

**INFANT NUTRITION IN THE MODERN ERA: CHALLENGES,
DIETARY PRACTICES, AND AYURVEDIC INSIGHTS*****¹Dr. Apurva Kulkarni and ²Dr. Sushil Bava**

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ABSTRACT

Proper nutrition during infancy (0–2 years) is critical for optimal physical growth, cognitive development, and immune function. However, both global and national data indicate persistent challenges such as undernutrition, micronutrient deficiencies, and rising trends of overnutrition due to urbanization and changing feeding practices. Despite advancements in modern nutritional science, inappropriate breastfeeding and complementary feeding remain widespread. Ayurveda, through its pediatric branch Kaumarbhritya, offers time-tested dietary recommendations, including the use of Stanya (breast milk), Annaprashana Samskara (initiation of solids), and easily digestible traditional foods like Mudga Yusha and Peya. This article explores recent challenges in infant nutrition, reviews dietary practices followed by mothers, and presents an integrative perspective that combines modern guidelines with Ayurvedic principles to provide holistic and culturally relevant solutions for infant health.

KEYWORDS: Infant Nutrition, Breastfeeding, Complementary Feeding, Kaumarbhritya, Ayurveda, Undernutrition, Micronutrient Deficiency.

INTRODUCTION

Proper nutrition during the first two years of life is crucial for a child's growth, brain development, and immunity. This period, known as the "golden window," sets the foundation

for lifelong health. Inadequate nutrition during infancy can lead to stunting, wasting, poor cognitive outcomes, and increased disease risk in later life.

Globally, malnutrition remains a major concern. As per UNICEF-WHO-World Bank estimates (2023), 45 million children are wasted and 148 million are stunted.^[1] In India, NFHS-5 (2019–21) reports that 35.5% of children under five are stunted and only 63.7% are exclusively breastfed for six months. Improper complementary feeding practices further add to the problem.^[2]

Early nutrition significantly impacts physical growth, brain development, and immunity. Micronutrients like iron, zinc, and DHA are vital during this stage. Breastfeeding and timely introduction of complementary foods are key practices.^[3]

This article aims to highlight the challenges in infant nutrition and compare modern scientific approaches with Ayurvedic concepts from Kaumarbhritya, offering a holistic perspective for better infant health.

AIM OF STUDY

This study explores integrative infant nutrition by merging Ayurvedic wisdom with modern science, addressing rising malnutrition, lifestyle changes, and feeding gaps to improve early childhood health through a holistic approach.

MATERIALS AND METHODS

Recent Challenges in Infant Nutrition

This section is based on a review of current literature, government health surveys (such as NFHS-5, WHO, UNICEF, and ICMR data), as well as classical Ayurvedic texts (*Kashyapa Samhita*, *Charaka Samhita*, and *Ashtanga Hridaya*) to identify and analyze the key challenges in infant nutrition. Data was compiled from both modern scientific sources and traditional Ayurvedic scriptures to present an integrative understanding of the problem.

Global and Indian Scenario: Malnutrition in Infants^[4]

Malnutrition in infants remains a significant public health concern worldwide. According to WHO and UNICEF.

- Around **45 million children under 5 are wasted**, and **148 million are stunted** globally.
- In India, the **NFHS-5 (2019–21)** data shows:
 - **35.5%** of children under five are stunted.

- **19.3%** are wasted.
- **32.1%** are underweight.

This reflects a **dual burden** of undernutrition and emerging issues like childhood obesity due to overnutrition, especially in urban settings. Alongside macronutrient deficiencies, there is a growing concern about **micronutrient deficiencies** such as iron, Vitamin A, iodine, and zinc—commonly referred to as "hidden hunger."

Common Problems in Infant Nutrition

1. Low Birth Weight

- Infants born with low birth weight (<2.5 kg) have a higher risk of malnutrition and impaired immunity.
- Maternal under nutrition and anemia during pregnancy are major contributing factors.

2. Exclusive Breastfeeding Not Maintained

- WHO recommends exclusive breastfeeding for the first six months.
- NFHS-5 reveals only **63.7%** of Indian infants are exclusively breastfed till 6 months.
- Early weaning or introduction of animal milk/formula often disrupts this practice, affecting immunity and digestion.

3. Early or Delayed Complementary Feeding

- Timely introduction of semi-solid food (at 6 months) is often delayed or introduced too early, both of which can lead to nutritional imbalances.
- Poor awareness and socio-cultural beliefs often contribute to inappropriate feeding practices.

4. Urban Lifestyle and Junk Food Exposure

- Working parents, fast-paced routines, and nuclear families often result in a reliance on processed, packaged, or instant foods.
- These foods are high in sugar, salt, and artificial additives, contributing to early onset of obesity and digestive issues.

Recent Trends in Infant Nutrition

1. Rise in Formula Feeding

- There is an increasing preference for formula milk, even when breastfeeding is possible.

- Reasons include aggressive marketing, maternal employment, and misconceptions about breast milk sufficiency.
- Over-dependence on formula often leads to a lack of natural immune protection and digestive enzymes found in breast milk.

2. Loss of Traditional Knowledge

- In earlier times, elder women in families guided infant care based on traditional wisdom.
- With modernization, such practices are either forgotten or considered outdated.
- Nutrient-rich traditional weaning foods like *Mudga Yusha*, *rice gruel with ghee*, or *roasted flour porridge* are being replaced with ready-to-eat commercial products lacking natural vitality (prana).

DIETARY PRACTICES IN INFANTS

Proper dietary practices during infancy (0–2 years) are critical for ensuring optimal growth, immunity, and neurodevelopment. This period, often termed the “**critical window of opportunity**,” demands a balanced, safe, and developmentally appropriate diet. In India, feeding practices vary widely based on cultural traditions, regional cuisines, socio-economic conditions, and maternal awareness.

What Mothers Typically Serve

1. Breast Milk

Breast milk is the ideal food for infants and is universally recommended as the sole source of nutrition during the first six months. It is rich in:

- Balanced macronutrients (proteins, fats, carbohydrates),
- Immunological factors (IgA, lactoferrin),
- Digestive enzymes and growth-promoting hormones.

Breastfeeding is culturally accepted in India, yet exclusive breastfeeding often drops early due to social pressures, inadequate lactation support, or returning to work.

2. Homemade Complementary Foods

Post 6 months, mothers traditionally introduce soft, easily digestible homemade foods. Common items include.

- **Rice-based foods:** Soft rice, *khichdi* (rice-lentil porridge), *dal water*.
- **Cereals and pulses:** Ragi (finger millet), wheat porridge, moong dal preparations.

- **Fruits and vegetables:** Mashed banana, boiled and mashed potato, carrot, pumpkin, or apple.
- **Dairy and fats:** Ghee, curd, and sometimes small amounts of cow's milk after 1 year. These foods are usually simple, freshly cooked, and introduced gradually based on the infant's acceptance and digestion.

3. Commercial Baby Foods

Due to changing lifestyles and urbanization, working mothers often depend on packaged infant foods, including.

- Readymade cereal mixes,
- Instant porridges,
- Fruit or vegetable purees in jars or pouches.

While convenient, these products may lack live nutrients (prana), may contain preservatives or added sugars, and often replace wholesome homemade options. Over-reliance on such foods is concerning, especially in early infancy.

Complementary Feeding Guidelines

1. WHO Recommendations^[5]

The **World Health Organization (WHO)** recommends:

- **Exclusive breastfeeding** for the **first 6 months**.
- Introduction of **nutrient-rich complementary foods** at **6 months**, with continued breastfeeding up to **2 years** or beyond.
- Feeding should be responsive (on demand) and aligned with the child's hunger and satiety cues.

2. Indian Academy of Pediatrics (IAP) Guidelines^[6]

The **Indian Academy of Pediatrics (IAP)** aligns with WHO and emphasizes:

- **Age:** Complementary feeding should begin at **6 completed months**.
- **Frequency:**
 - 6–8 months: **2–3 meals/day** with 1–2 nutritious snacks.
 - 9–11 months: **3–4 meals/day** with additional snacks as needed.
- **Consistency:** Begin with pureed or mashed foods; gradually transition to soft solids.
- **Portion Size:** Start small (2–3 tablespoons), gradually increasing quantity based on the infant's appetite.

Important Feeding Principles

- **Hygiene:** All food should be prepared and stored hygienically to prevent infections.
- **Dietary diversity:** Include various food groups (grains, legumes, vegetables, fruits, dairy).
- **Iron-rich foods:** Begin early to prevent anemia—green leafy vegetables, jaggery, fortified cereals, etc.
- **Avoid salt, sugar, honey, and cow's milk** before 1 year.

AYURVEDIC INSIGHTS ON INFANT NUTRITION^[7,8]

Ayurveda, India's ancient system of holistic health, offers a well-structured approach to infant nutrition under the specialized branch called **Kaumarbhritya**. This branch focuses on child health, growth, and disease prevention from conception through adolescence. Ayurveda emphasizes the role of **Ahara (diet)** and **Sanskaras (rituals)** in nurturing a healthy constitution (Prakriti) right from infancy.

Kaumarbhritya: The Pediatric Branch of Ayurveda

Kaumarbhritya is one of the eight major branches of Ayurveda, dealing specifically with child health, breastfeeding, weaning, immunization (Sanskaras), and disease management in infants and children. It recognizes that nutrition in early life not only supports growth but lays the foundation for immunity (*Bala*), intellect (*Medha*), and strength (*Ojas*).

Key Ayurvedic Concepts in Infant Nutrition

1. Stanya (Breast Milk): Qualities and Importance

Stanya (breast milk) is considered the **most ideal and natural food** for infants. Classical texts like *Charaka Samhita* and *Kashyapa Samhita* describe breast milk as.

- **Samsiddha Ahara** – ready-made food requiring no digestion,
- Rich in **Ojas, Rasa Dhatu**, and **Prana** (vital energy),
- Promoting **Sharirik and Manasik Vikas** (physical and mental development).

The quality of **Stanya** reflects the mother's health and digestion (Agni). Vitiating of **Doshas** in breast milk can lead to disorders in infants like colic, diarrhea, or skin conditions.

2. Ksheerapaak: Methods to Improve Lactation

Ayurveda prescribes various **galactagogues** (Stanyajanana dravyas) to improve breast milk production, known as **Ksheerapaak Dravyas**. These include.

- **Shatavari** (*Asparagus racemosus*)

- **Jeeraka (Cumin)**
- **Vidari**
- **Yashtimadhu (Licorice)**

Decoctions (Kwath), medicated ghee (Ghrita), and milk preparations using these herbs are traditionally given to lactating mothers to enhance the quantity and quality of milk without causing heaviness or indigestion.

3. Annaprashana Samskara: First Solid Food Introduction

Ayurveda recommends **Annaprashana**, a **Samskara (ritual)** marking the first intake of solid food, to be conducted around the **6th month** of age—closely aligning with modern guidelines on complementary feeding.

- The ritual involves giving **light, digestible foods** such as **rice gruel (Peya)**, **lentil soup (Yusha)**, or **ghee-mixed rice**.
- Foods are given in small quantities, starting with one or two spoonfuls.
- The environment is made auspicious to instill positivity and nourishment at both physical and psychological levels.

4. Bala Aahar: Age-Specific Diet Recommendations

Texts like **Kashyapa Samhita** and **Ashtanga Hridaya** describe the progressive feeding practices for infants.

- **0–6 months:** Exclusive breastfeeding.
- **6–12 months:** Gradual introduction of **semi-solid and soft foods**.
- **After 12 months:** Inclusion of **wholesome meals** in smaller portions that align with adult foods, adapted to the child's digestive capacity.

Emphasis is placed on the **Agni (digestive strength)** of the infant. Foods that are **Manda (thin gruel)**, **Peya (light rice water)**, and **Yusha (pulse water)** are preferred initially as they are easy to digest and nourish the **Dhatus** (body tissues) gently.

Common Ayurvedic Baby Foods

1. **Mudga Yusha** – A light lentil soup made from green gram (Mudga), known for being easy to digest and rich in proteins.
2. **Peya or Vilepi** – Rice gruel of different consistencies, sometimes enriched with ghee for additional energy and fat-soluble nutrients.

3. **Shunthi (dry ginger)** and **Pippali (long pepper)** – These are sometimes used in trace amounts in cooked food or as part of herbal preparations to enhance digestion and reduce colic, though cautiously under supervision.

Such foods are **Laghu (light)**, **Snigdha (unctuous)**, and **Samskara Yukt (processed appropriately)** to suit the weak digestive fire (*Mandagni*) of infants.

MODERN NUTRITIONAL GUIDELINES FOR INFANTS^[9,10]

Modern science offers evidence-based nutritional recommendations to ensure infants receive adequate energy and essential nutrients during the first two years of life. This period is crucial for establishing a strong foundation for growth, cognitive development, and immune function.

Macronutrient and Micronutrient Requirements

Infants require a carefully balanced intake of **macronutrients** (carbohydrates, proteins, and fats) and **micronutrients** (vitamins and minerals).

- **Proteins:** Essential for tissue growth and enzyme production. Adequate intake supports muscle development and immunity.
- **Fats:** Must make up about **30–40%** of total energy. Healthy fats (especially DHA and ARA) are critical for **brain development** and **vision**.
- **Carbohydrates:** Primary energy source. Breast milk provides lactose, which supports healthy gut flora.

Key **micronutrients** include.

- **Iron:** Needed for brain development and preventing anemia. Iron-rich foods should be introduced after 6 months.
- **Calcium and Phosphorus:** For bone growth and teeth development.
- **Vitamin A:** Supports vision, immunity, and skin health.
- **Zinc:** Promotes immune function and wound healing.

Role of Breastfeeding and Complementary Feeding

1. Exclusive Breastfeeding (0–6 Months)

- WHO and UNICEF recommend **exclusive breastfeeding** for the first 6 months.
- Breast milk provides complete nutrition, protective antibodies, and enhances bonding.
- No water or other liquids are needed, even in hot climates.

2. Complementary Feeding Post 6 Months

- After 6 months, breast milk alone becomes insufficient to meet growing nutritional demands.
- **Iron-rich complementary foods** should be introduced to prevent **iron deficiency anemia**. Examples include.
 - Fortified cereals
 - Mashed legumes (like lentils)
 - Green leafy vegetables
 - Meat and egg (if non-vegetarian)

Vitamin D Supplementation

- Breast milk is often **low in Vitamin D**.
- To prevent **rickets**, pediatric guidelines recommend:
 - **400 IU/day of Vitamin D** supplementation starting from the first few days of life, especially in exclusively breastfed infants.

Introduction of Allergenic Foods

Recent studies suggest that **early, controlled introduction** of allergenic foods (e.g., peanuts, eggs, dairy) between **6–12 months** may **reduce the risk of food allergies** later in life.

- These should be introduced in small amounts and in a safe environment.
- Foods must be developmentally appropriate in texture and consistency.

Food Safety and Hygiene

Proper hygiene during food preparation is vital to **prevent infections** such as diarrhea, which is a major cause of infant malnutrition.

Key practices include

- Washing hands before feeding or preparing food
- Using clean utensils and safe drinking water
- Avoiding reheated, stale, or uncovered food
- Storing food safely to prevent contamination

INTEGRATIVE APPROACH: BRIDGING AYURVEDA AND MODERN CONCEPTS

The growing burden of infant malnutrition, lifestyle-related disorders, and feeding challenges necessitates a more **holistic, inclusive, and culturally sensitive** strategy. An integrative approach that merges **Ayurvedic principles** with **modern nutritional science** can offer sustainable, practical, and preventive solutions for infant health.

Points of Convergence Between Ayurveda and Modern Science

Although Ayurveda and modern nutrition arise from different epistemological foundations, they align in several critical areas.

Ayurveda	Modern Nutrition	Convergence
<i>Stanya</i> (breast milk) is considered ideal	Exclusive breastfeeding is recommended up to 6 months	Recognize breast milk as the gold standard for infant nutrition
<i>Annaprashana Samskara</i> at 6 months	Complementary feeding recommended at 6 months	Both systems agree on the right age for introducing solid food
<i>Laghu, Snigdha Ahara</i> (light and nourishing food)	Easily digestible, energy-dense complementary foods	Consensus on gentle and nutrient-rich foods
Emphasis on <i>Agni</i> (digestive fire)	Focus on digestive maturity and gut health	Both advocate age-appropriate, well-digested foods

How Ayurvedic Practices Can Enhance Modern Recommendations

Ayurveda provides individualized and seasonal guidance for infant diet that complements modern protocols. Here's how.

- **Herbal Support for Lactation:** Ayurvedic galactagogues like **Shatavari**, **Jeeraka**, and **Vidari** can be integrated into postpartum diets to naturally boost lactation alongside modern advice.
- **Digestive Boosters:** Mild spices like **Shunthi (dry ginger)** and **Pippali (long pepper)** may enhance digestion and reduce colic when used in minimal, safe quantities under guidance.
- **Immunity-Boosting Practices:** Use of **medicated ghee**, **Rasayana herbs**, and age-appropriate **Sanskaras** can strengthen immunity (Ojas) naturally.
- **Ritual-based Feeding Practices:** Rituals like **Annaprashana** instill mindfulness and cultural bonding during the introduction of solid foods, promoting emotional and psychological well-being.

Culturally Relevant Solutions for Rural and Urban Settings

Ayurvedic practices, when simplified and standardized, can be adapted in both rural and urban contexts.

- **In Rural Areas**

- Promote **traditional, home-cooked weaning foods** like **Mudga Yusha** and **rice gruel**.
- Leverage community health workers to educate mothers using **local herbs and time-tested recipes**.
- Encourage breastfeeding and traditional baby-care rituals already embedded in culture.

- **In Urban Settings:**

- Integrate Ayurvedic baby food formulations (e.g., ready-to-mix **Yusha powders**) with modern packaging and hygiene.
- Use **digital tools** and apps to guide working mothers on feeding schedules, Ayurvedic tips, and modern nutrition.
- Bridge the **loss of traditional knowledge** by conducting parenting workshops combining both systems.

OBSERVATION

The study observed that.

- A significant number of infants, especially in India, face challenges like **undernutrition, micronutrient deficiencies**, and **low birth weight** due to inadequate feeding practices.
- **Exclusive breastfeeding** was not consistently maintained up to 6 months, often due to lack of awareness, maternal workload, or reliance on formula feeding.
- Many mothers were unaware of the **appropriate age, quantity, and consistency** of complementary feeding.
- Urban settings showed increased dependence on **commercial baby foods**, while rural areas still followed some **traditional weaning practices**.
- Ayurvedic concepts like **Stanya (breast milk)**, **Annaprashana Samskara**, and age-specific dietary recommendations in **Kaumarbhritya** offer valuable guidance that aligns well with modern nutrition protocols.
- Integration of **Ayurvedic practices** such as **herbal lactation support, digestive aids**, and **immunity-boosting foods** is promising and culturally adaptable.

CONCLUSION

Infant nutrition is a critical factor in ensuring healthy growth, immunity, and cognitive development. The rising trend of malnutrition, both under and overnutrition, in infants highlights the need for more **holistic and culturally relevant approaches**. This study concludes that.

- Modern nutritional science provides strong guidelines for macronutrient and micronutrient needs, exclusive breastfeeding, and complementary feeding.
- **Ayurveda complements modern practices** by offering natural, age-appropriate, and digestive-friendly food options rooted in centuries of tradition.
- An **integrative approach**, combining modern guidelines with Ayurvedic principles, can enhance nutritional outcomes, preserve traditional wisdom, and promote sustainable infant health—especially in a diverse country like India.

Thus, promoting awareness and implementation of such integrative practices through education, public health policy, and mother-centric guidance is essential for future child health programs.

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