# "UNDERSTANDING INATTENTION PATTERNS IN ADHD AND EXPLORING OCCUPATIONAL THERAPY INTERVENTIONS: A COMPREHENSIVE REVIEW "


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**UNDER THE GUIDANCE OF**
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**INSTITUTE OF PHARMACY**
**NIRMA UNIVERSITY**


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# "UNDERSTANDING INATTENTION PATTERNS AND EXPLORING OCCUPATIONAL THERAPY INTERVENTIONS IN ADHD: A COMPREHENSIVE REVIEW"

**Thesis submitted to the Institute of Pharmacy, Nirma University,**
**in partial fulfillment of the requirements for the Degree of**

**BACHELOR OF PHARMACY**


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**Semester VIII**
**(PROJECT WORK BP812PW)**
**UNDER THE GUIDANCE OF**

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## DECLARATION

We, **PATEL HET RAJESH (20BPH039), HAARD MEHTA (20BPH034), HARSHIL THAKKAR (20BPH036),** hereby declare that B.Pharm projectwork (BP812PW) entitled **"UNDERSTANDING INATTENTION PATTERNS IN ADHD AND EXPLORING OCCUPATIONAL THERAPY INTERVENTIONS: A COMPREHENSIVE REVIEW"** being submitted to the Institute of Pharmacy, Nirma University for the award of degree of B.Pharm was carried by us under the supervision of Dr. Bhagawati Saxena, Institute of Pharmacy, Nirma University. The content of this project work, in full or in parts, has not been submittedto any other University for the award of any degree. We also declare thatall the information collected from various primary sources (journals, patents, etc.) hasbeen duly acknowledged inthis project report.

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## CERTIFICATE FOR SIMILARITY OF WORK

This to undertake that the B.Pharm Project work (BP812PW) entitled **"UNDERSTANDING INATTENTION PATTERNS IN ADHD AND EXPLORING OCCUPATIONAL THERAPY INTERVENTIONS: A COMPREHENSIVE REVIEW"** Submitted by **PATEL HET RAJESH (20BPH039) HAARD MEHTA (20BPH034), HARSHIL THAKKAR (20BPH036),** B.Pharm. Semester VIII is a bonafide research work carried out by us at the Institute of Pharmacy, Nirma University under the guidance of "Dr. Bhagawati Saxena". We are aware about the rules and regulations of Plagiarism policy of Nirma University, Ahmedabad.

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## Abbreviations

ADHD- Attention Defecit Hyperactivity disorder

OT-Occupational Therapy

IEP-Individualized Education Program

CMD-Congenital muscular dystrophy

ASD-Autism spectrum disorder

EKG-Electrocardiogram

SLD-Specific Learning Disability

PEO- Person-Environment-Occupation (PEO)

CO-OP- Cognitive Orientation to daily Occupational Performance

# Abstract

Attention Deficit Hyperactivity Syndrome (ADHD) affects many facets of daily life by posing serious difficulties with self-regulation, organization, and focus. The initial part of the thesis aimed to study about how the brain in ADHD works -the structural brain changes various brain networks, neuro imaging, neuropsychological data . Interventions using occupational therapy (OT) are a viable way to treat attention problems in ADHD patients. This thesis examines, through a thorough analysis of the literature, how well occupational therapy (OT) interventions can improve attention patterns in people with ADHD. The goal of the study is to evaluate several OT strategies for improving attentional functioning, such as sensory integration methods, environmental adjustments, and cognitive-behavioral approaches. Here the INATTENTION Patterns of all age groups are discussed - Infant/toddler, Pre-school /Nursery, Primary school, Secondary school children and ADHD in adults. Attention Deficit Hyperactivity Disorder (ADHD) presents significant challenges in maintaining focus, organization, and self-regulation, impacting various aspects of daily life. Occupational therapy (OT) interventions offer promising avenues for addressing attention deficits in individuals with ADHD. This thesis explores the effectiveness of OT interventions in improving attention patterns among individuals with ADHD through a comprehensive review of existing literature. The study aims to analyze various OT strategies, including sensory integration techniques, environmental modifications, and cognitive-behavioral approaches, in enhancing attentional functioning. Additionally, the thesis investigates the underlying mechanisms of instructing children in school and classes for OT interventions and their implications for optimizing attentional outcomes in individuals with ADHD. The thesis also looks into the co-morbidities associated with ADHD and how they might affect people with ADHD who are able to focus. Through synthesizing empirical evidence and theoretical frameworks, this thesis contributes to a deeper understanding of the role of occupational therapy in managing attention deficits in ADHD and provides recommendations for clinical practice and future research directions.

**Keywords:** Occupational Therapy, Inattention Patterns, Infancy/toddler years, Primary school, Secondary school, ADHD in Adult, Introducing lessons, Conducting lesson,

Concluding lesson, Classrooms accommodations, Instructional tools and Physical learning environment.

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## Chapter 1: Introduction

Attention Deficit Hyperactivity Syndrome (ADHD) is a chronic illness characterized by trouble focusing, excessive activity, or thoughtless behavior. Since each person is unique, both adults and children may exhibit all or some of these traits. Additionally, symptoms of ADHD may vary with time. It is marked by recurrent patterns of impulsivity, hyperactivity, and inattention. This study aims to clarify the underlying mechanisms by which occupational therapy can improve a range of daily functioning skills, such as executive functioning, self-regulation, sensory processing, and social participation. Many people suffer from the common illness ADHD, which causes problems for a person in their social, professional, and academic lives. It affects individuals across the globe, with significant variations in prevalence rates. However, prevalence rates can vary due to factors such as diagnostic criteria and cultural differences. In India, while data remains limited, emerging studies suggest a prevalence rate comparable to global figures. Understanding the prevalence of ADHD both worldwide and in India is crucial for effective intervention strategies and public health policies aimed at supporting individuals with ADHD and their families. Generally,urban areas tend to have higher reported prevalence rates as compared to rural regions. Factors such as access to healthcare services, socio-economic status, and environmental factors may contribute to this discrepancy. Urban environments often exposeindividuals to more stimuli and stressors, which can exacerbate symptoms of ADHD. One such alternate strategy is occupational therapy (OT). OT adopts a holistic approach and seeks to enhance everyday functioning abilities in individuals with ADHD. It focuses on utilizing purposeful activities and modifying surroundings to improve their ability to focus and self-manage. Together, occupational therapists and people with ADHD can create methods for better time management, organization, and focus. ADHDsignificantly impacts sleep patterns and quality for individuals affected by the condition.Sleep disturbances are common among those with ADHD, manifesting in various ways such as difficulty falling asleep maintaining sleep, and experiencing restless sleep. The restless and hyperactive nature often associated with ADHD can lead to increased arousal levels, making it challenging for individuals to wind down and relax enough for restful sleep. Additionally, the impulsivity and inattention characteristic of ADHD may contribute to irregular sleep schedules and poor sleep hygiene practices. Comorbidity is the term used to describe the relationship of ADHD with other mental health illnesses

and disorders. People with ADHD may have worsening sleep disturbances as a result of these comorbid conditions. Approximately 2.6% (139.8 million) of adults worldwide have persistent ADHD from childhood, which includes individuals who experienced childhood onset paired with continued ADHD symptoms into adulthood. It is estimated that around 5 to 8% of schoolchildren in India are affected by ADHD though some studies have found the prevalence to be as high as 11%.

The aim is to understand the inattention patterns and Explore Occupational Therapy Interventions in ADHD and the objective being to identify and understand the Inattention patterns and determining whether the child/adult has ADHD and to explore an overall strategy of Occupational Therapy for the successfully Instructing Children with ADHD studying in school and classes (Sonuga-Barke and Edmund 275-289).

# Chapter:2 Literature Review

## 2.1) ADHD and brain.

These days, it is believed that ADHD is a neurodevelopmental disorder that began in childhood and is associated with poor connection between particular brain regions as well as delayed development of crucial brain regions. In order to better grasp what makes an individual with attention deficit hyperactivity disorder special, let's take a closer look at how neural coordination and brain function (Friedman and L.A 106- 111). In addition to processing and coordinating information, the brain's various regions and centers also govern higher-order functions like mood, social behavior, and voluntary movement. The immediate outer layer of the brain is divided into lobes, which are layered over and connected to the cerebral cortex (Hoogman 531-542).

There are two primary ways in which the brains of those with ADHD and those without any difference.

## 2.2) Networks and connections:

Children and adults with ADHD have different brain areas communicating with each other. A network of multiple brain areas or centers may occasionally communicate information. These networks frequently involve areas of the cerebellum, brain stem, and cortex.

The routes outlined here do not conflict with one another. They work together in a variety of ways to regulate behavior in ADHD sufferers.

The ability to activate, arrange, and regulate activities, memory, and tasks is part of the executive function network. Through these procedures, people may comprehend the short- and long-term effects of their acts and modify their behavior accordingly.

The thalamus, together with the frontal and parietal lobes, are part of the attention/alert network. Both selective (preferential focus on a single interest) and sustained (capacity to carry out a continuous job throughout time) attention are components of attention.

The reward network is a necessary reaction to actions or behaviors that promote constructive engagement with advantageous circumstances (learning or activities) and avoidance of unfavorable circumstances (Curatolo 1-7).

**2.3) Structural Neuroimaging:**

The last 20 years have seen a large number of publications on the anatomy of the brain in ADHD. Research revealed a 3% to 5% difference in brain size between ADHD and non-ADHD patients. A meta-analysis revealed that the limbic and basal ganglia are smaller subcortical regions (Kessler and Ronald 716-723).

**2.4) Functional Neuroimaging:**

Front striatal, frontoparietal, and ventral attention networks have been shown to be under-activated in patients with ADHD, according to task-based MRI studies incorporating working memory, inhibitory control, and attention-demanding tasks. The limbic system, the front-amygdalar circuits, and the posterior parts of the brain seem to be further implicated. Additionally, several studies show that patients with ADHD have less activity in the ventral striatal reward processing pathways when compared to controls. They also show hyperactivation of the somatomotor and visual systems (Seidman 1263-1272).

**2.5) Neuropsychological data:**

It is crucial to emphasize right away that no neuropsychological test has the necessary predictive ability to identify ADHD. The neuropsychological explanation of ADHD that is most widely accepted, has a strong emphasis on abnormalities related to behavioral inhibition, which includes problems with working memory, sustained focus, physical coordination, and mood management. Additionally, some research points to deficiencies in non-executive abilities including delay aversion. Furthermore, it is common to have trouble controlling arousal in response to environmental cues. In a clinical sense, this would imply that long and laborious tasks aggravate ADHD symptoms. In terms of cognitive anomalies, it was shown that IQ scores in ADHD were moderately correlated

with lower reading comprehension, and there was a considerable impairment in math and spelling skills. Again, the most important finding is the diversity in the neuropsychological profile of individuals with ADHD. As seen in the following: "Although certain individuals may exhibit a broad pattern of impairment across multiple executive functions, others may exhibit severe impairment in a single executive function (e.g., working memory) but not in other domains (e.g., the ability to inhibit)." Some folks will not show any signs of executive function impairment at all. More importantly, there is no one impairment that is pathognomonic of ADHD; rather, a range of various disorders can show a distinct pattern of cognitive deficits (Young and Rhona Lee 454-459).

A recurrent pattern of hyperactivity-impulsivity and/or inattention that interferes with normal development or functioning is what defines ADHD. Inattention can manifest in a number of ways, including disarray, a lack of persistence, and daydreaming. Excessive motor activity when not needed, fidgeting, tapping, or talkativeness are signs of hyperactivity. The ability to act or form opinions without giving them much thought is known as impulsivity. It could occasionally come off as social intrusivenessor making crucial decisions without fully understanding the ramifications. It is crucial to stress that disobedience or ignorance should not be the cause of these behavioral patterns. Two components have been identified by research on the component structure of ADHD symptoms across the lifespan. These factors include inattentiveness and hyperactivity/impulsivity. Several information sources, including teachers andparents, have been used in the study. Three symptoms of ADHD are proposed by the DSM-5: primarily inattentive, hyperactive/impulsive, and mixed. Nonetheless, this explanation includes useful clinical prototypes with relationships.

The primary indications and manifestations of ADHD are present; nevertheless, impulsivity and inattention, the behavioral and functional correlates of hyperactive symptoms, do not provide stable subgroups with enough long-term stability to support the disorder's classification into separate categories. It is crucial to emphasize that children with ADHD may find it easier to stay focused when engaging in activities like playing video games, watching television, or being in enjoyable environment (Ianni et al. 162-183).

## Chapter 3: Methodology

Database Selection:

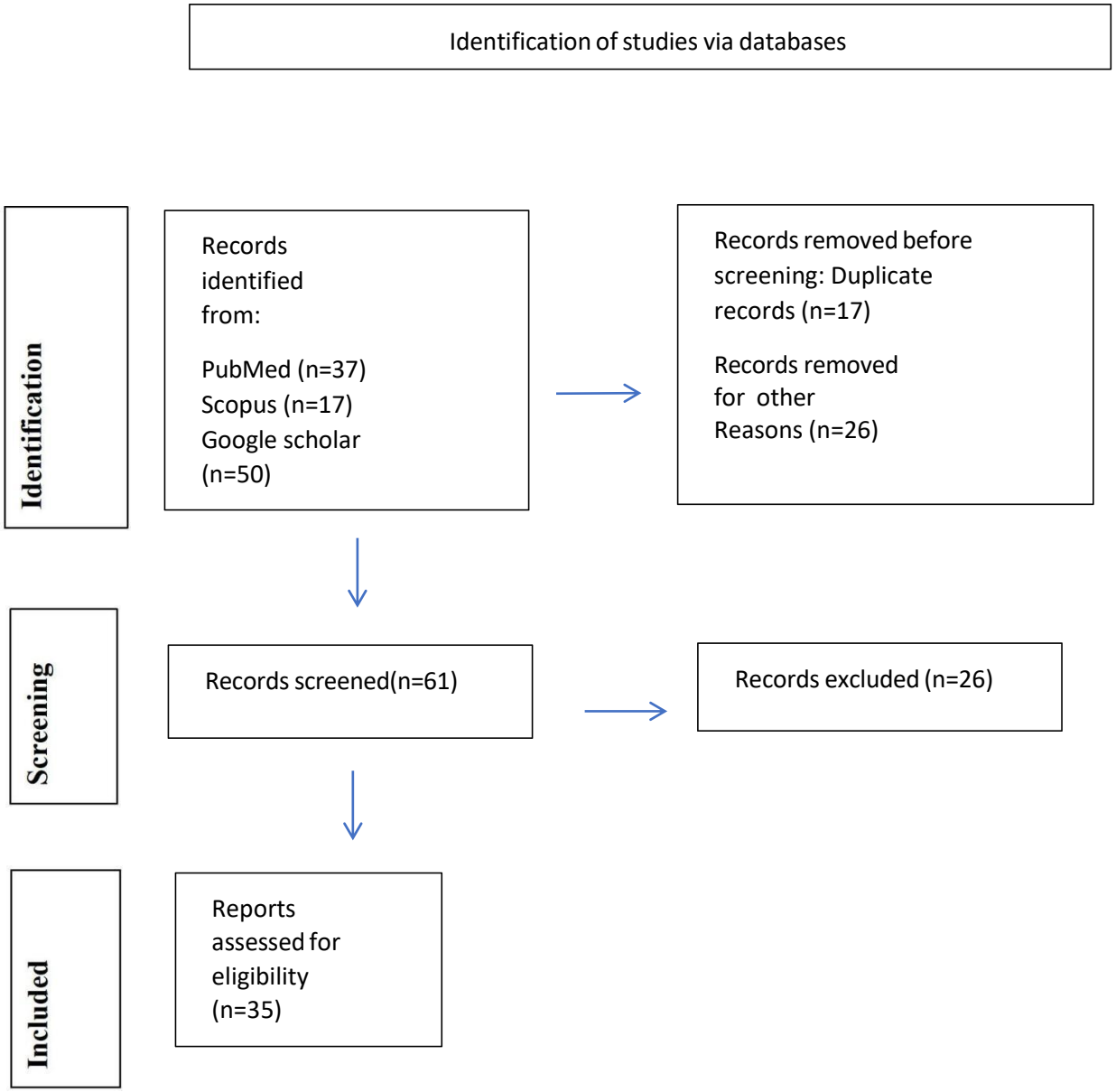
The following are the search included for the review: PubMed, ScienceDirect, and Google Scholar.

Filters And Limits:

Publications ranging from the past 3 decades, study type: systematic review, randomized control trials, umbrella reviews, and statistical data, language: English.

Theoretical Framework:

Person-Environment Occupation (PEO) or the Cognitive orientation to the daily occupation (CO OP) Sensory Integration Therapy, Cognitive Behavioral Strategies, BAARS self-report and Barkley Screening Checklist for Attention Deficit Hyperactivity Disorder. https://www.remedypsychiatry.com/wp- content/uploads/2020/10/BAARS-ADHD-questionnaire-PLEASE- COMPLETE-with-respect-to-symptoms-while-OFF-ADHD- medication.pdf


Identification of studies via databases
Identification
Records identified from:
PubMed (n=37)
Scopus (n=17)
Google scholar (n=50)
Records removed before screening: Duplicate records (n=17)
Records removed for other Reasons (n=26)
Screening
Records screened(n=61)
Records excluded (n=26)
Included
Reports assessed for eligibility (n=35)

# Chapter 4: Occupational therapy and Inattention Patterns

## 4.1) Understanding attention patterns and determining whether the child has ADHD or not.

Given that these individuals may have everyday interactions with the child, their assistance may be required in evaluating whether the youngster has ADHD. Adults who are attempting to diagnose themselves with ADHD may require behavioral insight from parents, siblings, coworkers, or significant others. Although the precise etiology of ADHD is unknown, most cases have a hereditary component, according to doctors. Scholars have seen certain distinctions in the way an individual with ADHD interprets information. It's critical to diagnose ADHD correctly since children who don't have a proper diagnosis may also struggle with anxiety, despair, or learning difficulties. Seeking medical attention for your child with ADHD symptoms if you are a parent or caregiver may help avoid future issues with the child's self-esteem, friends, and school performance. Teens with ADHD may exhibit restless behaviors such as twitching with their hands or feet or wriggling around in their seats. Other behaviors that make it difficult to postpone gratification include lack of focus and attention to detail, answeringquestions quickly, losing items needed for exercise or activities, having trouble listeningto others without becoming diverted or interrupting, having wide mood changes, and having trouble delaying gratitude (Friedman and L.A 106-111).

### 4.1.1) Inattention patterns:

Infancy/ Toddler Years, easily agitated and prone to crying more than typical kids.Sleep issues. Being overly concerned about food (Stiener and NJ 18-27).

**Pre School/ Nursery School Years**

Limited focus and difficulty following lengthy stories, Variations in mood and fits of rage, Issues with fine motor skills (Steiner and NJ 18-27).

**Primary School**

Difficulties adhering to rules and sitting quietly Issues with reading, Difficulties in school issues with other kids, and Issues with focus and concentration. (Steiner and NJ 18-27)

**Secondary School**

Ignorance being easily distracted and bored Being impetuous and occasionally agitated Partaking in hazardous activities (drugs, alcohol, smoking, sex, etc.) (Odenbring and Y.T 51-64).

**ADHD in Adults**

Between 15 and 50 percent of people with ADHD are thought to eventually outgrow the condition. These numbers, however, are based on follow-up research that did not use the most recent and stringent diagnostic standards for the illness. It's likely that only 20–35 percent of children with the illness no longer have symptoms that interfere with their adult lives, even when more suitable and contemporary criteria are used. A sizable number of people with ADHD are more likely to develop oppositional and defiant behavior (50%+), conduct issues and antisocial challenges (25–45%), learning disabilities, and other issues throughout their life depression (25%), low self-esteem, and disability (25–40%). Five to ten percent of people with ADHD go on to acquire more severe mental illnesses like bipolar disorder or manic-depressive illness. By maturity, 10 to 20 percent of people may have antisocial personality disorder; most of these people may also struggle with substance misuse. In general, between 10 and 25 percent experience problems related to excessive use, dependence, or even abuse of substances that are either legal (such as alcohol, and tobacco) or illegal (suchas marijuana, cocaine, illicit use of prescription drugs, etc.). The risk of this is highestfor individuals who experienced conduct disorder or delinquency as teenagers. Despite these dangers, it should be noted that at least half of people with ADHD do not haveany related problems or disorders. On the other hand, most people withADHD undoubtedly had difficulties in school; up to 30–50% of them had at least one grade retention and 25–36% had never finished high school. Those with ADHD are prone to have lower levels of schooling in adulthood compared to their intellectual capacity and family's educational history. In addition, they might find it difficult to transition to their new jobs, and they might be underpaid for their professions given their IQs, educational attainment, and familial histories. They frequently switch

occupations more than others, either due to interpersonal issues at work or just plain boredom (Okie 129-132).

### 4.2) An Overall strategy of Occupational Therapy for the Successful Instruction of students in School with ADHD

Three strategies are employed by teachers who are successful in teaching students with ADHD. They start by determining the child's particular needs. For instance, the instructor decides.

What makes the child so impulsive, energetic, and unfocused? Subsequently, the instructor selects various instructional tactics pertaining to academic education, behavioral interventions, and classroom accommodations, considering the child's needs. Lastly, to construct an individualized educational program (IEP) or other tailored plan, the instructor combines these practices with the learning activities provided to the other students in the class. To sum up, the threefold strategy is as follows:

#### 4.2.1) Considering the child's unique requirements and advantages

Examine the special educational requirements and abilities of a student in the class who has ADHD. collaborating with a multidisciplinary team and the child's parents use official diagnostic tests and unofficial classroom observations to consider the child's academic and behavioral needs. Learning style inventories are one type of assessment that can be used to identify a child's strengths and help teachers improve on those skills. In the assessment, it is important to consider the environments and situations which are difficult for student (Chu and Sidney 209-218).

#### 4.2.2) Selection of suitable methods of instructions

Choose the teaching strategies that will best address the child's indicated behavioral and academic needs. Choose activities that capture the child's interest, are age- appropriate, and correspond with the subject matter (Mulligan and Shelley 25-44).

#### 4.2.3) Include acceptable procedure in an IEP for kids getting special education.

After consulting with parents and other educators, an IEP should be designed with yearly objectives, special education-related services, and additional aids and services required to meet those objectives in mind. Plan on how to incorporate the educational activities chosen for the ADHD child with those given to the other students in your class. Since every child with ADHD is unique, it is critical to remember that no one educational approach, practice, or environment will work best for every child. The Individualized Educational Plan (IEP) is a plan or program developed to ensure that a child who has a disability identified under the law and is attending an elementary or secondary educational institution receives specialized instruction and related services (Nielsen 70-80).

The involvement and progress of the child with a disability in the general curriculum. All related services for which the child qualifies.

Appropriate educational accommodations are necessary.

### 4.2.4) Introducing Lessons:

The greatest academic lessons for students with ADHD are those that are meticulously planned, with the teacher outlining the skills and knowledge the students should acquire in the present lesson and placing them within the framework of earlier lessons. Skilled educators set expectations for their students' behavior and content before the class even begins. It has been discovered that some teaching-related techniques are particularly helpful in promoting this process:

Provide a planned agenda.

Review previous lessons.

Establish expectations for learning.

Establish expectations for behavior.

Describe any further resources

Make decisions, instructions, and scheduling simpler (Hughes 34).

### 4.2.5) Conducting Lessons

Retain your uniformity.

Motivate the student to take part in class activities.
Make use of the video resources.
Assess the students' performance.
Conducting continual assessment (Pineda and David 455-462).

**Instructions for follow-up.** Children with ADHD who get effective instruction also receive follow-up instructions:
**--Spoken directives.** After guiding the class, give a child with ADHD further oral directions.
-- **Written guidelines.** Give written instructions for further action. For instance, write the assignment page number on the chalkboard and tell the child to check it in case they forget what needs to be done.

-- **Diminish the noise level.** Pay attention to how loud the classroom is, and when appropriate, provide helpful feedback. If noise levels exceed what is suitable for the type of instruction, remind all students, or just a select few, of the behavioral boundariesthat were set at the beginning of the course.

**Break up the job into smaller chunks.** Divide your assignments into manageable, simpler jobs. Give kids five math questions to do, for instance, and then the remaining five problems.

**Emphasize important points**. To aid a youngster with ADHD in focusing on instructions, highlight important terms in worksheet instructions. Before the session starts, prepare the worksheet, or highlight important terms as you and the kid go over the instructions. Before requesting a synopsis of the complete book, teach kids how to recognize and highlight an important passage in a book or have them write it down on a different piece of paper. Teach kids how to highlight key information and operations in math. For example, in the sentence "Mary has two apples, and John has three," emphasize the words "two," "and" and "three."

Get rid of timed exams or cut back on their frequency. Due to their potential, timed tests may prevent kids with ADHD from demonstrating what they really know and becoming

obsessed with the passing of time. To alleviate "test anxiety," give students with ADHD extra time to finish quizzes and tests and provide them alternative ways, methods, or exam formats to demonstrate their knowledge.

**Make use of Co-operative learning techniques**

Assemble small groups of students to collaborate and enhance each other's learning. Employ techniques like Think-Pair-Share, in which educators urge students to consider a subject, talk about it in pairs with a partner, and then present their thoughts to the class (Young and Rhona Lee 454-459).

Make use of assistive technologies. Technology (such as laptops and projector screens) can help all kids, but especially those with ADHD, since it makes learning more visual and involves them in the process (Melago and Kathleen 37-43).

### 4.2.6) Concluding Lessons

When a lesson is about to end, effective teachers let the students know by giving them advance notice, making sure that at least some of the students with ADHD have turned in their assignments, and giving them instructions on how to start getting ready for the next task. Review the assignments you have been given. A sneak peek at the upcoming lesson (Melago and Kathleen 37-43).

### 4.2.7) Individualizing Instructional Practices

Effective teachers of students with ADHD individualize their teaching practices according to various academic areas and the needs of their pupils within each area, in addition to the broad strategies outlined above for introducing, conducting, and ending their sessions. This is because children with ADHD absorb and retain knowledge in diverse ways, some of which may not entail reading and listening in the traditional sense. After determining which areas each student needs more help with, effective teachers employ specialized techniques to give supervised opportunities for the student to study and understand a subject that was previously taught to the class. Thefollowing tactics, arranged according to topic area, could aid in achieving this objective.

### 4.2.8) Language arts and understanding reading

Try the following to help kids with ADHD who struggle with reading develop their reading comprehension abilities:

#### 4.2.8.1) Teaching Strategies

Private time for reading. As an example, consider D.E.A.R.: Drop Everything and Read and Sustained Silent Reading. Set aside a specific period each day for silent reading.
Read aloud in sync. Request that the child read a narrative aloud to the class as they listen to other students, or the instructor read it aloud.
Reading exercises with a partner. Assign the youngster with ADHD to a strong reader-partner student partner. Each partner reads aloud and listens to the other for a turn.

**Storyboards.** Request that the youngster create storyboards that depict the order of a story's major events.

**Acting out.** Set aside time for the child to role-play several characters from a beloved story during playacting sessions.
Word cloud. Maintain a word bank or dictionary with brand-new or "hard-to-read" sight words.
**Reading comprehension computer games**. Plan computer time so the youngster can practice sight words by drilling and practicing.
**Books with recordings**. These resources, which are offered by many libraries, can be utilized to support and enhance reading instruction as well as spark interest in traditional reading (Chu and Sidney 209-218).
**Resources for synthesis.** Instead of using published book summaries, synopses, and digests of important reading assignments, let and encourage students to evaluate the reading assignments.

#### 4.2.8.2) Phonics

Introduce the youngster to mnemonic devices that serve as helpful reminders for challenging phonics rules, such as "when two vowels go walking, the first does the talking."

Word families. Teach the child to recognize and interpret word families that stand for specific phonetic concepts, such as "at-bat-cat" and "ph" sounds (Watroba and Anni 1-33).

Phonics board games. Engage pupils in board games that help them learn phonetically irregular words, like bingo.

Phonics computer games. Give your children the chance to practice and drill phonics or grammar skills using a computer.

Charts that display images rather than text. Use these for children who can recognize the sounds but not the letters that go with them.

#### 4.2.8.3) Writing

When creating stories or completing other writing tasks, kids with ADHD can benefit from the following strategies:

Guidelines for writing tasks. Identifying specific story, etc. (Gutman 13-38).

#### 4.2.8.4) Spelling

The following methods have been found to be effective in helping children with ADHD who struggle with spelling:

**Common instances of difficult words to spell.** Use commonplace occurrences to teach spelling words that are challenging in context. For instance, have a young child spell "sandwich" while they consume a cheese sandwich.

Words that are used frequently. Assign spelling words to children whose speech they use daily.

**Word processors.** Sort frequently misspelled words alphabetically using 3" x 5" index cards (Maeir and Adina 260-267).

A misspelled word dictionaries. Encourage the youngster to compile a personal glossary of terms that they often misspell.

**Spelling exercises with a partner**. Assign the youngster to a peer partner. Ask the partners to test one another's spelling of unfamiliar words. Invite the two pupils to guess the right spelling.

**Deceptive**. For challenging words, utilize cutout letters or additional manipulatives to spell them out.

**Letters with color codes**. Color-code distinct letters in words that are difficult to spell, like "receipt."

**Physical activity**. Incorporate physical exercises into spelling instruction. For example, jump rope while pronouncing words aloud.

Separate whiteboards. Give the youngster a tiny, private chalkboard to practice writing the target words on and erasing them. Two children can practice their target words in pairs (Neilsen et al. 70-80).

**Calm areas for writing by hand.** Give the child a designated "quiet place" to finish their handwriting homework, such as a table outside the classroom.

**Word separations on a sheet**. Tell the child to use his or her finger to measure the space between each word in a written assignment.

**Unique writing surface**. To help the child understand how to space letters and words on a page, give them a special paper with vertical lines (Neilsen et al. 70-80).

Handwriting programs with structure. Educate handwriting techniques using asystematic curriculum.

Children with ADHD can benefit from a variety of tailored teaching strategies toenhance their fundamental computing abilities.

These are just a handful of them:

**Patterns in mathematics.** Teach the learner to search for patterns when they are adding, subtracting, multiplying, or dividing whole numbers. (For example, the total of the digits in numbers [18, 27, 36...] that are multiples of nine is nine.

**Command of mathematical symbols.** Children will not be able to complete the assignment if they do not comprehend the symbols used in math. Do they comprehend, for example, that the "minus" in 5 – 3 means to take away?

**Working in pairs on math exercises**. Assign a youngster with ADHD to a partner. with a different learner, giving them the chance to test one another on fundamental computation abilities.

**Working together on math tasks.** Assign an ADHD youngster to a classmate and give the partners the chance to test one another on fundamental math concepts (Neilsen et al. 70-80).

**Real-world examples of financial aptitude.** Give the kid the chance to practice the desired money management skills in real life. One way to help students learn how to calculate change is to set up a class store or assign them to figure out how much change they will have while paying for lunch in the school cafeteria.

**Symbol color coding for math**. Basic arithmetic symbols like +, –, and = should be color-coded to give kids visual cues when they are computing entire numbers (Gutman et al. 13-38).

Calculators to verify simple math operations. Request that the youngster check addition, subtraction, multiplication, or division with a calculator.

Basic computation games on a board. To help the youngsters with addition, subtraction, multiplication, and division of whole numbers, assign board game.

**4.2.8.5) Handling mathematical word problem**

To assist kids with ADHD in developing their problem-solving abilities Try the following while solving mathematical word problems:

Go over the issue again. Teach a word to the youngster to read. Before starting to calculate the solution, go over the problem twice.

Deceptive terms. Teach the young learner hints that indicate which operation to apply in word issue solving. Words like "sum," "total," or "all together," for instance, may suggest an additional procedure.

Directing inquiries for word puzzles. Instruct pupils to When tackling word problems pose leading questions. For instance, what query is posed in the problem? What details are required to determine the answer? Which computation method should you use to get the answer?

Directional inquiries for word problems. Instruct students to solve word problems by asking leading questions. As an illustration: What query is posed in the problem? What details are necessary for you to determine the answer? Which calculation method ought to be applied to get the answer? (Rowland et al. 162-170).

Word issue examples from everyday life. Request that the learner formulate and work through word problems that target target operations, including addition,

subtraction, multiplication, or division. The child's recent, actual experiences mayserve as the basis for these issues. Certain children with ADHD benefit from using specific resources, such as number lines, to assist them in finishing their arithmetic homework. Give the child access to number lines so they may compute full numbers (Neilsen et al. 70-80).

Deceptive. Assist kids in learning basic math abilities by using manipulatives.

A graph paper. When the kid adds, subtracts, multiplies, or divides whole numbers ask them to arrange the columns using graph paper.

### 4.2.9) Organizational and Study Skills Useful For Successful Academic Instruction Of Children with ADHD

Many children with ADHD find it difficult to focus on their allotted work and are often sidetracked. Nonetheless, students with ADHD may benefit from the following strategies to better organize their daily chores and homework:

Assign a single instructor to serve as the student's coordinator or advisor. This teacher will serve as a liaison between the home and the school and periodically examine the student's progress through progress reports submitted by other teachers. Give the student permission to meet with this advisor on a regular basis (e.g., Monday morning) to discuss concerns from the previous week and to plan and arrange for the next week (Neilsen et al. 70-80).

**Notebooks for assignments.** Give the youngster a notebook for assignments so theycan keep track of their homework and other schoolwork.

Files with color coding. Give the young learner color-coded folders to assist with class assignment organization for several academic areas (e.g., science, reading, arithmetic, and social science).

**Assign a partner's homework**. Provide a companion for the child to help with organizing worksheets and other paperwork into the proper folders and writing down assignments and other seatwork in the assignment notebook.

**Organize book bags and workstations.** Request that the child clean and organize his or her desk, book bag, and any other special places where written assignments are kept on a regular basis (Nielsen et al. 70-80).

**Visual aids that serve as topic material reminders.** Utilize banners, lists, charts, pie graphs, and diagrams placed all over the classroom to serve as a reminder to students of the subject material being learned (Ostoits and Jean 129-132).

### 4.2.10) Helping Students manage their time well

Since children with ADHD frequently struggle to complete their projects on time, they can benefit from specialized resources and time-management exercises, such as:
Make use of a watch or clock. Instruct the child in reading and demonstrate how to use a watch or clock to keep track of time while finishing task. Instruct the child in reading and demonstrate how to use a calendar to arrange homework.

### 4.2.11) Beneficial Study techniques for ADHD students

Children diagnosed with ADHD frequently struggle to develop independent study skills. Students with ADHD may benefit from the following techniques to help them acquire the study techniques required for scholastic success:
Worksheets should be modified. Show a youngster how to modify worksheets for instruction. Assist a youngster with folding their reading worksheet so that only one question is visible at a time, for instance. The remaining questions on the page can alternatively be filled in by the youngster using a blank piece of paper.
Venn charts. Teach a child how to arrange and illustrate important ideas in reading, arithmetic, or other academic topics using Venn diagrams.
Taking notes abilities. Teach an ADHD child—possibly with the aid of a program—how to take notes when arranging important academic concepts that they have learned.
A list of the materials needed for homework. Give the child a checklist with categories of supplies (such as books, pencils, and homework) that they will need for their assignments (Rowland et al. 162-170).
-Assignment paperwork
A neat work area. Teach an ADHD youngster how to organize their workplace so they can finish their homework. Give the youngster instructions, such as putting away extra books or objects, before starting seatwork (Rowland et al. 162-170).

Keep an eye on your homework. Monitor the extent to which your ADHD children finish their prescribed homework. If they run into any difficulties finishing these assignments, talk about them and their parents' solutions. Examine the tasks' level of difficulty and the amount of time the kids spend on it each night, for instance.

Keep in mind that the most crucial factor is the quality of the work, not the quantity of homework assigned. Even though homework is a crucial component of learning how to study, it should serve as a review of content covered in class and a way to reinforce abilities rather than giving students a ton of new information ahead of time (Langberg 407).

**4.2.12) Behavioral Interventions:**

The second essential component of training that helps children with ADHD is the application of behavioral therapies. Children with ADHD often behave immaturely and have difficulty controlling their impulsive and hyperactive inclinations. They could find it difficult to form friendships with their classmates and to think about the social consequences of their actions.

Behavioral treatments aim to support students in exhibiting the behaviors that are most beneficial to their own learning as well as the learning of their peers. Well-run classrooms provide an ‘atmosphere that is ideal for learning and avoids many disciplinary issues. Less time is available for helping other students when a teacher has to spend it dealing with kids whose actions are not in line with the material being taught.Rather than being seen as a means of punishment, behavioral interventions should be seen as a chance for the most effective and efficient (Sonuga- Bark and Edmund 275-289).

**4.2.13) Effective Behavioral Intervention Techniques:**

To help children learn how to control their behavior, effective teachers employ a variety of behavioral intervention strategies.

The most significant and successful of them is probably verbal reinforcement of proper behavior. The most popular type of verbal reinforcement is compliments, which are offered to students as they start and finish an activity or display a specific desirable

behavior. Little words like "good job" can motivate a child to behave properly. Praising children with ADHD on a regular basis and focusing on positive behaviors earlier rather than after they stray from the goal are signs of an effective instructor. The following tactics offer some direction on how to use praise:

Specify acceptable behavior. Specify proper conduct when praising someone. When praising a kid for their positive behavior, it's important to be specific about what the student did well and to point out the specific behavior that the student demonstrated. For example, a teacher should commend a student for silently finishing a math lesson on time, rather than applauding them for not disrupting the class (Rowland et al. 162-170).

Express gratitude right away. The likelihood that a learner will repeat appropriate behavior increases with the speed at which it is approved.

Change the compliments that are offered. Teachers should utilize a variety of remarks to commend proper behavior; if pupils hear the same compliment repeated, it may lose its impact.

When praising someone, be true and consistent. Constructive conduct ought to be consistently commended. To keep ADHD kids from becoming confused, it is critical that teachers maintain consistency in expected behavior. In a similar vein, when professors praise their students insincerely, the students will catch on and the praise will lose its impact (Nielsen et al. 70-80).

It is crucial to remember that the most successful educators emphasize praise over punishment in their behavioral intervention tactics. Adverse consequences have the potential to modify conduct momentarily, but they seldom alter attitudes. In fact, by drawing attention to misbehaving students, they may even make incorrect behavior more frequent and intense. Furthermore, discipline might simply teach kids what not to do; it does not provide them with the abilities they need to behave in expected ways. Long-term behavioral changes in students are shaped by the attitudes they adopt, which are created via positive reinforcement.

Neglect certain inappropriate actions. Teachers may find it useful to selectively overlook bad behavior. This method works especially well when the behavior is accidental, unlikely to happen again, or just meant to attract a teacher's or student's attention without causing a disturbance or impeding other students' learning.

Get rid of things that bother you. Instructors frequently discover that specific items (such as toys and rubber bands) divert ADHD kids' attention in the classroom. The best results are usually obtained when the student is offered the option to put the object awayright away and then chooses not to.

Provide manipulatives that are calming. Even while some toys and other materials can be distracting for both the ADHD students and their classmates in the classroom, some children with the disorder can benefit by having access to calm manipulable objects. With the use of manipulatives, kids can learn the content while getting essential sensory stimulation (Hoogman 531-542).

Provide "escape valve" openings. Giving ADHD children permission to leave the classroom for a short while, maybe to run an errand (like returning a book to the library), can help them relax and come back to the classroom prepared to focus.

Assisting with hurdles. Instructors can provide support, help, and support to keep pupils from turning angry about a task. This assistance may require numerous approaches, such as asking a peer for assistance or providing extra resources or data.

Conferences with parents. The role of parents is crucial in student education, and this concept could be especially valid for people who have ADHD. Therefore, parents need to be collaborators in creating a plan for the student's achievement. Incorporating parental feedback into partnerships with parents means behavioral intervention techniques, continuing regular dialogue between educators and parents, and cooperatingto keep an eye on the student's development (Gutman et al. 13-38).

Proactive educators also employ behavioral cues with their pupils. Students can be reminded of the standards for their behavior and learning in the classroom by using these prompts. Three that could be especially useful are as follows:

Visual clues. Create straightforward, unobtrusive visual clues to help the youngster stay focused. You may extend out your hand, palm down, in front of the youngster, or you could point at the child while looking him or her in the eye.

Close supervision. Approach a child where they are seated or standing when you are speaking to them. The child will be better able to concentrate and pay attention to what you are saying if you are physically close to them.

Hand motions. When speaking privately with a youngster who has ADHD, use hand signals. For instance, each time you offer a question, ask the child to raise his or her

hand. Lessons on social skills. Use an organized classroom to teach children with ADHD appropriate social skills. You could, for instance, invite the kids to role-play and demonstrate several approaches to typical social issues. Encouraging youngsters to use their newly acquired social skills through regulated opportunities is essential for the generalization of these skills. Providing these courses, or experiences, to all students can have a good impact on the school environment.

Sessions for fixing problems. Talk about resolving societal disputes. When a dispute emerges, have spontaneous conversations with the offending student or with a small group of pupils. Ask two kids who are fighting over a game to talk about how to resolve their differences in this situation.

Functional behavioral assessments, as well as positive behavioral therapies and supports, such as token economy systems, behavioral contracts and management plans, and tangible rewards, are effective in teaching many ADHD youngsters how to control their own behavior. Since every student is unique, it is crucial for educators to assess if these techniques are acceptable for their classrooms in collaboration with the family and other relevant specialists. Here are some examples of these methods and the procedures to be followed in their application: (Abramowitz et al. 220-234).

### 4.2.14) Classroom Accommodations:

Physical classroom accommodations make up the third element of a plan for teaching ADHD kids. Children diagnosed with ADHD frequently struggle to focus on their allotted work, learn what is important, and adapt to the regulated setting of a classroom. They get easily sidetracked by classroom activities going on around them or by other kids. Because of this, a lot of kids with ADHD gain from adjustments thatmake the classroom less distracting and support learning and focus. Children with ADHD can benefit from certain modifications made in the physical and learning environments of the school (Barkley and Russell 248-296).

### 4.2.15) Special Classroom Arrangements:

Selecting a child's seat is one of the most popular modifications that can be made to the physical layout of the classroom to accommodate an ADHD youngster. There are three specific seating allocations that could be quite helpful:

Settle the youngster close to the instructor. Give the youngster a seat in front of the room or close to your workstation. This seating arrangement gives you the chance to keep an eye on and encourage the child's on-task behavior.

Place the youngster in front of a role model student. Put the youngster in a seat next to a role model pupil. Children can collaborate with one another and pick up knowledge from their classmates thanks to this seating arrangement.

Make low-distraction workspaces available. Teachers' ought to provide a peaceful, distraction-free location for students to study and take tests, if there is enough capacity. To avoid giving the impression that they are being punished, students should be led to this room or location in private and discreetly (Barkley and Russell 248-296).

## Chapter 5: Discussion:

The discussion section of your review article, "Exploring Occupational Therapy Interventions and Understanding Attention Patterns in ADHD: A Comprehensive Review," provides an opportunity to delve deeper into the implications of your findings, address the significance of your research, and offer insights for future studies and clinical practice. Here is how you could structure the discussion:

Integration of Findings: Begin by summarizing the key findings of your review, emphasizing the effectiveness of occupational therapy interventions in improving attention patterns and functional outcomes in individuals with ADHD. Highlight any trends or commonalities observed across studies, such as the prevalence of sensory processing difficulties and the importance of individualized treatment approaches.

Clinical Implications: Discuss the clinical implications of your findings for occupational therapists and other healthcare professionals working with individuals with ADHD.

Holistic Approach to Treatment: Explore the concept of a holistic approach to ADHD management, which considers the interplay between sensory, motor, cognitive, and environmental factors in shaping attention patterns and behavior.

Challenges and Limitations: Acknowledge any challenges or limitations encountered during the review process, such as the heterogeneity of study populations, variability in intervention protocols, or limitations in study methodologies (Nielsen et al. 70-80).

Future Suggestions: Offer suggestions for future research directions based on gaps identified in the literature and unanswered questions arising from your review.

## Chapter 6: Summary

"Examining Occupational Therapy Interventions and Grasping Attention Patterns in ADHD: An In-Depth Analysis" delves into the intricate landscape of attention deficit hyperactivity disorder (ADHD) through the perspective of occupational therapy strategies. This article meticulously scrutinizes various therapeutic methods aimed at easing the daily struggles faced by individuals with ADHD. By dissecting the nuances of attention patterns in ADHD, the piece illuminates the underlying mechanisms and complexities associated with this neurodevelopmental condition.

Furthermore, the article delves into the intricate relationship between environmental influences, sensory processing challenges, and attention regulation in individuals grappling with ADHD, offering valuable insights into a holistic approach to managing this condition. Through a thorough examination of existing literature and evidence- based methodologies, this article provides a nuanced perspective on the pivotal role of occupational therapy in optimizing outcomes for individuals living with ADHD.

## Chapter 7: Conclusion

In summary, delving into occupational therapy interventions and attention patterns in ADHD provides valuable insights into the intricate nature of this disorder and potential avenues for effective intervention. Throughout this thorough examination, several central themes have emerged, shedding light on the complex interaction between attention deficits, occupational involvement, and the broader landscape of managing ADHD. Primarily, it emphasizes the significance of grasping the nuanced attention patterns characteristic of individuals with ADHD. Recognizing the variability in attentional functioning enables occupational therapists to tailor interventions to address specific deficits and leverage individual strengths. Whether it is managing attentional fluctuations or addressing challenges in sustaining focus, a nuanced understanding of attention patterns is crucial for informing targeted therapeutic approaches. It underscores the array of occupational therapy interventions available. It mitigates attention deficits in ADHD. From incorporating sensory integration techniques to providing training in executive functioning, occupational therapists utilize evidence- based strategies to enhance attentional control and functional performance. By integrating sensory-motor activities, environmental adjustments, and cognitive- behavioral techniques, therapists empower individuals with ADHD to better managetheir attentional difficulties across diverse settings. It highlights the importance ofaddressing comorbidities associated with ADHD within the realm of occupational therapy intervention. Conditions such as anxiety, depression, learning disabilities, and sensory processing difficulties significantly impact attentional functioning and overall occupational engagement. Adopting a holistic approach that addresses both ADHD symptoms and coexisting conditions allows therapists to optimize the effectiveness of interventions and improve functional outcomes. Addressing sleep disturbances thusemerges as a crucial aspect of comprehensive ADHD management, with occupational therapists playing a pivotal role in promoting healthy sleep habits and enhancing daytime performance. To conclude, this thorough review underscores theinterconnectedness of attention patterns, occupational engagement, and ADHD management within the scope of occupational therapy intervention. Embracing a holistic approach that considers individual differences, comorbidities, and daily life

contexts enable occupational therapists to empower individuals with ADHD to navigate their attentional challenges more effectively and achieve greater success in their occupational endeavors. Through ongoing research and clinical innovation, the field of occupational therapy remains committed to advancing the well-being of individuals with ADHD and promoting their overall quality of life. In conclusion, this thorough review underscores the interconnectedness of attention patterns, occupational engagement, and ADHD management within the scope of occupational therapy intervention.

## Chapter 8: Recommendations For Future Research

Need for Further Research: Despite the promising findings, the review underscored the need for further research to elucidate the mechanisms underlying the effectiveness of occupational therapy interventions for ADHD. Longitudinal studies, comparative trials, and investigations into novel intervention modalities are warranted to advance our understanding and enhance clinical practice in this area.

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