AYURVEDIC UNDERSTANDING AND HOLISTIC MANAGEMENT OF AUTISM SPECTRUM DISORDER: A REVIEW.

Abstract

Background: Autism Spectrum Disorder (ASD) is a prevalent neurodevelopmental condition with complex etiology. Ayurveda offers a unique framework through the concept of *Unmada*.

Objective: To correlate ASD with *Unmada*, delineate its *Samprapti* (pathogenesis) using classical and modern evidence, and synthesize Ayurvedic management strategies.

Methods: A review was conducted by searching PubMed, Scopus, DHARA, and AYUSH Research Portal (2000-2025) using keywords "autism spectrum disorder", "Unmada", "Ayurveda", "ManovahaSrotas", and "Samprapti". Classical texts (Charaka Samhita, Sushruta Samhita) were also referenced.

Results: ASD correlates strongly with *Tridoshaja Unmada* involving vitiation of *Manasika Doshas* (Rajas, Tamas) and *Manovaha Srotas*. The *Samprapti* includes *Sahaja* (genetic) factors leading to *Alpa Satva*, upon which *Garbhaja* (intrauterine) factors act, causing *Dosha* vitiation, impaired *Dhee*, *Dhriti*, *Smriti*, and *Agnimandya*-induced *Ama* formationparalleling the modern gut-brain axis and leaky gut syndrome. Ayurvedic management includes *Shodhana* (Basti, Nasya, Shirodhara), *Medhya Rasayana*, and *Satvavajaya*.

Conclusion: The Ayurvedic model of *Unmada* provides a valid, holistic framework for ASD. The *Ama*-gut-brain axis convergence offers a rational basis for integrative treatment. Large-scale clinical trials are warranted.

Keywords: Autism Spectrum Disorder, Unmada, Ayurveda, Samprapti, Gut-Brain Axis

1. Introduction

Autism Spectrum Disorder (ASD) is a lifelong neurodevelopmental condition defined by persistent deficits in social communication and social interaction across multiple contexts, along with restricted, repetitive patterns of behaviour, interests, or activities. Global prevalence has increased substantially, reflecting improved awareness and broader diagnostic criteria. A meta-analysis by Issac et al. (1) estimated a global prevalence of 0.77% among children, with higher rates in males (1.14% vs. 0.42%). Regional variations exist, with

Australia showing the highest prevalence (2.18%), followed by Europe (0.84%) and North America (0.82%) (1). Another recent synthesis reports global ASD prevalence around 1-2% (2). These figures translate to millions of individuals worldwide, placing a substantial burden on families and healthcare systems.

The etiology of ASD is multifactorial, involving genetic vulnerabilities and environmental exposures. Twin studies show heritability estimates of 64-91% (3). No single genetic mutation accounts for >1% of cases; ASD is a polygenic disorder affecting synaptic formation, neuronal communication, and immune regulation (4). Environmental risk factors during prenatal and early postnatal periodsmaternal immune activation, metabolic conditions, drug/toxin exposure, and perinatal complicationsinteract with genetic susceptibilities (5).

DSM-5 criteria require persistent deficits in social communication and at least two types of restricted, repetitive behaviours, with symptoms present in early childhood (29). Despite advances, disease-modifying treatments are lacking. Management relies on behavioural and educational interventions (e.g., ABA, speech therapy) and pharmacotherapy for co-occurring symptoms (risperidone, aripiprazole), which carry significant side effects and do not address core deficits (5). Hence, interest in complementary approaches like Ayurveda is growing.

Ayurveda views ASD as a manifestation of *Dosha* imbalances (*Vata*, *Pitta*, *Kapha*) and *Manasika Doshas* (*Rajas*, *Tamas*). Patil et al. (6) established that ASD features closely resemble *Unmada*a perversion of intellect (*Dhee*), mind (*Manas*), and memory (*Smriti*) (7). Charaka Samhita describes *Unmada* as a *Tridoshaja* disorder with *Agantuja* (exogenous) causes (7). The *ManovahaSrotas* (channels of the mind) originate from *Hridaya* (seat of consciousness); their obstruction (*Sanga*) by vitiated *Doshas* leads to behavioral abnormalities (19,20).

This review aims to: (i) correlate ASD with *Unmada* using the *Samprapti* framework, (ii) integrate gut-brain axis research with *Agnimandya* (impaired digestion) and *Ama* (metabolic toxins), (iii) delineate *Samprapti Ghatakas* for ASD, and (iv) synthesize evidence-based Ayurvedic management strategies (*Shodhana*, *Shamana*, *Medhya Rasayana*, *Satvavajaya*).

2. Methods

This narrative review followed the SANRA (Scale for the Assessment of Narrative Review Articles) guidelines. A systematic literature search was conducted in the following electronic

databases: PubMed, Scopus, Google Scholar, DHARA (Digital Helpline on Ayurveda Research Articles), and the AYUSH Research Portal. The search period was from January 2000 to March 2025. Keywords used alone and in combination were: “autism spectrum disorder”, “ASD”, “Unmada”, “Ayurveda”, “ManovahaSrotas”, “Samprapti”, “Ama”, “gut-brain axis”, “Medhya Rasayana”, and “Panchakarma”. Only articles published in peer-reviewed journals, classical Ayurvedic texts (Charaka Samhita, Sushruta Samhita), and registered clinical trials (CTRI) were included. Conference abstracts, editorials, and non-English articles (without translation) were excluded. Reference lists of retrieved articles were hand-searched for additional relevant studies. Data extraction focused on etiopathogenesis, *Samprapti* components, and therapeutic interventions.

3. Results

3.1 Modern Perspective on Aetiology and Gut-Brain Axis

Gastrointestinal (GI) disturbances are highly prevalent in ASD and correlate with behavioral severity (8). Microbial dysbiosis-reduced *Bifidobacterium* and increased *Clostridia*- is consistently reported (9-11). Meta-analyses confirm altered microbial diversity in ASD (12,13). This dysbiosis contributes to increased intestinal permeability (“leaky gut”), allowing bacterial lipopolysaccharides to trigger systemic and neuro-inflammation (14,15). Altered microbial metabolites (short-chain fatty acids, indoles) have been found in autistic children (16). The microbiota-gut-brain (MGB) axis is thus an emerging therapeutic target (17).

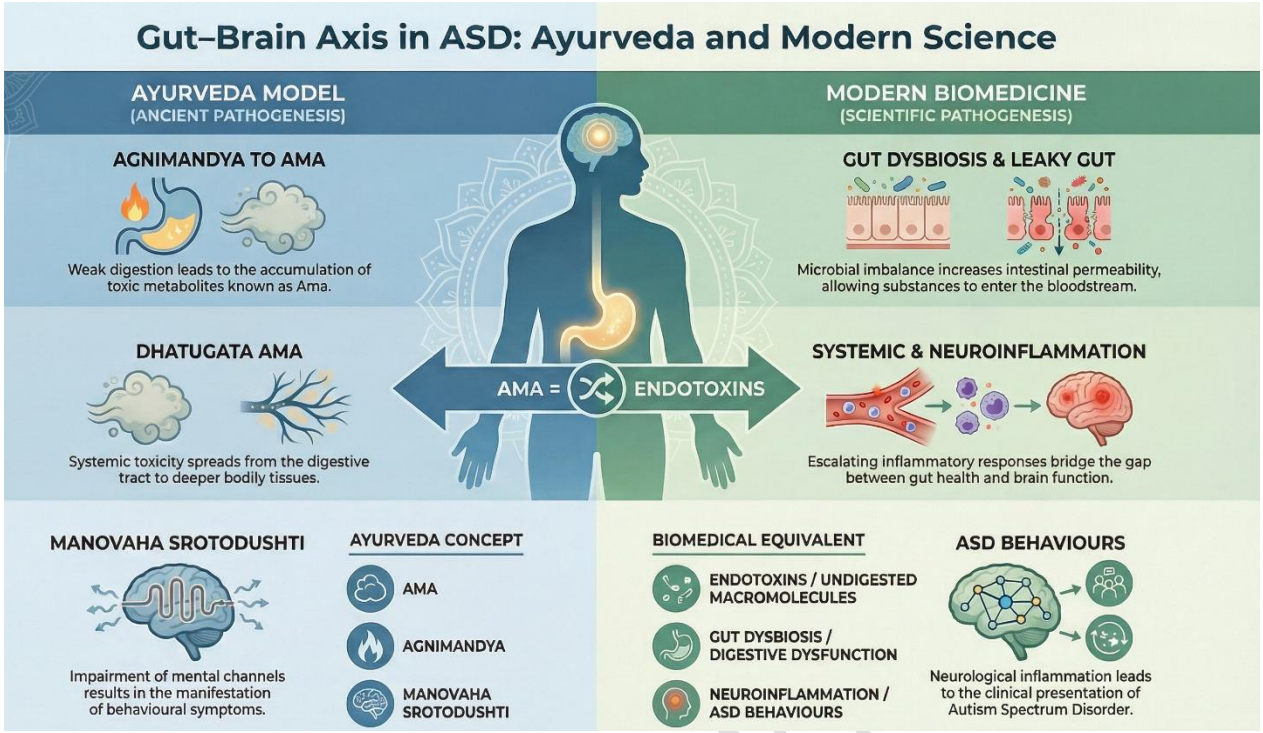

Figure 2: Convergence of Ama and gut-brain axis in ASD

3.2 Ayurveda Framework: *Unmada* and *ManovahaSrotas*

Unmada is defined as a perversion of intellect, mind, consciousness, knowledge, memory, desire, manners, and conduct (7). Charaka classifies it into Vataja, Pittaja, Kaphaja, Sannipataja, and Agantuja types (7). A systematic review confirms equivalence of *Unmada* with psychosis (18). The *ManovahaSrotas* originate from *Hridaya* (heart, seat of consciousness) (19,20). Their obstruction (*Sanga*) is central to *Unmada* pathogenesis. Cognitive functions like *Dhee* (learning), *Dhriti* (retention), *Smriti* (memory)are all impaired in ASD (6).

3.3 *Samprapti* (Pathogenesis) of ASD as *Unmada*

3.3.1 *Nidana* (Etiological Factors)

According to Charaka (7), *Unmada* arises from contradictory food, impure diet, and mental afflictions. For ASD, these are categorized as:

- ***Sahaja* (genetic)**: *AdibalaPravrutta Vyadhi*, hereditary predisposition including *Alpa Satva* (low mental resilience) (21).
- ***Garbhaja* (intrauterine)**: Maternal diet, infections, stress, toxins acting during fetal life.

- ***Agantuja* (postnatal)**: Environmental toxins, trauma, improper diet.

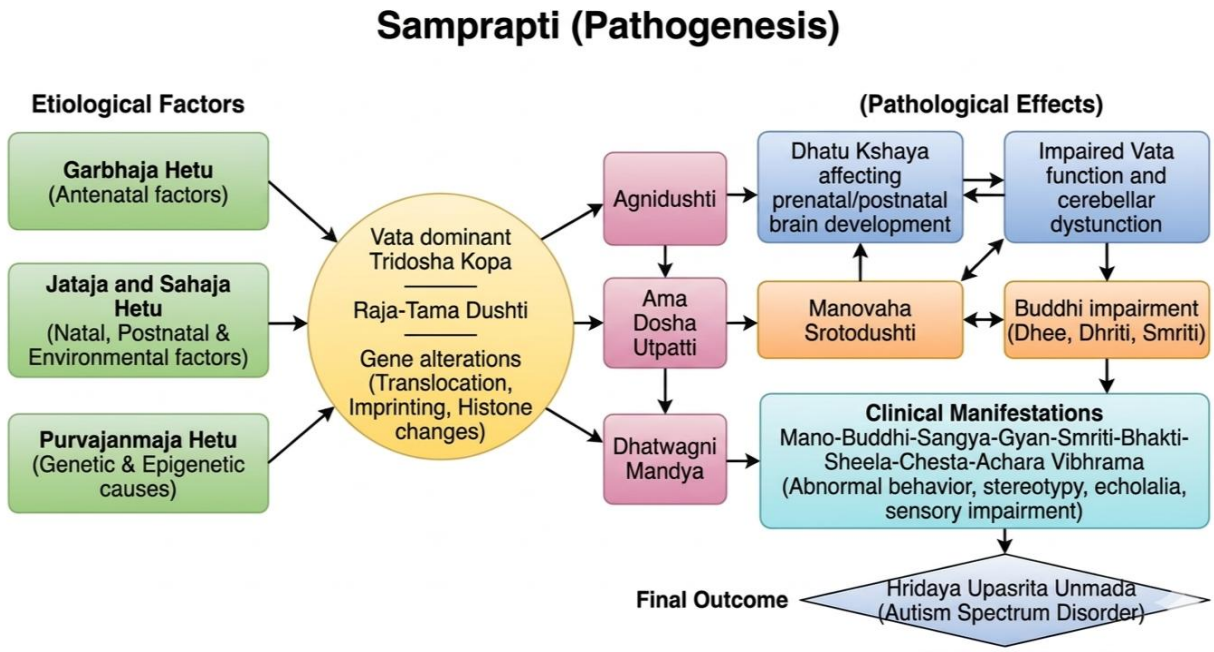

Figure 1: Samprapti flowchart of ASD

3.3.2 *SamraptiGhatakas* (Components of Pathogenesis)

Table 1: *SamraptiGhatakas* of Autism as *Unmada*

Component	Specifics	Rationale
Sharirika Dosha	Vata (Prana, Udana, Vyana); Pitta (Sadhaka,Alochaka); Kapha (Tarpaka)	*Prana Vata* governs sensory input; *Udana Vata* controls speech; *Vyana Vata* motor functions. *Sadhaka Pitta* regulates emotions and intellect. *Tarpaka Kapha* provides neural stability.
Manasika Dosha	Rajas and Tamas	Vitiation leads to agitation (Rajas) or withdrawal (Tamas).
Dushya	Rasa, Majja	*Rasa* carries *Ama*; *Majja* (nervous tissue) is the direct site of affliction.
Srotas	Rasavaha, Manovaha, Pranavaha	*Manovaha Srotas* obstruction is primary.

SrotodushtiPrakara	Sanga (Obstruction)	Prevents normal flow of mental functions.
Udbhavasthana	Mastishka (brain), Hridaya (heart)	Seat of consciousness and mind.
Vyaktisthana	Sarva Sharira (whole body)	Behavioral and motor manifestations involve entire body.
Rogamarga	Madhyama (middle path)	Involves both mind and body.

3.3.3 Dynamic Pathogenesis

The process begins with *Sahaja* factors establishing *Alpa Satva* and *Utsanna Dosha*. Then *Garbhaja* factors vitiate *Sharirika* and *Manasika Doshas* during brain development, obstructing *ManovahaSrotas* (22,23). This leads to perversion of *Dhee*, *Dhriti*, and *Smriti*, manifesting as core ASD symptoms.

A critical downstream event is Agnimandya (impaired digestive fire). Several case reports link ASD symptoms to *Agnimandya* and *Ama* accumulation (24,25). *Ama* (undigested metabolic toxins) accumulates in the gut (*Ama Sanchaya*) and spreads to tissues (*Dhatugata Ama*), increasing intestinal permeability mirroring "leaky gut syndrome". This creates a vicious cycle of neuroinflammation and behavioral exacerbation.

3.4 Ayurvedic Management Strategies

Based on the *Samprapti*, a rational treatment plan includes four stages (Table 2).

Table 2: Integrated Ayurvedic Management Approach for ASD

Stage	Principle	Key Interventions	Rationale
1.Preliminary	*Nidana Parivarjana*	*Satvic* diet, avoid *Viruddha Ahara* (incompatible foods)	Removes root cause, preventsfurther *Dosha* vitiation
2.Purification	*AmaPachana*	*Deepana-Pachana* (Trikatu); *Basti* (Ya	Eliminatesvitiated *Dos has* from *ManovahaSr*

(*Shodhana*)	+ *Panchakarma*	pana Basti); *Nasya* (Anu Taila); *Shirodhara*	*otas*, pacifies Vata
3.Palliation (*Shamana*)	*Medhya Rasayana*	*Brahmi*, *Mandukaparni*, *Shankhapushpi*, *Jatamansi*; *Brahmi Ghrita*, *KalyanakaGhrita*	Nourishes *MajjaDhatu* ,improves *Dhee, Smriti, Dhriti*
4.Mental hygiene	*Satvavajaya*	Parental counseling, structured routine, speech/occupational therapy, yoga	Addresses *Manasika Doshas*, provides environmental support

(Source: Compiled from Charaka Chikitsa 9/3-10 and contemporary studies 26-28)

A systematic review of clinical trials on Ayurveda for ASD concluded that all included studies showed effectiveness with no adverse effects (26). Case reports have documented significant reduction in Indian Scale for Assessment of Autism (ISAA) scores using *Panchakarma* (Basti, Shirodhara, Abhyanga) combined with oral *Medhya* formulations (27,28). A registered randomized controlled trial on *Brahmi Swarna Yoga* (CTRI/2022/04/041706) is ongoing (29).

4. Discussion

This review demonstrates that ASD can be systematically and comprehensively understoodthrough the classical Ayurvedic framework of *Unmada*. The *Samprapti* model presented
hereintegrates *Sahaja* (genetic/hereditary)predisposition,*Garbhaja*(intrauterine)insults, *Mano vahaSrotodushti* (obstruction of the mind's channels),and *Agnimandya*-induced *Ama* formation into a coherent pathogenic cascade. This model not only aligns with modern understanding of ASD's multifactorial etiology but also provides a rational, stepwise approach to treatment that addresses root causes at multiple levels.

4.1 Deconstructing the *Samprapti*: A Stepwise Pathogenic Cascade

The *Samprapti* begins with *Sahaja* (genetic) factors, which in Ayurveda are termed *AdibalaPravruttaVyadhi* diseases that arise from inherent constitutional weaknesses. In the context of ASD, this manifests as a hereditary predisposition that includes *Alpa Satva* (low mental resilience or weak psyche). *Satva* is one of the three *Manasa*

Prakriti (mental constitutions) and represents the inherent strength, clarity, and stability of the mind. An individual with *Alpa Satva* is more vulnerable to psychological disturbances and less capable of coping with environmental stressors (21). Modern research on ASD has identified numerous genetic risk variants that affect synaptic function, neuronal connectivity, and immune regulation, all of which can be considered as *Sahaja* factors that create a vulnerable terrain (4,31). Additionally, the concept of *Utsanna Dosha*a natural propensity for *Dosha* imbalance resonates with the modern understanding of polygenic risk scores and endophenotypes that predispose to neurodevelopmental disorders.

Upon this vulnerable foundation, *Garbhaja* (intrauterine) factors act as the primary triggering events. These include maternal diet, infections (e.g., rubella, cytomegalovirus), metabolic conditions (e.g., gestational diabetes), stress, and exposure to toxins or medications during critical periods of foetal brain development (5,31). In Ayurvedic terms, these factors vitiate the *Sharirika Doshas* (Vata, Pitta, Kapha) and *Manasika Doshas* (Rajas and Tamas) within the developing foetus. This vitiation specifically targets the *ManovahaSrotas* the channels that carry the mind. The *SrotodushtiPrakara* (type of channel pathology) is primarily *Sanga* (obstruction), which prevents the normal flow of mental functions (7). This obstruction leads to a perversion of *Dhee* (intellect), *Dhriti* (retention/commitment), and *Smriti* (memory), the three cognitive faculties that are essential for learning, social interaction, and behavioural regulation (6). Clinically, this manifests as the core symptoms of ASD: impaired social communication, restricted interests, and repetitive behaviours.

Several case reports and clinical studies have noted that children with ASD frequently present with signs of *Agnimandya*, such as poor appetite, irregular bowel habits, bloating, and food intolerances (24,25). According to Ayurveda, *Agnimandya* leads to the incomplete digestion of food, resulting in the formation of *Ama* a toxic, undigested metabolic waste product. *Ama* is not merely a metaphorical concept; it describes a tangible pathological entity that includes partially digested macromolecules, endotoxins, and other bioactive compounds that can be absorbed into the circulation and deposited in various tissues (*Dhatugata Ama*). When *Ama* accumulates in the gut, it increases intestinal permeability a condition strikingly similar to the modern concept of "leaky gut syndrome" (14,15). The systemic absorption of *Ama* triggers inflammation and oxidative stress, which further impairs *Manovaha Srotas* and exacerbates neurobehavioral symptoms, creating a vicious cycle.

4.2 Convergence with Modern Gut-Brain Axis Research

One of the most compelling findings of this review is the remarkable convergence between the Ayurvedic *Ama* theory and the modern understanding of the microbiota-gut-brain (MGB) axis in ASD. The MGB axis is a bidirectional communication network that integrates the gastrointestinal tract, the enteric nervous system, the central nervous system, and the gut microbiota, mediated by neural, hormonal, and immunological pathways (8,36). In ASD, numerous studies have documented gut dysbiosis - an imbalance in the composition and function of the gut microbiome characterized by reduced microbial diversity, lower abundance of beneficial bacteria such as *Bifidobacterium* and *Lactobacillus*, and increased abundance of potentially pathogenic bacteria such as *Clostridia* and *Desulfovibrio* (9-13).

This dysbiosis is associated with increased intestinal permeability, allowing bacterial products such as lipopolysaccharides (LPS) and other microbial metabolites to enter the bloodstream (14,15). These products trigger systemic inflammation, activate immune cells, and can cross the blood-brain barrier, leading to neuroinflammation and altered neurotransmission (16,17). Elevated levels of pro-inflammatory cytokines (e.g., IL-6, TNF-α, IFN-γ) have been consistently reported in the blood and cerebrospinal fluid of individuals with ASD, and these levels correlate with the severity of behavioural symptoms (16). The *Ama* concept in Ayurveda undigested, toxic macromolecules that arise from impaired digestion and cause systemic diseasedirectly parallels this modern understanding. The localized gut inflammation triggered by *Agnimandya* and the presence of deposited *Ama* leads to increased permeability of the intestinal mucosal barrier, exactly as described in the "leaky gut" hypothesis. Thus, the Ayurvedic *Samprapti* not only predicts the gut-brain connection but also provides a time-tested framework for its therapeutic manipulation.

4.3 Therapeutic Implications: From *Samprapti* to *Chikitsa*

The strength of the Ayurvedic model lies in its direct therapeutic implications. By identifying the *SampraptiGhatakas* (components of pathogenesis), a rational, stepwise treatment plan can be devised that addresses each stage of the pathogenic cascade.

Nidana Parivarjana (avoidance of causative factors) is the cornerstone of Ayurvedic management. This involves dietary modifications (*Pathya*), including the avoidance of *Viruddha Ahara* (incompatible food combinations), processed foods, potential allergens (e.g., gluten, casein), and foods that are heavy, cold, or difficult to digest. Instead, a *Satvic* diet consisting of fresh, light, easily digestible, and nourishing foodsis recommended.

This dietary approach aligns with modern recommendations for ASD, where elimination diets and gluten-free/casein-free diets have shown variable but sometimes significant benefits in reducing GI and behavioural symptoms (14,17).

Agnimandya and *Ama* is the immediate therapeutic priority. This is achieved through *Deepana* (herbs that kindle digestive fire) and *Pachana* (herbs that digest and eliminate *Ama*). Commonly used herbs include *Trikatu* (a combination of *Piper longum*, *Piper nigrum*, and *Zingiber officinale*), *Chitrak* (*Plumbago zeylanica*), and *Sunthi* (dried ginger). These herbs have been shown in modern pharmacological studies to enhance digestive enzyme activity, reduce intestinal inflammation, and modulate gut microbiota (32).

Shodhana (purification therapies) is indicated to expel deeply rooted vitiated *Doshas* from the *ManovahaSrotas*. Among the five *Panchakarma* procedures, Basti (medicated enema) is considered the most effective treatment for *Vata* disorders affecting the nervous system (7). *Basti* not only pacifies *Vata* but also removes *Ama* from the colon, which is considered the primary seat of *Vata*. In the context of ASD, *Yapana Basti* - a special type of nourishing enema has been used with good results (26-28). Nasya (nasal administration of medicated oils or powders) is used to clear the channels of the head and sense organs (*UrdhwaJatrugata Srotas*) and has a direct effect on *Manovaha Srotas* (30). Shirodhara (pouring of medicated liquids, typically warm oil, on the forehead) has a direct calming effect on the mind and has been shown in modern studies to reduce anxiety, improve sleep, and modulate autonomic nervous system activity.

Shamana (palliative medications) includes the use of Medhya Rasayana (nootropic tonics) a class of herbs and formulations specifically indicated for improving cognition, memory, and intellect. The four primary *Medhya Rasayana* herbs described in Charaka Samhita are *Brahmi* (*Bacopamonnieri*), *Mandukaparni* (*Centellaasiatica*), *Shankhapushpi* (*Convolvul us pluricaulis*), and *Yastimadhu* (*Glycyrrhiza glabra*) (42). Modern research has validated the nootropic, antioxidant, anti-inflammatory, and neuroprotective effects of these herbs. For example, *Bacopa monnieri* has been shown to enhance synaptic plasticity, increase cerebral blood flow, and reduce amyloid-beta toxicity, while *Centella asiatica* promotes neurite outgrowth and improves mitochondrial function (40,41). Formulations such as *Brahmi Ghrita*, *Kalyanaka Ghrita*, and *Saraswatarishta* are classical *Ghrita* (medicated ghee) preparations that combine multiple *Medhya* herbs with the synergistic properties of ghee,

which acts as a *Yogavahi* (carrier) that enhances the absorption and delivery of active principles to the nervous system. A systematic review of clinical trials on Ayurveda for ASD found that all included studies (five out of six) used formulations containing *Medhya* ingredients, and no adverse effects were reported (26).

Satvavajaya (psychotherapy and behavioural support) addresses the *Manasika Doshas* (Rajas and Tamas). This involves counselling and training parents to provide a structured, nurturing, and predictable environment for the child. It also includes the implementation of behavioural therapies such as speech therapy, occupational therapy, and social skills training, which work on calming the agitated *Rajas* and activating the withdrawn *Tamas* aspects of the mind. Yoga, *Pranayama* (breathing exercises), and meditation are also recommended as part of *Satvavajaya* to improve self-regulation and reduce stress (18).

4.4 Clinical Evidence and Safety

The clinical evidence for Ayurvedic management of ASD, although still preliminary, is promising. A systematic review by Pathak et al. (26) identified six clinical studies (including case reports, case series, and one randomized controlled trial) that evaluated Ayurvedic interventions for ASD. All studies reported significant improvements in core and associated symptoms, as measured by validated scales such as the Indian Scale for Assessment of Autism (ISAA) and the Childhood Autism Rating Scale (CARS). Importantly, no adverse effects were reported in any of the studies, indicating a favourable safety profile. Case reports have documented remarkable improvements, such as a reduction in ISAA scores from 130 to 86 following a course of *Panchakarma* (Basti, Shirodhara, Abhyanga) combined with oral *Medhya* formulations (27,28). A registered randomized controlled trial on *Brahmi Swarna Yoga* (CTRI/2022/04/041706) is currently ongoing and will provide higher-quality evidence (29).

However, it must be acknowledged that the existing evidence has significant limitations. Most studies are small, uncontrolled, or non-randomized, and there is considerable heterogeneity in interventions, outcome measures, and treatment durations. Therefore, large-scale, double-blind, placebo-controlled, multi-centre randomized controlled trials are urgently needed to establish the efficacy of Ayurvedic interventions for ASD with high levels of evidence.

Limitations of this review include the heterogeneity of available clinical studies (mostly case reports and small trials) and the lack of standardized outcome measures. Large-scale, double-blind, randomized controlled trials are urgently needed.

Future directions should focus on: (i) validating *Samprapti* components using biomarkers (e.g., gut permeability, inflammatory cytokines); (ii) comparative effectiveness research of *Panchakarma* versus *Medhya Rasayana* alone; (iii) developing standardized, individualized Ayurvedic treatment protocols for ASD.

5. Conclusion

The Ayurvedic framework of *Unmada* offers a robust, holistic, and clinically relevant model for understanding and managing ASD. The *Samprapti* presentedintegrating genetic predisposition, intrauterine factors, *Manovaha Srotodushti*, and *Agnimandya*-induced *Ama*aligns remarkably with modern gut-brain axis research. Ayurvedic interventions, including *Shodhana*, *Medhya Rasayana*, and *Satvavajaya*, are safe and show promise in addressing core and associated symptoms of ASD. Collaborative, integrative approaches combining modern behavioural therapies with Ayurveda hold the greatest promise for improving outcomes in children with ASD and their families.

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