



## **EFFICACY OF BEHAVIOR MODIFICATION THERAPY IN RELATION TO ATTENTION DEFICIT AND HYPERACTIVITY BEHAVIOR AMONG PRIMARY SCHOOL CHILDREN IN SELECTED SCHOOLS AT COIMBATORE, INDIA**

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### *Abstract*

*The major objective of the present study was to explore the efficacy of behaviour modification therapy to reduce Attention deficit and Hyper Activity Behavior (ADHB) among primary school children. An experimental approach was adopted and pre test post test design was employed. Multi stage sampling technique was adopted to recruit the participants. Totally 150 students with low academic performance were identified with the assistance of their respective class teachers from two selected Schools. Modified Vanderbilt Attention Deficit Hyperactivity Scale was administered to identify the attention deficit behaviour, among these low academic performance group students 60 were identified with Attention deficit and hyperactivity behavior. Behavior modification therapy was imparted to the participants for a period of 40 minutes/day for 20 consecutive working days. A post test was conducted to ascertain the efficacy of behavior modification therapy to reduce ADHB. Paired 't' test was employed to find out the significant between mean scores of pre and post tests. The result revealed that there is a significant difference in the ADHB after behavior modification therapy. Thus, the behavior modification therapy attributed in the reduction of ADHB and academic performance was found to be enhanced among students.*

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## **Introduction**

Attention deficit and hyperactivity disorder (ADHD) also denoted as Attention Deficit disorder (ADD) by many authors is a major common problem prevailing among school children. Unidentified and untreated children with ADHD cause adverse effects in late adolescence or adulthood. ADD involves hyperactivity, difficulty in paying attention and impulsivity (Foster, 2009). ADHD children have problem in functioning with home setting, school and peer group relationships. Poor self esteem, academic under achievement, poor social relationship are the consequent factors of ADHD. Foster (2009) identified three different forms of ADHD namely predominantly inattentive (difficulty in paying attention), Hyperactive/impulsive (difficulty in controlling behavior), Combined type (Combines other two forms of ADHD) are the common form of ADHD.

Worldwide, ADHD affects children ranging 8 to 12 % and results in inattentiveness, impulsivity and hyperactivity, and also at intimidate the risk of school performance among them 20 to 25 % are identified with specific learning disabilities and vice-versa (Karnade & Kulkarni, 2005). ADHD begins in childhood and persist through adulthood cause negative effects in one's life at home, school and community (Silver, 2006; Bhatt, 2009). Individuals diagnosed with ADHD (30-50%) in childhood continued to have symptoms into adulthood (Elia, Ambrosinni, & Judith, 1999). Further, ADHD affects 8 to 10% of school age children worldwide in that boys are evidenced three times more than girls (Richard & Kingsley, 2008). National Institute of Mental Health (NIMH, 2009) reported boys are significantly higher in number diagnosed with ADHD than girls but girls are not exceptional. And the report also noted that about 2 million school aged children which is about 2 to 5% in the United States identified with ADHD. Attention deficit behavioral disorder affects about 8 to 12% of all Americans. The incidence rate differs between females (1%) and males (3.6%). American Psychiatric Association (2000) reported that

there is a significant impairment in the social, occupational, and academic settings among Attention deficit children.

Centre for Disease Control and Prevention (2006) reported prevalence of ADHD varied 10 to 20% depending upon various diagnostic criteria. Children with attention deficit behavior encountered difficulty in one or overall attention process. Some of them have encountered difficulty in one specific or routine task. Likewise others encountered trouble in initiation of task, lost in the direction along the way, trouble in paying attention, controlling impulsive behavior and in some cases overall activity deficit was identified. The greater risks identified were meeting accident and emergency departments frequently than normal children. Despite, the causes for ADHD is not well understood, whereas numerous researchers believed changes in brain structure, alterations in neural pathways that carry neural message, impairment in the neural pathways, lower level of metabolic activity, in addition to these factors heredity, maternal exposure to chemicals during pregnancy, exposure to chemicals during childhood and gender was believed to be the causative factors for ADHD. Factors such as maternal smoking, alcoholism, brain injury, birth injury, stress, malnutrition and insomnia too causes attention deficit and hyperactivity disorder.

Early theories suggested birth complications, head injury during birth, brain damage caused by infections might be the cause for ADHD. However, there was no supportive evidences substantiated this hypothesis. Though, there was no cause was identified between poor parenting and ADHD. Nonetheless, problems in home, difficulty in school, community environment exacerbated ADHD. Attention deficit children are easily distractible, inattentive, and impulsive and exhibit poor academic performance (Ahuja, 2002). Similarly, children with attention and self control problem develop remarkable impairment in academic skill, social attainment skill, and emotional stability in their future life. Consequently, children face problems in focusing school and fail to learn basic information for success and these difficulties prolong even up to the stage of adolescence and adulthood (Greydancy, 2005).

#### *ADHD/ADD and Behavior Modification Therapy*

Generally, ADHD is being treated with pharmacological interventions, and often combined with other therapeutic techniques such as psychiatric

treatments, guidance and counseling and behavior therapies contributed significantly in managing the problem. Applying pharmacological interventions are quite risk to administer for since, poor cooperation of school aged children to such treatment procedures and also has a chance of producing side effects. Thus, behavior therapy or behavior management therapy is an alternative solution for such challenging threats specifically to school aged children. An important non-medical approach used in treating children with Attention Deficit Hyperactivity Disorder/Attention Deficit Disorder is known as behavior therapy or behavior management therapy. Behavior therapy is based on several simple and sensible notions about what leads children to behave in socially appropriate ways (Rabiner, 2006). Behavior modification therapy is a blend of behavior therapeutic techniques that basically developed based on the principles of learning. Reinforcement for increasing certain desirable behavior and punishment of cessation of the undesirable behavior are the major elements of behavior therapy. Generally, psychologists and behavior therapists develop and utilize behavior modification techniques to modify behavior and treat various psychological problems. Behavior modification techniques include mental and physical exercises that facilitate in improving attention, memory, concentration, learning ability, self esteem, academic achievement and also reduce anxiety, depression, stress, attention deficit and hyperactivity behavior. Behavior modification techniques are formed based on the psychological theories and principles generally employed to modify maladaptive behavior, improve psychological health or solve behavior problems. Battle (2002) considered behavior modification therapy is a treatment approach based on the principles of operant conditioning and also psycho stimulant medication is the treatment choice for ADHD with or without behavior modification. Upcoming research evidence shows behavior modification therapies are widely used in the modern therapeutic world to deal various behavior problems. Among many behavior problems, ADHD is the most common problem encountered by school children.

Behavioral interventions were found to be effective in modifying the behavior of attention deficit children and also to reduce the need for medication (Sailaxmi & Carlsherman, 2006). Likewise, behavior modification techniques enhance the child's performance and attention (Blackmore, Schilder, & Conte, 1993). While examining the applicability, behavior modification therapies are not restricted to behavior problems of children and also the scope

is vast across age group. Behavior modification therapies employed to treat ADHD, phobias, enuresis, generalized anxiety disorder, separate anxiety disorder and obsessive - compulsive disorder as well. Behavior modification therapies include physical exercises, mental relaxations, mental imagery, social skill training, token economy, meditation and yoga etc.

Practicing meditation and physical exercises reveal a remarkable change in one's physical and mental health. Meditation is a kind of mental exercise that facilitate to improve concentration, memory and general wellbeing. It is an activity that calms the mind and keeps it focused on the present. Meditation or mindfulness techniques, was found to be effective in relieving psychological discomforts and various forms of anxiety (Barnes, Treiber, & Davis, 2001; Epply, Abraham, & Shear, 1989; Kabat-Zinn et al., 1992), depression (Teasdale et al., 2000), insomnia (Jacobs, Benson, & Friedman, 1993), and improve general wellness (Brown & Ryan, 2003).

Similarly, (Mañas, Luciano, & Sánchez, 2008; Mañas, Sánchez, & Luciano, 2008) argues other effects of meditation and related interventions have direct impact on stress and anxiety is reduced nervousness, worry and emotional discomfort and increased muscular relaxation and emotional calm.

Thinkquest (1998) argues during meditative state the mind is not cluttered with thought or neither past memories nor it is concerned with the future events. Meditation helped students to concentrate better in school activities and reduced conflict at school among attention deficit children (Manocha, 2009). Some studies are evident that practicing meditation enable to train mental activity and processes, strengthening all the cognitive abilities upon acquiring the skill of methodologically exercising mental attention and concentration (Jha, Krompinger, & Baime, 2007; Valentine & Sweet, 1999), increases the ability to focus attention and ignore distractions, and improves cognitive performance in demanding situations, tension and concentration (Solberg, Berglund, Engen, Ekeberg, & Loeb, 1996; Sugiura, 2004).

Similarly, meditation facilitated to improve attention, working memory, organization and behavior regulation and also helped in reduction of stress and anxiety (Grosswald, 2003). Exercise like aerobic facilitated in children (Tofler & Tuckman, 1998). There is an improvement in the intelligence and creativity among general pediatric population and physical activity influenced in improving cognitive abilities among learning disability children (Shipman, 2000).

Barnes, Bauza, and Treiber (2003) employed a meditation program to students with classroom behavior problems resulted in improving class attendance and school behavior. Similarly, Barragán, Lewis, and Palacio (2007) found mindfulness intervention improved ability to focus and sustain attention and also to follow a stimulus closely and to manage distraction among university students. More specifically, meditation has been directly related to increasing and improving academic performance. Chang and Hierbert (1989) noted how primary students significantly improved their schoolwork after mindfulness intervention.

Cranson, Orme-Johnson, Gackenbach, Dillbeck, Jones, and Alexander (1991) practicing mindfulness twice a day increased their academic performance among university students. León (2008) identified a significant relationship between the levels of mindfulness and academic performance in secondary education students. Finally, Beauchem, Hutchins, and Patterson (2008) applied meditation to a group of 34 student participants with learning problems and low academic performance resulted significant improvement in social skills and academic performance and trait anxiety was found to be diminished after training.

Franco, Mañas, Cangas, and Gallego (2011) revealed there was a statistical difference between experimental and control groups on academic performance, self concept and state and trait anxiety after mindfulness intervention among students of secondary school.

ADHD/ADD is manifested with certain behaviors which is highly prevalent among school children. The present study mainly focused to identify those disruptive behaviors which cause negative impacts in home, school and social environment rather than diagnose it as a disorder. Further, the diagnostic process for ADHD is a long term one and time consuming and it is not so simple.

Ascertaining ADHD entails various diagnostic criteria consumes excessive time, money and effort. According to American Psychiatric Association (APA), ADHD is a condition most commonly found among adolescent girls, and is diagnosed with six or more symptoms of inattention have persisted for more than six months (Foster, 2009). Early identification of the problem will help parents for further treatment and unidentified problems will cause serious consequences in future. Hence, this piece of investigation attempted to modify those problematic behaviors with the following objectives.

## **Objectives**

To evaluate the effectiveness of behavior modification therapy to reduce attention deficit and hyperactivity behavior among primary school children.

### *Specific objectives*

1. To assess the level of attention deficit behavior;
2. To assess the academic performance of the students;
3. To impart behavior modification therapy to children with attention deficit and hyperactivity behavior;
4. To assess the attention deficit behavior after behavior modification therapy;
4. To assess the performance of students after the behavior modification therapy.

### *Research questions*

The research questions were raised based on the above literature evidences pertinent to ADHD in relation to behavior modification therapy among school children.

1. What is the prevalence rate of attention deficit and performance behavior among selected schools?
2. What is the level of attention deficit behavior before behavior modification therapy?
3. What is the academic performance of the students before behavior modification therapy?
4. What is the level of attention deficit behavior after behavior modification therapy?
5. What is the effect of behavior modification therapy on ADHD among selected school children?

### *Hypotheses*

The following hypothesis was stated to examine the significant difference in the attention deficit and hyperactivity behavior among selected school children.

H<sub>1</sub>: There is a significant difference in the level of attention deficit and hyperactivity behavior before and after behavior modification therapy among selected school children;

H<sub>2</sub>: There is a significant difference in the level of performance behavior before and after behavior modification therapy among selected school children.

## **Method**

### *Participants*

The target population of the study was 7-10 years of age. The rationale of the age criteria is obedience and listening behaviors of the students. The total population of the first school (P<sub>1</sub>=960) among them 320 and from the second school (P<sub>2</sub>=1440), 480 students fulfilled the age criteria. Multi stage sampling technique was employed to recruit respondents for the study. In the first stage there are 150 students with low academic performance was identified with the assistance of their respective class teacher. The final sample participants of the study (N=60), 27 from (P<sub>1</sub>) and 33 from (P<sub>2</sub>) was determined based on the score (14 and above) obtained in the Vanderbilt Attention deficit and hyperactivity scale.

The study sample was drawn from two schools with the following inclusion and exclusion criteria.

### *Inclusion criteria*

1. Students age ranged from 7- 10 were included for the study;
2. Respondents scored 14 and above in Vanderbilt Attention Deficit and Hyperactivity Scale.

### *Exclusion Criteria*

1. Newly joined students;
2. Students in sections dealt by newly appointed teachers.

### *Measures*

*Background profile:* includes age, gender and birth order:



*Modified Attention Deficit and Hyperactivity Scale.* This scale consists of two dimensions viz. 1) Inattention Dimension: Nine questions indicating predominantly inattention behavior like difficulty in sustaining attention in the class, does not follow through the instructions, does not seem to listen when spoken directly were included in the scale. The responses were rate on a three point likert scale from 0, 1, 2 and 3. Minimum score is 0 and maximum score is 27 and 14 $\geq$  is considered as more attention deficit and hyperactivity behavior.

*Performance Dimension:* this dimension consists of 8 question statements under two sections among them three indicates a) academic performance such as reading, writing and mathematics, b) classroom behavior performance scale consists of 5 questions related to relationship with peers such as direction, disturbing class, assignment completion and organizational skills. The responses are rated on 5 point rating scale from 1 to 5. The maximum score is 40 and minimum is 8.

#### *Procedure*

##### *Behavior Modification Therapy*

Behavior modification therapy is formulated by synthesizing various behaviour modification techniques. This combines mindfulness meditation and physical exercises (Bending exercise, stretching and running).

##### *Procedure of Mindfulness Meditation*

The following instructions were given to the participants prior to each session of mindfulness meditation.

1. Sit comfortably on the floor
2. Sit with your back erect and straight.
3. Place hands on your knees.
4. Close your eyes.
5. Start to count each inhalation and exhalation silently in your mind up to 10.
6. Repeat the same procedure for 10 times.

##### *Procedure of Physical Exercise*

Physical exercise includes bending, extension and running. A) Physical exercise - Bending, 1) exercise-Stand straight with your legs one foot apart. 2)

Raise your hand above your head. 3) bow forward without flexing your knees and touch the tip of the toe with your hands. 4) repeat this for 10 times. B) Physical – Exercise- Extension 1) Stand with legs one foot apart 2) Extend your head and body towards back slowly. 3) Slowly come back to normal position. 4) Repeat this for 5 times.

*Procedure of running exercise*

1. Students were assembled in a line and asked them to extend both the hands by the side. While doing so no one should touch each other.
2. Then the students are asked to putdown the hands and stand turn right side, so that each one can stand one behind one as a Queue.
3. The students are instructed to start run when the “go” signal is given and stop when the “stop” signal is given.
4. All students were instructed to maintain an optimum speed for running for duration of ten minutes by maintaining equal distance between each other.
5. A stop watch was set on simultaneously when the go signal was given and set off when the stop signal was given.
6. Due care was taken with the assistance of the physical education teacher while conducting this exercise.
7. Appropriate dress and foot wear were suggested to wear by the students and necessary physical examinations and information gathered from both students and teachers before involving in the running exercise.

*Design*

A field experimental design with one group pre test post test design was adopted to conduct this study. Initially, a field survey was conducted to identify the prevalence rate of ADHB in the selected two schools by administering Modified Vanderbilt Attention Deficit Hyperactivity Scale. From this low academic performance students with attention deficit and hyperactivity were included for the study. Behavior modification therapy was employed to participants to reduce ADHB for 45 days and then a post test was conducted to ascertain the efficacy of the intervention.

## Results

Table 1 Show the demographic picture of the respondents. Among the total participants 40% were 10 years of age and the rest of their age from 7 to 9 years. Among them 77% were males and 23% were females. The birth order of the respondents was first order (38%) and second order (62%).

Table 1 Demographic profile of the participants (N=60)

Variables	N	%
Age		
7	11	18
8	15	25
9	10	17
10	24	40
Gender		
Male	46	77
Female	24	40
Birth order		
First	23	38
Second	37	62

Table 2 shows the significant difference between pretest and post test scores of attention deficit and hyperactivity behavior of respondents. The pretest mean Score ( $M=18.95$ ;  $SD=3.89$ ) and post test mean score ( $M=16.90$ ;  $SD=4.07$ ). The pretest ( $M\%=70.18$ ) and post test ( $M\%=62.59$ ). The mean difference between pretest and post test is 2.05. The mean score of the ADHB is found to be decreased from pretest to post test condition. There is a significant difference between the pre test and post test scores of attention deficit and hyperactivity behavior ( $t=3.60$ ,  $p<.01$ ).

Table 2: Pretest post test comparison of mean scores of attention deficit and hyperactivity behavior (N=60)

Condition	Mean	Mean%	SD	Mean Difference	"t"
Pre test	18.95	70.18	3.89	2.05	3.60***
Post test	16.90	62.59	4.07		

Note: \*\*\*level of significance 0.001

Table 3: Pretest post test comparison of mean scores of performance behavior (N=60)

Condition	Mean	Mean%	SD	Mean Difference	t
Pre test	19.27	48.17	4.22	1.12	2.13*
Post test	20.38	50.96	3.64		

Note: \*\*\*level of significance 0.05

Table 2 shows the significant difference between the pre test and post test scores of performance behavior of the respondents. The Mean and SD of the pretest (M=19.27; SD=4.22) and the mean and SD of the post test is (M=20.38; SD=3.64). The mean difference between the pre test and post test is 1.12. There is a significant difference between pretest and posttest scores of performance behavior ( $t=2.13, p<.05$ ).

### Discussions

The result herein obtained clearly reveals Attention deficit and hyperactivity behavior is prevalent among the respondents of the present population. Further, attention deficit and hyperactivity behavior is a major cause to poor academic performance among the students. The majority of the respondents belong to the age group of 10 years and the rest were from age 7 to 9 years. Most of the sample here in studied was males (77%) and the rest were females (23%). And majority of the participants were second born. In the pretest condition ADHB was found to be higher than the post test condition. Similarly, the performance behavior of the respondents was found to be less compared to post test condition. After behavior modification training for 20 days ADHB was found to be reduced and performance of the respondent was found to be improved. Hence, Behaviour modification therapy contributed to change both ADHB and performance behaviour of the respondents. The result from the present study shows the attention deficit and hyperactivity behaviour is found to be high before behavior modification therapy. After 20 days of intervention ADHB was found to be reduced and academic performance was subsequently improved among the participants. Hence, the H<sub>1</sub> and H<sub>2</sub> were accepted. Thus, the behavior modification therapy was attributed in reducing the attention deficit and hyperactivity behavior and ultimately the performance behaviour was found to be improved. The present result is consistent with the result of Cranson, Orme-Johnson, Gack-enbach, Dillbeck, Jones, and Alexander (1991); Manocha (2009); Jha, Krompinger, & Baime (2007);

Valentine & Sweet (1999); Barragán, Lewis, and Palacio (2007); Solberg, Berglund, Engen, Ekeberg, & Loeb, (1996); Sugiura (2004). Though there are no direct supportive studies in line with the present study, the intervention herein utilized is typical behavior modification technique facilitated in changing both the behavior.

### **Conclusion**

From the above findings it can be concluded that the Attention deficit and hyperactivity behavior may be manageable with suitable behavioural interventions. Behaviour modification therapy is a tailor made intervention that facilitates individuals with attention deficit and hyperactivity behavior. Conducting an in depth investigation among poor academic performers will yield a fruitful result that helps parents and teachers for early identification of such problem among primary school students. Further, such behavior modification therapy can be employed to school students to improve academic performance and reduce attention deficit/ hyperactivity behavior.

#### *Limitations*

1. The study result is limited to the present population of study and it cannot be generalized to other population.
2. The study period was short which limits the external validity of the result.
3. The study comprised a small sample size which limits the generalization of the study.
4. The intervention was not conducted with a controlled setup which limits the internal validity of the study.
5. To control the extraneous and confounding variables no due care was taken.

#### *Implications*

1. Behaviour modification therapy can be applied in school set up to manage such behavior problem among students.
2. It is a non clinical intervention helps to promote general wellbeing and academic performance.
3. Identification of such behavior problems with appropriate assessment techniques will help teachers for early diagnosis and further reference.
4. Such evidenced based results will direct for future researches.

5. Behaviour modification therapy will help practitioners to manage such behavior problems of school aged children.
6. This piece of investigation paves ways to identify students with Attention deficit and hyperactivity behavior or disorder.

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