

Prakriti, Dosha-Dushya, and Samprapti Profiling for Developing a Standardized Ayurvedic Treatment Protocol in Children with Autism Spectrum Disorder: An Observational Cross-Sectional Study

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ABSTRACT

Background:

Autism spectrum disorder is a neurodevelopmental condition marked by persistent deficits in social communication and restricted, repetitive behaviour, with rising prevalence worldwide. Ayurveda offers a constitution-based framework for understanding and managing the condition, yet no standardized treatment protocol currently exists within this system.

Objective:

To assess Prakriti, Dosha-Dushya predominance, and Samprapti across severity grades of autism spectrum disorder in children, and to develop a prototype standardized Ayurvedic treatment protocol.

Methods:

An observational cross-sectional study was conducted among 65 children aged 3 to 12 years diagnosed with autism spectrum disorder according to DSM-5 criteria, attending the Kaumarbhritya and Paediatrics outpatient departments of a tertiary teaching hospital. Severity was graded using the Indian Scale for Assessment of Autism. Prakriti was assessed using a standardized proforma, and Dosha-Dushya predominance and Samprapti were evaluated through structured Ayurvedic clinical examination. A treatment protocol prototype was formulated through systematic literature synthesis and appraised in part against the AGREE-II instrument.

Results:

Moderate autism was the most common severity grade (61.4%). Vata-Pitta Pradhana Prakriti predominated (43.1%), and Vata-Pitta Dosha was the most frequent pattern (49.2%), with progressively greater Dosha and Srotodushti involvement across increasing severity. Speech delay (83.1%), sensory processing issues (78.5%), and hyperactivity (69.2%) were the most common associated features. These findings informed a multi-phase prototype protocol combining Panchakarma, internal Shamana therapy, and Rasayana rejuvenation.

Conclusion:

Vata-Pitta predominance and progressive multisystem involvement characterize autism spectrum disorder in Ayurvedic terms, supporting a severity-graded, constitution-based approach to treatment protocol development, pending validation in larger, methodologically robust studies.

Keywords: Autism spectrum disorder; Ayurveda; Prakriti; Dosha; Indian Scale for Assessment of Autism; Dushya, Panchakarma

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Introduction

Autism spectrum disorder is a neurodevelopmental condition defined by persistent deficits in social communication and interaction, together with restricted and repetitive patterns of behaviour, interests, or activities, typically emerging in early childhood and continuing across the lifespan [1]. The disorder affects multiple domains of functioning, including cognition, language, sensory processing, and adaptive behaviour, and its presentation varies widely in severity, from mild social awkwardness to profound impairment requiring lifelong support.

Global epidemiological data indicate that the burden of autism spectrum disorder has grown substantially over the past two decades. A widely cited systematic review update estimated that approximately one in 100 children worldwide is affected [2], while pooled estimates from other meta-analyses report figures ranging between 0.6% and just over 1%, depending on region, diagnostic criteria, and case-ascertainment methodology [3,4]. Surveillance data from the United States Centers for Disease Control and Prevention placed prevalence among eight-year-old children at 2.8%, or one in 36, using 2020 data, a marked rise from the 2018 estimate of one in 44 [5], and early identification data from the same network show that four-year-old children are now being diagnosed earlier than previous birth cohorts [6]. Regional estimates from South and Southeast Asia, including India, generally place prevalence between 1% and 1.5% of children, though under-recognition and limited surveillance infrastructure likely mean the true burden is higher [7,8]. Co-occurring gastrointestinal symptoms are also common, affecting a substantial proportion of children with the disorder and adding to the overall clinical burden [9].

This rising prevalence has occurred alongside only incremental progress in disease-modifying treatment. Current management in conventional medicine centres on behavioural and educational intervention, several forms of which show measurable benefit for cognitive, language, and adaptive outcomes when begun early [10,11], although access to intensive, sustained early intervention programmes remains inconsistent, particularly in resource-limited settings, and challenges around diagnostic delay, service availability, and family burden persist even in well-resourced health systems [12]. Pharmacological options remain limited to symptom-targeted agents, and no approved treatment addresses the core features of the disorder. This treatment gap, combined with a

growing understanding of the biological heterogeneity underlying autism spectrum disorder, including the contribution of gut microbial dysbiosis and the microbiota-gut-brain axis to symptom expression [13,14], has pushed many families toward complementary and alternative approaches. Surveys from diverse settings report that a considerable proportion of parents use complementary therapies for their children, frequently without adequate clinician guidance, reflecting both an unmet clinical need and a search for individualized options that conventional protocols do not currently offer [15].

Ayurveda, one of India's traditional systems of medicine, approaches neurodevelopmental and behavioural disorders through the framework of Prakriti, the constitutional typology determined by the relative predominance of Vata, Pitta, and Kapha, and through Dosha-Dushya Samprapti, the analysis of which functional principles and bodily tissues are involved in disease pathogenesis. Because Ayurvedic management is inherently individualized to a person's constitution rather than applied uniformly to a diagnostic label, it has been proposed as a natural fit for a condition as heterogeneous as autism spectrum disorder [16]. Contemporary research increasingly supports the biological plausibility of Prakriti as a constitutional classification, with studies linking it to genomic and metabolic correlates and positioning it within the broader movement toward personalized and precision medicine [17,18]. Small case reports and limited clinical trials of Ayurvedic and related constitution-based interventions have reported symptomatic improvement using standardized outcome measures such as the Indian Scale for Assessment of Autism [16,19], but the overall evidence base remains fragmented, consisting largely of single case reports and small case series, without a codified, severity-stratified treatment protocol.

This lack of standardization represents a significant gap in the field. No prior Ayurvedic publication on autism spectrum disorder has been developed and appraised using a recognized clinical guideline development framework, despite validated instruments such as AGREE-II being routinely applied to appraise clinical practice guidelines across other specialities, including other neurodevelopmental and behavioural conditions [20,21]. Without a systematically developed, constitution-based, and severity-stratified protocol, Ayurvedic management of autism spectrum disorder is likely to remain confined

to individual clinical experience rather than replicable practice. The present study was therefore undertaken to characterize the Prakriti, Dosha-Dushya predominance, and Samprapti of children with mild, moderate, and severe autism spectrum disorder, and to use these observations, together with a systematic literature synthesis, to develop a prototype standardized Ayurvedic treatment protocol appraised in part against the AGREE-II framework.

Methodology

Study Design and Setting

This was an observational cross-sectional study conducted at the Kaumarbhritya (Ayurveda) outpatient department, Faculty of Ayurveda, and the Department of Paediatrics, Institute of Medical Sciences, Banaras Hindu University, Varanasi, India. Data collection commenced in October 2024. The study was designed to characterize the constitutional and pathogenetic profile of children with autism spectrum disorder and, on this basis together with a structured literature review, to develop a prototype standardized Ayurvedic treatment protocol.

Study Population

Children aged three to twelve years of either sex, registered from the Balroga (Ayurveda) and Paediatrics outpatient departments, were screened for eligibility. Children were included if they carried a confirmed diagnosis of autism spectrum disorder according to Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition criteria, and scored 70 or above on the Indian Scale for Assessment of Autism. Children were excluded if they were younger than three years or older than twelve years, if they had other behavioural disorders such as attention-deficit/hyperactivity disorder, pervasive developmental disorder not otherwise specified, Rett syndrome, or Asperger syndrome, or if their presentation was attributable to an infectious aetiology, global developmental delay, cerebral palsy, another chronic disease, or a syndromic disorder such as Down syndrome or Fragile X syndrome. Participants were free to withdraw at any stage without prejudice, and any withdrawal was documented, along with the reason, in the case record form.

Sample Size

The sample size was estimated using the standard formula for prevalence studies, $n = Z^2p(1-p)/e^2$, based on a hospital-based autism prevalence of 4%, a 95% confidence level ($Z = 1.96$), and an absolute error of 5%, which yielded a minimum requirement of 60 participants. After accounting for an anticipated non-response rate of 5%, the final target sample size was set at 65, which was achieved in full.

Diagnostic and Assessment Tools

Diagnosis of autism spectrum disorder was established using Diagnostic and Statistical Manual of Mental

Disorders, Fifth Edition criteria A through D as the reference standard. Severity was graded using the Indian Scale for Assessment of Autism, with scores of 70 to 106 classified as mild, 107 to 153 as moderate, and above 153 as severe. Prakriti was assessed using the standardized proforma described by Tripathi et al. (2019), which evaluates physical, physiological, and psychological attributes to determine the predominant constitutional type. Dosha-Dushya predominance and Samprapti were evaluated through structured Ayurvedic clinical examination incorporating Ashtavidha Pariksha, the eight-fold clinical examination of pulse, urine, stool, tongue, speech, touch, eyes, and general appearance, together with Dashavidha Pariksha, the ten-fold constitutional and functional assessment.

Data Collection

A structured case record form was used to capture personal, family, and pregnancy history; developmental milestones and any history of regression; dietary and bowel habits; Indian Scale for Assessment of Autism scoring performed by a trained examiner; the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition criteria checklist; Prakriti proforma scoring; and structured Dosha-Dushya assessment findings. All data were collected by trained investigators under the supervision of the study team to maintain consistency across participants.

Treatment Protocol Development Methodology

A systematic literary search was undertaken to inform development of the treatment protocol. Classical Ayurvedic texts, including Charaka Samhita, Sushruta Samhita, Ashtanga Hridaya, Ashtanga Sangraha, Sharangadhara Samhita, and Bhavaprakash Nighantu, were reviewed alongside electronic databases comprising PubMed/MEDLINE, Google Scholar, Scopus, the Digital Helpline for Ayurveda Research Articles, and the AYUSH Research Portal, using search terms including autism, autism spectrum disorder, Unmada, Manovaha Srotas, Ayurvedic management of autism, Medhya Rasayana, Panchakarma in autism, Kaumarbhritya and autism, and Prakriti and autism. The resulting prototype protocol was appraised in part against the AGREE-II instrument, which evaluates guideline development across six domains: scope and purpose, stakeholder involvement, rigor of development, clarity of presentation, applicability, and editorial independence. Given constraints of time and resources, full AGREE-II compliance, which requires external stakeholder participation and formal evidence grading, could not be achieved, and the resulting protocol is accordingly designated a prototype rather than a validated clinical practice guideline.

Ethical Considerations

The study protocol was reviewed and approved by the Institutional Ethics Committee, Institute of Medical Sciences, Banaras Hindu University (reference number IMS/IEC/2024/7565), prior to enrolment of participants. Written informed consent was obtained from the parent or legal guardian of each participating child.

Statistical Analysis

Data were entered and analysed descriptively. Categorical variables, including age group, sex, severity grade, Prakriti type, Dosha-Dushya predominance, and associated clinical features, are presented as frequencies and percentages. Given the descriptive, prevalence-oriented objectives of this prototype study, no formal between-group inferential testing was performed; this represents a planned limitation that is addressed in the discussion.

Results

Sixty-five children with autism spectrum disorder, confirmed by Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition criteria, were enrolled from the Balroga (Ayurveda) and Paediatrics outpatient departments over the study period. The cohort was predominantly young and male, with three in every four children falling in the three-to-five-year age band and males outnumbering females by more than three to one (Table 1). Assessment using the Indian Scale for Assessment of Autism showed that most children presented with moderate disease severity, and Prakriti evaluation identified Vata-Pitta Pradhana as the leading constitutional type, present in nearly half of the cohort. Dosha-Dushya analysis mirrored this pattern, with Vata-Pitta predominance again accounting for close to half of all cases and increasing in proportion with rising severity grade. Associated clinical features were common and multisystemic, most prominently affecting speech, sensory processing, and behavioural regulation.

Demographic Profile of Study Participants

Among the 65 children enrolled, 55 (85.7%) were aged three to five years, 7 (10.8%) were aged six to eight years, and 3 (4.5%) were aged nine to twelve years. Fifty children (76.9%) were male and 15 (23.1%) were female, giving a male-to-female ratio of approximately 3.3:1 (Table 1).

Table 1. Demographic characteristics of study participants (N = 65)

Characteristic	Category	n	%
Age group (years)	3–5	55	85.7
	6–8	7	10.8
	9–12	3	4.5

Characteristic	Category	n	%
Sex	Male	50	76.9
	Female	15	23.1

Note: Percentages are calculated out of the total sample (N = 65) within each characteristic category (age group, sex).

Severity Distribution According to ISAA Grading

Grading using the Indian Scale for Assessment of Autism showed that moderate autism was the most frequent category, accounting for 40 children (61.4%), followed by mild autism in 15 children (23.1%) and severe autism in 10 children (15.5%) (Table 2). This distribution indicates that most children in this cohort presented for care at an intermediate stage of clinical severity.

Table 2. Severity distribution according to Indian Scale for Assessment of Autism (ISAA) grading (N = 65)

ISAA grade	Score range	n	%
Mild autism	70–106	15	23.1
Moderate autism	107–153	40	61.4
Severe autism	>153	10	15.5
Total	–	65	100.0

ISAA: Indian Scale for Assessment of Autism.

Prakriti (Constitutional) Distribution

Prakriti assessment using the standardized proforma showed that Vata-Pitta Pradhana was the predominant constitutional type, observed in 28 children (43.1%), followed by Vata-Kapha Pradhana in 17 (26.2%), Pittaja Pradhana in 10 (15.4%), Vata Pradhana in 7 (10.8%), and Kapha-Pitta Pradhana in 3 (4.6%) (Table 3). Vata-associated constitutional types, either alone or in combination, accounted for the large majority of the cohort.

Table 3. Distribution of Prakriti (constitutional type) among study participants (N = 65)

Prakriti type	n	%
Vata-Pitta Pradhana	28	43.1
Vata-Kapha Pradhana	17	26.2
Pittaja Pradhana	10	15.4
Vata Pradhana	7	10.8
Kapha-Pitta Pradhana	3	4.6

Prakriti type	n	%
Total	65	100.0

Prakriti was assessed using the standardized proforma of Tripathi et al. (2019). “Pradhana” denotes predominance of the named Dosha(s) in constitutional type.

Dosha-Dushya Predominance and Samprapti Patterns Across Severity Grades

Vata-Pitta was the most common predominant Dosha overall, identified in 49.2% of children, followed by Vata-Kapha in 27.7%, Tridosha (Sannipata) involvement in 16.9%, and isolated Vata predominance in 6.2% (Table 4). The proportion of children with Tridosha involvement rose with increasing severity, while isolated Vata predominance was seen almost exclusively in mild disease.

Table 4. Predominant Dosha distribution across severity grades of autism spectrum disorder (N = 65)

Predominant Dosha	Mild (n)	Moderate (n)	Severe (n)	Total (%)
Vata-Pitta	10	14	8	49.2
Vata-Kapha	5	8	5	27.7
Tridosha (Sannipata)	3	5	3	16.9
Vata	3	1	0	6.2

Sannipata: simultaneous involvement of all three Doshas (Vata, Pitta, Kapha). Row totals across severity grades correspond to the n values reported in Table 2 for each grade.

Samprapti analysis across severity grades showed a graded pattern of pathogenesis. Mild autism was characterized by Vata-Pitta predominance with relative preservation of Ojas, and vitiation largely confined to Manovaha Srotas and Majja Dhatu. Moderate autism showed progressive Vata-Pitta aggravation with emerging Kapha involvement, moderate Ojas Kshaya, and additional Annava and Rasavaha Srotodushti, reflecting gastrointestinal dysfunction. Severe autism was characterized by Sannipata Dosha, extensive multi-Srotas vitiation spanning Manovaha, Majjavaha, Annava, Rasavaha, and Purishavaha Srotas, marked Ojas Kshaya, and predominant derangement of Rajas and Tamas, the Manasika Doshas.

Associated Clinical Features and Comorbidities

Speech delay or non-verbal presentation was the most frequent associated feature, present in 83.1% of

children, followed by sensory processing issues in 78.5%, hyperactivity in 69.2%, intellectual disability in 61.5%, sleep disturbance in 56.9%, gastrointestinal complaints such as constipation or diarrhoea in 52.3%, self-injurious behaviour in 30.8%, and seizure disorder in 15.4% (Table 5). Communication, sensory, and behavioural disturbances were therefore the dominant clinical concerns across the cohort.

Table 5. Associated clinical features and comorbidities among study participants (N = 65)

Feature	%
Speech delay / non-verbal	83.1
Sensory processing issues	78.5
Hyperactivity	69.2
Intellectual disability	61.5
Sleep disturbances	56.9
GI complaints (constipation, diarrhoea)	52.3
Self-injurious behaviour	30.8
Seizures / epilepsy	15.4

GI: gastrointestinal. Categories are not mutually exclusive; individual children could present with more than one associated feature, so percentages do not sum to 100.

Drawing on this demographic, constitutional, and pathogenetic profile, together with the systematic literature synthesis described in the methodology, a multi-phase prototype Ayurvedic treatment protocol was formulated, combining Panchakarma-based Shodhana procedures, internal Shamana therapy, and Rasayana rejuvenation, tailored according to Prakriti, predominant Dosha-Dushya, and severity grade, and appraised in part against the AGREE-II framework.

Discussion

This observational cross-sectional study characterized the constitutional and pathogenetic profile of 65 children with autism spectrum disorder and used these findings, together with a systematic review of classical and contemporary literature, to develop a prototype standardized Ayurvedic treatment protocol. The cohort was young, predominantly male, and most commonly presented with moderate disease severity; Vata-Pitta Pradhana Prakriti and Vata-Pitta Dosha predominance emerged as the leading constitutional and pathogenetic patterns, with a graded increase in multisystem Dosha and Srotodushti involvement from mild through severe disease.

The demographic pattern observed here, with children concentrated in the three-to-five-year age band and a clear male preponderance, is consistent with international surveillance data. The male-to-female ratio of approximately 3.3:1 in this cohort closely mirrors the more than three-fold higher prevalence among boys reported by recent surveillance networks [5], and the concentration of cases in early childhood reflects the age window in which autism spectrum disorder is most commonly formally recognized and referred for evaluation, an interval that overlaps with the period of maximal benefit from early behavioural intervention identified in recent meta-analyses [10,11]. This concordance with global data supports the external validity of the study cohort as broadly representative of children typically presenting for care, despite the single-centre design.

The predominance of Vata-Pitta Pradhana Prakriti found in this study is consistent with the theoretical expectation that autism spectrum disorder, characterized by hyperactivity, sensory hypersensitivity, communication instability, and behavioural unpredictability, aligns with the qualities classically attributed to aggravated Vata, together with the cognitive and irritability features associated with Pitta. This pattern also finds indirect support in the expanding body of research linking Prakriti typology to measurable biological correlates. Prakriti has been associated with distinct genomic and metabolic signatures in ayurgenomics research [17], and has been proposed as a viable stratifier within precision and integrative medicine frameworks that seek biological correlates for traditional constitutional typing [18]. If Vata-Pitta constitution genuinely predisposes toward the neurodevelopmental vulnerability seen in autism spectrum disorder, incorporating Prakriti-based stratification into treatment planning, as attempted in the present prototype protocol, offers a mechanistic rationale distinct from a uniform, diagnosis-only approach. However, because validated Prakriti assessment tools continue to face questions around standardization and inter-rater reliability [22], any protocol built on Prakriti stratification should, at this stage, be regarded as hypothesis-generating rather than confirmatory.

The Samprapti pattern traced across this cohort also points toward a more precise Ayurvedic nosological term for autism spectrum disorder than the broad and heterogeneous category of Unmada under which it is conventionally placed. Classical Ayurveda holds that normal mental function rests on three pillars, Dhi (intellect and comprehension), Dhriti (retention, self-regulation, and behavioural steadiness), and Smriti (memory), and that disturbance of one or more of these pillars underlies the range of manasika disorders. Tracing the pathogenesis observed in this cohort from

Nidana and Beeja Dosha through Dosha Prakopa, aggravation of Prana and Udana Vata with derangement of Rajas and Tamas, Khavaigunya of Manovaha Srotas and the Siras, and consequent depletion of Ojas and Sattva Guna, the resulting impairment of mental faculties centres predominantly on loss of Dhriti, that is, on impaired behavioural regulation, poor adaptability to change, and an inability to sustain steady, goal-directed engagement, with Dhi and Smriti affected secondarily rather than as the primary lesion. This pattern is consistent with the clinical picture recorded in the present cohort, where hyperactivity, sensory dysregulation, and repetitive, poorly modulated behaviour were far more prominent than frank loss of orientation, comprehension, or consciousness, features that would instead point toward global Unmada. On this basis, the present findings support characterizing autism spectrum disorder in Ayurvedic terms as Dhriti Vaishamya, disturbance of Dhriti, rather than as an undifferentiated form of Unmada. This distinction is not merely terminological: framing the disorder around Dhriti impairment narrows the therapeutic target toward Dhriti-restorative measures, particularly Medhya Rasayana and Sattvavajaya Chikitsa aimed at behavioural steadiness and self-regulation, delivered alongside the broader Manovaha Srotas-directed and Dosha-pacifying components already incorporated into the proposed protocol. As with the Prakriti-based stratification discussed above, this proposed reclassification is a hypothesis generated from the Samprapti analysis performed here and requires correlation with standardized severity and adaptive-functioning measures in larger studies before it can be regarded as established nosology.

The Dosha-Dushya and Samprapti findings more broadly also showed a biologically plausible gradient. Progression from relatively preserved Ojas and localized Manovaha and Majja Dhatu involvement in mild disease, through emerging gastrointestinal (Annavaha, Rasavaha) and Kapha involvement in moderate disease, to Sannipata Dosha and extensive multi-Srotas vitiation with marked Ojas Kshaya in severe disease, parallels the increasing multisystem burden well documented in conventional accounts of autism spectrum disorder severity. The high prevalence of gastrointestinal complaints observed in this cohort (52.3%), and their association with more advanced Samprapti patterns, is consistent with a growing body of evidence implicating the microbiota-gut-brain axis in autism pathophysiology, whereby gut dysbiosis, altered short-chain fatty acid production, and increased intestinal permeability are thought to influence neurodevelopment and behaviour through bidirectional gut-brain signalling [13,14]. The Ayurvedic construct of Annava and Rasava

Srotodushti, and the resultant impairment of Agni and accumulation of Ama, offers a conceptually compatible, though not identical, framework for the same clinical observation, and this convergence strengthens the rationale for including gut-directed Shodhana and dietary correction within the proposed treatment protocol, particularly for children presenting with moderate to severe disease.

The high burden of speech delay, sensory processing difficulty, and hyperactivity identified here as the leading associated features is consistent with the core diagnostic domains of autism spectrum disorder and reinforces the clinical priority these features are typically given in both conventional and integrative management pathways. That these features were present in the large majority of children, well before any consideration of comorbid intellectual disability or seizure disorder, suggests that a treatment protocol prioritizing Manovaha Srotas-directed Rasayana and Medhya interventions, alongside gut-directed and sensory-modulating therapy, is likely to address the most burdensome symptoms for the largest proportion of affected children.

Regarding the secondary objective of protocol development, the partial application of the AGREE-II framework represents, to the best of the authors' knowledge, among the first attempts to appraise an Ayurvedic autism spectrum disorder protocol against an internationally recognized guideline development instrument, an approach that is increasingly standard in other specialties, including other neurodevelopmental and behavioural conditions, where AGREE-II is now routinely used to benchmark clinical practice guidelines [20,21]. Existing Ayurvedic literature on autism spectrum disorder management remains dominated by single case reports and small case series employing Panchakarma procedures such as Nasya, Abhyanga, and Basti, alongside Medhya Rasayana formulations, several of which report meaningful reductions in Indian Scale for Assessment of Autism scores [16], and comparable outcomes have been reported using constitutionally similar Siddha interventions in a larger interventional cohort [19]. However, none of this literature has previously been organized into a severity-stratified, constitutionally individualized protocol subjected to any formal guideline appraisal, a gap the present prototype begins to address, albeit only partially, given that full AGREE-II compliance requires external stakeholder involvement and formal evidence grading that were not feasible within the resource constraints of this study. The considerable interest among families in complementary approaches to autism spectrum disorder management, documented across diverse cultural settings [15], further supports the practical value of moving toward standardized, appraisable

protocols rather than leaving Ayurvedic practice reliant on individual clinical experience alone.

This study has several limitations that warrant consideration. Its cross-sectional, single-centre, descriptive design precludes causal inference and formal hypothesis testing, and no inferential statistical comparisons between severity grades were performed, meaning the associations described here should be regarded as observational patterns rather than statistically confirmed differences. Prakriti and Dosha-Dushya assessment, although standardized through validated proformas and structured clinical examination, retain an element of examiner judgement inherent to Ayurvedic diagnostics. The AGREE-II appraisal of the resulting protocol was partial rather than complete, and the protocol itself has not yet been tested for clinical efficacy or safety in a prospective interventional trial. These limitations, together with the single-institution setting, restrict generalizability and mean the present findings and the accompanying prototype protocol should be viewed as a foundation for, rather than a substitute for, future large-scale, multicentric, and ideally randomized evaluation.

Despite these limitations, the findings carry meaningful implications. They provide, for the first time, a severity-graded constitutional and pathogenetic map of autism spectrum disorder in an Ayurvedic clinical population, and they translate this map into a structured, literature-derived, and partially guideline-appraised treatment prototype, a combination not previously available in the published Ayurvedic literature on this condition. This work therefore offers a replicable template that future, adequately powered studies can refine, validate, and ultimately test for clinical benefit.

Conclusion

In this cohort of 65 children with autism spectrum disorder, Vata-Pitta Pradhana Prakriti and Vata-Pitta Dosha predominance were the leading constitutional and pathogenetic patterns, with multisystem Dosha and Srotodushti involvement increasing progressively from mild to severe disease. Speech delay, sensory processing difficulty, and hyperactivity were the most common associated features, reflecting the multidomain burden of the disorder. These observations, integrated with a systematic review of classical and contemporary literature and appraised in part against the AGREE-II framework, informed a multi-phase prototype Ayurvedic treatment protocol combining Panchakarma, Shamana therapy, and Rasayana rejuvenation, individualized by constitution and severity. As a prototype derived from a single-centre, descriptive study, this protocol requires validation through larger, methodologically rigorous, and ideally multicentric clinical trials before it can be recommended for routine practice, but it offers a

structured starting point for standardizing Ayurvedic management of this increasingly prevalent condition.

References

1. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision (DSM-5-TR). Washington, DC: American Psychiatric Association Publishing; 2022.
2. Zeidan J, Fombonne E, Scora J, Ibrahim K, Durkin MS, Saxena S, et al. Global prevalence of autism: A systematic review update. *Autism Res.* 2022;15(5):778–790.
3. Salari N, Rasoulpoor S, Rasoulpoor S, Shohaimi S, Jafarpour S, Abdoli N, et al. The global prevalence of autism spectrum disorder: a comprehensive systematic review and meta-analysis. *Ital J Pediatr.* 2022;48:112.
4. Talantseva OI, Romanova RS, Shurdova EM, Dolgorukova TA, Sologub PS, Titova OS, et al. The global prevalence of autism spectrum disorder: A three-level meta-analysis. *Front Psychiatry.* 2023;14:1071181.
5. Maenner MJ, Warren Z, Williams AR, Amoakohene E, Bakian AV, Bilder DA, et al. Prevalence and Characteristics of Autism Spectrum Disorder Among Children Aged 8 Years: Autism and Developmental Disabilities Monitoring Network, 11 Sites, United States, 2020. *MMWR Surveill Summ.* 2023;72(2):1–14.
6. Shaw KA, Bilder DA, McArthur D, Williams AR, Amoakohene E, Bakian AV, et al. Early Identification of Autism Spectrum Disorder Among Children Aged 4 Years: Autism and Developmental Disabilities Monitoring Network, 11 Sites, United States, 2020. *MMWR Surveill Summ.* 2023;72(1):1–15.
7. Srivastava M, Srivastava P, Dubey AK, Srivastava P. A Narrative Review of Autism Spectrum Disorder in the Indian Context. *J Indian Assoc Child Adolesc Ment Health.* 2023;19(4).
8. Shrestha B, et al. Prevalence of autism spectrum disorder among children in Southeast Asia from 2002 to 2022: An updated systematic review and meta-analysis. *Health Sci Rep.* 2024;7(3):e2005.
9. Wang J, Ma B, Wang J, Zhang Z, Chen O. Global prevalence of autism spectrum disorder and its gastrointestinal symptoms: A systematic review and meta-analysis. *Front Psychiatry.* 2022;13:963102.
10. Daniolou S, Pandis N, Znoj H. The Efficacy of Early Interventions for Children with Autism Spectrum Disorders: A Systematic Review and Meta-Analysis. *J Clin Med.* 2022;11(17):5100.
11. McGlade A, Whittingham K, Barfoot J, Taylor L, Boyd RN. Efficacy of very early interventions on neurodevelopmental outcomes for infants and toddlers at increased likelihood of or diagnosed with autism: A systematic review and meta-analysis. *Autism Res.* 2023;16(6):1145–1160.
12. Pires JF, Grattão CC, Gomes RMR. The challenges for early intervention and its effects on the prognosis of autism spectrum disorder: a systematic review. *Dement Neuropsychol.* 2024;18:e20230034.
13. Mehra A, Arora G, Sahni G, Kaur M, Singh H, Singh B, et al. Gut microbiota and Autism Spectrum Disorder: From pathogenesis to potential therapeutic perspectives. *J Tradit Complement Med.* 2022;13(2):135–149.
14. Dargenio VN, Dargenio C, Castellaneta S, De Giacomo A, Laguardia M, Schettini F, et al. Intestinal Barrier Dysfunction and Microbiota-Gut-Brain Axis: Possible Implications in the Pathogenesis and Treatment of Autism Spectrum Disorder. *Nutrients.* 2023;15(7):1620.
15. Hatahet M, Sárváry A. Arabic Mothers' Experiences Using Complementary and Alternative Medicine for Children with Autism Spectrum Disorder: A Qualitative Study. *Children (Basel).* 2026;13(1):132.
16. Pathak VK, Sharma R, Rajagopala S. Ayurvedic therapy in management of autism spectrum disorder. *J Ayurveda.* 2023;17(4):329–336.
17. Huang Z, Chavda VP, Bezbaruah R, Uversky VN, Patel S, Patel AB, et al. An Ayurgenomics Approach: Prakriti-Based Drug Discovery and Development for Personalized Care. *Front Pharmacol.* 2022;13:866827.
18. Mukerji M. Ayurgenomics-based frameworks in precision and integrative medicine: Translational opportunities. *Camb Prism Precis Med.* 2023;1:e29.
19. Elangovan P, Ramasamy G, Sundaram M, Ramasamy M. Efficacy of Siddha Therapeutics on Mantha Sanni (Autism Spectrum Disorder) Among Pediatric Patients: An Interventional Non-randomized Open-Label Clinical Trial. *Cureus.* 2023;15(10):e47128.
20. Wahyu MD, Sugimoto A, Zain E, Parawansa FBP, Kasahara H, Yoshinaga K, et al. Quality appraisal of clinical practice guidelines for attention deficit hyperactivity disorder: a systematic review using the appraisal of guidelines for research and evaluation (AGREE II) instrument. *Front Psychiatry.* 2025;16:1576538.
21. Fan M, Liu A, Lu T, Zhou X, Tian C, Liu B, et al. Quality appraisal of clinical practice guidelines addressing massage interventions using the AGREE II instrument. *Syst Rev.* 2024;13:71.
22. Venkatesh A, Johansson L, Sivanandan PV, Gopakumar SP, Sankaranarayanan K, Kessler CS, et al. Prakriti (constitutional typology) in

Prakriti, Dosha-Dushya, and Samprapti Profiling for Developing a Standardized Ayurvedic Treatment Protocol in
Children with Autism Spectrum Disorder: An Observational Cross-Sectional Study

Ayurveda: a critical review of Prakriti assessment
tools and their scientific validity. *Front Med*
(Lausanne). 2025;12:1656249.