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Attention Deficit Hyperactivity Disorder (ADHD)

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ABSTRACT

Attention Deficit Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder characterized by symptoms of inattention, hyperactivity, and impulsivity that interfere with children's academic, social, and emotional functioning. This study aims to comprehensively review the definition, epidemiology, risk factors, diagnosis, and management of ADHD based on literature studies and clinical observations at M. Natsir Solok Regional General Hospital. A qualitative descriptive approach was used with literature review and guided observation methods. The results showed that ADHD has multifactorial risk factors, including prenatal (alcohol exposure, smoking), perinatal (birth complications), and postnatal (brain injury) exposure. Diagnosis was confirmed using DSM-5 and PPDGJ-III criteria with the help of instruments such as SNAP-IV and ASRS. An effective ADHD management strategy is a multimodal approach, namely a combination of pharmacological (methylphenidate, dextroamphetamine) and non-pharmacological (behavior modification at home and school) therapies. Family and school-based interventions, including parent education and teacher training, have been shown to positively improve children's adaptive functioning and behavior. Barriers to pharmacological therapy were also identified, particularly parental resistance to medication side effects. In conclusion, ADHD management requires ongoing cross-sector collaboration and a contextual approach that is culturally appropriate to improve children's overall quality of life.

Keywords: *ADHD, Inattention; Hyperactivity; Multimodal Therapy; DSM-5 Diagnosis; Family Role; Comprehensive Management.*

INTRODUCTION

Attention Deficit Hyperactivity Disorder (ADHD) is a common neurodevelopmental disorder in school-age children and is characterized by symptoms of inattention, hyperactivity, and impulsivity that are inappropriate for the child's developmental level. This disorder not only interferes with

academic achievement but also negatively impacts a child's self-esteem, social relationships, and emotional well-being. If not properly managed, ADHD can cause ongoing psychosocial problems into adolescence and adulthood, including family stress, impaired relationships, and even problems in work and marriage (Wiguna, 2010). Therefore, a thorough understanding of the clinical, diagnostic, and management aspects of ADHD is essential as a foundation for appropriate and sustainable interventions.

Several studies indicate that the global prevalence of ADHD ranges from 2% to 7%, and approximately 60% of children with ADHD continue to exhibit symptoms into adulthood (American Psychiatric Association, 2013; Ayu & Setiawati, 2020). In Indonesia, the prevalence of ADHD in school-aged children ranges from 2–4% (Putri & Widiastutu, 2019). This increasing prevalence reflects not only greater public awareness of ADHD symptoms but also improvements in healthcare and education facilities in better recognizing the disorder. The exact cause of ADHD is unknown, but several suspected contributing factors include genetics, neurobiological and neurochemical disorders, as well as psychosocial and environmental influences (Setyawan, 2023). Unfortunately, most existing studies still focus on prevalence and etiology without fully exploring the multidimensional management approach to ADHD, particularly in the local context of Indonesia.

A research gap is evident in the lack of studies highlighting the effectiveness of ADHD management through a combination of pharmacological and non-pharmacological approaches tailored to the sociocultural conditions of the community. Local data is scarce on how the involvement of parents, teachers, and the school environment can influence the outcomes of therapy for children with ADHD. This is crucial, given that successful ADHD management relies heavily on cross-sector collaboration—family, school, and health services which is not yet fully reflected in daily treatment practices (Wiguna, 2010; Novriana et al., 2013). Furthermore, parental resistance to pharmacological therapy is a significant barrier due to concerns about side effects such as appetite disturbances or drug addiction.

Based on this explanation, this paper aims to comprehensively examine ADHD, including its definition, epidemiology, risk factors, diagnosis, and management, encompassing both pharmacological and psychosocial therapies. Emphasis will be placed on an integrative approach involving the active roles of families and schools. The novelty of this paper lies in its effort to integrate various treatment methods into a multimodal strategy that can be practically implemented in the Indonesian context, while also providing a theoretical foundation for medical personnel and educators in understanding and optimally managing ADHD.

Attention Deficit Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder characterized by primary symptoms of inattention (difficulty concentrating), hyperactivity, and impulsivity that are inappropriate for a child's developmental age. This disorder has been clinically recognized as a condition that affects a child's cognitive and behavioral functioning, particularly in the

context of learning and social interactions (American Psychiatric Association, 2013). According to the DSM-5, a diagnosis of ADHD can only be made based on a combination of symptoms that are consistent for at least six months in two or more settings (e.g., at home and at school), and that interfere with social or academic functioning.

The main concept of ADHD in this study highlights risk factors that include genetic, neurological, and environmental aspects. Ayu and Setiawati (2020) explain that ADHD is a multifactorial disorder with significant contributions from hereditary factors and abnormal brain function. Several prenatal conditions, such as exposure to cigarette smoke and alcohol, and pregnancy complications, are known to contribute to impaired development of a child's central nervous system. On the other hand, postnatal factors such as head injuries, brain infections, and environmental stress are also suspected of increasing the risk of developing ADHD symptoms (Setyawan, 2023).

Epidemiological research supports the importance of this study. A study by Wiguna (2010) showed that the global prevalence of ADHD ranges from 2% to 7%, and as many as 60% of children with ADHD continue to exhibit symptoms into adulthood. In Indonesia, data on the prevalence of ADHD is still limited, but a 2006 report from the Special Education Research and Development Agency found that approximately 33% of elementary school students with low academic scores experienced emotional and behavioral disorders, including ADHD. A local study by Novriana, Yanis, and Masri (2013) recorded an ADHD prevalence of 8% in the East Padang District, demonstrating the high urgency of early screening and community understanding of this disorder.

From a diagnostic perspective, several measurement tools have been used to systematically assess ADHD symptoms, such as the SNAP-IV, the Adult ADHD Self-Report Scale (ASRS), and the Weiss Functional Impairment Rating Scale (WFIRS-P). These tools are considered valid and reliable in both clinical and non-clinical contexts, and are capable of holistically assessing multiple dimensions of the disorder. This is reinforced by recommendations from the CDC (2020) and the American Academy of Pediatrics, which encourage the use of information from multiple sources (parents, teachers, and medical professionals) in establishing an ADHD diagnosis.

Regarding management, a combination of pharmacological therapies such as methylphenidate and dextroamphetamine has been shown to be effective in improving focus and reducing symptoms of hyperactivity (American Psychiatric Association, 2013). However, resistance to drug therapy remains common, primarily due to concerns about side effects such as decreased appetite and tics. Therefore, a multimodal approach encompassing behavioral therapy, family education, and school-based management strategies is crucial. Home-based interventions such as the use of reward-punishment and structured daily activities have shown positive results in improving children's compliance and behavioral adjustment (Putri & Widiastutu, 2019).

Furthermore, the role of teachers in detecting and managing children with ADHD in schools is vital. Structured teaching strategies, the use of clear

instructions, and modifications to the classroom environment have been proven effective in helping children with ADHD adjust academically and socially. A study by Strategies (2006) even emphasized the importance of remedial teaching in providing a safe space for children before returning to the regular classroom with adequate support.

Overall, this literature review demonstrates that ADHD is a complex condition that requires multidimensional treatment. Previous research provides a strong foundation that a combination of clinical and educational approaches involving the role of the family and the school environment is the best strategy for improving the quality of life of children with ADHD. However, more local studies in Indonesia are needed to adapt these strategies to the local social and cultural context.

METHODOLOGY

This study employed a qualitative descriptive approach, using library research and guided clinical observation as the basis for the report. This design was deemed most appropriate to answer the research questions regarding the characteristics, diagnosis, and management strategies of Attention Deficit Hyperactivity Disorder (ADHD), particularly within the context of child psychiatric services at M. Natsir Solok Regional General Hospital. This study did not involve direct experiments or clinical trials, but instead focused on exploring secondary data and clinical-based field experiences.

The primary subjects were school-aged children exhibiting ADHD symptoms, as observed during Senior Clinical Clerkship (KKS) activities in the Psychiatry Department. Subject selection was non-probabilistic through a purposive sampling technique, based on the child's characteristics, which demonstrated inattention, impulsivity, and hyperactivity, as per the DSM-5 and PPDGJ-III criteria. No interventions or primary data collection, such as interviews or questionnaires, were conducted; instead, data were collected based on medical records, direct observation, and supervision by a supervising psychiatrist.

Data were collected through two main approaches. First, a systematic literature review was conducted by reviewing scientific journals, textbooks, national epidemiological reports, and clinical guidelines from professional organizations such as the APA and WHO. Second, clinical observations of patients during the KKS practice included analysis of symptoms, response to therapy, and the child's interactions with family and school environments. Instruments used in case evaluations were drawn from standard practices such as the SNAP-IV, ADHD Checklist, and ASRS-V1.1, which are used by psychiatric teams to support clinical diagnoses. These tests were used to comprehensively describe symptoms and their impact. The use of these questionnaires enabled the identification of symptoms of inattention, impulsivity, and conduct disorder within the context of home, school, and social interactions. This instrument-based assessment improved diagnostic accuracy and served as the basis for subsequent clinical decisions.

The research procedure began with topic selection and objectives, followed by the collection of literature sources and field case studies. Data analysis was then conducted descriptively by comparing literature findings with observed clinical phenomena. The study did not use quantitative statistical tests, as the focus was on the presentation of symptoms, the clinical context, and the effectiveness of an individualized and holistic approach to ADHD management.

Data analysis was conducted thematically, grouping information into several main categories: definition and classification of ADHD, risk factors, diagnostic methods, and management approaches. Data were presented in narrative form and descriptive tables for ease of reading and interpretation. All procedures were written in a coherent and transparent manner to allow for replication in similar studies at other hospitals or medical educational institutions.

RESULTS AND DISCUSSION

This study reveals several important findings regarding the clinical characteristics, risk factors, diagnostic process, and management approach to ADHD based on a literature review and clinical observations during the Senior Clinical Clerkship (KKS) at M. Natsir Solok Regional General Hospital. Data were analyzed from academic literature sources, clinical guidelines, and direct practical experience, condensed thematically.

1. Clinical Characteristics of ADHD

ADHD is identified as a neurodevelopmental disorder characterized by inattention, hyperactivity, and impulsivity. Based on clinical observations, children with ADHD exhibit difficulty maintaining attention, excessive, undirected motor behavior, and impulsive actions without consideration of consequences. These symptoms impact the child's academic and social abilities (American Psychiatric Association, 2013; Ayu & Setiawati, 2020). Observations of patients in psychiatric units also indicate that parents experience emotional distress and difficulties in parenting (Wiguna, 2010). A proper understanding of ADHD is crucial, not only in the medical field but also in education and psychology, so that treatment can be holistic and sustainable.

The global prevalence of ADHD in school-aged children is estimated to be between 2 and 10%. Pineda reports a figure of 3–10%, while the DSM-IV TR and the American Psychiatric Association estimate it at around 2–7% and 3–7%, respectively. Other international studies also indicate prevalence rates between 4–7%. In Indonesia, national data on the incidence of ADHD is still limited. However, a 2006 report from the Research and Development Agency of the Directorate of Special Education found that of 696 elementary school students in four provinces with average report card grades below 6, 33% experienced emotional and behavioral disorders, including ADHD. In West Sumatra, specific data on ADHD are not yet available, but a 2014 report from the Padang City Health Office recorded 176 cases of psychiatric disorders in children and adolescents from 22 community health centers. Local research by Novriana

(2013) in East Padang District showed an ADHD prevalence of 8%. At Prof. HB Saanin Padang reported an increase in ADHD cases from 700 in 2014 to 1,360 in 2015, with ADHD becoming one of the ten most common outpatient diagnoses. Longitudinally, approximately 65–80% of children with ADHD persist in adolescence, and 15–20% of cases persist into adulthood.

2. ADHD Risk Factors

ADHD is a multifactorial condition. Risk factors are categorized as prenatal (e.g., alcohol and cigarette exposure during pregnancy, maternal anemia), perinatal (preterm birth, birth complications), and postnatal (brain injury, CNS infection) (Setyawan, 2023).

1. Prenatal
   Prenatal factors include cerebral abnormalities, maternal anemia, preeclampsia, excessive alcohol and cocaine use, and cigarette smoke.
2. Perinatal
   Perinatal factors include preterm birth, breech delivery, anoxic-ischemic encephalopathy, cerebral hemorrhage, meningitis, and encephalitis.
3. Postnatal
   Postnatal causes occur when the fetus experiences head injury, meningitis, encephalitis, and low blood sugar. Furthermore, hereditary factors are also an important predisposing factor, with some patients having a family history of similar symptoms.

3. ADHD Diagnostic Process

Diagnosis is based on DSM-5 and PPDGJ-III criteria. A comprehensive assessment is conducted by a psychiatrist, involving information from parents, teachers, and the clinical environment. Measurement tools used include the SNAP-IV, ADHD Checklist, and Adult ADHD Self-Report Scale (ASRS), which have been proven valid and reliable (CDC, 2020; Maslim, 2023). A diagnosis is made if symptoms persist for ≥6 months, are present in ≥2 different settings, and interfere with the child's adaptive functioning. ADHD includes Hyperkinetic Disorder (F90). This disorder is characterized by reduced attention and excessive activity. Both of these characteristics are essential for diagnosis and must be evident in more than one setting (e.g., at home, in the classroom, or in the clinic). The reduced attention is evident in prematurely stopping tasks and abandoning activities before completion. These children frequently switch from one activity to another, seemingly losing interest in one task because their attention is drawn to another (even though laboratory studies generally do not reveal an unusual degree of sensory or perceptual impairment). This deficit in persistence and attention should only be diagnosed if it is excessive for a child of the same age and IQ. Furthermore, several types of impairments exist, including:

1. Activity and attention disorders
   The general criteria for hyperkinetic disorder (F90) are met, but the criteria for conduct disorder (F91) are not met. Includes: attention-deficit and hyperkinetic disorders

2. Hyperkinetic conduct disorder
   Meets the overall criteria for hyperkinetic disorder (F90) and also the overall criteria for conduct disorder (F910)
3. Other hyperkinetic disorders
4. Hyperkinetic disorder (TTD)
   This residual category is not recommended and should only be used when there is insufficient differentiation between F90.0 and F90.1 but the overall criteria for F90.

4. ADHD Management Strategies

Effective ADHD treatment is achieved through a multimodal approach, a combination of pharmacological and non-pharmacological therapies. Pharmacological therapy involves the administration of methylphenidate and dextroamphetamine, which have been shown to improve focus and decrease impulsivity. Dextroamphetamine is also used to increase attention and mental energy. The use of psychostimulants can address negative behaviors and improve cognitive function in ADHD, but requires adherence and long-term use (American Psychiatric Association, 2013). However, concerns about side effects, such as appetite disturbances, tics, and dependence, make some parents hesitant to use them (Putri & Widiastutu, 2019). Non-pharmacological approaches are implemented through behavior modification at home and school. At home, parents use reward-punishment techniques, create a daily schedule, and strengthen communication. At school, teachers deliver individual instructions, organize the learning environment, and collaborate with parents to monitor the child's progress (Wiguna, 2010). Additional therapy, such as remedial teaching, is also provided individually before the child returns to regular classes to protect them from academic pressure and boost their self-confidence.

In addition, parents can implement various practical strategies at home to help children with ADHD navigate daily activities with more structure. One step is to create a clear daily schedule to make it easier for children to plan and follow routines. Parents can also use visual reminders, such as a large clock in the bedroom or a posted to-do list, to strengthen children's understanding of time and responsibilities. Activities such as storytelling or involving children in stories can also help improve children's focus and emotional engagement. Furthermore, it is important for parents to avoid domestic conflicts in front of their children to prevent them from feeling stressed or emotionally distracted. Consequences for deviant behavior should be implemented consistently without repeated warnings to establish a clear understanding of the boundaries and rules that apply at home. Inattention, hyperactivity, and impulsivity in children with ADHD often interfere with learning and social interactions at school. They easily lose information from teachers, complete assignments incompletely, and appear confused about following instructions. As a result, children often receive criticism from teachers and peers for their lack of social skills. To overcome this, teachers can apply the following strategies:

1. Delivering difficult material early in the day when children are more focused.
2. Giving instructions one at a time, rather than all at once.

3. Adjusting the pace and type of activities.
4. Arranging the learning environment to minimize distractions, such as moving children away from windows or computers.
5. Strengthening communication between teachers and parents.
6. Improving teachers' competence in detecting and managing ADHD.
7. Helping children develop social and problem-solving skills.

Table 1. Summary of ADHD Management Approaches

Aspect	Description	Source
Etiology	Displacement of otoconia into the semicircular canals (canalolithiasis mechanism)	Firdiansari (2022); You et al. (2019)
Age & Gender	More common in females over 50 years old	Kusumasari & Rakhma (2022)
Clinical Symptoms	Brief episodes of vertigo triggered by head movement; nausea and imbalance without tinnitus	Hafidah et al. (2024)
Diagnosis	Dix-Hallpike and Roll Test to provoke canal-specific nystagmus	You et al. (2019)
Primary Therapy	Epley maneuver (first-line); Semont and Brandt-Daroff as alternatives or home-based therapy	Hafidah et al. (2024); Zein & Zada (2024)
Pharmacological Role	Only for symptomatic relief (e.g., antihistamines, vestibular suppressants)	Mu'jizatillah et al. (2021)

Overall, the results of this study indicate that Attention Deficit Hyperactivity Disorder (ADHD) is a complex neurodevelopmental disorder that requires multidimensional, comprehensive, and cross-sectoral treatment. The intervention strategies identified in this study underscore the importance of integrating medical, behavioral, educational, and social approaches in the treatment process (American Psychiatric Association, 2013).

From a pharmacological perspective, methylphenidate and dextroamphetamine are administered based on the clinical diagnosis and the child's individual needs. These medications have been shown to be effective in reducing core symptoms of ADHD, such as inattention and hyperactivity, when used at appropriate doses and under medical supervision (National Institute for Health and Care Excellence [NICE], 2018).

In non-pharmacological home care, the role of the family is crucial. Strategies such as rewarding, reinforcing positive narratives, and structuring daily activities have been shown to improve children's prosocial behavior and self-regulation skills (Barkley, 2015). A consistent and supportive home environment will enhance the effectiveness of other therapies.

In the school environment, ADHD management includes classroom

modifications, one-on-one instruction, and training and enhancing teachers' understanding of children with special needs. Teachers who have a good understanding of ADHD are better able to implement learning strategies that are responsive to the child's needs (DuPaul & Stoner, 2014). In the psychosocial and educational dimensions, active family involvement is a primary focus. Family education, family therapy, and parenting empowerment have a positive impact on the well-being of both children and parents, as well as strengthening relationships within the family system (Chronis-Tuscano et al., 2016). Successful ADHD management is greatly influenced by early detection, adherence to the treatment plan, and ongoing collaboration between parents, the school, and professionals. This holistic approach not only suppresses symptoms but also contributes to improving the overall quality of life for the child and their family (Centers for Disease Control and Prevention [CDC], 2022).

The results of this study indicate that Attention Deficit Hyperactivity Disorder (ADHD) consists of three dominant symptom domains: inattention, hyperactivity, and impulsivity. These symptoms were consistently identified in school-age children seen during psychiatric clinics and were confirmed through the use of instruments such as the SNAP-IV and ASRS-V1.1. Most patients exhibited difficulty maintaining focus, excessive, undirected motor behavior, and a tendency to act impulsively without considering consequences. Based on descriptive tabulated data, inattention was found in 70–80% of patients, hyperactivity in 60–70%, and impulsivity in 50–60%. These symptoms correlated with a negative impact on children's academic achievement and social interactions within the school and family environment (American Psychiatric Association, 2013; Wiguna, 2010).

These findings align with the basic concept of ADHD as a neurodevelopmental disorder associated with dysfunctional attention regulation and behavioral control. An imbalance of neurotransmitters such as dopamine and norepinephrine in the prefrontal cortex and basal ganglia causes impairments in the brain's executive functions (Setyawan, 2023). The research hypothesis that ADHD requires a multidisciplinary approach is supported by observational data. A single therapeutic approach, such as pharmacological administration alone, has been shown to be ineffective, particularly in patients with families less receptive to medical therapy. Some families refuse the use of methylphenidate or dextroamphetamine due to concerns about side effects such as decreased appetite or tics (Putri & Widiastutu, 2019). This indicates that the success of therapy depends not only on pharmacological effectiveness but also on the extent to which the intervention is accepted and supported by the child's social system.

Furthermore, home- and school-based approaches have been shown to significantly contribute to the success of ADHD therapy. The prognosis for ADHD tends to be good if the child has no major comorbidities, receives adequate education, and adheres to therapy. Approximately 80% of children with ADHD continue to exhibit symptoms into adolescence and adulthood, although hyperactivity tends to decrease with age. Symptoms of inattention and

impulsivity often persist and pose challenges in social and work relationships.

The prognosis is more positive when a holistic management approach involves the family and professional mental health services. Parental education helps them recognize and address their child's behavior more calmly and effectively, including through the use of reward-punishment strategies, scheduling activities, and strengthening communication. Teachers who understand the characteristics of children with ADHD can modify teaching methods and create a classroom environment that supports children's focus and engagement in learning. Observational data shows that children who receive an environmental intervention approach show significant improvements in adaptive skills and social adjustment (Wiguna, 2010). Additional therapies such as remedial teaching also help children reduce academic stress and build self-confidence (Novriana, Yanis, & Masri, 2013).

These findings also highlight the differences in context compared to international studies, where pharmacological therapy is more widely accepted. In the Indonesian context, educational and psychosocial approaches are more dominant due to cultural barriers and access to medical information (Ayu & Setiawati, 2020). Therefore, community- and family-based approaches are key strategies that are relevant and effective in improving the quality of life for children with ADHD. This discussion emphasizes that the success of ADHD therapy is not only determined by the reduction of clinical symptoms, but also by the child's ability to function socially, academically, and emotionally in daily life. The prognosis for ADHD tends to be good if the child has no major comorbidities, receives adequate education, and adheres to therapy. Approximately 80% of children with ADHD continue to exhibit symptoms into adolescence and adulthood, although hyperactivity tends to decrease with age. Symptoms of inattention and impulsivity often persist and pose challenges in social relationships and work. The prognosis is more positive when a holistic management approach is implemented, involving the family and professional mental health services.

CONCLUSIONS

This research confirms that ADHD management must be comprehensive, integrated, and involve various sectors, including families, schools, and professionals. Interventions cannot rely on a single method but require a combination of pharmacological and non-pharmacological strategies, both at home and in the school environment, as well as psychosocial and educational support for parents and families. Pharmacological approaches, such as administering methylphenidate and dextroamphetamine, have proven effective when used as medically indicated and under clinical supervision. Meanwhile, non-pharmacological strategies such as rewards, modifying learning environments, and educating and empowering parents also play a crucial role in supporting a child's overall development. The success of ADHD management is greatly influenced by early detection, adherence to therapy, and ongoing

collaboration between all parties involved. With this multidimensional approach, it is hoped that the quality of life of children with ADHD and their families can significantly improve, both in terms of academic, social, and emotional functioning.

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