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REVIEW ON COMPLEMENTARY AND ALTERNATIVE TREATMENTS FOR AUTISM SPECTRUM DISORDERS

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ABSTRACT

Autism Spectrum Disorder (ASD) is a neurodevelopmental condition that affects the way the brain functions and develops. People with ASD may have difficulty with social behavior and communication and tend to engage in solitary activities. Since there are no reliable biomarkers for ASD, diagnosis is based on behavioral observations. Behavioral intervention and speech therapy are the main treatments for ASD. Moreover, antipsychotic medications such as Aripiprazole, Risperidone for ASD, and Methylphenidate, atomoxetine, and guanfacine are commonly used to treat ADHD in children with ASD. However, these antipsychotics can cause significant side effects, leading parents to explore complementary and alternative treatments (CAT). CATs have shown greater safety and efficacy than antipsychotics. Many CATs are used to improve ASD symptoms, and while some may have minor adverse effects, they do not cause any major adverse effects. The study reports a review of the adverse effects that have been reported in CATs. Therefore, it is important to avoid therapies that are harmful, impractical, difficult, or expensive and instead focus on safe, simple, affordable, and sensible therapies for ASD.

Keywords: Complementary medicine, Alternative medicine, Speech therapy, Occupational therapy

INTRODUCTION

In 1943, Leo Kanner introduced the term "autism" to describe a particular disorder seen in young children. This disorder is characterized by early onset, specific symptoms, and disrupted social and emotional interactions. Today, autism is recognized as an ASD and is classified as a developmental disorder in the DSM-5 (Diagnostic and Statistical Manual of Mental Disorders, 5th Edition) by the American Psychiatric Association and the ICD-10 (International Classification of Diseases, 10th Revision) by the World Health Organization. ASD is characterized by significant impairment in social communication and atypical repetitive and/or restrictive behaviors or interests, with an onset in the early developmental period, before the age of 3 years [1]. ASD is considered a neurodevelopmental disorder that is caused by irregularities in the way the brain functions and develops. This term covers a range of innate disorders, including autism and Asperger's syndrome, which were previously considered separate conditions. Although some people still use the term Asperger's syndrome, it is generally considered to be at the milder end of the ASD spectrum. Individuals with ASD have difficulties in social behavior and

communication, and they tend to engage in solitary activities that they do repeatedly.

ASD usually becomes apparent during the first 5 years of a person's life and tends to persist into adolescence and adulthood. The highest prevalence of ASD is among those aged 5 to 11 years, with 1 in 40 children affected, followed by those aged 12 to 17 years with 1 in 53, and those aged 1 to 4 years with 1 in 91. According to CHSCY (2019), males are diagnosed with ASD approximately four times more frequently than females, with 1 in 32 males and 1 in 125 females diagnosed with the disorder. A WHO report from 2023 suggests that 1 in 100 children worldwide are presumed to have ASD. The prevalence of ASD has increased in the United States, with 1 in 36 (2.8%) 8-year-old children estimated to have ASD in 2020, up from 1 in 59 children in 2014, according to the CDC. ASD is reported to occur in all racial and ethnic groups, and individuals with ASD often have other conditions, including epilepsy, depression, anxiety, and attention deficit hyperactivity disorder (ADHD). The cognitive functioning and level of intelligence of individuals with ASD vary greatly, ranging from significant disability to superior functioning [2]. ASD has undergone a significant transformation in the past 50 years.

It was once a rare diagnosis with a narrow definition but is now a widely recognized and extensively researched condition that affects people throughout their lives. ASD is a highly heterogeneous condition that is considered a spectrum, ranging from mild to severe. While the core features of ASD, including deficits in social communication and repetitive and unusual sensory-motor behaviors, have remained unchanged, the way we understand and approach the condition has evolved significantly. While many individuals with ASD can thrive with support, others require support throughout their lives. Families, teachers, and direct service providers play a critical role in assisting individuals with ASD, but doctors and other clinicians also have an important impact. They provide information on how ASD currently functions, refer individuals to service providers and specialists as needed, and ensure that families receive the guidance they need to support their loved ones. ASD imposes a significant economic burden, particularly on adults who require ongoing support. This can lead to higher educational and medical costs, as well as a loss of income for caregivers. Despite the challenges posed by ASD, educational and behavioral services remain the primary treatment approach. While medication can be an important supplement, it is important to

recognize that ASD is a circadian disorder that requires a comprehensive approach to treatment [3]. Autistic individuals often experience atypical cognitive deficiencies, which include abnormal perception and information processing, executive dysfunction, and poor social cognition and perception. These traits are underpinned by atypical neurodevelopment at the systems level.

The causes of autism are complex and involve both genetics and environmental factors in early childhood. Genetic diversity in genes significantly increases the risk of ASD. Although signs of autism may appear in early infancy, the diagnosis is often made much later. Early detection requires a collaborative interdisciplinary evaluation. Specific behavioral treatments and medication therapy can lessen the difficulties associated with social impairment and emotional instability, although they are not entirely curable. Since there are no well-defined neuropathological indicators of autism that may serve as the foundation for diagnostic standards, it is hypothesized that aberrant behavior in autism is related to changes in newly developing aspects of brain function. Therefore, it is essential to conduct research into the physiological processes and possible

pathophysiology of brain circuits to develop new diagnostic tools.

To understand the neuropathology of ASD, progress has been achieved by using transgenic mice models and modified environmental conditions. Pathological links between ASD animal data and ASD populations were analyzed using a thorough method. Neurological circuits and molecular biological mechanisms linked to autism spectrum disorders were also combined to investigate further the essential components of each set of ASD disorder symptoms and the underlying molecular mechanisms behind them. Lastly, we outline the advancements and drawbacks of the available treatments for ASD and the potential challenges of the most recent research on autism, along with the goals for its future growth [4]. Individuals with ASD often experience additional neurological disorders or cognitive deficiencies, such as a seizure disorder, which can complicate their appearance and treatment. Moreover, there is a high prevalence of emotional, behavioral, and adaptation challenges that contribute to the disorder's diverse presentation.

Pediatric neuropsychologists are often called upon to evaluate children's behavioral and cognitive development in cases of ASD, both to support the diagnostic process and to

provide suggestions for this complex illness. Neuropsychologists are well-suited for this task due to their ability to evaluate and integrate data from a wide range of sources. The purpose of neuropsychological assessments is for the results to be used by others to direct the provision of services for the child. For instance, the results may highlight areas of strength or weakness, which can help educators develop tailored interventions. Unfortunately, little research has been done to demonstrate how or to what extent instructors are using neuropsychological results and recommendations. Both empirical data and anecdotal evidence suggest a disconnect between the supply of educational services and the application of recommendations from neuropsychological assessments [5].

Signs and symptoms of autism spectrum disorder

ASD affects individuals from all walks of life, regardless of their cultural, racial, or socioeconomic background. Although each person with ASD is unique, they commonly experience challenges related to social communication and repetitive sensory-motor behaviors. These challenges are not limited to any specific culture, ethnicity, or socioeconomic group. The root cause of ASD

is abnormal brain development and neural reorganization that occurs early in life.

Diagnosing ASD is a behavioral process since there are no reliable biomarkers available. The American Psychiatric Association released the Diagnostic and Statistical Manual of Mental Disorders (DSM)-5 criteria in 2013 to simplify the diagnosis of ASD. The DSM-5's diagnostic criteria for ASD are based on two domains: social communication and limited, repetitive, or atypical sensory-motor behaviors. This has resulted in a single spectrum for ASD and subtypes such as Asperger's disorder and pervasive developmental disorder not otherwise defined have been combined into a single ASD diagnosis. Additionally, the DSM-5 acknowledges that individuals with ASD may also have other conditions such as hereditary illnesses like Fragile X syndrome and mental health issues like attention-deficit hyperactivity disorder (ADHD). To receive an ASD diagnosis, an individual must have experienced previous or ongoing challenges in all three subdomains of social communication and have or have had difficulties in two of the four distinct sensory-motor behaviors that are confined and repeated. The DSM-5 has also introduced severity levels based on the need for assistance, with the idea of functioning being

crucial in and of itself. However, the validity of these severity levels is still up for debate [3]. Although each person with ASD manifests the condition differently, there are certain common indications and symptoms.

- Difficulties in communication, such as delayed linguistic development, limited vocabulary for their age, difficulty in expressing oneself with a range of phrases or words, and exhibiting flat and monotonous tones in certain conversations are all examples of communication challenges.
- Having trouble interacting with others. It refers to facing difficulties in forming friendships and interacting with others, experiencing challenges in recognizing facial expressions, struggling with being aware of their own and others' emotions, avoiding eye contact, and not responding to affection or complying with requests.
- Repetitive actions and adherence to rigid schedules. Individuals with ASD might engage in behaviors that could lead to self-harm, such as biting or head-banging. They may also prefer sticking to the same schedule every day, and find it challenging to adapt to even minor changes. Additionally,

they may exhibit repetitive body movements, such as hand flapping, and engage in repetitive actions with objects, such as spinning the wheels of a toy car.

- Sensitivity to senses. Being oversensitive or undersensitive to stimuli, such as pain, noise, light, touch, taste, and smell [2].

Treatment for autism spectrum disorder

Although autism spectrum illnesses are incurable, there are strategies to help those who have them live a more comfortable life. and their household.

Medication: A psychiatrist could occasionally prescribe and provide medication to treat severe self-harm, aggressive behaviors, or recurrent behaviors. Others Depression, anxiety, or ADHD are symptoms.

Cognitive and behavioral interventions: Interventions may enhance performance. of the juvenile. Among them are speech occupational therapy, behavioral health, and educational therapy, communication therapy, and family education and assistance to empower families individuals to support and live with a child that has ADHD [2].

ASD Behavioural Interventions

For Children and Adolescents with ASD

A study by Weitlauf *et al.* [6] analyzed the effectiveness of behavioral therapies,

including 48 randomized trials and 17 non-randomized comparative studies. The results showed that applied behavior analysis (ABA) at high intensity can lead to improvements in the language and cognitive abilities of young children compared to community controls [7]. Early intensive behavioral intervention (EIBI), based on the principles of applied behavior analysis, is a trusted treatment for young children with ASD. It has proven to be effective in improving core ASD symptoms over a few years, with an average of 20 to 40 hours per week, especially in terms of communication skills [8]. Social skills interventions, such as group instruction, have also shown favorable results in improving social behaviors in older children [9].

For Adults with ASD

According to the National Institute for Health and Care Excellence (NICE), it is recommended that children and young adults with autism should receive group or individual social learning programs to improve their social interaction skills. These programs use behavioral therapy techniques within a social learning framework and involve teaching social norms through video modeling, peer feedback, imitation, and reinforcement [10]. Studies have shown that social skills groups can help enhance social interaction in individuals with ASD [11].

Additionally, Cognitive Behavioural Therapy (CBT) can be beneficial for adults with ASD, particularly in treating OCD and anxiety, or for helping those who have experienced victimization in the past [1].

A manualized intervention called Parent-Child Interaction Therapy has been found to improve children's adaptability and share positive effects through hands-on parent training. This supports the widely held conclusion that parent education alone is insufficient, and training is necessary to reduce disruptive behavior. However, many families of children with ASD still underutilize interventions for oppositional disorders and violence, and traditional behavior management remains useful. There is still debate on whether new behavioral descriptions, such as the increasingly common phrase "pathological demand avoidance" in the UK, are beneficial or detrimental, especially when they rely mostly on surveys or generic items from reports of carers. Furthermore, the optimal way to take into account the complexity of the relationships between emotional regulation deficiencies, ASD impairments, current diagnoses (such as Oppositional Defiant Disorder), and other behavioral issues is still up for debate [3].

Medication Treatments for ASD

The diverse nature of ASD and its frequent co-occurrence with other conditions make it challenging to treat with psychopharmacology. Individuals with ASD are more likely to experience side effects from such medication than their neurotypical peers [12]. Additionally, ASD is a lifelong condition, and most research on the use of psychotropic drugs in this population focuses on children. When considering psychopharmacological treatment, potential risks and benefits must be carefully evaluated. Current evidence suggests that about 50% of insured children with ASD receive medication, such as stimulants, alpha-2 agonists, antidepressants, antipsychotics, and anticonvulsants, to target specific symptoms of the condition [13]. However, no drugs have been approved to treat the hallmark symptoms of social communication deficits and repetitive behaviors. Symptoms such as hyperactivity, inattention, impulsivity, irritability, aggression, self-injury, and repetitive behaviors are often treated with effective medication. Risperidone and aripiprazole are the only antipsychotics approved by the US Food and Drug Administration for the treatment of irritability associated with ASD [1].

The current research on the use of medications to treat ASD is limited to treating co-occurring

diagnoses and behaviors. Randomized controlled trials have shown that Aripiprazole [14] and Risperidone are effective in improving symptoms of irritability or agitation in children and adolescents with ASD. When used together, most children exhibit improvements in irritability, aggression, self-injury, and other disruptive behaviors [15]. Both medications are partial agonists and mixed dopamine-receptor and serotonin-receptor antagonists, and they belong to a class of drugs known as atypical antipsychotics [16]. However, not all similar medications are effective in treating ASD. Adverse side effects, such as sedation and weight gain, increase the risk of later health problems [17].

Methylphenidate, atomoxetine, and guanfacine are commonly used drugs to treat ADHD. These drugs are beneficial in treating the symptoms of ADHD in children with ASD, which affects more than 25% of children. However, people with ASD may experience less benefit and more adverse effects from these medications than people with ADHD. Studies suggest that the use of these three medications should be limited in children with ASD who also have co-occurring ADHD, which is classified as a distinct disorder in DSM-5.

When treating children who have both ASD and epilepsy or other neurological problems, it is recommended to use data from children without ASD as a basis. It makes sense to apply data from the general pediatric population to the treatment of mental diseases that can be present in addition to ASD, such as anxiety and mood disorders. So far, there have been no randomized trials with control populations that have assessed whether drugs used to treat various co-occurring conditions have comparable response rates or unfavorable incidents in ASD individuals. Therefore, caution should be exercised, with a preference for less risky therapies such as behavioral or psychological interventions [3]. Some medical professionals identify as biomedical or holistic practitioners and recommend therapies for ASD which lack supporting data and biological plausibility [18]. While certain nutrients like folic acid [19] and sulforaphane [20] have some biological plausibility and some preliminary data, more research is required to determine their effectiveness. It is important to be cautious of non-evidence-based treatments as they may cause negative effects such as toxicity brought on by hyperbaric oxygen or chelating agents [21]. Healthcare professionals should take measures to prevent such treatments from diverting funds from

evidence-supported behavioral or instructional strategies [3].

CAT for autism spectrum disorder

ASD requires a combination of therapies for effective treatment. A successful treatment plan would typically include specialized and supportive educational programs, social skills assistance, speech and language therapy, as well as behavioral intervention. Physical and occupational therapy may also be recommended to help manage co-occurring issues related to motor coordination and sensory deficiencies [22]. Behavior modification, specifically applied behavior analysis (ABA), has the most empirical evidence supporting its effectiveness in improving linguistic, social, play, and academic skills, as well as reducing severe behavioral disorders [23].

Although the use of complementary and alternative medicines is widespread, their efficacy remains uncertain [24]. Consequently, there is a significant need for further public health interventions due to the severe and chronic nature of ASD, as well as the limits of the currently existing treatments (price, effort, danger, and less-than-ideal response). Complementary and alternative medicine (CAM) is defined as "a group of diverse medical and health care systems, practices, and products that are not generally

considered to be part of conventional medicine" by the National Centre for Complementary and Alternative Medicine (NCCAM) [25].

Complementary and alternative therapy (CAT) techniques are commonly used alongside evidence-based treatments [26]. Conventional medicine is used as the primary treatment, while alternative medicine is used instead [27]. When used alongside conventional therapy, complementary therapy is believed to have incremental effects that have been empirically proven. Moreover, the outcomes of an alternative therapeutic approach should be on par with those of traditional therapy [28]. Clinicians can accept and supervise CATs that have been scientifically confirmed safe but whose efficacy is unclear or nonexistent, provided that they do not impede families from getting life-saving therapies. It is best to avoid using CATs since they have little to no effectiveness and may have negative side effects. Furthermore, CATs that are costly and time-consuming are to be avoided. The current narrative review incorporates findings from systematic reviews, meta-analyses, and randomized controlled trials (RCTs) that assessed the safety and effectiveness of several CAT therapies for kids with ASD [29].

CONCLUSION

Till date, autism spectrum disorder (ASD) do not have permanent cure. Pharmacological therapies such as risperidone and aripiprazole and standard care treatment such as occupational therapy, speech therapy, applied behavioral therapy and special education are often helpful for better prognosis. As the cost involved for this therapy are not affordable to many of the parents of ASD children, they pursue complementary and alternative system of medicine (CAM).

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