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Autism Spectrum Disorder: A Comprehensive Review of Literature

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Abstract **Review Article**

Autism spectrum disorder (ASD) is a neurodevelopmental condition that is defined behaviorally and is characterized by the presence of social-communication deficits as well as restricted and repetitive behaviors. Autism spectrum disorder can also be abbreviated as ASD. The present study was conducted to review the literature regarding different related topics to ASD. These topics included definition of the disease, its classification, diagnosis and therapeutic options. As a conclusion, ASD is a complex condition that affects every individual differently. Improving outcomes requires early detection and intervention, and healthcare professionals play a significant role in the diagnostic and treatment process. There is presently no cure for ASD; however there are a number of effective therapies that can assist those with ASD in leading satisfying lives.

Keywords: Autism spectrum disorder, developmental, behaviors, treatment, intervention.

1. Definition of Autism Spectrum Disorder

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder that affects communication, social interaction, and behavior (Asperger *et al.*, 1944; Das *et al.*, 2018). ASD is also defined from behavior point of view and is characterized by the presence of social-communication deficits as well as restricted and repetitive behaviors. Other names for ASD include Asperger syndrome. According to the most recent conceptualization of ASD, these two behavioral dimensions represent the core defining features that characterize individuals who have ASD. The heterogeneity of ASD can be described through the use of associated dimensions such as intellectual and language ability. In addition, the categorization of ASD subgroups, which are distinguished by the presence of known medical, genetic, or other psychiatric disorders, contributes to our advancement of knowledge regarding the heterogeneity of ASD. These subgroups are distinguished by the presence of known medical disorders, genetic disorders, or other psychiatric disorders (Ousley and Cermak, 2014). It is estimated that 1 in 54 children in the United States has ASD, making it one of the most common developmental disorders (CDC, 2020).

2. Classification of Autism

Since Kanner's seminal description of the syndrome now known as "early infantile autism," significant strides have been made in our understanding of not only this condition but also other conditions that are closely related to it (Kanner, 1943; Volkmar *et al.*, 2009; Volkmar *et al.*, 2012). In spite of the fact that it is extremely likely that cases of autism had been seen long before Kanner's report, for instance, reports of children who were referred to as "feral," it was Kanner's report that caught the attention of professionals (Wolff, 2004; Rutter, 2011). In the nearly seven decades that have passed since Kanner's report, a great deal of elucidation has been made regarding various aspects of autism and methods of diagnosis.

3. Spectrum Model

The condition that is now known as autism spectrum disorder was discovered under the diagnostic category pervasive developmental disorder prior to the adoption of the DSM-5 (2013) and ICD-11 (2022) diagnostic manuals. Diagnoses like Asperger syndrome and Kanner syndrome, which are not only closely related to one another but also overlap with one another, were used in the previous system. As a result of this, the boundaries between the terms became unclear; consequently, a spectrum approach was taken for the development of the DSM-5 and the ICD-11. The new method is also more restrictive, which means that there are now fewer people who are able to receive a diagnosis. Because of this, the number of people who are able to receive a diagnosis has decreased (Mishra *et al.*, 2023).

In order to define this spectrum, both the DSM-5 and the ICD-11 use separate classification approaches. The DSM-5 employs a "level" system, which ranks how in need of support the patient is, (WHO, 2023) whereas the ICD-11 system has two axes: intellectual impairment and language impairment (CDC, 2023), as these are seen as the most crucial factors. The DSM-5 makes use of a "level" system, which ranks the patient based on how much assistance they require (Geschwind, 2008).

It is now well understood that autism, which is a neurodevelopmental disorder, can present itself in a wide variety of different ways. The symptoms of this condition are thought, in general, to cover a wide and complex spectrum, and they can vary considerably from one individual to the next. When multiple diagnoses are present at the same time, it is more likely that an individual will have significant support requirements, developmental delays, and possibly even the inability to speak. Others have relatively low support needs; they may have more typical speech-language and intellectual skills, but they may have atypical social and conversational skills, narrowly focused interests, and wordy, pedantic communication. Some people with autism have atypical social and conversational skills, narrowly focused interests, and wordy, pedantic communication. Some people have atypical social and conversational skills, interests that are highly specialized, and communication styles that are wordy and pedantic (American Psychiatric Association, 2013). There is a possibility that they still require a considerable amount of assistance with certain aspects of their lives. The spectrum model should not be understood as a continuum running from mild to severe, but rather as meaning that autistic symptoms can present in a very different way in each individual. This is the more accurate interpretation of the model (Happé and Frith, 2006). The way in which a person presents themselves to the world is something that can shift over the course of time and adjust according to the circumstances (www.autism.org.uk, 2023).

Despite the fact that the DSM and ICD are highly influenced by one another, there are still some significant distinctions between the two. For instance, the DSM-5 categorized Rett syndrome as an autism spectrum disorder (ASD), but the ICD-11 moved it to the chapter on developmental anomalies because it was no longer considered to be a part of the ASD category. This change occurred because the DSM-5 no longer considered Rett syndrome to be part of the ASD category. Since 1980, when DSM-III was first released and ICD-9 was in use, there has been collaborative work toward a convergence of the two classification systems. This work is being done in an effort to improve patient care. In the course of this work, a more stringent biological assessment has been substituted for previous experience, and the classification system has also been simplified (Mezzich, 2002; ncvhs.hhs.gov, 2023).

The International Classification of Diseases (11th Revision), more commonly referred to as ICD-11, was published by the World Health Organization in June of 2018, and it began to take full effect in January of 2022. The International Classification of Diseases (11th Revision) is also known as ICD-11 (WHO, 2018).

4. Signs and Symptoms of ASD

ASD can present differently in each individual, but there are some common signs and symptoms to look for (CDC, 2023). These include communication Difficulties: People with ASD may have difficulty with verbal and nonverbal communication, such as difficulty understanding gestures and facial expressions, difficulty initiating and maintaining conversations, or repetitive speech. Social Interaction Difficulties: They may have difficulty making friends or interacting with others, may not respond to their name, avoid eye contact, or may not share interests with others. Repetitive Behaviors: People with ASD may engage in repetitive behaviors, such as flapping their hands, rocking back and forth, or repeating words or phrases. Sensory Issues: They may have sensitivity to sounds, touch, taste, or smells, and may have difficulty adjusting to changes in routine or environment (Soke *et al.,* 2010; Hodges *et al.,* 2020).

5. Diagnostic Process

The diagnostic process for ASD involves several steps, including a comprehensive medical and developmental history, observation and assessment of behavior, and diagnostic testing. The diagnosis is usually made by a qualified healthcare professional, such as a pediatrician, psychiatrist, or psychologist, who specializes in developmental disorders (Brian *et al.,* 2019).

The diagnosis of autism spectrum disorder (ASD) in children is typically made for the very first time by a pediatrician, family physician, parent, or another caregiver who regularly interacts with the child. These children can exhibit a wide variety of symptoms that range in both severity and frequency. These symptoms can also be present in varying numbers. Diagnostic approaches that are administered by multidisciplinary teams with the mentality that "one size fits all" are inefficient and contribute to long wait times (Penner *et al.,* 2018; Yuen *et al.,* 2018). This statement offers three potential methods for identifying ASD in patients. The choice of which of these strategies to implement is determined not only by the clinical expertise and discretion of the pediatric care provider, but also by the degree of difficulty in the manifestation of the symptoms (Volkmar *et al.,* 2014), and possibly the patient's psychosocial history (Brian *et al.,* 2019).

The Diagnostic and Statistical Manual of Mental Disorders (DSM-5) is currently used to diagnose ASD (WHO, 2013). This manual defines two main categories of symptoms: persistent deficits in social communication and social interaction, and restricted,

repetitive patterns of behavior, interests, or activities (Kulage *et al.,* 2014; Baio *et al.,* 2018). The healthcare professional may also use specialized tools, such as the Autism Diagnostic Observation Schedule (ADOS) (Gotham *et al.,* 2007) or the Autism Diagnostic Interview-Revised (ADI-R) (Kim *et al.,* 2013), to aid in the diagnostic process. These tools involve direct observation and interaction with the person being evaluated, as well as interviews with caregivers (Ousley and Cermak, 2016).

6. Treatment Options

Even though behavioral interventions are still the mainstay treatment for autism spectrum disorder (ASD), several potentially targeted treatments that address the underlying neurophysiology of ASD have emerged in the past few years. This is despite the fact that behavioral interventions are still the mainstay treatment for ASD. These treatments are geared toward relieving particular manifestations of autism spectrum disorder (ASD). These are encouraging in the sense that there is a possibility that, in the future, they will become a component of the mainstay treatment for addressing the core symptoms of ASD. This would be a significant step forward in the fight against ASD. Even though it is likely that the development of future targeted treatments will be influenced by the underlying heterogeneity in etiology, associated genetic mechanisms that influence ASD are likely to be the first targets of treatments and even gene therapy in the future for ASD. This is because associated genetic mechanisms that influence ASD have been shown to be associated with ASD. This is due to the fact that ASD is influenced by associated genetic mechanisms. In this article, we provide a review of the current psychopharmacological treatment in autism spectrum disorder (ASD), including treatments used to address common comorbidities of the condition and upcoming new targeted approaches in the management of autism. Specifically, we focus on the use of antipsychotic medications. Medications like metformin, arbaclofen, cannabidiol, oxytocin, bumetanide, lovastatin, and trofinetide, as well as dietary supplements like sulforophane and N-acetylcysteine, are a few of the topics that are discussed in this article. Other topics include a discussion on trofinetide and a discussion on bumetanide. This article also discusses the most common medications that are used to treat the comorbidities that are associated with ASD. These medications include atypical antipsychotics, serotoninergic agents, alpha-2 agonists, and stimulant medications. The most common genetic disorder that can lead to autism spectrum disorder (ASD) is fragile X syndrome (FXS). Targeted treatments for FXS serve as a model for developing new treatments that may be helpful for other forms of ASD (Aishworiya *et al.,* 2022).

7. Non-Pharmacological Treatment

Lovaas (1987) detailed a novel method of treatment of ASD. He found that almost half of the children diagnosed with ASD showed a significant improvement in their IQ scores as well as their educational functioning. It is a behavior intervention designed specifically for young children that is intensive, highly structured, long-term, and one-on-one. It is supported by a large body of empirical research and has become the basis for a significant number of the evidence-based behavioral interventions that are utilized in the world today (Slocum *et al.,* 2014). This intervention is also known as The Lovaas Method of Applied Behavior Analysis (Lovaas Method) in some circles. Since then, a number of modifications and adaptations of the Lovaas method have since been developed thanks to the decades of extensive research that have been conducted since then. These modifications and adaptations have been made possible by the Lovaas method. These have been shown to be effective in addressing the core impairments of autism spectrum disorder, including social communication, speech, behaviors, play, and learning (Smith, 2013; Leaf *et al.,* 2016). These are versatile tools that can be applied in a wide variety of situations, environments, and processes. Comprehensive treatment models (CTMs) and focused interventions are the two categories that Odom *et al.,* (2010) and Wong *et al.,* (2015) have distinguished between when discussing the behavioral evidence-based interventions that exist.

Comprehensive treatment models that focus on core ASD symptoms have been found to improve language, cognitive and functional language skills in young children. These models use intensive and long-term multi-disciplinary strategies in naturalistic environments. These models use naturalistic environments. Instructions could be provided either at home or in a school environment, either one-on-one or in a group setting, either by parents or by teachers. In addition, instructions can be provided either one-on-one or in a group setting. Some examples of well-established CTMs include Early Behavior Intervention (EIBI) (Reichow *et al.,* 2012), the Early Start Denver model (ESDM) (Dawson *et al.,* 2010), the Developmental, Individual Difference, Relationship-Based Model (DIR/Floortime, or the Greenspan model) (Wieder and Greenspan, 2003), Pivotal Response Training (PRT) (Koegel and Koegel, 2006), and Treatment and education of autistic and related communication handicapped children (TEACCH) (Mesibov and Shea, 2010).

8. Intervention Therapeutic Options

Fahad and Alkhatib (2019) conducted a study to look at intervention programs for children who have ASD from the perspective of a family concept that includes both children who have autism as well as their parents. This is done because it is generally accepted that parental involvement is one of the most important factors contributing to the overall success of intervention programs. ASD is a neurodevelopmental condition that is characterized by difficulties in social communication and interaction, as well as the prevalence of restricted

and repetitive patterns of behavior, interests, or activities. Autism spectrum disorder is categorized as a neurodevelopmental condition that lasts for a significant amount of time. Patients who have been given a diagnosis of ASD may be able to benefit from intervention programs, particularly when they are in the earlier stages of their development. Involving the parents of children who have been given a diagnosis of autism spectrum disorder (ASD) is another objective with the purpose of improving the effectiveness of these interventions and making them more accessible to families (Fahad and Alkhatib, 2019).

9. Pharmacological options for ASD

Serotonin is a crucial messenger that plays an especially important role in the gastrointestinal, cardiovascular, and central nervous systems. The levels of serotonin, which are controlled by medications that are serotoninergic, can be affected by a variety of factors. It has been discovered that autistic individuals have higher levels of serotonin than the general population, and it is hypothesized that serotonin dysregulation is linked to the symptoms that are commonly observed in autistic people, such as anxiety and repetitive behaviors (Aishworiya *et al.*, 2022). Studies conducted with PET have revealed that children with ASD who are younger than 5 years old have lower levels of serotonin in their cerebral spinal fluid (CSF) (Chandana *et al.*, 2005). These findings were obtained from the children. In comparison to healthy controls, patients diagnosed with autism spectrum disorder (ASD) have been shown to have lower levels of enzymes in their lymphoblastoid cell lines that are responsible for the conversion of tryptophan to serotonin (Boccuto *et al.*, 2013). Individuals diagnosed with ASD may benefit from treatment with an SSRI, which has been shown in these studies to stimulate neurogenesis and provide neuroprotection (Jansson *et al.*, 2002). The levels of serotonin in the body can be influenced by taking one of the following types of medication: selective serotonin reuptake inhibitors (SSRIs), serotonin-norepinephrine reuptake inhibitors (SNRIs), or tricyclic antidepressants. One of the classes of drugs known as selective serotonin reuptake inhibitors, or SSRIs, is one of the antidepressants, mood stabilizers, and irritability treatments that medical professionals most frequently recommend to autistic patients. On the other hand, the results of the clinical trials that have been conducted to date have shown that the benefits of SSRIs for reducing aggressive behavior and improving the core symptoms of ASD have been inconsistent (Williams *et al.*, 2013).

10. CONCLUSION

ASD is a complex disorder that affects each individual differently. Early detection and intervention are crucial for improving outcomes, and healthcare professionals play a critical role in the diagnostic and treatment process. While there is currently no cure for ASD, there are several effective treatments available that can help individuals with ASD lead fulfilling lives.

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