control	84.08	1	84.08	1.47	0.233	0.04	0.21
		spatial planning	113.13	1	113.13	5.67	0.023	0.14	0.63
Error	Clinical symptoms	Hyperactivity	87069.32	34	87069.32				
		Attention deficit	46246	34	46246				
		Impulsiveness	104517.23	34	104517.2				
		Shifting and flexibility of attention	20011.88	34	20011.88				
Error	Executive functions	Spatial span	1142.14	34	1142.14				
		Spatial working memory	31502.22	34	31502.22				
		planning and motor control	1941.78	34	1941.78				
		spatial planning	677.38	34	677.38				
Error	Clinical symptoms	Hyperactivity	739075	44	739075				
		Attention deficit	328800	44	328800				
		Impulsiveness	536033	44	536033				
		Shifting and flexibility of attention	129994	44	129994				
Total	Executive functions	Spatial span	6811	44	6811				
		Spatial working memory	237043	44	237043				
		planning and motor control	6675	44	6675				
		spatial planning	6225	44	6225				

As seen in the table 2, To test the Research hypotheses a multivariate analysis of covariance was used. The results showed that the integrated program of cognitive-behavioural treatment and motor family-centered improves two indicators of (attention deficit and hyperactivity) Clinical signs and Four indicators (Change and attention flexibility, Working memory capacity, spatial working memory, spatial planning) of the executive function has been studied in participants.

DISCUSSION AND CONCLUSION

Confirmation of hypothesis based on the effectiveness of the overall program of CBT and motor family-centered in improvement of hyperactivity and attention deficit in children with ADHD with finding of the shuttle (Freitag et al., 2012; Majorek, Tüchelmann, & Heusser, 2004; Medina et al., 2010; Müller, Druss, Dombrowski, & Rosenheck, 2014; Pontifex, Saliba, Raine, Picchietti, & Hillman, 2013; Sadati Farahani, 2012; Schottelkorb & Ray, 2009), and (Momeni.F, 2002) are aligned. Also findings of this research with conducted study by Halperin, Berwid, and O'Neill (2014), (Chronis-Tuscano et al., 2014) and (Borich, Babul, Yuan, Boyd, & Virji-Babul,

2015) are aligned, In explaining the Effectiveness of motor therapy on hyperactivity and attention deficit and executive functions Putnam's approach can be cited. Putnam based on his review study provide a therapy method based on movement and exercise .He believes that the impact of movement and exercise, is Like a drug treatment (Ritalin) and both treatment increase the peace movement and alertness , accuracy and attention in the infected. In explaining the effectiveness of the movement treatment on attention deficit and hyperactivity, neurological studies of Ratey and Hagerman (2008) have shown that Motor and air burning activities increases blood flow and neurochemical changes and increases dopamine and nor epinephrine in the brain, And in the primary motor areas and sensory and motor areas of the frontal and positive changes in cerebellum And thus increase attention and decrease distractibility and reduce defects of executive functions and behavioural problems. Also the results show that the Integrated program of cognitive-behavioural treatment and motor family-centered in improving impulsivity (of Clinical signs) and planning and motor control (of executive functions) of studied participants were not effective. Lack of effectiveness of integrated

treatment of Family centered on control (impulsivity) response with findings of (Medina et al., 2010; Putnam, 2001; Salend, Elhoweris, & Van Garderen, 2003; Shipman, 1984; Simos, 2002) is inconsistent. This inconsistency could be because that in the mentioned research, findings is used only through interviews or checking the diagnostic list that have been completed by parents or teachers.

But in the present study Integrated visual and auditory Continuous Performance Test was used and children with ADHD must be personally and by pressing the computer mouse to auditory and visual signals That appears on the screen and then disappeared with appropriate speed and correctly respond. Therefore, these experimental conditions can cause stress in effected children when presenting feedback to the screen signals and thus, could effect on obtained results in signals of control (impulsivity) response. Also this inconsistency could also be because the research sample were selected purposefully, but the sample of Mentioned research were selected randomly, so this possibility exist that in examples of present research signals of control (impulsivity) response is more severe. For The lack of treatment effectiveness on the planning and movement control, It is noteworthy that participants when conducting the test is required in addition to spatial planning and simulating models as Subjective, must by touching the ball at the bottom of the screen, regulated them exactly the same as the provided pattern shown in the top of the screen, and by touching the ball by participants their position is moving. Given the lack of treatment effectiveness on impulsivity of test groups, and considering the responding process of participants as tactile selection, impulsivity factor in participants can reduce their rating, and selecting research sample purposefully and with high probability of severe impulsivity of sample groups could affect this aspect in negative direction. Present Research in this direction is aligned with the findings of Shipmen. But in the Shipmen research, stopping motor exercises cause performance of participants to return to the base line. Although in the present study due to lack of follow-up tests, the possibility to return

to the previous behaviour level in participants is not studied. Given that the provided treatment in this study was a combination type, And as Brown et al. (1985) in their study have shown that combination therapy comparing with non-combination treatments had a significant effect, And the subjects of present study were simultaneously under cognitive-behavioural treatment and as Stallard (2002) stated the goal of cognitive-behavioural treatment, is to increase behavioural skills through self-awareness, and improve self-control. And since the CBT due to the positive and effective change in the cognitive basis, is associated with more long-term effect, Therefore, it appears that the level of recovery of participants in the present combination treatment had persistent and as Friedberg has stated In the children's cognitive treatment, like cognitive treatment for adults on being active and purposeful is emphasized, and due to Practicality of children, Practical learning for them is more eloquent and better and through connecting adaptive skills with the objective and tangible Performance, children will be ready for recalling and performing the desired behaviour in different situations (Friedberg, McClure, & Garcia, 2009). Due to the Friedberg statement, simultaneous presentation of motor treatment and cognitive-behavioural treatment in terms of a combination therapy, exhilarating motor activities with increasing Adaptive skills that affected by combination of cognitive-behavioural treatment approaches and provide the possibility to recall and perform the desired behaviour in different situations. Major Limitations of the study include:- Purposive sampling was used in this research and as it wasn't in random way, generalizing the results is limited. Playing computer games, especially fast and impulsive ones, by subjects may affect the study results. This aspect of the study is uncontrolled. The main recommendations of the study are, It is recommending to study that treatment effectiveness through follow-up period during the research. It is suggesting for other disorders such as learning disabilities, autism and motor disabilities to research the effectiveness of mentioned treatment.

REFERENCES

- Afrooz, G. (2010). Introduction to psychology and education of exceptional children. *Tehran: Tehran University Publications.*
- Allen, J. I. (1980). Jogging Can Modify Disruptive Behaviors. *Teaching Exceptional Children*, 12(2), 66-70.
- Barkley, R. A. (1997). Behavioral inhibition, sustained attention, and executive functions: constructing a unifying theory of ADHD. *Psychological bulletin*, 121(1), 65.
- Barkley, R. A., & Cunningham, C. E. (1978). Do stimulant drugs improve the academic performance of hyperkinetic children? A review of outcome studies. *Clinical Pediatrics*, 17(1), 85-92.
- Borich, M., Babul, A.-N., Yuan, P. H., Boyd, L., & Virji-Babul, N. (2015). Alterations in Resting-State Brain Networks in Concussed Adolescent Athletes. *Journal of neurotrauma*, 32(4), 265-271.
- Brown, R. T., Wynne, M. E., & Medenis, R. (1985). Methylphenidate and cognitive therapy: A comparison of treatment approaches with hyperactive boys. *Journal of Abnormal Child Psychology*, 13(1), 69-87.
- Christiansen, A. S. (2000). Persisting motor control problems in 11-to 12-year-old boys previously diagnosed with deficits in attention, motor control and perception (DAMP). *Developmental medicine & child neurology*, 42(01), 4-7.
- Chronis-Tuscano, A., Lewis-Morrarty, E., Woods, K. E., O'Brien, K. A., Mazursky-Horowitz, H., & Thomas, S. R. (2014). Parent-Child Interaction Therapy With Emotion Coaching for Preschoolers With Attention-Deficit/Hyperactivity Disorder. *Cognitive and Behavioral Practice*.
- Dadsetan, P. (2008). Developmental Psychopathology from Childhood to Adulthood: Tehran: Samt Publication.
- Fabiano, G. A., Pelham, W. E., Coles, E. K., Gnagy, E. M., Chronis-Tuscano, A., & O'Connor, B. C. (2009). A meta-

- analysis of behavioral treatments for attention-deficit/hyperactivity disorder. *Clinical Psychology Review*, 29(2), 129-140.
- Freitag, C. M., Hänig, S., Schneider, A., Seitz, C., Palmason, H., Retz, W., & Meyer, J. (2012). Biological and psychosocial environmental risk factors influence symptom severity and psychiatric comorbidity in children with ADHD. *Journal of neural transmission*, 119(1), 81-94.
- Friedberg, R. D., McClure, J. M., & Garcia, J. H. (2009). *Cognitive therapy techniques for children and adolescents: Tools for enhancing practice*: Guilford Press.
- Goldstein, S., & Goldstein, M. (1998). Managing attention deficit hyperactivity disorder in children: A guide for practitioners . New York: John Willey & Sons: Inc.
- Halperin, J. M., Berwid, O. G., & O'Neill, S. (2014). Healthy body, healthy mind?: the effectiveness of physical activity to treat ADHD in children. *Child and adolescent psychiatric clinics of North America*, 23(4), 899-936.
- International Society of Sport Psychology. (1992). *The Physician and Sportsmedicine*, , 20, 179-184.
- John, J., & Ratey, E. (2008). *The Revolutionary New Science of Exercise and the Brain*: New York: Little Brown and Company.
- Kadesjö, B., & Gillberg, C. (1998). Attention deficits and clumsiness in Swedish 7-year-old children. *Developmental medicine & child neurology*, 40(12), 796-804.
- Kendall, P., Hammen, C. (1995). *Abnormal Psychology*. Boston: Houghton-Mifflin.
- Majorek, M., Tüchelmann, T., & Heusser, P. (2004). Therapeutic Eurythmy-movement therapy for children with attention deficit hyperactivity disorder (ADHD): a pilot study. *Complementary therapies in nursing and midwifery*, 10(1), 46-53.
- Medina, J. A., Netto, T. L., Muszkat, M., Medina, A. C., Botter, D., Orbetelli, R., Miranda, M. C. (2010). Exercise impact on sustained attention of ADHD children, methylphenidate effects. *ADHD Attention Deficit and Hyperactivity Disorders*, 2(1), 49-58.
- Miller, C. L., Druss, B. G., Dombrowski, E. A., & Rosenheck, R. A. (2014). Barriers to primary medical care among patients at a community mental health center. *Psychiatric Services*.
- Momeni, F., B. H. (2002). Evaluation of efficacy in the treatment of Delacatto neuro- psychiatric Method To treat hyperactive children . *Journal of Andisheh Va Raftar*.
- Piek, J. P., Dyck, M. J., Nieman, A., Anderson, M., Hay, D., Smith, L. M., . . . Hallmayer, J. (2004). The relationship between motor coordination, executive functioning and attention in school aged children. *Archives of Clinical Neuropsychology*, 19(8), 1063-1076.
- Pontifex, M. B., Saliba, B. J., Raine, L. B., Picchietti, D. L., & Hillman, C. H. (2013). Exercise improves behavioral, neurocognitive, and scholastic performance in children with attention-deficit/hyperactivity disorder. *The Journal of pediatrics*, 162(3), 543-551.
- Putnam, S. C. (2001). *Nature's ritalin for the marathon mind: Nurturing your ADHD child with exercise*: Upper Access Books.
- Ratey, J. J., & Hagerman, E. (2008). *Spark: The revolutionary new science of exercise and the brain*: Little Brown & Company.
- Sadati Farahani, S. (2012). *Effectiveness movement therapy on clinical symptoms , executive function and well-being of children with attention deficit hyperactivity disorder and comparison with Neurofeedback*. Tehran University.
- Salend, S. J., Elhoweris, H., & Van Garderen, D. (2003). Educational interventions for students with ADD. *Intervention in School and Clinic*, 38(5), 280-288.
- Sandford, J., & Turner, A. (2004). Integrated Visual and Auditory Continuous Performance Test (IVA+ Plus). *Brain Train*.
- Schoemaker, M. M., Ketelaars, C. E., Van Zonneveld, M., Minderaa, R. B., & Mulder, T. (2005). Deficits in motor control processes involved in production of graphic movements of children with attention-deficit-hyperactivity disorder. *Developmental medicine & child neurology*, 47(06), 390-395.
- Schottelkorb, A., & Ray, D. (2009). ADHD symptom reduction in elementary students: A single-case effectiveness design. *Professional School Counseling*, 13(1), 11-22.
- Shipman, W. (1984). Emotional and behavioral effects of long distance running on children. *Running as therapy*, 125-138.
- Simos, G. (2002). *Cognitive behaviour therapy: a guide for the practicing clinician* (Vol. 1): Psychology Press.
- Stallard, P. (2002). Cognitive behaviour therapy with children and young people: A selective review of key issues. *Behavioural and Cognitive Psychotherapy*, 30(03), 297-309.
- Stallard, P. (2009). Cognitive behaviour therapy with children and young people. *Clinical psychology in practice*, 117.