World Journal of Advanced Research and Reviews
eISSN: 2581-9615 CODEN (USA): WJARAI
Cross Ref DOI: 10.30574/wjarr
Journal homepage: https://wjarr.com/

(RESEARCH ARTICLE)

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# Effect of Cognitive Behaviour Therapy (CBT) on in-school Adolescents with Attention Deficit Hyperactivity Disorder (ADHD)

Toyin Odofin Ufuophu [1], Akpojotor Joseph Oderhohwo [1] and Lawrence Arumuru [2]

[1] *Department of Guidance and Counselling, Faculty of Education, Delta State University, Abraka, Nigeria.*
[2] *Department of Library and Information Science, Faculty of the Social Sciences, Delta State University, Abraka, Nigeria.*

World Journal of Advanced Research and Reviews, 2025, 26(03), 1864-1870

Publication history: Received on 17 January 2025; revised on 12 June 2025; accepted on 14 June 2025

Article DOI: https://doi.org/10.30574/wjarr.2025.26.3.0640

## Abstract

This study investigated the Effect of Cognitive Behaviour Therapy (CBT) on in-school Adolescents with Attention Deficit Hyperactivity Disorder (ADHD). Quasi-experimental research design was adopted in the study. Two (2) hypotheses guided the study, a total of 102 in-school adolescents were selected from three public secondary schools in Sapele Local Government Area, Delta State using multi-stage sampling techniques. Strengths and Weaknesses of Attention Deficit Hyperactivity Disorder and the Normal Behaviour Rating Scale (SWAN) developed by Swanson, et al (2012) were used to assess children with ADHD. The Child and Adolescents Scale of Irrationality (CASI) developed by Bernard and Cronan (1999) was designed to measure irrational beliefs/ cognitions in children and adolescents aged between 10 and 17 years. The researcher collected data for the study by administering the instruments to the sampled respondents with the help of two trained research assistants in each of the schools. The data gathered was analysed using descriptive, t-test and ANOVA statistics. The findings amongst others showed that CBT was efficacious in managing ADHD among in-school adolescents. The study further revealed that ADHD was influenced by sex. Therefore, the study recommends amongst others that, functional counselling units should be established in all public secondary schools and counsellors should be employed and trained on how to give proper psychotherapy such as CBT to adolescents who are suffering from ADHD.

**Keywords:** ADHD; Cognitive Behaviour Therapy; Sex; Adolescents

## 1. Introduction

Adolescents in secondary schools face many academic challenges, such as the need to complete assignments and exams, manage their time and master an overwhelming quantity of study material, which may cause emotional distress. Many are also expected to adapt to new living conditions and social relationships (Fernández-Rodríguez et al, 2019). Adolescents with attention deficit hyperactivity disorder are likely to face more stressors and have higher levels of perceived stress which can lead to maladaptive thoughts that increase the likelihood of other mental health problems, such as anxiety, depression, anger issues, and dysfunctional behaviour.

Attention deficit hyperactivity disorder is a neurodevelopment disorder that limits attention, working memory, inhibitory control and motivation, and affects functioning, often with severe levels of inattention, impulsivity and hyperactivity and the symptoms present during childhood can persist into adulthood (American Psychiatric Association, 2013). The impact of ADHD can lead to functional impairment across behavioural, academic and social domains (National Institute for Health and Care Excellence, 2018). In a recent study in which ADHD prevalence was examined among Asian American and Pacific Islanders (AAPI), college students were found to report the prevalence of ADHD among AAPI students to be 3,8%, White 9% and Black students 4.5% (Jhawar & Antshel, 2024). Usually, the first

* Corresponding author: Lawrence Arumuru

line of treatment for ADHD is medication (National Institute for Health and Care Excellence, 2018). However, the frequently prescribed stimulant medications do not seem to be effective for 22–75% of persons diagnosed with ADHD (Kosheleff et al, 2023). Additionally, some individuals are unable to tolerate the medication due to side effects (Elliott, 2020).

Psychosocial interventions may enhance the improvement achieved with medication and may also benefit those who do not respond to medication (Liu et al, 2023). NICE Guidelines recommend a group or individual Cognitive Behavioural Therapy (CBT) for people with ADHD in addition to medication (National Institute for Health and Care Excellence, 2018). A systematic review and meta-analysis of randomized controlled trials on the efficacy of CBT for students with ADHD indicated that CBT had positive effects on ADHD symptoms (Young et al, 2020).

Attention Deficit Hyperactivity Disorder (ADHD) is one of the mental disorders usually observed in the formative years of a child when paying attention becomes a challenge. This disorder among children most often lasts into adulthood. Centre for Disease Control and Prevention (2022) opined that it is one of the most common neuro-developmental disorders of childhood which results in having trouble paying attention, controlling impulsive behaviours and being overly active. Attention Deficit Hyperactivity Disorder as defined by the National Institute of Mental Health (2024) is a neuro-developmental disorder in children, adolescents as well as adults characterized by inattentiveness, impulsivity or hyperactivity which interferes with functioning and development. This disorder adversely affects a person's attentiveness, calmness and how to control behavior. According to the American Psychiatric Association (2013), this disorder affects 3 to 7% of all children, in addition, boys (14.0%) showed a higher estimated prevalence of this disorder than girls (6.3%) (Wong, 2022). ADHD is one of the prevalent disorders which show similarities with other psychiatric disorders. It is a condition that has a detrimental impact on many facets of the patient's life, including educational, social, family, and interpersonal interactions. Adolescents suffering from ADHD disorder often avoid important activities like school and work, and may not participate even if they eventually attend. As a result, students perform worse in vocational, academic, and familial functions, are more likely to abuse drugs and alcohol, have fewer opportunities to marry, and have a worse quality of life. They may also be more likely to commit suicide.

ADHD can be triggered by several factors, including brain injury, exposure to environmental hazards like lead as well as pre-natal conditions especially in the first trimester of pregnancy, alcohol and tobacco use during pregnancy, premature delivery as well as low birth weight. Centers for Disease Control and Prevention (2022) asserted that genetic factors have a link with ADHD. American Academy of Pediatrics (2023) stated that ADHD may be caused by brain anatomy and function, genes and heredity, significant head injury, prematurity, prenatal exposures such as alcohol or nicotine from smoking during pregnancy, and in rare cases, toxins in the environment like lead in the body which affects the children who suffer from the disorder and those around them.

Being inattentive is normal among young children and adolescents, however, it becomes a challenge when this behaviour is continuous and severe. ADHD could lead to difficulty in school work, and at home as well as difficulty getting along with friends and family, which may result in substance use, relationship difficulties, risky sexual practices, and unwanted pregnancy among others, which affects the quality of life of the child and may become a family burden is proper care is not taken. This could also lead to impairments in emotions, self-esteem and success in life. According to Usami (2016), children and adolescents with ADHD have poorer long-term outcomes in academic achievement and attainment, occupational rank and job performance. Harpin (2005) enumerated the effects of ADHD on not just the affected child but on the parents and siblings as well. They include lower educational attainment, employment issues, social skills problems strained parent-child relationships and increased healthcare cost strain on the family finances. The consequences of this disorder could depend on its different forms.

This disorder is in three forms depending on the conditions that are most prominent in the individual. According to Centers for Disease Control and Prevention (2022), the first form is predominantly inattentive presentation, which occurs when it becomes very difficult for the adolescents to organize themselves to complete a task, pay rapt attention to details and follow the lines of dialogue and instructions. Here, students easily forget instructions and are unable to pay attention to details of everyday routines. Centres for Disease Control and Prevention further stated that the second form is predominantly hyperactive-impulsive presentation. This occurs when children suffering from this condition often play around and are flippant. It is also challenging for such children to remain calm for an extended period during meal time, doing homework and class exercises. Young children often run, and jump up and down incessantly. Therefore, impulsive children may rudely interrupt others during conversation and have difficulty in listening, waiting, and taking turns in activities. An impulsive child usually suffers multiple effects than others. The third form is the combination of the above two forms. These are (predominantly inattentive and predominantly hyperactive-impulsive presentations) conditions which is a very severe form of ADHD (American Psychiatric Association, 2013). That is the last form of ADHD is the most severe of the three existing forms. ADHD can occur among children irrespective of gender.

Studies have shown that the gender of an adolescent (male or female) is considered to have a tremendous influence on ADHD. Gender has to do with characteristics of men, women, girls and boys that are socially constructed (World Health Organization, 2024). This includes norms, behaviours and the roles associated with being male or female. Ifelunni (2019) see gender as the roles expected form adolescents based on being male or female, these roles may affect them as they develop. Gender is an important construct in all societies, which involves binary differences of what is taken to be masculine and feminine (Gormley, 2015). Gender is one variable that has been related to differences found in ADHD. Even though the prevalence level of ADHD for boys may appear to be higher than for girls, the dangers associated with ADHD are not gender bias. There is limited empirical evidence which has explicitly addressed problem behaviour among boys and girls (Owens, 2016). Many methods have been used in the past to help in-school adolescents manage ADHD but have not been completely effective. Thus, Cognitive Behavioural Therapy (CBT) which is a psycho-social intervention aimed at reducing various symptoms of mental health conditions are effective by empirical studies (Ifelunni, 2023, Wood et at, 2009, Abdolalizadeh & Neiazi, 2020, Eneogu et al, 2023).

Cognitive-behavioural therapy is a short-term goal-oriented psycho-social treatment that involves an applied method to problem-solving. It aims to alter thought patterns that are behind individuals' difficulties, and so alter the way they feel. It is a psycho-social intervention that aims to improve mental health. CBT focuses on challenging and changing unhelpful cognitive distortions such as thoughts, beliefs, attitudes, and behaviours, improving emotional regulation, and developing personal coping strategies that target solving current problems. It was initially developed to treat depression, the therapy has now been adapted to address a variety of mental health disorders, including ADHD. This therapy has been shown to help improve adaptive behaviour (Egbochukwu & Obadan, 2005). This therapy is an approach that is used to make people understand themselves, understand others, and act rationally by correcting their negative thoughts (Okun & Kantrowitz, 2015). This can be done by changing those basic life philosophies that affect them negatively which will enable them to be in charge of their emotions.

There is research evidence to prove the efficacy of CBT for managing ADHD among adolescents. Steven and Safren (2021) found that CBT resulted in a remarkable improvement in the ADHD of participants when compared to the control group. Senyametor, et al (2021) found that there is much improvement in girls when compared to boys. The findings of Dupaul, et al (2016) also showed that CBT produced a higher positive impact in reducing ADHD symptoms in girls than boys. Ifelunni, (2023) also found that ADHD children exposed to CBT were reduced more than those in the no-intervention control group, the study further showed that male children experienced reduced ADHD slightly than female children. It is on this basis that the researchers investigated the effectiveness of CBT in the management of ADHD in a randomized controlled group. It is hoped that this counseling technique when used would help to manage ADHD among in-school adolescents.

### 1.1. Hypotheses

- There is no significant difference in the pre-test and post-test of ADHD mean scores of in-school adolescents exposed to Cognitive Behavioural Therapy.
- There is no significant difference in the ADHD of male and female adolescents exposed to CBT and those in the no-intervention control group.

## 2. Methods

The study adopted a quasi-experimental research design. The Pre-test and Post-test Control group was used. In this research design, participants are not randomly assigned into groups, rather, intact classes were randomly assigned to experimental and control groups so that the normal classes were not disrupted. The design is appropriate since the study investigated the causality between an intervention and an outcome. Two (2) hypotheses guided the study. A total of 102 in-school adolescents were selected from three public secondary schools in Sapele Local Government Area, Delta State using multi-stage sampling techniques.

The two instruments that were used to collect data for the study were, the Strength and Weaknesses of Attention Deficit Hyperactivity Disorder and the Normal Behaviour Rating Scale (SWAN) developed by Swanson, et al (2012) is an 18-time questionnaire used to assess children with ADHD. The Child and Adolescents Scale of Irrationality (CASI) developed by Bernard & Cronan (1999), is a 28-item scale designed to measure irrational beliefs/ cognitions in children and adolescents aged between 10 and 17 years. Since these instruments are standardized and are developed outside the study area, they were subjected to face validity by some experts to determine their suitability for the respondents of this study. The instruments were pilot-tested on some selected students and validated through an internal method of validation. The instruments reported a reliability coefficient of 0.85 and 0.88 respectively using the Cronbach Alpha

method. The data collected were analyzed using descriptive statistics of mean and standard deviation and inferential statistics of paired sample t-test at 0.05 level of significance.

## 3. Results

- **Hypothesis 1** There is no significant difference in the pre-test and post-test of ADHD mean scores of in-school adolescents exposed to Cognitive Behavioural Therapy.

**Table 1** Mean difference in the Management of ADHD of in-school adolescents Exposed to CBT Treatment

| Test | N | Mean | Standard Deviation | T | Sig (2-tailed) |
|---|---|---|---|---|---|
| Pre-test | 35 | 123.30 | 21.34 | | |
| | | | | 6.722 | 0.000 |
| Post- test | 40 | 96.77 | 16.82 | | |

$$\propto = 0.05$$

Table 1 shows a paired sample t-test of 6.722, testing at an alpha level of 0.05, with a *p-value* of 0 .000. Since the *p-value* is less than an alpha level of 0.05, the null hypothesis which states that "There is no significant difference in the pre-test and post-test of ADHD mean scores of in-school adolescents exposed to Cognitive Behavioural Therapy" is rejected. Consequently, Cognitive Behavioural Therapy is significantly efficacious in the management of ADHD among in-school adolescents.

**Table 2** One-way ANOVA of Pre-test Scores on the Management of ADHD among in-school adolescent exposed to CBT and Control

| Group | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between | 436.655 | 2 | 315.272 | 0.738 | 0.521 |
| Within | 44210.535 | 73 | 434.351 | | |
| Total | 44728.313 | 75 | | | |

$$\propto = 0.05$$

Table 2 shows an F-value of .738 and a p-value of 0.521, testing at an alpha level of 0.05. The p-value of 0.521 is greater than the alpha level of 0.05; thus, no significant difference exists among the groups at the post-test. Therefore, the result of the pre-test showed no significant difference in the management of ADHD among in-school adolescents.

**Table 3** One-way ANOVA on Management of ADHD among in-school adolescent at Post-test

| Group | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between | 42811.2331 | 2 | 34841.165 | 85.416 | 0.000 |
| Within | 35416.854 | 73 | 243.725 | | |
| Total | 65321.213 | 75 | | | |

$$\propto = 0.05$$

Table 3 reveals an F-value of 85.416 and a p-value of 0.000 testing at an alpha level of 0.05, the p-value of 0.000 is less than the alpha level of 0.05. Therefore, the null hypothesis which states that "there is no significant difference in the pre-test and post-test scores of in-school adolescents exposed to CBT and Control groups at post-test" is rejected. Hence, there is a significant difference in the post-test scores of adolescents exposed to CBT and Control at post-test.

- **Hypothesis 2** There is no significant difference in the ADHD of male and female adolescents exposed to CBT and those in the control group.

**Table 4** Mean and standard deviation of treatment by sex interaction effect on ADHD among in-school adolescents

| Group | Sex | Mean | Std. Deviation | N |
|---|---|---|---|---|
| CBT | Male | 82.762 | 17.341 | 10 |
| | Female | 101.132 | 13.431 | 20 |
| Control | Male | 135.361 | 14.353 | 18 |
| | Female | 133.840 | 11.123 | 27 |

Table 4 shows that CBT had a mean of 82.762 with a standard deviation of 17.341 for the male and a mean of 101.132 and a standard deviation of 13.431 for the female while for the Control group, the male had a mean of 135.361 and a standard deviation of 14.353 and the female had a mean of 133.840 with a standard deviation of 11.123. Therefore, there is a significant difference in ADHD between male and female adolescents exposed to CBT and those in the control group.

**Table 5** Two-way Analysis of Variance (ANOVA) of Interaction Effect of Treatment by Sex on Management of ADHD

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Corrected Model | 42536.452[a] | 5 | 11428.386 | 37.415 | 0.000 |
| Intercept | 1148481.351 | 1 | 1148481.351 | 4.24213 | 0.000 |
| Group | 44304.354 | 2 | 33642.621 | 74.312 | 0.000 |
| Sex | 0.147 | 1 | 0.147 | 0.002 | 0.001 |
| Group* Sex | 633.051 | 2 | 361.021 | 1.345 | 0.002 |
| Error | 24362.730 | 70 | 254.283 | | |
| Total | 1335450.410 | 75 | | | |
| Corrected Total | 67311.313 | 75 | | | |

a.R Squared=.652 (Adjusted R Square =.645)

Table 5 shows an F-value = 1.345 and a p-value of 0.002 at an alpha level of 0.05. The p-value is less than the alpha level of 0.05; so, the null hypothesis which states that "There is no Significant Interaction Effect of Treatment by Sex on the Management of ADHD among in-school adolescents is retained. This means that CBT therapy manages ADHD of male and female in-school adolescents equally.

## 4. Discussion

The result showed that there is a significant difference in the pre-test and post-test of ADHD mean scores of in-school adolescents exposed to CBT. This implies that CBT is efficacious in managing ADHD among in-school adolescents exposed to CBT treatment. This result agrees with the study carried out by Steven and Safren (2021) that CBT resulted to a remarkable improvement in the ADHD of participants when compared to the control group. Ifelunni, (2023) also found that ADHD children exposed to CBT reduced more than those in the no-intervention control group.

The finding also revealed that there is a significant difference in ADHD of male and female adolescents exposed to CBT and those in the control group. This means that CBT therapy manages the ADHD of male and female in-school adolescents. In this study, the ADHD level of males and females exposed to the treatment package of CBT was significantly managed. This result agrees with Senyametor, et al. (2021) that there is much improvement in girls when compared to boys. The findings of Dupaul, et al (2016) also showed that CBT produced a higher positive impact in reducing ADHD symptoms in girls than boys.

## 5. Conclusion

Based on the findings of this study, it was concluded that Cognitive Behaviour Therapy is efficacious in managing ADHD among in-school adolescents and that ADHD is not influenced by the sex of in-school adolescents.

### *Recommendation*

From the findings of this study, it was recommended that

- The government should introduce seminars and workshops on CBT to equip in-school adolescents who are battling with ADHD.
- Functional counselling units should be established in all public secondary schools and employ trained experts/therapists on how to give proper psychotherapy such as CBT to adolescents who are suffering from ADHD.

In-school adolescents who are going through ADHD should take advantage of the treatment package of CBT as this will help them to manage this disorder.

## Compliance with ethical standards

### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.

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