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# COMPARING THE EFFECTS OF COGNITIVE BEHAVIOURAL THERAPY AND MOTOR LEARNING TECHNIQUES IN ADULTS WITH ATTENTION DEFICIT HYPERACTIVE DISORDER.

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**Abstract**

***BACKGROUND:*** *Attention deficit hyperactivity disorder is a disorder that is marked by In-attention, hyperactivity and impulsivity that interferes with daily life, functioning and development. In our study, effects of cognitive behavioral therapy and motor learning techniques on adults with ADHD were studied and compared.*

***OBJECTIVES:*** *To apply different motor learning techniques and cognitive Behavioural therapy in order to determine whether combine effect of both or cbt alone were more effecting on adults with adhd.*

***METHODOLOGY:*** *In this randomized controlled trial, 30 participants were assessed by validated questionnaire; adult Self-Report Scale-V1.1 (ASRS-V1.1) for screening of ADHD. Random assignment was done by lottery method. The control group was given Cognitive Behavioural Therapy while the intervention group was given CBT and Motor Learning Techniques for 15 alternative days. The pre and post treatment scores were collected.*

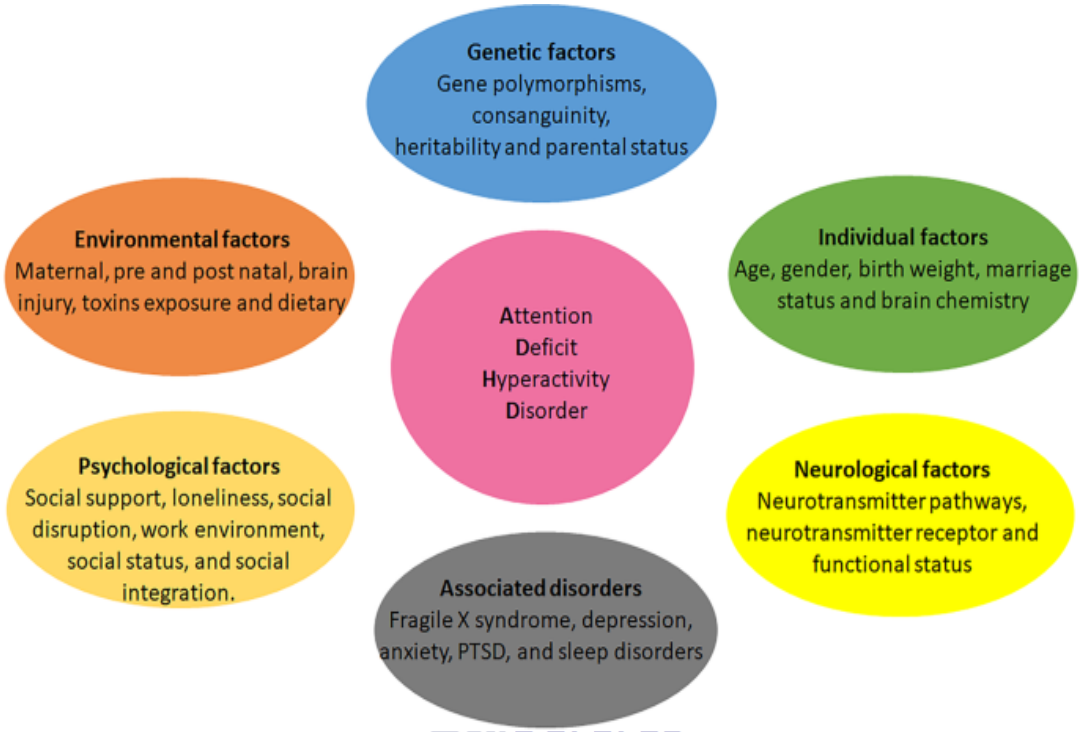
***RESULTS:*** *In that study, 34 adults participated. Mean age of the CBT+Motor participants was 22.3529±1.16946 years and CBT was 22.1875±1.04682 with range from 18 to 40. All the participants have attention deficit hyperactivity disorder. Mean of CBT+Motor group was 21.65 and mean of CBT group was 24.94. There was no statistically significance between both groups (p-value 0.182). There was statistical difference in Montreal cognitive assessment score among both groups (p-value0.002)*

***CONCLUSIONS:*** *The frequency of attention deficit hyperactivity disorder was common among the adult population. Reduction in symptoms was seen in group given CBT+Motor learning techniques as compare to the group given CBT only.*

## INTRODUCTION

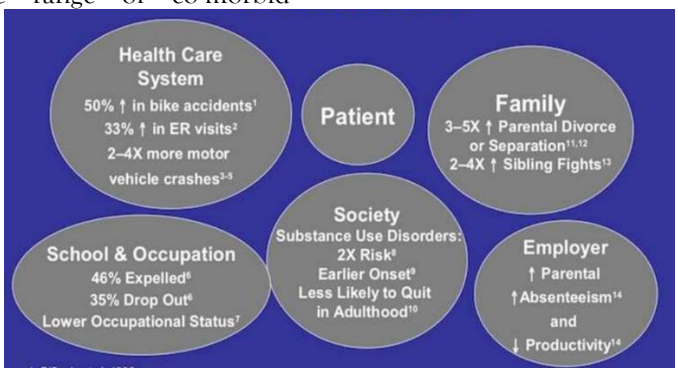
Attention deficit disorder/hyperactivity (ADHD) among adults is a frequent but under-diagnosed clinical situation. Attention deficit hyperactivity disorder prevails from childhood to adulthood and

most of the adults suffering from this disorder are the same who went through this syndrome in their childhood.(1)




**(Figure1.1 Risk factor of ADHD) (2)**

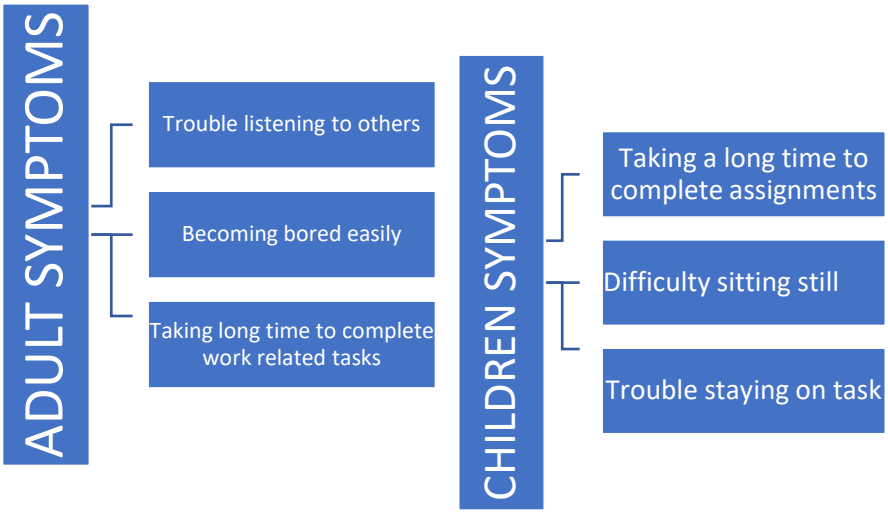
ADHD significantly impairs multiple aspects of life, leading to educational underachievement, unemployment, unsuccessful marriage and criminality, etc. Moreover, ADHD shows significant correlations with a wide range of co-morbid psychiatric disorders, including effective disorders, antisocial personality disorder, self-harm, substance misuse, placing a considerable burden on society and family (3)




**(Figure 1.2 Impact of untreated and undertreated ADHD)(4)**

This syndrome include difficulty in performing activities of daily living, difficulty in making decisions

and loss of attention while performing a task. They feel trouble in following and remembering plans, important events and daily tasks.(5)



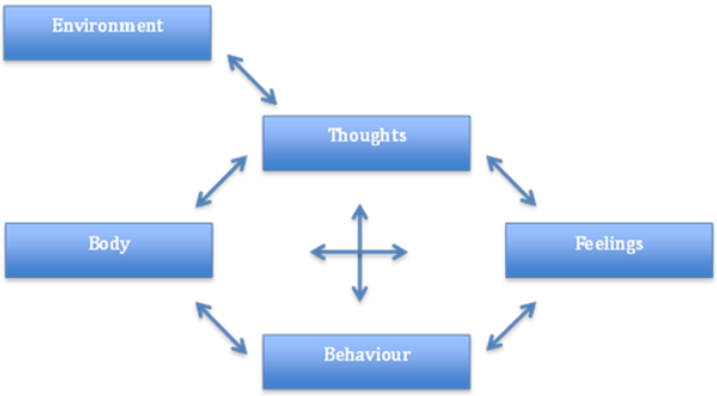

**(Figure 1.3 Common ADHD symptoms)**

The prevalence of persistent adult ADHD (with a childhood onset) and symptomatic adult ADHD (regardless of a childhood onset) both decreased with advancing age. By adjusting for the global demographic structure in 2020, the prevalence of persistent adult ADHD was 2.58% and that of symptomatic adult ADHD was 6.76%, translating to 139.84 million and 366.33 million affected adults in 2020 globally.(3).

Attention deficit hyperactivity disorder (ADHD) is recognized as the most common neurodevelopmental disorder of childhood. A frequently cited study by Polanszky of 2007 reported a worldwide ADHD prevalence estimate of 5.3%. (6)

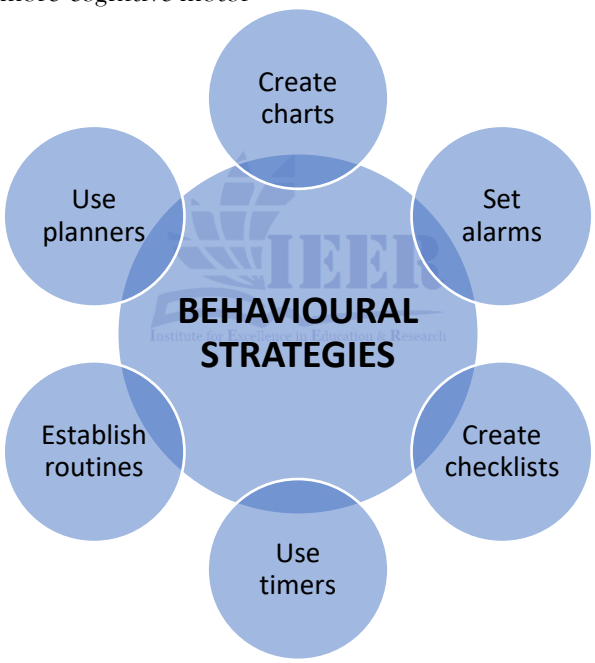
In Pakistan, a study conducted on 1889 patients showed almost 11% patients had diagnosis of ADHD after a screening questionnaire from their consultant.(7)

Longer exercise intervention (motor learning techniques) duration was consistently associated with larger effect sizes (g .627). Results suggest that exercise has a modest positive impact on ADHD functional outcomes, such as executive functions and motor skills, with longer interventions yielding better results.(8)




**(Figure 1.5 Cognitive behavioral model)**

Cognitive-motor training is an intervention that integrates cognitive and motor tasks to promote an individual's physical and mental health. It has been shown that performing two or more cognitive-motor tasks simultaneously, such as computation in postural training and movement under computer games, will contribute more to improvements in cognitive domains compared to single-task training(9)




**(Figure 1.6 Behavioral strategies for ADHD**

Motor learning strategies can be applied in such people. Motor learning techniques are used to enhance someone's ability to perform a task more effectively and efficiently. They progress from a stage of dependency to automacity. These techniques are used for the acquisition and modification of a task to make it more effective.(10).

**OBJECTIVE**

Objective of our study was to apply different techniques related to motor learning and cognitive behavioral therapy in order to determine whether combined effect of cognitive behavioral therapy and motor learning were more effective or the cognitive behavioral therapy alone.

**Material and method:**

In this randomized controlled trial, 34 participants were assessed by validated

questionnaire; adult Self-Report Scale-V1.1 (ASRS-V1.1) Screener from WHO Composite Page 4 of 9 International Diagnostic Interview) for screening of ADHD. These participants were then randomly recruited to control and intervention group. The control group was given Cognitive Behavioural Therapy while the intervention group was given CBT and Motor Learning Techniques for 15 alternative days. The results were obtained by assessing the participants using validated ASRS scale and then comparing the scores to the initial scores. Study Design: Single blind Randomized Controlled Trial, Duration: 6 months after the approval of IRB. Setting: Shalamar School of Allied Health Sciences in Lahore, Pakistan, Population**:** 30 ADHD adults. Sampling: Simple random sampling using lottery method.Data collection: It was done through two questionnaires (ADHD self report scale and MOCA).

**RESULTS**

**T-Test**

**Table 1: Mean age of attention deficit hyperactivity disorder group.**

| Study variable | CBT+Motor | CBT | p-value |
|---|---|---|---|
| Age | 22.3529±1.16946 | 22.1875±1.04682 | 0.672 |

Independent sample t-test*p-value is significant.
Mean value of CBT+Motor is 22.3529±1.16946 and mean value of CBT is 22.1875±1.04682 and p-value (.672) was not statistically significant.



**T-Test**

**Table 2: Mean age at which subject first notice attention deficit hyperactivity disorder symptoms.**

| Study variable | CBT+Motor | CBT | p-value |
|---|---|---|---|
| At what age did you first notice that you are unable to focus on things? | 19.0000±.00000 | 19.6875±1.44770 | .077 |

Independent sample t-test*p-value is significant.
Mean value of CBT+Motor is 19.0000±.00000 and mean value of CBT is 19.6875±1.44770 and p-value (.077) was not statistically significant.

**T-Test**

**Table 3: Mean age at which parents notice attention deficit hyperactivity disorder symptoms.**

| Study variable | CBT+ Motor | CBT | p-value |
|---|---|---|---|
| At what age did you notice your child getting hyperactive and losing attention in work? | 9.1176±1.49509 | 9.6875±1.07819 | .221 |

Independent sample t-test*p-value is significant.
Mean value of CBT+Motor is9.1176±1.49509 and mean value of CBT is 9.6875±1.07819and p-value (.221) was not statistically significant.

**Table 4: comparison of ADHD score at different time of study**
**T-Test**

| | Group | | |
|---|---|---|---|
| Study variable | CBT+Motor | CBT | p-value |
| Pre Treatment | 44.35±7.19 | 40.88±7.21 | 0.176 |
| After 7 sessions of treatment | 31.82±5.99 | 28.00±11.79 | 0.245 |
| After 15 sessions of treatment | 24.82±8.82 | 25.94±7.86 | 0.705 |
| After 1 week of treatment | 21.64±7.52 | 24.94±6.23 | 0.182 |

Independent sample t-test*p-value is significant.
At the time of pre-treatment mean attention deficit score of CBT+Motor group was 44.35±7.19 and CBT group was 40.88±7.21. Mean attention deficit score of both groups was statistically not significant (p-value 0.176).
After 7 session of treatment mean attention deficit score of CBT+Motor group was 31.82±5.99 and CBT group was 28.00±11.79. Mean attention deficit score of both groups was statistically not significant (p-value 0.245).
After 15 session of treatment mean attention deficit score of CBT+Motor group was 24.82±8.82 and CBT group was 25.94±7.86. Mean attention deficit score of both groups was statistically not significant (p-value 0.705).
After 1 week of treatment mean attention deficit score of CBT+Motor group was 21.64±7.52 and CBT group was 24.94±6.23. Mean attention deficit score of both groups was statistically not significant (p-value 0.182).

**T-test**

**Table 5: Comparison of Montreal cognitive assessment score at different time of study.**

| **Study variable** | **CBT+Motor** | **CBT** | **p-value** |
|---|---|---|---|
| **MOCA (Pre)** | **19.17±3.97** | **18.37±3.84** | **0.561** |
| **MOCA (Post)** | **24.00±2.94** | **20.31±3.28** | **0.002** |

**Independent sample t-test*p-value is significant.**
At the time of pre-treatment mean Montreal cognitive assessment score of CBT+Motor was 19.17±3.97. Mean Montreal cognitive assessment score was statistically different. (P-value 0.561).
After the treatment mean Montreal cognitive assessment score of CBT+Motor was 24.00±2.94 and CBT was 20.31±3.28 and Mean Montreal cognitive assessment score was not statistically different (p-value 0.002).

**GRAPHS**
Figure 1: Mean ADHD score of groups.

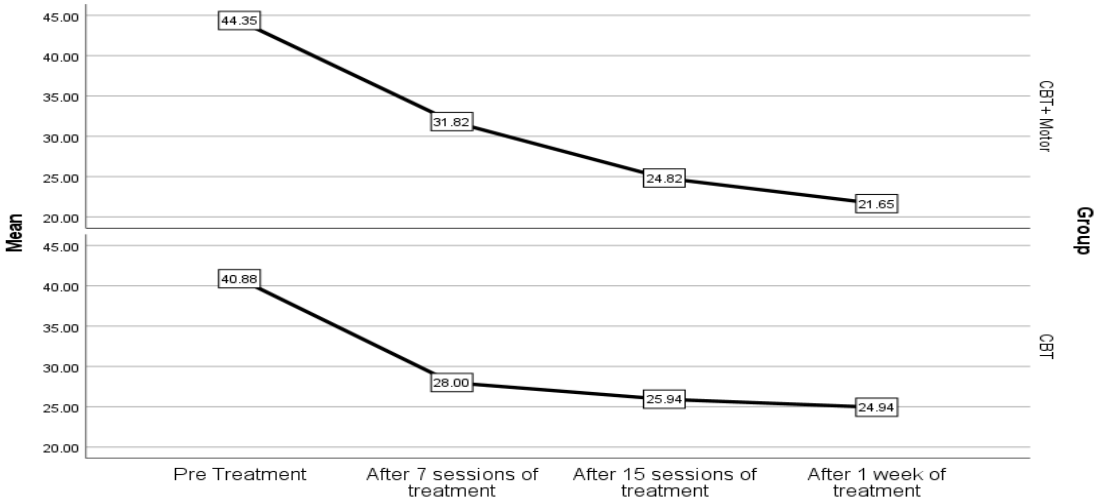



**Figure 2: Mean age showing symptoms of ADHD.**

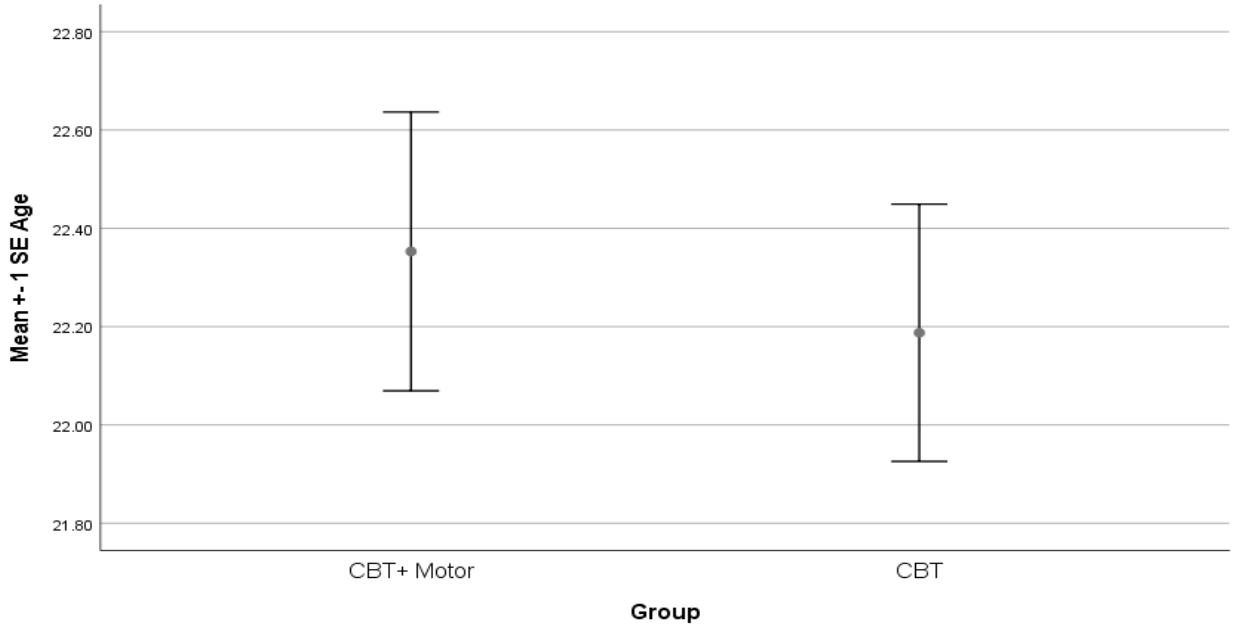



**Figure 3: Mean score of Montreal cognitive assessment scale of groups.**

## Discussion

This study has examined and compared the effect of cognitive behavioral therapy and motor learning techniques along with cognitive Behavioural therapy on adults with attention deficit hyperactivity disorder. This was the first study to show that there is significant reduction in symptoms of attention deficit hyperactivity disorder if we use cognitive Behavioural therapy along with motor learning techniques, as measured by ADHD self-report scale and Montreal cognitive assessment.

In this study cognitive and motor impairment were determined by using Montreal cognitive assessment and ADHD self-report scale respectively. The ADHD

self-report was the most specific and sensitive test for evaluation of ADHD symptoms.

There was no statistically significant difference between age and both groups (p-value 0.672). with regard to age at which subject first notice attention deficit hyperactivity disorder symptoms there was no statistically difference seen between both groups (p-value 0.077). If we see age at which parents notice attention deficit hyperactivity disorder there was no statistically significant difference seen among two groups CBT + Motor and CBT. (P-value 0.221). According to this study comparison of score of ADHD at different time of study we see that there was no statistically significant difference seen at pre-treatment (p-value 0.176), after 7 session of treatment (p-value 0.245), after 15 session of treatment (p-value 0.705), and after 1 week of treatment (p-value 0.182) among both groups CBT + Motor and CBT.

A statistically significant difference was seen when we compare scores of Montreal cognitive assessment pre-treatment (p-value 0.561) and post-treatment (p-value 0.002) among both groups CBT+Motor and CBT.

In medical terms it was seen that subjects who have given CBT +Motor had more reduced ADHD score than those who had given CBT only. So if we combine CBT+Motor learning techniques the patients will had more reduced symptoms of ADHD. Motor and cognitive impairments were reduced more in CBT+Motor group as compared to CBT group only.

Comparison of the impact of our results with those of other studies on ADHD was difficult due to differences in criteria and methodological variations. To the best of researchers no study had focused on the comparison of CBT+Motor and CBT of adult population of Pakistan.

## CONCLUSIONS:

The frequency of attention deficit hyperactivity disorder was common among the adult population that might be attributed mainly to lack of education. Reduction in symptoms was seen in group given CBT+Motor learning techniques as compare to the group given CBT only.

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