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ΙΑΤΡΙΚΗ ΣΧΟΛΗ

## ΠΡΟΓΡΑΜΜΑ ΜΕΤΑΠΤΥΧΙΑΚΩΝ ΣΠΟΥΔΩΝ

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Κλινική Πράξη και Έρευνα”

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“Η συμβολή της γιόγκα σε παιδιά με Νοητική Υστέρηση:  
Ανασκόπηση Πεδίου”

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## ΒΕΒΑΙΩΣΗ ΕΚΠΟΝΗΣΗΣ ΔΙΠΛΩΜΑΤΙΚΗΣ ΕΡΓΑΣΙΑΣ

«Δηλώνω υπεύθυνα ότι η συγκεκριμένη Διπλωματική Εργασία με τίτλο:

**Η συμβολή της γιόγκα σε παιδιά με Νοητική Υστέρηση: Ανασκόπηση Πεδίου**

για τη λήψη του μεταπτυχιακού τίτλου σπουδών του **Π.Μ.Σ. “ΓΕΝΙΚΗ ΚΑΙ ΕΞΕΙΔΙΚΕΥΜΕΝΗ ΠΑΙΔΙΑΤΡΙΚΗ: ΚΛΙΝΙΚΗ ΠΡΑΞΗ ΚΑΙ ΕΡΕΥΝΑ”**, της Ιατρικής Σχολής του ΕΚΠΑ, έχει συγγραφεί από εμένα προσωπικά και δεν έχει υποβληθεί ούτε έχει εγκριθεί στο πλαίσιο κάποιου άλλου μεταπτυχιακού ή προπτυχιακού τίτλου σπουδών, στην Ελλάδα ή στο εξωτερικό.

Η εργασία αυτή αντιπροσωπεύει τις προσωπικές μου απόψεις επί του θέματος.

Κατά τη συγγραφή, ακολούθησα την πρόπουσα ακαδημαϊκή δεοντολογία. Οι πηγές στις οποίες ανέτρεξα για την εκπόνηση της συγκεκριμένης διπλωματικής αναφέρονται στο σύνολό τους, δίνοντας πλήρεις αναφορές στους συγγραφείς, συμπεριλαμβανομένων και των πηγών που ενδεχομένως χρησιμοποιήθηκαν από το διαδίκτυο. Έχω επίσης αποφύγει οποιαδήποτε ενέργεια που συνιστά παράπτωμα λογοκλοπής. Γνωρίζω ότι η λογοκλοπή μπορεί να επισύρει ποινή ανάκλησης του πτυχίου μου.

Σε κάθε περίπτωση, αναληθούς ή ανακριβούς δηλώσεως, υπόκειμαι στις συνέπειες που προβλέπονται στον Κανονισμό Σπουδών του Μεταπτυχιακού Προγράμματος Σπουδών στην Γενική και Εξειδικευμένη Παιδιατρική: Κλινική Πράξη και Έρευνα, και στις διατάξεις που προβλέπει η Ελληνική και Κοινοτική Νομοθεσία περί πνευματικής ιδιοκτησίας».

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## **ΕΥΧΑΡΙΣΤΙΕΣ**

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## ΠΕΡΙΛΗΨΗ

**ΤΙΤΛΟΣ:** Η συμβολή της γιόγκα σε παιδιά με Νοητική Υστέρηση: Ανασκόπηση Πεδίου

**ΕΙΣΑΓΩΓΗ:** Τα παιδιά με νοητική υστέρηση αντιμετωπίζουν συχνά προβλήματα στις κινητικές και σωματικές δεξιότητες, άγχος, γνωστικές και συναισθηματικές δυσκολίες. Η γιόγκα μπορεί να βοηθήσει αυτά τα παιδιά στην εμπλοκή τους σε κοινωνικά περιβάλλοντα παρέχοντας σωματικές και κινητικές βελτιώσεις, συναισθηματική ρύθμιση, γνωστικό και συμπεριφορικό έλεγχο.

**ΣΚΟΠΟΣ:** Η γιόγκα είναι μια προσέγγιση που μπορεί να βοηθήσει τα παιδιά με οποιοσδήποτε δυσκολίες και διαγνώσεις. Σκοπός αυτής της ανασκόπησης είναι να διερευνήσει τη συμβολή της γιόγκα για παιδιά με νοητική υστέρηση, να εμπνεύσει τους επαγγελματίες υγείας να καθορίσουν αν πρέπει να προωθήσουν τη γιόγκα ως ευεργετική παρέμβαση για τα παιδιά με ειδικές ανάγκες και να αναδείξει ένα ευεργετικό αποτέλεσμα στην εφαρμογή της γιόγκα που μπορεί να βοηθήσει τους γονείς, τους εκπαιδευτικούς και τα παιδιά να εκπληρώσουν τις ανάγκες τους.

**ΜΕΘΟΔΟΛΟΓΙΑ:** Πραγματοποιήθηκε ανασκόπηση της υπάρχουσας βιβλιογραφίας με αναζητήσεις σε βάσεις δεδομένων όπως είναι οι AMED, CINAHL, Academic Search Complete και Google scholar. Επιλέχθηκαν 11 μελέτες που εστιάζουν στη συμβολή της γιόγκα για παιδιά με νοητική υστέρηση, λαμβάνοντας υπόψη τα κριτήρια ένταξης και αποκλεισμού, τη χρήση των κατευθυντήριων γραμμών PRISMA και χρησιμοποιήθηκε ένα εργαλείο αξιολόγησης της ποιότητας για την ανάπτυξη αναλυτικών θεμάτων.

**ΑΠΟΤΕΛΕΣΜΑΤΑ:** Οι μελέτες που εξετάστηκαν παρέχουν πειστικές ενδείξεις ότι η γιόγκα είναι μια προσιτή και αποτελεσματική παρέμβαση για παιδιά που αντιμετωπίζουν σωματικές, συναισθηματικές και γνωστικές δυσκολίες. Επισημάνθηκαν σημαντικές βελτιώσεις στις κινητικές δεξιότητες, στη συναισθηματική ρύθμιση, στον γνωστικό και συμπεριφορικό έλεγχο. Υπογραμμίζεται, επίσης, ότι η γιόγκα μπορεί να αποτελέσει ουσιαστικό μέρος των θεραπευτικών προγραμμάτων για παιδιά με νοητική αναπηρία. Ωστόσο, η ποικιλία στα σωματικά ευρήματα, ειδικά για τα παιδιά με εγκεφαλική παράλυση που έχουν σωματικές δυσκολίες, υπογραμμίζει την ανάγκη για πρόσθετες υποστηρικτικές παρεμβάσεις.

**ΣΥΜΠΕΡΑΣΜΑΤΑ:** Τα 11 άρθρα που εξετάστηκαν έδειξαν γενικά ότι η γιόγκα είναι μια αποτελεσματική παρέμβαση για παιδιά με νοητικές δυσκολίες. Ο συνδυασμός σωματικών κινήσεων, ενσυνειδητότητας και αναπνοής είναι απόλυτα κατάλληλος για τις πολυδιάστατες προκλήσεις των παιδιών με νοητική υστέρηση. Η αποτελεσματικότητα της γιόγκα σε μια ποικιλία πληθυσμών για παιδιά με αυτισμό, ΔΕΠΥ, και άλλα ψυχιατρικά προβλήματα δείχνουν ότι η γιόγκα μπορεί να είναι αποδεκτή και έχει ένα ευρύ δυναμικό ως θεραπεία για αυτά τα παιδιά.

**ΘΕΜΑΤΙΚΗ ΠΕΡΙΟΧΗ:** Εργοθεραπεία και Γιόγκα για παιδιά με νοητική αναπηρία, φροντίδα παιδιών με ειδικές ανάγκες

**ΛΕΞΕΙΣ ΚΛΕΙΔΙΑ:** Γιόγκα, Ψυχική υγεία, Νοητική υστέρηση, Παιδιά, Έφηβοι.

## **ABSTRACT**

**TITLE:** The contribution of yoga to children with Mental Health disabilities: A scoping review

**BACKGROUND:** Children with mental health difficulties often experience challenges in motor and physical skills, stress, anxiety and emotional difficulties. Yoga can help these children in engaging in social environments providing physical and motor improvements, emotional regulation, cognitive and behavioural control.

**AIM:** Yoga is an approach that can help children with any occupational challenges and diagnosis. The aim of this scoping review is to explore the contribution of yoga for children with mental health disabilities, to inspire healthcare professionals to determine whether to promote yoga as a beneficial intervention for children with special needs and highlight a beneficial outcome in implementing yoga that can help the parents, caregivers and the children to fulfill their needs.

**METHODOLOGY:** A scoping review of the existing literature was conducted based on databases such as AMED, CINAHL, Academic Search Complete and Google scholar. 11 studies focusing on the contribution of yoga for children with mental health disabilities were selected taken into account the inclusion and exclusion criteria, the use of PRISMA guidelines and a quality appraisal tool was used for the development of analytical themes.

**RESULTS:** The studies reviewed provide convincing evidence that yoga is an accessible and effective intervention for populations that have physical, emotional and cognitive difficulties. Significant improvements were highlighted in motor skills, emotional regulation, cognitive and behavioural control. It is also underlined that yoga can be an essential part of therapeutic programs for children with intellectual disabilities. However, the variety in physical outcomes, specifically for children with cerebral palsy that have physical challenges, highlights the need for additional supporting interventions.

**CONCLUSIONS:** The 11 articles reviewed had generally showed that yoga is an effective intervention for children with mental health difficulties. The combination of physical movements, mindfulness and breathing are perfectly suited for multidimensional challenges for children with mental health disabilities. Yoga's effectiveness in a diversity of populations for children with autism, ADHD, children with psychiatric issues show that yoga can be acceptable and has a broad potential as therapy for these children.

**SUBJECT AREA:** Occupational therapy yoga for children with mental disabilities, caring for children with special needs.

**KEYWORDS:** Yoga, Mental health, Mental disorder, Mental Health Disabilities, Children, Adolescents

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## **ABBREVIATIONS TABLE**

### **Foreign language terms**

ICF	International Classification of Functioning, Disability and Health
ADL	Activities of Daily Living
ADHD	Attention Deficit Hyperactivity Disorder
ASD	Autism Spectrum Disorder
PDD	Pervasive Developmental Disorders
ID	Intellectual Disability
MR	Mental Retardation
OT	Occupational Therapy
AMED	Allied and Complementary Medicine databased
CINAHL	Cumulative Index to Nursing and Allied Health Literature
MeSH	Medical Subject
CE	Common Era
RCT	Randomized Control Trial
CBT	Cognitive Behavioral Therapy
ABC	Aberrant Behaviour Checklist
KiTAP	Kinder Test of Attentional Performance
MAC2	Movement Assessment battery for children
HRV	Heart Rate Variability
CCPT	Conner’s Continuous Performance Test
SUB	Subjective Units of Disturbance

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## CHAPTER 1: INTRODUCTION

Children’s lives are created from daily living activities that deliver the contexts in discovering their own behavior and forming their own culturally meaningful character. Participation in daily activities is an important feature as it plays a key role in human evolution. Based on this, daily living activities make up the fabric of a young human being whilst living with family can enhance the child’s skills and experiences in improving their learning development. Furthermore, the definition of activity by Dunst et.al is “a situation-specific experience, an opportunity or an event that involves a young individual’s interaction with others, the physical environment, that delivers a context for a child to learn about its own abilities and capabilities” (Dunst et. al., 2006).

Activities of daily living (ADL) are tasks that play a fundamental role in supporting children in environments such as school, home, and the community. ADLs are conceived within the “Participation and Activities” domain of the International Classification of Functioning, Disability and Health (ICF) and are classified as life living tasks required for self-care and self-maintenance. They are also classified as personal ADL tasks which are aligned towards self-care (bathing, dressing up, eating etc.), or instrumental ADL tasks which are oriented towards being independent and require a higher level of cognitive and physical competency than the personal daily living activities (meal preparation, taking care of pets, household chores etc.). Furthermore, Personal ADLs are performed by children more commonly, whereas adolescents can also engage in instrumental tasks. Children with mental health difficulties often have motor and other associated difficulties, that they often fall below the typical development trajectory. However, young individuals with mental health difficulties are more likely to have trouble with activities of daily living (ADL) whilst performing these tasks may be a high priority for their parents as well as a vital component for their personal growth. However, therapists must assess ADLs with strict outcome measures in order to facilitate effective intervention planning (James et. al., 2013).

The International Classification of Functioning, Disability and Health (ICF) has been evolving drastically since its establishment and is now comprising four vital components of daily living activities. These are: (1) body structures; , (2) body functions; , (3) activities and participation; , and (4) environmental factors. The concept of disabilities in the ICF indicates the biopsychosocial nature and highlights the urge to help young people to achieve their best capacity and participation in all aspects and parts of living (James et. al., 2013).

People with severe mental health impairments report that their way of living is of diminished quality, there is an assumption shared by many researchers that this is a consequence of their disability. However, evidence shows that this is only an assumption. Researchers also found that the quality of life for people with these impairments is diminished by a decreased social participation, reduced community services, few life opportunities, they may appear dissatisfied in contributing to everyday activities and having limited choices in control of their own way of living. These may all be factors contributing to depression. In addition to this, both depression and diminished quality of life may be consequences of social factors (Hammell, 2015).

The Occupational Therapy role within families aims to help parents and facilitate awareness and confidence on their child's strengths and weaknesses (Graham, 2017). Everyone has the right for occupational needs, all children must have the choice to choose their own daily occupations, participate in everyday occupations, have a variety of balanced occupations throughout their lives, for example, being productive, leisure and care. Lastly, engage in personally meaningful occupations to them (Brown & Hollis, 2013). While knowing the difficulty of parenting children with mental health disabilities, occupational therapists guide and assist the parents in a goal orientated way in implementing ideas for an improved performance and daily living for the child as well as the family (Graham, 2017). Occupational therapy does not direct the parent, but it assists the parent in resolving complex situations in relation to their child, implementing social life and activity opportunities for the child to achieve its best capacity and fulfilling their dreams and desires in a better and a social life (Graham. et al., 2009).

Children with intellectual disabilities often experience high levels of stress and distress from their surroundings. This includes environmental sensory anxiety which can be loud, fast-paced or distracting noises. Another difficulty an individual might experience is forming relationships with other people. Peer victimization and bullying are aspects that may distress a child with mental health difficulties. Learning or hobby environment spaces may be sites where such stressors can change and a potential site where children with mental health difficulties can engage in stress reduction tasks. Yoga can help these children to engage in a more peaceful but social environment as it is a holistic, mind and body practice that uses several techniques that can amplify potential stress with physical movement, such as breathwork and meditation and mindfulness practices (Killick et. al., 2023).

## Chapter 2 : INTELLECTUAL DISABILITY

### 2.1 Mental Retardation – Mental Health.

Intellectual Disability (ID) is classified as an abnormality which has huge impact on social effects. It does not only affect the children with it but also the people around them such as family, friends, and the wider society cycle. According to the Child Law Center, children with special needs are children who seek some form of extra special care due to health reasons. These can be mental, physical, or emotional health reasons. Millions of children in the world are diagnosed and its prevalence is counted to be at 3% in developed countries (Katz & Lazcano-Ponce, 2008).

Mental Retardation (MR) or Mental Health Disability or Intellectual disabilities are all general terms for common life-long conditions where differences in adaptive and cognitive functioning development occur in result of several abnormalities within the brain’s structure or function. In medical terms, mental retardation must not be thought of as a form of diagnosis but as a symptom of neurologic dysfunction, spasticity, or weakness to function. The presence of mental retardation has several impacts in many aspects of a child’s life, their family, their community and, the most important one, on their health and social life (Shea, 2006).

Mental disorders can be divided into several different categories based on the diagnosis and the characteristics that each child exhibits. They are disorders that can affect the child cognitively, emotionally, behavioral control and sustainability can interfere with the ability of the young individual to learn and with the ability of their parents and carers to function in their families, at work or generally within the society (Hyman et. al., 2006). These are children with reduced adaptive, intellectual, and functional behavior, with weakness in social adaptation and participation, it can be present at birth, or it can also appear in the first years of life. Intellectual disabilities are incurable and need therapeutic treatment or a suitable daily intervention that can help the child function in everyday living occupations. Any inactivity or lack of help for these children can impact the family as well as the child in various areas or everyday life.

Children with intellectual disabilities express a wide spectrum of disorders. These include psychiatric disorders such as psychosis or mood disorders, disruptive behavior disorders such as attention deficit hyperactivity disorder (ADHD), maladaptive traits such as high levels of anxiety or impulsivity and many other more specific features such as



stereotypes or self-injurious behavior. In addition, 30% of young individuals with intellectual disorders come under the autism spectrum disorder (ASD) or pervasive developmental disorders (PDD) (Dykens, 2000).

Additionally, children with diagnosis of any intellectual disability may experience times of being uncomfortable with their surroundings. For example, children under the autism spectrum disorder may experience stress and distress from their surrounding environment. This may include sensory difficulties and relationship and social difficulties. Their school settings are often recognized as complex social and sensory settings which can be challenging for them. However, school learning environments including physical education settings may concurrently be an environment where such stressors can be amplified and potentially students can engage in stress-reduction activities (Killick et. al., 2023).

Studies have shown that young individuals with intellectual and developmental difficulties may indicate higher levels of anxiety in comparison to children without any form of diagnosis (Lai et. al., 2019). Especially children with autism tend to report the highest levels of depression and anxiety in comparison to other children. Other internalizing disorders such as anxiety can impact children with autism due to the high levels of stress they experience. Some common behaviors that are noticed in young individuals with ASD can be difficulties in socializing and communicating with peers, repetitive behaviors and sensory features which can contribute to these imbalances in their stress levels. Aggressiveness and self-injurious behaviors are some behaviors that children with Autism experience. These come from comorbidities such as anxiety and stress which can be aggravated under stressful conditions (Dykens, 2000).

In contrast to their normal developing counterparts, children with intellectual disabilities exhibit more global and less differentiated self-concepts, together with less idealized self-perception. The above beliefs may pave the way for increased negativity or unrealistic appraisals of themselves over time, which may be compounded by exposure to failure. Due to their cognitive and adaptive delays, Zingler and Bennet-Gates in 1999 underline that children with intellectual disabilities often have a learning history dominated by failure experiences (Zigler & Bennett-Gates, 1999). Failing then exacerbates feelings of uncertainty and "learned helplessness" which can be connected to depression and other personal or even family issues. In spite of the fact that children with intellectual disability have a higher possibility of failure, it is still unknown whether or to what extent these risks are offset by nowadays emphasis on positive behavioral and inclusive support settings (Dykens, 2000).

## 2.2 Identification and Diagnosis

Diagnosis can be defined as the process of identifying and determining the nature of a disorder by the signs and symptoms revealed. This can be achieved through the use of assessment techniques such as tests or examinations as well as other available evidence within legislation and science. One of the most vexed topics in the field of mental health is how to diagnose and characterize mental disorders.

Diagnosing a child can be the key feature of recognizing, helping, and giving the child the ability to live in their own way according to their form of diagnosis. Lack of diagnosis and knowledge about intellectual disabilities, lack of training and infrastructure to establish diagnosis, as well as the absence of legislation in developed countries could significantly delay the possibilities for intervention and the use of specific services to provide the best possible techniques and structures for the child’s development (Katz & Lazcano-Ponce, 2008).

Detecting signs and symptoms different to the norms of each human being can be the first step in identifying and understanding that a child may or may not have some abnormalities within their mental or physical way of living. This can be seen by the parents as well, as they may identify some differences in their child compared to other children (Croft et. al., 2015). The initial contact for diagnosis begins with a meeting with the child’s parents conducting clinical history. Clinical history gives more emphasis on the child’s and mother’s healthcare during the child’s fetal life, prenatal, perinatal, and postnatal period. This includes the results of several previous examinations and studies including the family genealogical tree for at least three generations. This can include intentional research about the family’s history and antecedents of any mental health delay, psychiatric illnesses or any abnormalities that may have been reported in the past. Another form of diagnosing a child is the physical examination that gives attention to abnormalities, malformations, somatometric measurements, neurological and behavioral factors. This can be achieved through assessments. Some syndromes may further need gene analysis to distinguish etiological diagnosis (Katz & Lazcano-Ponce, 2008).

Some other forms of intellectual disability can be seen at an earlier stage of life due to some differences with the landmarks in theory. For example, Asperger Syndrome and Autism. This consists of three specific domains that can be seen as impairments in the child. These are functioning - reciprocal social interaction, communication and lastly, restricted – repetitive and stereotypical behaviors and interests. Another sign that may ring a bell is delays in cognitive and adaptive functioning as well an early-stage symptom of the Autistic

syndrome can be the absence of language delay by the age of 2 and 3 where the child must express a single word or a phrase accordingly (Toth & Stobbe, 2011). On the other hand, anomalies within the child's language that may include deficits in pragmatic language, or any use of stereotyped language are not regarded as delays. Identifying at least two or more social symptoms and at least one in restricted, repetitive, and stereotypical interests and behaviors are needed for diagnosing Asperger syndrome. Communication and learning difficulties and stereotypical behaviors such as insufficient facial expressions, limited gestures for example clapping smiling and nodding are observed. In children with Autism repetitive behaviors and interests are frequently observed. Such behaviors may be motor attitudes like twirling, finger flicking, hand flapping and headbanging. Children with autism are often interested and engage in repetitive use of things such as lining up toys, engaging with household repetitive items such as the washing machine, repetition of words as well as restricted echolalia. On the other side, if a child meets these criteria but has more symptoms across the domains discussed above, an appropriate diagnosis will be Autism. Unfortunately, there is limited empirical support in diagnosing the difference between higher functioning children with autism and those with Asperger in clinical presentation. The DSM-IV is planning to eliminate Aspergers disorder as a diagnosis within the future (Alrehaili et al., 2023)

Denial may be the initial reaction of any parent, which is normal. After that the first years they justify the differences during the critical development, while becoming more demanding when there is no significant change as the child is growing up. Wrong decisions in diagnosis and the impossibility in attaining the expectations may generate frustration and can result to serious errors in the child's childrearing. This undoubtedly may have a substantial impact on the psychological development of the young children as well as the parents. As a result, parents must confront the right diagnosis in order to limit the denial mechanism to prevent other difficulties (Katz & Lazcano-Ponce, 2008).

### **2.3 How do children with special needs identify their activities**

Children with special needs learn how to live their life in their own way, with their difficulties, the support they get and the environment around them. A lot of research show that occupational therapy focuses on their daily living and can help to improve their daily activities. This can be achieved as occupational therapists build on their goals and improve the child's quality of life as well as their families. The occupational therapy (OT) practice focuses less on the client's diagnosis and more on the actual activities of daily living (ADL)

task performances by identifying the most suitable solution to achieve a child’s goal. Since children with special needs have mental or physical difficulties that may impact their social life, occupational therapy prioritizes several ideas and activities on how enhance ADL ability.

Strategies in managing everyday life for people with special needs have been pointed out through ideas and themes such as “Finding new ways to perform activities” or “Researching for a reasonable balance of activities” (Kallhed & Mårtensson, 2017). More ideas such as “organizing activities” and “adjusting activities to today’s abilities” are themes that contribute to planning and prioritizing tasks in order to fulfill activities that are meaningful and bring joy in everyday living. All ideas discussed above are interventions that formulate the philosophy of occupational therapy as well as the occupational therapy theory. To develop a future occupational therapy intervention the above themes, support the structure of the occupational therapy process that focuses on the activities the patients consider to be meaningful and relevant to them (Nielsen et. al., 2018).

There are various models and approaches that can guide a therapist to determine and identify a person’s needs and wants. The Occupational Therapy Intervention model is an example that demonstrates a top – down strategy when an occupational therapist commences the procedure by gathering information and a broad picture of who the patient is and what the patient needs and wants to achieve. In depth, this model guides occupational therapists to use a client – centered, top – down, and occupational – based approaches for assessment and intervention. The assessment starts with an initial referral or a chart review. The therapist then meets the patient for an interview in order to build trust and a client – centered performance context for information and identity gathering and the identification of the patients’ goals. A top – down approach is then used to assess the situation taking in consultation the patients’ diagnosis and condition. Trust and a therapeutic rapport also start to establish and maintain a comfortable, unconstrained therapeutic relationship. Maintaining confidence and respect between the occupational therapist and the patient. A therapeutic rapport will also be established to maintain an unconstrained and comfortable relationship of respect and confidence from both sides, the therapist and the patient. The therapist will then identify the patients’ strengths and weaknesses to implement their performance analyses. This will help to evaluate the demands of an activity and the skills the patient will use by using standardized performance analysis. The therapist will then be able to identify the tasks that the patient cannot perform well and clarify any possible causes such as social or physical environments. Based on this performance analysis results the occupational therapist will choose the best suitable intervention or plan any strategies

to enable performance on the tasks the patient cannot perform. Occupational therapists use approaches to amend impairments that will be implemented to achieve the patient's goals (Fisher, 2009).

## Chapter 3 : YOGA

### 3.1 Definition and History of Yoga

Yoga is described as a tool of connecting mind and body together. In the book “*Yoga Kids; Educating the whole child through yoga*”; yoga is defined as much more than physical activity and postures to encompass a method of educating children. Marsha Wenig in 2014, explains yoga as a miscellaneous practice integrating physical movements, mindfulness, breath control and creating expression which aims in increasing a child’s physical, intellectual, emotional and social development. It is characterized as a tool of showing young people in connecting with themselves, their friends and family, their environment in a positive mindful approach (Wenig, 2014). It is a holistic practice combining physical activity as well as breathing and meditation exercises. Yoga was originated in ancient India aiming the unicity of the body, mind and spirit, increasing self-awareness, inner peace and health.

In “Yoga: original concepts and history” in the book “*Yoga and Mindfulness based Cognitive therapy*” a chapter is provided with a detailed description of the origins and the history of yoga (Pradhan, 2014). More information regarding history of yoga will be briefly explained below.

#### 3.1.1 Ancient Yoga

The roots of yoga were deeply ingrained in the Vedic tradition 5,000 years ago. Yoga was originated historically in ancient India which was developed as a philosophical spiritual discipline practice (Pradhan, 2014). The first concepts of yoga were focusing on the achievement of spiritual awareness and unity with the divine which is a reflection of the word “yoga” that come from the Sanskrit root of “yuj” which means “to join” and “to unite”. When yoga was first introduced as found in the ancient texts; it was mentioned as the “Vedas” and specifically the “Rigveda” which consists of hymns and rituals which were used by the Vedic priests. Further development aspects of yoga were introduced by the Upanishands emphasizing ethical practices and meditation (Singleton et al., 2022).

#### 3.1.2 Classical Yoga

Classical yoga introduces the significant contribution of the Patanjali who has stigmatized yoga through his yoga aphorisms (sutras) at around 400 CE (Common Era). Patanjali is commonly known as the “father” of yoga and his sutras are deliberated as the authoritative text of classical yoga. This is consisted by an eight-fold path of yoga (Ashtanga

Yoga) by Patanjali which was introduced; including ethical regulations and guidelines (yamas and niyamas), physical postures (asanas), breath control (pranayama) and meditation (dhyana) designed for spiritual liberation (moshka) (Pradhan, 2014).

### **3.1.3 Post – Classical yoga and pre-modern development**

History has revealed that that the medieval period, yoga had an evolving stage with the development of Hatha Yoga (Pradhan, 2014). This form of yoga had emphasized on physical posture (asanas) and breath control (pranayama). Hatha Yoga was importantly influential in the 11<sup>th</sup> century to prepare the body for meditation making it the foundation of several physical practices linked with modern yoga. Movements such as Tantric and Bhakti had also influenced yoga within this period by introducing religious and ritual practices that are still in some forms of yoga at present (Singleton et al., 2022).

### **3.1.4 Modern Yoga**

As previously reviewed in the literature, yoga in the 20<sup>th</sup> century was fully transformed from a ritual religious practice to a more focused physical and wellness health activity. It began to gain recognition internationally from the late 19<sup>th</sup> century due to the effort that was put in by Swami Vivekananda who had introduced yoga to the West in 1893 in Chicago. Coming in the 20<sup>th</sup> Century, yoga had gone through a significant transformation in which it became focused on fitness, physical activities, a calming technique activity and wellness (Singleton et al., 2022). Innovators such as Krishnamacharaya, Lyengar and Pattabhy had evolved and developed yoga in a more modern style that would emphasize on a broader audience such as both age groups adults and children (Pradhan, 2014).

In these days, yoga can adapt in several ways and forms including empowerment yoga, prenatal yoga, yoga as therapy; each adapting and catering to one’s different needs and preferences. Yoga has now spread globally in several countries with interpretations and styles. As previously highlighted, yoga has now been adapted to meet the needs of many cultures; fully integrated into modern wellness practices which includes the use of therapeutic related context such as mindfulness and cognitive therapy (Singleton et al., 2022). All in all, yoga has a rich background that goes beyond thousands of years back with several ways and interpretations that various age groups can gain and is still evolving significantly over time. It’s evolution from a spiritual practice to a global wellness activity can highlight the adaptability of yoga across centuries and cultures.

## 3.2 Benefits of Yoga

The activity of yoga can play a key role on a child’s life in several ways. Yoga does not only promote physical activity through flexibility, balance and strength but it can also increase a child’s emotions and emotional intelligence by making them understand and handle their feelings. It is also described as a playful and engaging hobby which makes it accessible and enjoyable for young people whilst building in their concentration, self-discipline, relaxation and life skills in general. The developmental stages of children’s internal and external growth can be adapted through yoga, fostering a sense of inner awareness, self-esteem and positivity towards life (Wenig, 2014). The main purpose of yoga is to accomplish a balanced coordination of the body, mind and spirit. The objective of yoga is not only designed to increase physical activity and health, such as flexibility, strength and cardiovascular function. It can be also used to enhance mental health, by stress reduction, anxiety and depression. Regular yoga practice seeks to develop general well-being and self-awareness. Noting that the therapeutic potential of yoga is its growing use in rehabilitation and medical settings in managing several conditions, such as mental health disorders and intellectual disabilities. This aspect of therapy highlights yoga in preventive healthcare and treatment of specific medical ailments (Nayak & Shankar, 2004)

### 3.2.1 Stress and Anxiety

The act of yoga supports young people to manage or reduce their anxiety and stress levels by teaching them how to handle their emotions with breathing exercises (pranayama), mindfulness and relaxation techniques. The parasympathetic nervous system is activated by these techniques, which is responsible for calming the body and the reduction of any “fight or flight” or any impulsive responses. A result to this, is that children who practice yoga on a regular basis tend to experience decreased levels of stress and anxiety which makes it easier to cope with challenges or emotional difficulties they might experience daily.

### 3.2.2 Emotional Regulation

The ability in managing and responding to any emotional experience in a healthy manner is emotional regulation. Yoga supports young people in connecting their emotions through meditation and mindfulness. Self-awareness is normally promoted from these practices and often help the children understand and control their emotional reactions which



can lead to more stable emotions and feelings as well as resilience (Nanthakumar, 2018). A benefit to this, is that emotional regulation can help the children in managing frustration, anger or any sorts of negative and hard emotions.

### **3.2.3 Sleep Quality**

Literature has previously shown that attending regular yoga classes can improve the quality of sleep in children. Techniques used for relaxation in combination with the physical exertion of yoga usually help young people calm and wind down before they go to sleep. This can help children in having more restful and deeper sleep which is a fundamental aspect for their growth and development learning, their overall well-being (Nanthakumar, 2018).

### **3.2.4 Physical Health**

Maintaining a healthy physique is a huge benefit that yoga can offer. Yoga can offer various physical health benefits such as increased strength, flexibility, coordination and balance. Physical improvement provided by yoga can play a key role for children’s development especially in a young age; by helping them perform daily physical activities and by reducing the risk of injury. In addition to this, yoga can develop a child’s posture, enhance their motor skills and give great support in a healthy lifestyle and healthy growth patterns (Nanthakumar, 2018).

### **3.2.5 Cognitive benefits**

Yoga often requires focus and concentration, which can be translated to increased cognitive function and academic success in a child’s real life. When teaching younger people to focus on their minds, yoga can enhance their attention span, it can help with memory and problem-solving skills (Nanthakumar, 2018). The above skills discussed can be beneficial into real life scenarios a child might experience such as the school setting, classroom were sustained focusing and cognitive sharpness are used.

### **3.2.6 Behavioral and Social skills**

Yoga encouragingly promotes positive social relationships and teamwork collaborations, especially in group classes where young people can perform partner postures and group activity exercises. This can foster a sense of community, collaborative work and empathy in youngsters to work with one another. In addition to this, yoga also teaches discipline and self-control which can lead to positive behaviors at home and in school settings (Nanthakumar, 2018).

All in all, these detailed benefits discussed above show how yoga can impact significantly on a child's life in several aspects, promoting physical health, emotional, cognitive and social well-being.

## Chapter 4 : METHODOLOGY

### 4.1 Study Purpose

This review carried out a thematic analysis literature review of the existing research studies on how children with mental health difficulties can benefit from joining a yoga class and the perception of them or their parents when using yoga intervention and techniques in their daily life. The context of this review is pinned on the experiences of children that have already used this technique and the values of their young individual to be socially inclusive and participating in activities like yoga when being diagnosed. However, yoga has been recommended but a root cause of this review was that each perspective varies to each child. Reviewing the existing literature on the benefits of yoga for these children may help the parents in identifying if yoga is beneficial for their child. Additionally, this may encourage families to decide to join or no longer attend yoga sessions for their child, which was based on the findings whether they were positive or negative. The following analysis aimed to inspire other healthcare professionals such as occupational therapists to determine whether to promote yoga as a beneficial intervention for children with a diagnosis of mental health difficulties. However, the main purpose of this review was to accomplish an advantageous outcome in implementing yoga that can benefit both parents and professionals to fulfill the child's needs.

Consequently, this academic scoping review explored the following questions in order to identify and outline any research gaps within the existing research:

- Whether yoga is a beneficial activity for the child or not.
- If there are elements or factors that may change in the implementation of the specific activity that would benefit children with mental health difficulties.

### 4.2 Research Design

For the purpose of this review, a scoping review was carried out to evaluate, identify and synthesize previously researched literature to create a synoptic summary of the existing published literature that can be future used for evidence-based practice. The main purpose in conducting this particular research design is because some research has been already carried out regarding the contribution of yoga to children with mental health disabilities but

an in-depth conclusion on the outcome of using yoga to children with intellectual disabilities was never highlighted. The dissemination and summary of the above scoping review findings within the existing literature can identify research gaps for further consideration research that will therefore come to light.

### **4.3 Thematic Synthesis**

An often-utilized strategy in health care research for evaluating empirical research is thematic synthesis. Thematic synthesis is developed in three stages: These stages consist of the indication of line-by-line coding articles, the formation of descriptive themes using the appropriate coding and creating analytical themes that are necessary (Thomas and Harden 2008). These three stages can be then utilized to for the exploration of the research question and the creation of the appropriate analytical framework themes relevant to the scoping review. Analytical themes can also illustrate the interpretation when researchers can surpass empirical studies and can generate new concepts of a certain topic while providing a more useful contribution to practice (Thomas and Harden 2008). The use of a systematic synthesis in this review can also be advantageous, as it uses minimized bias techniques and can also introduce the synthesis in a way that decision makers such as parents of children with special needs as well as yoga practitioners can acknowledge (Sofaer and Strech 2012).

### **4.4 Research Quality**

The systematic scoping review did not require approval from the ethics committee as it is a study based on previously published research found in recognized and reliable databases. Ethical integrity was fully retained as ethical approval has been secured by the committee of the National Kapodestrian University of Athens in conducting the specific research. No funding was required for the present scoping review. Ethical quality of the systematic scoping review must be taken into account by all reviewers and researchers of secondary data, as it can potentially poses ethical dilemmas for many researchers (Ruggiano and Perry 2017). This research project was carried out in an ethical manner with no potential harm or any disturbance to any individual; the ownership of any data analyzed is fully acknowledged and referenced. Guidelines to report any participant’s word or voice, the usage of primary data, issues of trustworthiness, ethical manner considerations and consent in secondary data investigation were also acknowledged and considered. Specified

quality criteria for constructing qualitative research are credibility, transferability, reliability, confirmability and the abilities in validation and ethics (Korstjens and Moser 2018). It should be noted that when conducting secondary data reviews, the above-mentioned criteria must be taken into account in order to prevent or minimize wrong interpretation and synthesis of the existing data. A fair comprehensive interpretation of the data selected was used in this review, to prevent any misunderstanding, selective presentation or any assumptions that may occur on behalf of the young people or the experts in yoga that will be reviewed. This can be accomplished through using the concept of reflexivity. A reason for this is that by reflecting on own ideas, thoughts or assumptions within the findings of this scoping review will minimize bias (Day 2012). The transparency of the process supports in rigor and the validity of the scoping review (Korstjens and Moser 2018). Quality criteria in conducting quantitative research methods are essential to ensure the validity, reliability and generalizability of the findings. Validity is divided into two aspects of validity: Internal validity and External validity. Internal validity measures whether the study is accurately measured, what is intended to measure and whether the effects observed are due to the intervention rather than other reasonable factors. External validity is referred to the generatability of the findings to other populations, times or locations. Reliability measures whether the findings can be attained if the study is repeated under the specific conditions. Generalizability is the extent to which study findings can be applied in wider contexts. Representative samples, appropriate sampling techniques and conducting the research in real life settings is ensured in generalizability (Bryman et al., 2008).

#### **4.5 Research Method**

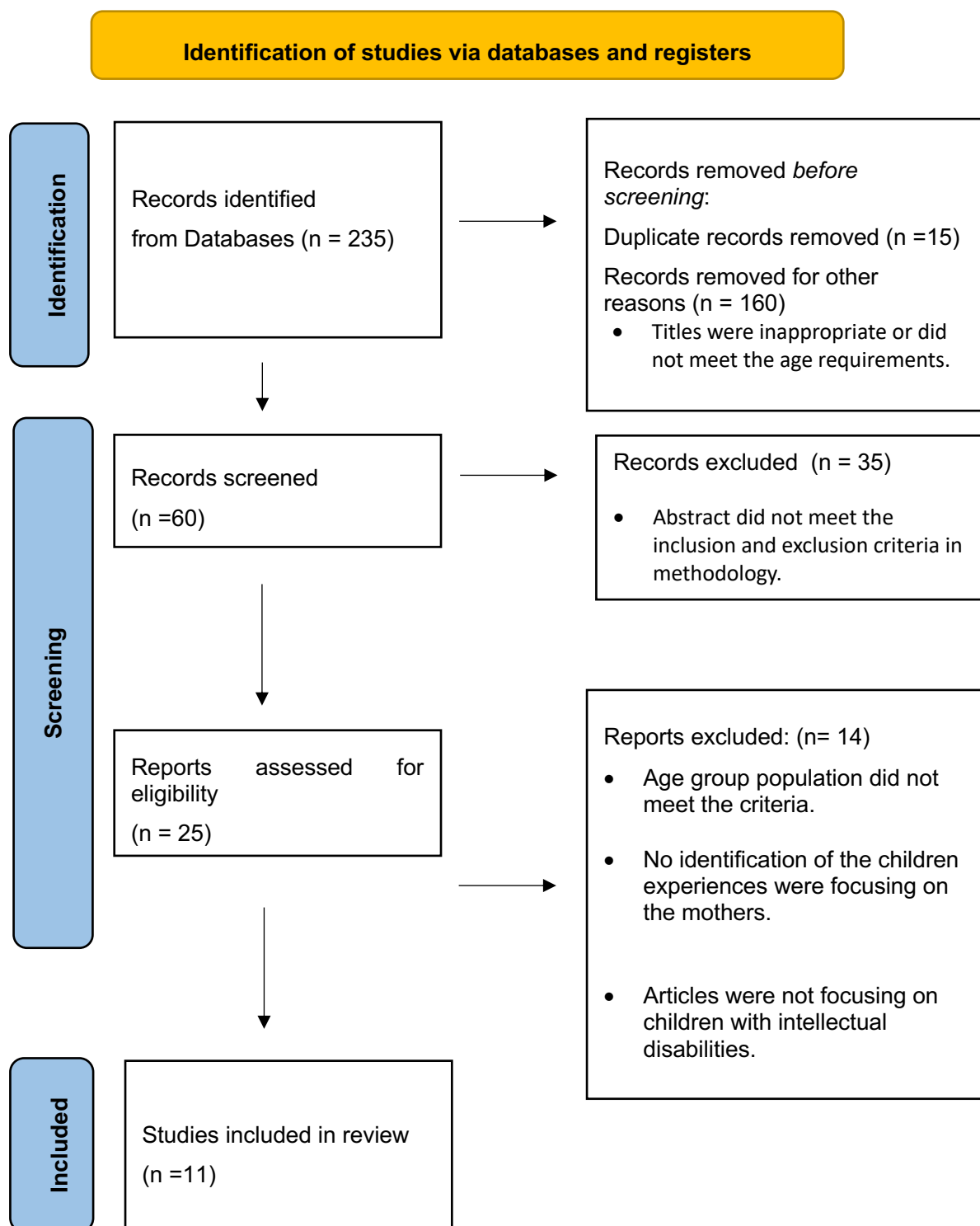
An evaluation search strategy was used in order to comprehend any existing literature available. Research from several healthcare multidisciplinary profession databases were used in conducting this review. The Allied and Complementary Medicine databased (AMED), the Cumulative Index to Nursing and Allied Health Literature (CINAHL) were used as they both focus on social and educational aspects of healthcare professions and are as well suitable for research scoping reviews. Another broad in depth of coverage database used was Academic Search Complete. Google Scholar was also used for several articles found in this review for its large variety of articles found in the specific database. It is a broader search engine for academic scholarly literature. MeSH headings, Boolean operators and truncations were utilized as they are a time consuming and useful way in

searching and finding more accurate and appropriate results, helping in the elimination of any unsuitable or irrelevant articles that may appear when searching. Search terms used were "yoga" AND "mental health" OR "mental illness" OR "mental disorder" OR "psychiatric illness" OR "mental retardation" AND "children" OR "adolescents" OR "youth" OR "child" OR "teenager".

#### **4.6 Study Collection Criteria**

In article selection, exclusion and inclusion criteria were used in selecting the appropriate articles that can focus on the contribution of yoga for children with mental health difficulties. Articles were excluded if the intervention was not yoga and participation related or if the population of the article was not focusing on young people and children. All articles included in this research review were in research form in order to identify and define the contribution of yoga for young people having mental health difficulties. All articles used must consist of interviews, measuring assessment tools and questionnaires that were taken when undergoing the yoga intervention. All articles must be primary research articles and complete published in English or Greek language in order to review. They must all consist of studies that concern yoga in children with mental health difficulties and all studied must be published from 2005 until 2024. Exclusion Criteria regarding this scoping review were duplicate articles, meta-analyses, all kinds of reviews and case studies. Inclusion and exclusion criteria are a provided method in which the researcher is assisted in selecting the appropriate articles for the review. Study Selection Criteria is a method that helps and enables the researcher to identify articles in an easier way by using the inclusion and exclusion criteria, which can further prevent any unnecessary reading of a full text article when the criteria are not met. Any articles that would not meet the criteria due to irrelevant information or outdated were excluded.

#### 4.7 Prisma Flow Diagram



(Page et al., 2021)

**Figure 1:** A PRISMA flow diagram demonstrating the articles identification process.

## Chapter 5 : FINDINGS

Systematic database searching has led the way in pointing out eleven appropriate articles to appraise in the present scoping review (Figure 1). The selected articles are fully summarized in the following articles table (Table 1). All Includes articles were selected according to the exclusion and inclusion criteria. The present scoping review has led to eleven articles due to the limitation of existing research regarding the contribution of yoga for children with intellectual disabilities, as most of the articles found were in several forms of research such as RCT’s, (Randomized Control Trials), Quantitative and Qualitative research.

### 5.1 Summary of articles table

Author / Title / Country	Summary of Article	Study Design / Sample	Findings
<p><b>Article 1:</b> (Re et al. 2014)</p> <p>Effects of yoga on patients in an adolescent mental health hospital and the relationship between those effects and the patients’ sensory – processing patterns.</p> <p>Illinois, USA</p>	<p>This study analyzes the utilization of yoga as a sensory regulation tool for stress reduction among teenagers in a psychiatric hospital setting. The aim of the study is to examine the relationship of yoga participation in sensory patterns and emotional regulation in psychiatric patients.</p>	<p>Quantitative study design with 75 adolescents participating between the age of 12 and 18 that were either inpatients or in a partial-hospitalization program. All 75 patients had engaged in at least 2 sessions of yoga and data collection was conducted from patient charts, pre/post measures that included pulse rates and distress ratings.</p>	<p>The outcome results had revealed improvements in the participants’ pulse rates and self-reported distress levels after the sessions. It is suggested that yoga may assist teenagers in acute psychiatric wards to self soothe, emotional regulation and eased emotional distress.</p>
<p><b>Article 2:</b> (Mak et al. 2018)</p>	<p>The current study explores the impact of a mindfulness – based yoga</p>	<p>Randomized Control Trial involving 42 children with Cerebral palsy divided into</p>	<p>The outcome of this study showed that the children demonstrated improved</p>



<p>Effect of mindfulness yoga programme                  MiYoga on attention, behaviour and physical outcomes in cerebral palsy: a randomized control trial.</p> <p>Queensland, Australia</p>	<p>program called MiYoga on children with cerebral palsy (CP)</p>	<p>2 groups. The programme consisted of 6 90-minute sessions undergoing a 6-week schedule in enhancing mindfulness and attention thought movement. The population was assessed attention using the Conners' Continuous Performance Test (CCPT).</p>	<p>attention, lower impulsivity and consistency. On the other hand, the program did not show significant improvements in physical functioning or psychological well-being,</p>
<p><b>Article 3:</b>                  (Cohen et.al 2018)</p> <p>Effects of Yoga on Attention Impulsivity and Hyperactivity in Preschool-Aged Children with Attention-Deficit Hyperactivity Disorder Symptoms.</p> <p>California, US</p>	<p>The research examined the impact of yoga on preschool young children that showed symptoms of attention deficit hyperactivity disorder (ADHD).</p>	<p>Randomized Control Trial that concerned 23 preschool-aged children that were divided into 2 groups who showed 4 or more ADHD symptoms based on an ADHD Rating Scale IV. The children were selected from preschool programs that focused on the children that showed ADHD behaviours. Results were conducted by parent questionnaires.</p>	<p>The overall result of the study is that yoga had led to improvements in attention control and in distractibility. Children that participated in the intervention group showed improvements in task performance and hyperactivity reduction. However. No changes in heart rate variability were identified. It is suggested that yoga can be an advantageous activity for managing impulsivity and attention for children with ADHD symptoms.</p>
<p><b>Article 4:</b>                  (Pise et al. 2018)</p>	<p>This article analyzes the impact of yoga program focusing on coordination and motor skills for</p>	<p>A quantitative experimental study that involved 70 children with intellectual disabilities divided into two</p>	<p>The experimental group revealed significant improvements in static balance, eye-hand</p>

<p>Effect of yoga practices on psycho-motor abilities among intellectual disabled children.</p> <p>India</p>	<p>children with intellectual disabilities.</p>	<p>groups: Experimental and control group. The experimental group participated in a 12-week yoga training of 1 hour per day whilst the control group did not. Both groups were evaluated in assessments of their psychomotor abilities and the results were analyzed using statistical methods.</p>	<p>coordination, agility and improved reaction time whereas the control group did not show any improvements in these areas. Overall, the analysis concluded that yoga is an effective exercise in improving psychomotor abilities in children with intellectual disabilities.</p>
<p><b>Article 5:</b> (Milton et al. 2019)</p> <p>Yoga and Autism: Students' perspectives on the get ready to learn yoga program.</p> <p>New York, US</p>	<p>The purpose of the study is to comprehend the perspective of students with Autism that participated in a get ready to learn yoga program as part of their physical education classes at school</p>	<p>Qualitative study design in capturing the experiences of 7 male students ages from 10 to 14 with ASD diagnosis. The program consisted in participating in 4 45-minute yoga session focusing on postures, relaxation techniques in improving functional and academic behaviour. Information was gathered through interviews in gathering their perspectives.</p>	<p>The outcome of this study was positive behavioural responses and self-efficacy. Students had indicated in feeling calmer and in more control of their actions after the program. They were also able to perform yoga poses indicating improvement in their physique contributing a sense of achievement.</p>
<p><b>Article 6:</b> (Tanksale et al. 2020)</p> <p>Evaluating the effects of a yoga-based program integrated</p>	<p>The article examined the significance of a yoga program integrated with cognitive behavioral therapy (CBT) on children with autism spectrum disorder (ASD).</p>	<p>Randomized Control Trial study design that involved 61 children between the age of 8 and 12 divided into 2 groups; one receiving a 6-week yoga program combined with CBT</p>	<p>The key findings of the trial showed that children who participated in the intervention indicated significant improvements in function and emotional regulation specifically in</p>

<p>with third-wave cognitive behavioral therapy components on self-regulation in children on the autism spectrum: A pilot randomized controlled trial.</p> <p>Queensland, Australia</p>		<p>elements focusing on emotional regulation, behaviour and attention improvement whilst the other group were on a waiting list for comparison.</p>	<p>managing emotions and feelings communication. Parent reports also state that there was improvement in sleep patterns and overall self-regulation.</p>
<p><b>Article 7:</b> (Laxman, 2022)</p> <p>Socio-emotional well-being benefits of yoga for atypically developing children</p> <p>Auckland, New Zealand</p>	<p>This study investigates the impact of yoga on the behaviours and well-being of children who are atypically developed especially on children with ASD in a special needs school in New Zealand.</p>	<p>Qualitative study design on acknowledging the living experiences of children with autism spectrum disorders when participating in yoga sessions. This study consisted of 5 weekly sessions of yoga lasting 15 minutes each which explored on how this intervention affected the children’s behaviour and well-being through interviews.</p>	<p>Children that underwent this intervention reported that participating in yoga sessions was engaging leading in improvements in physical health and flexibility. Emotional regulation was also improved through breathing techniques as the kids appeared calmer. The overall study suggestion was the incorporation of yoga into the school curriculum for atypically developing children; in enhancing their well-being.</p>
<p><b>Article 8:</b> (Helsel et al. 2022)</p> <p>A Remotely delivered Yoga intervention for</p>	<p>The present study evaluated the practicability of delivering yoga remotely in improving physical</p>	<p>Quantitative Feasibility study design focusing on 20 adolescents with autism spectrum disorder (ASD) with average age of 13 that</p>	<p>This study demonstrated that remote yoga sessions for children with ASD were feasible and effective as attendance</p>

<p>Adolescents with Autism Spectrum Disorder: Feasibility and Effectiveness for Improving skills Related to Physical Activity.</p> <p>Kansas, USA</p>	<p>activity. Focusing on motor skills, balance, strength and flexibility.</p>	<p>completed a 12-week yoga intervention.</p>	<p>and engagement was high and the whole intervention had shown significant improvements in leg strength, flexibility and dynamic balance.</p>
<p><b>Article 9:</b> (Shanker &amp; Pradhan, 2022)</p> <p>Effect of yoga on the motor proficiency on children with autism spectrum disorder and its Feasibility of its inclusion in special school environments.</p> <p>India</p>	<p>The article investigates the impact of yoga for children with Autism Spectrum Disorder (ASD). Exploring the effect of a group yoga program on motor proficiency and its inclusion in special needs schools.</p>	<p>Quantitative Quasi-Experimental study design exploring the impact on yoga with 43 young people across 4 special needs schools. The study population was divided into two groups, the yoga group and the control group. The yoga group completed a yoga program for 12 weeks with 45-minute sessions, while the control group did not participate in the intervention.</p>	<p>The main outcome of the article suggests that yoga has a positive impact on gross motor skills (balance and coordination) for children with autism. It is also suggested that the inclusion of yoga in school-based environments is effective in enhancing motor proficiency in children with Autism.</p>
<p><b>Article 10:</b> (Tom &amp; Singh, 2023)</p> <p>Effectiveness of Yoga Training as an Adjunct Intervention Alongside Multisensory Teaching in Enhancing Self-esteem and</p>	<p>This study demonstrates how yoga can be integrated with multisensory teaching for children with Learning Disorders. Evaluating the effects on self-esteem and behavioral parameters.</p>	<p>Quantitative Quasi-Experimental study design that includes the pre and post intervention assessments to measure the effect of yoga training; examining on how the intervention affects behavioural and self-</p>	<p>The key findings of the article were improved self-esteem and reduction of negative behavioural issues. The young people of this study showed significant improvements in self-esteem especially in their social and</p>

Behavioural Parameters of Children with Learning Disorders.  India		esteem parameters of children with learning disabilities.	academic aspects as well as contributing to their emotional regulation and stress management.
<b>Article 11:</b> (Ju et al. 2024)  Effect of Yoga Intervention on Problem Behavior and Motor Coordination in Children with Autism.  China	This study was conducted to assess the impact of yoga on children on the Autism Spectrum. Addressing the challenges of problem behaviours and motor coordination difficulties.	Randomized Control Trial that was conducted in an 8-week period. The study population were 17 children with ASD that attended 45–50-minute yoga sessions 3 times per week focusing on breathing exercises, physical postures, negative behaviours and motor coordination.	The outcome of this study showed that the yoga sessions had significantly reduced negative behaviours such as irritability, social withdrawal and had also shown improvements in motor coordination specifically in dynamic and static balance.

**Table 1:** Summary of Articles selected for the review.

### 5.1 Sources selection

Following the review of the existing literature listed in the table above (Table 1), duplicates and some other articles were removed due to illegibility, a total of 60 articles were identified through database searching online. Based on the abstracts and titles 35 had been excluded with 25 full text articles remaining to be assessed to identify eligibility. 15 articles were excluded for the subsequent reasons: 8 articles were excluded as they didn't include children with any disability, 4 articles were focusing on the experiences of the mothers of children with intellectual disabilities and 3 articles were excluded as the age group population was out of the children's age range. The remaining 11 article studies were eligible to be considered within the review (Figure 1).

## 5.2 Analytical themes developed

Further on the review of the existing literature that is listed above, multiple findings and opinions were gathered. Children which was the study population that was reviewed within the present scoping review had revealed that yoga could perceive a positive change in their activities, tasks, daily living routines, behavior and motor skills. Children with all sorts of intellectual disabilities such as autism spectrum disorder (ASD), attention deficit hyperactivity disorder (ADHD) and others that will be mentioned below had led to significant changes within their character and behaviour after undergoing the intervention of yoga sessions within their school or hospital settings accordingly. One article does not mention a specific disability but focuses on general intellectual disabilities which will be analyzed separately. The following analytical themes which will be divided by each intellectual disability regarding the effects of yoga on each mental health diagnosis will be the outcome of the synthesis that was conducted.

- Psychiatric patients
- Cerebral Palsy (CP)
- Attention Deficit Hyperactivity Disorder (ADHD)
- General intellectual disabilities
- Learning Disorders
- Autism Spectrum Disorder (ASD)

## 5.3 Yoga and Psychiatry

The effects of yoga as a sensory regulation tool on patients within a mental health hospital setting is included within the present scoping review. Youngsters participating within the yoga intervention had showed a considerable significant reduction in distress as this was measured by the Subjective Units of Disturbance (SUB) scale. Such reductions happened regularly across all participants regardless of their gender or sensory patterns. Notable improvements in physiological measures were reported, specifically a decrease in pulse rates following the yoga sessions which indicated a calming effect on the adolescents. The present study used the adolescent/adult sensory profile to assess any sensory seeking or avoidance within the sensory processing preferences. Regardless of

any individual sensory patterns, yoga assisted the adolescents in emotional regulation responses that led to a suggestion that yoga is an effective intervention for diverse sensory needs. This study comes to the conclusion that yoga can offer therapeutic benefits in acute psychiatric hospitals in helping patients in emotional management, managing their distress and effective self-regulation. It is highlighted that yoga can be a complementary treatment to assist emotional and sensory regulation for adolescents in mental health settings. It is suggested that yoga can be effectively incorporated as a non-pharmacological intervention for psychiatry in clinical settings (Re et al. 2014).

#### **5.4 Yoga and Cerebral Palsy**

The investigation whether yoga could improve attention, behaviour and physical outcomes for children with cerebral palsy (CP) is examined in the article “Effect of Mindfulness Yoga Programme MiYoga on Attention, Behaviour and Physical Outcomes in Cerebral Palsy: A Randomized Control Trial”. Children participating in the yoga group revealed improvements in their attention and their abilities to control impulsive behaviours. They also demonstrated better sustained attention, less impulsivity and increased consistency in task completion which was measured by the Conner’s Continuous Performance Test (CCPT). These findings were increasingly better compared to those in the waiting list group suggesting that mindfulness tasks can help cognitive control for children with cerebral palsy (CP). With the attention being the primary focus of this study, this intervention had also positively impact behaviour parameters. Children participating in the yoga group were better in concentration and focus contributing to better behaviour management. Even though the most significant improvements were in attention and behaviour, this study did not come out with any significant improvement in physical outcomes such as strength, flexibility or motor function. This means that while yoga can easily enhance behavioural and cognitive aspects, yoga may be needed to be combined with other therapies in improving physique for children with CP. To Finalize, yoga has demonstrated effective improvements in attention and behaviour; limited effects were identified on physical functioning thus the study suggests that the use of yoga in rehabilitation programs for children with cerebral palsy can improve cognitive and behavioural outcomes (Mak et al. 2018).

## 5.5 Yoga and ADHD

One article within this scoping review focuses on the effects of yoga on children with Attention Deficit Hyperactivity Disorder (ADHD). Cohen et al. had carried out a research of a randomized control trial (RCT) on the impulsivity, attention and hyperactivity for preschool children with a diagnosis of ADHD. All children were divided into two groups; group 1 which were the children that participated in the yoga sessions and group 2 which were children that were on a waiting list and participated in yoga on a second phase. This intervention has shown major improvements in attention. The kinder test of attentional performance (KiTAP) tool was used and had revealed faster reaction times and less distraction errors which indicated increased attentional control for children that participated in yoga in comparison to the control group that were on the waiting list. Reduced impulsivity and hyperactivity were reported by parent-rated scales through questionnaires and ADHD rating scales. The outcomes reported by the parents showed reduced hyperactivity and symptoms of impulsivity after completing the yoga sessions especially the ones with more severe symptoms. Heart rate variability (HRV) was measured with inconsistent effects to explore physiological changes related with self-regulation. It is suggested in the study that the physiological markers of stress might need longer duration times or different settings to define as no significant differences were noticed between the two groups. Despite the fact that some children particularly those with increased impulsivity, that struggled with yoga and changes in their environment this intervention has led to better engagement. This was noticed as parents would use yoga DVDs to encourage regular practice at home and children had showed increased and improved participation in silent settings. To sum up, Cohen's study stated that yoga can be a beneficial activity in improving concentration and attention while reducing hyperactivity and impulsivity in children with ADHD at a preschool age although some aspects such as HRV showed less impact (Cohen et.al 2018).



## 5.6 Yoga and Intellectual Disability

Effects of yoga practices on psycho-motor abilities for children with intellectual disabilities are examined on a twelve-week intervention study that focused on motor abilities these include static balance, agility, eye/hand coordination and reaction timing among children with intellectual disabilities in general. Significant improvement was shown within the yoga group in static balance which was measured by the standing stork test. Children within the yoga group were able to balance for longer periods of time after the twelve-week yoga intervention in comparison to the control group that did not show any significant change. Improved static balance is attributed to sustained yoga practice which required stillness, and stability body control. Participants within the yoga group established a significant improvement in hand and eye coordination ( $p < 0.001$ ) which was measured by the wall toss test where participating children had to catch a ball thrown against the wall whilst alternating their hands. In comparison to the control group that showed less improvement ( $p > 0.05$ ) as yoga exercises had likely increased proprioception and reflexes, allowing for more precise hand/eye coordination activities. Considerable gains were reported in the agility of the yoga group, as measured by the shuttle run test. Agility can play a critical role for motor control and the repeated practice of dynamic poses that likely contributed to improved speed and flexibility. The control group again had showed no significant improvement, demonstrating the efficacy of yoga increasing motor skills. A dramatical improvement of reaction time was reported within the yoga group which was measured by the ruler drop test. Such improvements assist in faster reflexes which can be reasoned to the calming and focusing effects of breathing exercises and meditation in comparison to the control group that did not show any changes in reaction time. In conclusion, this study showed that yoga significantly improves psychomotor abilities such as balance, coordination, reaction time and agility for children with intellectual disabilities in general. Such developmental improvements feature the potential of yoga as an effective intervention that can be implemented in therapeutic and educational schedules to enhance mental and physical well-being. Growing evidence that yoga can improve motor skills effectively for children with intellectual disabilities, it can also improve their abilities in performing daily activities and securing an improved quality way of living (Pise et al. 2018).

## 5.7 Yoga and Learning Disorders

To examine the effects of whether yoga training is an adjunct intervention for increasing self-esteem and behavioural parameters for children with learning disorders a research study was carried out in 2023. Young participants in the yoga intervention had shown considerable improvements of self-esteem due to the combination of physical postures, mindfulness and breathing techniques that were used in yoga which improved their self-awareness and body postures. A noticeable reduction in negative behaviours such as aggression and impulsivity were also reported in this study. These changes in their behaviour were because of the calming effects of yoga that helped the participants manage their emotions more easily and effectively. A combination use of multisensory teaching techniques which engage in several senses during learning activities had complemented the yoga practice. This combination approach assisted the children in integrating their learning experiences in enhancing their emotional and social development alongside with their cognitive abilities. The yoga intervention program was well structured which made the children to highly and actively engage in the sessions. Caregivers and teachers had also observed that the participating children would appear more attentive and participated more in the classroom after the yoga sessions. This study proposes yoga as a powerful tool for self-esteem enhancement and behavioural management issues for children with such disorders. The potential in integrating yoga within the school curriculum as an intervention alongside with multisensory teaching is highlighted (Tom & Singh, 2023).

## 5.8 Yoga and Autism Spectrum Disorder

A total of six articles included in this review, are research regarding yoga and children diagnosed with autism spectrum disorder (ASD). Two of them are a quantitative study design, two are qualitative and the remaining consist of a randomized control trial (RCT) research design.

Lauren Milton and her colleagues in 2019 had carried out qualitative research on yoga for children with autism; collecting their perspectives on a get ready to learn program alongside with yoga. The participating students had stated that they experienced a sense of calmness and relaxation after joining the yoga sessions. Several had states

improvements in their concentration and stress management that are difficult areas for children with autism. Such behavioural changes were also observed and supported by their teachers and occupational therapists at their school, decreased impulsivity and improved attention were observed during and after their sessions. Another noticeable outcome was that the student's capacity to remember, recall and replicate yoga poses and breathing techniques on a regular basis and outside of the yoga sessions. This shows improved motor coordination development and an increase sense of self control of their bodies which is again a difficulty children with ASD face. The intervention participants perceived yoga as an enjoyable task, breathing techniques were emphasized to be helpful in stress and anxiety management whilst physical yoga postures improved their body awareness and body coordination (Milton et al. 2019).

In a randomized control trial that was conducted in 2020 by Tanksale et al. on evaluating the effects of a yoga program intervention integrated with cognitive behavioral therapy (CBT) for sixty children with Autism between the ages of 8-12 years old that were divided in two groups: intervention and control groups. Findings of this study include improvements in functioning, sleep and anxiety and emotional awareness. The trial primarily focused on self-regulation and executive functioning. A statistical reduction in executive difficulties from the baseline until post intervention (-2.61 mean decrease) and improvements after six weeks follow up (-4.17 mean decrease). Such results suggest that the combination of CBT and yoga had an encouraging impact in assisting children in emotional regulation, positive thoughts and behaviours. Parents reported fewer sleep issues after completing the intervention which showed that yoga has a positive effect on the children's sleeping routines. On the other hand, even though improvements in anxiety and emotional awareness were reported the effects were fewer and more varied, which is suggested that more research is needed to understand the impact on a deeper level. The young participants of the yoga group revealed a higher ability in communication and were better in understanding their emotions, becoming more self-conscious in understanding their feelings and more willing in engaging in emotional meditation after completing the intervention. To sum up, this study stated positive outcomes on self-regulation and functioning the researchers noted the need for additional research with a larger-scale study population as some non-significant findings such as anxiety and emotions were not fully assessed; thus, the need of further investigation to expand and confirm these results (Tanksale et al. 2020).

The article by Helsel et al "A Remotely Delivered Yoga Intervention for Adolescents with Autism Spectrum Disorder: Feasibility and Effectiveness for Improving Skills Related

to Physical Activity” is a quantitative study design. This research had analyzed the feasibility and impact of a yoga intervention remotely program on physical activity skills for young people that have a diagnosis of Autism. The research aim was to assess if yoga could effectively improve some key components of strength, balance, motor skills and flexibility that are often seen as areas that challenge children with autism. The outcome of this study demonstrated an increased level of engagement and participation by the children as a nineteen out of twenty contributors that have completed the whole twelve-week intervention program. An average of 83% had been reached by the participants for attending the programmed yoga sessions with suggestion that remote delivered interventions are feasible for the specific population. In Addition, noteworthy improvements had been observed in various physical related skills. Flexibility had been improved with a percentage of 40.3%, leg strength had increased by 12.5%, specifically a dynamic balance of 11.1% on the right leg was enhanced and an 8.1% on the left leg were increasingly observed. Such results emphasize the potential that yoga can deliver to improve physical functioning for children with Autism. Motor and physical gains had been additionally noticed as increases in motor skills particularly skills related to flexibility and balance recommend that yoga can be a valuable tool in enhancing not only physical well-being but also motor control and coordination issues that are related to autism. All in all, this research calls to attention the use of yoga as a therapeutic intervention in adolescents diagnosed with autism spectrum disorder (ASD) by showing improvements across various physical and motor domains that can be all delivered through a remote accessible way (Helsel et al. 2022).

A second research article included in the scoping review is a quantitative quasi-experimental article; the “Effect of yoga on the motor proficiency on children with autism spectrum disorder and its Feasibility of its inclusion in special school environments” by Shanker and Pradhan in 2022. This study included forty-three young children with autism across four different special needs schools that were randomly divided in two groups: the yoga group which consisted of twenty-three children that participated in the yoga intervention and the control group of twenty children who did not participate. The yoga program was a forty-five-minute yoga session that was programmed five days a week for twelve weeks. Trained yoga teachers were focusing on key motor skills throughout the session recording them daily on their progress and responses. Motor proficiency was pre and post intervention assessed using the Bruininks-Oseretsky Test of motor proficiency (BOT-2) that focused on evaluating the children’s motor skills. The findings of this research were in several areas of development for children with autism. The gross motor

skills of the participants in the yoga group intervention had been developed significantly including the areas of strength, balance and gross motor coordination. Notable improvements were in balance, specifically dynamic balance and postural stability. On the Bruininks-Oseretsky test (BOT-2) the yoga group had revealed a progress of around 18-25% in gross motor function in comparison to the other group. These consist of abilities like speed, running, agility and body coordination in general. Fine motor skills were the second outcome that was seen in this research but had only showed an approximate 5-10% of increasement; these consist of manual dexterity and hand-eye coordination. An outstanding result is that yoga is beneficial for physical muscle skills but might need to be improved and supplemented with tasks in enhancing fine motor skills at the same time. Strength enhancement was identified within the yoga group, specifically leg and core improvement. Strength was developed within the yoga participant group by reaching an approximate percentage of 15-20% for those who actively participated in the forty-five-minute sessions. Coordination and balance had shown pronounced outcomes as the study reported an enhancement of 20-30% in balance tasks, emphasizing the potential for yoga to meaningfully enhance stability and physical control in general. A large percentage of 80% was reported in this study as the yoga group participated actively in the intervention program showing the feasibility and participation in including yoga into the schedule of special need schools. The overall rate of attendance in this intervention came up to an 85% that shows a manageable and well-receiving activity within the school context. In contrast, the control group had a very minimal improvement of 3-5% approximately in gross motor skills which supports the impact of yoga on motor proficiency. To conclude, this study had showed that yoga had significant enhancement in gross motor skills and less gains in fine motor skills with percentages of 18-30% and 5-10% accordingly for children with autism. Such results can easily propose that yoga is a feasible and effective activity in physical ability enhancement within school environments (Shanker & Pradhan, 2022).

Laxman’s article: “The socio-emotional benefits of yoga for atypically developing children” that particularly focused on children with a diagnosis of Autism Spectrum Disorder (ASD) was a detailed examination on how yoga can impact their emotional well-being and physical health. This study consists of a qualitative study design and was conducted in 2022. Data collection of this research involved observations of the participant behaviour, physical progress, emotional responses and feedback of caregivers and teachers. The specific yoga sessions had revealed significant development in flexibility and physical health in general. Several young people who often face difficulties

on body control and coordination had showed obvious progress in their motion range and their improved ability in physical activities. The children would appear feeling more relaxed and calmer after participating in the intervention through breathing techniques alongside with anxiety reduction and emotional distress. It was reported that several children had accomplished an improved emotional regulation, reducing any sense of increased anxiety, stress and frustration. Another positive outcome that was highlighted is that kids that participated would experience a fun and engaging exercise that would help them create a positive emotional manner alongside with positive activities. Children had also expressed their enjoyment that further maintained their willingness to participate in yoga regularly. Teachers and caregivers revealed fewer emotional outbursts and behavioural imbalance as an outcome effect of the yoga sessions. This illustrates the potential of yoga in supporting behaviour management for children with ASD. A critical feature of this research was the feasibility of integrating yoga in special needs schools. This study showed that yoga can be easily integrated in the school’s curriculum without any disruptions to the normal school program. It is also suggested that short regular yoga sessions are beneficial and practical due to the children’s engagement and enthusiasm in joining the sessions. All in all, Laxman’s study highlights the holistic well-being benefits of yoga not only on physical well-being but also in increasing and enhancing children’s emotional health. The combination of physical activity and relaxation that is offered by yoga can be a valuable tool in improving social and emotional aspects for children with autism (Laxman, 2022).

A randomized control trial (RCT) included in this scoping review examined the effects of yoga on motor coordination and problematic behaviour for young people with Autism. Significant reduction in problem behaviours were noted for the participants of the yoga intervention, specifically in the areas of withdrawal and irritation problems. Positive changes were noticed during the intervention and had continued in follow up measurements with the Aberrant Behaviour Checklist (ABC) indicating that yoga had a noticeable effect in reducing problematic behaviours and continued for four weeks after the sessions had ended. This research intervention had found a significant improvement in the youngster’s motor coordination which was assessed by the Movement Assessment battery for children – second edition (MABC2). The yoga intervention had showed noteworthy gains in both static and dynamic ball skill balancing which calls attention to yoga’s potentials in enhancing motor abilities which are often delayed for these children. Four weeks after the intervention a follow up was complete which again has confirmed that yoga is a beneficial activity for children with autism and specifically for reducing

negative behaviours and improving motor coordination. The level of engagement and feasibility were also observed in this study as well; with the experimental group reaching over a 90% of attendance in the sessions. Although all of the above positives are stated from this study, further research is suggested to identify a detailed overall outcome result (Ju et al. 2024).

## Chapter 6 : DISCUSSION

The present thematic analysis scoping review had led to six different diagnosis as analytical themes in which explored all eleven articles that were discussed in detail above regarding the impact of yoga for children with intellectual disability disorders. Across the large span of mental health yoga can impact significantly on such children in a different way for each child and each diagnosis.

These articles related to yoga interventions give specific emphasis on behavioural, cognitive, psycho-motor and emotional effects of yoga within different populations. Helsel’s study revealed noticeable improvements in physical health and capabilities such as flexibility, balance and strength.

Improvements in flexibility and dynamic balance occurred within his study while the remote delivery of the intervention did not negatively affect engagement, and this was showed by a high attending rate of the children in the intervention. This study’s findings on balancing and flexibility improvements support closely with Pise’s et al. in 2018 study who had also found noteworthy gains in coordination and static balance for children with intellectual disabilities. In addition to this, the physical and emotional benefits were equivalent with the outcomes of Ju’s article where children with autism had reported improvements in motor coordination and behaviours. Shanker and Pradhan in 2022 highlighted improvements in gross motor skills such as balance, coordination and strength, however minimal fine motor skill gains were reported that emphasized the ability of yoga to mostly improve gross muscle activities. Comparing to the findings of the study conducted by Helsel in 2022 and Pise et al. in 2018, where gross motor skill improvements were less vigorous. Both studies revealed that yoga can effectively help with large-scale motor skills but needs more intervention in fine motor skill functions.

Laxman in 2022, emphasized the emotional benefits of yoga, specifically anxiety and stress reduction by promotive calmness and relaxation through breathing techniques. Emotional regulation had been enhanced significantly for children across several developmental difficulties. Laxman’s research findings regarding the emotional regulation benefits of yoga are similar to the findings of Re et. al 2014 in which significant reduction in emotional outbursts and distress occurred for the adolescents in a psychiatric ward after their yoga sessions. Both studies underline yoga’s ability in acting as a sensory regulation tool that can reduce emotional stress and anxiety regardless any sensory based patterns. Tanksale’s study in 2020 had carried out a combination study of cognitive behavioural



therapy (CBT) and yoga, noticeable improvements in self-regulation and functioning were found. Emotional control regulation had revealed fair few improvements, but it was not the primary focus of the study. Yoga and therapy combination had resulted in greater self-regulation across the six-week intervention. Tanksale's focus on executive functioning reflects the cognitive improvements reported by Cohen in 2018 for children with ADHD, where yoga has significantly enhanced their attention and impulsive control. In addition to this, like Mak's study 2018, Tanksale emphasizes the cognitive benefits of yoga which are combined with CBT or mindfulness that can both have cooperative effects on increased levels of cognitive skills. A qualitative study carried out by Milton in 2019 captures the participants reflections on the effects of yoga, giving emphasis on the calming and focusing effects this intervention and giving attention on how it helped them in emotional regulation. Students with a diagnosis of autism stated yoga had helped them in their ability to manage their stress and increase their engagement in physical education classes. Student perspectives and emotional regulation findings of this article are well aligned with the findings of Laxman (2022) and Re et al. (2014), who both concluded that yoga is an effective activity in enhancing emotional well-being and stress reduction. Ju in 2024 had reported in his study that significant reductions in problematic behaviour occurred, such as social withdrawal and irritability parallel to improvements in motor coordination. It must be noted that these improvements were sustained for even a month after the intervention which indicated long-term benefits as well. These long-term findings on behavioural improvement are as well reinforced by Tom and Singh (2023) who stated significant enhancements in behaviour and self-esteem through the intervention of yoga. In addition to this, Ju focuses on behavioural changes that are similar to the study of Cohen (2018) were reductions in hyperactivity and impulsivity that were observed. As previously discussed, Cohens study had revealed improvements in impulsivity control, attention and hyperactivity following the yoga sessions. Children's ADHD symptoms were drastically reduced and the participating children had shower greater and faster reduction times when completing the Conners' Continuous Performance Test.

Similar results are in improvements in attention and task completion are reported in Mak's study (2018) for children with Cerebral Palsy, which suggested that yoga is a broad activity in improving cognitive control across other developmental conditions. Furthermore, comparable results are shown in Tanksale's findings that also reveal improvements in executive functioning for children with ASD, giving emphasis in yoga's cognitive regulation benefits. Learning disorders study by Tom and Singh had revealed increased improvements in self-esteem by 20% and behavioural parameters for children with yoga in combination of

multisensory teaching. In addition to this, behavioural issues had decreased, and children started feeling more confident. Such results are effectively aligned with the results of Ju (2024), where behaviour difficulties such as irritability and withdrawal had decreased after the yoga sessions, recommending that yoga interventions can identify emotional and behavioural difficulties in a variety of special needs populations. Moreover, self-esteem improvements match with the findings of Milton in 2019 where the study gives emphasis on how yoga has helped students with autism spectrum disorder to feel more self-efficacious. The Cerebral Palsy article by Mak (2018) focused on attention and task completion context of yoga. The participating children showed marked improvements in sustaining attention in other aspects except from physical ones like strength in the lower limb. Cognitive enhancements in attention and concentration reflect those identified in Cohen (2018) and Tanksale (2020), in which similar improvements in focus and task performances were identified in children with ASD and ADHD. Nonetheless, lack of physical task improvements varies with the motor function improvements reported in Pise et al. (2018) and Helsel (2022).

Yoga and sensory processing in mental health settings study by Re (2014), demonstrated that yoga had helped in the reduction of emotional stress and improved emotional regulation in adolescents in a mental health setting. Regardless of the sensory processing patterns, yoga was used as a sensory regulation tool providing emotional relief for the participating patients. The findings of this article are similarly aligned with Milton (2019) and Laxman (2022) where reduction in anxiety occurred as well as emotional regulation after the yoga interventions. Furthermore, sensory regulation aspects are lines up with Tom and Singh's findings (2023) which underlined behavioural regulation in children with learning disorders. Pise's study that had focused on intellectual disabilities in general had revealed significant improvements in eye and hand coordination, static balance, agility and reaction timing in children with any kind of intellectual disability. These results show to be consistent to those from Shanker and Pradhan (2020) as well as Helsel (2022) who also reported improvements in gross motor skills such as balance and coordination abilities after the yoga intervention.

Findings of the scoping review did not only share improvements on several aspects regarding the contribution of yoga on children with intellectual disability but share a detailed comparative analysis of yoga in relation to disability. When comparing the eleven studies included in the review the key dimensions of the research outcomes are cognitive enhancement, motor skill development, emotional regulation and behavioural improvements. Providing a better understanding on the impact of yoga on different

populations, starting from children with intellectual disabilities to adolescents with autism or ADHD.

One of the most common and consistent findings of the review is the enhancement of motor skills with several studies underlining various aspects such as balance coordination, agility and strength. Helsel (2022), Pise et al. (2018), Shanker and Pradhan (2020) revealed that yoga can significantly enhance gross motor skills such as strength and balance in children with ASD and intellectual disabilities. Helsel reported an 11.1% of improvement in dynamic balance whilst Pise showed similar improvements in static balance and coordination. Such findings support Ju's results who also reported improvements in motor coordination for young people with ASD, highlighting sustained benefits for weeks after the yoga intervention. On the other hand, Mak had focused on children with CP which did not show any improvements in physical functioning in lower-limb strength, even though they showed improved attention and task-following abilities. In contrast to this, the physical benefits are also seen in other developmental disorders such as ASD and other intellectual disabilities. Lack of physical health improvement in this study can be an attribute to the motor challenges that are associated with CP. Consequently, while yoga reveals greater efficacy in improvement in gross motor skills for children with ASD, the impact on physical health functioning for children with cerebral palsy appears limited without any supplement therapy.

Yoga's contribution on cognitive control and functioning is another area of strong evidence across several studies in the review. Tanksale (2020) and Cohen (2018) both highlighted improvements in executive functioning and self-regulation, especially in children with ADHD and Autism. Tanksale (2020) had revealed moderate improvement in self-regulation and attention when the yoga intervention was combined with CBT. Additionally, Cohen (2018) indicated that preschool children with a diagnosis of ADHD had improved with faster reaction timing and reduced hyperactivity after the yoga intervention, highlighting improved cognitive functioning. Correspondingly, Mak (2018) stated improvements in attention amongst children with CP, supporting the idea that yoga can efficiently enhance attention across several developmental disorders. All in all, cognitive benefits in yoga seem tied to yoga's ability in promoting self-discipline, calmness and focus which are essential for young people struggling with attention deficits. Such findings also suggest that yoga can match with existing cognitive therapies to maximize their potential and efficacy. Another pronounced outcome across the studies mentioned above is the effectiveness of yoga in behavioural management and emotional regulation, especially in children that are facing emotional dysregulation, these consist of children with ASD, ADHD and learning disorders.

Both Laxman (2022) and Re et al. (2014) had found that yoga assisted in the reduction of emotional anxiety and distress through yoga's breathing and mindfulness techniques. These interventions helped the young participants in managing their anxiety and emotional responses. Milton (2019) supported these outcomes, showing that children with autism recognized yoga as a relaxing practice that improved their focus and decreased their emotional irritations. Meanwhile, Ju (2024) stated that yoga had helped in the reduction of problematic behaviours for children with ASD such as irritation and social withdrawal, highlighting that these benefits were sustained weeks after the intervention had finished. Yoga's ability in emotional regulation is also reported in the outcomes of Tom and Singh's (2023) study who revealed improvements in self-esteem and reduction in behavioural difficulties for children with learning disorders. This is demonstrated by the breathing and mindfulness exercises yoga can offer for emotional management. The overall findings of this aspect of the review suggest that yoga does not only enhance physical and cognitive abilities but also plays a key role in improving emotions and behaviour by making it beneficial for children with such challenges. Another advantage of yoga interventions is the potential for long term benefits that are also highlighted in several studies reviewed in the present scoping review. Ju (2024) stated that the positive effects of motor coordination and behaviour that were gained through the sessions were maintained weeks after the intervention was finished, advising that yoga can provide long lasting benefits in autism treatment. In similarity to Tom and Singh (2023) that also reported long-lasting improvements in task following abilities and attention, indicating that yoga can give a post-intervention lasting impact on emotional and behavioural regulation. On the other hand, Mak (2018) showed long-term improvements in attention and task following abilities for children with CP, the physical benefits were not maintained which suggested more consistent yoga practices may be necessary for motor skill enhancement for children with cerebral palsy. Behavioural and Sensory Process intergration was highlighted in one of the reviewed articles in the scoping review. Re et al. (2024) focused on the relationship of yoga and sensory processing patterns especially in psychiatry. The study had revealed that yoga assisted the participants in regulating their sensory responses, in emotional distress reduction across several sensory processing aspects such as sensory seeking or sensory avoidance behaviours.

These outcomes show that yoga has calming effects that extend beyond regulation of emotions and has a role as a sensory regulatory tool in psychiatric care. Sensory regulation aspects are indirectly mirrored in the emotional behavioural improvements in the studies by Milton (2019) and Laxman (2022). Both articles revealed that yoga had helped

in anxiety reduction and improved the participants emotional awareness, although sensory processing aspects are not directly measured in the studies. Conversely, a primary divergence between these studies is in the differences in physical outcome reporting, especially in populations that have physical disabilities such as cerebral palsy. Helsel (2022), Pise et al. (2018) and Shanker and Pradhan (2020) all show noteworthy physical improvements in motor functioning such as balance, strength and coordination. In contrast to Mak (2018) that found that children with CP did not indicate any significant improvements in physical ability like lower limb strength or flexibility; even though they showed cognitive improvements. This divergence shows how the effectiveness of yoga in physical function improvements may vary based on each population.

Children with autism or intellectual disabilities might benefit more from motor function related improvements, whereas children with cerebral palsy may need additional or more intensive interventions to address their more complex physical difficulties. Conclusively, across this findings yoga acts as a versatile, effective intervention in improving cognitive, motor, emotional and behavioural outcomes which may vary based on the population or the disability.

## Chapter 7 : CONCLUSION

Conclusively, the present scoping review has underlined the contribution of yoga for children with mental health disabilities. The findings collected from the studies discussed above robust the evidence that yoga is a versatile, effective intervention in improving cognitive, motor, emotional and behavioural outcomes in a variety of populations, especially in children with intellectual disorders such as autism spectrum disorder (ASD), attention deficit hyperactivity disorder (ADHD), learning disorders and physical disabilities such as cerebral palsy (CP). Several studies highlight the impact on motor skills such as balance, agility and strength. The studies carried out by Helsel (2022), Pise et al. (2018) and Shanker and Pradhan (2020) had all showed consistently improvements in motor ability functions such as balance and coordination for children with autism and intellectual disabilities in general. Such findings are reliable across several studies where motor control was seen as a primary finding, with improvement ranging up to 40% in measurements such as strength and flexibility. On the other hand, Mak (2018) who had focused on children with CP revealed that whilst yoga improved attention and task following abilities, it showed limited effects on physical functions like lower limb strength. This indicated that yoga’s physical benefits differ according to the condition and populations with more severe difficulties such as CP which may require additional support. In addition to this, yoga appeared to significantly improve attention, focus, cognitive control and executive functioning. Studies by Tanksale (2020) and Cohen (2018) revealed that yoga had significant improvements in children with autism and ADHD in areas including self-regulation and attention with obvious reduction in hyperactivity and impulsive behaviours. These outcomes are also reflected in Mak’s (2018) study who reported that yoga had drastically improved sustained attention for young people with cerebral palsy. The incorporation of yoga with the cognitive behavioural therapy (CBT) intervention in Tanksale (2020) advises that the combination of yoga with other therapeutic modalities and tools can amplify the cognitive improvements. Furthermore, yoga has always been proven effective in encouraging emotional regulation and enhance behavioural outcomes from several articles. Re et al. (2014) and Laxman (2022) confirmed that yoga helps in anxiety, emotional and distress reduction and improving problematic behaviours like aggression, irritation and social withdrawal. In psychiatric mental health hospital settings yoga has helped the participating adolescents in emotional regulation regardless their sensory processing matters, making yoga a helpful toll in emotional stability as per Re et al. (2014). Additionally, Ju (2024) and Tom and Singh (2023) underlined the potential of yoga in behavioural issues reduction and in improving self-esteem with the effects being

sustainable weeks after the intervention. Many studies also highlighted the long-term sustainability benefits of yoga. For example, Ju (2024) emphasized improvements in motor coordination and improved behaviour weeks after the intervention had finished which suggested that yoga had long lasting effects. Likewise, Tom and Singh (2023) revealed continued improvements in self-esteem and behaviour for children with learning disabilities. Such benefits indicate that yoga is not only effective for short-term intervention but also gives lasting therapeutic benefits. Cooperatively, these eleven studies provide convincing evidence that yoga can be an accessible, non-invasive and effective intervention for a wide range of people with physical, cognitive and emotional difficulties. Improvements shown in motor skills, emotional control, cognitive and behavioural regulation management seen within these studies show that yoga can act as an essential part of educational and therapeutic programs for such populations. Thus, the variety in physical outcomes, especially for children with cerebral palsy that have physical difficulties emphasizes the need for additional intervention in some cases. The nature of yoga which is combined in physical movement, mindfulness and breathing techniques, is uniquely suited for the multidimensional difficulties children with special needs face. The effectiveness of yoga in a diversity of populations from those with ADHD and ASD to those in psychiatry show that yoga has a board potential and applicability as a therapeutic tool.

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