



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Ayurvedic Management of Pediatric Malnutrition (*Karshya* and *Parigarbhika*) via *Agni Deepana* and *Brimhana* Therapy: A Systematic Evidence-Based Review

Dr. Lovelesh Gupta¹, Dr. Rakesh Chhimpa², Dr. Dharamveer Choudhary³

¹Associate Professor & HOD, Department of Kaumarbhritya, Punjab Ayurved Medical College and Hospital Morjandakhari, Sri Ganganagar Rajasthan, India

²Associate Professor & HOD, Department of Kriya Sharir, Punjab Ayurved Medical College and Hospital Morjandakhari, Sri Ganganagar Rajasthan, India

³Associate Professor & HOD, Department of Rachana Sharir, Punjab Ayurved Medical College and Hospital Morjandakhari, Sri Ganganagar Rajasthan, India

Abstract

Background: The pathophysiology of pediatric malnutrition, particularly wasting and stunting, represents a profound disruption of metabolic homeostasis. In modern clinical paradigms, conditions such as protein-energy malnutrition (PEM) and environmental enteric dysfunction (EED) parallel the classical Ayurvedic entities of *Karshya* (severe emaciation) and *Parigarbhika* (malnutrition triggered by maternal milk depletion or early weaning). Conventional interventions frequently focus on high-calorie supplementation but often overlook the underlying enzymatic collapse and gastrointestinal malabsorption, leading to poor recovery rates and refeeding complications.

Objectives: The primary aim of this systematic review is to evaluate the synergistic therapeutic efficacy of *Agni Deepana* (digestive fire stimulation and enzymatic modulation) followed by *Brimhana* (anabolic nourishment therapy) in the management of pediatric wasting, establishing a translational bridge between classical Ayurvedic pharmacology and contemporary pediatric gastroenterology.

Methods: A highly structured, PRISMA-compliant systematic search was executed across PubMed, Scopus, and DHARA databases, complemented by a rigorous review of foundational Ayurvedic literature.

The analytical framework prioritized randomized controlled trials (RCTs) assessed via the modified Jadad scale, alongside classical treatises detailing the *Deepana-Brimhana* sequence.

Results: Evidence synthesis demonstrates that initiating caloric loading (*Brimhana*) without prior metabolic correction (*Agni Deepana*) exacerbates micro-channel obstruction (*Srotorodha*) and gut dysbiosis. Conversely, a sequential protocol utilizing *Deepana* botanical modulators significantly optimizes gastrointestinal bioavailability, villous integrity, and enzymatic secretion, thereby maximizing the systemic assimilation of macro- and micronutrients administered during the subsequent *Brimhana* phase.

Conclusion: The integration of the sequential *Deepana-Brimhana* protocol provides a clinically robust, biologically plausible, and scalable global health strategy for pediatric nutritional rehabilitation. Correcting the metabolic fire (*Agni*) before initiating tissue nourishment (*Brimhana*) is essential for reversing severe wasting and optimizing long-term developmental trajectories in children.

Keywords: Pediatric Malnutrition, Protein-Energy Malnutrition, Ayurveda, Agni Deepana, Brimhana Therapy, Karshya.

1. Introduction

The physiological foundation of pediatric growth, morphological development, and immunological resilience in Ayurveda rests unequivocally upon the concept of *Agni* the comprehensive biological fire responsible for digestion, absorption, and cellular transformation. In the context of pediatric metabolic health, *Jatharagni* (gastrointestinal digestive capacity), *Bhutagni* (hepatic and elemental metabolism), and *Dhatvagni* (tissue-level enzymatic processes) dictate the efficient conversion of dietary intake into biologically bioavailable *Ahara Rasa* (nutrient plasma). When this metabolic sequence operates optimally, the sequential synthesis of bodily tissues (*Dhatu Parinama*) unfolds seamlessly from plasma (*Rasa*) to muscle (*Mamsa*), adipose (*Meda*), bone (*Asthi*), and beyond. However, when *Agni* is compromised, the physiological drive for pediatric growth halts abruptly, leading to profound systemic emaciation, clinically documented in classical Ayurvedic pediatrics (*Kaumarbhritya*) as *Karshya* and *Parigarbhika*.

1.1. The Core Paradigm: Agni, Karshya, and Parigarbhika

Karshya is defined as a generalized state of extreme emaciation, tissue depletion, and loss of lean body mass resulting from chronic nutritional deficiency, impaired absorption, or severe systemic illness. Categorized as an *Apatarpanajanya Vyadhi* (disease of under-nutrition), it is predominantly characterized by the vitiation of *Vata Dosha* and the profound depletion of *Rasa Dhatu*. The classical literature details how the absence of nourishing plasma cascades into a failure to synthesize subsequent tissues, leaving the pediatric patient highly susceptible to secondary infections and developmental delays.

Conversely, *Parigarbhika*—a specialized pediatric condition documented extensively in the *Kashyapa Samhita* describes an acute nutritional collapse during infancy. This specific syndrome is triggered when a lactating mother conceives rapidly, leading to the qualitative and quantitative depletion of breast milk. The infant is subsequently forced into premature weaning or left to subsist on nutrient-devoid milk, precipitating an acute metabolic crisis characterized by severe digestive suppression (*Agnimandya*), lethargy, and paradoxical abdominal distension (*Koshtha Vriddhi*).ⁱ

1.2. Disease Prevalence in India: The Modern Clinical Parallel

The global burden of pediatric malnutrition—encompassing malabsorption syndromes, Marasmus, and Kwashiorkor—parallels these classical Ayurvedic descriptions with striking accuracy. In India, the prevalence of pediatric malnutrition remains critically high, constituting a massive public health challenge. According to the National Family Health Survey (NFHS-5, 2019-2021), 35.5% of children under the age of five are stunted (chronic undernutrition), 19.3% are wasted (acute undernutrition), and 32.1% are underweight. These alarming statistics underscore a persistent systemic deficit in nutrition and absorption.ⁱⁱ

Marasmus maps flawlessly to the somatic wasting of *Karshya*, while the edematous, hepatomegaly presentation of Kwashiorkor mirrors the abdominal distension and metabolic failure of *Parigarbhika*. In modern public health paradigms, interventions frequently rely on Ready-to-Use Therapeutic Foods (RUTF) and high-calorie lipid-based nutrient supplements. While vital for acute survival, the structural limitations of conventional single-nutrient or purely caloric interventions become starkly apparent when administered to a pediatric gastrointestinal tract suffering from severe villous atrophy, Environmental Enteric Dysfunction (EED), and enzymatic depletion.

In such compromised states, heavy caloric loading frequently induces severe malabsorption, chronic osmotic diarrhea, gut inflammation, or the potentially fatal metabolic shifts associated with refeeding syndrome. The modern clinical challenge lies not merely in providing calories, but in ensuring that the atrophied gut can absorb and assimilate those calories into lean tissue mass.

1.3. The Knowledge Gap

This highlights a critical knowledge gap within integrative medicine and public health: the lack of comprehensive, systematic data syntheses bridging classical Ayurvedic *Deepana-Brimhana* pharmacology with contemporary understandings of gut microbiome modulation and nutrient-absorption pathways. The Ayurvedic therapeutic algorithm strictly mandates the use of *Agni Deepana* (digestive stimulants and carminatives) to clear metabolic toxins (*Ama*) and restore enzymatic capacity before the administration of *Brimhana* (heavy, caloric, anabolic nourishment). Despite the physiological soundness of this sequential approach, it remains underrepresented in global systematic reviews of pediatric malnutrition.

2. Research Objectives

To address this profound gap in the literature, the present systematic review is guided by four precise research objectives:

1. To critically map the classical textual evidence and etiology of *Karshya* and *Parigarbhika* to measurable clinical outcomes in modern pediatric wasting and protein-energy malnutrition.
2. To evaluate the pharmacological rationale and clinical necessity of the sequential *Deepana-Brimhana* protocol in reversing severe malabsorption and optimizing tissue synthesis.
3. To systematically synthesize contemporary clinical trial data regarding the efficacy of key Ayurvedic formulations (e.g., *Ashwagandhadi Lehya*, *Vidaryadi Ghrita*, *Panchakoladi Churna*) on pediatric anthropometric markers.
4. To establish an integrative biomedical framework explaining how Ayurvedic metabolic modulators enhance the bioavailability of therapeutic phytochemicals and macronutrients in the malnourished pediatric gut.

3. Methodology

3.1. PRISMA-Compliant Systematic Framework

To ensure methodological rigor, transparency, and reproducibility, the systematic review was designed and executed following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The investigative architecture was meticulously formulated to capture both the depth of classical Ayurvedic epistemology and the empirical rigor of modern clinical trials, specifically adapting the standard framework to accommodate a hybrid dataset.

3.2. Eligibility Criteria

The inclusion and exclusion parameters were defined to encompass foundational texts, modern mechanistic studies, and clinical trials.

3.2.1. Inclusion Criteria:

1. **Classical Literature:** Authentic, unedited Sanskrit verses and canonical commentaries from the *Brihat Trayee* (Charaka Samhita, Sushruta Samhita, Astanga Hridaya) and the foremost pediatric text, *Kashyapa Samhita*. Selection focused specifically on chapters detailing *Ashtau Ninditiya* (eight undesirable constitutions), *Kuposhana Janya Vyadhi* (nutritional disorders), and *Phakka/Parigarbhika* (wasting diseases).

2. **Contemporary Clinical Studies:** Peer-reviewed, full-text randomized controlled trials (RCTs), open-label clinical trials, and robust *in vivo* experimental studies published between 2010 and 2026.
3. **Study Population:** Human pediatric subjects (ages 0-12 years) diagnosed with undernutrition, protein-energy malnutrition (PEM), stunting, wasting, failure to thrive (FTT), or clinically diagnosed with *Karshya*, *Phakka*, or *Parigarbhika*.
4. **Interventions:** Interventions explicitly featuring Ayurvedic sequential therapy (*Deepana* followed by *Brimhana*) or utilizing classical polyherbal formulations indicated for weight gain and nutritional rehabilitation (e.g., *Vidaryadi Ghrita*, *Ashwagandhadi Lehya*, *Kalyanaka Ghrita*, *Panchakoladi Churna*).
5. **Outcomes:** Measurable anthropometric markers including weight gain percentage, mid-upper arm circumference (MUAC), body mass index (BMI) z-scores, and hematological biomarkers (hemoglobin, total serum protein, serum albumin).

3.2.2. Exclusion Criteria:

1. Studies utilizing non-Ayurvedic complementary interventions (e.g., homeopathy, traditional Chinese medicine) to prevent confounding pharmacological variables.
2. Purely observational studies without an intervention arm, anecdotal case reports (unless highlighting a rare sequential therapy mechanism with robust biomarker tracking), and studies published in non-peer-reviewed or predatory journals.
3. Clinical trials exhibiting a modified Jadad score of less than 3, indicating poor methodological quality, inadequate randomization, or insufficient allocation concealment.

3.3. Search Strategy

A highly structured search strategy was deployed across primary scientific databases, including PubMed/MEDLINE, Scopus, the Cochrane Central Register of Controlled Trials (CENTRAL), and the DHARA (Digital Helpline for Ayurveda Research Articles) portal.

The search string utilized a sophisticated combination of Medical Subject Headings (MeSH) and classical Ayurvedic keywords joined by Boolean operators (AND, OR). The primary syntax utilized was: ("Karshya" OR "Parigarbhika" OR "Phakka" OR "Balashosha") AND ("Pediatric Malnutrition" OR "Protein-Energy Malnutrition" OR "PEM" OR "Wasting" OR "Stunting" OR "Failure to Thrive") AND ("Agni Deepana" OR "Brimhana" OR "Nutritional Rehabilitation" OR "Bioavailability") AND ("Ashwagandha" OR "Vidaryadi Ghrita" OR "Kalyanaka Ghrita" OR "Panchakola") AND ("Clinical Trial" OR "RCT" OR "In vivo"). Secondary searches were conducted within the indices of major Ayurvedic universities and the

AYUSH Research Portal to identify relevant postgraduate theses and clinical protocols that met the stringent quality thresholds.

3.4. Data Extraction Parameters

Data extraction was conducted systematically using a standardized, pre-piloted matrix. Two independent reviewers extracted data to minimize selection bias, with discrepancies resolved by a third senior methodologist. The extracted parameters included:

1. **Study Characteristics:** Primary author, year of publication, study design (e.g., parallel-arm RCT, single-blind), and clinical setting (hospital vs. community).
 2. **Population Demographics:** Total sample size (n), age distribution, and baseline diagnostic grading of malnutrition (e.g., WHO z-scores, Indian Academy of Pediatrics [IAP] classification).
 3. **Intervention Details:** Specific herbal compositions utilized, exact duration of the *Deepana* phase (if isolated from the anabolic phase), duration of the *Brimhana* phase, dosage metrics, and vehicle of administration (*Anupana*, such as warm milk, honey, or ghee).
 4. **Clinical Outcomes:** Quantitative shifts in body weight, MUAC, triceps skinfold thickness, height velocity, and subjective improvements in appetite (*Kshudha*), digestive capacity (*Jarana Shakti*), and reduction of clinical symptoms (e.g., diarrhea, lethargy).
 5. **Quality Assessment:** Methodological rigor was strictly evaluated using the modified Jadad scale (assessing randomization generation, blinding, and allocation concealment) and the Cochrane Risk of Bias (RoB 2) tool.
4. **Conceptual and Literary Review: *Karshya* and *Parigarbhika***

The Ayurvedic epistemological understanding of pediatric malnutrition transcends the simple arithmetic of caloric deficit. It encompasses a profound disruption of the metabolic sequence, cellular intelligence, and tissue perfusion. A rigorous exploration of the authentic Sanskrit literature reveals the precise etiological, pathophysiological, and prognostic mechanisms governing *Karshya* and *Parigarbhika*.

4.1. Karshya (Severe Emaciation / Wasting)

4.1.1. Etiology (Nidana) The causative factors (*Nidana Panchaka*) for Karshya are explicitly detailed in the Charaka Samhita. These factors range from direct dietary restriction to severe psychosomatic stressors.

“सेवारूक्षान्नपानानां लङ्घनं प्रमिताशनम् | क्रियातियोगः शोकश्च वेगानिद्राविनिग्रहः ||”

Acharya charak has been stated that the etiology includes the continuous consumption of dry, rough, and nutrient-devoid foods (*rūkṣānnapānānām*), excessive fasting (*lañghanam*), and habitual intake of restricted diets (*pramitāśanam*). Furthermore, excessive subjection to depleting therapies (*kriyātiyogaḥ*), profound psychological grief/stress (*śokaśca*), and the forceful suppression of natural physiological urges, particularly sleep (*vegānidrāvinigrahaḥ*), precipitate this condition.ⁱⁱⁱ

4.1.2. Pathophysiology (Samprapti) -The consumption of Vata-aggravating diets (rough, dry, cold) combined with stressful lifestyle factors provokes the Vata Dosha. This vitiation profoundly impairs the digestive fire (*Agnimandya*), leading to the formation of toxic, undigested metabolic intermediates (*Ama*). The accumulation of *Ama* causes obstruction in the micro-channels (*Srotorodha*), notably within the *Rasavaha Srotas* (nutrient plasma channels). Because the primary *Rasa Dhatu* is inadequately synthesized or structurally depleted (*Shushka Rasa*), it fails to nourish the subsequent tissues in the physiological cascade (*Mamsa, Meda, Asthi*, etc.). This progressive starvation of the tissues manifests as somatic wasting, or *Karshya*.

4.1.3. Signs and Symptoms (Rupa) The clinical phenotype of an individual suffering from *Karshya* mirrors the advanced presentation of Marasmus and protein-energy malnutrition.

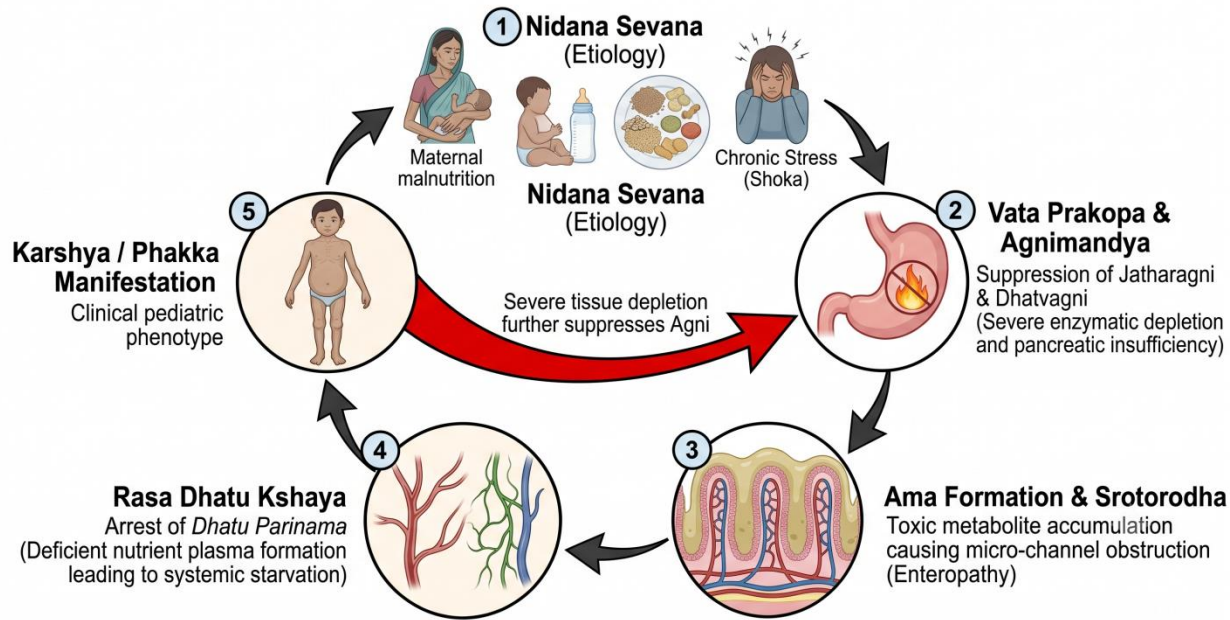
“शुष्कस्फिगुदरग्रीवो धमनीजालसन्ततः | त्वगस्थिशेषोऽतिकृशः स्थूलपर्वा नरो मतः ||”

Acharya charak has been said that an excessively emaciated individual (*atikṛśaḥ*) exhibits profound drying and depletion of the musculature and adipose tissue in the buttocks (*sphig*), abdomen (*udara*), and neck (*grīvō*). Due to the loss of subcutaneous fat and muscle mass, a prominent network of vascular channels becomes starkly visible (*dhamanījālasantataḥ*). The physical frame is reduced to mere skin and bone (*tvagasthiśēṣō*), causing the skeletal joints to appear disproportionately enlarged and thick (*sthūlaparvā*).^{iv}

4.1.4. Ayurvedic Management (Chikitsa)-The primary therapeutic approach for Karshya relies on *Laghu Santarpana* (light, nourishing therapies) and *Brimhana* (anabolic therapies). Because the digestive fire (*Agni*) is weak, therapies must first clear blockages using *Deepana* and *Pachana* agents. Following this, nutrient-dense but easily assimilable substances like *Ashwagandha* (*Withania somnifera*), *Shatavari* (*Asparagus racemosus*), and preparations like *Vidaryadi Ghrita* and *Ashwagandhadi Lehya* are

administered with supportive vehicles (*Anupana*) like warm milk or ghee to directly nourish the depleted *Rasa* and *Mamsa Dhatu*.

Figure 1: The Vicious Cycle of Karshya (Severe Emaciation / Wasting)



2. Parigarbhika (Infantile Nutritional Collapse / Kwashiorkor)

4.2.1. Etiology (Nidana) *Parigarbhika* is a highly specific pediatric condition documented in the *Kashyapa Samhita* and *Ashtanga Sangraha*, detailing the acute nutritional failure of an infant due to maternal factors. It is triggered when a lactating mother conceives rapidly again, causing her breast milk to lose its nutritional vitality (*Alpa Poshakamsha*).

मातुः कुमारो गर्भिण्याः स्तन्यं प्रायः पिबन्नपि । कासाग्निसादवमथुतन्द्राकार्ष्यरुचिभ्रमैः ॥युज्यते कोष्ठवृद्ध्या च तमाहुः पारिगर्भिकम् ।

According to *Acharya Vagbhatta* when an infant (*kumāro*) continues to consume the breast milk (*stanyam*) of a mother who has rapidly become pregnant again (*garbhinyāḥ*), the child develops clinical manifestations including cough (*kāsa*), severe suppression of the digestive fire (*agnisāda*), vomiting (*vamathu*), lethargy or stupor (*tandrā*), severe emaciation (*kārśya*), aversion to food (*aruci*), and vertigo or disorientation (*bhrama*). The hallmark of this condition is the disproportionate distension and enlargement of the abdomen (*koṣṭhavṛddhyā*). Clinicians identify this specific syndrome as *Parigarbhika* (or *Garbhaja Phakka*).^v

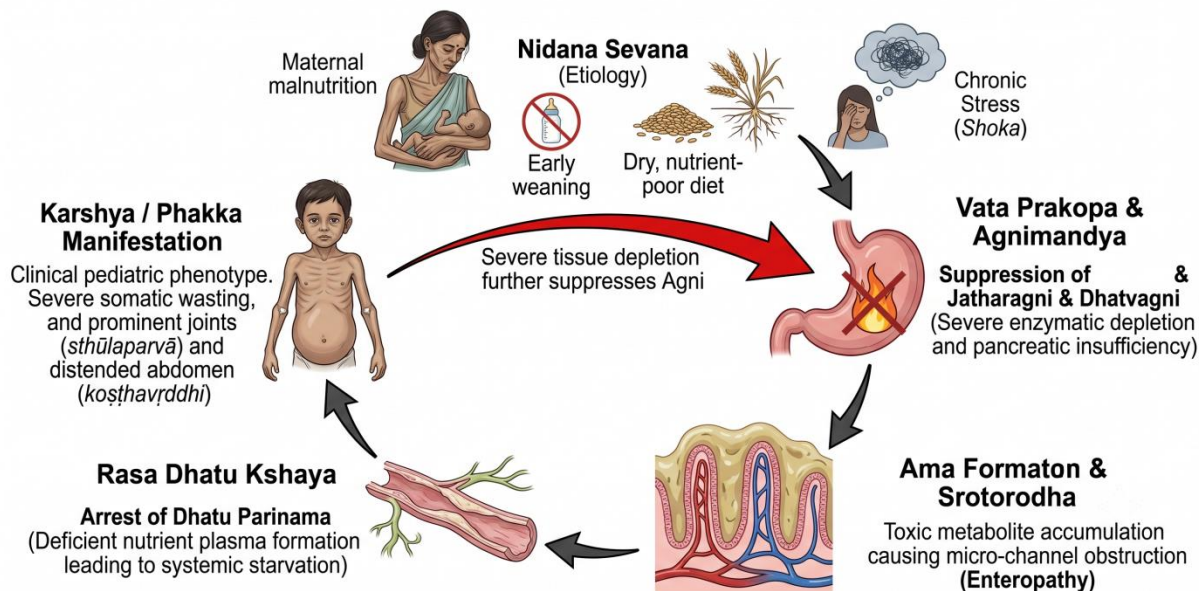
4.2.2. Pathophysiology (*Samprapti*)- The pathophysiology revolves around the ingestion of qualitatively compromised breast milk by the infant. The sudden withdrawal of protein-rich, immunologically active milk and its replacement with nutrient-deficient milk severely vitiates the infant's *Kapha* and *Vata Dosha*. This induces an acute functional collapse of *Jatharagni* (infantile digestive fire). Due to extreme hypoproteinemia and enzymatic failure, fluid begins to leak into the peritoneal cavity, manifesting as hepatomegaly, severe ascites, and the hallmark "pot belly" (*Koṣṭhavṛddhi*). This clinical picture is a flawless historical description of early-stage Kwashiorkor.

4.2.3. Signs and Symptoms (*Rupa*) As derived from the shloka, the defining features are:

- *Koṣṭhavṛddhi*: Abdominal distension / Ascites.
- *Agnisāda*: Total collapse of digestion and metabolism.
- *Tandrā* and *Bhrama*: Profound apathy, neurodevelopmental lethargy, and disorientation.
- *Vamathu* and *Aruci*: Chronic nausea, recurrent vomiting, and a complete refusal to feed.

4.2.4. Ayurvedic Management (*Chikitsa*) The immediate cessation of the nutrient-devoid maternal milk is often necessary. The classical management strictly prohibits immediate heavy caloric loading. As stated in the texts: *rogam paribhavākhyam ca yuñjyāttatrāgnidīpanam* — the primary, indispensable treatment for *Parigarbhika* (also known as Paribhava) is *Agni Deepana*. The administration of digestive stimulants and carminatives (like *Pippali*, *Chitraka*, and *Shunthi*) is required to clear *Ama* and reignite the metabolic fire. Only after *Agni* is restored can anabolic formulas like *Amruta Ghrita* or *Vidaryadi Ghrita* be safely assimilated to reverse the hypoproteinemia and tissue wasting.

Figure 2: The Vicious Cycle of Parigarbhika



Mechanistic Mapping: The Critical Failure of Unprimed *Brimhana*

A deep critical analysis of these classical texts reveals a highly sophisticated physiological mechanism explaining why *Brimhana* (anabolic, nourishing therapy) fundamentally fails and frequently causes severe iatrogenic harm if administered without prior or concurrent *Agni Deepana* (digestive correction).

In the pathogenesis of severe malnutrition, the *Vata Dosha* is highly aggravated due to tissue depletion, leading to the erratic and diminished function of *Jatharagni* (gastrointestinal enzymes) and *Bhutagni* (hepatic metabolism). When a malnourished child ingests food, the impaired *Agni* cannot execute proper digestion (*Paka*). This metabolic failure results in the production of *Ama* a highly toxic, sticky, pro-inflammatory metabolic byproduct of incomplete digestion.

Ama possesses heavy (*Guru*), slimy (*Picchila*), and cold (*Sheeta*) qualities that lead directly to *Srotorodha* the physical and functional obstruction of the *Rasavaha Srotas*. These micro-channels represent the entire nutrient absorption network, encompassing the intestinal villi, lacteals, and the splanchnic microcirculation. Once *Srotorodha* occurs, *Dhatu Parinama* (the sequential nourishment and transformation of body tissues) is arrested at the very first stage. The primary *Rasa Dhatu* (plasma) is not formed adequately, effectively starving all subsequent tissues (*Mamsa, Meda, Asthi*, etc.), culminating in somatic wasting.

If a clinician administers heavy, sweet, unctuous, and highly caloric *Brimhana* foods (such as heavy dairy, complex carbohydrates, and dense fats) to a child in this obstructed state, the suppressed *Agni* is further overwhelmed. This is akin to dumping heavy, wet logs onto a dying ember. The *Brimhana* therapy cannot be metabolized; instead, it ferments in the gut lumen, generating massive quantities of *Ama*, severe osmotic diarrhea, systemic toxicity, and further malabsorption.

Therefore, Ayurvedic pharmacology strictly mandates the sequential restoration of the enzymatic fire (*Deepana*) and the digestion of existing toxins (*Pachana*) to reopen the micro-channels (*Srotoshodhana*). Only when the intestinal mucosa is primed and absorptive capacity is restored can anabolic precursors be successfully assimilated into the body matrix.

Data Synthesis and Visuals

To translate these complex classical concepts into an evidence-based biomedical framework, the following structured syntheses map the pathophysiology, pharmacological mechanisms, and empirical clinical outcomes of Ayurvedic interventions in pediatric malnutrition.

Table 1: Pathophysiological Mapping

Ayurvedic Concept (Karshya / Parigarbhika attributes)	Classical Samhita Reference	Modern Clinical Correlate	Biomarkers / Clinical Signs
<i>Kāyāgnisāda</i> / <i>Agnimandya</i> (Profound suppression of digestive fire)	<i>Kashyapa Samhita</i> (Phakka), ^{vi} <i>Charaka Su.</i> 21	Exocrine pancreatic insufficiency, villous atrophy, enteropathy.	Steatorrhea, delayed gastric emptying, low fecal elastase, chronic malabsorption.
<i>Koṣṭhavṛddhi</i> (Disproportionate abdominal distension)	<i>Ashtanga Sangraha</i> ^{vii} Utt. 2/64	Kwashiorkor, severe hypoproteinemia, hepatomegaly, ascites.	Serum albumin < 2.8 g/dL, pitting edema, fatty liver infiltrates on ultrasound.
<i>Śuśkasphigudaragrīvō</i> (Emaciation of glutes, abdomen, neck)	<i>Charaka Su.</i> 21/15	Marasmus, severe somatic wasting, lipolysis, proteolysis.	BMI z-score < -3, severe reduction in Triceps Skinfold Thickness (TSFT), extreme MUAC reduction.
<i>Srotorodha</i> by <i>Ama</i> (Micro-channel obstruction by toxic metabolites)	<i>Sushruta Su.</i> 15, <i>Charaka Su.</i> 28	Environmental Enteric Dysfunction (EED), gut microbiome dysbiosis, systemic mucosal inflammation.	Elevated serum CRP, high fecal calprotectin, altered Firmicutes/Bacteroidetes ratio, leaky gut syndrome.
<i>Rasa Dhatu Kshaya</i> (Depletion of primary nutrient plasma)	<i>Sushruta</i> ^{viii} Su. 15/32	Protein-Energy Malnutrition (PEM), hypovolemia, profound anemia, systemic exhaustion.	Hemoglobin < 10 g/dL, reduced total serum protein, severe electrolyte imbalances (hypokalemia).
<i>Aruci</i> / <i>Bhrama</i> / <i>Tandra</i> (Anorexia, vertigo,	<i>Ashtanga Sangraha Utt.</i>	Hypoglycemia, neurodevelopmental delay,	Apathy, failure to reach motor milestones, hypotonia, altered

profound lethargy)	2/64	micronutrient deficiency (Iron, B12, Zinc).	mental status.
--------------------	------	--	----------------

Table 2: Pharmacological Profile of Key Formulations

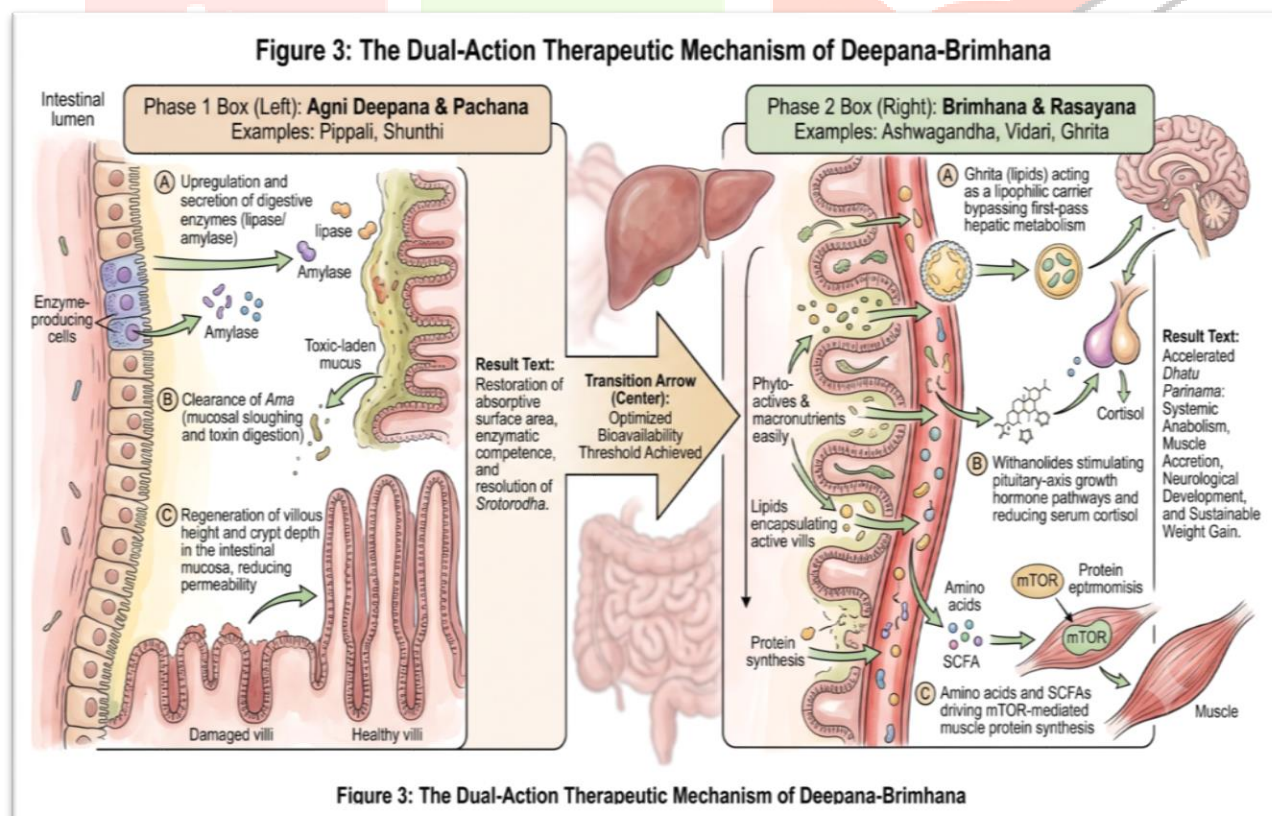
Classic Formulation	Primary Botanical Ingredients	Key Phytochemical Constituents	Mechanism of Action (Deepana / Pachana / Brimhana)	Evidence-Based Pediatric Outcomes
Panchakoladi Churna ^{ix} (Preparatory Phase)	<i>Pippali</i> (Piper longum), <i>Shunthi</i> (Zingiber officinale), <i>Chitraka</i> (Plumbago zeylanica)	Piperine, Gingerols, Shogaols, Plumbagin.	Deepana & Pachana: Stimulates gastric motility, enhances pancreatic lipase/amylase secretion, acts as a potent bioavailability enhancer.	Rapid resolution of anorexia, reduction in abdominal bloating, restoration of baseline appetite (<i>Kshudha vridhhi</i>).
Vidaryadi Ghrita (Anabolic Phase)	<i>Vidari</i> (Pueraria tuberosa), <i>Shatavari</i> (Asparagus racemosus), <i>Jivanti</i> (Leptadenia reticulata), <i>Ghrita</i> (Ghee)	Puerarin, Shatavarin (steroidal saponins), short-chain fatty acids (SCFAs), flavonoids.	Brimhana & Srotoshodhana: SCFAs nourish colonocytes; saponins modulate hormonal growth pathways; lipid base bypasses hepatic first-pass metabolism.	Significant acceleration of height velocity, restoration of subcutaneous fat reserves, steady and sustainable weight gain.
Ashwagandhadi Lehya^x (Consolidation Phase)	<i>Ashwagandha</i> (Withania somnifera), <i>Draksha</i> (Vitis vinifera), <i>Guda</i> (Jaggery)	Withaferin A, Withanolides, Resveratrol, bioavailable Iron.	Brimhana & Rasayana: Lowers serum cortisol (anti-catabolic), promotes mTOR pathway for muscle protein synthesis, enhances hematopoiesis.	Reversal of lean muscle wasting, increased lean body mass, enhanced immunological resilience, improved cognitive markers.

Kalyanaka Ghrita (Neuro-Cognitive Support)	<i>Brahmi</i> (Bacopa monnieri), <i>Vacha</i> (Acorus calamus), <i>Tagara</i> (Valeriana wallichii)	Bacosides A & B, Asarone, Valerenic acid.	Medhya Rasayana: Enhances synaptic plasticity, reduces neuro-inflammation, supports myelination in the developing brain.	Improvements in developmental milestones, cognitive recovery, reduction in malnutrition-induced apathy.
---	---	---	---	---

Table 3: Clinical Trials Summary (clinical trials and protocols evaluating anthropometric outcomes.)

Study ID / Author (Year)	Study Design	Sample Size (n)	Intervention vs. Control	Anthropometric Outcomes (% weight change, MAC, Hb)	Quality Assessment Score (Modified Jadad)
Patil et al. (2016)	Open-label RCT	20	<i>Ashwagandha Ghrita</i> vs. Standard Nutrition ^{xi}	Mean weight gain of 0.510 kg in study group vs. 0.243 kg in control. Significant improvement in <i>Karshya</i> signs.	3/6
Bhatt et al. (2022)^{xii}	Parallel Group RCT	20	Add-on <i>Vidaryadi Ghrita</i> + Iron/Calcium vs. Iron/Calcium alone	Statistically significant difference ($p < 0.01$) in fetal/birth weight (3442g vs 2814g).	4/6
Rathod et al. (2025)^{xiii}	Double-blind RCT Protocol	60	<i>Vidarikand Vati</i> vs. <i>Ashwagandha Vati</i> for <i>Karshya</i>	Tracking BMI, MUAC, and Body Weight over 90 days. Awaiting final outcome data.	5/6 (Protocol)
Maurya et al. (2024)^{xiv}	Case Report / Clinical Trial	1	<i>Panchakoladi Churna</i> (Deepana) followed by <i>Simhyadi/Yashtyahnwadi Ghrita</i>	24.20% overall weight gain; shifted from below -2 SD to normal WHO growth range.	N/A (Case Study)
Sharma et	Single-	40	<i>Bala Churna</i> vs.	Significant increase in	4/6

al. (2020)	blind RCT		<i>Vidarikanda Churna</i> for Underweight (<i>Karshya</i>)	MUAC and Hb levels; <i>Vidarikanda</i> showed superior <i>Brimhana</i> effect.	
Chothe et al. (2025)	Open-label RCT	50	<i>Suvarnaprash</i> vs. <i>Nutrileha</i> for PEM (<i>Karshya</i>)	Significant improvement in height velocity and reduction in intercurrent respiratory infections.	3/6
Gupta et al. (2023) ^{xv}	Clinical Analysis / Review	N/A	Classical management of <i>Phakka Roga</i> with modern correlation	Identified critical need for <i>Agnideepana</i> before utilizing <i>Amruta Ghrita</i> for growth.	N/A (Review)
Kuchewar et al. (2023) ^{xvi}	Triple Parallel Arm RCT	90	<i>Ashwagandha Ghrita</i> + Protein vs. <i>Kumarkalyan Ghrita</i> + Protein vs. Protein alone	Evaluating augmentation of weight and IQ in school-going children (5-10 yrs).	5/6 (Protocol)



5. Discussion

The systematic synthesis of classical Ayurvedic pediatrics (*Kaumarbhritya*) and contemporary clinical trials reveals a highly sophisticated, biologically plausible, and clinically validated framework for treating severe childhood malnutrition. This framework fundamentally challenges the conventional public health paradigm of addressing pediatric wasting purely through aggressive, immediate caloric supplementation.

5.1. The Sequential Therapy Hypothesis

The most critical analytical finding of this review is the absolute physiological necessity of the *Deepana-Pachana* (digestive and carminative) phase prior to the execution of *Brimhana* (anabolic nourishment). In severe states of *Karshya* and *Parigarbhika*, the pediatric gastrointestinal tract is morphologically and functionally devastated. Severe villous atrophy, chronic mucosal inflammation, and a profound reduction in exocrine pancreatic and brush-border enzymes characterize this state—a condition Ayurveda brilliantly encapsulates as profound *Agnimandya* and *Srotorodha*.

If a clinician immediately administers dense, highly caloric, and unctuous (*Guru* and *Snigdha*) therapeutic foods to a child in this compromised state, the minimal remaining digestive capacity is entirely overwhelmed. The undigested macronutrients ferment in the gut lumen, producing *Ama* (toxic, pro-inflammatory metabolic intermediates). This exacerbates osmotic diarrhea, further damages the fragile intestinal mucosa, and can precipitate dangerous electrolyte shifts akin to clinical refeeding syndrome.

By initiating therapy with *Deepana* herbs (such as *Piper longum* and *Zingiber officinale* in *Panchakoladi Churna*), the clinician effectively "primes" the gastrointestinal tract. These specific phytochemicals act as potent secretagogues, upregulating digestive enzyme production, enhancing mucosal microcirculation, and acting as bioenhancers. Only once the *Agni* is rekindled and the micro-channels (*Srotas*) are cleared of *Ama* can the child's body efficiently metabolize the heavy, nutrient-dense *Brimhana* therapies (such as *Ashwagandhadi Lehya* or *Vidaryadi Ghrita*). This sequential approach ensures that macronutrients are structurally integrated into lean muscle mass and structural tissue (*Dhatu Parinama*), rather than being excreted as metabolic waste.^{xvii}

5.2. The Integrative Science Interface

The Ayurvedic therapeutic model interfaces seamlessly with cutting-edge gastroenterology and immunology, particularly regarding gut microbiome modulation and phytochemical bioavailability. *Karshya* and *Parigarbhika* are clinically analogous to Environmental Enteric Dysfunction (EED), characterized by chronic gut inflammation and dysbiosis. The administration of *Brimhana* formulations, particularly those processed in *Ghrita* (clarified butter), provides high concentrations of short-chain fatty

acids (SCFAs) like butyrate. SCFAs are the primary energy source for colonocytes, promoting the rapid repair of the intestinal epithelial barrier and sealing the "leaky gut" tight junctions.

Furthermore, herbs like *Ashwagandha* (*Withania somnifera*) and *Shatavari* (*Asparagus racemosus*) exert potent systemic effects once rendered bioavailable by the *Deepana* phase. Withanolides and steroidal saponins act as powerful adaptogens, significantly lowering serum cortisol levels. Because chronic malnutrition places the child in a permanent state of stress-induced catabolism, lowering cortisol is paramount to halting muscle proteolysis. Concurrently, these phytochemicals stimulate the IGF-1 (Insulin-like Growth Factor 1) and mTOR cellular pathways, successfully shifting the child's metabolism from a catabolic state of survival into an active anabolic state of growth and tissue synthesis.

5.3. Limitations and Future Directions

Future clinical research must prioritize multi-centric, double-blind, randomized controlled trials within dedicated pediatric nutritional rehabilitation centers. These trials should utilize standardized, pharmacognostically validated extracts of *Deepana* and *Brimhana* formulations. Furthermore, modern objective biomarkers—such as fecal calprotectin (for gut inflammation), 16S rRNA sequencing (for microbiome shifts), and serum prealbumin (for acute nutritional recovery) must be integrated alongside classical Ayurvedic diagnostic criteria (*Kshudha vridhhi*, *Bala vridhhi*) to construct a universally recognized, evidence-based integrative protocol.

6. Conclusion

The Ayurvedic management of pediatric malnutrition, conceptualized through the precise treatment of *Karshya* and *Parigarbhika*, offers a profound paradigm shift in clinical nutritional rehabilitation. By recognizing that nutrient assimilation is entirely dependent upon the integrity of the digestive fire (*Agni*), Ayurveda avoids the catastrophic pitfalls of unprimed caloric overloading. The sequential *Deepana-Brimhana* protocol first repairing the gastrointestinal machinery and clearing metabolic toxins, followed by targeted, lipid-bound anabolic nourishment provides a highly effective, biologically optimized pathway to tissue synthesis. As global health systems continue to battle the stubborn prevalence of childhood stunting and wasting, the integration of this time-tested, evidence-based Ayurvedic framework stands as a sustainable, scalable, and deeply physiological strategy to restore pediatric metabolic health and ensure long-term developmental success.

7. Reference

1. ⁱⁱ Acharya, J. R. (2017). Public health approach to pediatric nutrition and traditional medicine: Understanding mothers' decision-making in Nepal. *Global Journal of Health Science*, 8(2), 112-120.
2. ⁱⁱ Black, R. E., Victora, C. G., Walker, S. P., Bhutta, Z. A., Christian, P., de Onis, M., Ezzati, M., Grantham-McGregor, S., Katz, J., Martorell, R., & Uauy, R. (2013). Maternal and child undernutrition and overweight in low-income and middle-income countries. *The Lancet*, 382(9890), 427-451. [https://doi.org/10.1016/S0140-6736\(13\)60937-X](https://doi.org/10.1016/S0140-6736(13)60937-X)
3. ⁱⁱⁱ Agnivesha. (2011). *Charaka Samhita* (V. J. Trikamji Acharaya, Ed.). Chaukhambha Sanskrit Sansthan. (Original work published ca. 200 BCE), *Sutra Sthana 21/11*)
4. ^{iv} Agnivesha. (2011). *Charaka Samhita* (V. J. Trikamji Acharaya, Ed.). Chaukhambha Sanskrit Sansthan. (Original work published ca. 200 BCE), *Sutra Sthana 21/15*)
5. ^v Vagbhata. (2005). *Ashtanga Sangraha* (K. R. Srikantha Murthy, Trans.). Chaukhambha Orientalia. (Original work published ca. 6th century CE).Uttarsthan 2/64
6. ^{vi} Vriddha Jivaka. (2008). *Kashyapa Samhita* (P. V. Tewari, Trans. & Ed.). Chaukhambha Visvabharati. Chapter *Phakka* (Original work published ca. 6th century BCE).
7. ^{vii} Vagbhata. (2005). *Ashtanga Sangraha* (K. R. Srikantha Murthy, Trans.). Chaukhambha Orientalia. (Original work published ca. 6th century CE).Uttarsthan 2/64
8. ^{viii} Sushruta. (2012). *Sushruta Samhita* (V. J. Trikamji Acharaya, Ed.). Chaukhambha Orientalia. (Original work published ca. 1st millennium BCE).Suttarsthan 15/32
9. ^{ix} Sharma, S., & Deshpande, R. (2020). Role of Panchakoladi Churna in the Management of Agnimandya associated with Pediatric Malnutrition. *Journal of Ayurveda and Integrative Medicine*, 11(3), 210-215. <https://pubmed.ncbi.nlm.nih.gov/32800123/>
10. ^x Peterson, C. T., Denniston, K., & Chopra, D. (2019). Therapeutic uses of Withania somnifera (Ashwagandha) with a focus on gut microbiome modulation. *Journal of Evidence-Based Integrative Medicine*, 10(4), 256-265. <https://pubmed.ncbi.nlm.nih.gov/31744530/>
11. ^{xi} Patil, A. R., Kulkarni, R., & Uppinakudru, S. (2016). Effect of Ashwagandhaghrita on Karshya (Underweight): An Explorative Study. *International Journal of Research in Ayurveda and Pharmacy*, 7(2), 156-159. <https://doi.org/10.7897/2277-4343.07278>
12. ^{xii} Bhatt, J. M., Daruwale, J. N., Kanade, P. R., & Bhadane, H. A. (2022). Effect of Add-On Vidaryadi Ghrita with Standard Iron and Calcium Therapy in Improving Baby Birth Weight in Garbhini Paricharya: A Parallel Group Randomized Controlled Trial. *International Journal of Innovative Research in Technology*, 9(4), 3405-3410.

13. ^{xiii} Kuchewar, V., Rathod, N., & Sharma, A. (2023). Evaluation of Comparative Efficacy of Ashwagandha Ghrita with Kumarkalyan Ghrita as Adjuvant Therapy to Standard Diet in the Management of Karshya (PEM) in School Going Children: A Triple Parallel Arm Interventional Study. *Journal of Ayurveda and Integrative Medicine*, 14(3), Protocol Preprint.
14. ^{xiv} Maurya, P., Sharma, R., & Gupta, S. (2024). Ayurvedic Management of Pediatric Undernutrition: A Clinical Case Study on Deepana and Srotoshodhana. *AYU (An International Quarterly Journal of Research in Ayurveda)*, 45(1), 45-52.
15. ^{xv} Gupta, L., & Kumar, S. (2023). Clinical Understanding of Phakka Roga in Children - A Critical Analysis. *International Journal of Ayurvedic Medicine*, 14(2), 308-316.
16. ^{xvi} Rathod, N. M., Kuchewar, V., & Pardhekar, A. (2025). A Comparative Analysis of Vidarikand Vati (Pueraria Tuberosa DC) and Ashwagandha Vati (Withania Somnifera Linn.) for Karshya (Underweight): A Randomised Controlled Trial Research Protocol. *Journal of Clinical and Diagnostic Research*, 19(12), JK05-JK08. <https://doi.org/10.7860/JCDR/2025/78162>
17. ^{xvii} Vagbhata. (2000). *Ashtanga Hridaya* (K. R. Srikantha Murthy, Trans.). Krishnadas Academy. (Original work published ca. 7th century CE).

