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Prevalence & Effectiveness Of Physiotherapy Interventions In Attention Deficit Hyperactivity Disorder In School Going Children

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ABSTRACT

Background: Attention-deficit hyperactivity disorder (ADHD) is one of the well-known neurological developmental disorders among children, adolescents, and even in adults. It is a childhood and adolescence condition which characterized by a pattern of persistent, extreme per-meant, and debilitating inattention, impulsivity and over-activity. There are 3 major different sub-types of ADHD predominantly inattentive subtype, predominantly hyperactive–impulsive subtype, and combined inattentive/hyperactive-impulsive. ADHD is one of the most prevalent chronic health disorders affecting 3–5% of school age children.

Methodology: The review search from two high-quality databases (Pub Med and Web of Science). Keywords used for each separate string were ("Autism" OR "ADHD") AND ("Sensory integration therapy" OR "SI Therapy" AND ("Play therapy" OR "ADHD" OR "Prevalence" OR "ADHD") and were search through Title/Abstract and Topic for each database, respectively.

Result: ADHD manifests in approximately 2-18% of children between the ages of 6 and 12 years. Several studies estimated the prevalence of ADHD, in USA 4-8%, Korea 7.6% to 9.5%, India 20% , and Emirates 29.7% in United Arab. Most of the studies show effectiveness of sensory integration therapy as well as play therapy in children with ADHD in terms of symptom reduction, functional improvement and overall quality of life.

Conclusion: This review underscores the growing significance of physiotherapy as a promising intervention for managing ADHD symptoms among school-going children. Further research is warranted to refine and customize physiotherapy interventions, ensuring equitable access and optimal outcomes for all children diagnosed with ADHD.

Key words Autism, Sensory integration therapy, Prevalence, Play therapy, ADHD

INTRODUCTION

Attention Deficit Hyperactivity Disorder (ADHD) is one of the well-known neurodevelopmental disorders in childhood, adolescence and even in adults.[1]The American Psychiatric Association lists three types of ADHD: ADHD-Inattentive, ADHD-Hyperactivity/Impulsivity, and ADHD-Combined.[2]Children with ADHD may struggle to focus, lack self-control and impulsive behaviors, or exhibit excessive activity.[3]Inattention normally appears when an

individual is involved in certain tasks or assignments that demand, for example, sustained and systematic listening, perceptual and visual search, rapid reaction time and vigilance. Impulsivity is marked by actions which are hasty and have the potential risk of negative outcome such as a child running across a street without even paying attention to the traffic, adolescents or adults quitting suddenly important activities such as jobs or school without thoroughly thinking of the consequences. Hyperactivity is essentially marked by excessive motor function. Children, especially the younger ones like those in church or school mostly show tendencies of hyperactivity. ADHD occurs in all ethnic groups and social classes and is the most common neurobehavioral disorder of childhood.[4] ADHD is considered a neurodevelopmental disorder as it is predominantly a consequence of a delay in specific mental abilities.[5]There are parts of the brain that are delayed or dysfunctional in maturation especially that the "brain's prefrontal cortex may develop more slowly as well as "irregularities in the way certain neurotransmitters in the brain function in people with ADHD".[5, 6, 7] The fundamental aspect of Attention Deficit Hyperactivity Disorder ADHD, according to the Fifth Diagnostic and Statistical Manual of Mental Disorders (DSM5), is a set of behaviors that disturb social status. Increased motor activity in inappropriate contexts, excessive wobbling, finger play, and talkativeness are examples of these social circumstances, which can interfere with personal and educational life.[3]

The exact cause of ADHD is unknown, yet many researchers offer different ideas as to the source of this disorder. A widely accepted view centers on the medical model which poses that ADHD is the result of neurological abnormalities, brain injuries, and/or genetics. The behavior of children with ADHD is thought by some researchers to be caused by a structural anomaly in the prefrontal cortex of the brain and/or neurotransmitter abnormalities.[8,9] Scientists at the National Institute of Mental Health (NIMH) suggest that ADHD has a biological basis that serves as a link between a person's ability to pay close attention to detail and his or her level of brain activity. These researchers feel this has to do with the level of glucose used by the areas of the brain that inhibit impulses and control attention.According to the medical model, another possible cause of ADHD is brain injury. Earlier theories were based on studies of brain injured children who exhibited signs or behaviors similar to those in a child with ADHD. In fact, one of the early terms for ADHD was Minimal Brain Dysfunction. Moreover it is believe that attention disorders often run in families, so there are likely genetic influences. Research indicates that 25% of close relatives in families of ADHD children also have ADHD, whereas the rate is only about 5% in the general population.[10]

Symptoms of ADHD are frequent in school-aged children and can last far into adulthood. In general, ADHD is usually characterized by impulsivity, attention deficit, and hyperactivity. A person with inattention may have trouble remaining on task, maintaining focus, and maintaining organization. A hyperactive person may appear to move around frequently or fidget excessively. An impulsive person may behave without thinking or struggle with self-control. Patients may be unable to pay close attention to detail or may be careless when performing tasks such as schoolwork, job, or other activities.The initial signs of hyperactivity are frequently hard to detect until a child reaches the age of 4, and it is most evident in elementary school. Attention deficit disorder affects children differently depending on their age and gender, and it is three times common in boys than in girls.[11]There are significant differences in how the condition reveals in boys and girls. Boys with ADHD usually show externalized symptoms, such as running and impulsivity. On the other hand, Girls with ADHD, typically show internalized symptoms such as inattentiveness and low self-esteem. Boys also tend to be more physically aggressive and externalize their frustrations, while girls tend to be more verbally aggressive and turn their pain and anger inward, putting them at an increased risk for depression, anxiety, and eating disorders.[12]

The prevalence rates of ADHD may vary and this is dependent on various factors such as: age i.e. the disorder shows no age discrimination and the prevalence rates are shown to be variable between children and adults; age i.e. a higher prevalence is mostly present in boys than girls; the presentation i.e. The illness can be variable between patients based on severity, impulsive and hyperactive symptoms, and the inattention combination; many adults suffering from ADHD have undiagnosed or diagnosed psychiatric co-morbidities that may complicate the ADHD diagnosis as well as

treatment.Globally, ADHD has an overall mean prevalence of approximately 2.2 %. A 0.1-8.1 % range in children and young adults under the age of 18 has been estimated.[13]Worldwide pooled prevalence of ADHD is 5.29%. Prevalence of ADHD in India ranges from 1.6 to 14% in various studies. About 7% school going children have been reported with ADHD.[14] ADHD is one of the most prevalent chronic health disorders affecting 3–5% of school-age children. ADHD manifests in approximately 2-18% of children between the ages of 6 and 12 years. Several studies estimated the prevalence of ADHD, in the USA as 4-8%, in Korea 7.6% to 9.5%, in India 20%, and in Emirates 29.7% in United Arab.[15,16]Likewise, almost 50% of children with ADHD will be placed in special education programs for learning disabilities and behavioral disorders.[17] Since special education programs are found in elementary and middle schools, ADHD was believed to be a childhood disorder that was outgrown around mid-to late adolescence. Yet 50%-80% of children will continue to have symptoms of ADHD into adolescence. Also about 3%-7% of adults have ADHD, yet only 15% of them know they have ADHD.[18]

ADHD can have an impact on multiple occupations in a child's life, making it difficult to function in the home, school, and social environments. Children of this population may experience failure in every aspect of their life, negatively affecting their self-esteem and confidence.[19] Once the diagnosis of ADHD is given there are two treatment options: the medication-only approach and the combination of the medication with the behavioral or psychosocial therapy. The combination of the medication and behavioral or psychosocial therapy has been proven the most effective because it not only gives clients medication, but it gives them time to talk about what is going on with them and how their behaviors can be adjusted.[20] The treatment of ADHD requires medical, educational, behavioral, and psychological treatment. This involves parent training, behavior intervention strategies, an appropriate educational program, education regarding ADHD, individual and family counseling, and medication when required.[10, 21]

The treatment of children with ADHD needs to be multidisciplinary, with emphasis on subtypes and in the co-morbidities that are associated.[22] There is currently a shortage of physiotherapy work in the area of psychiatry, although it was concluded that body techniques have much to contribute in mental health care and stresses that physical therapy must take its place within the area of psychiatry. Through physical therapy, it can be used several techniques, such as massage therapy, play therapy, sensory integration therapy and breathing exercises to reduce anxiety, stress, muscle tension, sensory issues caused by ADHD and thus promote relaxation and improve the quality of life.[23] Some practitioners use different interventions in the clinical settings that they claim to be effective in improving the problems associate with ADHD. Among these interventions play therapy and sensory integration therapy, that have been utilized with children and is effective in improving cognitive skills, sensory issues and treating this disorder.[24,25,26]

Play therapy is a developmentally appropriate and culturally sensitive counselling intervention for children that enables them to use play to communicate and engage with their feelings. This form of treatment recognizes that people have the internal resources required to both grow and reach their potential. Thus, play-therapy enables children, as opposed to therapists, to control the pace, direction and content of their therapeutic journey. Based on the belief that play is a child's natural medium of communication and learning about themself, others and the world around them, play therapy sets children on the path toward self-actualization through self-expression and the processing of experience. This is especially important for children who have experienced adverse experiences such as grief and loss, domestic violence, divorce, attachment issues, bullying, medical trauma and chronic illness, abuse, autism spectrum disorders, ADHD, anxiety, bullying, and the impact of parental drug and alcohol use or mental health issues.[27]

The treatment of children with behavioral, social and emotional difficulties is most effective when therapists and counsellors adopt developmentally appropriate interventions. As such, play therapy has become one of the most popular therapeutic approaches for treating childhood mental health conditions.[28,29] Play therapy is a developmentally appropriate and culturally sensitive counselling intervention originating from Carl Rogers' philosophy of person-centred therapy. [28,30,31,32] This form of treatment recognizes that people have the internal resources required to both

grow and reach their potential.[31] Thus, play-therapy enables children, as opposed to therapists, to control the pace, direction and content of their therapeutic journey.[33] Based on the belief that play is a child's natural medium of communication and learning about themself, others and the world around them, play therapy sets children on the path toward self-actualization through self-expression and the processing of experience. [30,34]

Sensory integration, also known as sensory processing, refers to a person's ability to organize, interpret, and respond to the input gathered by their senses in various situations. According to this theory, individuals with typically developing sensory processing skills are able to organize the input from their senses, interpret the information, and respond appropriately. In contrast, individuals who display sensory delays or deficits in this area are reportedly likely to display deficits in adaptive skills, such as remaining focused on tasks during typical activities.[35] Children with autism spectrum disorder (ASD), attention-deficit hyperactivity disorder (ADHD), and other sensory processing disorders can have sensory issues that fall under the categories of tactile, vestibular, and proprioceptive (i.e. touch, deep pressure, movement), and these deficits can lead to inattention and off-task behaviors in the classroom.[36]

With the rise of the sensory integration theory, and research examining perceived sensory processing deficits across disability categories, there has been an increase in sensory-based interventions prescribed by physiotherapists and occupational therapists. These interventions are intended to target a range of modalities (e.g. vestibular, somatosensory, and auditory) and have focused on a variety of target behaviors and provided to, or applied to, an individual that fits into their daily routine and are intended to address their sensory related challenging behavior, examples of which included weighted vests, brushing, and sitting on a therapy ball.[37]

There is only a limited source of information regarding the prevalence and effectiveness of physiotherapy interventions on ADHD. Hence, this current review aims with early diagnosis and effective treatment can dramatically improve their ability to function successfully in the classroom setting, to relate to family members and friends, and to develop a positive sense of self.

REVIEW OF LITERATURES

1. Articles on prevalence of ADHD:

Johny Kutty Joseph et al [38] conducted a study which concluded that the point prevalence of ADHD among children and adolescents in the included studies ranges from 1.30% to 28.9%. The pooled prevalence of ADHD among children and adolescents is 7.1% and according to the ADHD Institute, Japan the world prevalence of ADHD ranges from 0.1% to 8.1%. This explains that ADHD affects quite a large number of children in India. Again, **A.C. Ndukuba et al** [39]explained in a study that Twelve (6.6%) children met the criteria for diagnosis and a history of prolonged labor and parents' negative assessment of their marriages were the most predominant factors which independently associated with ADHD in the children. Moreover, Sami Richa et al [40]concluded that the prevalence of ADHD Inattentive subtype was 3 per 1,000, Hyperactive-Impulsive subtype 12 per 1,000, and ADHD Combined subtype 17 per 1,000 and ADHD was significantly more prevalent in boys than in girls**. Jyothsna Akam Venkata et al** [41]found that the prevalence of ADHD among primary school children was found to be 11.32%. Prevalence was found to be higher among the males (66.7%) as compared to that of females (33.3%). The prevalence among the lower socio-economic group was found to be 16.33% and that among the middle socio-economic group was 6.84%. The prevalence was highest in the age group of 9 and 10 years. Likewise **Alipasha Meysamie et al** [42]concluded that 1403 children aged 3-6 years, 362 were classified as having ADHD symptoms according to their parent evaluation [25.8% (23.6-28.1%)] and 239 according to their teacher's evaluation [17% (14.1-20.4%)]. **The author Neyir Gul et al**[43]explained that the prevalence of ADHD was 8.6% (n=97) and the subtypes were predominantly inattentive 1.6% (n=18), predominantly hyperactive/impulsive 6.1% (n=69), and combined 0.9% (n=10) respectively and the male to female ratio was 3.5/1 for ADHD (all subtypes).**Mohammed M. J. Alqahtani et al** [44]conducted an another study, concluded that the overall rate of ADHD was 2.7%, and in particular, the rate of attention types, was 2.0%; hyperactive/impulsivity type, 1.4% and combined type, 0.7%. Teachers reported ADHD at a higher frequency than parents.

Moreover, **Jamal H Al Hamed et al** [15]suggestedthat the overall prevalence of combined ADHD was 16.4% (208), 12.4% (157) hyperactivity-impulsivity and 16.3% (207) inattention disorders respectively and a variety of socioeconomic factors such as these including parents' low level of education, mother's occupation, and low socioeconomic status. to be significantly associated with the development of ADHD. Likewise, **Milena Pereira Pondé et al** [45]concluded that 6.7% of children were considered highly likely to have the disorder. Of the more severe cases of ADHD, the hyperactive-impulsive subtype was more frequently identified in girls, while the inattentive subtype was more prevalent among boys. The another author **Paria Hebrani MD et al** [46]suggested that one hundred thirty-three (12.3%; CI95%: 10.3 –14.2%) children were diagnosed to have ADHD and recommended the need for diagnosis and treatment of ADHD in preschool-age children. **Guardiola et al.**[47] carried out a study in which they assessed the prevalence of ADHD in 484 pupils using two criteria: DSM-IV and neuropsychological criteria. The results showed that the incidence of ADHD using the DSM-IV criterion and the neuropsychological criterion were 18% and 3.5%, respectively. **Shabani et al.**[48] conducted another research wherein 428 elementary childrens were studied. According to the findings of this study, 4.9% of students (or 21 persons) have ADHD. According to a survey conducted by Adonna et al.[49], 8.7% of Nigerian students aged 7 to 12 had ADHD. In addition, the prevalence of attention-deficit subtypes was determined to be 4.9%, hyperactivity/impulsivity subtype 1.2%, and hyperactivity and attention deficit subtype 2.6% in this study. According to research **by Mahala et al.**[50], 18.1% of Tunisian youngsters suffer from ADHD. ADHD was identified as the most common disorder among teenagers in another study **by Oes Borg et al.** [51], which looked into the prevalence of chronic diseases among adolescents with mental disabilities aged 18−12.Another study on the prevalence of ADHD was undertaken by **Maulov et al.**[52] A total of 210 Lebanese teenagers between the ages of 11 and 17 were studied. 10.2% of persons have ADHD, according to the findings of this study.

2. Articles on Physio-therapeutic interventions of ADHD:

2.1 Articles on sensory integration therapy

Case-Smith et al [37] had examined the effectiveness of SIT for children with ASD and co-occurring sensory processing problems on self-regulation and behavior and found that positive effects of SIT on reducing negative behaviors. Moreover , **Lang et al** [53] had Identified, analyzed, and summarized the research involving the use of SIT in the education and treatment of individuals with ASD and found that as no benefit or mixed benefits as positive results with a level of certainty. Likewise**, Yunus et al** [54] had examined evidence of Sensory Based Interventions with children with behavior problems of ASD and concluded that positive results in behavior for sensory based interventions is in tactile interventions.**Watling et al** [55] concluded that there is a moderate amount of evidence supporting Sensory Integration for people with autism involving treatments related to sensory issues. Moreover, **Schaaf et al** [56] were evaluating the effectiveness of SI in comparison to usual care in children with ASD which had showed significant improvement with SI. According to **Pfeiffer et al** [57] SI Therapy showed more significant improvement in the treatment group than the control group in the attainment of goals in children with ASD. Likewise, **Delvin et al** [58] were investigated and compared the effects of SI therapy and behavioral intervention on rates of challenging behavior in children with autism which explained that behavior intervention was found to be more effective in reducing challenging behaviors than SI therapy. According to **Miller et al** [59] that sensory integration approach is better in ameliorating attention, cognitive/social, sensory, or behavioral problems in children with ASD.

2.2 Articles on Play therapy:

Lin and Bratton's et al [60] meta-analytical review of 52 previously published studies looking at the effectiveness of play therapy found that it could improve overall behaviour problems, internalizing behaviors, externalizing behaviors and self-efficacy in children. These findings are largely consistent with those uncovered in **Ray et al.'s** [61] meta-analytical review of 23 studies focused explicitly on the effectiveness of play therapy in schools. They also align closely with the findings of earlier meta-analytical studies by **LeBlanc et al.** [62], that noted the overall effectiveness of

play therapy, and **Bratton et al.** [60], which highlighted its positive impact on behavioral problems, social adjustment, personality concerns, self-concept, anxiety/fear and developmental/adaptive concerns. In particular, knowledge surrounding play therapy's ability to improve internalizing and externalizing behaviors has been strengthened, while its effectiveness at reducing stress and social-skill deficits has been more clearly revealed **Pester et al.** [29]; **Parker et al.** [64]. The meta-analytical studies conducted by **Ray et al.** [61] and **LeBlanc et al.** [62] both acknowledged that participating in play therapy can improve a child's academic performance. More specifically, both studies noted play therapy had a small to medium effect on a child's overall academic performance. It is important to note, however, that **Lin et al** [60] only observed a small effect, and thus warned that the ability of play therapy to improve academic performance may actually be limited. Further research conducted in the review has helped to strengthen the case that play therapy does have a positive effect on a child's academic performance. For example, it has been found in at least two studies that play therapy can lead to a statistically significant improvement in academic scores amongst normal functioning school children **Blanco et al.** [65,32]. Similar findings have also been uncovered in studies looking specifically at the effect of play therapy on academic performance amongst at-risk kindergarten and second-grade students **Blanco et al.**[66]; **Perryman et al.** [67]**; Massengale & Perryman** [68]. In fact, it has even been noted in one study that at-risk children who participate in play-therapy may see their academic results improve by more than their normal functioning peers who do not participate in play therapy **Perryman et al.** [67].

METHODOLOGY

This review looked at the prevalence and effectiveness of physiotherapy interventionson ADHD in School going childrenby a systematic review and meta-analysis of cross-sectional data. The technique for carrying out the various stages of this study following the criteria of Guideline [69] was created and implemented.

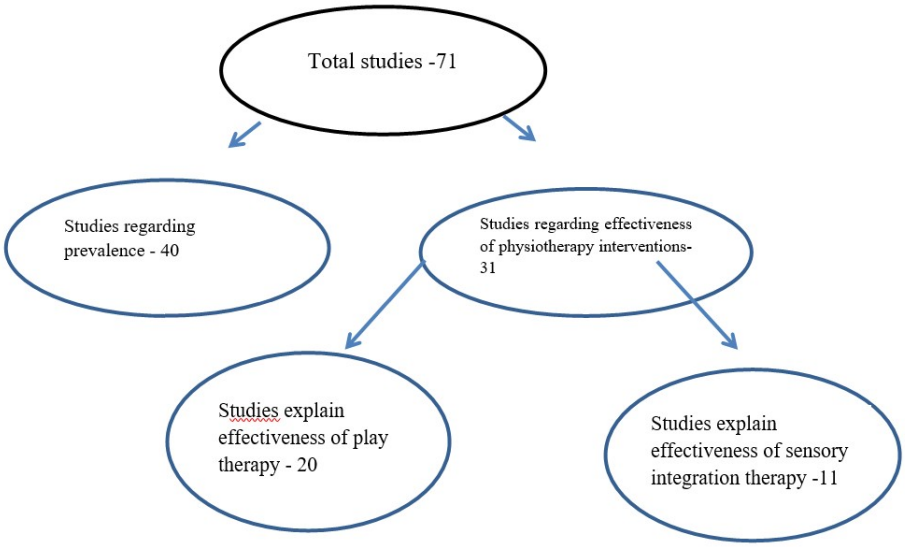
ELIGIBILITY CRITERIA

In general, the criteria for selecting documents in this review and analysis are within the framework of PICO (Population, Intervention, Comparison, Outcomes, Study).[70] In this study, the eligibility criteria are based on these conditions. Population: All people under the age of 6-12 years were examined in the various studies. Type of study: Cross-sectional observational studies were utilized to establish the disease's prevalence and appropriate treatment methods of physiotherapy and methodologies, such as interventional review.

SEARCH STRATEGY

The review search from four high-quality databases including Pub Med, Web of Science, Scopus, and science direct, as well as any electronic publications printed before 2021. Keywords used for each separate string were ("Autism" OR "ADHD") AND ("Sensory integration therapy" OR "SI Therapy" AND ("Play therapy" OR "ADHD" OR "Prevalence" OR "ADHD") and were search through Title/Abstract and Topic for each database, respectively.

This review and analysis search retrieved a total of 71 studies were included in this review and among them 40 studies discussprevalence and 31 studies discuss effectiveness of physiotherapy interventions on ADHD in school going children. Again among 31 studies, 20 studies explain effectiveness of play therapy and 11 studies explain effectiveness of sensory integration therapy on ADHD.



RESULT AND DISCUSSION

This review and analysis of information on research on the prevalence and effectiveness of physiotherapy interventionson ADHD in School going children around the world was conducted in this study, with no time constraint until 2021.

ADHD prevalence was found to be 2-18 % in 40 studies with a total sample size of 96,904 participants who looked at children under the age of 6-12 years. ADHD is a neurodevelopmental disorder with excessive motor activity, inattention, and impulsivity in children and adolescents.[71] According to the findings, the incidence of ADHD is average 7.6% in children aged 6 to 12 years . The findings of this study are nearly identical to those of earlier meta-analysis studies on the prevalence of ADHD. The prevalence of ADHD in children has been estimated to be between 2 and 7% in previous research. Several studies estimated the prevalence of ADHD, in USA 4-8%, Korea 7.6% to 9.5%, India 20% , and Emirates 29.7% in United Arab.

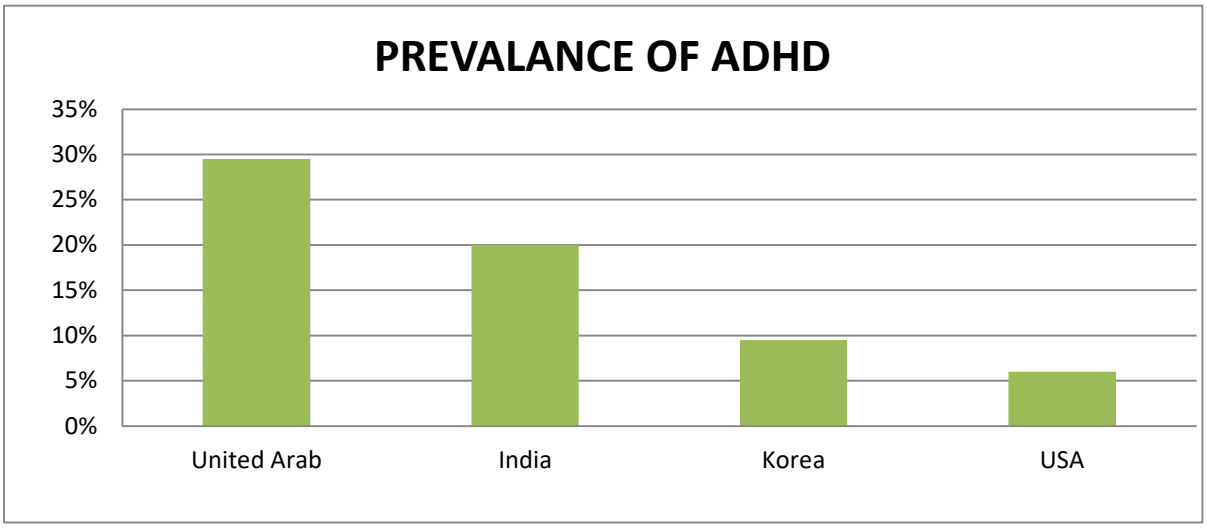
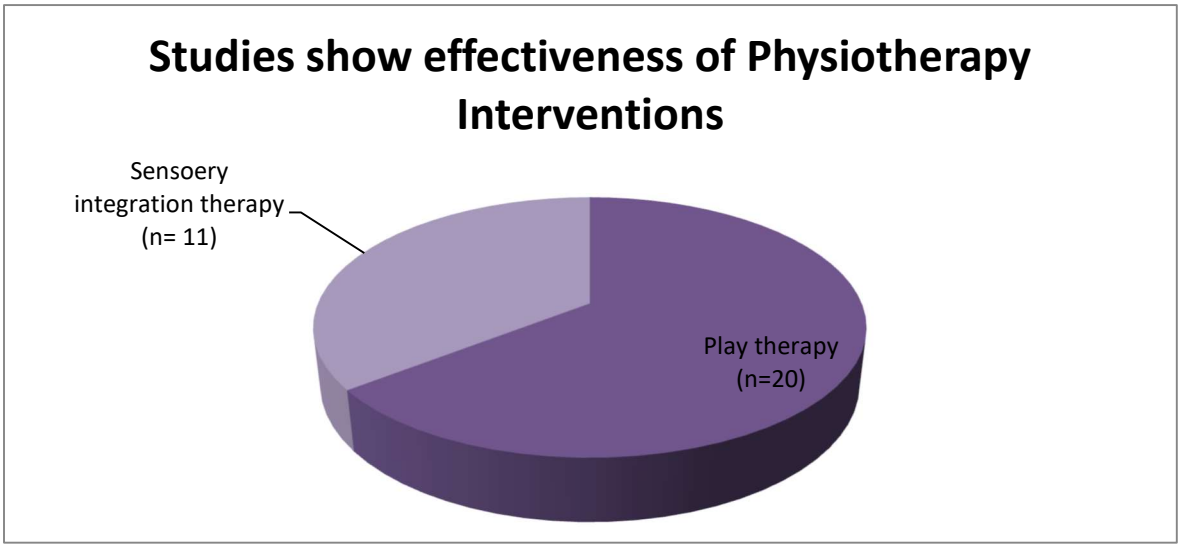


Table 1 shows the prevalence of ADHD in school going children in countries like UA, INDIA, KOREA, and USA.

A total 31 studies discuss effectiveness of physiotherapy interventions on ADHD in school going children. Again among 31 studies, 20 studies explain the effectiveness of play therapy and 11 studies explain the effectiveness of sensory integration therapy on ADHD. Almost all the studies randomly assigned patients to either an Experimental Group (EG), which consisting of sensory integration therapy and play therapy or a Control Group (CG) which consisted in traditional exercise therapy, no treatment, standard occupational therapy has been applied. Most of the studies show effectiveness of play therapy as well as sensory integration therapy in children with ADHD in terms of symptom reduction, functional improvement and overall quality of life.



Graph 1 shows the effectiveness between sensory integration therapy and play therapy

The literature reviews of Sensory integration therapy suggested that there is evidence for Sensory integration therapy for achieving individual goals for children with ADHD but may not be as effective as behavioral based interventions in reducing challenging behaviors. It has been found that many symptoms of ADHD, in the areas of attention, activity, coordination, visual perception, balance and others from the sensory issues were improved by Sensory integration therapy in the children with ADHD. Because of the number of children being diagnosed with disorders involving sensory challenges, physiotherapists and occupational therapists should be aware of current treatments for individuals with sensory problems. Evidence supports the use of sensory integration techniques, therapeutic listening, massage therapy, and lighting changes for positive effects on ADHD children.

The literature reviews pertaining to the effects, determinants of success and lifelong benefits of play therapy has been reviewed in order to present a concise summary of the findings from pre-existing meta-analytical reviews and single-case studies.The positive effect of play therapy on behavioral and social-emotional competencies can be observed in both normal function children and children with specific presenting issues such as autism, attention deficit hyperactivity disorder (ADHD) and disruptive behaviors. Moreover, Play therapy has a positive effect on academic performance, especially in the areas of reading, mathematics and spoken language as well as has a positive effect on children's relationships with both their peers and family members. Play therapy also leads to expend children's energies during sessions, this energy expenditure leads to decrease their impulsiveness and hyperactivity at rest of the day.

Limitation of the study

There are some limitation existing this review. Firstly, this review has been only focusing in a particular age group which is limited to 6 - 12 years. As ADHD can extended to adolescent so it the limitation of this study. Secondly, there are several physio - therapeutic interventions related to ADHD to improve the symptoms but this review mainly

has been focusing on mainly two particular interventions that are play therapy and sensory integration therapy.

Future scope for the study

There will be need for more study regarding prevalence of ADHD of different age groups as this study has been focusing on only a particular age group in school going children. Furthermore, there will be need for more experimental study regarding interventions of physiotherapy on ADHD and comparative studies in between the different interventions as well as gather the information about the effectiveness of the interventions and determine the appropriate intervention for particular needs.

CONCLUSION

The findings of this study based on systemic review and meta-analysis demonstrate the significant prevalence of attention deficit hyperactivity disorder (ADHD). The results of this investigation corroborate prior research and highlight the importance of planning and policy-making in the treatment and control of ADHD in children. This review underscores the growing significance of physiotherapy as a promising intervention for managing ADHD symptoms among school-going children. By providing insights into the prevalence of ADHD and the effectiveness of physiotherapy techniques, this review contributes valuable information for clinicians, educators, and fostering a holistic approach to support the well-being and academic success of children affected by ADHD. Further research is warranted to refine and customize physiotherapy interventions, ensuring equitable access and optimal outcomes for all children diagnosed with ADHD and look into the prevalence of ADHD in different age groups and how it affects their personal and social lives.

Conflict of Interests: None

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