CHAPTER ONE

INTRODUCTION

Background to the Study

Attention Deficit Hyperactivity Disorder (ADHD) is a prevalent neurodevelopmental disorder characterized by persistent patterns of inattention, hyperactivity, and impulsivity. These symptoms often lead to significant impairment in academic, social, occupational functioning and strained relationship. Impulsivity and hyperactivity may lead to difficulties building and maintaining appropriate peer relationship and developing a supportive group (Abikwi, 2009). In Nigeria, the increasing recognition of ADHD among secondary school students has highlighted the urgent need for effective intervention strategies to manage this condition (Adewuya and Famuyiwa, 2007). ADHD is a particularly serious problem because pupils with core difficulties of inattentions, hyperactivity/impulsivity may lead to poor attainment in school. The educational system in Nigeria faces numerous challenges, and the inclusion of students with ADHD further complicates the scenario, necessitating specialized therapeutic approaches.

The counsellors' activities should be conveniently seen as enabling stimuli that promptly organize an individual towards a better assessment of his or her potentials. When knowledge acquisition is put in place the individual acquires better coping skill and better ways of relating to events in his or her environment. The use of counselling techniques can be seen as remedial measures towards balancing individual's behaviour and interest. In carrying out one's duty as a counsellor, it is observated that some students could possess persistent patterns of inattention and hyperactivity at school or home , and if not diagnosed early and so lack therapeutic intervention can impact on the performance of the individual (Baker and Baker, 2017; Halgin and Whitebeard, 2019). ADHD occurs across cultures. In Nigeria, it was observed

that ADHD occurs about 9% among children between ages 7 – 12 years, and 14% among 13 – 17 years and 23% among primary school children Abikwi and Egbochuku (2007).

Attention Deficit Hyperactivity Disorder (ADHD) is a prevalent neurodevelopmental disorder that affects a significant number of children from age 2 to 7 years and thereby lingers on to secondary school, often leading to challenges in various aspects of their lives. ADHD is characterized by symptoms such as inattention, hyperactivity, and impulsivity, which can adversely impact a student's academic performance, social interactions, and overall well-being. Inattention in students with ADHD manifests as difficulty in sustaining focus, being easily distracted, and often failing to follow through on tasks. This lack of attention can result in poor academic performance, as students may struggle to complete assignments, miss important details during lessons, and find it challenging to stay organized. The persistent nature of inattention can lead to a cumulative negative impact on a student's educational journey (Sarkis, 2014; Shapiro and Shapiro, 2012).

Hyperactivity is another core symptom of ADHD, and could be characterized by excessive movement, restlessness, and difficulty remaining seated or quiet when required. In a classroom setting, hyperactivity can be disruptive, not only for the student experiencing it but also for their peers. This constant need for movement can interfere with the student's ability to engage in learning activities and focus on academic tasks, thereby hindering their academic progress (Barkley, 2014).

Impulsivity in students with ADHD could be exhibited through hasty actions, difficulty waiting for their turn, and a tendency to interrupt others. Impulsive behaviour could lead to social challenges, as these students may struggle with self-regulation in social situations, leading to conflicts with peers and difficulties in maintaining friendships. Impulsivity could also affect academic performance, as students may rush through tasks without considering

consequences, leading to mistakes and incomplete work. Social interactions are crucial for the overall development of secondary school students. However, students with ADHD often face challenges in forming and maintaining positive relationships due to their inattention, hyperactivity, and impulsivity. These difficulties could lead to social isolation, low self-esteem, and a reduced sense of belonging, which could further exacerbates the negative effects of ADHD on their overall well-being.

The cumulative effects of inattention, hyperactivity, and impulsivity often result in compromised academic performance for students with ADHD. They may struggle to meet academic expectations, leading to frustration, a lack of motivation, and an increased risk of school dropout (Fabiano, Pelham, Coles, Gnagy, Chronis-Tuscano and O'Connor, 2009). The academic challenges faced by students with ADHD highlight the need for effective interventions that address the root causes of these difficulties.

Abikwi (2009) listed inattentiveness, Hyperactivity/Impulsivity and combined type as the three types of ADHD. Against this background, it is very necessary that concerted efforts be made towards assisting ADHD students to overcome the symptoms of ADHD. Such efforts may involve the use of behaviour intervention/modification techniques. Behaviour modification is the systematic arrangement and scientific process of altering behaviours, the alteration of which could be from undesirable behaviour to desirable behaviour or improving existing behaviour. Behaviour modification as a scientific tool has been found to be efficacious in the management of different behaviour problems (Nnodum, 2001, Chima, 2003; Ekenta, 2009; Nwobi 2008). As a behavioural problem therefore, the researchers believed that students' ADHD could be better handled using behavioural counselling intervention techniques such as modelling therapy. In this light, the researchers employed a behaviour intervention technique which is modelling in reducing ADHD among school age individuals with special focus on junior secondary school students. Modelling therapy was developed by Albert Bandura in

1977. This therapy focuses on helping individuals to learn target behaviours by observing a model and imitating such behaviours. Modelling is also viewed as a process of observational learning in which the behaviour of one individual or group or the model, act as a stimulus for the thoughts, attitudes or behaviour of another individual who observes the model's performance. Modelling involves practicing appropriate behaviour responses within social situations. The author therefore described modelling as the acting out of behaviour, to learn it and refine it as a skill. It involves students imitating their social skills in the therapy session and eventually moving to real life situations. Learning is easier and better retained through observation and imitation (Nwamuo and Ekwe 2005; Bandura 1977).

Modelling therapy involves the client or learner using the model, and retaining what is learnt. Modelling therapy has been used in treating symptoms of ADHD among student and to improve social skills of students with social anxiety. More so, modelling therapy has been found to be significantly effective in reducing maladaptive behaviours such as truancy, anxiety, and shyness and improving adaptive behaviours such as reading fluency and comprehension (Cathy, 2013; Laley and Currain 2016; Ekwe, Iwuama and Nwamuo 2012; Gilchrist 2013).

Most importantly, the modification of human thought process is the goal of modeling therapy. Since modelling therapy has proven effective in reducing other maladaptive behaviours as reported by previous researchers, the present researchers therefore embarked on this study which investigated the impact of modelling therapy on ADHD among junior secondary school students in Edo state.

Statement of the Problem

The prevalence of ADHD among secondary school students in Nigeria poses significant changes to the educational system. Students with ADHD often struggle inattention, hyperactivity, impulsivity, academic performance changes, exhibit disruptive behaviour, and

face social stigmatization, which can lead to long-term negative outcomes. Traditional classroom settings and teaching methods are often inadequate in addressing the unique needs of these students, leading to increased dropout rates, reduced educational attainment and social interactivity.

Mirealt and Trahan (2017) noted in their reteach that school teachers and administrators have tried to solve the problems of ADHD among adolescents in schools by employing various measures such as scolding, sending students away during lessons, and even sending the students for medical treatment whereas the signs posited may not be of medical case. Furthermore, school counsellors have been adopting routine conventional counselling, emphasizing on the need to study, organizing orientation for students and seminars stressing study skills, study habits among others, with the view that most students are exposed to ADHD. These measures have not solved the problem of ADHD among adolescents.

It becomes necessary to therefore to determine approaches on how to reduce. ADHD among adolescents through measures applied by the clients themselves, in order to ensure that this group would not only achieve their set educational goals but also develop into socially and emotionally balanced personalities. Modelling therapy such as behavioural models has long been proposed by psychologist as the better intervention technique for solving the ADHD syndrome. But how much these models can overcome these syndromes still remains a problem. It becomes reasonable to ascertain the impact of Modelling therapy on the reduction of ADHD among secondary school adolescents in Edo state.

Purpose of the Study

The major purpose of the study is to evaluate the Impact of Modelling Therapy on the decrease of ADHD among secondary school adolescents in Anchor of Hope school of Autism Benin city. Specifically, the study seeks to:

1. Determine the effect of Modelling Therapy on secondary school adolescents in in Anchor of Hope school of Autism Benin city based on Sex.
2. Ascertain the time rate of the effect of Modelling Therapy ADHD secondary school Adolescent in Anchor of Hope school of Autism Benin city.
3. Examine the impact of Modelling Therapy on ADHD based on age among secondary school adolescents in Anchor of Hope school of Autism Benin city.
4. Examine the sustainability level of the impact of Modelling Therapy on ADHD among secondary school adolescents in Anchor of Hope school of Autism Benin city.
5. Determine the impact of Modelling Therapy on academic performance among secondary school adolescents in Anchor of Hope school of Autism Benin city.

Research Questions

This research addresses the following questions:

1. What is the level of impact of Modelling Therapy on ADHD secondary school Adolescent in Anchor of Hope school of Autism Benin city?
2. What is the time rate of impact of Modelling Therapy on ADHD secondary school adolescent in Anchor of Hope school of Autism Benin city?
3. What is the level of impact of Modelling Therapy based on sex?
4. What is the level of impact of Modelling Therapy based on age?
5. What is the level of sustainability over time, of the impact of Modelling Therapy?

Hypotheses

The following null hypotheses would be tested:

1. The level of impact of Modelling Therapy is not significant.
2. There is no significant difference of the time rate of impact.
3. The level of impact based on sex is not significant.

4. The level of impact based on age is not significant.
5. The level of sustainability over time is not significant.

Significance of the Study

The findings of this study will be of benefit to the following stakeholders: educational psychologist, researchers, government/policy makers, Curriculum planners, adolescents, parents, guidance counsellors, and the society at large, by the findings of the study which indicate that the effects of using Modelling Therapy on the adolescents with ADHD could have a significant reduction in their ADHD behaviour. This will be of great benefit to social and educational psychologists because it will confirm the authenticity of these therapies to motivate students to adjust and adopt desired healthy and rational behaviour. Thus, this study is deemed significant because it provides insights into current therapy on behaviour modification.

To researchers it will contribute additional empirical knowledge in using Modelling therapy in modifying ADHD behaviour among adolescents, this time using subjects drawn from secondary schools in Anchor of Hope school of Autism Benin city, Edo State. To the government/policy makers, (Ministry of Education, state Education Commission, Edo State Universal Basic Education Board) the findings of this study can arouse them to organize workshops, conferences and seminars for counsellors and teacher counsellors, equipping them with adequate knowledge that would enable them to effectively counsel and train students with maladaptive behaviours using the techniques employed in this work.

Curriculum planners based on the findings of this study can now modify secondary school curriculum to incorporate Modelling therapy to modify student's behaviour that manifest symptoms of ADHD in secondary school. The findings of this study when published will enable adolescents to be armed with skills that will enable them control their behaviour. They will be enabled to differentiate between positive and negative forms of behaviours owing

to the fact that adolescents exhibit those behaviours spontaneously and do not know that they are aberrant to their future adjustment in the society. However, when such behaviours are corrected, it will enable them to enjoy cordial, relaxed and healthy relations with human and the environment. It will also enhance the academic performance of the adolescents.

The findings of the study will be significant to parents in that when published, it will provide information on factors that constitute ADHD through the inventory used in this study. The identification of adolescents that manifest such behaviour will enable parents work towards early prevention and management. The findings of this study will also enable parents to be aware of the dangers and ripple effects of Modelling therapy on their children, and help them to get assistance from the school guidance counsellors.

Finally, the findings of this study when published will add to the stock of existing knowledge in the area of application of Modelling therapy in ADHD management which will be disseminated through workshops, journals, conferences and websites

Scope of the Study

The scope of this study is delimited to the impact of modelling therapy on secondary school adolescents with ADHD in Anchor of Hope school of Autism Benin city of Edo state. Though, this study is on ADHD, it will be limited to inattention as a type of ADHD. Being a quasi- experimental research, was used as the area of study. Specifically, the study covers junior secondary school adolescents, specifically the JSS 1 secondary school adolescent. The independent variables of the study are modelling therapy while the dependent variables include inattention, sex, sustainability level, age, and time rate.

Operational Definition of Terms

Attention Deficit Hyperactivity Disorder: A neurodevelopmental disorder characterized by symptoms of inattention, hyperactivity, and impulsivity

Modelling Therapy: This is a process of creating an activity that will help reduce an unwanted behaviour.

Hyperactivity: Excessive movement and restlessness, often observed in individuals with ADHD

Impulsivity: The tendency to act without thinking, common in individuals with ADHD

Attention: the ability to focus and concentrate on tasks, often impaired in individuals with ADHD

Counsellor: An educator who works in primary/secondary schools to provide academic, career, college access/admission, and social-emotional competencies to all students through a counselling program.

Inattention: can simply be defined as the lack of attention or reduced attention span.

Age: Age refers to the chronological age of the participant measured in completed years at the time of data collection, verified through official school records.

Sex: Sex refers to the self-reported or school-record-verified biological sex of the adolescent participant, classified as either Male or Female.

CHAPTER TWO

LITERATURE REVIEW

Introduction

This chapter provides a comprehensive review of the literature on the impact of Modelling therapy on the reduction of ADHD among secondary school adolescents in Benin Metropolis Edo state. It explores the concept of Modelling Therapy (MD), concept of ADHD, and its symptoms including attention, hyperactivity, and impulsivity, and they are impacted by Age and Sex. The chapter also provides a theoretical framework and previous studies of work done by authors and experts in this field.

Conceptual Framework

This concept for this study will be built around the framework for this study. The conceptual framework for this study is given below:

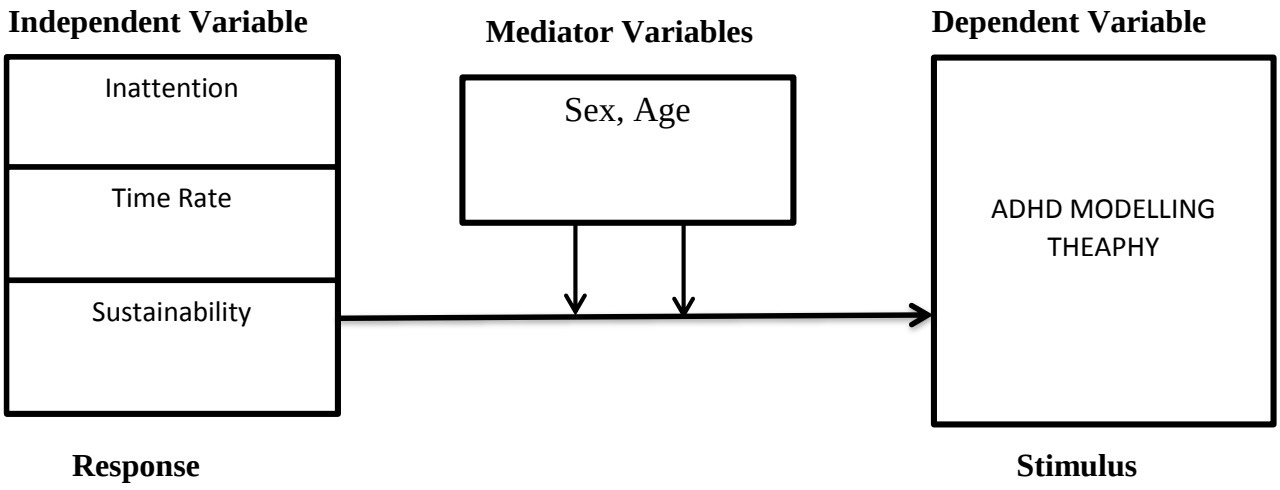


Figure 1: Conceptual model of the Study.
Source: Developed by the Researcher

Overview of Attention Deficit Hyperactive Disorder (ADHD)

ADHD is a neurodevelopmental disorder characterized by persistent patterns of inattention, hyperactivity, and impulsivity. According to the American Psychiatric Association (2023), ADHD significantly affects children's academic, social, and emotional functioning. These symptoms often manifest during early childhood and can continue into adolescence and adulthood (Barkley, 2024). The prevalence of ADHD among school-aged children is estimated to be between 5% and 7%, with boys being more frequently diagnosed than girls (Fabiano, Pelham, Coles, Gnagy, Chronis-Tuscano and O'Connor, 2019).

Attention Deficit Hyperactivity Disorder (ADHD) is one of the most commonly diagnosed neurodevelopmental disorders, affecting children, adolescents, and even adults worldwide. The disorder is marked by a persistent pattern of inattention, hyperactivity, and impulsivity, which can significantly impair an individual's functioning across various domains, including academic, social, and occupational settings. The onset of ADHD typically occurs in childhood, with symptoms often becoming evident before the age of 12 (American Psychiatric Association, 2023). According to the Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-5), ADHD is diagnosed based on the presence of symptoms in two or more settings (e.g., at school and home) for at least six months. These symptoms must interfere with or reduce the quality of social, academic, or occupational functioning (American Psychiatric Association, 2023). The DSM identifies three subtypes of ADHD. These include:

Predominantly Inattentive Presentation (ADHD-I*):* This subtype is characterized primarily by symptoms of inattention without significant hyperactive or impulsive behaviours. Individuals with this presentation may appear forgetful, disorganized, and easily distracted, which often leads to academic difficulties. They may struggle to follow instructions, complete

tasks, or sustain attention on activities requiring mental effort (McGlynn, Smitherman, & Gothard, 2004).

Predominantly Hyperactive-Impulsive Presentation *(ADHD-HI):* In this subtype, hyperactivity and impulsivity are the predominant symptoms. Individuals may exhibit fidgeting, an inability to stay seated, excessive talking, and difficulty waiting their turn. Impulsivity can manifest as making hasty decisions, interrupting others, and acting without considering the consequences, leading to social and academic challenges.

Combined Presentation (ADHD-C): The combined subtype is characterized by a combination of inattention, hyperactivity, and impulsivity. This presentation is the most common and typically involves a more severe impact on an individual's functioning due to the presence of all three symptom clusters.

The exact cause of ADHD remains unclear, but research suggests a multifactorial origin, including genetic, environmental, and neurobiological factors. For genetic factors, ADHD has a strong hereditary component, with studies indicating that the disorder tends to run in families. Twin and family studies suggests that genetic factors account for approximately 70-80% of the variance in ADHD symptoms (Faraone, Perlis, Doyle, Smoller, Goralnick, Holmgren and Sklar, 2015). Specific genes related to dopamine regulation, such as DRD4 and DAT1, have been implicated in the development of ADHD (Gizer, Ficks and Waldman, 2019).

Neuroimaging studies have identified structural and functional abnormalities in brain regions associated with attention, executive function, and behavioural regulation, such as the prefrontal cortex, basal ganglia, and cerebellum (Shaw et al., 2017). These brain differences may contribute to the characteristic symptoms of ADHD, including difficulties with sustained attention, impulse control, and hyperactivity. Environmental factors, such as prenatal exposure to tobacco smoke, alcohol, or drugs, low birth weight, and exposure to lead, have been

associated with an increased risk of developing ADHD (Nigg, 2022). Additionally, early childhood adversity, including trauma, stress, and poor parenting practices, may exacerbate the symptoms of ADHD, although these factors alone are not considered direct causes of the disorder.

ADHD is a global disorder, with prevalence rates varying across different countries and cultural contexts. The global prevalence of ADHD in children and adolescents is estimated to be around 5-7% (Polanczyk, Willcutt, Salum, Kieling and Rohde, 2015). However, diagnostic practices and cultural attitudes towards behavioural and developmental disorders may contribute to differences in reported prevalence rates. Sex differences are also notable in ADHD diagnoses. Boys are more likely to be diagnosed with ADHD than girls, with a ratio of approximately 2:1 to 3:1 (Willcutt, 2022). Boys are more frequently diagnosed with the combined or hyperactive-impulsive presentations, which may be due to more overt disruptive behaviours that draw attention from educators and parents. In contrast, girls are more likely to present with the inattentive subtype, which may result in under diagnosis or misdiagnosis, as their symptoms are often less disruptive and more easily overlooked.

ADHD is characterized by a triad of symptoms: inattention, hyperactivity, and impulsivity. These symptoms manifest differently in each individual and can vary in severity. They are central to the diagnosis of ADHD and have significant implications for the individual's daily functioning, especially in an academic setting.

Inattention

Inattention is one of the core symptoms of ADHD, characterized by difficulty sustaining attention, forgetfulness, and an inability to complete tasks. Students with ADHD may struggle to concentrate during lessons, leading to incomplete assignments and poor academic performance (Biederman, Petty, Clarke, Lomedico and Faraone, 2020). Inattention also affects

their ability to organize tasks, follow instructions, and engage in activities that require sustained mental effort. Individuals with ADHD often struggle to maintain focus on tasks or activities, particularly those that are repetitive or require prolonged mental effort. This difficulty can be especially evident in schoolwork, where students may find it challenging to complete assignments, follow instructions, or engage in activities that require sustained concentration (Willcutt, 2022).

Inattention can lead to difficulties with organization and time management. Students with ADHD may struggle to keep track of their assignments, lose important items like books or homework, and have trouble planning and prioritizing tasks (DuPaul and Stoner, 2024). Forgetfulness is another hallmark of inattention. Individuals with ADHD may frequently forget to complete tasks, miss deadlines, or fail to remember important details, leading to academic underachievement and social difficulties (Barkley, 2024). People with ADHD are often easily distracted by extraneous stimuli, whether in their environment or internally generated thoughts. This can result in a difficulty focusing on the task at hand, leading to incomplete work and a lack of progress in school or other activities (American Psychiatric Association, 2023). Inattention can significantly impact academic performance, as students may find it difficult to concentrate on lectures, complete homework, or study effectively for exams. Over time, this can lead to frustration, low self-esteem, and a sense of inadequacy, further exacerbating the challenges faced by students with ADHD.

Hyperactivity

Hyperactivity is another key symptom of ADHD, characterized by excessive motor activity and an inability to remain still or quiet when it is appropriate to do so. This symptom is particularly prominent in children and tends to diminish in intensity as individuals age, though it may persist in different forms into adulthood. Hyperactivity in students with ADHD

is marked by excessive fidgeting, restlessness, and an inability to remain seated or quiet. This symptom often results in disruptive behaviour in the classroom, making it challenging for students to engage in learning activities (Sarkis, 2014). Hyperactive students may also struggle with waiting for their turn, interrupting others, and exhibiting behaviours that are inappropriate for the situation. Hyperactivity is frequently observed as a need for constant movement. Children with ADHD may run or climb in situations where it is inappropriate, such as in the classroom or at home, leading to safety concerns and disciplinary issues (American Psychiatric Association, 2023). Hyperactivity can be particularly disruptive in educational settings, where students are expected to sit still, listen, and engage in activities that require sustained mental effort. This symptom often leads to conflicts with teachers and peers, further complicating the learning process and social integration.

Impulsivity

Impulsivity, the third core symptom of ADHD, refers to hasty actions that occur without forethought or consideration of the potential consequences. This symptom can lead to significant challenges in decision-making, social interactions, and behavioural regulation. Impulsivity often leads to poor decision-making, as individuals with ADHD may act without thinking through the consequences. This can result in risky behaviours, such as engaging in dangerous activities, violating social norms, or making hasty decisions that lead to negative outcomes (Willcutt, 2022).

Interrupting Others: Individuals with ADHD may have difficulty waiting their turn in conversations, often interrupting others or speaking out of turn. This can lead to social difficulties, as peers and authority figures may perceive them as rude or disrespectful (Barkley, 2024). Impulsivity is also characterized by an inability to delay gratification. Individuals with ADHD may struggle to wait for rewards or benefits, leading to challenges in situations that

require patience and self-control, such as saving money or working towards long-term goals (American Psychiatric Association, 2023).

Emotional Reactivity: Impulsive individuals may also exhibit emotional reactivity, where they respond to situations with intense emotions, such as anger, frustration, or excitement, without considering the appropriateness of their reactions. This can lead to conflicts and difficulties in managing relationships (DuPaul and Stoner, 2014). Impulsivity can have far-reaching consequences, affecting academic performance, social relationships, and overall well-being. In educational settings, impulsive behavior can result in disciplinary actions, social isolation, and academic underachievement, further compounding the challenges faced by individuals with ADHD. The symptoms of inattention, hyperactivity, and impulsivity often coexist and interact in complex ways, leading to a wide range of challenges for individuals with ADHD. The combination of these symptoms can make it difficult for students to succeed in academic settings, maintain positive social relationships, and achieve their full potential. For example, a student who struggles with inattention may find it difficult to complete assignments, while hyperactivity may lead to disruptive behaviour in the classroom. Impulsivity may result in conflicts with peers or authority figures, further complicating the student's social and academic life. The interplay of these symptoms can create a cycle of frustration, low self-esteem, and academic underachievement, making early intervention and effective treatment crucial for supporting individuals with ADHD.

Modelling therapy

Modelling therapy is often referred to as observational learning or vicarious learning, is a structured behaviour modification technique in which an individual observes the behaviour of another person (the model), processes the action, and subsequently reproduces the observed behaviour (Bandura, 1986; Core, 2020). Rather than relying on direct instruction or physical

promptings alone, modeling therapy utilizes visual and behavioural demonstrations to teach adaptive behavioural responses, emotional regulation, and cognitive strategies (Miltenberger, 2016). Modeling therapy as a behavioural/cognitive-behavioural intervention where desired behaviours are demonstrated by a model and observed, retained, and reproduced by the students. The key component of modeling therapy are

Attention - The student must first attend to accurately perceive and observe the target behaviour (e.g., waiting for their turn to speak).

Retention - The students must symbolically encode and store the observed behaviour in memory through verbal or visual imagery.

Reproduction - The students translates symbolic representations into overt physical or cognitive actions, refining them through feedback and practice.

Motivation/Reinforcement - the students decision to perform the modeled behaviour depends on reinforcement—either direct reinforcement, vicarious reinforcement (seeing the model rewarded), or self-reinforcement.

In therapeutic and educational settings, modeling operates across several operational modes which includes

• Live Modeling - Involves direct, real-time demonstration of targeted behaviours by a counsellor, teacher, or peer. For instance, a teacher explicitly demonstrates taking a slow breath and raising a hand before speaking.

• Symbolic / Video Modeling - Involves the use of recorded media, illustrative literature, or digital content demonstrating individuals successfully performing desired behaviours.

• Participant Modeling - The client first observes the live model performing the target task, after which the model assists the client in performing the identical task until mastery is achieved without assistance (Kazdin, 2012).

• Cognitive Self-Instructional Modeling - The model explicitly speaks their thought processes aloud (think-aloud strategy) while tackling a task, demonstrating how to self-monitor, problem-solve, and maintain task adherence (Meichenbaum, 1977).

How Modeling Therapy Targets ADHD

Modeling therapy addresses executive functioning impairments by breaking abstract expectations into observable actions, Modeling provides visually clear, step-by-step procedures for task initiation and execution. Observing a model complete a complex worksheet sequentially helps the inattentive student structure their internal thinking process. By utilizing cognitive "think-aloud" modeling, the therapist demonstrates how to pause before reacting. When a model vocalizes phrases such as "I need to pause and check my work before turning it in," the ADHD student learns to internalize verbal self-regulators.

Instead of demanding complete physical stillness, modeling demonstrates acceptable alternative physical behaviours (e.g., using a silent fidget tool, squeezing a stress ball, or raising a hand silently for permission to move).

Impact of ADHD on Age

Attention-deficit/hyperactivity disorder (ADHD) is one of the widely recognized childhood disorders, have characteristic complications of inattention, hyperactivity, and impulsivity (American Psychiatric Association, 2000). The globally pooled prevalence for childhood ADHD is approximately 5.29% (Polanczyk et al., 2007). Historically, ADHD has been thought to be a disorder of childhood that, only rarely continues into adulthood (Spitzer et al., 1980). Though, the detailed studies published in the mid-1980 s documented that ADHD

not only prevails in a notable percentage of adult cases but in fact only in minor number of cases it is well adjusted in adulthood (Gittelman et al., 1985). It is now projected that nearly 4–5% of adults are suffering from ADHD (Montes et al., 2007, Kessler et al., 2006). ADHD symptoms can fluctuate with age, often decreasing in hyperactivity and impulsivity while inattentive symptoms may persist or even become more prominent in adulthood. While some individuals experience remission of symptoms, others continue to struggle with ADHD throughout their lives, facing challenges at work, home, and in relationships. Adult attention-deficit/hyperactivity disorder (ADHD) is a mental health disorder that includes a combination of persistent problems, such as difficulty paying attention, hyperactivity and impulsive behavior. Adult ADHD can lead to unstable relationships, poor work or school performance, low self-esteem, and other problems. Though it's called adult ADHD, symptoms start in early childhood and continue into adulthood. In some cases, ADHD is not recognized or diagnosed until the person is an adult. Adult ADHD symptoms may not be as clear as ADHD symptoms in children. In adults, hyperactivity may decrease, but struggles with impulsiveness, restlessness and difficulty paying attention may continue.

Treatment for adult ADHD is similar to treatment for childhood ADHD. Adult ADHD treatment includes medications, psychological counseling (psychotherapy) and treatment for any mental health conditions that occur along with ADHD. During adolescence, the challenges associated with ADHD can become more pronounced, particularly in the context of secondary education. Adolescents with ADHD may face increased academic demands, social pressures, and the need for greater self-regulation and independence. These challenges can lead to academic underachievement. Adolescents with ADHD often struggle to keep up with the academic demands of secondary school. They may have difficulty completing assignments, managing time, and preparing for exams, resulting in lower grades and a higher risk of school dropout. Social relationships become increasingly important during adolescence, but ADHD symptoms such as impulsivity and inattention can lead to peer rejection, social isolation, and

low self-esteem (Hoza, Gerdes, Mrug, Hinshaw, Bukowski, Gold and Wigal, 2005). Adolescents with ADHD may also be more susceptible to negative peer influences, increasing the risk of engaging in risky behaviours.

The stress and frustration associated with managing ADHD symptoms during adolescence can lead to emotional and behavioural issues, including increased irritability, mood swings, and oppositional behaviour. These issues can strain relationships with parents, teachers, and peers, further complicating the adolescent's social and academic experience (Sibley, Evans and Serpell, 2024).

Early Childhood:

Symptoms often peak in severity between ages 7 and 8. More severe cases are typically diagnosed earlier, with the median age of diagnosis being 4 years for severe ADHD. Children with ADHD may experience academic difficulties, low self-esteem, and social challenges.

Adolescence and Early Adulthood:

ADHD symptoms can persist into adolescence and adulthood, though hyperactivity and impulsivity may become less pronounced and Some individuals may experience increased severity of symptoms as the demands of adulthood increase. Adults with ADHD may struggle with focus, time management, impulsivity, and completing tasks.

Older Adulthood:

While the prevalence of ADHD might decrease in older adults, possibly due to underdiagnosis or improved coping mechanisms, symptoms can still persist and Common comorbidities in older adults with ADHD include mental health conditions like depression and anxiety. Social isolation, relationship difficulties, and challenges with medication adherence may also be present in this age group.

Factors Influencing ADHD Symptoms Across the Lifespan include; **Relative Age** -Being younger within a school cohort (relative age) can be associated with a higher risk of ADHD diagnosis, even when controlling for other factors. Individuals develop strategies to manage ADHD symptoms over time, which can help them cope with the challenges of daily life. ADHD may be undiagnosed or misdiagnosed in older adults, leading to a lack of appropriate support and interventions.

The transition from adolescence to adulthood is a critical period for individuals with ADHD. Many adolescents with ADHD continue to experience symptoms into adulthood, affecting their ability to succeed in higher education, secure employment, and establish independent lives (Biederman, Petty, Clarke, Lomedico, and Faraone, 2020). Early and effective intervention is essential to support adolescents with ADHD as they navigate this transition.

Sex and ADHD

Historically, ADHD was considered as male dominant disorder. The reason of which was the less diagnosis due to low number to cases as ADHD in females was overlooked due to high IQ of girls and were only presented when there were signs of anxiety or depression. Even with that, ADHD may be ignored (Taylor and Keltner, 2002). But in last 2 decades, there have been researches that shown ADHD is not a male dominant disorder but female also affected by it and even more in some cases. These researches challenged the old concepts that females with ADHD are not as affected as males with ADHD (Bauermeister, Shrout, Chávez, Rubio-Stipec, Ramírez, Padilla, Anderson, García and Canino, 2007; Huss, Hölling, Kurth, and Schlack, 2008). Studies have now credibly shown that females with ADHD struggle greatly compared with females without ADHD in every way including academic, cognitive, psychosocial, and psychiatric with comparable rates as males with ADHD (Hinshaw, 2002).

While Attention-Deficit/Hyperactivity Disorder (ADHD) can affect individuals of all sexs, there are some notable differences in how it manifests and is diagnosed in males and

females. In general, boys are more likely to be diagnosed with ADHD, particularly in childhood, due to a higher prevalence of disruptive, hyperactive, and impulsive behaviours. Girls, on the other hand, may be more likely to present with inattentive symptoms, which can be less noticeable and may lead to under-diagnosis or later diagnosis. Here's a more detailed look at the sex-based differences in ADHD.

Males:

Boys are more likely to be diagnosed with ADHD in childhood, with a ratio of 3:1 compared to girls. Boys with ADHD often exhibit more outward signs of hyperactivity and impulsivity, which can be more easily identified and lead to earlier diagnosis. Some studies suggest that boys with ADHD may be more likely to be diagnosed with externalizing disorders like conduct disorder or oppositional defiant disorder, potentially masking or delaying ADHD diagnosis.

Females:

Girls with ADHD may be underdiagnosed or diagnosed later in life, possibly due to less overt symptoms and a tendency for them to develop better coping mechanisms to manage their ADHD-related difficulties. Females are more likely to present with predominantly inattentive symptoms, which may be less disruptive and therefore less likely to lead to referral for evaluation. Girls with ADHD may experience higher rates of anxiety, depression, and other internalizing disorders. In some cases, ADHD symptoms in females may be mistaken for other conditions like anxiety or depression.

Despite these differences, it's important to remember that ADHD manifests differently in individuals, regardless of sex. Many women are not diagnosed with ADHD until adulthood, often after their children are diagnosed or after experiencing significant challenges in their personal or professional lives. Societal expectations and sex roles can influence how ADHD symptoms are perceived and recognized in both males and females. While ADHD is not

exclusively a male disorder, there are clear differences in how it is presented and diagnosed in males and females. Understanding these differences is crucial for early identification, accurate diagnosis, and effective treatment of ADHD in all individuals, regardless of sex.

The procedure to apply this treatment during the experiment, according to Ohanaka and Oladipo (2019) is as follows:

- Prepare a treatment manual containing the treatment and procedure
- Train assistants and school counsellor on modelling therapy. This involves exposing the assistants and counsellor to the necessary steps that will be employed for the experimental groups.
- Pre-treatment test (Pre-test): the pre-test session takes place on the first day and first week of the research. The purpose will be to carry out a pretest on the suspected ADHD students in other to identify 15 severe cases which will form our sample test. It will also act as the control experiment as it will be used as baseline for comparing the result of the post test to measure effectiveness of treatment.
- Treatment Programs: this is where the treatment will take place. Meaning the treatment will be applied firstly to the groups at different days in the same week (second week).
- Post treatment program (Post-test): this will take place after the students must have been exposed to the various treatments. They will then be post-tested and their results compared with the pre-test.

Theoretical Framework

A robust theoretical framework is essential for understanding the underlying mechanisms of ADHD and how interventions like Modelling Therapy may help in mitigating its symptoms. This study will review two key theories: **The Arousal Theory of ADHD** and **Behavioural Theory**. These theories provide insight into the cognitive and behavioural aspects of ADHD and support the rationale for using Modelling Therapy as a therapeutic intervention.

Arousal Theory of ADHD

Arousal Theory is one of the prominent neurobiological explanations for ADHD. This theory suggests that individuals with ADHD experience chronic under-arousal of the central nervous system, leading to the hallmark symptoms of the disorder, including inattention, hyperactivity, and impulsivity.

The Arousal Theory, grounded in the work of early psychologists such as Hans Eysenck and Donald Hebb, posits that arousal levels are crucial for optimal functioning. According to this theory, there is an optimal level of arousal for performance and attention, with both under-arousal and over-arousal leading to impaired functioning. In the context of ADHD, it is hypothesized that individuals have a baseline level of arousal that is lower than optimal, resulting in a compensatory increase in activity (hyperactivity) and a constant search for stimulation (impulsivity) to elevate their arousal levels to a more functional state (Faraone, Perlis, Doyle, Smoller, Goralnick, Holmgren and Sklar, 2015).

The under-arousal in ADHD is thought to be linked to deficits in the brain's dopaminergic and noradrenergic systems. These neurotransmitters play a critical role in regulating attention, executive function, and the ability to control impulses. The deficiency in these systems may lead to difficulties in sustaining attention on tasks, particularly those that are monotonous or do not provide immediate rewards (Nigg, 2022). Consequently, individuals with ADHD may engage in hyperactive or impulsive behaviors as a way to self-stimulate and increase their arousal levels.

Relation to Study

In applying this theory to the study, it can be noted that the Arousal Theory helps explain why individuals with ADHD exhibit symptoms such as: inattention, hyperactivity, and impulsivity. Due to the low arousal state, maintaining focus on a single task, especially one

that is not inherently stimulating, becomes challenging. The brain seeks out novel or more stimulating activities, leading to frequent task switching or difficulty staying on task (Pliszka, 2013). This explains why inattention ADHD patients find it difficulty paying attention to detail and why they often lose concentration leading to academic deficiency. This theory will help to guide this study when creating the modelling framework that will be employed during the treatment phase of this study. Understanding ADHD through the lens of the Arousal Theory suggests that interventions should focus on increasing arousal to optimal levels in a controlled manner.

Behavioural Theory

The behavioural theory was grounded in the work of behaviourists like B.F. Skinner and John Watson, posits that behaviour is learned and maintained through reinforcement and punishment. According to this theory, ADHD symptoms can be understood as learned behaviours that have been reinforced over time by environmental contingencies. For example, a child who is frequently rewarded with attention or escape from difficult tasks when they act out (hyperactivity or impulsivity) may learn to continue these behaviours as a way to achieve desired outcome (DuPaul and Stoner, 2024).

Behavioural theory also highlights the role of negative reinforcement in perpetuating ADHD behaviours. If a child finds a task aversive and is allowed to escape from it by engaging in disruptive behaviours, these behaviours are negatively reinforced. Over time, the child learns that acting out is an effective way to avoid unpleasant or challenging tasks, reinforcing the cycle of inattention, hyperactivity, and impulsivity.

Behavioural Theory provides insight into how ADHD symptoms are maintained and exacerbated through environmental interactions. Inattention may be reinforced if a child is allowed to avoid or escape tasks that they find boring or difficult. Over time, the child learns

that they can avoid these tasks by not paying attention, leading to a pattern of inattention that becomes ingrained (Faraone, et al, 2015).

Hyperactive behaviours may be reinforced if they result in positive outcomes, such as gaining attention from teachers or peers. For example, a child who fidgets or moves around the classroom may receive attention, which reinforces the behaviour (Hoza, 2017). Impulsive behaviours may be reinforced if they lead to immediate rewards or the avoidance of undesirable outcomes. For instance, a child who interrupts the teacher to get an answer quickly may find that this behaviour is reinforced by receiving immediate feedback or attention (DuPaul and Volpe, 2019).

Behavioural Theory suggests that effective treatment for ADHD should focus on modifying the environmental contingencies that reinforce maladaptive behaviours. Behavioural interventions, such as SDT, can be effective in reshaping these contingencies by introducing new, more adaptive behaviours and gradually extinguishing maladaptive ones. SDT, when applied within a behavioural framework, involves the gradual exposure to anxiety-provoking stimuli while teaching relaxation techniques to manage the physiological arousal associated with these stimuli. By reinforcing the use of relaxation techniques and providing positive reinforcement for sustained attention and appropriate behaviour, SDT can help reduce the frequency and intensity of ADHD symptoms. For example, a student who struggles with inattention during class may be gradually exposed to longer periods of focused academic work, with reinforcement provided for maintaining attention and using relaxation techniques to manage any associated anxiety or discomfort. Over time, this approach can help the student develop more adaptive behaviours, reducing the need for hyperactivity or impulsivity as coping mechanisms.

Thus, the Arousal Theory and Behavioural Theory provide complementary perspectives on ADHD, offering both neurobiological and environmental explanations for the symptoms of inattention, hyperactivity, and impulsivity. Together, these theories support the use of interventions like Systematic Desensitization Therapy, which addresses both the physiological underpinnings of ADHD and the learned behaviors that contribute to its persistence. By understanding the theoretical foundations of ADHD, practitioners can develop more targeted and effective treatment strategies to support students in managing their symptoms and achieving their full potential.

Empirical Review

Amaechi-Udogu and Opara (2024) investigated the effect of play therapy on school adjustment on attention deficit hyperactivity disorder (ADHD) pupils in Port Harcourt Metropolis, Rivers State. This study was guided by three research questions and three null hypotheses. Quasi-experimental research design within which; the Solomon four group design was employed. A purposive sampling technique was used to draw the sample for the study. A sample of 60 primary three pupils who met the criteria for ADHD were randomly assigned into the four groups which was made up of two experimental groups and two control groups. Two valid instruments titled: Conners' Rating Scales-Revised (CRS-R) for assessment of Attention Deficit Hyperactive Disorder and School Adjustment Scale (SAS) were used for collection of data in the study.

The validity of instruments was determined using both expert judgment and multivariate statistical method of factor analysis. To ensure the reliability of the instruments for internal consistency, Cronbach alpha was used and reliability coefficients of .78 and .510 were gotten for CRS-R and SAS respectively. Data obtained was analyzed using mean, standard deviation, dependent sample t-test, 2, Analysis of Covariance (ANCOVA) and using

One-way analysis of Variance (one-way ANOVA). The results revealed that play therapy (toy and object and role play techniques) is significantly effective in the improvement of school adjustment of attention deficit hyperactivity pupils.

DuPaul, Steven, Julie, Courtney, Kristen, Qiong and Kari (2021) noted in their study that Multi-component training interventions such as the Challenging Horizons Program (CHP) improve organization skills and academic functioning of middle school students with attention-deficit/hyperactivity disorder (ADHD); however, few studies have investigated treatment for high school students. Hence, their study explored the extent to which CHP adapted for high school would improve proximal (e.g., organization skills, homework performance) and distal (e.g., report card grades) academic outcomes through 6-month follow-up relative to a community care (CC) condition. Participants included 186 adolescents who were randomly assigned to CHP (n = 92; 80% male; M age = 15.0; SD = 0.8) or CC (n = 94; 78% male; M age = 15.1; SD = 0.9) with CHP delivered over one school year. Parent, teacher, and self-report ratings of organization skills and academic performance, report card grades, and achievement tests were collected across multiple occasions. Intent-to-treat analyses using hierarchical linear modeling revealed significant improvements of small to medium magnitude (d range = 0.32 to 0.58) for parent-rated organization skills, homework performance, and academic functioning at 6-month follow-up. CHP effect on grades was small, but associated with a less steep decline than that found for CC. No statistically significant effects on teacher or self-report ratings were obtained. CHP appears efficacious for ameliorating organization skills and homework performance deficits exhibited by high school students with ADHD and can protect against decline in report card grades experienced by these students. CHP may require supplementation with academic skills instruction for some students and may need implementation beyond one school year to produce durable effects.

Abdulaziz, Hesham, Mona, Naglaa and Abo-Eid (2024) in their study opined that Attention-Deficit/Hyperactivity Disorder (ADHD) is one of the most common neurodevelopmental conditions in children, and can profoundly affect their social interactions, well-being, and relationships with parents, peers, and teachers. Their study investigated the effectiveness of a social-play-based intervention programme in reducing ADHD symptoms in a sample of 67 Saudi boys aged 8–10 diagnosed with ADHD. The programme consisted of ten 60-minute sessions of play-based activities, delivered to the experimental group twice weekly for 5 weeks. The control group followed the usual school curriculum. Teachers and parents completed the Conners' Teacher Rating Scale–Revised: Short Form and Conners' Parent Rating Scale–Revised: Short Form for all participants at pre-test, post-test, and follow-up. The experimental group showed a significant reduction in ADHD-associated behavioural problems over time, with moderate to large effect sizes. No significant changes over time were found for the control group. The results were maintained at a 2-month follow-up. They then recommend incorporating social-play-based activities and skill training into the school context. Reducing ADHD symptoms may improve children's academic performance and perspective on school.

Nicolai, Borgen, Frønes and Raaum (2021) opined that although attention deficit hyperactivity disorder (ADHD) is among the most heritable psychiatric childhood disorders, social and gene–environment interactions seemingly play an important role in the etiology of ADHD. Consistent with this, the study finds that School-Wide Positive Behavioral Interventions and Supports (SWPBIS) reduced the likelihood of pharmacotherapeutic treatment for ADHD at age 14–16 by 12%, using population-wide Norwegian register data and a difference-in-difference design (N = 698,364, birth cohorts 1990–2002, 48.7% girls, 5.7% immigrant background). At-risk students in schools with high fidelity of implementation are driving these intervention effects. Overall, the findings indicate that children with a genetic

disposition for ADHD are more likely to avoid medical treatment in an organized and predictable school setting with a focus on positive reinforcement.

Kelly, Kelly and Taylor, (2024) were of the opinion that Attention-deficit/hyperactivity disorder (ADHD) is underrecognised and underdiagnosed in females. As a result, females often navigate years of symptoms without appropriate support, sometimes contributing to adverse outcomes for them and for those who try to support them. Their review describes the experience of females with ADHD and explores and explains the main challenges they face. The researchers distilled the most common themes expressed in the available literature on ADHD in females and used these to develop topic headings for a literature review. They then explored therapeutic options and identified future priorities for clinical research and development. The result of their review showed that the commonest issues identified and explored related to the following topics: emotional development, friendships and relationships, handling conflict, self-harm and suicidality, creativity and hyperfocus, hypersensitivity, cognition and coordination, physical, psychological, and psychiatric comorbidity, and the effects of masking. They specifically considered the implications for serious self-harm, conflict, and criminal conviction among ADHD females, and explored how these risks may be mitigated with treatment. *They therefore concluded that* Females with ADHD are both under-diagnosed and undersupported, despite the serious psychosocial consequences of this condition. Given that many of these carry potentially serious complications, recognition of these issues and the provision of appropriate support and intervention is of paramount importance if those who care for them professionally and/or personally are to respond effectively. Treatment mitigates adverse outcomes for many females with ADHD.

Danielson, Holbrook, Bitsko, Newsome, Charania, McCord, Kogan,. and Blumberg, (2022) provided state-level estimates of diagnosed ADHD and associated treatment among

children in the United States in 2016 to 2019. This study used the National Survey of Children's Health to produce national and state-level estimates of lifetime diagnosis and current ADHD among all children aged 3 to 17 years (*n*=114,476), and national and state-level estimates of medication and behavioral treatment use among children with current ADHD.

The state-level estimates of diagnosed ADHD ranged from 6.1% to 16.3%. Among children with current ADHD, state-level estimates of ADHD medication usage ranged from 37.8% to 81.4%, and state-level estimates of behavioral treatment ranged from 38.8% to 61.8%. There was substantial state-level variation for indicators of ADHD diagnosis and associated treatment. These state-level results can be used by policymakers, public health practitioners, health care providers, and other stakeholders to help address the service needs of children with ADHD in their states.

ADHD and Sex

Bramham, Murphy, Xenitidis, Asherson, Hopkin, and Young, (2012) noted in their study that the outcomes of attention deficit hyperactivity disorder (ADHD) have been studied extensively in the first decades of life, but less is known about ADHD in adulthood. Hence they investigated cross-sectional age-related differences in behavioural symptoms, neuropsychological function and severity of co-morbid disorders within a clinically referred adult ADHD population. They subdivided 439 referrals of individuals with ADHD (aged 16–50 years) into four groups based on decade of life and matched for childhood ADHD severity. And then compared the groups on measures of self- and informant-rated current behavioural ADHD symptoms, neuropsychological performance, and self-rated co-morbid mood and anxiety symptoms. Results show that there was a significant age-related reduction in the severity of all ADHD symptoms based on informant-ratings. In contrast, according to self-ratings, inattentive symptoms increased with age. Neuropsychological function improved across age groups on measures of selective attention and response inhibition. There was a mild

correlation between the severity of depression symptoms and increasing age. This observational study suggests that, in adulthood, ADHD symptoms as measured using informant-ratings and neuropsychological measures continue to improve with increasing age. However the subjective experience of people with ADHD is that their symptoms worsen. This dichotomy may be partially explained by the presence of co-morbid affective symptoms. The main limitation of the study was that it is cross-sectional rather than longitudinal, and the latter design would provide more conclusive evidence regarding age-related changes in an adult ADHD population.

Gershon and Gershon (2002) examined sex differences in ADHD through a meta-analysis. Effect size estimates for the primary symptoms and correlates of ADHD were calculated in an attempt to replicate and extend a previous meta-analysis on sex differences in the disorder. Relatively lenient inclusion criteria were used in order to maximize the number of studies included in the effect sizes. The results indicated that in comparison to ADHD boys, ADHD girls had lower ratings on hyperactivity, inattention, impulsivity, and externalizing problems. In addition, ADHD girls had greater intellectual impairments and more internalizing problems than ADHD boys. Overall, the results of the current meta-analysis indicated general agreement with the previous meta-analysis. The clinical implications of these sex differences and future research considerations are discussed.

Gaining insight into possible sex differences in the clinical presentation of adults with attention-deficit/hyperactivity disorder (ADHD) is of relevance in order to conduct appropriate screening and treatment interventions in both sexs.

The analyses of Cortese, Faraone, Bernardi, Wang and Blanco, (2016) compared (1) prevalence and socio-demographic correlates, (2) frequency of ADHD core symptoms, (3) rates of subtypes, (4) prevalence of comorbid mental health conditions, and (5) rates of risky/impulsive behaviours, as well as health and social correlates, in men and women with

ADHD in a nationally representative, US population–based sample. Face-to-face psychiatric interviews were conducted according to DSM-IV criteria in 34,653 adults from the US National Epidemiologic Survey on Alcohol and Related Conditions (Wave 2, 2004–2005). While the prevalence of lifetime ADHD was significantly higher in men than in women (OR= 1.46, 95% CI= 1.22–1.76), the rate of persistent ADHD did not significantly differ across sexs (OR= 1.23, 95% CI= 0.96–1.58). Compared to men with persistent ADHD, women with persistent ADHD, despite having lower rates of hyperactive symptoms, presented with similar ADHD subtypes profile and rates of risky behaviors (except for reckless driving), as well as with significantly more anxiety and perceived mental health impairment (P=. 032). Results were similar when considering lifetime ADHD. Findings show that, despite different symptom profiles and comorbidities, men and women have similar rates of current ADHD and of risky behaviors associated with the disorder. Women with ADHD should receive as much attention as their male counterparts.

Mowlem, Agnew-Blais, Taylor and Asherson, (2019) investigate if different factors influence whether girls versus boys meet diagnostic criteria for attention-deficit/hyperactivity disorder (ADHD) among children with high ADHD symptoms. Participants were 283 children aged 7–12 from a population-based study. Girls and boys meeting diagnostic criteria for ADHD, based on an objective investigator-based interview, were compared to children who did not meet criteria despite high symptoms on a rating-scale measure of ADHD. We assessed factors that could differentially relate to diagnosis across girls and boys including ADHD symptoms, co-occurring behavioural/emotional problems and impairment, and sex-effects in rater perceptions of ADHD symptoms. While overall similar factors distinguished girls and boys who met diagnostic criteria from high-symptom peers, effect sizes were larger in girls. Emotional problems were particularly salient to distinguishing diagnosed versus high-symptom girls but not boys. Parents rated boys meeting diagnostic criteria as more impaired

than high-symptom boys but did not do so for girls, and under-rated diagnosed girls' hyperactive/impulsive symptoms compared to more objective interview assessment, with the opposite observed in boys. Results suggest girls' ADHD may need to be made more prominent by additional behavioural/emotional problems for them to meet full diagnostic criteria and that sex differences in parental perceptions of ADHD behaviours and impairment exist.

Edvinsson, Lindström, Bingefors, Lewander and Ekselius, (2013) investigate sex differences in psychiatric comorbidity patients diagnosed with attention-deficit hyperactivity disorder (ADHD) as adults. Interviews about current ADHD symptoms and psychiatric comorbidity on axis I and II (Structured Clinical Interview for DSM-IV axis I and axis II) were conducted in a clinical cohort of 168 patients (78 women, 90 men). Independent information on childhood and current symptoms was collected from parents, partners and patient files. The lifetime prevalence of psychiatric comorbidity on axis I reached 92%, and current comorbidity, including autism spectrum disorders and Tourette's syndrome, was 47%. Women had a higher lifetime prevalence of mood and eating disorders compared with men, where substance-use disorders were more frequent. Ten per cent of patients fulfilled diagnostic criteria for a personality disorder. When excluding the general diagnostic criteria, 46% of the patients endorsed the specific criteria for at least one personality disorder. Sex differences were identified with predominance of histrionic personality traits in women and conduct disorder in men. It was therefore concluded that Patients diagnosed with ADHD as adults display an extremely high lifetime axis I comorbidity with a sex-specific pattern similar to the general population. No sex differences were identified with regard to personality disorders; however, an increased prevalence of deviant personality traits was confirmed. This study stresses the importance of evaluating comorbidity among patients diagnosed with ADHD as adults to secure optimal treatment.

Shaw, Stringaris, Nigg and Leibenluft, (2014) examine the current literature using both quantitative and qualitative methods. Three key findings emerge. First, emotion dysregulation is prevalent in ADHD throughout the lifespan and is a major contributor to impairment. Second, emotion dysregulation in ADHD may arise from deficits in orienting toward, recognizing, and/or allocating attention to emotional stimuli; these deficits implicate dysfunction within a striato-amygdalo-medial prefrontal cortical network. Third, while current treatments for ADHD often also ameliorate emotion dysregulation, a focus on this combination of symptoms refra questions and could stimulate novel therapeutic approaches. The authors then consider three models to explain the overlap between emotion dysregulation and ADHD: emotion dysregulation and ADHD are correlated but distinct dimensions; emotion dysregulation is a core diagnostic feature of ADHD; and the combination constitutes a nosological entity distinct from both ADHD and emotion dysregulation alone. The differing predictions from each model can guide research on the much-neglected population of patients with ADHD and emotion dysregulation.

Corbisiero, Mörstedt, Bitto and Stieglitz, (2017) noted in their study that Attention-deficit/hyperactivity disorder (ADHD) is characterized by inattention, hyperactivity, and impulsivity. However, this triad might not be able to explain the complete spectrum of ADHD symptoms, as emotional dysregulation (ED) frequently seems to accompany the disorder. Hence, the aim of their study was to further understand the role of ED in adult ADHD. To achieve this goal, their sample comprised 393 adults with ADHD without or with comorbidity, and 121 adults without ADHD or any other mental disorder. Additionally, the sample focused on ED. The contribution of core symptoms and the effect of comorbidity on ED were tested and the predictive value of ED for the ADHD diagnosis itself analyzed. Finally, all subjects were categorized into groups–No ADHD, ADHD, and ADHD + ED–to analyze the differences in the severity of ADHD symptomatology in the three groups. ED levels were found to be

elevated in patients with ADHD. The core symptoms affected ED, and the ADHD diagnosis was predicted by ED. The addition of ED to a regression model with the core symptoms was shown to improve the predictability of the ADHD diagnosis. The presence of ED proved to be an indicator of the severity of adult ADHD independent of a present comorbidity. They therefore concluded that ED is a significant symptom in adult patients with ADHD and appears to be associated with ADHD itself. Whilst the presence of other mental disorders intensifies symptoms of ED, ED seems not to manifest solely as a consequence of comorbidity.

Sciutto, Nolfi and Bluhm, (2024) investigated the effects of child sex and attention-deficit/hyperactivity disorder (ADHD) symptom type on elementary school teachers' referral decisions. Participants (N = 199) read a profile of a fictional child's academic record and rated the likelihood of referring the child for an evaluation. The profiles varied by the child's sex and the type of symptoms the child was exhibiting (inattention, hyperactivity, or hyperactivity plus aggression). Results indicated that teachers were more likely to refer boys than girls, regardless of symptom type, but that the largest sex difference in referrals was for children who exhibited hyperactivity without inattention or aggression. These results suggest that differences in teacher perceptions of boys' and girls' behaviors may contribute to sex differences in ADHD referrals.

The association of attention- deficit—hyperactivity disorder (ADHD) with bullying in the peer group in school was studied by Holmberg and Hjern (2008) in an entire population of 577 fourth graders (10- year- olds) in one municipality in Stockholm, Sweden. The schoolchildren were screened for ADHD in a two- step procedure that included Conners' ratings of behavioural problems: teacher and parent interviews in a first step; and a clinical assessment in the second. Information about bullying was collected from the children themselves in a classroom questionnaire. Five- hundred and sixteen children (89.4%; 252 females, 264 males), for whom there was information from all data sources, were included in

the study population. Conners' ratings that was collected from parents early in first grade was available for 382 of these children. Hypotheses were tested by multivariate analyses with adjustment for sex and parental education. Pervasive ADHD was diagnosed in 9.5% (95% confidence interval [CI] 5.6- 12.8) of the males and 1.6% (CI 0.1- 3.1) of the females. ADHD was associated with bullying other students (adjusted odds ratios (OR) 3.8 [CI 2.0- 7.2]) as well as being bullied (often, OR 10.8 [CI 4.0- 29.0]; sometimes, OR 2.9 [CI 1.5- 5.7]). Bullying other students in fourth grade was associated with high scores in parental reports of behavioural problems at entry into first grade, suggesting a causal link to the ADHD syndrome. Being bullied, on the other hand, was not linked to behavioural problems at school entry. This study demonstrates a connection between ADHD and bullying in the peer group at school. They concluded that Evaluation and treatment strategies for ADHD need to include assessment and effective interventions for bullying. And that Evaluation of ADHD should be considered in children involved in bullying.

The Objective of the study of Quinn and Madhoo (2014) was to describe the clinical presentation of attention-deficit/hyperactivity disorder (ADHD) in women and girls and factors influencing proper diagnosis and treatment. A PubMed search was conducted in April 9, 2012 for English-language publications from the previous 10 years. Search terms included attention deficit hyperactivity disorder, attention deficit/hyperactivity disorder, ADHD, and AD/HD combined with sex, girls, females, women, continuity, discontinuity, gap, treatment, untreated, and lack of treatment. A total of 41 articles were reviewed for relevance. Reference lists from relevant articles were reviewed for additional publications; sources known to the authors were also included. Results indicated that Attitudes about ADHD among individuals with ADHD and knowledgeable informants (families, teachers, colleagues) vary on the basis of the diagnosed individual's sex. The ADHD prevalence rates are higher among boys than girls. A low index of clinical suspicion exists for girls; their presentation is considered "subthreshold"

because inattentiveness is more prominent than hyperactivity/impulsivity. Females with ADHD may develop better coping strategies than males to mask their symptoms. Lastly, anxiety and depression, common comorbidities in female patients with ADHD, can lead to missed or misdiagnosis. If not properly diagnosed and treated, girls with ADHD experience the same negative consequences as boys, including poor academic performance and behavioral problems. Unique issues related to hormonal effects on ADHD expression and treatment response are also experienced by women and girls. It was therefore Conclusions that accurate ADHD diagnosis in women and girls requires establishing a symptom history and an understanding of its sex-specific presentation. Coexisting anxiety and depression are prominent in female patients with ADHD; satisfactory academic achievement should not rule out an ADHD diagnosis.

Attention-deficit hyperactivity disorder (ADHD) affects approximately 5% of children and adolescents globally and is associated with negative life outcomes and socioeconomic costs. First-generation ADHD treatments were predominantly pharmacological; however, increased understanding of biological, psychological, and environmental factors contributing to ADHD has expanded non-pharmacological treatment possibilities.

Therefore, the Review of Sibley, Bickman, Atkins, Tanana, Coxe, Ortiz, Martin, King, Monroy, Ponce, Cheng, Pace, Zhao, Chawla and Page, (2023) provided an updated evaluation of the efficacy and safety of non-pharmacological treatments for paediatric ADHD, discussing the quality and level of evidence for nine intervention categories. Unlike medication, no non-pharmacological treatments showed a consistent strong effect on ADHD symptoms. When considering broad outcomes (eg, impairment, caregiver stress, and behavioural improvement), multicomponent (cognitive) behaviour therapy joined medication as a primary ADHD treatment. With respect to secondary treatments, polyunsaturated fatty acids showed a consistent modest effect on ADHD symptoms when taken for at least 3 months. Additionally,

mindfulness and multinutrient supplementation with four or more ingredients showed modest efficacy on non-symptom outcomes. All other non-pharmacological treatments were safe; clinicians might tolerate their use but should educate families of childrenand adolescents with ADHD on the disadvantages, including costs, burden to the service user, absence of proven efficacy relative to other treatments, and delay of proven treatment.

ADHD and Age

Attention-deficit/hyperactivity disorder (ADHD) is a prevalent, chronic, and impairing mental health disorder of childhood. Decades of empirical research have established a strong evidence-based intervention armamentarium for ADHD; however, limitations exist in regards to efficacy and effectiveness of these interventions. Chacko, Merrill and Kofler, (2024) provide an overview of select evidence-based interventions for children and adolescents, highlighting potential approaches to further improving the efficacy and effectiveness of these interventions. They concluded with broader recommendations for interventions, including considerations to moderators and under-explored intervention target areas as well as avenues to improve access and availability of evidence-based interventions through leveraging underutilized workforces and leveraging technology.

Deng, Jonathan, Coleman, Mottershead, Ronald, Zavos and Kuntsi (2024), investigated this “relative age effect” on educational achievement at age 15 to 16 years and on ADHD symptoms from age 7 to age 21 years. Also, whether being young-in-class is linked to a greater reduction in ADHD symptoms from childhood to adulthood and a lower genetic propensity to ADHD. The researchers identified 3,928 young-in-class and 4,580 old-in-class participants from the Twins’ Early Development Study. Educational achievement was measured with mathematics and English examination grades at age 15 to 16 years, and ADHD symptoms were measured using 2 different scales and different raters, from age 7 to 21 years, with effects tested

using regression. Result indicated that a relative age effect emerged for English but not mathematics examination grades, and for the majority of parent and teacher ratings on ADHD symptoms, most consistently in middle childhood. Being young-in-class was associated with a greater reduction in parent-rated ADHD symptoms from childhood to adulthood when measured with a brief scale, but the comparable result from a longer scale was non-significant (after multiple testing correction). No interaction emerged between relative age and ADHD polygenic scores. The results emphasize the need to improve support for the children who start school younger than most, and to ensure that developmental comparisons take children's precise age into account. Future research would benefit from in-depth analyses of individual trajectories and their variability among the young-in-class children.

The study of Costa, Paula, Alvim-Soares, Diniz, Romano-Silva and Malloy-Diniz and Miranda (2014) aimed to assess mediation and moderation models that test possible pathways of influence between these factors. Sixty-two children with ADHD and 33 age-matched, typically developing students were evaluated with Raven's Colored Progressive Matrices and the spelling and arithmetic subtests of the Brazilian School Achievement Test. Dimensional ADHD symptomatology was reported by parents. Findings from this study suggest that fluid intelligence has a significant impact on academic tests through inattention. The inattentive dimension was the principal behavioral source of influence, also accounting for the association of hyperactive-impulsive manifestations with school achievement. This cognitive-to-behavioral influence path seems to be independent of diagnosis related group, and sex, but lower socioeconomic status might increase its strength. The researchers therefore concluded that Fluid intelligence is a relevant factor in the influence of ADHD behavioral symptoms on academic performance, but its impact is indirect. Therefore, early identification of both fluid intelligence and inattentive symptoms is of the utmost importance to prevent impaired academic performance and future difficulties in functioning. Emotional impulsiveness (EI)

may be a central feature of attention-deficit/hyperactivity disorder (ADHD) contributing impairment beyond the two ADHD dimensions of inattention and hyperactivity–impulsivity.

Barkley and Fischer (2010) evaluated EI in hyperactive (N = 135) and control (N = 75) children followed to adulthood (mean age 27 years). The hyperactive cases were subdivided into those individuals whose ADHD persisted (ADHD-P) and did not persist (ADHD-NP) to adulthood. they examined the additional contribution of EI apart from ADHD symptoms to global ratings of impairment in 10 major life activities, adverse occupational and educational outcomes, criminal and driving outcomes, and money management difficulties at ages 21 and 27. Result of evaluation showed that the ADHD-P group reported more EI symptoms than either the ADHD-NP or community control groups. EI uniquely contributed to seven of 10 major life domains and to overall impairment beyond ADHD symptoms. Severity of EI uniquely contributed to numerous impairments in occupational, educational, criminal, driving, and financial outcomes beyond ADHD symptoms. It was therefore concluded that EI is as much a component of ADHD as are its two traditional dimensions and is associated with impairments beyond those contributed by the two traditional dimensions.

Sibley, Bruton, Zhao, Johnstone, Mitchell, Hatsu, Arnold, Basu, Levy, Vyas, Macphee, Gonzalez, Kelley, Jusko, Bolden, Zulauf-McCurdy, Manzano, and Torres, (2023) opined that Implementation of behaviour therapy for ADHD faces challenges in community settings. They therefore describe development of a community-based implementation model for adolescent ADHD behaviour therapy (Supporting Teens' Autonomy Daily; STAND) blended with Motivational Interviewing (MI). A stakeholder-engaged development approach was used based on the Exploration, Preparation, Implementation, Sustainment (EPIS) framework. Resulting model features include: (a) task-shifting supervision from experts to agency supervisors, (b) holding bi-weekly technical assistance drop-ins to provide training and implementation supports, (c) MI integrity monitoring and feedback by artificial intelligence (AI), (d) AI-

generated metrics for STAND content fidelity, (e) digitizing resources (manual, worksheets, tips, videos) on a clinician dashboard, (f) creating visual displays of feedback using badges and graphs, and (g) adding a rapport-building session prior to manualized content. The authors conducted stakeholder focus groups (N = 32) and two pilot studies to evaluate the new STAND AI measurement tool and revised service-delivery model (N = 6 therapists, 7 youth and parents, 3 agency supervisors). Results revealed advantages and disadvantages of the model, supported the promise of a STAND AI fidelity measurement tool, and indicated initial feasibility, acceptability, and agency engagement in STAND's community-based implementation model. Future directions for continued iterative development and testing were discussed.

Holland and Sayal, (2019) noted that there is a growing international literature investigating the relationship between attention-deficit/hyperactivity disorder (ADHD) and younger relative age within the school year, but results have been mixed. There are no published systematic reviews on this topic. This study therefore aimed to systematically review the published studies on the relative age effect in ADHD. Systematic database searches of: Medline, Embase, PsycINFO, Web of Science, ERIC, Psychology and Behavioral Sciences Collection and The Cochrane Library were conducted. Studies were selected which investigated the relative age effect in ADHD in children and adolescents. Twenty papers were included in the review. Sixteen (of 20) papers reported a significantly higher proportion of relatively younger children being diagnosed with ADHD and/or receiving medication for this. Meta-analyses involving 17 of these 20 papers revealed a modest relative age effect in countries with higher prescribing rates, risk ratio = 1.27 (95% CI 1.19–1.35) for receipt of medication. The relative age effect is well demonstrated in countries with known higher prescribing rates. Amongst other countries, there is also increasing evidence for the relative age effect, however, there is high heterogeneity amongst studies. Further research is needed to understand the possible reasons under-pinning the relative age effect and to inform attempts to reduce it.

Salari, Ghasemi, Abdoli, Rahmani, Shiri, Hashmian, akbari and Mohammadi, (2023) opined that Attention-Deficit / Hyperactivity Disorder is a developmental neurological disorder that has three basic characteristics: Attention Deficit, Hyperactivity, and impulsivity. Their study aimed to investigate the prevalence of ADHD in children and adolescents. This investigation was carried out using the meta-analysis method under PRISMA guidelines. Until October 2020, the articles were gathered by scanning PubMed, Scopus, WOS, and Science Direct databases. The second version of Comprehensive Meta-Analysis software was used to run analyses after extracting data from chosen papers. At a significance level of 0.05, the I^2 test was used to analyze study heterogeneity, and the Egger test was used to assess publication bias. This analysis includes 61 cross-sectional research, with 53 research used to determine the prevalence of ADHD in children, 7.6% of 96,907 children aged 3 to 12 years had ADHD (95% confidence interval: 6.1–9.4%), and 5.6% of teenagers aged 12 to 18 years have ADHD (95% confidence interval: 4.8-7%). The prevalence of ADHD in children and adolescents according to the DSM-V criterion is also higher than previous diagnostic criteria, according to studies. The findings of this study based on meta-analysis show the high prevalence of attention deficit hyperactivity disorder (ADHD). The findings of this study demonstrate the importance of management and policy in the treatment and control of ADHD in children and adolescents.

Claire, Sean and Chunqiao, (2010) examine the relationship between ADHD medications, study habits, and academic achievement of ADHD-diagnosed undergraduates. A total of 92 students with a self-reported ADHD diagnosis and a current prescription for ADHD medication were compared with 143 control students in a survey of academic performance. Result showed that Most ADHD students took stimulant medication and said the drugs helped them, yet believed they were worse than other students at planning and completing assignments and avoiding distractions. Although most study habits of ADHD students did not differ from controls, their high school and college GPA (grade point average), and ACT scores were

significantly lower, and they withdrew from significantly more classes than did control students. Interestingly, preliminary data suggested that good study habits alone, even without stimulants, could overcome the achievement disparity of ADHD students. The researchers therefore concluded that as previously shown for children and adolescents, stimulant medications alone did not eliminate the academic achievement deficit of ADHD undergraduates.

Hoseini, Ajilian, Taghizadeh, Khademi and Saeidi, (2014) noted that Attention-deficit/hyperactivity disorder (ADHD) is a chronic condition that affects millions of children and often persists into adulthood. ADHD includes a combination of problems, such as difficulty sustaining attention, hyperactivity and impulsive behavior. ADHD is estimated to affect about 6 to 7 percent of people aged 18 and under when diagnosed via the DSM-IV criteria. Hyperkinetic disorder when diagnosed via the ICD-10 criteria give rates of between 1 to 2 percent in this age group. Children in North America appear to have a higher rate of ADHD than children in Africa and the Middle East - however, this may be due to differing methods of diagnosis used in different areas of the world. If the same diagnostic methods are used rates are more or less the same between countries.

Taanila, Tiihala, Kaakinen, Moilanen, Hurtig and Yliherva, (2014) investigated whether childhood specific learning difficulties (SLDs) predict later school performance in adolescents with ADHD symptoms (ADHDs) and how SLDs associate with educational aspirations. In the Northern Finland Birth Cohort 1986 (n = 9,432), data about children were collected using questionnaires for parents and teachers at ages 7 and 8 and for parents and adolescents at ages 15/16. Information on school performance was obtained from a national register. Result of analysis shows that the occurrence of SLDs at 8 years was 19.9% (n = 1,198), ADHDs at 15/16 years was 8.0% (n = 530), and comorbid ADHDs and SLDs was 3.0% (n = 179). Having ADHDs but not SLDs or having both was associated with a significantly lower

mean value in school grades for theoretical subjects. Adolescents with comorbid ADHDs and SLDs repeated a grade more often, and their educational aspirations were less ambitious than those in other groups. The researchers therefore concluded that ADHDs and SLDs have a negative influence on academic achievements

Merrell, Sayal, Tymms and Kasim, (2017) investigate the link between a continuum of inattention, hyperactivity and impulsivity at age five and academic attainment at age 11. The sample comprised 46,369 children from 1812 English primary schools. Methods employed where Reading and mathematics when starting school, Teachers rated behaviour at age five, English and mathematics were assessed at age 11. Result from analysis showed a substantive negative direct relationship between the severity of inattentive behaviour at age 5 and attainment at age 11. Hyperactivity was not significant but impulsivity was weakly but positively associated with attainment. These relationships applied across the whole range of behaviour scores. The researchers thus concluded that Investigation of the continuum of symptoms has important implications for the teachers; particularly for those children with mild inattention whose difficulties may go unnoticed.

DeLisi, Vaughn, Beaver, Wexler, Barth and Fletcher, (2011) explores characteristics that are associated with fledgling psychopathy and educational outcomes relating to reading comprehension performance in a community sample of 432 middle school students. Latent class analysis (LCA) produced a four-class solution. Class 1 was a large (71.5% of sample) ‘‘control’’ group of youths with no attention/hyperactivity deficits and the highest reading comprehension scores. Class 2 was 11.6% of the sample and was consistent with traits associated with attention deficit hyperactivity disorder (ADHD) predominantly inattentive type. Class 3 was 7.4% of the sample and was consistent with traits associated with ADHD predominantly hyperactive—impulsive type. Class 4 was 9.5% of the sample and was consistent with traits associated with ADHD combined type. Classes 2 and 4 were

characterized by elevated levels of psychopathic and callous-unemotional (CU) traits and lower educational performance. This study extends the utility of fledgling psychopathy to educational outcomes, which has broad implications for adolescent development, delinquency, and youth violence.

Daley and Birchwood, (2010) reviews the relationship between attention deficit hyperactivity disorder (ADHD) and academic performance. First, the relationship at different developmental stages is examined, focusing on pre- schoolers, children, adolescents and adults. Second, the review examines the factors underpinning the relationship between ADHD and academic underperformance: the literature suggests that it is the symptoms of ADHD and underlying cognitive deficits not co- morbid conduct problems that are at the root of academic impairment. The review concludes with an overview of the literature examining strategies that are directed towards remediating the academic impairment of individuals with ADHD.

Wu, and Gau, (2013) investigated school functioning among youths with and without persistent ADHD and identified the clinical correlates for school functioning in a large sample of 333 youths with persistent ADHD, 166 with non-persistent ADHD, and 266 without ADHD. The participants and their mothers received structured interviews for diagnosis of ADHD and other psychiatric conditions according to the DSM-IV diagnostic criteria by using the Kiddie epidemiologic version of the Schedule for Affective Disorders and Schizophrenia, and for school functioning by using the Chinese Social Adjustment Inventory for Children and Adolescents. The results showed that both ADHD groups had more impairment in all domains of school functioning than youths without ADHD with a gradient relationship in the order of persistent ADHD, non-persistent ADHD, and non-ADHD. The most consistent correlates for all domains of impaired school functioning were youth- and mother-reported inattention symptoms and increased age. Childhood hyperactivity–impulsivity symptoms also predicted more severe problems in social interactions and school behaviors. Psychiatric comorbid

conditions also predicted poorer attitudes toward school works and interactions at school. Our findings indicate that lifetime diagnosis of ADHD, regardless of persistence of ADHD, associate with the impairment of overall school functioning sustaining from childhood into adolescence, and imply that early intervention of childhood inattention may offset school dysfunction at late childhood and adolescence.

ADHD and Time Rate

Cedergren, Östlund, Åsberg, Billstedt and Johnson, (2022) stated that Documenting effectiveness of ADHD medication is essential throughout the course of treatment. A rating scale and a continuous performance test (CPT) with motion tracking were used to study the effect of ADHD medication including compliance during one year. Children ($N = 78$, age 6–18 years) with ADHD were tested with the QbTest at baseline, visit 1 (1 month after baseline) and visit 5 (12 months after baseline). The ADHD-Rating scale was rated by investigator interview at the same visits. QbTest results and ADHD-RS ratings showed reductions in symptoms on all cardinal parameters of the QbTest and on all ADHD-RS subscales between baseline and 1 month and between baseline and 12 months. There was a weak but significant correlation between the total change scores on the two measures from baseline to 1 month. Eighteen participants dropped out of the study before visit 5; at baseline, these children showed significantly lower results on the inattention parameter of the QbTest, with faster reaction time and lower variation in reaction time, suggesting they suffered less problems with inattention. Both the QbTest and the ADHD-RS showed robust ADHD symptom improvements indicative of medication effect, and the QbTest results might also predict non-compliance of medication. Further research is warranted to increase knowledge about reliable monitoring of long-term medication and compliance.

Michael, Mark, Dustin, Joseph, Sarah, Lauren and Ellen, (2013) noted that Individuals with ADHD are characterized as ubiquitously slower and more variable than their unaffected

peers, and increased reaction time (RT) variability is considered by many to reflect an etiologically important characteristic of ADHD. Their study therefore critically evaluates these claims through meta-analysis of 319 studies of RT variability in children, adolescents, and adults with ADHD relative to typically developing (TD) groups, clinical control groups, and themselves (subtype comparisons, treatment and motivation effects). Random effects models corrected for measurement unreliability and publication bias revealed that children/adolescents (Hedges' g=0.76) and adults (g=0.46) with ADHD demonstrated greater RT variability relative to TD groups. This increased variability was attenuated by psychostimulant treatment (g=−0.74), but unaffected by non-stimulant medical and psychosocial interventions. Individuals with ADHD did not evince slower processing speed (mean RT) after accounting for RT variability, whereas large magnitude RT variability deficits remained after accounting for mean RT. Adolescents and adults with ADHD were indistinguishable from clinical control groups, and children with ADHD were only minimally more variable than clinical control children (g=0.25). Collectively, results of the meta-analysis indicate that RT variability reflects a stable feature of ADHD and other clinical disorders that is robust to systematic differences across studies.

To determine which ADHD symptoms and subtypes have the strongest association, Rigoni, Blevins, Rettew and Kasehagen, (2020) employed type and frequency of symptoms on the 2014 National Survey of the Diagnosis and Treatment of ADHD and Tourette Syndrome (NS-DATA) to create symptom scores for inattention and hyperactivity-impulsivity and define subtypes (ADHD-Inattentive [ADHD-I], ADHD-Hyperactive-Impulsive, ADHD-Combined [ADHD-C]). Regression methods were used to examine associations between symptoms and subtype and a composite measure of school performance. Children with ADHD-C and ADHD-I had higher adjusted odds of having reduced overall school performance (ADHD-C = 5.8, 95% confidence interval [CI] = 3.1–10.9; ADHD-I = 5.5, 95% CI = 3.1–10.1) compared with

children without ADHD. All inattentive symptoms were significantly related to reduce school performance in reading, writing, and handwriting, while 6 of 9 symptoms were significantly associated in mathematics. Children with ADHD-I were significantly more likely than children with other ADHD subtypes to receive a school-based Individualized Education Program or 504 Plan. ADHD-I symptoms may be broadly linked to reduced school performance.

Barbaresi, Katusic, Colligan, Weaver and Jacobsen, (2007) compared long-term school outcomes (academic achievement in reading, absenteeism, grade retention, and school dropout) for children with attention-deficit/hyperactivity disorder (AD/HD) versus those without AD/HD. To achieve this, the researchers included 370 children with research-identified ADHD from a 1976–1982 population-based birth cohort (N= 5718) and 740 non-AD/HD control subjects from the same birth cohort, matched by sex and age. All subjects were retrospectively followed from birth until a median age of 18.4 years (AD/HD cases) or 18.3 years (non-AD/HD controls). The complete school record for each subject was reviewed to obtain information on reading achievement (last available California Achievement Test reading score), absenteeism (number/percentage of school days absent at each grade level), grade retention (having to repeat an entire grade in the subsequent school year), and school dropout (failure to graduate from high school). Results indicated that Median reading achievement scores at age 12.8 years (expressed as a national percentile) were significantly different for ADHD cases and non-ADHD controls (45 vs 73). Results were similar for both boys and girls with ADHD. Median percentages of days absent were statistically significantly higher for children with ADHD versus those without ADHD, although the difference was relatively small in absolute number of days absent. Subjects with ADHD were three times more likely to be retained a grade. Similarly, subjects with ADHD were 2.7 times more likely to drop out before high school graduation (22.9%) than non-AD/HD controls (10.0%). The results of this population-based

study clearly demonstrate the association between ADHD and poor long-term school outcomes.

ADHD and Sustainability

Watabe, Stewart, Owens, Andrew and Griffeth, (2013) In a pre–post design study, examined the effectiveness and sustainability of a school mental health program for youth with or at-risk for ADHD (n = 41) when implemented over the course of 4 years by district-employed school mental health professionals (SMHPs) in a rural community. In the program, children received a daily report card (DRC) intervention and teachers received behavioral consultation sessions twice a month. Parent and teacher ratings of symptoms and impairment were collected at pre-intervention (typically fall) and post-intervention (spring) of each academic year. According to parent ratings, children experienced significant improvement in academic functioning (effect size (*ES*) = .65) and overall functioning (*ES* = .57). Changes in parent-rated symptoms were in the expected direction, but small in magnitude (ranged from .22 to .32) and non-significant. Changes in teacher ratings of symptoms and impairment were non-significant. The *ESs* ranged from −.12 (self-esteem) to .42 (inattention). Results are discussed in the context of current efforts to disseminate treatments for youth with ADHD and disruptive behavior disorders.

Attention-Deficit Hyperactivity Disorder (ADHD) is a chronic neurobehavioral disorder characterized by persistent and often acute distractibility, hyperactivity, and impulsivity. It is a condition usually associated with children but in recent years the diagnosis of ADHD in adults has risen significantly. ADHD often coexists with a wide array of other psychiatric illnesses, including depression and bipolar disorder, thus complicating its assessment and management. In Attention-Deficit Hyperactivity Disorder in Adults and Children, a team of world renowned experts bring together the recent research in this area and cover the history, diagnosis, epidemiology, comorbidity, neuroimaging, and a full spectrum of

clinical options for the management of ADHD. The wide ranging, detailed coverage in this text will be of interest to psychiatrists, psychologists, social workers, coaches, physicians, or anyone who wants to develop a deeper understanding of the etiology, characteristics, developmental process, diagnostics, and range of treatment modalities.

Zafar, Shah and Malik, (2017) presents a review of 23 studies on BCI-based ADHD treatment; 15 contemporary studies from the years 1996 to 2015 along with 8 pioneer researches were analysed. Studies with participants from various age groups and ethnicities were also targeted in this review. Different BCI strategies that use Sensorimotor Rhythm, Theta/Beta ratio and Slow Cortical Potential as signal analysis protocols were observed. The results of the review were integrated and the relevance/forte and limitations were evaluated. Based upon the findings procured, the prospects of BCI systems for NF therapy as a treatment strategy for ADHD were explored.

Schultz, Evans, Langberg and Schoemann, (2017) conducted a large (N = 216) multisite clinical trial of the Challenging Horizons Program (CHP)—a yearlong after-school program that provides academic and interpersonal skills training for adolescents with attention-deficit/hyperactivity disorder (ADHD). Intent-to-treat (ITT) analyses suggest that, as predicted, the CHP resulted in significant reductions in problem behaviors and academic impairment when compared to community care. However, attendance in the CHP ranged from 0 to 60 sessions, raising questions about optimal dosing. To evaluate the impact of treatment compliance, complier average causal effect (CACE) modeling was used to compare participants who attended 80% or more of sessions to an estimate of outcomes for comparable control participants. Result showed that treatment compliers exhibited medium to large benefits (ds = 0.56 to 2.00) in organization, disruptive behaviors, homework performance, and grades relative to comparable control estimates, with results persisting six months after treatment ended. However, compliance had little impact on social skills. It was therefore concluded that

Students most in need of treatment were most likely to comply, resulting in significant benefits in relation to comparable control participants who experienced deteriorating outcomes over time. Difficulties relating to dose-response estimation and the potentially confounding influence of treatment acceptability, accessibility, and client motivation are discussed.

Wegner, Stiles, Jacobson, Rasmussen and Wegner, (2017) noted in their study that Adherence to practice guidelines for diagnosing and treating attention-deficit/hyperactivity disorder (ADHD) by primary care providers (PCPs) is important for optimizing care for many children and youth. However, adherence is often low. To address this problem, the researchers implemented an intensive intervention in 2009 aimed at improving diagnosis and management of ADHD among PCPs. The study objective is to assess the sustainability of intervention-attributable outcomes. The study aims are to assess the sustained effect of the intervention on PCP intentions to implement, attitudes toward, and obstacles to implement ADHD practice guidelines. During November 2009, 48 PCPs from 31 clinical practices completed a 3-day training, 6 months of biweekly telephone peer group reinforcement, and baseline questionnaires; follow-up questionnaires were completed at 12 months. To assess sustainability, the researchers tracked PCPs and administered the questionnaire in 2016. Results Intentions to implement ADHD guidelines remained stable over seven years, with all mean values ranging from "probably will" to "definitely will" implement guidelines. They therefore concluded that generally, favorable self-reported intentions, attitudes and obstacles to implementing ADHD guidelines were sustained seven years after the intensive training and follow-up intervention.

Rebecca, Fiona and John, (2022) carried out a systematic review to evaluate interventions to address poor adherence/persistence to ADHD pharmacotherapy, with the aim of guiding the development of future interventions. An extensive search was conducted from January 1980 until January 2021. Thirteen studies were identified involving interventions

based on psycho-education, behavioural therapy, combined psychoeducation/behavioural therapy, technology-based interventions, written informed consent and a nursing support line. All 13 studies (including five RCTs) reported improvement in adherence/persistence and five studies (including four RCTs) also reported improvement in ADHD symptomatology. Almost all studies involved interventions utilising some form of education. Three RCTs of psychoeducation alone were included, with two of the three studies reporting adherence benefits at three and 12 months respectively. The third RCT was terminated early due to poor recruitment. A behavioural intervention RCT reported improved adherence six months post intervention (but not at 12 months), although a substantial drop-out rate was observed. A final included RCT used a Smartphone Application and reported a short term increase in adherence. The authors of the studies in this review make salient attempts at improving adherence and provide insight for future intervention development. We believe future interventions should involve combinations of strategies, have a theoretical framework and target the most common reasons for non-adherence. Interventions should also be integratable into routine care and include patient input to maximise sustainability.

Other Related Study

Álvarez-Godos, Ferreira and María-José (2023) in their study opined that University students with Attention Deficit Hyperactivity Disorder (ADHD) need to have a range of actions at their disposal that are tailored to their needs. The aim of this study therefore was to analyse the actions of support for university students with ADHD by means of a systematic review of ERIC, WOS, and Scopus from 2017 to 2022, following the PICOC and PRISMA guidelines. A sample of 24 studies are analysed through the MAXQDA 2022 software. The results show two types of studies, on the one hand, supporting actions offered directly by universities to their students and, on the other, intervention programs from which university students have benefit but outside the university settings. Concerning the first type, universities mainly offer

accommodations linked to exams, tutoring and online courses adapted to ADHD students. About the second type, programmes focused on cognitive-behavioural therapy, coaching and mindfulness have proven to be useful with ADHD university students. They therefore noted that, further research is needed to analyze the viability of including these intervention programs for ADHD students at universities.

Abikwi and Egbochuku, (2007) investigated the prevalence of attention deficit hyperactivity disorder (ADHD) among pupils in primary schools in Benin City, Edo State through a teacher questionnaire. Three selected public schools were drawn purposively from schools in Benin City, Edo State. The pupils were selected from primary one to six, and the age range was between 5 to 12 years (mean age was 9.13yrs). The instrument used was the Disruptive Behaviour Disorder rating scale. Six research questions were generated and the statistical tool used was percentages. Four hundred pupils were sampled, 94 (23.15%) were screened as having symptoms of ADHD of which 45 (47.87%) had the Hyperactivity type, 20 (21.28%) had the Inattention type and 29 (30.85%) had ADHD combined type. The result confirmed that pupils in primary schools suffer more from ADHD hyperactivity type than inattention and the combined type. The sex ratio for ADHD combined type and Inattention type is about 2:1, while hyperactivity is about 1:1. Sex difference was found to vary across ADHD type. Boys being generally rated as more impaired in the combined with a prevalence of 21 (8.90%) but equally or less impaired with hyperactivity-impulsive subtype 28 (11.86%) and 9 (3.81%) in the inattention group. These findings suggest that there is a prevalence of ADHD in Edo State.

Adewuya and Famuyiwa, (2007) aimed to determine the prevalence of ADHD and co-morbid conditions in a sample of primary school children aged 7-12 years in Nigeria. A two-staged procedure in which primary school pupils aged 6-12 years (n = 1112) were assessed for DSM-IV criteria of attention deficit hyperactivity disorder (ADHD) by their teachers in the

first stage and their parents in the second stage. A flexible criterion was used for estimating the prevalence. The prevalence of ADHD was 8.7%. The prevalence of the subtypes were: predominantly Inattentive 4.9%, predominantly hyperactive/impulsive 1.2% and combined 2.6%. The male to female ratio was 2:1 for all the subtypes of ADHD except hyperactive/impulsive which was 3.2:1. The co-morbid conditions include oppositional defiant disorder (ODD - 25.8%), conduct disorder (CD - 9.3%) and anxiety/depression (20.6%). While ODD and CD were associated with the hyperactive/impulsive subtype, anxiety/depression was associated with inattentive subtype. The findings support the notion that ADHD occurs across cultures. Given the prevalent rate, efforts should be made to map out strategies for early identification and referral of these children for proper evaluation and treatment. This study can serve as a platform for future analytical studies about this challenging research issue in sub-Saharan Africa.

Abikwi and Egbochuku, (2022) assessed Educators experience in the Management of Attention Deficit Hyperactivity Disorder (ADHD) among Children in Edo State, Nigeria. The study is a quasi-experimental design. The purpose of the study is to assess Educators' experience in the management of ADHD among children in Edo State; the populations of the study are Educators in primary schools in Edo State. 140 Educators were selected from two out of 18 Local government Areas, to go through the training for 6weeks. In this study one hypothesis was formulated: There is no significant difference in the levels of experience of Educators in the post treatment knowledge in the management of ADHD. The Modified - Knowledge of Attention Deficit Hyperactivity Disorder (M-KADHD) questionnaire modified by the researchers was used for the study and was administered to the participants at the beginning. They were grouped into 2 equal groups: control and experimental. Each group had 70 participants respectively. Only the experimental group received the behaviour modification treatment which lasted for 6 weeks. The analysis of covariance for the effect of level of

experience of Educators showed .166 as the F-ratio with df = (139). This was not significant at p>.05. The null hypothesis was retained. The result showed there was no significant difference in the management of ADHD based on the level of experience of Educators. It was recommended that for proper management Pupils who manifest ADHD symptoms of inattention, hyperactivity/impulsivity Educations should be trained irrespective of the years of teaching experience. Educators' should manage these children by breaking assignments into smaller units and give reward accordingly

The study of Adler, Kunz, Chua, Rotrosen and Resnick, (2004) examined the association between PTSD and ADHD using retrospective and current clinical evaluations. Twenty-five male veterans with PTSD and 22 male veterans with panic disorder were evaluated for ADHD. The data was analyzed using chi-square and student's *t*-tests. Thirty-six percent of participants with PTSD and 9% of participants with panic disorder met criteria for childhood ADHD. Twenty-eight percent of participants with PTSD and 5% of participants with panic disorder met criteria for current ADHD. There appears to be a significant association of PTSD with ADHD. ADHD or common predisposing factors may increase the vulnerability for developing PTSD

Tourjman, Louis-Nascan, Ahmed, DuBow, Côté, Daly, Daoud, Espinet, Flood, Gagnier-Marandola, Gignac, Graziosi, Mansuri and Sadek, (2022) opined in their study that Multiple psychosocial interventions to treat ADHD symptoms have been developed and empirically tested. However, no clear recommendations exist regarding the utilization of these interventions for treating core ADHD symptoms across different populations. The objective of their study was therefore a systematic review and meta-analysis by the CADDRA Guidelines work Group was to generate such recommendations, using recent evidence. Randomized controlled trials (RCT) and meta-analyses (MA) from 2010 to 13 February 2020 were searched in PubMed, PsycINFO, EMBASE, EBM Reviews and CINAHL. Studies of populations with

significant levels of comorbidities were excluded. Thirty-one studies were included in the qualitative synthesis (22 RCT, 9 MA) and 24 studies (19 RCT, 5 MA) were included in the quantitative synthesis. Using three-level meta-analyses to pool results of multiple observations from each RCT, as well as four-level meta-analyses to pool results from multiples outcomes and multiple studies of each MA, we generated recommendations using the GRADE approach for: Cognitive Behavioral Therapy; Physical Exercise and Mind–Body intervention; Caregiver intervention; School-based and Executive intervention; and other interventions for core ADHD symptoms across Preschooler, Child, Adolescent and Adult populations. The evidence supports a recommendation for Cognitive Behavioral Therapy for adults and Caregiver intervention for Children, but not for preschoolers. There were not enough data to provide recommendations for the other types of psychosocial interventions. Our results are in line with previous meta-analytic assessments; however, they provide a more in-depth assessment of the effect of psychosocial intervention on core ADHD symptoms.

Lopez, Torrente, Ciapponi, Lischinsky, Cetkovich-Bakmas, Rojas, Romano and Manes, (2018) noted in their study that Attention Deficit Hyperactivity Disorder (ADHD) is a developmental condition characterised by symptoms of inattention, hyperactivity and impulsivity, along with deficits in executive function, emotional regulation and motivation. That the persistence of ADHD in adulthood is a serious clinical problem. ADHD significantly affects social interactions, study and employment performance. Previous studies suggest that cognitive- behavioural therapy (CBT) could be effective in treating adults with ADHD, especially when combined with pharmacological treatment. CBT aims to change the thoughts and behaviours that reinforce harmful effects of the disorder by teaching people techniques to control the core symptoms. CBT also aims to help people cope with emotions, such as anxiety and depression, and to improve self- esteem. Hence, the objective of their study was to assess the effects of cognitive- behavioral- based therapy for ADHD in adults. CENTRAL,

MEDLINE, Embase, seven other databases and three trials registries, reference lists, hand searched congress abstracts, and contacted experts and researchers in the field were searched within the period 2017. Randomized controlled trials (RCTs) evaluating any form of CBT for adults with ADHD, either as a monotherapy or in conjunction with another treatment, versus one of the following: unspecific control conditions (comprising supportive psychotherapies, no treatment or waiting list) or other specific interventions were employed. Standard methodological procedures suggested by Cochrane as method for data collection and analysis. 14 RCTs (700 participants), 13 of which were conducted in the northern hemisphere and 1 in Australia were included in the study. It was therefore concluded that there is low- quality evidence that cognitive- behavioural- based treatments may be beneficial for treating adults with ADHD in the short term. Reductions in core symptoms of ADHD were fairly consistent across the different comparisons: in CBT plus pharmacotherapy versus pharmacotherapy alone and in CBT versus waiting list. There is low- quality evidence that CBT may also improve common secondary disturbances in adults with ADHD, such as depression and anxiety. However, the paucity of long- term follow- up data, the heterogeneous nature of the measured outcomes, and the limited geographical location (northern hemisphere and Australia) limit the generalizability of the results. None of the included studies reported severe adverse events, but five participants receiving different modalities of CBT described some type of adverse event, such as distress and anxiety.

Summary of Literature Review

The conceptual, theoretical and empirical underpinnings of this investigation were reviewed in this chapter. The conceptual framework linked the relationship between the independent varibles (Modelling therapy) and the dependent variables (ADHD) namely: inattention, age, sex, sustainability. Literatures of concepts relating to these variables that define them were reviewed. Theories such as the **Arousal Theory of ADHD** and **Behavioural**

theory were critically reviewed in the theoretical framework section of this chapter. The empirical review was where we detailed all the work that was done by researchers in this field and other related fields that relates to the objective of this study.

However, it was observed from our study that there is limited work that has been done on the impact of modelling therapy on ADHD in relation to inattention. This is the gap this study is to fill in this research work.

CHAPTER THREE

METHODOLOGY

Introduction

This chapter presents the research design, the population, sample and sampling technique. The descriptions of the research instrument, validity and reliability of the instrument, and Procedures for data collection and analysis. These are as follows:

Research Design

This research will be carried out using the quasi experimental design namely time series experiment. The quasi-experimental design is a research methodology that lies between the rigor of a true experimental method (true experimental design includes random assignment to at least one control and one experimental/interventional group) (Hulley, 2013) and the flexibility of observational studies (Maciejewski, 2020). Quasi- experimental designs include the post-test-only design with a control group, one-group pretest-post-test design, and pretest-post-test with a control group (Gray, 2023; Harris AD, McGregor JC, Perencevich EN, Furuno JP, Zhu J, Peterson DE, and Finkelstein J, 2006). The pretest and post- test control group design will be used in the study for the purpose of controlling for internal and external threats to experimental validity.

Population of the Study

The target population for this study will comprise of 50 ADHD cases in a Anchor of hope school of Autism students in Benin City metropolis. To get the population of student with ADHD, the researcher will work with the school authority to get the student with characteristics similar to those with ADHD PATIENTS. The junior secondary school will be used because the cases of ADHD syndrome will be more pronounced at that level of secondary school education. The population in this research cut across sex and age group.

Sample and Sampling Techniques

The sample for the study will consist of purposive sampling technique of 15 junior secondary school students with ADHD syndrome from the target population. The 15 students will be selected from one (1) junior public secondary school with the largest student population. The junior secondary school employed in this study is the ANCHOR OF HOPE SCHOOL OF AUTISM LOCATED IN ETETE BENIN CITY. This school was chosen for this study because it is a school basically with children with special cases which includes ADHD syndromes. During the pretest phase, 15 students with ADHD will be identified and selected from the suspected student ADHD cases presented by the school authority making up the samples needed for the experiment. The choice of only one (1) school having the largest student population with ADHD out of the junior public schools in the district is a PURPOSIVE SAMPLING TECHNIQUES based on the need to reduce environmental threats to the experimental validity of the study and at the same time get enough students with ADHD syndrome for the study. Because time series experimental design does not employ control group, the 15 students will be exposed to the pre-test, treatment and post-test. This study makes use of the purposive sampling techniques.

Research Instrument

Effectiveness of Modeling Therapy on ADHD among Secondary School Adolescent Quantitative Schedule (EMTAQS)

A self-designed Effectiveness of Modeling Therapy on ADHD among Secondary School Adolescent Quantitative Schedule (**EMTAQS**) will be used as the research instrument to collect data for the study. This Quantitative Schedule will consist of Pre-test Quantitative Schedule and Post-test Quantitative Schedule.

Table 1: EMTAQS Research Instrument for Pre-Test

Game	Week1		Week 2		Week 3	
	Points	**Scores**	**Points**	**Scores**	**Points**	**Scores**
Tell a story and five questions maximum time 20mins	5					
Monopoly Games maximum time 10mins	20					
Participants are asked to solve five problems (BODMAS). Maximum time 20 mins.	20					
Participants are asked to solve five organizational problems (Jigsaw puzzle/ pseudo game). Maximum time 20mins.	20					
Spelling games	20					
Total	20					

Table 2: EMTAQS Research Instrument for Post-test

Game	Week1		Week 2		Week 3	
	Points	**Scores**	**Points**	**Scores**	**Points**	**Scores**
Tell a story and five questions maximum time 20mins	5					
Monopoly Games maximum time 10mins	20					
Participants are asked to solve five problems (BODMAS). Maximum time 20 mins.	20					
Participants are asked to solve five organizational problems (Jigsaw puzzle/ pseudo game). Maximum time 20mins.	20					
Spelling games	20					
Total	20					

Table 3: EMTAQS Research Instrument for Post-test

Attention Deficit Hyperactive disorder Game Model Therapy (ADGAT)

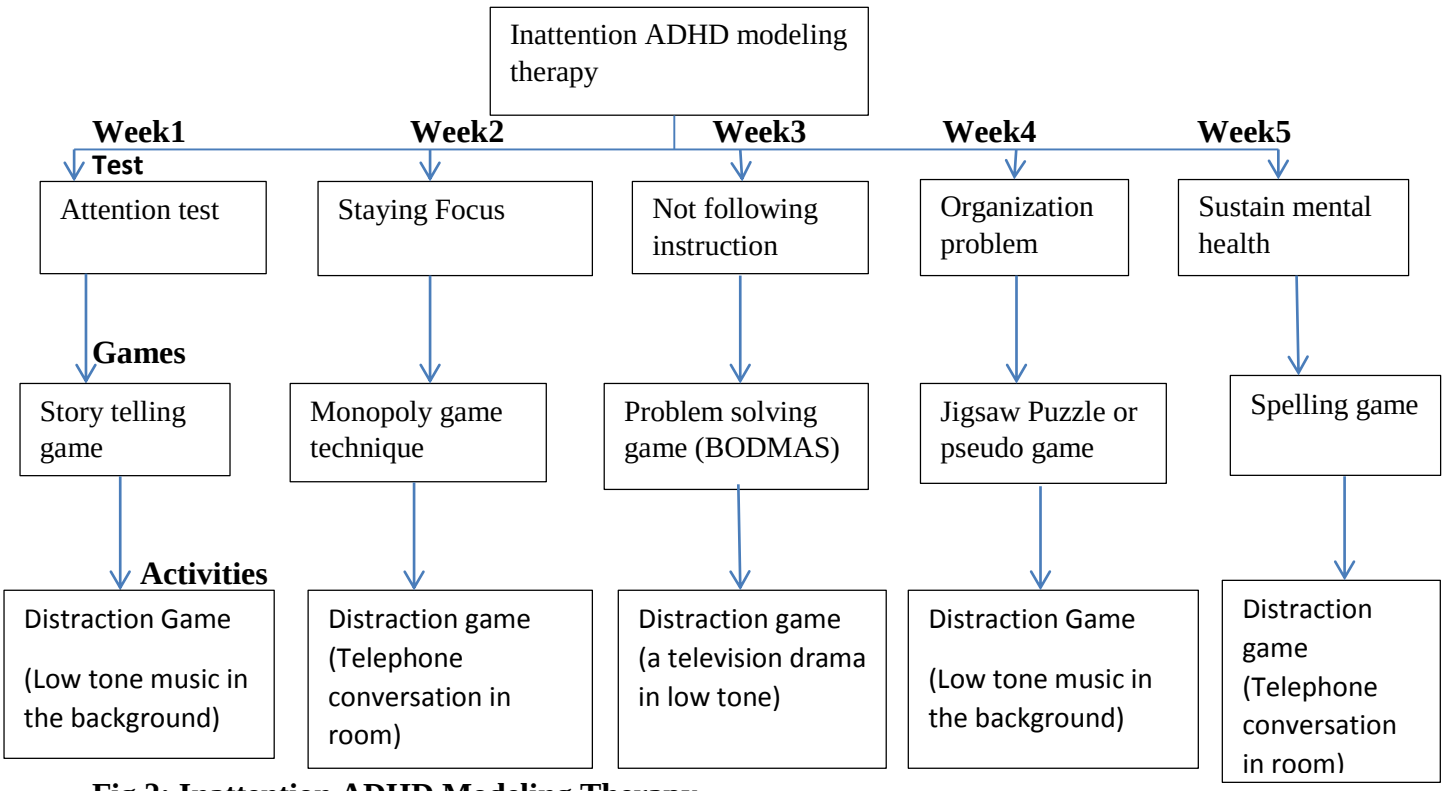


Fig 2: Inattention ADHD Modeling Therapy

Experimental Procedures

The procedures to be used for the treatment will be divided into three phases' that is pre-treatment phase, treatment phase and post treatment phase.

Pretreatment Phase

This is the first stage of the treatment procedure. It is the stage where base line data will be collected.

One week before the commencement of the treatment the researcher will administer the pre-test instrument to the respondents in order to ensure the accuracy of the sample selected. The base line data collected will be scored and kept to serve as pre- test and will later be used to compare with the post test score for inference to be drawn on the effect of the treatment on students. The pre-test will be carried out for three (3) weeks.

Treatment Phase

This is the second phase of the experiment which involved the use of modeling therapy approach on the experimental group (sample size). These respondents will be exposed to the different therapy contained in the model. Treatment will last for five (5) weeks.

Post treatment Phase

Post treatment phase is the third in the experimental procedure. In this phase data will be collected by re-administering the instrument after 2 weeks of the treatment. The data collected for the second administration (Post-test) will be compared with that of the Pre-test in order to determine the effect and sustainability of the therapy on inattentive ADHD. The post-test will last for three (3) weeks.

Table 3: EMTAQS Treatment

Game	Week1	Week2	Week3	Week4	Week5
Tell a story and five questions in each	How lion became king of the animals	The portrait of a liar	Generation of mad people	Akpomedaya the rejected stone	Zuru the warrior queen
Participants are asked to solve five problems (BODMAS). One for each day.	Involving Plus(+) and minus(-).	Involving Plus(+), minus(-), and multiplication(x)	Involving Plus(+), minus(-) and division(÷)	Involving Plus(+), minus(-), multiplication(x) and division(÷)	Involving Plus(+), minus(-), multiplication(x) bracket( ) and division(÷)
Participants are asked to solve five organizational problems (Jigsaw/ pseudo game). One for each day	Jigsaw	Jigsaw/pseudo	Jigsaw/pseudo	Jigsaw/pseudo	Jigsaw/pseudo
Spelling game	2 words This These	4 words Dog Run	6 words Bike Shoe	8 words 1. Apple 2. Orange	10 words 1. Family 2. Pencil

		Jump House	Friend Paper Door Ruler	3. Mango 4. Fruits 5. Tree 6. Road 7. Root 8. Book	3. Banana 4. Library 5. Teacher 6. Football 7. Uncle 8. Father 9. Mother 10. Brother

The chart above shows the modeling therapy that will be employed in this study. The therapy is a game technique that is introduced to the student patients with a bid to helping them modify their inattentive behavior so as to overcome the inattentive syndrome that they face via modification. The therapy will last for duration of 5 weeks, once a week; whereby the patients will be exposed to series of educational games that will test their inattention, level of focus, organization and sustainability.

The goal of this therapy is to measure how well the inattention of the patient will be overcome through positive behavioral modification using these game techniques. Each session will involve gaming routine that addresses and relates to the different characteristics or features of inattentive ADHD. Each session will end with a series of distraction test that will be used to rate level of modification using our quantitative scale rater.

The intensity of the game will change with every session or week. The goal is that, at the end of the therapy, the patients would have been able to adjust his/her behavior positively implying that the therapy did achieve its goal of helping adolescent overcome inattention ADHD.

The games that will be employed in this therapy are:

- Story Telling Games – Week 1
- Monopoly Games – Week 2
- BODMAS Games - Week 3
- Jigsaw Games / Pseudo Games – Week 4
- Spelling Game – Week 5

These games are intended to modify their levels of attention and sustainability over time, which is the overall goal of inattentive ADHD therapy. While these games are going on, distraction factors will be introduced at the end of each therapy to test level of concentration. A time keeper will measure the time each participant's attention is distracted by the distraction trick. The time a participant is successfully distracted represent his or her attention span.

This is a novel treatment therapy that makes use of behavioral modification therapy for the treatment of Inattention ADHD in adolescents.

Controlling for Environmental Differences

To control for environmental differences, the researcher shall employ pre-test to ascertain the baseline levels and subject the data sets to ANOVA statistical analysis to control for possible differences. Also, the experiment will be carried out in a particular school. To ensure a better time series experimental test, the treatment will be carried out in a repeated sequence.

Treatment Procedure for This Study

1. Meet with the school to help us identify 50 cases of junior secondary school with ADHD
2. Next we meet with the students. This time we will interact with them and in the process, we will take record of the most severe 15 cases which will make up the experimental group (sample size). The experimental group will be our concern as they are the once that we will be directly applying our treatment. There will be no control group due to the type of experimental research that we are carrying out. Time series experimental design does not allow for control group but experimental group treated over a successive interval.

3. We will then perform a pre-test on each of the participants to identify their level of ADHD and then take record based on the time rate and sustainability. This treatment will be in three (3) stages lasting 3 weeks.
4. The next stage is to administer our treatment on participants. The treatment will be in five stages, each stage been on a different day. The students will not be aware of the treatment plan or the essence so as to avoid pretense, resistance and bias.
5. The treatment procedure will involve introducing the experimental patients to a distracting factor to test their level of patience, concentration and how far they can handle their impulse. During the cause of the five stages, the treatment routine change from less-complex to more complex. While record will be taken in relation to our instrument of data collection.
6. At the end of the last stage, a post test will be done to determine how much impacts the treatment have impacted the patients. And then the record will then be used to compare that of the pre-test. 3 stages carried out on 3 different weeks.

Validation of the Instrument

The research instrument was validated by three expert. Two in measurement and evaluation and one from guidance and counseling all in the department of Education, Benson Idahosa University, Benin City, who checked and ascertained its face, content, and construct validity in relation to the research objective for the study. After a rigorous criticism and technical considerations relating to the appropriateness of the items and clarity of the language, the suggestions of the experts were effected in the final copy of the instrument. Then, the instrument was administered to 6 students. Three with ADHD syndrome and three normal students after a pretest has been carried out to identify the three students with ADHD. The mean score of the ADHD students was considerable lower than the mean score of the normal students. This implied that the instrument had discriminant construct validity.

Reliability of the instrument

The pilot testing was carried out for the purpose of establishing inter-rater reliability coefficient of the instrument. The researcher and his assistant used the instrument to rate 5 JSS1 inattentive ADHD students who are not part of the sample. The research assistant was trained on the use of the instrument by the researcher before the pilot study. The two data sets (pre-test and post-test) were subjected to PPMC analysis. This yielded a coefficient of 0.87 for Effectiveness of Modeling Therapy on inattentive ADHD among Secondary School Adolescent Qantitative Schedule (**EMTAQS**). The reliability index was adequate and consistent with Creswell (2002), recommendation of 0.70 and above.

Method of Data Collection

The researcher will collect a letter of introduction from department of Educational, Benson Idahosa University Benin city, containing the explanation regarding the nature and purpose of the study, to the management of the school seeking permission to conduct the research in the schools. After granting permission, the researcher will go to the school and contact the principals/school managements for discussion on the conduct of the research. Once granted, the researcher request for students with possible cases of ADHD and then carry out a series of pre-test on the students in other to select 15 students with inattention ADHD in JSS1. 15 students with severe cases will be selected to make up the sample size. These students will be subjected to three pretests, 5 treatments and three post-test.

Method of Data Analyses

The data obtained will be subjected to statistical analysis using descriptive statistics namely: mean and Standard Deviation to answer the Research Questions (RQs). Analysis of Variance (ANOVA) will be used to test the hypothesis and compare the 6 set of data.

If the H_0 is rejected and the Pro-Hoc analysis shall be set up to assess individual set differences. The decision rule is that if the three post test score are greater than the pre test scores at 0.05

Alpha level, the null hypotheses for the individual pair will be rejected. Secondly, if the null hypotheses on the pair of the three post-test scores at 0.05 alpha level is retained then the sustainability of the treatment is affirmed.

CHAPTER FOUR

ANALYSIS OF DATA PRESENTATION OF RESULTS

In this chapter the summary of the analysis of the data collected from the sample of respondents drawn from the area of study is presented. The results are presented in relation to the research questions and the hypotheses stated in chapter one. These are as follows:

Research Question 1

What is the level of performance of the sample of respondents selected from ADHD students before exposure to modelling therapy in Anchor of Hope school of Autism Benin city?

The descriptive analysis of the level of performance of the sample of respondents selected from ADHD students before exposure to modelling therapy at secondary school in Benin City Edo State is presented in table 1

Table 1: The Mean Performance of the Sample of Respondents Selected from ADHD Students in the Pre -Test on the Five Major Items in the Research Instrument

SN	ITEM	N	Point	WK1 mean	WK2 mean	WK3 mean	Grand Mean	Percent	Remark
1	Five questions on a story comprehension in 20minutes	14	05	1.14	1.36	1.29	1.26	25%	Poor
2	Monopoly games in 10 minutes	14	20	0.93	1.00	1.21	1.05	5%	Poor
3	Five problems in BODMAS 20 minutes	14	20	0.79	1.21	1.14	1.05	5%	Poor
4	Five Jigsaw puzzle/pseudo games in 20 minutes	14	20	1.29	1.29	1.25	1.29	6%	Poor
5	Spelling games	14	20	0.86	0.46	0.71	0.81	4%	Poor
	Aggregate	14	85	5.01	5.32	5.60	5.31	6%	poor

Key: WK =Week

Table 1 showed that the grand mean performances of the students on five major items on the research instrument namely comprehension, monopoly game, BODMAS, Jigsaw/pseudo games and spelling games are 1.26, 1.05, 1.05, 1.29, and 0.81 respectively. The percentage performances in the five major items used in the study are 25%, 5%, 5%, 6% and 4%

respectively. The aggregate mean performance is 5.31 representing 6% of the total points. These show that the performances of the students are poor in all the five items. These poor performances are proof of the fact that the students lack the ability to concentrate which is a prerequisite ability to navigate the above test items in the study. This evidence is a predominant characteristic of ADHD syndrome

Research Question 2

What is the level of the effectiveness of modeling therapy on the sample of respondents selected from ADHD students at Anchor of Hope school of Autism Benin city?

The F – ratio (ANOVA) analysis of the difference between the pre –test and the post- test performances of ADHD students who were exposed to four weeks of modeling therapy is presented in table 2

Table 2: Descriptive Statistics of the Pre –Test and the Post- Test Performances of ADHD Students Exposed to Four Weeks of Modeling Therapy in Time Series Experimental Study

Stage	Test	N	SD	Mean	Mean diff	Percent	Remark
	Pre – test 1	14	3.361	05.01	Nil	Nil	Base value
Stage 1	Pre – test 2	14	2.307	05.32	0.31	6.2%	Low
	Pre – test 3	14	2.766	05.60	0.28	5.3%	Low
	Post – test 1	14	12.654	32.500	26.90	480%	V. High
Stage 2	Post – test 2	14	11.654	34.143	1.643	5.1%	Low
	Post – test 3	14	11.783	48.071	13.928	40.8%	Low

Table 2 statistics showed that the mean difference in stage 1 between the pre –test 1 and the pre-test 2 scores is 0.31 while the mean difference between pre – test 2 and pre – test 3 is 0.28. In stage 2 the mean difference between pre –test 3 and post – test 1 scores is 26.90 and the mean difference between port –test 1 and post –test 2 is 1.643 while the mean difference between post – test 2 and post- test 3 is 13.928. The percentage mean differences in stage 1 are 6.2 % and 5.3% respectively. The percentage mean differences in stage 2 are 480%, 5.1% and 40.8% respectively. The very high percentage difference in stage 2 between pre- test 3 and post – test

1 scores of 480% relative to 6.2% and 5.3% in stage 1 indicates that modeling therapy was extremely impactful. The low percentages of 5.1% and 40.8% of stage 2 after the surge (480 %) is evidence of internal validity rather than the effect of extraneous factor outside the intervention

Research Question 3

What is the level of the effectiveness of modeling therapy on ADHD students based on sex?

The analysis of the F –ratio (ANOVA) Statistics of the pre – test and post –test scores of ADHD students exposed to modelling therapy based on sex is presented in table 3

Table 3: The Analysis of the Descriptive Statistics of the Pre – Test and Post –Test Scores of ADHD **Students Exposed to Modeling Therapy Based on Sex**

Sex	Test	N	Mean	SD	Mean diff	Percent	Remark
Female	Pre-test	7	14.8571	6.69399	-97.00000	652.9%	V. High
	Post - test	7	111.8571	33.47351			
Male	Pre -test	7	17.0000	9.55685	-105.14286*	618.5%	V. High
	Post-test	7	122.1429	36.34753			

Table 2 showed that the pre – test and post – test mean performances of female ADHD students who were exposed to modeling therapy are 14.86 and 111.86 respectively while that of their male counterparts are 17 and 122.14 respectively. The mean differences between the pre –test and post–test of the female and male students are -97.00000 and -105.14286 respectively. The percentage mean differences for both are 652.9% and 618.5% respectively. These percentage mean differences are considered very high respectively.

Research Question 4

What is the level of the effectiveness of modeling therapy on ADHD students based on age?

The analysis of the F –ratio (ANOVA) Statistics of the pre – test and post –test scores of ADHD students exposed to modeling therapy based on age is presented in table 4

Table 4: The F – Ratio (ANOVA) Statistics of the Pre – Test and Post –Test Scores of ADHD Students Exposed to Modeling Therapy Based on Age

Age	Test	N	Mean	SD	Mean diff	Percent	Remark
9 - 11	Pre-test	10	18.4000	8.16769	107.7	585.3%	V. High
	Post-test	10	126.1000	29.80846			
12 - 13	Pre -test	4	9.7500	2.50000	85.25	874.4%	V. High
	Post-test	4	95.0000	35.63706			

Table 4 statistics showed that the differences between pre – test and post – test mean performances of ADHD students between the ages of 9 -11 and 12 -13 who were exposed to modeling therapy are 107.7 and 85.25 respectively The percentage mean differences for the students in the two age groups are 585.3% and 874.4% respectively. These percentage mean differences are considered very high respectively.

Research Question 5

What is the level of sustainability of the effect of modeling therapy on ADHD students?

The descriptive statistics of four post –test scores of ADHD students in six weeks after the modeling therapy is presented in table 3

Table 2: Descriptive Statistics of the Sustainability of the Effect of Modeling Therapy on ADHD Students Post - Tested Four Times in six Weeks

Post -Test	N	SD	Mean	Weekly diff	Percent diff	Cumulative percent	Remark
Post-test 1	14	3.361	32.500	Nil	Nil	Nil	Based level
Post-test 2	14	2.766	34.143	1.643	5.1%	5.1%	Low
Post-test 3	14	11.783	48.071	13.928	40.8%	45.9%	Low
Post-test 4	14	8.113	54.143	6.072	12.63%	58.53%	Moderate

Scale = 85 points

Table 5 statistics showed that the four mean values of ADHD students' post – test scored over eighty five points in six weeks are 32.500, 34.143, 48.071, 54.143 in order of occurrence. The last test was taken on the sixth week which was two weeks after the previous test. At the sixth week the

mean difference dropped to 6.072 representing 12.63% a reduction in the effect of the therapy. However the cumulative mean at the 6th week (58.53) was still higher than the effect of the first week (32.5) by 26.03 representing 80% progress. This means that the effect was not only sustained it was progressive by the sixth week

The Summary of the Test of Hypotheses

The Summary of the test of hypotheses is presented as follows:

Hypothesis 1

There is no significant difference between the **performances of the ADHD students in the three weeks of Pre- tests**

The F- ratio **(ANOVA)** test for the differences between the performances of ADHD students in the three weeks of pre – tests on items in the research instrument is presented in table 6

Table 6: F- ratio (ANOVA) Test for the differences between the Academic Performances of ADHD **Students in the Three Weeks of Pre-Tests**

Source of variation	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	12.133	2	6.067	.645	.542
Within Groups	112.800	12	9.400		
Total	124.933	14			

Table 6 statistics showed that the between groups and within groups sum of squares are 12.133 and 112.800 respectively. The degrees of freedom for both are 2 and 12 respectively. The mean values of the sum of squares for both variations are 6.067 and 9.400 respectively. The F – ratio between the two values is .645 which is significant at .542 probability level. Therefore the null hypothesis is retained at 0.05 alpha level. Thus there is no significant difference between the three pre –test mean scores before the students were exposed to the modeling therapy. The implication is that the base values for the experiment are reliable

Hypothesis 2

The modeling therapy is not significantly effective in reducing the ADHD syndrome among junior secondary school adolescents

The Paired sample t -test for the difference between the combined pre – test scores and combined post - test scores of ADHD students exposed to modeling therapy in a time series experimental study is presented in table 7

Table 7: Paired Sample t -test for the differences between the Combined Pre – test Scores and Combined Post – Test Scores of ADHD Students Exposed to Modeling Therapy in a Time Series Experimental Study

Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (1-tailed)	Decision
-98.78571	27.03894	7.22646	-13.670	13	.000	Reject Ho

Table 6 statistics showed that the mean difference between the two groups is -98.79. The standard deviation is 27.04.. The t –value is -13.6 while the degree of freedom is 13. The t –value is significant at .000 probability level. Thus the mean value of the three post –test scores are significantly greater than the scores of the three pre –test scores. The implication is that modeling therapy is significantly effective for reducing ADHD syndrome among junior secondary school students

Hypothesis 3

There is no significant difference in the effect of Modeling Therapy on ADHD Students based on sex

The F test and the post hoc analysis for the difference between Pre – test and Post – test Scores of ADHD Students exposed to Modeling Therapy in a time series experimental study based on sex is presented in table 8

Table 8: F - Ratio Test and Post Hoc Analysis for the differences between the Pre – test and Post – Test Scores of ADHD Students Exposed to Modeling Therapy in a Time Series Experimental Study Based on Sex

Source of Variation	Sum of Squares	df	Mean Square	F	Sig.	Decision	Multiple comparison	Diff	Sig
Between Groups	71894.393	3	23964.798	37.187	.000	Reject Ho	1 - 2.00	-97.00000*	.001
Within Groups	15466.571	24	644.440				1 - 3.00	-2.14286	.998
Total	87360.964	27					2 - 4.00	-10.28571	.995
							3 - 4.00	-105.14286*	.001

Key: 1 = Female pre-test, 2 = Female post-test, 3 = Male pre -test, 4 = male post –test

Table 8 statistics showed that the sum of squares between groups and within groups are 71894.393 and 15466.571 respectively. The mean squares for between and within groups are 23964.798 and 644.440 respectively with F value of 37.187 which is significant at .000 probability level. Therefore the null hypothesis is Rejected at 0.05 alpha level. Thus there is significant difference between the performances of ADHD Students Exposed to Modeling Therapy in a Time Series Experimental Study based on sex. The post hoc multiple comparison showed that both the female and male students benefited equally and significantly because their pretests are not significantly different while their posttests were also not significantly different meanwhile their posttests were significantly greater than their pretest scores The implication is that the effect of modeling therapy has equal significant impact in the treatment of male and female ADHD students in junior secondary school

Hypothesis 4

There is no significant difference in the effect of Modeling Therapy on ADHD Students based on age

The F test for the difference between Pre – test and Post – Test Scores of ADHD Students Exposed to Modeling Therapy in a Time Series Experimental Study based on age is presented in table 9

Table 9: F - Ratio (ANOVA) Test and Post Hoc Analysis for the differences between the Pre – test and Post – Test Scores of ADHD Students Exposed to Modeling Therapy in a Time Series Experimental Study Based on Age

Source of Variation	Sum of Squares	df	Mean Square	F	Sig.	Decision	Multiple comparison	Diff	Sig
Between Groups	74788.807	3	24929.602	48.150	.000	Reject Ho	1 - 2.00	-107.7000*	.000
Within Groups	12426.050	24	517.752				1 - 3.00	8.65000	.064
Total	87214.857	27					2 - 4.00	31.1000	.709
							3 - 4.00	-85.25000	.098

Key: 1 = Pre-test for 9 -11, 2 = Post-test for 9 -11, 3 = Pre-test for 12 -13, 4= Post-test for 12 -13,

Table 7 statistics showed that the sum of squares between groups and within groups are 74788.807 and 12426.050 respectively. The mean squares for between and within groups are 24929.602 and 517.752 respectively with F value of 48.150 which is significant at .000 probability level. Therefore the null

hypothesis is rejected at 0.05 alpha level. Thus there is significant difference between the performances of ADHD Students Exposed to Modeling Therapy in a Time Series Experimental Study based on age. The pot hoc analysis showed that the posttest scores of students between 9 -11 are significantly greater than their pretest scores while the posttest scores of the students between 12 -13 are not significantly greater than their pretest scores, meanwhile the pretest scores of both age groups are not significantly different. The implication is that the modeling therapy has significant differential effect on ADHD students based on age while it is effective on those between 9 – 11 it does not have significant impact on the older students between 12 -13

Hypothesis 5

The effect of Modeling Therapy on ADHD Students is not sustainable overtime

The F -test and the pot hoc analysis for the difference between Post – test Scores in six weeks of ADHD Students Exposed to Modeling Therapy in a Time Series Experimental Study is presented in table 10

Table 10: F - Ratio (ANOVA) Test Post Hoc Analysis for the differences between Four Post – Test Scores in Six Weeks of ADHD Students Exposed to Modeling Therapy

Variable	Sum of Squares	df	Mean Square	F	Sig.	Decision	Multiple comparison	Diff	Sig
Between Groups	4705.571	3	1568.524	12.533	.000	Reject Ho	1 -2.00	-1.64286	1.000
Within Groups	6507.857	52	125.151				1 - 3.00	-15.57143*	.014
Total	11213.429	55					1 - 4.00	-21.64286*	.000
							2 - 3.00	-13.92857*	.025
							2- 4.00	-20.00000*	.000
							3 - 4.00	-6.07143	.554

Key: 1 = Post test1, 2 = Post-test 2, 3 = Post –test3, 4= Post-test 4

Table 10 statistics showed that the sum of squares between groups and within groups are 4705.57 and 6507.86 respectively. The mean squares for between and within groups are 1568.52 and 125.15 respectively with F value of 12.53 which is significant at .000 probability level. Therefore the null hypothesis is rejected at 0.05 alpha level. Thus there is significant difference between the performances of ADHD students exposed to Modeling Therapy in a time series experimental study based on time. The post hoc analysis showed that the posttest mean scores increased progressively to the

last test. All of them except the second and the last one were significantly greater than the previous levels. Implication is that the effect of modeling therapy is significantly sustainable in the treatment of ADHD students in junior secondary school

Summary of Findings

1. The percentage performances of the ADHD students in the five major items used in the study are 25%, 5%, 5%, 6% and 4% respectively. These show that the performances of the students are poor in all the five items. These poor performances are proof of the fact that the students lack the ability to concentrate which is a prerequisite ability to navigate the test items in the study. This evidence is a predominant characteristic of ADHD syndrome. There was no significant difference between the three pre –test mean scores before the students were exposed to the modeling therapy. The implication is that the base values for the experiment were reliable
2. The percentage mean differences in stage 2 in the time series experimental study were 480%, 5.1% and 40.8% respectively. The very high percentage difference in stage 2 between pre- test 3 and post – test 1 score of 480% relative to 6.2% and 5.3% in the previous stage indicates that modeling therapy was extremely impactful. The low percentages of 5.1% and 40.8% of stage 2 after the surge (480 %) is evidence of internal validity rather than the effect of extraneous factor outside the intervention. The mean value of the three post –test scores were significantly greater than that of the three pre –test scores. The implication is that modeling therapy is significantly effective for reducing ADHD syndrome among junior secondary school students
3. The pre – test and post – test mean performances of female ADHD students who were exposed to modeling therapy are 14.86 and 111.86 respectively while that of their male counterparts are 17 and 122.14 respectively. The mean differences between the pre –test and

post –test of the female and male students are -97.00000 and -105.14286 respectively. The percentage mean differences for both are 652.9% and 618.5% respectively. These percentage mean differences are considered very high respectively. There is significant difference between the performances of ADHD Students Exposed to Modeling Therapy in a Time Series Experimental Study based on sex. The post hoc multiple comparison showed that both the female and male students benefited equally and significantly because their pretests were not significantly different while their posttests were also not significantly different meanwhile their posttests were significantly greater than their pretest scores The implication is that the effect of modeling therapy has equal significant impact in the treatment of male and female ADHD students in junior secondary school

4. The differences between pre – test and post – test mean performances of ADHD students between the ages of 9 -11 and 12 -13 who were exposed to modeling therapy are 107.7 and 85.25 respectively. The percentage mean differences for the students in the two age groups are 585.3% and 874.4% respectively. These percentage mean differences are considered very high respectively. Thus, there was significant difference between the performances of ADHD Students Exposed to Modeling Therapy in a Time Series Experimental Study based on age. The pot hoc analysis showed that the post-test scores of students between 9 -11 are significantly greater than their pretest scores while the post-test scores of the students between 12 - 13 were not significantly greater than their pretest scores, meanwhile the pretest scores of both age groups were not significantly different. The implication is that the modeling therapy has significant differential effect on ADHD students based on age while it is effective on those between 9 – 11 it does not have significant impact on the older students between 12 -13.
5. The four mean values of ADHD students' post – test scored over eighty five points in six weeks were 32.500, 34.143, 48.071, 54.143 in order of occurrence. The last test was taken on

the sixth week which was two weeks after the previous test. At the sixth week the mean difference dropped to 6.072 representing 12.63% a reduction in the effect of the therapy. However the cumulative mean at the 6th week (58.53) was still higher than the effect of the first week (32.5) by 26.03 representing 80% progress. This means that the effect was still sustained by the sixth week. There was significant difference between the performances of ADHD students exposed to Modeling Therapy in a time series experimental study based on time. The post hoc analysis showed that the posttest mean scores increased progressively to the last test. All of them except the second and the last one were significantly greater than the previous levels. Implication is that the effect of modeling therapy is significantly sustainable in the treatment of ADHD students in junior secondary school

Discussion of Results

The findings generally align with and expand upon the existing empirical literature, particularly regarding the effectiveness of modeling therapy on ADHD, sex differences in presentation and outcomes, and the sustainability of treatment effects.

1. **Initial Performance (Research Question 1 & Hypothesis 1)**

Findings: The ADHD students demonstrated poor performance across all five pre-test items (aggregate mean 5.31 out of 85, or 6%), confirming a lack of concentration characteristic of ADHD. The non-significant difference across the three pre-tests confirmed the reliability of the baseline values.

Academic Impairment: The review consistently links ADHD to impaired academic performance and deficits. Daley and Birchwood (2010), Barbaresi (2007), Taanila (2014), and Anderson (2010) all confirm that ADHD is associated with lower grades, poor school performance, and difficulties like reduced reading achievement and higher

school dropout rates. The baseline data (6% aggregate score) provides concrete evidence of this academic deficit in the study's sample.

Inattention: The low scores on tasks requiring concentration (like story comprehension and BODMAS) align with the emphasis on inattention as a key factor in academic underperformance (Rigoni, 2020; Wu & Gau, 2013; Merrell, 2017).

2. **Effectiveness of Modeling Therapy (Research Question 2 & Hypothesis 2)**

Findings: Modeling therapy was significantly effective in improving performance, with a very high percentage difference (480%) between the last pre-test and the first post-test. The post-test scores were significantly greater than the pre-test scores, leading to the rejection of the null hypothesis.

Efficacy of modeling therapy on ADHD: the finding of this study strongly supports the efficacy of behavioral and multi-component modeling therapy for ADHD.

Modeling/Behavioral Therapy: modeling therapy aligns conceptually with the Cognitive Behavior Therapy (CBT), play therapy, and multi-component training programs reviewed. Dupaul. (2021) showed the Challenging Horizons Program (CHP) improved organization skills and homework performance in adolescents, echoing the improvements seen in the multi-item test battery.

Play Therapy: Amaechi-Udogu & Opara (2024) and Alothman. (2024) found that play therapy was significantly effective in improving school adjustment and reducing ADHD symptoms, supporting the use of a focused and modelling based approach.

Magnitude of Effect: The 480% increase was observed, indicates a dramatic, immediate impact, which aligns with the literature showing that effective interventions can yield small to large effect sizes (Dupaul, 2021: d range \text{= 0.32 to 0.58}; Alothman, 2024: moderate to large effect sizes).

3. **Effect by Sex (Research Question 3 & Hypothesis 3)**

Findings: Both male and female students showed a very high percentage increase in performance (Female: 652.9%; Male: 618.5%). Statistical analysis (ANOVA and post-hoc) showed no significant difference in the effect of the therapy based on sex, implying modeling therapy has an equal significant impact on both male and female ADHD students.

Sex Differences in Presentation vs. Treatment Response: The review highlights that ADHD presents differently in females, often with less hyperactivity and more internalizing symptoms (Gershon & Gershon, 2002; Cortese, 2016; Quinn & Madhoo, 2014; Mowlem, 2019). This often leads to under-diagnosis and under-support for girls (Kelly, 2024).

Novel Contribution: the study offers a valuable, specific finding that modeling therapy works equally well for both sexs, despite these known differences in presentation and diagnostic bias. This suggests that while girls might be under-recognized, once identified and treated, the therapy's impact can be as strong as it is for boys.

4. **Effect by Age (Research Question 4 & Hypothesis 4)**

Findings: Both age groups showed a very high percentage increase (9–11 years: 585.3%; 12–13 years: 874.4%). However, the post-hoc analysis revealed a significant differential effect, the therapy was significantly effective for the 9–11 age group but did not have a significant impact on the older 12–13 age group.

Age and Intervention Efficacy: This finding aligns with the general challenge of treating older adolescents and adults. While Dupaul. (2021) adapted CHP for high schoolers, they noted it may require supplementation or longer implementation to produce durable effects, suggesting treatment becomes more complex with age.

The literature suggests that some ADHD symptoms (hyperactivity, impulsivity) may naturally improve with age, while others (inattention, comorbidity) may worsen or persist (Bramham, 2012). The study data suggests that the specific modeling therapy employed was less able to induce significant change in the older group (12-13 years), possibly due to greater entrenchment of behavioural patterns or the emergence of more complex co-existing condition typical of older adolescents (Barkley & Fischer, 2010; Edvinsson, 2013).

Relative Age Effect: The relative age effect (Deng, 2024; Holland & Sayal, 2019) focuses on the younger-in-class being misdiagnosed. The finding, however, points to an efficacy difference between two clinically diagnosed age groups, suggesting a true developmental moderator for the therapy's impact.

5. **Sustainability of Effect (Research Question 5 & Hypothesis 5)**

Findings: The effect of the therapy was significantly sustainable and progressive over six weeks, with the cumulative mean difference at the sixth week showing an 80% progress over the first post-test score. The null hypothesis of non-sustainability was rejected.

Treatment Maintenance: The sustainability of treatment effects is a critical, but often challenging, area in ADHD research. The finding of this study progressive sustainability is a strong result. This finding is in line with studies showing that treatment gains can be maintained over time. Alothman. (2024) found results from their social-play-based intervention were maintained at a 2-month follow-up. Schultz. (2017) found that benefits from the CHP program persisted six months after treatment ended for compliant participants. Watabe. (2013) showed significant improvement in parent-rated academic and overall functioning was sustained over the course of 4 years in a school-based program.

The progressive improvement you observed (Post-test 4 mean of 54.143 vs. Post-test 1 mean of 32.500) indicates that the skills learned through modeling therapy may continue to generalize and improve academic performance even after the structured intervention phase, which is a key goal of behavioral interventions.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

Summary

The study is to ascertain the Impact of Modelling Therapy on the level of ADHD among adolescent in Anchor of Hope School of Autism in Anchor of Hope school of Autism Benin city. Five research questions and five hypotheses were raised and tested to guide the study. These include;

1. What is the level of impact of Modelling Therapy on ADHD secondary school Adolescent in Anchor of Hope school of Autism Benin city?
2. What is the time rate of impact of Modelling Therapy on ADHD secondary school adolescent in Anchor of Hope school of Autism Benin city?
3. What is the level of impact of Modelling Therapy based on sex?
4. What is the level of impact of Modelling Therapy based on age?
5. What is the level of sustainability over time, of the impact of Modelling Therapy?

Hypothesis

1. The level of impact of Modelling Therapy is not significant.
2. There is no significant difference of the time rate of impact.
3. The level of impact based on sex is not significant.
4. The level of impact based on age is not significant.
5. The level of sustainability over time is not significant.

The design for this study was carried out using the quasi experimental design namely time series experiment. The population for this study comprised of ADHD students in Anchor of hope school Austim Benin city. Purposive sampling technique was adopted in selecting 15 participants from Anchor of Hope School of Autism in Benin City. The research instrument

used for this study was a self-designed Effectiveness of Modeling Therapy on ADHD among Secondary School Adolescent Quantitative Schedule (**EMTAQS**). The pilot testing was carried out for the purpose of establishing inter-rater reliability coefficient of the instrument. The data collected was analysis using descriptive statistics namely: mean and Standard Deviation to answer the Research Questions (RQs). Analysis of Variance (ANOVA) was used to test the hypothesis and compare the 6 set of data. The result obtained showed that;

1. The percentage performances of the ADHD students in the five major items used in the study are 25%, 5%, 5%, 6% and 4% respectively.
2. The percentage mean differences in stage 2 in the time series experimental study were 480%, 5.1% and 40.8% respectively.
3. The pre – test and post – test mean performances of female ADHD students who were exposed to modelling therapy are 14.86 and 111.86.
4. The differences between pre – test and post – test mean performances of ADHD students between the ages of 9 -11 and 12 -13 who were exposed to modeling therapy are 107.7 and 85.25.
5. The four mean values of ADHD students' post – test scored over eighty five points in six weeks were 32.500, 34.143, 48.071, 54.143 in order of occurrence.

Educational Implications

The findings of this study will have direct implications for school as it will help them in designing curriculum that will be inclusive for adolescents with inattention ADHD, particularly those with other disorder. Employing the modeling technique employed in this study will help schools and educational institutions to easily identify and treat students with ADHD. This study has shown and proved that modeling therapy is an effective method for the treatment of ADHD, if when employed can allowed for better student academic success. School

should formally integrate structured social and behavioral modeling sessions into the daily or weekly curriculum. These sessions could focus on skills essential for school success, such as waiting turns, active listening, organized task completion, and self-regulation in Benin City.

Conclusions

The study concluded based on the findings that Modelling Therapy had a significant and positive impact on reducing the level of Attention Deficit Hyperactivity Disorder (ADHD) symptoms among the adolescent participants in the specialized educational setting. Specifically, the intervention was found to be effective in improving attention span, reducing the frequency of hyperactive-impulsive behaviors, and enhancing on-task performance during structured learning activities. This suggests that observational learning, a core component of Modelling Therapy, is a viable and powerful therapeutic technique for managing ADHD characteristics.

Recommendations

Based on the findings of the study, the following recommendations are made;

1. School administrators and policymakers should consider promoting programs or initiatives that prove modelling therapy for adolescence with ADHD
2. Based on the successful methods, the school should formalize and document a standardized protocol for implementing Modelling Therapy. This manual would specify the materials, duration, frequency, and model characteristics (e.g., video vs. in-person peer model) to ensure consistent application.
3. Teacher and Parent should implement mandatory, in-depth professional development for all staff (teachers, aides, therapists) on the proper execution of Modelling Therapy. Furthermore, develop parent training workshops to teach modelling techniques that encourage the generalization of positive behaviors at home.

4. Curriculum planners should modify secondary school curriculum to incorporate Modelling therapy to modify student's behaviour that manifest symptoms of ADHD in secondary school. The findings of this study when published will enable adolescents to be armed with skills that will enable them control their behaviour. They will be enabled to differentiate between positive and negative forms of behaviours owing to the fact that adolescents exhibit those behaviours spontaneously and do not know that they are aberrant to their future adjustment in the society. However, when such behaviours are corrected, it will enable them to enjoy cordial, relaxed and healthy relations with human and the environment.

Suggestion for Further Research.

Based on the findings of the study, the researcher suggests that research should be replicated in all Local Government Areas of Edo State to corroborate or disagree with this research finding. Further study could be carried out to examine other variables that can deepen their understanding of the modelling therapy on the level of inattention attention deficit hyperactive disorder (ADHD).

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