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TINJAUAN PUSTAKA

ATTENTION DEFICIT HYPERACTIVITY DISORDER IN ADULTS

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ABSTRAK

Pendahuluan: *Attention Deficit-Hyperactivity Disorder* (ADHD) adalah gangguan psikiatri yang cukup umum terjadi dimana gangguan ini mempengaruhi fungsi kehidupan sehari-hari seseorang dengan beberapa kondisi, seperti kurangnya perhatian, hiperaktivitas, impulsivitas, dan sulit beristirahat.
Pembahasan: Pada beberapa anak, ADHD menetap hingga mereka tumbuh dewasa. ADHD memiliki beberapa dampak buruk pada orang dewasa dan dapat mempengaruhi kualitas hidup mereka secara signifikan. Orang dewasa dengan ADHD dilaporkan lebih berhubungan dengan pekerjaan yang tidak stabil, kurang berprestasi secara akademik, kecelakaan lalu lintas, perceraian, kriminalitas, dan gangguan penggunaan zat. Laki-laki dilaporkan memiliki prevalensi ADHD yang lebih tinggi dibandingkan perempuan. ADHD dapat disebabkan oleh beberapa faktor, seperti genetik, gangguan perkembangan saraf, cedera otak, dan komponen lingkungan. Mendiagnosis ADHD memberikan tantangan tersendiri karena banyaknya komorbiditas yang mengelilinginya, seperti gangguan bipolar, gangguan cemas, depresi, dan lain-lainnya. Terlebih lagi, beberapa orang dilaporkan mendapat diagnosis ADHD saat dewasa yang disebabkan oleh ketidaktepatan diagnosis sebelumnya. Terapi ADHD pada orang dewasa memerlukan terapi farmakologi, terbagi menjadi stimulan dan non-stimulant.
Simpulan: Mendiagnosis ADHD dengan segera, memberikan terapi yang tepat, dan menyediakan lingkungan yang empati bagi pasien akan membantu mereka untuk mengatasi gejala yang dialami dan meningkatkan kualitas hidup.

Kata kunci: *Attention Deficit Hyperactivity Disorder*, ADHD, ADHD pada orang dewasa

ABSTRACT

Introduction: *Attention Deficit-Hyperactivity Disorder (ADHD) is a common psychiatric disorder that affects daily life function by some conditions, like inattentiveness, hyperactivity, impulsivity, and restlessness.*
Discussion: *In some children, ADHD persists into adulthood. ADHD has some bad consequences on adults and could affect their quality of life significantly. Adults with ADHD are reported to be more likely associated with unstable employment, academic underachievement, traffic accidents, divorce, criminality, and even substance use disorder. Males are reported to have a higher prevalence than females. ADHD could be caused by several factors, including genetic, neurodevelopmental disorders, brain injury, and environmental components. Diagnosing ADHD could be challenging due to many comorbidities surrounding the disorder, such as bipolar disorder, anxiety disorder, depression, etc. Moreover, it was reported that some people get diagnosed with ADHD during their adulthood due to prior misdiagnoses. Treatment for ADHD in adults requires pharmacological therapy, divided into stimulants and non-stimulants.*
Conclusion: *Diagnosing ADHD as soon as possible, giving appropriate treatments, and providing an empathetic environment for the patients will help them overcome the symptoms and improve their quality of life.*

Keywords: *Attention Deficit Hyperactivity Disorder, ADHD, adults ADHD*

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INTRODUCTION

Attention Deficit-Hyperactivity Disorder (ADHD) is a common psychiatric disorder that affects children's ability to function normally in doing daily life tasks due to some conditions like inattentiveness, hyperactivity, impulsivity, and restlessness.[1] Symptoms of ADHD usually develop at a young age and should be present before the age of 12.[1] The symptoms that could be seen in patients with ADHD include lack of concentration, lack of attention, distractibility, difficulty in completing tasks, disorganization, being forgetful, and losing things frequently.[1] Some studies reported some children carry ADHD into adulthood.[2,3]

Both in childhood and adulthood, ADHD has large consequences and interferences in daily life. Persons with ADHD were reported to have difficulty in social interactions,

relationships, decision making, personal finances, emotional control, maintaining good work at job, and achieving in his/her study.[4] Therefore, adults with ADHD usually results in unstable employment and relationships.[2]

In addition, ADHD has also been reported to have an association with other psychiatric disorders. Adults with ADHD usually have one or more psychiatric comorbidities, such as anxiety, depression, bipolar, and substance use.[2,5] Comorbidities in ADHD present a big challenge for physicians in the assessment of ADHD and often lead to undiagnosis.[2] Many adults with ADHD had late diagnosis and some even had been misdiagnosed as other psychiatric disorders like personality or mood disorder.[6] Research and issue about ADHD in adults still receive far less attention and concern than ADHD in children despite how big ADHD affects adult quality of life.[7]

Considering the consequences of ADHD on adults' quality of life and the number of underdiagnosed or misdiagnosed cases, better understanding and attention of ADHD in adults should be improved.

METHOD

A literature search was conducted through PubMed and Google Scholar. Various keywords were used to find articles that match the topic of this paper, such as "ADHD", "Attention Deficit Hyperactivity Disorder" and "adult ADHD". Inclusion criteria consisted of studies published within the last 2 years. Several studies that met the inclusion criteria and matched the topic were selected.

DISCUSSION

Epidemiology

Some studies reported that the prevalence of ADHD tends to decrease along with increasing age. Salari et al[8] reported that the global prevalence of ADHD at age 3 to 12 years is 7,6% while the prevalence of ADHD at age 12 to 18 years is 5,6%. Another study about prevalence of ADHD in Korea conducted by Seo et al[9] reported the number of patients with ADHD at ages 7 to 12 years, 13 to 18 years, 19 to 30 years, and more than 31 years respectively are 441.690 (46,87%), 302.480 (32,10%), 81.789 (8,68%) and 41.476 (4,40%).

ADHD has been reported to be higher in male population than female population.[9,10] A sociodemographic study of Japanese workers reported that males with ADHD had significantly higher scores of ADHD traits scores than females with ADHD.[11] ADHD affects males and females differently. Females with ADHD had more impairment in social functioning, stress intensity, and mood disorder than males.[10] While males with ADHD had more impairment in working memory and educational functioning.[10]

There is a significant association between the prevalence of ADHD and low socioeconomic status.[12] A study in Japan reported that low-income workers got higher trait scores of ADHD than high-income workers.[11]

ADHD is frequently reported to be present among populations that suffer from substance use disorder (SUD). A meta-analysis conducted by Rohner et al reported that an estimated prevalence of ADHD among SUD populations was 21%.[13] The prevalence of ADHD varied among subpopulations of SUD. Alcoholic population had the biggest ADHD prevalence (25%), followed by cocaine-user population (19%) and opioid-user population (18%).[13]

Etiology and Risk Factors

ADHD is caused by several factors. These factors include genetic, neurodevelopmental disorders, brain injury, and environmental components.[1,2] ADHD is one of the psychiatric disorders that tend to be hereditary.[1] Environmental risk factors associated with ADHD could be present at prenatal, perinatal, or postnatal stage. Risk factors of ADHD in prenatal and perinatal stages are prematurity, low birth weight, mother with psychological disorder during pregnancy, lack of vitamin B during pregnancy, smoking and alcohol exposure during pregnancy, stress and trauma, and obesity.[1,2,12]

Risk factors of ADHD during postnatal are style of parenting, artificial colors, fragrances, pollutants, and pesticides.[2]

Studies reported that there is a significant association between the level of education of the mother or the family and the prevalence of ADHD.[12] Robinson et al[14] in their systemic review and meta-analysis reported that preterm adults receive more ADHD diagnoses in adulthood compared to full-term adults. That systematic review and meta-analysis don't show increased symptoms in preterm adults than in full-term adults.[14]

Quality of Life

Adults with ADHD have been found to have more disruption in daily life functions. Adults with ADHD have been reported to be more associated with unemployment, criminality, traffic accidents, substance use, and less academic achievement.[15] Those are caused by executive deficits, behaviors, and emotional dysregulation that present in ADHD patients.[15] However, another study reported the contrary. Alghamdi et al[3] reported in their studies that adults with ADHD are related with higher family income. Another finding in that study reported that ADHD related to having

divorced parents and low GPAs in their last semester of college.[3]

Academic underachievement was widely reported due to difficulty in paying attention, focusing on reading comprehension, and needing more tutoring than others.[6] Patients with ADHD reported that they cope with educational problems by medications, learning actively in a small study group, and learning from home to minimize distractions.[6]

Difficulty in work in ADHD patients related to underemployment and high job-turnover rates. Deadlines and tensions in the workplace hindered them from doing the work properly. Noisy workplace and other distractions also make them hard to concentrate.[6]

An observational study in Japan during COVID-19 pandemic reported that participants with ADHD tended to change jobs during the pandemic. The study also reported an improvement in productivity during COVID-19 pandemic in participants with or without ADHD.[4] Even so, adults with ADHD still consistently had lower quality of life, productivity, and more depressive symptoms than those without ADHD before or during pandemic.[4]

Impulsivity in adults with ADHD disrupts their social interactions with other people that leads to them having difficulties in building and maintaining good relationships. They have tendencies to make inappropriate words/remarks, do reckless acts/behaviors, and agree to engagements without thinking through consequences. Adults with ADHD reported to feel overwhelmed in social interaction with others and unsure how to respond.[6]

Diagnosing ADHD

ADHD is diagnosed based on Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5). In order to be diagnosed with ADHD, children up to age 16 years should have six or more symptoms that match the ADHD criteria on DSM-5.[1,16] However, persons with age 17 years or older only need 5 symptoms that match the ADHD diagnosis criteria in DSM-5 to be diagnosed with ADHD.[16] Symptoms of ADHD should be present for at least 6 months. Moreover, there are some following conditions to diagnose ADHD: [1,16]

1. *The onset of symptoms was before age 12 years old.*
2. *Two or more settings present, for example, the symptom presents at home and work, with families or with friends, etc.*
3. *The symptoms impair, interfere, or reduce the quality of life in social, work/occupational, or academic functioning*
4. *The disorder is not better explained by any other mental disorder, for example mood disorder, personality disorder, or anxiety disorder.*

According to DSM-5, there are three types of ADHD: predominantly inattentive presentation, predominantly impulsive or hyperactive presentation, and combined presentation. Symptoms of the three types of ADHD are explained in Table 1.

Some people get diagnosed with ADHD later in life during their adulthood. The late diagnosis of ADHD in adults was reported to be caused by prior misdiagnoses, lack of psychiatric resources, and physicians' stigma about ADHD in adulthood.[6] A study also reported that some adults often received ADHD diagnosis after their children got diagnosed with ADHD.[6] A cross-sectional study conducted by Alghamdi et al[3] reported that only a few percentage (6,5%) of adults with suspected ADHD got the diagnosis of ADHD in their childhood. The study also reported that less than 1% had taken medication.[3]

Some core symptoms of ADHD in adults may be missing and they could manifest into other problems such as mood instability, low self-esteem, and procrastination. Adults with ADHD frequently have more inattentive symptoms as the hyperactive symptoms can be controlled better as the age gets older.[1]

Diagnosing ADHD presents multiple challenges because it could overlap with other psychiatric conditions. A cross-sectional study conducted by Alghamdi et al[3] in one of universities in Saudi Arabia reported that adults with ADHD tend to get a previous diagnosis of depression. Moreover, many other studies also reported that adults with ADHD have one or more psychiatric comorbidities which could mask the diagnosis of ADHD.[2,9,17,18]

Table 1. *Diagnosis Criteria of ADHD Symptoms According to DSM-5*[16]

Predominantly inattentive presentation	*≤ 16 years old : 6 following symptoms or more.* *≥ 17 years old :5 following symptoms or more.*
Symptoms	*(1) Frequently fail to have attention to detail or do careless mistakes, (2) Difficulty maintaining attention on task, (3) Often seem not listening when spoken to directly, (4) Doesn't follow through on instructions, (5) Having trouble or difficulty in task and activities organization, (6) Often avoids and keeps away tasks or activities that require sustained mental effort, (7) Often loses or misplaces objects that are necessary for tasks and activities, (8) Has great distractibility, (9) Being forgetful in daily activity.*
Predominantly impulsive/hyperactive presentation	*≤ 16 years old : 6 following symptoms or more.* *≥ 17 years old :5 following symptoms or more.*
Symptoms	*(1) Fidgetiness or squirms in seat, (2) Often leaves seat, (3) Often does activity like running or climbing and feels restless, (4) Unable to engage or take part in leisure activity quietly, (5) Often being very active or busy and difficult to stay quiet, (6) Talks too much, (7) Says something or answers suddenly without fully being thought, (8) Frequently has difficulty in waiting for his/her turn, (9) Frequently interrupts or intrudes on others.*
Combined Presentation	*If the patient has enough symptoms of both predominantly inattentive presentation and predominantly impulsive/hyperactive presentation.*

Comorbidities

ADHD in adults often presents with other comorbid psychiatric disorders. Various studies had shown rates of comorbidity around 57-92%.[2] *Common comorbidities that could be present in adults with ADHD are*[2,3,9,17,18] *:*

1. *Bipolar disorder*
2. *Personality disorder*
3. *Depression*
4. *Anxiety disorder*
5. *Substance use disorder*
6. *Sleep disorder*
7. *Schizophrenia spectrum disorder*
8. *Other psychotic disorder*

A study of adults with ADHD in Geneva University Hospitals reported a high prevalence of anxiety disorder as a comorbidity for ADHD and often associated with worse clinical presentation, such as less control toward anger, higher rates of suicide attempts, higher rate of hospitalization, and psychotic symptoms.[18]

Treatment

Pharmacological therapy is needed as the main treatment for ADHD patients. There are two major categories of pharmacological therapy to treat ADHD, stimulants and non-stimulants.[1]

Stimulants enhance the presence of dopamine and norepinephrine receptors in frontal lobes of brain.[2] Therefore, the effectiveness of brain to process information increases, especially at the pyramidal site.[2] Stimulants could be divided into amphetamines and methylphenidates.[1]

Amphetamine is reported to have a 70% success rate in treating ADHD patients which the onset starts at adulthood. Various formulations of amphetamine that are reported to be effective for ADHD therapy are lisdexamfetamine, dexamphetamine, and mixed amphetamine salts. Mode of action of amphetamine is by adhering to transporters of monoamine, norepinephrine, and dopamine. Then it inhibits the reuptake of neurotransmitters. Amphetamine also enables dopamine transporter to undergo phosphorylation by trace-amine-associated receptor 1. However, amphetamines have some side effects that should be considered. Those side effects that could be present after consuming amphetamine to treat ADHD are anorexia, nausea, vomiting, decrease in body weight, aches in abdomen, insomnia, increased heart rate or tachycardia, and increased blood pressure or hypertension.[2]

Methylphenidate performs its function by adhering to dopamine transporter of the presynaptic cell and then increases efflux of neuronal dopamine and inhibits dopamine reuptake from synapse. This will lead to increased amount of dopamine in extracellular and decreased dopamine reuptake.[2] Immediate-release methylphenidate was reported to be successful to treat three main symptoms of ADHD: inattentiveness, hyperactivity, and impulsiveness.[2] Methylphenidate is associated with higher risk of sleeping issues and reduced appetite. Other side effects that could be found are increased risk of anxiety, level of blood pressure, and rates of pulse. Treatment using methylphenidate could be linked with urticaria, rash, and arrhythmias. When delivered intravenously, methylphenidate could produce a sensation of euphoria.[2]

For non-stimulant medicines, there are two types of drugs, antidepressants and alpha agonists. Atomoxetine is the best known in antidepressant category. It works by inhibiting reuptake of norepinephrine selectively. Although it is not as good as stimulants, it is reported by many trials to have effective outcome in treating ADHD. It is frequently used as a treatment for children who can't tolerate stimulants or have anxiety. Other antidepressants that could be used to treat ADHD include bupropion and TCAs. Bupropion works by targeting dopamine and serotonin. While TCAs perform their function by targeting norepinephrine.[1]

Examples of alpha agonists to treat ADHD are clonidine and guanfacine. They are reported to be effective. However, both clonidine and guanfacine are associated with higher risk of multiple cardiovascular effects, increased body weight, sedation, dizziness, etc. Alpha agonists are reported to be more effective in younger children than adults.[1]

Other than pharmacological treatment, ADHD patients also could receive psychosocial treatment. Psychosocial treatment includes psycho-education for the patient's family and cognitive behavioral training programs for the patients..[1]

Prognosis

Symptoms of hyperactivity in ADHD tend to decrease as the patient gets older. However, impairments or symptoms of attention deficit still persist. Adults with ADHD are associated to have problems at school and work, failure in relationships, and increased risk of injuries and car accidents. Adults with ADHD have been reported to have an increased risk of psychiatric disorders, including conduct disorder, oppositional defiant disorder, substance use disorder, and mood disorder. Prognosis of the patient depends on the severity and management of any psychiatric comorbid that presents in ADHD adults. ADHD patients should get medical attention as early as possible. Diagnosing ADHD earlier, giving appropriate medications, giving supportive therapies, and building empathetic environment for the patients will help them to have a good quality of life and achieve more in life.[2]

CONCLUSION

ADHD affects both children and adults in doing normal life functions by some conditions like inattentiveness, hyperactivity, and restlessness. ADHD could be divided into predominantly inattentive presentation, predominantly impulsive/hyperactive presentation, and combined presentation. Some of the consequences of ADHD in adults include disruption in work, academic, relationship, traffic accidents, and even criminality. ADHD is diagnosed based on DSM-5 criteria. However, diagnosing ADHD could be difficult due to many comorbidities that could mask ADHD diagnosis. Some of the most prevalent comorbid conditions include bipolar disorder, personality disorder, anxiety, etc. Pharmacological treatment for ADHD is stimulant and non-stimulant.

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