British Journal of Education, Society & Behavioural Science
14(2): 1-8, 2016, Article no.BJESBS.21052
ISSN: 2278-0998

SCIENCEDOMAIN *international*
www.sciencedomain.org

Effectiveness of Neurofeedback and Drug Therapy on ADHD Children and Its Impact on Happiness of Their Mothers

Ramazan Hasanzadeh[1*], Leyla Vatandoust[2] and Mandena Mirmobini[1]

[1]Department of Psychology, Islamic Azad University, Sari Branch, Sari, Iran.
[2]Young Researchers and Elite Club, Islamic Azad University, Sari Branch, Sari, Iran.

Authors' contributions

This work was carried out in collaboration between all authors. Author RH designed the study, wrote the protocol and supervised the work. Authors LV and MM carried out all laboratories work and performed the statistical analysis. Author LV managed the analyses of the study and wrote the first draft of the manuscript. Author MM managed the literature searches and edited the manuscript. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/BJESBS/2016/21052
Editor[s]:
(1) Chan Shen, Department of Biostatistics, University of Texas, USA.
Reviewers:
(1) Michael F. Shaughnessy, Eastern New Mexico University, Portales, New Mexico, USA.
(2) Syed Ali Raza Kazmi, Institute of Biomedical and Genetic Engineering, Islamabad, Pakistan.
(3) Abdelaziz Mousa Thabet, L Quds University, Palestine.
(4) Anonymous, University of Sao Paulo, Brasil.
(5) Sahar Mohammed Nour El- Din, Ain Shams University, Egypt.
Complete Peer review History: http://sciencedomain.org/review-history/12983

Original Research Article

Received 11th August 2015
Accepted 25th December 2015
Published 15th January 2016

ABSTRACT

Background: The aim of this study was to compare effectiveness of neurofeedback and drug therapy on ADHD children and their mothers' happiness.
Methods: In this study, 30 ADHD children with their mothers in Sari city were selected via simple sampling method and complete Kanzer's Parents Questionnaire [short form] and Oxford Happiness Questionnaire. To compare the effectiveness of neurofeedback and drug therapy on ADHD children, t-independent test, and to investigate impacts of these two therapies on their mothers' happiness, t-independent test was used.
Findings: The results showed a significant difference between neurofeedback compared to drug

**Corresponding author: E-mail: rhassanzadeh@yahoo.com;*

therapy on attention deficit of ADHD children; however, no significant difference was found between happiness of mothers of ADHD children in the neurofeedback or drug therapy group.
Conclusion: Attention in ADHD children treated with neurofeedback is higher than those treated by drug therapy, while mothers' happiness levels of the both groups is the same and mothers of the both group have happiness.

Keywords: Neurofeedback; drug therapy; happiness.

1. INTRODUCTION

Attention Deficit Hyperactivity Disorder [ADHD] is one the most prevalent psychiatric disorders in childhood period. ADHD is the constant pattern of lack of attention or hyperactivity and usually is seen in children with similar developmental level. Studies show that this disorder like learning disabilities can highly be attributed to neurological deficits rather than real brain damage [1].

Mental stressing incidents, family imbalance and other stressing events have roles in beginning or persistence of the disorder. Underlying factors may include the child's temper, genetic-familial factors, and society expectations to observe behaviors or accepted function [2]. It has been determined that symptoms in nearly 50% of cases continue till adolescence or adulthood, while in the remaining 50%, they subside in puberty period or early adulthood. In some cases, hyperactivity disappears, but reduction of attention domain and problems related to impulse control remain. Hyperactivity is the first symptom that subsides and attention deficit is the last symptom that resolves. Usually, ADHD does not descend at the middle of childhood [3].

Although the cause of attention deficit/ hyperactivity disorder is not yet known [3], many factors are involved in the etiology in its psychopathology. A great number of correlation research has led to make assumption about the role of food additives, the degree of blood lead, allergies, cigarette and alcoholic beverages usage in pregnancy period, as the main causes of ADHD/ADD [4]. At the same time, there are studies which point to the role of neurologic foundations in attention deficit disorders. Data of these studies have certain implication related to frontal lobe role. Functions of the frontal lobe have executive nature, they are engaged in planning a resources organizing and have a critical role in mediating preventive actions like controlling motor behavior and preventing attending to unrelated or disturbing stimulants [5].

When a healthy person is asked to a do an attentional task like reading, doing simple arithmetic calculations, or listening to a story, some changes occur in their EEG, and the frequency and length of beta waves in frontal lobe [especially, right one] increases. However, the situation is averse in ADHD person, meaning that their electroencephalogram [EEG] slowly goes toward waves with theta low-frequency, and without any significant change in the frontal area [6-9]. Slow activity [theta waves] is the feature of confused mind, distraction, and decentralized thinking [7].

Since the first reports of Neurofeedback treatment in ADHD in 1976 many studies have been carried out investigating the effects of Neurofeedback on different symptoms of ADHD such as inattention, impulsivity and hyperactivity. This technique is also used by many practitioners, but the question as to the evidence based level of this treatment is still unclear [10]. Neurofeedback is a kind of rehabilitation approach in ADHD treatment [6] with the purpose of constant normalization of the behavior without permanent dependence on drugs or behavior therapy. Neurofeedback accepts the neurologic basis of ADHD. given the fact that the activity of slow brain waves [theta] is higher and beta activity is lower in adolescents or adults with ADHD, neurofeedback tries to teach these patients to make their brain waves reactions toward these stimulants more normal [9]. To make EEG as well as clinical changes permanent, the number of neurofeedback sections should be between 20 t0 80 [6].

Several studies have confirmed the effectiveness of this therapy on reduction of hyper activity, and increment of attention and concentration, IQ scores, parents' satisfaction with children's behaviors, and improvement of markers related to continuous attentions which are usually evaluated by tests of continuous performance evaluation like TOVA [10-17].

However, some scholars [7,14] believe that if neurofeedback is offered in a multidimensional treatment program, can lead to behavior normalization and also improves patients' academic and social functions and their general adaptations in everyday life. Today, usage of non-invasive therapies, like neurofeedback, is increasing. A therapy which its aim is to verify EEG abnormalities that ultimately, results in promotion of behavioral and cognitive functions of ADHD patients. It is expected that modification of EEG causes ADHD children attend and concentrate more carefully and reach higher levels of academic success. Therefore, this study aims to investigate the effectiveness of neurofeedback and drug therapy on ADHD children and their mothers' happiness.

Attention deficit/ hyperactivity «pattern of constant attention reduction/hyperactivity» and impulsive behaviors is more sever and common than what is seen in children with similar developmental levels. In the past, it was believed that hyperactivity is the major disturbing symptom of this disorder. However, today scholars believe that hyperactivity is secondary in most cases and related to poor impulse control [2].

Drug therapy: Ritalin affects release of dopamine neurotransmitter and therefore, enables the brain to perform executive functions more normally. Generally, effectiveness of Ritalin lasts for 1 hour and after 2 hours, its optimal effectiveness appears. The impact of this drug disappears after 4 hours. Response to Ritalin depends highly on the individual; hence, its daily dosage level is different from one individual to the other [1]. Among non-stimulant drugs, Automoksin hydrochloride [Astratra], a norepinephrine reuptake inhibitor has been approved by FDA for treatment of ADHD in children aged above 6.

Happiness is a feeling everyone wishes to have, while a few of us reaches it. The certain signs of this feeling are appreciation, internal feeling, satisfaction feeling and having interest in oneself and others. The most usual mental state of all persons is happiness state.

Researchers believes that happiness is a constant state that the individual achieves the most desirable ratio among his/her satisfied desired and all his/her desires, provided that satisfied desires occur unexpectedly, i.e. we become happy of seeing a person whom we did not expect to see.

One of the approaches that terminate in a wonderful happiness in human is experiencing peak moments. Maslow made a systematic research on those class of experiments that because of the great happiness associated with them, have had penetrated to peoples' minds. Maslow [18] himself used to reach peak moments by listening to classic music, especially those of Bach and Beethoven. When describe their peak experiences he found that these experiences were somehow mysterious for them. Two common examples of peak experiences come from sexual relations and music.

Factors affecting happiness can be different. Like sexual differences, income, age, studies, job satisfaction, health, religion, leisure time, success, and social approve [18]. Considering the above, the aim of this study was to compare effectiveness of neurofeedback and drug therapy on ADHD children aged 5 to 15 and their mothers' happiness.

2. MATERIALS AND METHODS

The present study is post-event that by the use of questioner completion investigated factors related to behavioral aspects. The statistical population consisted of children with their mothers who had referred to specialized psychiatric clinic of children in hospital of Zare-Shahr in Sari in 2013-14, and had received ADHD diagnosis based on DSM-IV interview and a specialist's opinion. The samples in this study were selected via simple sampling and accessible method. Sample contained 30 subjects [experimental group= 15, control group= 15]. The data gathering tool included Conners' hyperactivity with attention deficit questionnaire [revised form] and Oxford Happiness Questionnaire. Descriptive statistics have been used to draw tables and diagrams to explain education, job, and mothers' ages of the both groups. In the referential statics part, t static test and correlational test have been applied for determining the significance level of difference and means relations. 1-Kanres' Parents Questionnaire [short form], 2-Oxford Happiness Inventory [OHI]

2.1 Oxford Happiness Inventory [OHI]

Oxford Happiness Inventory contains 29 items and evaluates the individual's happiness degree. Theoretical basis of this questionnaire is Argail' and Kroslandas' definition of ADHD [in order to

offer an operational definition of ADHD, they consider it as a construct with 3 major parts: frequency in the degree of positive affect, the mean of satisfaction level in a period, and lack of negative feeling]. This questionnaire is developed by Michael Argaila based on Beck's depression questionnaire [BDI]. 21 items of this questionnaire has been taken from BDI and reversed. Eleven new items have been added to cover other aspects of health. Like BDI, each item of OHI has 4 choices and the subject should choose one of them based on his/her own current state. Today, this questionnaire is widely being used in studies of ADHD.

Foreign reliability: Agrail et al. reported reliability of OHI by Cronbach's alpha coefficient as 0.90 and they calculated its re-test reliability during 7 weeks as 0.78.

2.2 Conners' Parents Rating Sale [Short Form]

Conners' rating scale is one of the most valid questionnaires to evaluate behavioral problems of children. This questionnaire due to having several features compared to other questionnaires has been widely used to evaluate children's behaviors. Scoring by various evaluators, having short and long form, considering a range of children's behavioral problems in different situation, extensive use and clinical diagnosis, and also validity and reliability in different cultures are prominent features of these scales. In Canada, teacher form of this questionnaire was investigated by Conners et al. in 1998.

Scope of coefficients for 7 subscales varied between 0.73 to 0.95 for boys and 0.76 to 0.96 for girls. The reliability by re-test method also varied between 0.47 [attention deficit problems] to 0.86 [coping behavior of malignancy disorder] [19].

This scale has 48 items and 5 major factors including conduct problems, learning problems, psychosomatic, hyperactivity-impulsivity, and anxiety.

The scale reliability by re-test method for the whole scale was 0.76 and for the subscales varied between 0.68 to 0.82 for the conduct problems. Cronbach's alpha coefficient for the whole questionnaire was 0.86 and for the subscales varied from 0.74 for hyperactivity to 0.98 for attention deficit-day dreaming.

3. FINDINGS

3.1 Descriptive Findings

Including tables, computation and mean, percent and diagram drawing and central indexes.

According to this table, the samples have been put equally in both groups.

As it can be seen in Table 3, the means of the study variables are different in the two groups, that significance of this difference will be investigated in the inferential statistics part.

3.2 Inferential Statistics

To examine the hypotheses, t-independent test was used and the mentioned operations were performed via SPSS software [version 2o].

Hypothesis 1: Attention increase in the two groups of ADHD children with neurofeedback and drug therapy is different.

Based on Table 4, [t=-7.363, P=0.001], attention increase in two groups of ADHD children with neurofeedback and drug is different.

Hypothesis 2: Mothers' happiness of the two groups of ADHD children with neurofeedback and drug is different

Given Table 5 [t=-1.146, P=0.262] mothers' happiness of two groups of ADHD children with neurofeedback and drug is not different.

Table 1. Mean and standard deviation age of subjects in the two groups

Variable/group index	Age	Mean	Df	Min age	Max age
Under treatment by neurofeedback	Mothers	33.53	4.34	27	41
	Children	13.50	3.46	12	15
Under treatment by Ritalin	Mothers	36.67	5.79	28	45
	Children	13.10	3.24	11	14

Table 2. Sample frequency divided by the groups

Group	Frequency	Frequency percent
Under treatment by neurofeedback	15	50
Under treatment by Ritalin	15	50
total	30	100

Table 3. The mean and standard deviation of the study variables in both groups

Variable/group index	Under treatment by neurofeedback		Under treatment by Ritalin	
Children attention	25.47	13.005	64.53	15.910
Mothers happiness	5.011	47.40	50.33	8.558

Table 4. The results of t-independent test

Variable	Group	Mean	Standard deviation	t	α	P value
Attention increase	Under treatment by neurofeedback	25.47	13.005	7.363	0.05	0.0001
	Under treatment by Ritalin	64.53	15.910			

Table 5. Results of t-independent test

Variable	Group	Mean	Standard deviation	t	α	P value
Attention increase	Under treatment by neurofeedback	47.40	5.011	1.146	0.05	0.262
	Under treatment by Ritalin	50.33	8.558			

4. DISCUSSION AND CONCLUSION

The results of the present study showed higher level of attention improvement in ADHD children in the neurofeedback group compared to those of the drug therapy group.

In evaluation of the first hypothesis given the calculated t that is higher than the table t and the significance level which is less than 0.05, a significant difference was found between Conners' test scores of ADHD children in neurofeedback and drug therapy groups, confirming higher effectiveness of neurofeedback.

Ritalin [Methylphenidate] is a drug that its influence of ADHD has been proved in many controlled trials [20-23]. For example, according to previous studies and well as the present one, it can be claimed that stimulant drugs including Ritalin are one of the main method of ADHD treatment. In contrast to strong clinical effect of stimulant drug, particularly Ritalin on major symptoms of ADHD, there are increasing evidences indicating that a great portion of ADHD patients do not react toward these drugs 25% to 35%; [24]. 40 to 50 percent [4] and that side effects of these drugs [7,20,25] that may be seen in 4 to 10 percent of patients can prevent effective usage of the drugs on clinical tasks. Therefore, non-drug approaches of ADHD treatment [behavioral approaches and neurofeedback] should be attended. Study background conveys that among non-drug approaches, behavior therapy and cognitive-behavior therapy as well as psychosocial interventions do not have considerable effects on important of ADHD. For instance, Valen and Hekkler [26] points to 40 to 60 percent of behavior therapy, and strong need to constant persistence of boring behavioral techniques for children and their parents. Other scholars who have performed studies in fields related to behavior therapy also believe that behavior methods without drug interventions do not have a significant effect on reduction of ADHD main symptoms [27,28]; however, those researchers who have investigated the effectiveness of neurofeedback have mentioned simultaneous reduction of ADHD major symptoms and social and academic improvements of ADHD patients, which have been described below. The results of this research showed that attention deficit in the two groups of ADHD children who had received neurofeedback or drug therapy was different after the treatment termination. In fact, ADHD children in the neurofeedback group had less attention deficit compared to those of the drug therapy. This finding is consistent with previous studies.

4.1 Effectiveness of Neurofeedback Therapy

There is no consensus point to consider changes resulted from a treatment approach as clinically significant. But, Bakhshayesh et al. [16] have mentioned alternatives which include high percent of improved patients, omission of the present problems, normal function after the treatment, and the degree of changes in patients' lives from others' views. Given this issue, it can be seen that neurofeedback has been an effective approach. This study aligned with former ones [e.g. 7,8,10-15] showed that EEG neurofeedback therapy or neurofeedback as a major component of hyperactivity/attention deficit disorder can reduce behavioral and cognitive symptoms of ADHD significantly during 10 weeks and 30 treatment sessions, hold 3 times a week. Among 4 subjects in the neurofeedback group, 3 individual [75% of the subjects] had considerable progress in attention, impulse control, information processing speed, and swings. In addition, parents' reports of the subjects' behaviors between the gape of two evaluation phases, evaluated via Conenrs' Parents Questionnaire, revealed reduction of ADHD symptoms as well as reduction of their scores in subscales of learning disorder, conduct disorder, and even subscales of anxiety and psychosomatic.

Neurofeedback therapy is an effective therapy for ADHD, and a valuable alternative for stimulant drugs. And even in some cases that drug therapy is not effective, is somehow helpful and has acceptable side effects, or in cases that patients' cooperation in following the drug regime is low can be the selective treatment [10]. On the other hand, statistics show that 60 to 70 percent of children with ADHD will have some of its symptoms till adolescence and adulthood period [29]. So, drug therapy with stimulant drugs is not an acceptable treatment for many ADHD adolescents and adults. In such a situation, replacement of neurofeedback with drug therapy becomes more valuable. Regardless of stimulant drugs failure in treatment of a great portion of ADHD patents as well as their side effects, Monstra [20] reports that 10 percent of parents who want to examine neurofeedback to treat their ADHD children attribute the reason of this selection to the history of addiction in their families; in fact, they worry that their children become addicted to these drugs or they feel concerned with security of long term usage of stimulant drugs. It seems that fear of addiction of psychiatric drugs among Iranian families exist for all psychiatric drugs, including Ritalin.

In addition, this study found no significant difference between happiness of ADHD children mothers in the two treatment groups. In evaluation of the second hypothesis, given the calculated t that is lower than the table t and the significance level which is less than 0.05, it was inferred that no significant difference exists between the mothers' happiness scores of ADHD children in the neurofeedback therapy or drug therapy groups. In other words, mothers' happiness levels of these two groups of ADHD children is the same, while both group have gained happiness resulted from the mentioned therapies.

Another study [30] investigated 136 children with behavioral problems and their parents. The findings revealed a positive relationship among parents' depression, marital conflicts, children's behavioral disorders, and destructive interaction of parents and children. Based on a the research of a group of scholars [31], mothers' depression is an important factor in increment of hyperactivity/attention deficit disorder in children and teaching proper behaviour management skills, beside increasing parents-childe interactions, reduces mothers' psychological disorders [depression, anxiety, stress]; another group of scholars [32] showed that parents' self-esteem is positively correlated with children adjustments, while negatively correlated with mothers' depression, and holding positive parenting programs will result in improvement of mothers' self-esteem and reduction of their depression and also improves children' adjustments.

In explanation of these results, it should be remembered that mothers of children with hyperactivity/attention deficit disorder suffer from loneliness feeling [a component of depression] and lack of control on the situation [a symptom of stress] [33].

Some scholars [34] have reported that children with du=difficult lives have more depressed mothers. Researches showed [2000] examined the impact of autism children on their mothers' mental health. They found that mothers with autistic children compared to mothers of other-disorder children experience higher levels of stress and are more in danger of depression and anxiety.

Given the importance of mothers' psychological states on mental health of children, improving health levels of mothers with children suffering from psychiatric disorders is necessary. These

findings are similar to those found by Motale [2003] which showed that prevalence of psychiatric disorders [social function disorder, anxiety disorder, somatic compliant disorder, and depression disorder] are higher in mothers of ADHD children. In addition, GutMandeson and Tomason [2002] declared that life quality of mothers of children with psychiatric disorders is lower and prevalence of mental disorders is higher among them.

This outcome is consistent with findings of Sho et al. in 2000, since they also confirmed higher levels of stress and depression in mothers of autistic children in comparison to mothers of children with other diseases.

The outcomes of the present research indicated that attention deficit in ADHD children of the neurofeedback therapy and drug therapy groups differed significantly, and children who had received neurofeedback had significantly lower levels of attention deficit compared to that those in the drug therapy group. Also it was found that mothers of both groups of children had happiness.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Hallahan D, Kauffman J. exceptional learners: Introduction to special education with casebook [9th ed.] Boston: Allyn Bacon. Kaplan & sadocks synopsis of psychiatry behavioral sciences 2003;10.
2. Barkley RA. Attention – Deficit hyperactivity disorder: A handbook for diagnosis and treatment [3rd ed.] New York; 2005. Guilford Press.
3. Larsson H, Dilshad R, Lichtenstein P, Barker ED. Developmental trajectories of DSM-IV symptoms of attention-deficit/hyperactivity disorder: Genetic effects, family risk and associated psychopathology. J Child Psychol Psychiatry. 2011;52(9):954-63.
4. Wilens TE, Adler LA, Adams J, Sgambati S, Rotrosen J, Sawtelle R, et al. Misuse and diversion of stimulants prescribed for ADHD: A systematic review of the literature. J Am Acad Child Adolesc Psychiatry. 2008;47(1):21-31.
5. Lubar JF. Neurofeedback for the management of attention deficit disorders. In Schwarts MS, Andrasik F, [eds]. Biofeedback: A practitioner's guide. New York; 2003. The Guilford Press.
6. Lubar JF. Discourse on the development of EEG diagnostics and biofeedback treatment for attention-deficit/hyperactivity disorders. Biofeedback and Self-Regulation. 1991;16:201-225.
7. Gevensleben H, Holl B, Albrecht B, Vogel C, Schlamp D, Kratz O, Studer P, Rothenberger A, Moll GH, Heinrich H. Is neurofeedback an efficacious treatment for ADHD? A randomised controlled clinical trial. J Child Psychol Psychiatry. 2009; 50(7):780-9.
8. Rositer T, La Vaque TJ. A comparison of EEG biofeedback and psychostimulants in treating attention deficit/hyperactivity disorders. J Neurotherapy. 1995;1:48-59.
9. Kaiser DA, Othmer S. Efect of neurofeedback on variables of attention in a large multi- center trial. J Neurotherapy. 2000;4(1):5-28.
10. Arns M, de Ridder S, Strehl U, Breteler M, Coenen A. Efficacy of neurofeedback treatment in ADHD: The effects on inattention, impulsivity and hyperactivity: A meta-analysis. Clin EEG Neurosci. 2009;40(3):180-9.
11. Carmody DP, Radvansik DC, Wadhwani S, Sabo MJ, Vergara L. EEG biofeedback training and attention –deficit/ hyperactivity disorder in an elementary school setting. Journal of Neurotherapy. 2001;4(3):5-27.
12. Arns M, Heinrich H, Strehl U. Evaluation of neurofeedback in ADHD: The long and winding road. Biol Psychol. 2014;95:108-15.
13. Rositer T. The effectiveness of neurofeedback and stimulant drugs in treating AD/HD: Part II. Replication. APPL PSYCHO BIOFEED. 2004;29:233-243.
14. Tan G, Schneider SC. Attention-deficit hyperactivity disorder. Pharmacotherapy and beyond. Postgrad. MED. 1997;101: 201-204.
15. Eddington N, Shuman R. Subjective well being presented continuity psychology education; 2004.
16. Bakhshayesh AR, Hänsch S, Wyschkon A, Rezai MJ, Esser G. Neurofeedback in ADHD: A single-blind randomized controlled trial. EUR CHILD ADOLES PSYCHIAT. 2011;20(9):481-91.
17. Monastra VJ. Parenting children with ADHD: Lessons that medicine cannot

teach. Washington, DC: American Psychological Association; 2004.
18. Volkow ND, Ding YS, Wang GJ, Logan J, Gatley JS, Ashby C, Lieberman JH, Hitzemann R. Is methylphenidate like cocaine studies on their pharmacokinetics and distribution in the human brain. ARCHIV GEN PSYCHIAT. 1995;52:456-463.
19. Dresel S, Krause J, Krause KH, Lafougere C, Brinkbaumer K, Kung HF, Hahn K, Tatsch K. Attention deficit hyperactivity disorder. Binding of 99 m Tc TRODAT – I to the dopamine transporter before and after methylphenidate treatment. EUROP J NUCLEAR MED. 2000;27:1518-1524.
20. Jensen PS. Current concepts and controversies in the diagnosis and treatment of attention deficit hyperactivity disorder. Current Psychiatry Reports. 2000;2.
21. Greenhill LL, Halperin JM, Abikoff H. Stimulant medications. J American Academy CHILD ADOLES PSYCHIAT. 1999;38(5):503-512.
22. Carr A. The handbook of child and adolescent clinical psychology: A contextual approach [second edition]. London; 2006. Routledge.
23. Leins U, Goth G, Hinterberger T, Klinger C, Rumpf N, Strehl U. Neurofeedback for children with ADHD: A comparison of SCP and Theta/Beta protocols. Appl Psychophysiol Biofeedback. 2007;32(2): 73-88.
24. Pelham WE, Hoza B. Inrensive treatment: A summer treatment program for children with ADHD. In Hibbs E, Jensen P, [Eds.] Psychosocial treatments for child and adolescent disorders: Empirically based strategies for clinical practice New York. American Psychological Association Press. 1996;311-340.
25. Strehl U, Leins U, Goth G, Klinger C, Hinterberger T, Birbaumer N. Self-regulation of slow cortical potentials: A new treatment for children with attention-deficit/hyperactivity disorder. Pediatrics. 2006;118(5):e1530-40.
26. Weiss G, Hechtman I. Hyperactive children grown up [2nd ed.]. New York, Guilford Press; 1993.
27. Costin Y, Lichle C, Hill-Smith A. Parent group treatments for children with oppositional defiant disorder. Australian E Journal for the Advancement of Mental Health; 2004.
Available:http://www.auseinet.com/journal/3 [1vol 3 is 4/ Costin.Pdf
28. Low A, Stocker C. Family functioning and children's adjustment: Associations among parents' depressed mood, marital hostility, parent–child hostility, and children's adjustment. J FAM PSYCHO. 2005;19(3): 394-403.
29. Chronis AM, Lahey B, Pelham WEJ, Williams S, Baumann Kipp Jones A, Rathouz. Maternal depression and early positive parenting predict future conduct problems in young children with attention-deficit/hyperactivity disorder. DEVELOP PSYCHO. 2007;43(1):70-82.
30. Vance YH, Morse RC, Jenney ME, Eise C. Issues in measuring quality of life in child hood cancer: Measuring, proxies, and parental mental health. J CHILD PSYCHO PSYCHIAT. 2001;42:661-667.
31. Shu BC, Lung FW, Chang Y. Parental psychiatric disorder: Effect on children. Kaohsiung J MED SCI. 2000;16:308-314.
32. Salehi M, Salarifar M, Hadian M. Mental health of M others with children afflicted with psychiatric distorder comparison with control group. I JPCP. 2004;10(1-2):78–84.
33. Weaver C, Shaw D, Dishion T, Wilson M N. Parenting self-efficacy and problem behavior in children at high risk for early conduct behavior in children at high risk for early conduct problems: The mediating role of maternal depression. Infant BEHAV DEVELOP. 2008;31(4):594-605.
34. Linden M, Habib T, Radojevic V. A controlled study of the effects of EEG biofeedback on the cognition and behavior of children with attention deficit disorders and learning disabilities. Biofeedback and Self-Regulation. 1996;21(1):35-49.

Peer-review history:
The peer review history for this paper can be accessed here:
http://sciencedomain.org/review-history/12983