**COMPREHENSIVE REVIEW OF KARSHYA (MALNUTRITION) WITH AN EMPHASIS ON AYURVEDA**

**ABSTRACT**

**Background:** Ayurveda prioritises prevention over cure, with Aahara (diet) regarded as the foremost pillar of health, alongside Nidra (sleep) and Brahmacharya (discipline). A wholesome diet not only sustains health but also aids in recovery by restoring lost strength. Despite this emphasis, references to nutritional disorders in classical texts are scattered and lack systematic classification. **Methodology:** This review synthesises descriptions from classical Ayurvedic texts and aligns them with modern clinical understanding of protein-energy malnutrition (PEM). Specific conditions such as Karshya, Parigarbhika, Phakka, Balashosha, and Shushka Revati were analysed to identify parallels with contemporary concepts of undernutrition. **Results:** Karshya closely mirrors PEM in clinical features such as emaciation, weakness, and tissue depletion. Other conditions, including Phakka and Balashosha, reflect manifestations of chronic nutritional deficiency and developmental delays, corresponding to various forms of childhood undernutrition. **Discussion:** Ayurvedic texts present a fragmented yet insightful understanding of nutritional disorders. Correlating traditional concepts with modern definitions offers a more comprehensive view of pediatric undernutrition and highlights the relevance of Ayurvedic dietary and preventive measures in addressing this global health concern. **Conclusion**: Karshya and related conditions in Ayurveda closely align with modern concepts of childhood undernutrition, particularly protein-energy malnutrition. Integrating classical Ayurvedic insights with contemporary understanding offers a holistic approach to recognising and managing pediatric nutritional disorders, reinforcing the importance of Ayurvedic dietary and preventive measures in current healthcare.

**KEYWORDS:** Nutrition, Karshya, Undernutrition, Protein‑Energy Malnutrition, Ayurveda

**INTRODUCTION**

Undernutrition is a condition resulting from inadequate intake, poor absorption, or excessive loss of nutrients. The broader term malnutrition encompasses both undernutrition and overnutrition; however, in many contexts, the terms malnutrition and protein-energy malnutrition (PEM) are used interchangeably with undernutrition [1,2].

Children, especially during their growth years, are the most vulnerable to malnutrition. Their nutritional status serves as a sensitive indicator of the overall health and well-being of a community. Malnutrition severely impacts children’s growth, development, and survival, making it one of the most pressing public health challenges. In developing countries, malnutrition is a leading cause of childhood mortality. Nearly half of the 11 million annual deaths among children under five are linked to malnutrition [3]. The growth, development and survival of children, society and economy of the state and developing countries threatened due to double or triple burden of malnutrition [53].

Proper nutrition during childhood—a period of rapid growth and development—is critical. A balanced diet must include essential nutrients such as water, vitamins, minerals, proteins, fats, and carbohydrates. Childhood malnutrition primarily results from inadequate food intake, poor nutrient absorption, or excessive nutrient loss [4,5].

In India, according to a recent national survey, 7.5% of children suffer from severe acute malnutrition. The 2016 Sample Registration System Report estimated that over 960,000 children under the age of five die each year from malnutrition-related causes. Despite India's population increasing by 181 million between 2001 and 2011, the child population declined by 5.05 million during the same period. Hunger and food insecurity remain the main drivers of child malnutrition. According to the Global Hunger Index, India ranked 100th out of 119 countries in 2017 and further dropped to 101st out of 116 in 2021. High child mortality, low productivity, and rising malnutrition have all contributed to India’s slow economic growth [6].

Malnutrition in children under five is the most severe consequence of food insecurity. It not only hampers physical and cognitive development but also heightens the risk of infections, disabilities, and mortality. Every child has the fundamental right to grow and develop healthily, which can only be ensured through adequate nutritional support and access to quality healthcare [7].

In Ayurvedic literature, Aahara (food) is recognised as one of the three fundamental pillars of life (Trayopastambha), alongside Nidra (sleep) and Brahmacharya (discipline) [8]. The process by which food is transformed into nourishment is governed by Agni—the digestive fire—which is central to Ayurvedic physiology [9]. Acharya Charaka, in the classical Ayurvedic text Charaka Samhita, categorises excessively lean individuals (Atikrushya) among the eight undesirable body types (Ashtauninditiya Purusha), highlighting the health risks associated with extreme undernutrition, much like obesity (Medasvi) [10]. Ayurveda is known as the "science of life." The ultimate goal of Ayurveda is to help every human being in maintaining and promoting health, as well as preventing illnesses, which are the greatest inhibiting factor to achieving dharma. The medication Ashwagandhadi Avaleha is specifically used in the treatment of karshya, as described in Sahasrayogam [51,52].

**Aims and Objectives**

**Aim:**To comprehensively review the condition of Karshya (Undernutrition) as described in classical Ayurvedic texts and correlate it with modern nutritional science, particularly focusing on protein-energy malnutrition (PEM) in children.

**Objectives:**

1. To explore and compile Ayurvedic references related to Karshya and associated conditions such as Phakka, Parigarbhika, Balashosha, and Shushka Revati.
2. To analyse the classical etiopathogenesis (Nidana Panchaka), clinical features (Lakshana), and complications (Upadrava) of Karshya from major Ayurvedic treatises.
3. To correlate the Ayurvedic descriptions of Karshya with the modern understanding of undernutrition, especially protein-energy malnutrition.
4. To highlight preventive and therapeutic measures suggested in Ayurveda for managing Karshya, including dietary (Ahara), lifestyle (Vihara), and therapeutic (Chikitsa) approaches.
5. To assess the contemporary relevance and potential integrative applications of Ayurvedic insights in the management of pediatric undernutrition.

**METHODOLOGY**: The present review was conducted using classical Ayurvedic texts such as Charaka Samhita, Sushruta Samhita, Ashtanga Hridaya, and Kashyapa Samhita, along with authoritative commentaries and pediatric treatises. Relevant concepts related to Karshya, including conditions like Balashosha, Phakka, Parigarbhika, and Shushka Revati, were compiled and analysed. To establish clinical correlations, contemporary medical literature on protein-energy malnutrition (PEM) was reviewed using sources such as WHO publications, UNICEF reports, National Family Health Surveys (NFHS), and peer-reviewed journals. Ayurvedic concepts like Agnimandya (digestive impairment), Dhatu Kshaya (tissue depletion), and Daurbalya (weakness) were mapped with modern nutritional parameters. The collected data were critically reviewed to highlight conceptual similarities and integrative approaches in the management of pediatric undernutrition.

**RESULT**

**MODERN REVIEW**

Undernutrition continues to be a leading cause of child mortality worldwide, contributing to approximately 45% of all deaths among children under the age of five [11]. According to data from the National Family Health Survey (NFHS-4) conducted in 2015–16, 36% of Indian children under five years of age were underweight, 38% were stunted, and 21% were found to be suffering from wasting. The prevalence of undernutrition is significantly higher in rural areas, where 38% of children are underweight, compared to 29% in urban settings. Alarmingly, between 20% and 30% of infants are already undernourished within the first six months of life, primarily due to low birth weight. This critical early phase—especially between the fourth and sixth months—marks a steep rise in undernutrition and stunting.

These findings underscore the urgent need for targeted public health interventions, particularly focusing on maternal health, early childhood nutrition, and strengthening healthcare infrastructure in rural areas. Without timely action, undernutrition will continue to impede growth and development, perpetuating cycles of poor health and poverty in vulnerable communities [11].

**Protein Energy Malnutrition (PEM)**

According to the World Health Organisation (WHO), Protein-Energy Malnutrition (PEM) encompasses a spectrum of nutritional disorders caused by varying degrees of protein and calorie deficiency. PEM predominantly affects infants and young children and is often aggravated by concurrent infections, making it one of the most severe forms of undernutrition globally [12]. The Indian Academy of Paediatrics (IAP) classifies malnutrition based on weight-for-age as follows [12,13]:

Table 1: **IAP Classification of Malnutrition (Based on Weight-for-Age) [12][13]**

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| **Grade of Malnutrition** | **Weight-for-age (%)** |
| Normal | > 80% |
| Grade I (Mild) | 71–80% |
| Grade II (Moderate) | 61–70% |
| Grade III (Severe) | 51–60% |
| Grade IV (Very Severe) | < 50% |

**Clinical Types of PEM**

Marasmus is characterised by severe wasting of both fat and muscle, resulting in an extremely thin appearance often described as "skin and bones." Clinical signs include prominent ribs, loss of buccal fat giving a "monkey face" appearance, and sagging skin over the buttocks resembling a "baggy pants" appearance. Notably, oedema is absent, and the child may remain alert.

Kwashiorkor primarily affects children aged 1 to 4 years and is distinguished by pitting oedema, which can constitute 5–20% of body weight. Despite significant muscle wasting, children may appear plump due to fluid retention. Key clinical features include skin changes like the "flaky paint" appearance, hyperpigmentation, and petechiae. Hair changes such as the flag sign (banded hair), dullness, and easy pluckability are common. Additional symptoms include apathy, irritability, anorexia, abdominal distention, diarrhoea, anaemia, hypotension, bradycardia, and impaired renal function.

Marasmic-Kwashiorkor is a mixed form of PEM that presents with combined features of both marasmus and kwashiorkor. Children affected show significant muscle wasting along with pitting oedema, making diagnosis and treatment more complex.

**Ayurved Review**

Growth and development are natural physiological processes that progress optimally when all supporting factors are balanced and functioning harmoniously. When these influences—such as diet, lifestyle, emotional health, and metabolism—are compromised, children may exhibit failure to thrive, growth retardation, or appear small for age. In Ayurvedic literature, such conditions are conceptually described under the term Karshya, which denotes emaciation or pathological leanness.

**Etiological Factors (Nidana) of Karshya**

According to classical Ayurvedic texts, Karshya arises from a combination of dietary, behavioural, emotional, and constitutional factors. The primary causative factors include [14]:

* Rukshanna Pana Sevana – Consumption of dry, rough, or non-nutritive food and drinks
* Langhana – Frequent fasting or skipping meals
* Pramitashana – Insufficient dietary intake
* Kriyatiyoga – Overuse of evacuative therapies like purgation and emesis
* Manasika Nidana – Emotional disturbances including grief (Shoka), anxiety (Chinta), and fear (Bhaya)
* Shrama – Excessive physical and mental exertion
* Vega Nigraha – Suppression of natural bodily urges such as hunger, thirst, and sleep
* Atishrama – Chronic overexertion
* Ati Maithuna – Excessive indulgence in sexual activity
* Atisnana Abhyasa – Frequent bathing, believed to deplete bodily unctuousness
* Ruksha Udvartana – Regular application of dry or abrasive powders on the body
* Prakriti and Beeja Dosha – Inherent constitutional tendencies and hereditary factors
* Jara – Old age or age-related degeneration
* Vikar Anushaya – Chronic underlying illness
* Krodha – Frequent or excessive anger

Individuals suffering from Karshya typically show **diminished tolerance** to physical exertion, hunger, thirst, illness, medications, extreme environmental conditions (cold and heat), and sexual activity [15].

**Clinical Features of Karshya**

Classical Ayurvedic descriptions provide a detailed symptomatic profile of Karshya. Affected individuals often present with the following features [16]:

1. Shushka Sphic-Udar-Greeva – Dry and shrunken buttocks, abdomen, and neck
2. Dhamanijala Santataha – Prominently visible veins due to the loss of subcutaneous fat
3. Twak-Asthi-Shesha, Ati-Krusha – An extremely thin appearance, reduced to "skin and bones"
4. Sthoola Parva – Prominent or enlarged joints due to tissue loss around bony prominences
5. Vyayama Atisahishnuta – Inability to tolerate even mild physical exertion
6. Kshut-Pipasa-Vyadhi-Aushadha-Asahishnuta – Hypersensitivity or intolerance to hunger, thirst, illness, and medications
7. Ati-Shita-Ushna-Maithuna-Asahishnuta – Intolerance to extremes of temperature and sexual activity

These clinical features of Karshya are indicative of Dhatu Kshaya (tissue depletion), Agnimandya (digestive weakness), and Ojas Kshaya (vital essence depletion)—central concepts in the Ayurvedic pathophysiology of emaciation.

**Samprapti (Pathogenesis) of Emaciation**

The pathogenesis of Karshya (emaciation) is rooted in the sustained indulgence in Nidana Sevana—causative factors such as improper dietary habits and lifestyle choices that aggravate Vata Dosha, including excessive fasting, consumption of dry and non-unctuous foods (Ruksha Ahara), overexertion, and emotional disturbances [14]. These practices disturb the homeostasis of Vata, impair the digestive fire (Agni Dusti), and lead to the formation of Ama (toxic metabolic by-products) [15]. This pathological triad initiates a cascade of physiological disruptions, starting with the depletion of Rasa Dhatu, the primary nourishing fluid that is responsible for sustaining all other tissues [16].

When the consumed food (Ahara) is incompletely digested (Sama Ahara), the resultant Rasa Dhatu is both quantitatively and qualitatively deficient (Shoshita Rasa Dhatu). This improperly formed Rasa circulates in the body as a dry, ununctuous form (Shushka Rasa), incapable of nourishing subsequent Dhatus such as Rakta, Mamsa, Meda, and others [19]. Consequently, each tissue receives inadequate nutrition, leading to progressive Dhatu Kshaya (tissue depletion) and systemic weakness.

Over time, this results in the clinical manifestation of Karshya, characterized by severe leanness, weakness, loss of muscle and fat, intolerance to physical exertion, and hypersensitivity to hunger, thirst, and temperature variations. This chain of events is a classical Ayurvedic representation of the multifactorial and systemic progression of emaciation.

**Samprapti Ghatak (Pathological Components)**

In the pathogenesis of Karshya (emaciation), the predominant Dosha involved is Vata, due to its intrinsic properties of dryness (Rukshata), lightness (Laghuta), and mobility (Chalatva), which naturally lead to depletion of body tissues when aggravated [17]. The principal Dushya (vitiated tissue) is Rasa Dhatu, the primary nourishing fluid responsible for sustaining all subsequent Dhatus. When Rasa becomes deficient or improperly formed due to Agni Dushti and Ama formation, tissue nutrition is compromised [18].

The Rasavaha Srotas, which circulate Rasa Dhatu, are the main Srotas (channels) involved in Karshya. These channels undergo Srotodushti (channel pathology) primarily in the form of Sanga (obstruction), which may be due to the presence of Ama or deficient, non-nutritive Rasa, hindering the onward flow and transformation of nutrients [19].

The Adhisthana (origin site) of this pathological process is considered to be the Pakvashaya (large intestine), the main seat of Vata Dosha. The Vyaktisthana (site of clinical manifestation) is Sarvanga (the entire body), as the features of emaciation—such as loss of subcutaneous fat, prominent joints, intolerance to exertion, and systemic weakness—are generalised and affect the whole body [19].

**Complications of Karshya**

Individuals suffering from Karshya (extreme leanness or emaciation) are prone to a variety of systemic complications due to chronic Dhatu Kshaya (tissue depletion) and Agni Dushti (digestive impairment). According to classical Ayurvedic literature, untreated or long-standing Karshya can result in splenomegaly (Plihodara), chronic cough (Kasa), generalised wasting (Shosha), and dyspnea or breathlessness (Shvasa) [20]. Additionally, such patients may develop gaseous tumours (Adhmana), piles (Arsha), and various abdominal disorders, including diseases of the gastrointestinal tract (Grahani), due to impaired digestion and improper assimilation of nutrients [20].

These complications reflect both systemic and localised consequences of malnutrition and underline the critical importance of early intervention, proper nourishment, and restoration of Agni in the management of Karshya.

**Management of Karshya**

The Ayurvedic management of Karshya (emaciation) involves a multi-pronged approach focusing on cleansing, metabolic correction, nourishment, and rejuvenation. The first line of management is Srotoshodhana, or the purification of obstructed Rasavaha Srotas. While children are often too delicate for classical Panchakarma, a milder approach using medicated milk purgation is employed to clear the channels without disturbing their natural equilibrium [21].

Following this, Agnideepana therapy is initiated to rekindle the impaired digestive fire (Agni), which is critical in cases of Dhatu Kshaya and malabsorption. Ayurvedic texts recommend Deepana-Pachana drugs to enhance Jatharagni and Dhatvagni, thereby improving digestion and tissue nutrition. In undernourished children, physiological changes such as atrophy of salivary glands, fatty liver, reduced villi height, and atrophied pancreatic acini compromise nutrient assimilation. To counteract this, foods may be prepared with digestive enhancers like Hingu (asafoetida) and Jeeraka (cumin) to improve gut function and absorption [22].

The cornerstone of Karshya management is Brimhana Chikitsa (nourishing therapy). This involves administering wholesome, nutrient-rich, and easily digestible foods that promote anabolic activity and tissue regeneration [23]. Additionally, Vrishya Dravyas such as Shatavari (Asparagus racemosus), Ashwagandha (Withania somnifera), and Shweta Musli (Chlorophytum borivilianum) are used for their Rasayana (rejuvenative) and Brimhana properties [24].

To support cognitive and psychological well-being, Medhya Rasayanas like Mandukaparni (Centella asiatica), Yashtimadhu (Glycyrrhiza glabra), and Guduchi (Tinospora cordifolia) are incorporated. These herbs enhance both mental and physical resilience in children suffering from chronic undernutrition [25].

Panchakarma therapies, particularly Basti (medicated enema), are effective in pacifying Vata Dosha, improving microcirculation, and facilitating nutrient absorption. Supportive procedures such as Snehana (oleation) and Swedana (sudation) may also be used as preparatory therapies, tailored according to the child's strength and condition [26].

Diet plays a pivotal role in recovery. High-calorie, nutrient-dense foods, including milk, ghee, dates, almonds, and lentils, are recommended. For non-vegetarian individuals, Mamsa Rasa (meat soup) offers a potent source of nourishment and tissue regeneration [27].

Finally, lifestyle modifications are essential to support therapeutic outcomes. These include adequate rest, emotional wellbeing, stress reduction, and the establishment of a balanced daily routine, all of which are crucial for the restoration of strength and vitality in Karshya-affected individuals [28].

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**Ayurvedic Correlations to Malnutrition**

Ayurveda offers detailed accounts of pediatric nutritional disorders that correlate with modern concepts of malnutrition. Among them, Balashosha and Kshiraja Phakka are two distinct conditions described by various classical Ayurvedic scholars. Balashosha is attributed to factors such as excessive intake of Shlaishmika Ahara (heavy and Kapha-promoting foods), frequent consumption of cold water (Shitambupana), excessive daytime sleep (Divaswapna), and the intake of breast milk vitiated by Kapha dosha, typically due to maternal imbalance [29]. These etiological factors obstruct the Rasavaha Srotas (nutrient channels), impairing digestion and nutrient assimilation. Clinically, Balashosha manifests with symptoms like Arochaka (loss of appetite), Pratishaya (nasal discharge), Jwara (fever), and Kasa (cough). If not treated early, the disease progresses into Shosha (emaciation), marked by dry, lustreless, and pale eyes, suggesting advanced nutritional deterioration [30].

Kshiraja Phakka, on the other hand, results from the child’s consumption of breast milk vitiated by Kapha, often referred to as Phakka-causing milk. This pathologically altered milk leads to impaired digestion, recurring illnesses, and progressive malnutrition, culminating in a marasmic state. Over time, the child becomes severely emaciated despite food intake, highlighting the role of early dietary influences and maternal health [31].

Another important condition described in Ayurvedic paediatrics is Parigarbhika or Garbhaja Phakka, which occurs when a breastfeeding mother becomes pregnant again. This causes a physiological change in the quality and quantity of breast milk, rendering it deficient in vital nutrients (Alpa Poshakansha). As a result, the nursing infant experiences progressive malnourishment. In Garbhaja Phakka, inadequate feeding due to pregnancy-induced lactational failure can lead to severe Karshya, and in extreme cases, infant mortality [32].

The term Vyadhi Sambhavaja Phakka (also known as Vyadhija Phakka) refers to a form of malnutrition that arises secondary to chronic diseases. Long-standing internal or external illnesses deplete Bala (strength) and Dhatus (tissues). Children suffering from this condition exhibit persistent fever, gradual wasting, loss of vitality, and emaciation of the buttocks and upper limbs (Shuska Sphik and Shuska Bahu) [33].

Additionally, Shushka Revati is a unique condition described in the context of Graha Rogas (afflictions believed to be of supernatural or microbial origin). Despite normal or even increased food intake, the child continues to lose weight and vitality. Hallmark signs include a feeble voice, dry and discoloured tongue, hair fall, abdominal distension, and extreme weakness, mirroring features akin to abdominal tuberculosis or chronic wasting conditions [34].

**Prevention of Malnutrition: Recommendations**

Preventing malnutrition requires a multifaceted approach, beginning with early initiation of breastfeeding, ideally within one hour of birth, followed by exclusive breastfeeding for the first six months and the timely introduction of appropriate weaning foods thereafter [35]. Educating communities about cost-effective, locally available, nutritious diets is crucial, particularly in resource-limited settings [36]. Family planning measures must be promoted to ensure adequate spacing between children, which supports both maternal and child nutritional well-being [37].

Environmental factors also play a major role in malnutrition. Thus, improving environmental sanitation and hygiene can help prevent infections that exacerbate nutrient loss [38]. Long-term solutions require emphasis on socio-economic development in rural areas, where the prevalence of undernutrition remains disproportionately high. Furthermore, increased government investment in public health infrastructure and national nutritional programs is essential for sustained impact [39].

**Current Guidelines for Prevention**

Malnutrition prevention can be effectively addressed through interventions across three critical stages of life. The first stage, nutrition during pregnancy, is foundational, as fetal nutrition is entirely dependent on maternal nutritional status. Maternal deficiencies or illness can result in intrauterine growth retardation (IUGR), a precursor to infant malnutrition [40]. The second stage focuses on infant nutrition, emphasising exclusive breastfeeding for the first six months, followed by the introduction of complementary foods that meet the child’s evolving nutritional needs [41].

The third stage, childhood nutrition, requires the provision of a balanced and nutrient-rich diet. Children should not skip meals, especially breakfast, which provides essential energy and nutrients for physical activity and learning. While preschoolers need additional attention to vitamin and mineral supplementation, school-aged children require about three-quarters of the nutritional intake of an adult male, making nutritional adequacy during this phase vital for growth and cognitive development [42].

**Discussion**

Karshya, as described in Ayurvedic texts, closely correlates with the modern clinical understanding of undernutrition. Acharya Charaka lists Ati-Karshya (excessive leanness) among the Ashtauninditiya Purusha (eight condemnable body types), emphasising its undesirable nature both functionally and aesthetically [43]. Ayurvedic conditions such as Phakka, Balashosha, Parigarbhika, and Shushka Revati demonstrate clinical similarities to modern disorders, including Protein-Energy Malnutrition (PEM), Failure to Thrive (FTT), and chronic undernutrition [44].

The causative factors of Karshya encompass inadequate dietary intake (Alpashana, Vishamashana), excessive physical exertion (Atishrama), and mental-emotional disturbances such as grief (Shoka), fear (Bhaya), and anger (Krodha) [45]. Diagnosis, both traditionally and contemporarily, involves thorough dietary assessment, clinical examination, anthropometric measurements, and relevant laboratory investigations to determine the severity and nature of the malnutrition [46].

As an Apatarpana Janya Vyadhi (disease caused by undernourishment), the therapeutic strategy in Ayurveda includes Santarpana (repletion) and Brimhana Chikitsa (nourishing therapies). Treatments such as Shrotoshodhana (channel cleansing), Agnideepana (appetite stimulation), Brimhana (anabolic therapy), and Vrishya Chikitsa (rejuvenative therapy) aim to restore nutritional status by enhancing digestion, absorption, and tissue nourishment [47]. Basti therapy, known for its Vata-pacifying (Vatahara) properties, also contributes significantly to improving microcirculation and nutrient assimilation, leading to enhanced clinical outcomes in emaciated children [48].

According to the World Health Organisation, malnutrition remains a critical global public health issue, particularly in developing countries [49]. Effective prevention strategies should include comprehensive antenatal care, early initiation and exclusive breastfeeding, timely complementary feeding, community-based nutrition education, and efficient implementation of national programs such as the Integrated Child Development Services (ICDS) and POSHAN Abhiyaan [50].

**Conclusion**

Karshya, as interpreted through Ayurvedic literature, shares striking similarities with modern concepts of undernutrition, particularly Protein-Energy Malnutrition (PEM). Classical texts offer valuable insights into its etiopathogenesis, symptoms, and management through a holistic lens that emphasises digestive health (Agni), tissue nourishment (Dhatu Pushti), and lifestyle regulation. This comprehensive review highlights the relevance of Ayurvedic principles—such as Brimhana Chikitsa, Agnideepana, and Rasayana therapy—in addressing undernutrition effectively. By integrating traditional Ayurvedic wisdom with modern nutritional science, a more sustainable, individualised, and preventive approach to combating undernutrition—especially in children—can be developed.

Disclaimer (Artificial intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, manuscript.

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