

A Short Review: Diagnosis and New Therapy of Autism Spectrum Disorder

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ABSTRACT

Autism Spectrum Disorder (ASD) is a heterogeneous neurodevelopmental condition marked by challenges in social interaction and communication, alongside restrictive and repetitive behaviors. Given its rising global prevalence, a thorough understanding of contemporary diagnostic methodologies and therapeutic advancements is crucial. This review synthesizes recent progress in ASD diagnosis, highlighting the significance of early detection through validated screening tools and comprehensive clinical evaluation, which are pivotal for timely intervention. Furthermore, it delves into novel therapeutic strategies, moving beyond conventional behavioral approaches. We explore emerging pharmacological interventions targeting core symptoms and underlying neurobiological mechanisms, alongside innovative non-pharmacological modalities, including digital health solutions, targeted nutritional support, and neuromodulation techniques. The review highlights the importance of personalized, multidisciplinary care in enhancing long-term outcomes. Ultimately, this paper advocates for continued research into precise diagnostic biomarkers and more efficacious, individualized therapies to profoundly improve the quality of life for individuals with ASD.

KEYWORDS: Autism Spectrum Disorder (ASD), Diagnosis, Therapy, Neurodevelopmental

I. INTRODUCTION

The neurodevelopmental illness known as autism spectrum disorder (ASD) is characterized by persistent difficulties with social interaction and communication as well as repetitive and constrained behavioral patterns. Furthermore, learning, movement, and attention may be approached differently by those with ASD. Autism is strongly associated with the genetic condition Fragile X and is more prevalent in men and prematurely born children. The prevalence of

autism spectrum conditions has increased over time, with most cases being diagnosed in early childhood, between the ages of 18 and 24 months. The percentage of both new and old cases of ASD worldwide rose from 0.62 percent in 2012 to 1.0 percent in 2021(1).

Social interactions are frequently extremely challenging for people with ASD. These challenges could include trouble keeping eye contact and facial expressions, adjusting to social norms and expectations, and comprehending the intentions and feelings of others. People with ASD may find it difficult to make and keep friends; they might not comprehend that social interactions are reciprocal, or they might feel awkward disclosing their hobbies and interests. Another fundamental characteristic of ASD is communication impairments. Delays in language development, such as difficulties pronouncing simple sentences or first words, may be one way this shows up. They also frequently exhibit limited, repetitive interests and behavior patterns. These could include an excessive dependence on daily routines, repetitive body movements (like clapping or rocking), and a strong fixation on particular subjects or activities. Many people with ASD have sensory processing disorders, which can cause them to react to light, sound, touch, taste, or smell very strongly or slowly(2).

The diagnostic criteria for ASD were updated from the previous 4th edition (DSM-IV) in the Diagnostic and Statistical Manual of Mental Disorders—5th edition (DSM-5) published in 2013. The DSM-IV's distinct pervasive developmental disorder (PDD) diagnoses—autistic disorder, Asperger's disorder, childhood disintegrative disorder, and pervasive developmental disorder not otherwise specified (PDD-NOS)—were combined into one in the DSM-5, creating the idea of a "spectrum" ASD diagnosis. Since Rett syndrome is now recognized as a separate neurological

condition, it is no longer classified under ASD in the DSM-5(3).

No treatment has yet been shown to fully correct the fundamental symptoms of autism, despite significant advancements in early detection and intervention. Many pharmacological and non-pharmacological therapies, including food supplements, detoxification, dietary interventions, treatment of gastrointestinal disorders, treatment of chronic inflammation in the brain and intestines, immunologic treatments, etc., have been used in recent approaches to treating autism (4). The gut microbiota composition of children with ASD is significantly different from that of healthy children, according to studies. This dysbiosis may impact brain function through the MGBA, ultimately resulting in behavioral abnormalities and poor emotional regulation (5).

There are several non-evidence-based therapy alternatives for ASD, and there are worries that patients and families may be exploited by the way these treatments are marketed (6). The only medications for people with ASD and irritability that have FDA approval in the US are risperidone and aripiprazole. Research is ongoing on a number of medications, including trifinetide, arbaclofen, lovastatin, metformin, flavonoids, 5-hydroxytryptamine₇ (5-HT₇) agonist ligands, and the dietary supplement sulfurophane. Any overall management strategy must include behavior analysis and psychosocial therapy because medication won't address issues brought on by environmental variables or maladaptive learning(7). This review aims to advance the field toward more accurate, customized interventions by incorporating the latest research results and offering fresh perspectives and approaches for future ASD research and treatment.

II. DIAGNOSIS OF AUTISM SPECTRUM DISORDER

Children with autism spectrum disorders may not make eye contact, imitate movements like spinning around, and point to items using their parents' hands rather than their own. People could be unable to interact with children or adults, so if they went into a location where there were toys on one side and children on the other, the children would be ignored. Whenever called by name, they may not respond, and they might carry out imaginary behaviors, such as feeding a doll. They have trouble expressing and comprehending their feelings, and it is uncommon for them to have reactions to the way things sound, smell, touch, or

contact. Language issues and echolalia, or repeating phrases or sentences instead of speaking appropriately, are common among autistic children. Children might find rotating items appealing, such as the washing machine, or they might turn over play vehicles as well as rotate the tires. Most children lose the skills or vocabulary they had when they were young(8). DSM 5, which supersedes DSM 4, states that Asperger's disorder, childhood disintegrative disorder, and pervasive developmental disorder not otherwise specified are now included in the category of autism spectrum disorders. Currently, Rett syndrome is recognized as a distinct condition. Behavioral impairment, pervasive developmental disorder, attention deficit hyperactivity disorder, structural language disorder, anxiety disorders, and/or depressive disorders are only a few of the psychotic disorders that can overlap with autism. Co-morbidities such as digestive problems, sleep problems, and even seizures are very well(9).

Described below are the psychometric properties of the widely used developmental screening tools used in clinical settings in India. Moreover, the adapted items in these six development screening tools, VSMS, DASII, BDST, DDST, RBSK, and BSID from Western screening tools, were also validated in the Indian population. These screening tools are domain-specific, validated for the Indian population, and available in the local language with norms for specific age groups. These tools are psychometrically sound for use in children to assess various domains of neuropsychological development(10).

Timely and accurate ASD diagnosis in early childhood, although desirable, is likewise marked with challenges, some of which are due to flaws in diagnostic criteria requirements and standardized assessment tools of the moment. Mottron³⁴, for example, views these as contributing factors to the extensive heterogeneity in autism, unexpected prevalence increases, and generally hampering research progress. The applied assessment and treatment model focuses on core challenges in ASD(11).

III. CURRENT THERAPEUTIC APPROACHES FOR ASD

Pharmacological therapy falls under the first category of available treatments. These include "lack of attention, restlessness, nervousness, insomnia, impatience, restricted and repetitive, aggressiveness, and personality" and are frequently

used to treat illnesses. Additionally, they are utilized in the management of ADHD symptoms. Among the more common medications are atomoxetine, folinic acid, melatonin, psychostimulants, antipsychotics, and selective serotonin reuptake inhibitors (SSRIs).

Psychostimulants

Often referred to as Ritalin or Concerta, methylphenidate is a psychotropic substance that is frequently prescribed. Ritalin raises dopamine levels, which have an impact on focus, enjoyment, and mobility. Methylphenidate is also used to treat hyperactivity and ADHD in people with autism spectrum disorders. According to one child study, methylphenidate at low dosages proved useful in treating hyperactive behaviors in kids with ASD. When families, teachers, and doctors assessed the kids, they all reported fewer symptoms. According to the research, some people may require higher therapeutic dosages, even though it is normally advised to start with a modest dosage and increase it gradually as needed (12). Another study examining the long-term effectiveness of methylphenidate in treating ADHD and ASD in children and adolescents found that the medication considerably decreased the severity of the disorders after the first two years of therapy (13).

Antipsychotic

Antipsychotic drugs stop dopamine from being transmitted across the brain's dopaminergic circuits(14). Risperidone, an antipsychotic drug used to treat ASD, has been demonstrated to be useful in lowering behavioural issues, restlessness, and social disengagement(15). Research on the effectiveness of risperidone in treating children revealed that some patients experienced a higher reduction in restlessness than those receiving a placebo. The findings show that risperidone was successful in lowering restlessness in children with ASD following eight weeks of treatment. Risperidone users experienced improvements in their irritation scores that were nearly half as significant as those observed in the placebo group, according to other studies (16). Shea et al. found that risperidone was effective in controlling restlessness in children with ASD and was well tolerated. Aripiprazole is another schizophrenia medication used to reduce hyperactivity. Clinical studies have shown that it helps reduce repetitive behaviors in children and adolescents with ASD (17).

Behavioral Interventions

Behavioral therapy is used to educate social skills or alleviate comorbidities. Anxiety, repetitive behaviors, and poor communication skills are among the illnesses that are discussed. Crucially, rather than "accepting" the patient into the community, the primary objective of therapy is to encourage independence. Teaching coping mechanisms is the aim of all behavioral therapies (18).

IV. EMERGING THERAPEUTIC STRATEGIES

The main conclusion from the discussion of novel pharmacological treatments—oxytocin, bumetanide, acetylcholinesterase inhibitors, and memantine—is that more solid proof of their effectiveness and long-term advantages is required before any formal recommendations are made. The severity of ASD symptoms and related sleep difficulties have been found to benefit from various complementary approaches, such as music therapy and the addition of melatonin to other behavioral interventions, respectively (19). Standardizing and categorizing treatment approaches into a spectrum should be the first step in the future of ASD treatment. Greater acceptance among the relevant populations, particularly among parents of children with ASD, can be ensured by beginning with GI therapy, chelation, and nutritional supplementation as first-line therapy. With more specialized treatment options, including immunotherapy, antimicrobials, and antivirals, a case-by-case strategy should be developed to properly monitor severe cases of ASD (20).

V. CONCLUSION

This review highlights the dynamic evolution in understanding Autism Spectrum Disorder (ASD), from refined diagnostic criteria and improved early identification methods to a diverse landscape of therapeutic interventions. Significant strides have been made in recognizing ASD's heterogeneity and the complexities of its diagnosis, particularly concerning co-occurring conditions and varied presentations. Despite these advancements, critical gaps persist. The quest for objective, reliable biomarkers remains paramount to enable earlier and more precise diagnoses, and to guide individualized treatment strategies. Further rigorous research is essential to establish the long-term efficacy and safety of novel pharmacological agents and neurobiological interventions. The future of ASD care is poised towards highly personalized,

integrated, and multidisciplinary approaches. By leveraging cutting-edge advancements in genetic profiling, neuroimaging, and digital health technologies, we can foster tailored interventions that profoundly enhance developmental trajectories and overall quality of life for individuals across the autism spectrum. Continued collaborative efforts are vital to translate scientific discoveries into tangible improvements in clinical practice.

VI. REFERENCES

- [1]. Okoye C, Obialo-Ibeawuchi CM, Obajeun OA, Sarwar S, Tawfik C, Waleed MS, Wasim AU, Mohamoud I, Afolayan AY, Mbaezue RN. Early Diagnosis of Autism Spectrum Disorder: A Review and Analysis of the Risks and Benefits. *Cureus*. 2023 Aug 9;15(8):e43226. doi: 10.7759/cureus.43226. PMID: 37692637; PMCID: PMC10491411.
- [2]. Qin, L., Wang, H., Ning, W. et al. New advances in the diagnosis and treatment of autism spectrum disorders. *Eur J Med Res* **29**, 322 (2024). <https://doi.org/10.1186/s40001-024-01916-2>
- [3]. Hodges H, Fealko C, Soares N. Autism spectrum disorder: definition, epidemiology, causes, and clinical evaluation. *TranslPediatr*. 2020 Feb;9(Suppl 1):S55-S65. doi: 10.21037/tp.2019.09.09. PMID: 32206584; PMCID: PMC7082249.
- [4]. Kumar B, Prakash A, Sewal RK, Medhi B, Modi M. Drug therapy in autism: a present and future perspective. *Pharmacological Reports*. 2012 Nov;64(6):1291–304.1.
- [5]. Fang Z, Zhou Y, Chen K, Wang J, Liu X, Jia P. Gut microbiota and autism spectrum disorder: advances in dietary intervention strategies based on the microbiota-gut-brain axis mechanism. *Frontiers in Neuroscience*. 2025 Jun 4;19.
- [6]. Hellings J. Pharmacotherapy in autism spectrum disorders, including promising older drugs warranting trials. *World J Psychiatry*. 2023 Jun 19;13(6):262-277. doi: 10.5498/wjp.v13.i6.262. PMID: 37383284; PMCID: PMC10294139.
- [7]. Kaye AD, Allen KE, Smith Iii VS, Tong VT, Mire VE, Nguyen H, Lee Z, Kouri M, Jean Baptiste C, Mosieri CN, Kaye AM, Varrassi G, Shekoohi S. Emerging Treatments and Therapies for Autism Spectrum Disorder: A Narrative Review. *Cureus*. 2024 Jul 2;16(7):e63671. doi: 10.7759/cureus.63671. PMID: 39092332; PMCID: PMC11293483.
- [8]. Maenner, M. J., Shaw, K. A., Baio, J., Washington, A., Patrick, M., DiRienzo, M., Christensen, D. L., Wiggins, L. D., Pettygrove, S., Andrews, J. G., Lopez, M., Hudson, A., Baroud, T., Schwenk, Y., White, T., Rosenberg, C. R., Lee, L. C., Harrington, R. A., Huston, M., ... Dietz, P. M. (2020). Prevalence of autism spectrum disorder among children aged 8 years-Autism and developmental disabilities monitoring network, 11 Sites, United States, 2016. *MMWR Surveillance Summaries*, 69(4), 1–12. <https://doi.org/10.15585/MMWR.SS6904A1>
- [9]. Ayres, J. L. (2015). Intellectual disability (Intellectual developmental disorder). In *The 5-Minute Clinical Consult Standard 2016: Twenty Fourth Edition*. <https://doi.org/10.4324/9780429286896-121>.
- [10]. Shekhawat DS, Gupta T, Singh P, Sharma P, Singh K. Monitoring tools for early identification of children with developmental delay in India: an update. *Child Neuropsychology*. 2022 Jan 4;1–17. <https://doi.org/10.1080/09297049.2021.2022113>.
- [11]. Hus Y, Segal O. Challenges Surrounding the Diagnosis of Autism in Children. *Neuropsychiatric Disease and Treatment* [Internet]. 2021 Dec 3;17(17):3509–29. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8654688/> <https://doi.org/10.2147/NDT.S282569>
- [12]. Pearson, D. A., Santos, C. W., Aman, M. G., Arnold, L. E., Casat, C. D., Mansour, R., Lane, D. M., Loveland, K. A., Bukstein, O. G., Jerger, S. W., Factor, P., Vanwoerden, S., Perez, E., & Cleveland, L. A. (2013). Effects of extended release methylphenidate treatment on ratings of attention-deficit/hyperactivity disorder (ADHD) and associated behavior in children with autism spectrum disorders and ADHD symptoms. *Journal of Child and Adolescent Psychopharmacology*, 23(5), 337–351. <https://doi.org/10.1089/cap.2012.0096>

- [13]. Ventura, P., de Giambattista, C., Spagnoletta, L., Trerotoli, P., Cavone, M., Di Gioia, A., & Margari, L. (2020). Methylphenidate in autism spectrum disorder: A long-term follow up naturalistic study. *Journal of Clinical Medicine*, 9(8), 1–17. <https://doi.org/10.3390/jcm9082566>
- [14]. Guzman, F. (2019). Mechanism of Action of Antipsychotic Agents. Psychopharmacology Institute. <https://psychopharmacologyinstitute.com/publication/mechanism-of-action-of-antipsychotic-agents-2094>
- [15]. McCracken, J. T., McGough, J., Shah, B., Cronin, P., Hong, D., Aman, M. G., Arnold, L. E., Lindsay, R., Nash, P., Hollway, J., McDougle, C. J., Posey, D., Swiezy, N., Kohn, A., Scahill, L., Martin, A., Koenig, K., Volkmar, F., Carroll, D., ... McMahon, D. (2002). Risperidone in Children with Autism and Serious Behavioral Problems. *New England Journal of Medicine*, 347(5), 314–321. <https://doi.org/10.1056/nejmoa013171>
- [16]. Shea, S., Turgay, A., Carroll, A., Schulz, M., Orlik, H., Smith, I., & Dunbar, F. (2004). Risperidone in the treatment of disruptive behavioral symptoms in children with autistic and Other pervasive developmental disorders. *Pediatrics*, 114(5). <https://doi.org/10.1542/peds.2003-0264-F>
- [17]. Owen, R., Sikich, L., Marcus, R. N., Corey-Lisle, P., Manos, G., McQuade, R. D., Carson, W. H., & Findling, R. L. (2009). Aripiprazole in the treatment of irritability in children and adolescents with autistic disorder. *Pediatrics*, 124(6), 1533–1540. <https://doi.org/10.1542/peds.2008-3782>
- [18]. Donaldson, J. (2021). Treatments for Autism Spectrum Disorder: Literature Review.
- [19]. Kaye AD, Allen KE, Smith Iii VS, Tong VT, Mire VE, Nguyen H, Lee Z, Kouri M, Jean Baptiste C, Mosieri CN, Kaye AM, Varrassi G, Shekoochi S. Emerging Treatments and Therapies for Autism Spectrum Disorder: A Narrative Review. *Cureus*. 2024 Jul 2;16(7):e63671. doi: 10.7759/cureus.63671. PMID: 39092332; PMCID: PMC11293483.
- [20]. Konstantin Yenkovyan, Zadik Ounanian, Mirumyan M, Hayrapetyan L, Zakaryan N, Sahakyan R, et al. Advances in the Treatment of Autism Spectrum Disorder: Current and Promising Strategies. *Current Medicinal Chemistry*. 2023 Oct 5;31.