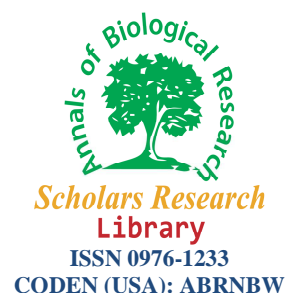




## Scholars Research Library

Annals of Biological Research, 2011, 2 (6):617-623  
(<http://scholarsresearchlibrary.com/archive.html>)



# Biological Effects of cycling exercise on reducing symptoms of children's attention deficit hyperactivity disorder

Abbasi Bakhtiari. Reza<sup>1\*</sup> and Foroghi poor. Hamid<sup>2</sup>

<sup>1</sup>Tiran Branch, Islamic Azad University, Tiran, Iran

<sup>2</sup>Borojerd Branch, Islamic Azad University, Borojerd, Iran

## ABSTRACT

*The purpose of this study was the biological effects of cycling exercise on reducing symptoms of children's attention deficit hyperactivity disorder (ADHD) in 7 to 11 years children's in the city of Isfahan. This study conducted in 2010-2009. Based on the CSI-4 teachers and parents scale, and using D.SM-IV diagnostic criteria, 20 patients were selected. Subjects for the 16 weeks and 2\* sessions in weeks, underwent biological effect of cycling. Immediately after completion of the intervention the post test was conducted on the subject, after two weeks the follow-up test was performed again. Research results induced from analysis of variance showed one period of bike game can reduce the symptoms of the ADHD disorder is ( $p \leq 0.0001$ ). The reduction in the pre test and follow-up test track in both in parents and teachers had the same assessment ( $p \leq 0.01$ ).*

**Key Words:** Attention Deficit Hyperactivity Disorder (ADHD), DSM-IV, CSI-4, Cycling.

## INTRODUCTION

Today one of the most interesting areas of research is research in children's amazing world. Recently many studies were States for children's that their behavior has attracted the attention of many parents and teachers. Inability to control of motor behavior, attention disorders, learning disabilities, aggression, academic problems, arousal and motor agitation are the behavioral characteristics of these children (Kaplan and Sadock, 2007). These children suffer from a mental disorder that is known the ADHD disorder (hyperactivity and attention deficit).

Behavior of ADHD children's negatively affected their performance in the family, school and community and, if continued, may in adolescence and adulthood periods may lead to more social and behavioral disturbances. Consequence of the disorder is so broad that without positive

intervention, their academic performance was severely affected, So that their cognitive growth, emotional, social, and moral and May disturbed.

For the first time the America Psychiatric Association defined the disorder as: "The phenomenon of hyperactivity and attention disorders in children is a condition that Child without particular reason neglect, early arousal and in many cases show hyperactivity to their chronological and mental age."

According to the (D.S.M-IV1) with a confirmed diagnosis of multiple symptoms of inattention or hyperactivity or both of them is divided into three sub-types are often hyperactive, predominantly inattentive and combined type. Currently, this disorder is common in many parts of the world and to be allocated a large percentage.

Report related to the incidence of this disorder in America, is about 3 to 5 percent of school age before puberty. Disorder is common in boys than girls and with the ratio of 3 to 1 and 5 to 1 has been reported in clinical specimens (Kaplan and Sadock, 1998).

For further understanding of the cause or causes of ADHD has not yet inconclusive But, in this context there are hypotheses, for example Heredity plays a role in the onset of the disorder, or abnormalities of the thyroid gland, low blood levels of serotonin, the brain disorder in local activities or environmental factors and acquired including stress in pregnancy period, little oxygen at birth, after birth encephalitis, and even overly sensitive child to holders and add ingredients to food (Feingold, 1974).

Drug treatment is not cause be modified the personal and social adjustments of children in the long term, and the drugs influence is until that their used. Likewise the treatment effects the drugs also have negative consequences, therefore use of non-drug treatments, including individual and group psychotherapy, behavioral therapy and parents and teachers education have to be necessity (Hechtman, 1993).

The ultimate goal of treatment for ADHD is enabling children's to Overcome on the problems that they face in their lifetime. This goal cannot get via medication or forcing children to obey the rules. Games and enjoyable exercise is one of the techniques that used for treatment of problems and disorders of affected children's.

Cognitive - behavioral Psychologists have many uses of the game therapy in treatment of children's disorders. Shawfer (1993) is used this way to treat and reduce the severity of attention deficit and hyperactivity symptoms in children with ADHD aged 4 to 12. Given the above background and research history in the field of game therapy and its likely effectiveness, may the targeted group games with emphasis on physical strength and endurance and also aims to improve the accuracy and alertness have effective role in the control and treatment of attention deficit/ hyperactivity disorder.

Research on the efficacy of cycling as a technique of game therapy for children with the condition of being active is very important. This study intends to provide new therapeutic

---

<sup>1</sup>. Diagnostic and statistical Manual of Mental Disorder-4 the dition

strategies based on the theory that the discharge through the game and is fun for the children, Lasting impact is important in reducing the symptoms of the disorder and treatment.

### **Material and Methods**

This study conducted in 2010-2009. Study design was quasi experimental method. Based on the CSI-4 teachers and parents scale, and using D.SM-IV diagnostic criteria, 20 patients randomly were selected.

Subjects were underwent to drug treatment furthermore 16 weeks and 2 sessions per week, each session lasting 60 minutes they were performed game therapy (cycling).

Each session includes 10 minutes general warm-up program includes running and low tension stretching for large muscles groups and then 15 minutes warm up with the ball and 30 min cycling game, finally Cool down was 5 minutes biking and walking fast and slow and relaxant movements of large muscles groups. Before the game therapy sessions with biking parents and teachers about the subjects in the form test was performed, after the finishing game sessions of bike meetings, to assess the severity of symptoms of hyperactivity disorder/ attention deficit, the CSI-4 questionnaires were completed by parents and teachers of the subjects.

Evaluation of the sustainability of the methods was performed again after 2 weeks via follow-up test. For Comparison of the three stages, the analysis of variance test and post hoc Tukkey's test was used.

Morbid symptoms questionnaire for children (C.S.I-4), is the most common screening tool for psychiatric disorders assessment and their portions is written based on the diagnostic criteria for DSM. This questionnaire contains a list of parents and teachers checklists that in comparison with other scales demonstrated its effectiveness and is an important substitute for a psychiatric interview.

Allergic disease symptoms questionnaire for each child hyperactivity disorder, attention deficit, conduct disorder, disobedience and confrontation was 0.75, 0.89, 0.89 and their characteristics specificity is obtained 0.92, 0.91 and 0.90 respectively. Furthermore the validity of the questionnaire for both parent and teacher checklists has been estimated 0.90, 0.93 respectively (Mohammadi, 2002).

Parents and teachers checklists in group A have 18 portions that are related to ADHD and have the same sentences. Grading way is to score cut method of screening<sup>1</sup> that is obtained from the sum of the number of words as "often" or "often" have answered and the grading will be equal to 1, then the resulting score can be compared to the score in criteria for ADHD are often hyperactive and often type of compound 6 and type 12, if the results of this measure is equal to or greater than the score, person is eligible to be impaired screening cut-off score would be "yes".

---

<sup>1</sup>. The Screening cut off core method

## RESULTS

Subjects (N=20) mean age was  $9.3 \pm 1.6$  yrs old. Based on analysis of variance results, cycling in parents and teachers opinion has significant effect on attention deficit and hyperactivity ( $p \leq 0.0001$ ). The scores of attention deficit and hyperactivity based on parents and teachers assessment in three stages shown in table one.

**Table1.** Shows the scores of attention deficit and hyperactivity based on parents and teachers assessment in three stages

Study period	Statistics examiner	Mean	SD
Pre test	Teacher	12.65	2.39
	Parent	12.65	2.7
Post test	Teacher	6.75	1.65
	Parent	6.45	1.95
Follow- up	Teacher	4.3	1.49
	Parent	5.15	1.87

**Table2.** Results of analysis of variance scored of attention deficit and hyperactivity based on parents and teachers assessment

examiner	Source of changes	Sum of square	df	Mean Square	F	Sig
teacher	Between group	736.9	2	368.45	103.712	<b>0.0001</b>
	Within group	202.5	57	3.553		
	Between group	642.533	2	321.267	65.859	<b>0.0001</b>
	Within group	278.05	57	4.878		

Also the tukkey's Posthoc test results dhowes that there are significant differences between pre with post test, pre test with follow-up results it means that after cycling attention deficit and hyperactivity was decreased ( $P \leq 0.01$ ). tukkey's test results for hyperactivity and attention deficit in child's based on teachers and parents are shown in table 3.

**Table3.** tukkey's test for hyperactivity and attention deficit in child's based on teachers and parents opinion

Study period	Pre test	Post test	Follow- up
Pre test	-	0.0001*	0.0001*
Post test	0.0001*	-	Teacher 0.062
			Parent 0.159
Follow- up	0.0001*	Teacher 0.062	-
		Parent 0.159	

\*significant differences at  $p \leq 0.01$  level.

## DISCUSSION

The purpose of this study was the biological effects of cycling exercise on reducing symptoms of children's attention deficit hyperactivity disorder (ADHD) in 7 to 11 years children in the city of Isfahan.

The results showed that bicycle exercise has a significant effect on reducing the severity of the child's attention deficit and hyperactivity.

Oliver (1985) used some physical training tests to check the physical and mental status of children's. He concluded that this tests, have substantial progress in these children and developed their physically and intellectually. Also Maddigan and colleagues (2004) examined the massage therapy or physical therapy effects on ADHD children's and concluded that massage therapy based on the parents opinion reduces the symptoms of disease.

Also Kim (2002) conducted research on hyperactivity in children and proposed best sports for them, he introduced the baseball as a appropriate sport and after that he proposed cycling, taekwondo and Karate as a enjoy full sports for ADHD child's. Kim findings are consistent with our study on the reduction of Hyperactivity side effects. Montesory focused on learning through game with the thought and says the game has a biological basis, this means that children used to the extra energy for doing game.

Physical needs of children to dispose of surplus energy perfects by them participation in games and sport activities and asked him to entertain the inner and give him pleasure. Of these, children may participate in this bike game make use of their surplus energy and cycling could affected the hyperactivity and reduce it side effects.

Majorek and colleagues (2004) studied the effect of regular physical movement and coordination of the children with ADHD and concluded that focus and coordination has improved. Danen.T.Moor (2000) studied the effect of eye muscle exercise on the increase and decrease impulsivity in ADHD children examined. This exercise led to increased attention, impulsivity and loss of business was more successful in school children. Firouzi (1372) investigated the effects of physical activity and game on mental and learning and concluded that game and physical activity have meaningful effect on mental ability of boys and girls; the findings are consistent with our study results. Set of activities in the game, either mentally or physically to make more actively used the child's senses, and to gain the power of more focus, the game is important to increase or at least stability, with the importance of children considered being. The estimated need for the child and his natural in this context, the appropriate environment and adequate facilities is provided. Probably lead to increased accuracy and range of bike games in the children's and could they put less attention on the positive impact and reduce it.

Kessler (1992) investigate the effects of exercise and games on mentally retarded children the results indicate relative improvements in the fitness, motor skills and psycho-social attitudes. Biyabangard (1371) concluded that one of the important factors that affect mental and physical development can be sports and games. He said the child's deprive from game, cannot reach to healthy physical and mental development, social and moral interest. Temple University researchers examined the effect of severe sport and physical activity on the ADHD children's viewed Symptoms such as restlessness and excessive exercise controlled about 95 percent; therefore the findings of the study to be inconsistent with our study results.

The same way that Piaget, Bruner and Fraebel believe children are active in learning. Winnicott believed that games are important for social and emotional growth of children. Learning and

game closely associated with together. Game not only depletes the extra energy for the child but also reinforces and strengthens the mind and senses of child. Totally it can be said that ADHD children have a defects to the attention, impulsivity and hyperactivity and cycling are emphasized on the treatment of these problems. This is one of the treatments that can be useful for children's or at least as well as complementary methods in combination with other methods of treatment of children.

Also based on the results disorder symptoms after attending to the cycling in the follow-up stage is more decreased so perhaps we can say game sessions and meetings to the gradual end of the game more stable in reducing the symptoms of the ADHD disorder. Recommended to the parents of ADHD children's and normal children's to reduce behavioral problems and children's education, providing the environment and the means necessary tools for children's game and encourage them to participate in group games. In addition for psychological specialist's that dialing with ADHD child's behavior therapy and medication, recommended using games and exercises along with drug remedial.

## REFERENCES

- [1] American psychology association, (2005). Diagnosis and statistics guidelines for psychic disorders. Translated by Nikkhah MR, Sokhan.
- [2] American psychology association, (2002). Revision on diagnosis and statistics guidelines for psychic disorders DSM-IV-TR. Translated by Nikkhah MR, Sokhan.
- [3] biyabangard E, (1992). Effective agents in children's physical and mental growth. Peyvand, 150,151.
- [4] Firouzi AH, (1992). The effect of physical activity and games on mental power and learning in short time. MSc thesis. Tehran university, central Tehran branch.
- [5] Kaplan H Sadock B, (1997). Comprehensive glossary of psychiatry and psychology. Translated by Pourafkari N, Shahrab pub.
- [6] Kaplan H Sadock B, (1993). Comprehensive glossary of psychiatry and psychology. Translated by Pourafkari N, 4th ed, Zoghi pub.
- [7] American psychiatric Association. (1994). Diagnostic and statistical manual of mental disorders of mental disorders (Four edition). Washington D.C.
- [8] DSM-IV. (1994). American Psychiatric Association. Washington. DC: APA.
- [9] Feingold, G.F. (1975). Why child is hyperactive. New York: Random House.
- [10] Gaub MJ, Carlson CL. *Journal of abnormal child psychology*, 2005; 25:103-111.
- [11] Hechtman, L. (1993). *Canadian journal of psychiatry* (vol 38), 458-464.
- [12] Kaplan, H.I. Sadock, B. (1991). Comprehensive glossary of psychiatry and psychology. Williams and Wilkins company.
- [13] Kaplan, H.I. Sadock, B.J. (1994). Synopsis of psychiatry behavioral sciences clinical psychiatry seven edition published by Williams and Wilkins.
- [14] Kaplan H, Sadocks B. Synopsis of psychiatry. 9<sup>th</sup> Ed. Lippincott Williams and Wilkins; 2007; 1675-80
- [15] Levy F, Hay DA, Mc Stephen M, Wood C, Waldman I. *Journal of American Academy of child and Adolescent psychiatry*. 1997; 36:737-744.

- 
- [16] Maddigan,B.Hodgson,P.Heath,S.Dick,B.John,K.St.Mcwilliam- Burton,T. Snelgrove,C. and White,H. (2003). The effects of Massage Therapy andExercise Therapy on children/adolescents withattention deficit/hyperactivity disorder. Memorial University of Newfoundland.
- [17] Majorek,M.Tuchelmann,T. and Heusser,P.(2004). *Nursing midwifery clinical*(vol10) ,(1) , 46-53.
- [18] MohammadiEsmail E . A study of reliability, validity, and determination of cut-off points in CSI-4.Tehran:educational publications. 2002; 120-135.
- [19] Moor,D.T.(2000). *Exercise medicin*(vol 14) ,(5) ,103-107.
- [20] Oliver,J.(1958). *B.J.of Education Psychology Juane*( vol29) ,755-765.
- [21] Shawfer M. Professional psychology: Research and practice, fhfteen effective play therapy techniques.2002;33 (6) :515-522.