

Clinico-Social Profile of Children with Autism Spectrum Disorder: A Descriptive Study from a Tertiary Care Centre

Pranali S. K.¹, Arundhati Patil², Roopa Mangashetty³

¹Resident Doctor, Dept. of Paediatrics, Mahadevappa Rampure Medical College, Kalaburagi, Karnataka, India

²Professor, Dept. of Paediatrics, Mahadevappa Rampure Medical College, Kalaburagi, Karnataka, India

³Professor & Head of Department, Dept. of Paediatrics, Mahadevappa Rampure Medical College, Kalaburagi, Karnataka, India

Received: 01-06-2026 / Revised: 15-07-2026 / Accepted: 21-08-2026

Corresponding author: Dr. Pranali S. K.

Conflict of interest: Nil

Abstract

Objectives: To evaluate the clinico-social profile of children diagnosed with Autism Spectrum Disorder (ASD) and to study the occurrence of co-morbid conditions.

Methods: This descriptive cross-sectional study included 60 children (1–18 years) with ASD attending OPD services and Special schools between June 2023 and October 2024. Diagnosis was based on DSM-5 criteria. Data were collected on socio-demographic variables, clinical features, comorbidities, and screen-time exposure using a semi-structured questionnaire. Statistical analysis was performed using SPSS v20.

Results: Majority of children were <5 years (61.7%), male (78.3%), and from upper-middle socioeconomic class (58.3%). Language delay was the most common complaint (71.7%), with 91.7% having delayed language developmental milestone. Comorbidities included ADHD (43.3%), sleep disturbances (50%), and GI issues (16.7%). Notably, 33.3% of children had screen exposure of 2–3 hours/day.

Conclusions: Early identification and awareness are essential for timely intervention in ASD. Sociodemographic factors and comorbid conditions play a significant role in presentation, early symptom recognition and management. Excessive screen time may influence symptom severity and development.

Keywords: Autism Spectrum Disorder, Children, Clinical Profile, Socioeconomic Status, Screen Time, Comorbidities.

DOI: 10.25258/ijcpr.18.9.171

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

Autism Spectrum Disorder (ASD) comprises a group of neurodevelopmental conditions marked by significant impairments in social communication and the presence of restricted, repetitive behaviours and interests.[1]

Genetic studies further affirm that ASD is a heterogeneous condition, with various genetic polymorphisms contributing to its presentation.

The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) is considered for the diagnosis of this condition.

Children with Autism Spectrum Disorder (ASD) often present with a range of associated medical, developmental, and psychiatric conditions that may impact diagnosis and management.

Intellectual Impairment: Cognitive abilities in children with ASD are often uneven. While they may perform well on tasks involving memory or

visuospatial skills, they may struggle with higher-order reasoning, abstract thinking, and problem-solving.[2]

Language Impairment: Although not essential for diagnosis, language impairment is common and varies widely. Difficulties may include: Absence of verbal communication, Use of only gestures or single words, Delayed or regressive speech development, Limited comprehension and atypical speech patterns, Language-based learning difficulties. [3]

Neurodevelopmental and Psychiatric Comorbidities

Anxiety Disorders: Common among adolescents with ASD, presenting as social anxiety, phobias, or obsessive behaviors. Prevalence ranges from 42% to 55%. Untreated, these can significantly affect academic and social functioning.[4,5,6]

ADHD: Symptoms of hyperactivity, impulsivity, and inattention affect 30%–50% of children with ASD and may worsen behavioral and learning outcomes.[7]

Mood Disorders: Depression and mood dysregulation are more frequent in adolescents, often related to social isolation and communication challenges. Some children may display Oppositional Behaviors like defiance, aggression, or irritability.[8]

Other Neurological and Behavioral Conditions

Tic Disorders: Repetitive motor or vocal tics, including palilalia and echolalia, may be observed.

Schizophrenia: Though rare, the risk of developing schizophrenia is higher in individuals with ASD.[9]

Learning Difficulties: Even in the absence of intellectual disability, children with ASD may face academic challenges related to executive dysfunction, abstract reasoning, and pragmatic language use.[9]

Sleep Disturbances: Common issues include bedtime resistance, frequent awakenings, restlessness, and altered sleep patterns, often due to anxiety or sensory sensitivities.[10,11]

Feeding Issues: Selective eating due to sensory sensitivities may lead to gastrointestinal symptoms or nutritional deficiencies.

Special Abilities ("Savant" Skills): A subset of individuals with ASD may exhibit exceptional abilities in areas like memory, calculation, music, art, or language. These rare talents, such as hyperlexia or calendar memory, may coexist with significant developmental challenges.[12]

Surveillance and screening aid in the early identification is an important step in optimizing outcomes. Early identification facilitates:[13]

- Initiation of early interventions (Specialist involvement, Behavioral modification techniques, Targeted treatments, Communication interventions, Occupational therapy)
- Delivery of appropriate medical care and treatment of associated conditions
- It is imperative for Paediatricians to actively screen for Red Flag signs of autism

Materials and Methods

Sample Size: According to the World Health Organization, the global prevalence of ASD is approximately 0.75%, representing around 16% of the worldwide paediatric population. Based on a reported ASD prevalence of 0.2% in India[14] and using the formula:

$$n = (Z\alpha/2 + Z1-\beta)^2 \times p \times q / d^2$$

With $\alpha = 0.025$ ($Z = 1.96$), $\beta = 0.20$ ($Z = 0.842$), $p = 0.2$, $q = 0.98$, and margin of error (d) = 0.1, the calculated sample size was approximately 32.4, which was rounded to 40. However, a total of 60 participants were ultimately included in the study.

Sampling Method

Participants were selected based on defined inclusion and exclusion criteria.

Data were collected using a predesigned, semi-structured, and validated proforma.

Inclusion Criteria

1. Children aged 1–18 years with features of Autism Spectrum Disorder.
2. Children with ASD and associated comorbidities such as epilepsy, psychiatric disorders, gastrointestinal disturbances, or tuberous sclerosis.

Exclusion Criteria

1. Children with suspected or confirmed genetic or metabolic disorders.
2. Children too ill to participate in the assessment.

Study Procedure: After obtaining written informed consent from caregivers in their local language, eligible children were assessed using DSM-5 diagnostic criteria for ASD. The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) is considered for the diagnosis of this condition which includes following cluster of symptoms

Cluster A: Persistent deficits in social communication and interaction.

Cluster B: Restricted, repetitive patterns of behaviour, interests, or activities, including atypical sensory responses.

All three of the following symptoms from Cluster A must be present:

1. Deficits in social-emotional reciprocity (e.g., limited back-and-forth interaction, poor sharing of emotions or interests).
2. Impairments in nonverbal communication (e.g., poor eye contact, facial expressions, gestures).
3. Difficulties in developing and maintaining relationships (e.g., minimal interest in peers, trouble adjusting behaviour in social situations).

At least two of the following symptoms from Cluster B are required:

1. Stereotyped or repetitive movements, speech, or object use (e.g., hand-flapping, echolalia, lining up toys).
2. Inflexible adherence to routines or rituals (e.g., distress over changes, strict routines).
3. Highly focused or intense interests (e.g., fixation on specific objects or topics).
4. Unusual sensory responses (e.g., hypersensitivity to sound, fascination with lights or textures).

In addition, the symptoms must:

Cause significant impairment in social, academic, or daily functioning.

Be present from early developmental periods, even if they become evident only under increased social demands.[1]

Statistical Analysis: Data were analysed using IBM SPSS version 20.0.

Results

In our study majority of cases were of age group less than 5 years 37(61.7 %), between 5-9 years 21(35%) and more than 10 years were 2(3.3%)

Out of the total 60 patients, 47 (78.3%) were male and 13 (21.7%) were female. The ratio of males to females is approximately 3.6:1, which is consistent with well-documented trends in autism spectrum disorder (ASD) research, where males are more frequently diagnosed than females.

Majority children (35%) were attending Special school, while only 18.3% cases attended regular schools. Children majorly belonged to Upper Middle class (58.3%), and (35%) of cases belonged to Upper class. These results of cases mainly from high Socioeconomic status can be attributed to education status of parents for recognition of symptoms and ability to reach out for consultation, while in lower socioeconomic status cases may be unnoticed due to lack of awareness about the condition as Autism.

Most of the cases presented with language delay (71.67%) as complaint and few complained of abnormal behaviour like not responding to name, hyperactivity, lack of attention, not playing with siblings/friends. The study shows that social-

communication deficits were the most prominent features among the children. The highest proportions were observed for inability to follow verbal commands and lack of joint attention (95.0% each). Other major findings included poor response to name, inability to follow language, abnormal social approach, lack of pointing, lack of social smile, poor eye contact, and language delay (91.7% each).

Among restricted/repetitive behaviours, same food habits (75.0%), difficulties in transition (66.7%), and resistance to small changes (63.3%) were common. Sensory abnormalities were also presented, particularly unusual responses to sound, smell, touch, pain or temperature. Spinning, echolalia, use of idiosyncratic phrases were other features noted.

Overall, the findings indicate that deficits in social communication and lack of interaction constituted the predominant clinical features, while restricted/repetitive behaviours and sensory abnormalities were also commonly present.

In our study all the children were using screen/mobile phones, maximum time of 4-6 hrs/day, and minimum for 1-2 hours/day. About 33.3 % cases had screentime exposure for 2- 3 hrs/day. Excess and continuous Screen exposure may may influence symptom severity and behaviour development of the children. Some cases of Virtual Autism have been reported and are under research studies.

In the present study, Autism with co-morbid conditions were studied where sleep-related issues such as delayed sleep onset and frequent awakenings were the most prevalent comorbidity, affecting 50% of children with Autism Spectrum Disorder (ASD). Attention Deficit Hyperactivity Disorder (ADHD) was also commonly observed, present in 43.3% of cases. Other notable comorbidities included tics in 20% of children and gastrointestinal issues, particularly constipation, in 16.7%. Seizures were reported in 10% of the participants, while Global Developmental Delay (GDD) and anxiety were each seen in 6.7% cases.

Tables 1: Age wise Distribution of cases

AGE (Years)	No. of patients	Percentage
< 5.0	37	61.7
5.0 - 9.9	21	35.0
10.0+	2	3.3
Total	60	100.0

Tables 2: Gender wise Distribution of cases

GENDER	No. of patients	Percentage
Female	13	21.7
Male	47	78.3
Total	60	100.0

Tables 3: Distribution of Clinical Features According to DSM-V Criteria (n = 60)

DSM-V Domain	Observation	Number of Children (n)	Percentage (%)
1. Deficits in social-emotional reciprocity	Inability to follow verbal commands	57	95.0%
	Inability to follow language	55	91.7%
	Poor response to name	55	91.7%
	Developmental regression	—	—
	Abnormal social approach and failure of normal back-and-forth conversation	55	91.7%
2. Deficits in nonverbal communicative behaviours used for social interaction	No finger pointing (index)	55	91.7%
	Lack of joint attention	57	95.0%
	Delayed motor milestones	7	11.7%
	Difficulty in playing with toys in a constructive manner	50	83.3%
	Lack of facial expressions	50	83.3%
	Deficits in use and understanding of gestures	40	66.7%
3. Deficits in developing, maintaining, and understanding social relationships	Minimal interest in interaction with peers	50	83.3%
	Lack of social smile	55	91.7%
	Poor eye contact	55	91.7%
	Language delay	55	91.7%
	Unusual play	15	25.0%
	Lack of social referencing	30	50.0%
	Lack of pretend play / imaginative play	40	66.7%
4. Stereotyped or repetitive motor movements, use of objects, or speech	Motor stereotypes (rocking, pinning, hand gazing, hand slapping, toe walking, flipping objects)	34	56.7%
	Echolalia	30	50.0%
	Idiosyncratic phrases	10	16.7%
5. Insistence on sameness, inflexible adherence to routines, or ritualized behaviour	Resistance or extreme distress even to small changes	38	63.3%
	Same arrangement of toys or books	25	41.7%
	Same food habits	45	75.0%
	Difficulties in transition	40	66.7%
6. Highly restricted, fixated interests or non-functional manipulation of objects/body	Spinning	3	5.0%
	Mouthing	28	46.7%
	Banging objects	25	41.7%
	Licking surfaces	18	30.0%
	Head banging	15	25.0%
	Tantrums	15	25.0%
7. Hyper- or hypo-reactivity to sensory input or unusual sensory interest	Unusual sensory response to smell, touch, sound, pain, temperature (hypo/hyper reactivity)	42	70.0%
	Visual fascinations with light or movement	28	46.7%

Tables 4: Distribution of cases according to Comorbid conditions with Autism

Comorbid Condition	Number of Children (n)	Percentage (%)
Sleeping issues (late onset / awakening)	30	50%
ADHD	26	43.3%
Tics	12	20%
GI issues – constipation	10	16.7%
Seizures	6	10%
GDD (Global Developmental Delay)	4	6.7%
ID (Intellectual Disability)	2	3.3%
Anxiety	4	6.7%

Discussion

This 18-month descriptive study conducted in Kalaburagi, Karnataka, included 60 children aged 1–18 years with Autism Spectrum Disorder (ASD). The most common presenting complaint was language delay, particularly among children under five. This aligns with findings from Kondekar et al. [15], Kommu et al. [16], and Malhi & Singhi [17] who all noted delayed speech as a primary early indicator of ASD, reinforcing the importance of early developmental screening.

In this study, Parental demographics showed that most mothers were aged 25–30 and fathers 31–35 years. A significant proportion (31.7%) of mothers held a college degree, and the majority of families belonged to the upper-middle socioeconomic class. These trends mirror observations by Dickerson et al. [18] and Durkin et al. [19], who linked higher maternal education and socioeconomic status with increased ASD diagnosis. This likely reflects greater health awareness and access to diagnostic services in better-educated and economically stable families.

Comorbidities were also noted in the study population. Sleep disturbances affected 50% of children, a higher rate than the 27.5% reported by Goldman et al. [20]. ADHD, a psychiatric comorbidity, was seen in 43.3% of cases higher than the 29.1% prevalence reported by Simonoff et al. [21]. Tics were observed in 20%, and gastrointestinal issues (mainly constipation) in 16.7%, similar to rates noted by Kohane et al. [22].

Consanguineous marriage was reported in 33.3% of parents. A positive family history of psychiatric or behavioral issues was observed in 26.7% of children. The study by Mamidala MP et al. [23] investigated the association between consanguinity and ASD in an Indian population. The findings indicated that consanguinity increased the risk for ASD with an odds ratio of 3.22, suggesting a significant association between parental consanguinity and ASD risk in this cohort. Regarding gestational age of delivery, in our study 33.3% were born preterm and 66.7% were born at term. A comprehensive Swedish cohort study by Crump C et al. [24] found that the risk of ASD was significantly higher in preterm births, with a prevalence of 6.1% in extremely preterm infants, 2.6% for very to moderate preterm compared to 1.4% in full-term births. The risk decreased progressively with increasing gestational age.

All children in the study were habituated to screen exposure, with an average daily use of 2–3 hours. This is consistent with broader research. Saito et al. [25] identified a significant association between screen exposure and ASD in preschool children. Kushima et al. [26] study suggested that boys with

over four hours of daily screen use at age one had a higher risk of ASD by age three. Similarly, Dong et al. [27] reported an average of 2.64 hours/day in children with ASD, linking it to lower developmental scores and reduced parent-child interaction. These findings highlight the growing concern regarding excessive screen time as a potential environmental risk factor in neurodevelopmental and behavioral disorders.

Conclusion

This study emphasizes the importance of early diagnosis and intervention in Autism Spectrum Disorder. Timely recognition of early signs can significantly improve developmental outcomes. Socioeconomic factors played a key role in diagnosis and access to care. Families with higher education and income levels were more likely to seek early evaluation, while children from lower socioeconomic backgrounds may face delays due to limited awareness and access.

A prominent concern identified was excessive screen exposure, which appears to negatively impact social and language development and may increase ASD risk. This highlights the urgent need to monitor and regulate screen time in early childhood, while promoting social interaction and responsive parenting. It is imperative for Paediatricians to actively screen for Red Flag signs of Autism, which include delayed social smiling, poor eye contact, and lack of name response, delayed or absent speech, absence of babbling or gesturing by 12 months, delayed or regressed language and social skills, and lack of joint attention. In addition, rising screen exposure among young children has contributed to increased risk and severity of Autism. The increasing prevalence of ASD, evolving diagnostic criteria, and delays in recognition of symptoms and formal diagnosis emphasizes the need for public awareness.

Early identification facilitates

- Provision of appropriate management (Specialist involvement, Behavioral modification techniques, Targeted treatments, Communication interventions, Occupational therapy)
- Earlier education planning
- Parent/caregiver and family support
- Genetic testing and counselling (particularly if syndromic/dysmorphic features noted)

ASD is a genetically influenced neurodevelopmental condition, but several perinatal and environmental risk factors such as advanced paternal age, consanguinity, prematurity, and antenatal complications may contribute to its occurrence. Comorbidities like ADHD, anxiety, sleep disturbances, and GI issues further

complicate management, thus the need for a comprehensive, individualized treatment approach.

In summary, managing ASD effectively requires a multi-pronged strategy involving early detection, socio-contextual support, regulation of environmental risks like screen exposure, and targeted interventions for comorbidities.

Early identification and management are crucial to empowering children with autism to develop essential life skills, pursue education, maintain personal care and safety. Ongoing research and inclusive public health policies are essential to ensure equitable care and support for all children with ASD.

Declarations

Limitations

- Small sample size.
- Descriptive studies often lack a control group, making it difficult to compare results and establish a baseline, cannot establish cause-and-effect relationships between variables.

Acknowledgement: I sincerely thank the Almighty, my guide Dr. Arundhati Patil, Dean Dr. Sharanagouda Patil, HOD Dr. Roopa Mangshetty, my parents Er. Srikant S. Katamble and Smt. Padmashree S K, my brother Ar. Gagan S K, the study participants, and all the well-wishers for their support, guidance, and encouragement throughout. Thank you all for being part of my journey.

References

1. American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 5th ed, text revision. Washington (DC): American Psychiatric Association; 2022. p. 56.
2. Pivalizza P. Intellectual disability (ID) in children: Clinical features, evaluation, and diagnosis. In: Augustyn M, Tehrani N, editors. [Internet]. [updated 2024 Feb 14; cited 2025 Feb]. Available from: [relevant URL if available]
3. Miller M, Iosif AM, Hill M, Young GS, Schwichtenberg AJ, Ozonoff S. Response to name in infants developing autism spectrum disorder: a prospective study. *J Pediatr*. 2017;183:141–6.
4. Yeh TC, Chen MH, Bai YM, Tsai SJ, Hsu JW, Huang KL, et al. Longitudinal follow-up of subsequent psychiatric comorbidities among children and adolescents with autism spectrum disorder. *J Affect Disord*. 2023;331:245.
5. Wijnhoven LAMW, Creemers DHM, Vermulst AA, Granic I. Prevalence and risk factors of anxiety in a clinical Dutch sample of children with an autism spectrum disorder. *Front Psychiatry*. 2018;9:50.
6. Kirsch AC, Huebner ARS, Mehta SQ, Howie FR, Weaver AL, Myers SM, et al. Association of comorbid mood and anxiety disorders with autism spectrum disorder. *JAMA Pediatr*. 2020;174(1):63–70.
7. Leitner Y. The co-occurrence of autism and attention deficit hyperactivity disorder in children - what do we know? *Front Hum Neurosci*. 2014;8:268.
8. Rai D, Heuvelman H, Dalman C, Culpin I, Lundberg M, Carpenter P, et al. Association between autism spectrum disorders with or without intellectual disability and depression in young adulthood. *JAMA Netw Open*. 2018;1(4):e181465.
9. Greenlee JL, Mosley AS, Shui AM, Veenstra-VanderWeele J, Gotham KO. Medical and behavioral correlates of depression history in children and adolescents with autism spectrum disorder. *Pediatrics*. 2016;137 Suppl 2:S105–12.
10. Malow BA, Katz T, Reynolds AM, Shui A, Carno M, Connolly HV, et al. Sleep difficulties and medications in children with autism spectrum disorders: a registry study. *Pediatrics*. 2016;137 Suppl 2:S98–105.
11. Valicenti-McDermott M, Lawson K, Hottinger K, Seijo R, Schechtman M, Shulman L, et al. Sleep problems in children with autism and other developmental disabilities: a brief report. *J Child Neurol*. 2019;34(7):387–90.
12. Grigorenko EL, Klin A, Volkmar F. Hyperlexia: disability or superability? *J Child Psychol Psychiatry*. 2003;44(8):1079.
13. Hyman SL, Levy SE, Myers SM; Council on Children with Disabilities; Section on Developmental and Behavioral Pediatrics. Identification, evaluation, and management of children with autism spectrum disorder. *Pediatrics*. 2020;145(1):e20193447.
14. Rudra A, Belmonte MK, Soni PK, Banerjee S, Mukerji S, Chakrabarti B. Prevalence of autism spectrum disorder and autistic symptoms in a school-based cohort of children in Kolkata, India. *Autism Res*. 2017;10:1597–605.
15. Kondekar A, Joshi S, Shah H, Subramanyam A. Clinical profile of children with autism spectrum disorder in tertiary care centre. *Int J Contemp Pediatr*. 2016;3:334–9.
16. Kommu JV, Gayathri KR, Srinath S, Girimaji SC, Seshadri SP, Gopalakrishna G. Profile of two hundred children with autism spectrum disorder from a tertiary child and adolescent psychiatry centre. *Asian J Psychiatry*. 2017;28:51–6.
17. Malhi P, Singhi P. A retrospective study of toddlers with autism spectrum disorder: Clinical and developmental profile. *Ann Indian Acad Neurol*. 2014;17(2):132–6.

18. Dickerson AS, Rahbar MH, Han I, Bakian AV, Bilder DA, Harrington RA, et al. Autism spectrum disorder prevalence and proximity to industrial facilities releasing arsenic, lead or mercury. *Sci Total Environ*. 2015;536:245–51.
19. Durkin MS, Maenner MJ, Baio J, Christensen D, Daniels J, Fitzgerald R, et al. Autism spectrum disorder among US children (2002–2010): Socioeconomic, racial, and ethnic disparities. *Am J Public Health*. 2017;107(11):1818–26.
20. Goldman SE, McGrew S, Johnson KP, Richdale AL, Clemons T, Malow BA. Sleep is associated with problem behaviors in children and adolescents with Autism Spectrum Disorders. *Res Autism Spectr Disord*. 2011;5(3):1223–9.
21. Simonoff E, Pickles A, Charman T, Chandler S, Loucas T, Baird G. Psychiatric disorders in children with autism spectrum disorders: prevalence, comorbidity, and associated factors in a population-derived sample. *J Am Acad Child Adolesc Psychiatry*. 2008;47(8):921–9.
22. Kohane IS, McMurry A, Weber G, MacFadden D, Rappaport L, Kunkel L, et al. The comorbidity burden of children and young adults with autism spectrum disorders. *PLoS One*. 2012;7(4):e33224.
23. Mamidala MP, Kalikiri MK, Praveen Kumar PTV, Rajesh N, Vallamkonda OR, Rajesh V. Consanguinity in India and its association with autism spectrum disorder. *Autism Res*. 2015 Jan;8(1):224–8. doi:10.1002/aur.1431. PMID: 25428403.
24. Crump C, Sundquist J, Sundquist K. Preterm or early term birth and risk of autism. *Pediatrics*. 2021 Sep;148(3):e2020032300. doi:10.1542/peds.2020-032300. PMID: 34380775; PMCID: PMC9809198.
25. Saito K, Saito M, Shinohara R, Minatoya M, Araki A, Itoh S, et al. Association between screen time exposure in children at 1 year of age and autism spectrum disorder at 3 years of age: The Japan Environment and Children's Study. *JAMA Pediatr*. 2022;176(4):384–91.
26. Kushima M, Kojima R, Shinohara R, Horiuchi S, Otawa S, Ooka T, et al. Association between screen time exposure in children at 1 year of age and autism spectrum disorder at 3 years of age: The Japan Environment and Children's Study. *JAMA Pediatr*. 2022;176(4):384–391. doi:10.1001/jamapediatrics.2021.5778.
27. Dong H, Wang J, Wang Y, Qi Z, Wang H, Zhang Y, et al. Correlation between screen time and autistic symptoms as well as development quotients in children with autism spectrum disorder. *Front Psychiatry*. 2021;12: 619994.