

ROLE OF MEDHYA RASAYANA IN DELAYED MILESTONES IN CHILDREN: A COMPREHENSIVE REVIEW

Dr. Prachi S. Awatade^{1*}, Dr. Pranav Kamthe², Dr. Punam Tupkar³, Dr. Sachin Gwalani⁴, Dr. Jitesh Thakur⁵

^{1,2,3}PG Scholar, Dept. of Kaumarbhritya, SMBT Ayurved College and Hospital, Dhamangaon, Nashik, Maharashtra India.

^{4,5}Associate Professor, Dept. of Kaumarbhritya, SMBT Ayurved College and Hospital, Dhamangaon, Nashik, Maharashtra India.

Article Received on 09 June 2026,
Article Revised on 29 June 2026,
Article Published on 01 July 2026

<https://doi.org/10.5281/zenodo.21093170>

*Corresponding Author

Dr. Prachi S. Awatade

PG Scholar, Dept. of
Kaumarbhritya, SMBT Ayurved
College and Hospital, Dhamangaon,
Nashik, Maharashtra India.



How to cite this Article: Dr. Prachi S. Awatade^{1*}, Dr. Pranav Kamthe², Dr. Punam Tupkar³, Dr. Sachin Gwalani⁴, Dr. Jitesh Thakur⁵ (2026). Role Of Medhya Rasayana In Delayed Milestones In Children: A Comprehensive Review. World Journal of Pharmaceutical Research, 15(13), 1506-1515.

This work is licensed under Creative Commons Attribution 4.0 International license.

ABSTRACT

Delayed developmental milestones represent a significant concern in pediatric healthcare, affecting gross motor, fine motor, language, cognitive, and social domains. Early identification and multidisciplinary intervention are essential to optimize outcomes. Ayurveda offers a holistic understanding of developmental delay through concepts such as Garbhaja Vikara, Beeja Dushti, Balavikara, Vata Prakopa, and impaired Medha. Among Ayurvedic therapeutic approaches, Medhya Rasayana occupies a special place for enhancement of intellect, memory, cognition, adaptive behavior, and nervous system nourishment. Classical Medhya Rasayana drugs such as *Mandukaparni* (*Centella asiatica*), *Yashtimadhu* (*Glycyrrhiza glabra*), *Guduchi* (*Tinospora cordifolia*), *Shankhapushpi* (*Convolvulus pluricaulis*), *Brahmi* (*Bacopa monnieri*), and *Vacha* (*Acorus calamus*) have demonstrated neuroprotective,

antioxidant, adaptogenic, anxiolytic, and nootropic properties in contemporary studies. This review critically evaluates the Ayurvedic basis of developmental delay, therapeutic rationale of Medhya Rasayana, pharmacological evidence, clinical applicability, integrative protocols, and future research directions. Medhya Rasayana may serve as an adjunctive modality alongside physiotherapy, occupational therapy, speech therapy, nutritional rehabilitation, and

modern pediatric care. Well-designed clinical trials are needed to establish standardized evidence-based pediatric protocols.

KEYWORDS: Medhya Rasayana, delayed milestones, developmental delay, Balroga, Kaumarbhritya, Ayurveda, pediatric neurology, cognition.

INTRODUCTION

Developmental milestones are age-specific functional achievements that reflect maturation of the central nervous system and musculoskeletal coordination. These include head control, sitting, walking, speech, social smiling, language comprehension, and adaptive skills. Failure to achieve milestones within expected age ranges may indicate developmental delay requiring prompt assessment and intervention.^[1] Globally, developmental disabilities affect millions of children and are associated with cerebral palsy, autism spectrum disorder, intellectual disability, hearing impairment, hypothyroidism, malnutrition, prematurity, perinatal hypoxia, and genetic syndromes.^[2] In low- and middle-income countries, risk factors such as undernutrition, inadequate stimulation, maternal illness, infections, and poverty further increase prevalence.^[3]

Ayurveda describes child development in the framework of Kaumarbhritya, emphasizing healthy conception, antenatal care, nutrition, mental development, and protection from disease. Delayed milestones can be interpreted through concepts of Garbhaja Vikara, Beeja Dushti, Vata Vyadhi, Mansika Daurbalya, and impaired Dhi, Dhriti, Smriti. Medhya Rasayana, a specialized rejuvenative group of drugs for intellect and nervous function, is particularly relevant in such children.^[4]

This review explores the role of Medhya Rasayana in delayed milestones and proposes an integrative model for pediatric developmental care.

Developmental Delay: Modern Perspective^[1]

Developmental delay is generally defined as significant lag in one or more developmental domains compared with age-matched peers. It may involve.

- **Gross motor:** delayed neck holding, sitting, crawling, walking
- **Fine motor:** poor grasp, delayed hand skills
- **Language:** delayed speech, poor comprehension
- **Cognitive:** learning difficulty, poor problem solving

- **Social/adaptive:** poor eye contact, limited interaction, self-care delay

Common Causes^[2,5]

1. Prematurity and low birth weight
2. Birth asphyxia
3. Cerebral palsy
4. Malnutrition
5. Congenital hypothyroidism
6. Autism spectrum disorder
7. Hearing impairment
8. Genetic/metabolic disorders
9. Chronic epilepsy
10. Environmental deprivation

Early stimulation and neuroplastic intervention are crucial during the first five years of life.

Ayurvedic Understanding of Delayed Milestones

Though the term “developmental delay” is not directly mentioned in classical texts, multiple Ayurvedic principles explain such conditions.

1. Garbhaja Vikara^[6]

Improper maternal diet, stress, illness, toxin exposure, or antenatal imbalance may affect fetal development and produce congenital or functional disorders.

2. Beeja Dushti^[7]

Defects in reproductive elements (Shukra-Artava) may correspond to hereditary and genetic abnormalities.

3. Vata Dosha Predominance^[8]

Vata governs movement, speech, sensory-motor coordination, and nervous system activity. Vitiated Vata may manifest as delayed motor milestones, speech delay, spasticity, tremors, and poor coordination.

4. Dhatu Kshaya

Inadequate nourishment of Rasa, Rakta, Majja, and Ojas may impair growth, cognition, immunity, and stamina.

5. Medha Hani

Reduced intellect, memory, attention, and learning correspond to disturbances in higher cortical function.

Medhya Rasayana: Concept and Relevance

Medhya Rasayana refers to substances that promote^[4]

- Intelligence (Dhi)
- Retention (Dhriti)
- Memory (Smriti)
- Learning ability
- Emotional balance
- Nervous system resilience

Classically described Medhya Rasayana herbs include

1. Mandukaparni
2. Yashtimadhu
3. Guduchi
4. Shankhapushpi

Later Ayurvedic practice also extensively uses Brahmi, Vacha, Jyotishmati, Ashwagandha, and combinations.

Why Relevant in Delayed Milestones?

Children with delayed milestones often have deficits in attention, cognition, motor planning, speech processing, adaptive learning, or behavior. Medhya Rasayana may support neurodevelopment through.

- Neuronal nourishment
- Improved synaptic plasticity
- Better memory and learning
- Reduction in anxiety/irritability
- Improved sleep
- Antioxidant neuroprotection
- Enhanced rehabilitation participation

Important Medhya Rasayana Drugs and Evidence

1. Brahmi (*Bacopa monnieri*)^[9]

Widely studied nootropic herb known to improve memory acquisition, learning speed, and cognitive processing. It possesses antioxidant and neuroprotective actions.

Pediatric Utility

- Attention deficits
- Speech therapy support
- Learning delay
- Hyperactivity with irritability

2. Mandukaparni (*Centella asiatica*)^[10]

Known for improving cognition, wound healing, cerebral circulation, and anxiolytic effects.

Utility

- Delayed speech
- Poor concentration
- Social interaction difficulties

3. Shankhpushpi (*Convolvulus pluricaulis*)^[11]

Traditionally used as a memory enhancer and anxiolytic. Experimental studies suggest nootropic benefits.

Utility

- Anxiety
- Sleep disturbance
- Behavioral dysregulation

4. Guduchi (*Tinospora cordifolia*)^[12]

Rasayana with immunomodulatory and antioxidant actions. Supports recurrently ill children with developmental compromise.

Utility

- Recurrent infections
- Poor immunity
- General weakness

5. Yashtimadhu (*Glycyrrhiza glabra*)^[13]

Demonstrates antioxidant and neuroprotective potential. Traditionally used for voice and intellect.

Utility

- Speech delay
- Hoarseness

- Cognitive support

6. Ashwagandha (*Withania somnifera*)^[14]

Adaptogenic herb with evidence for neuroregeneration, stress reduction, and motor strength.

Utility

- Low muscle tone
- Poor stamina
- Anxiety

Clinical Applications in Delayed Milestones

A. Gross Motor Delay

Examples: delayed sitting, standing, walking.

Ayurvedic Approach

- Abhyanga with Bala/Ashwagandha taila
- Swedana where appropriate
- Ashwagandha, Guduchi
- Nutritional support
- Physiotherapy integration

B. Speech Delay

- Brahmi Ghrita
- Yashtimadhu
- Vacha (carefully selected and purified form under supervision)
- Speech therapy

C. Cognitive Delay

- Brahmi
- Mandukaparni
- Shankhapushpi
- Structured play therapy

D. Autism Spectrum Features

- Medhya Rasayana as supportive therapy
- Sleep regulation
- Behavior modulation
- Sensory integration support

Integrative Management Protocol

Best outcomes occur when Ayurveda complements standard pediatric care.

Suggested Multidisciplinary Model

1. Pediatric developmental evaluation
2. Hearing and vision screening
3. Nutritional correction
4. Thyroid/metabolic screening were indicated
5. Physiotherapy
6. Occupational therapy
7. Speech therapy
8. Medhya Rasayana individualized by Prakriti and symptoms
9. Parent training and stimulation at home

Safety Considerations in Children

- Use age-appropriate pediatric dosing only
- Prefer classical formulations from GMP-certified sources
- Avoid self-medication
- Heavy metal-containing preparations require caution and regulatory scrutiny
- Monitor allergies, GI intolerance, sedation, or behavioral change
- Use under qualified Ayurvedic pediatric supervision

Current Evidence and Research Gaps^[9,10]

Preclinical and limited clinical studies support cognitive benefits of several Medhya Rasayana herbs, especially Brahmi and Centella. However, robust pediatric trials specifically in developmental delay remain limited. Major research needs include:

1. Standardized diagnostic categories
2. Domain-wise developmental scoring outcomes
3. Dose standardization by age/weight
4. Long-term safety data
5. Combination therapy trials with rehabilitation
6. Neuroimaging and biomarker studies

DISCUSSION

Developmental delay is heterogeneous and requires individualized management. Ayurveda's strength lies in constitutional assessment, dietary correction, neurocognitive support, and long-term restorative care. Medhya Rasayana offers a biologically plausible adjunct because many herbs exhibit antioxidant, anti-inflammatory, anxiolytic, and neurotrophic effects.

The most realistic role is not replacement of evidence-based developmental therapies, but adjunctive enhancement of cognition, behavior, sleep, attention, and rehabilitation responsiveness. Children with chronic delays often need sustained family-centered support, where Ayurvedic lifestyle measures and Rasayana may contribute meaningfully.

CONCLUSION

Medhya Rasayana represents a valuable Ayurvedic therapeutic concept with potential utility in children with delayed milestones. Herbs such as Brahmi, Mandukaparni, Shankhapushpi, Guduchi, Yashtimadhu, and Ashwagandha may support cognition, behavior, immunity, and neurological development when used judiciously. An integrative model combining pediatric diagnostics, rehabilitation therapies, nutritional optimization, and individualized Ayurvedic management appears promising. High-quality randomized clinical trials are needed to validate efficacy and establish standardized pediatric protocols.

REFERENCES

1. Centers for Disease Control and Prevention. *Developmental milestones*. Atlanta (GA): CDC; 2025.
2. World Health Organization. *World report on disability*. Geneva: World Health Organization; 2011.
3. United Nations Children's Fund. *Early childhood development report*. New York: UNICEF; 2022.
4. Sharma PV, translator. *Charaka Samhita of Agnivesa*. Vol. 2. Varanasi: Chaukhamba Orientalia; 2014. Chikitsa Sthana, Rasayana Adhyaya, Chapter 1, Pada 3, verses 30–31.
5. Lipkin PH, Macias MM; Council on Children with Disabilities, Section on Developmental and Behavioral Pediatrics. Promoting optimal development: identifying infants and young children with developmental disorders through developmental surveillance and screening. *Pediatrics*., 2020; 145(1): 20193449.
6. Sharma PV, translator. *Charaka Samhita of Agnivesa*. Vol. 2. Varanasi: Chaukhamba Orientalia; 2014. Sharira Sthana, Chapter 8, verses 21–22.

7. Murthy KRS, translator. *Sushruta Samhita*. Vol. 1. Varanasi: Chaukhambha Orientalia; 2012. Sharira Sthana, Chapter 2, verses 3–5.
8. Murthy KRS, translator. *Ashtanga Hridayam of Vagbhata*. Vol. 1, Sutra Sthana. Varanasi: Chaukhambha Krishnadas Academy; 2017. Doshabhediya Adhyaya, Chapter 12, verses 1–8.
9. Kongkeaw C, Dilokthornsakul P, Thanarangsarit P, Limpeanchob N, Norman Scholfield C. Meta-analysis of randomized controlled trials on cognitive effects of *Bacopa monnieri* extract. *J Ethnopharmacol.*, 2014; 151(1): 528–35.
10. Gray NE, Harris CJ, Quinn JF, Soumyanath A. *Centella asiatica* modulates antioxidant and mitochondrial pathways and improves cognitive function: a review. *Phytother Res.*, 2018; 32(7): 1112–24.
11. Nahata A, Patil UK, Dixit VK. Nootropic effects of *Convolvulus pluricaulis* in mice. *Pharm. Biol.*, 2010; 48(7): 779–84.
12. Singh SS, Pandey SC, Srivastava S, Gupta VS, Patro B, Ghosh AC. Chemistry and medicinal properties of *Tinospora cordifolia* (Guduchi). *J Ethnopharmacol.*, 2003; 35: 83–91.
13. Aly AM, Al-Alousi L, Salem HA. Neuroprotective effects of *Glycyrrhiza glabra* and its bioactive constituents. *Biomed Pharmacother.*, 2018; 107: 806–16.
14. Pratte MA, Nanavati KB, Young V, Morley CP. An alternative treatment for anxiety: a systematic review of human trial results reported for the Ayurvedic herb *Withania somnifera* (Ashwagandha). *J Altern Complement Med.*, 2014; 20(12): 901–8.