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Early Intervention and Strategies to Build a Friendly Ecosystem for Children with Attention Deficit Hyperactivity Disorder

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Abstract: Attention Deficit Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder prevalent in children, which impacts their cognitive and behavioral functioning. Early intervention is critical in managing ADHD and improving long-term outcomes. This article summarizes current research on early intervention for ADHD children using a scoping literature review method, focusing on the assessment, treatment and effectiveness of various interventions. The research reviewed highlights the importance of early identification and intervention in reducing the challenges associated with ADHD. Strategies such as mindfulness-based interventions, cognitive training, and behavioral therapy show promise in improving symptoms and functioning in children with ADHD. In addition, the role of parents and clinicians in supporting children with ADHD through interventions was also emphasized, in addition to the role of social media that provides positive support will form a friendly ecosystem for children with ADHD. Overall, early intervention and strategies play an important role in meeting the needs of children with ADHD and improving their well-being.

Keywords: Attention Deficit Hyperactivity Disorder, Early Intervention, Children with Special Needs, Assessment, Cognitive Training, Behavior Therapy, Scoping Literature Review

INTRODUCTION

ADHD is a common neurodevelopmental disorder characterized by symptoms of inattention, hyperactivity and impulsivity (Danielson et al., 2018). Early identification and intervention are critical in treating ADHD and improving outcomes for affected children. ADHD is diagnosed primarily in childhood, which significantly impacts a child's academic performance, social interactions, and emotional well-being. Traditionally, interventions for ADHD have focused on school-aged children. However, recent research suggests there is a critical window of opportunity during the preschool years to promote positive long-term outcomes through early intervention. Research suggests that early intervention can provide long-term benefits and positively impact the trajectory of this disorder (Halperin & Marks, 2019).

However, challenges in early identification, such as word-finding difficulties, can delay intervention efforts (Ganelin-Cohen, 2023). Therefore, there is growing interest in developing effective early interventions for children with ADHD. This article presents the results of a study that aims to review the existing literature on the benefits of early intervention for children with ADHD. Specifically, we will explore recommended approaches for intervention in younger children and discuss the positive impact on various aspects of the child's life.

METHOD

A scoping literature review was conducted to map existing research on early intervention for children with ADHD. Relevant databases and sources were searched between November 2023-January 2024 using search terms such as "early intervention", "Attention Deficit Hyperactivity Disorder", "children", "assessment", "outcomes" "parents role", "clinician role", studies in the last 10 years were used. The interventions were analyzed for their effectiveness in improving symptoms and functioning in children with ADHD. Given the limited resources, the search was targeted at major databases and sources namely: PubMed, PsycINFO, Web of Science, Google Scholar (first 100 results), websites of relevant organizations (e.g. CHADD, CDC).

Studies were included if they involved children aged 0-8 years with a diagnosis of ADHD, evaluated early interventions focusing on assessment, treatment, or effectiveness, had quantitative or qualitative outcome measures. The search yielded 2004 references, which were then reduced to 204 by manual extraction after applying inclusion criteria and removing duplicates, and analysis was conducted focusing only on interventions, outcomes, and the role of parents and clinicians in supporting children with ADHD.

Table 1. Stage Description

Identifying research questions	Identify early interventions and strategies for children with ADHD, focusing on assessment, treatment, and effectiveness, roles of parents, clinicians and therapists
Identifying relevant research	Conduct a comprehensive search using relevant databases and sources, such as PubMed, PsycINFO, Web of Science, Google Scholar, identifying all studies related to early intervention and strategies for children with ADHD.
Study selections	Apply inclusion and exclusion criteria to select studies relevant to the research question. Inclusion criteria included study design, population, interventions, and outcomes. Exclusion criteria included studies that did not focus on early intervention or strategies for children with ADHD.
Data Mapping	Extract relevant data from the selected studies, study design, population, interventions, and outcomes. Include author information, year of publication, study location, type of intervention, study population, study objectives, methodology, and important outcomes
Collect, summarize and report results	Collect and summarize data to identify patterns, themes, and gaps in existing research. Present an overview of all material reviewed, focusing on the scope, nature and distribution of the research included in the review. Organize the literature thematically, according to the type of intervention, and provide a consistent approach in reporting findings.

RESULTS AND DISCUSSION

A scoping literature review is a research synthesis method that aims to comprehensively map the key concepts, sources, and types of evidence available on a particular topic or research area. This approach has several key objectives, including identifying the nature and scope of research activities related to the topic, determining the breadth and depth of existing literature, summarizing and disseminating research findings, and identifying gaps in research for future study. The following are the main characteristics (Colquhoun et al., 2014) that distinguish scoping reviews from other types of reviews:

a) **Broad Research Question:** Unlike reviews that focus on a clinical problem or treatment, scoping reviews typically ask broad research questions to explore the full range of literature available on the topic

b) **Comprehensive Search Strategy:** The search strategy in scoping reviews involves searching relevant databases and sources without imposing date or research design restrictions to provide an overview of the field

c) **Inclusive Inclusion/Exclusion Criteria:** In scoping reviews, the inclusion/exclusion criteria are usually broad to capture all types of evidence on the topic, to ensure a comprehensive review

d) **Limited Quality Assessment:** Due to the broad scope and inclusion of different types of studies, quality assessment is usually not done in scoping reviews

e) **Narrative Format for Findings:** Findings in scoping reviews are often summarized in a narrative format through tables, concept maps, or discussions, rather than in the form of a statistical meta-analysis

f) **Focus on Mapping the Evidence Base:** The primary outcome of scoping reviews is mapping the evidence base rather than providing critical judgments or recommendations

Methodology The scoping literature review in this study used Arksey and O'Malley's framework (Querol et al., 2020), can be seen in table 1. The studies reviewed highlight the importance of early identification and intervention in managing ADHD. Strategies such as mindfulness-based interventions, cognitive training, and behavioral therapy show promising results in improving symptoms and functioning in children with ADHD. These interventions have been shown to be effective in reducing hyperactivity, improving attention, and enhancing cognitive skills. The role of parents and clinicians in supporting children with ADHD is also emphasized, with interventions such as parent training, medication management, and school-based support effective in improving outcomes, not forgetting the role of social media actors who form a friendly ecosystem for ADHD children. The above results were obtained from identifying questions and research, selecting studies and plotting data and then summarizing the following results.

Early intervention and strategies to build a supportive ecosystem for children with ADHD are critical in addressing the challenges faced by these individuals. Halperin et al. (2012) emphasize the importance of preventive interventions for ADHD from a neurodevelopmental perspective, highlighting innovative early interventions that aim to improve neurocognitive functioning in children with ADHD. Hosogane et al. (2018) discuss the importance of Parent-Child Interaction Therapy (PCIT) for young children with ADHD, emphasizing the importance of early intervention considering its impact on prognosis. This approach underscores the value of involving parents in the therapeutic process to create a supportive environment for children with ADHD.

Re et al. (2015) focused on a training program that targets executive functions in preschoolers who exhibit ADHD symptoms. By addressing attention, inhibition and working memory early on, this intervention aims

to prevent severe problems in the future, highlighting the importance of early intervention strategies for children with ADHD symptoms.

Feil et al. (2016) highlighted the effectiveness of early intervention for preschoolers at risk for ADHD through programs such as *Preschool First Step to Success*. These interventions not only target ADHD symptoms but also aim to improve educational attainment and social functioning, emphasizing the potential benefits of early identification and intervention for children at risk for ADHD.

Several studies have also highlighted the effectiveness of mindfulness-based interventions in children with ADHD. Among them is mindfulness training for children with ADHD and their parents, which has shown promising results in improving attention and self-regulation (Valero et al., 2021). Similarly, it has been found that a single session of mindfulness-based cognitive training can improve cardiac vagal control and core symptoms in children with ADHD (Robe & Dobrea, 2022). These findings suggest that mindfulness interventions may benefit children with ADHD by improving their ability to stay engaged in activities.

Cognitive training has also emerged as a valuable intervention for children with ADHD. A systematic review and meta-analysis of randomized controlled trials showed positive effects of mindfulness-based interventions on children and adolescents with ADHD (Lee et al., 2022). These interventions have the potential to improve cognitive functioning and reduce ADHD symptoms in affected individuals. In addition, the development of a risk calculator used to predict ADHD in extremely premature newborns illustrates the importance of early identification and intervention for at-risk populations (Franz et al., 2021).

On the other hand, behavior therapy has also been the focus of research in early intervention for ADHD children. A pilot study aimed to predict intervention success based on individual reward sensitivity in children with ADHD (Langen et al., 2020). This personalized intervention approach helps tailor treatment to the specific needs of each child, thereby increasing the effectiveness of behavioral interventions.

In addition, a combination of pharmacological and non-pharmacological interventions have been recommended for school-aged children with ADHD, web-based play therapy interventions have also shown effectiveness in supporting the development of children with ADHD (Budiyarti et al., 2023). In that study, the intervention, which had been previously approved by the regulatory body, offered a comprehensive approach to managing ADHD symptoms and improving overall well-being.

To support the success of early intervention, not only are actions provided to ADHD children, but also the role of teachers in special schools. Research

conducted by Lasisi et al. (2017) in Northwest Nigeria, highlighted the importance of training programs for teachers in improving their knowledge and attitudes towards students with ADHD. Negative attitudes from teachers can impact on students' self-esteem and motivation, thus explaining the importance of interventions not only for children but also for educators to create a supportive environment for children with ADHD (Lasisi et al., 2017).

The playful world of children has not gone unnoticed by research. In ADHD children, Wilkes et al. (2011) have conducted research on play-based interventions for children with ADHD, describing the potential benefits of incorporating play therapy in interventions. Play therapy can serve as a valuable tool in addressing behavioral challenges and improving social skills in children with ADHD, emphasizing the holistic approach needed in interventions for children with ADHD (Wilkes et al., 2011).

Research on interventions for children with special needs is not only conducted in developed countries, but also in Indonesia. The archipelago and its surrounding regions contribute to the growing body of research on early intervention for children with ADHD, highlighting the importance of culturally sensitive and comprehensive approaches to support the diverse needs of children with ADHD in different contexts. Since the twenties, research on early intervention for children with ADHD has emerged in Indonesia, with reviews focusing on innovative approaches to support the development and well-being of affected children. Budiyarti et al. (2023) tested the Indonesian Computer-Based Game Prototype on 10 children with ADHD, demonstrating its potential in developing computer-based game interventions designed for children with ADHD (Budiyarti et al., 2023).

In a follow-up investigation, it was also found that integrating positive psychology principles in early interventions for children with ADHD can significantly impact their overall well-being and outcomes. Positive psychology focuses on strengths, virtues, and factors that contribute to a fulfilling life, which can be particularly beneficial for children facing challenges associated with ADHD (Seligman et al., 2005). By incorporating positive psychology interventions, such as promoting resilience and optimism, early intervention can increase the psychological and emotional resilience of children with ADHD, leading to better coping mechanisms and better long-term outcomes.

The concept of ubiquitous learning also provides opportunities for innovative approaches in supporting children with ADHD. Ubiquitous learning emphasizes on continuous and personalized learning experiences that are seamlessly integrated into daily activities, utilizing technology and environmental cues to facilitate learning (Lestari & Suhartatik, 2022). By

exploring the potential of ubiquitous learning in the context of ADHD interventions, customized and adaptive strategies can be developed to meet the unique needs of each child, encouraging engagement and skill development in a supportive learning environment.

In dealing with children with special needs, especially ADHD children, it is necessary to understand the concept of growth and development, understanding child development is very important as measured by the PERMA-Profiler, which offers a multidimensional perspective on the well-being and positive functioning of children with ADHD (Butler & Kern, 2016). Understanding the components of development, including positive emotions, engagement, relationships, meaning, and achievement, can guide the design of comprehensive interventions that promote holistic development and flourishing in children with ADHD. By assessing and promoting development in children with ADHD, interventions not only aim to reduce symptoms but also to improve their quality of life and overall well-being.

In another study, Putrawan and Riadi concluded that the dominant use of language for informal online learning activities among English as a Foreign Language (EFL) learners in Indonesia explains the digital landscape where interventions can be implemented (Putrawan & Riadi, 2020). Utilizing smartphones and online platforms for educational purposes can improve access to resources and support for children with ADHD, offering interactive and engaging opportunities for skill development and learning. If early intervention has been carried out, then to ensure the creation of an ecosystem that supports the growth of children with ADHD, it must also involve many parties, in addition to parents and families, the role of the community that voices the interests of children with ADHD is needed. The delivery can be done directly or through the latest technology. In the digital era, the massive and structured delivery of messages by influencers on social media platforms such as Twitter, Instagram and Tik Tok can influence public discourse and perceptions, including attitudes towards children with ADHD (Sari et al., 2022). Understanding how influencers shape conversations and narratives relating to ADHD can inform targeted interventions and awareness campaigns that address stigma, promote acceptance, and provide accurate information about ADHD in Indonesian society.

CONCLUSIONS

Early intervention plays an important role in meeting the needs of children with ADHD. By focusing on assessment, treatment, and intervention effectiveness, clinicians and parents can support children with ADHD in managing their symptoms and improving their quality of life. By synthesizing the

insights from the above studies, it is clear that early interventions and strategies play an important role in supporting children with ADHD. These approaches not only aim to address ADHD symptoms, but also focus on improving neurocognitive functioning, engaging parents in therapy, targeting executive functioning, and improving social and educational outcomes for children at risk of ADHD. Further research is needed to explore the long-term effects of early intervention and to develop evidence-based strategies to optimize outcomes in children with ADHD. Integrating the principles of positive psychology, ubiquitous learning strategies, and a developmental focus, as well as insights from the Indonesian context, early intervention for children with ADHD can be tailored to meet children's diverse needs and improve their well-being and development.

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