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A Comprehensive Analysis of Pediatric Oral Nutritional Supplements in India

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Abstract

Background: Childhood malnutrition remains a persistent challenge in India. When integrated effectively into pediatric care, oral nutritional supplements (ONS) provide desirable support for bridging nutrient gaps and promoting catch-up growth. **Methods:** This cross-sectional study evaluated the nutrient composition of 14 pediatric ONS products available in the Indian market as of January 2026. **Results:** Our analysis revealed notable heterogeneity in nutrient profiles with the mean energy density of 442 kcal/100 g and reconstituted values ranging between 0.43 and 1.42 kcal/ml. Protein levels varied from 12.0 to 25.0 g/100 g, while sugar content averaged 27.6 g/100 g, ranging from 0 g to 45.6 g. Docosahexaenoic acid and probiotics were commonly incorporated functional ingredients. Nearly 44% of products were compatible with tube feeding. **Conclusion:** In conclusion, the judicious selection of pediatric ONS offers safe and targeted nutritional support. The diverse range of formulations enables personalized care, underscoring clinical oversight to optimize growth and long-term health outcomes.

Keywords: Pediatric oral nutrition supplements, Nutritional composition, Enteral nutrition, Nutrition in India, Nutritional ingredients

1 Introduction

Children experience dynamic periods of growth characterized by increases in height, bone mass, and musculature, which demand higher energy and nutrient intake[1, 2]. Inadequate dietary diversity and nutrient gaps during these critical stages can compromise their development[3-5]. In India, resources such as growth charts from the Indian Academy of Pediatrics (IAP)[6, 7] and the Comprehensive National Nutrition Survey (CNNS)[8] and National Family Health Survey (NFHS) offer essential benchmarks for tracking nutritional status and guiding public health strategies. However, dietary insufficiencies remain widespread across age groups.

Oral nutritional supplements (ONS) have gained attention as practical tools to complement regular diets and meet these heightened nutritional needs[9, 10]. Among macronutrients, high-quality protein is necessary for lean mass accretion[11] while carbohydrates are the primary energy source[12]. Additionally, functional ingredients such as docosahexaenoic acid (DHA) and probiotics are now common in pediatric ONS. DHA supports neurodevelopment, enhancing psychomotor and cognitive outcomes[13], while probiotics help maintain gut health by reducing diarrhea duration and enhancing immunity[14, 15].

ONS formulations increasingly address specific dietary restrictions and clinical contexts. Vegan, lactose-free, and

gluten-free options cater to children with allergies, intolerances, or lifestyle preferences. Plant-based protein blends are compatible with tube feeding or oral administration, ensuring nutrition without common allergens. Tube-feeding compatibility allows uninterrupted nutrient delivery in children unable to meet needs orally[16-18].

The American Academy of Pediatrics (AAP) advises that routine nutrient supplementation is unnecessary for healthy children consuming balanced diets, with the exception of vitamin D (400–600 IU daily). The AAP cautions against unregulated use of supplements without clear clinical indication[19]. Similarly, the Indian Academy of Pediatrics (IAP) recommends a thorough nutritional assessment prior to initiating ONS and emphasizes that supplements should support, not replace, whole foods within a balanced diet[20].

The Indian Council of Medical Research (ICMR), through its Dietary Guidelines for Indians, emphasizes obtaining good-quality proteins and essential amino acids through diverse food sources and specifically recommends avoiding excessive protein supplementation for muscle building in children and adolescents. These guidelines also highlight appropriate energy balance through balanced macronutrient intake, advocating for whole foods over supplements whenever feasible[21].

India's pediatric ONS market is growing rapidly, yet there is a striking absence of published comparisons among available products[22]. To bridge this gap, we aim to deliver a comprehensive overview of commonly marketed pediatric ONS in India, detailing nutrient composition, flavor profiles, and key ingredients, while highlighting their formulation characteristics to support informed clinical decision-making.

2 Materials and Methods

This study employed a cross-sectional, descriptive design to evaluate the nutritional composition and formulation characteristics of pediatric ONS marketed in India. The primary data sources for this analysis included hospital formularies of tertiary-care pediatric centers, leading pharmacy chains, manufacturer websites, and widely used Indian e-commerce pharmacy platforms, with all ingredient profiles and nutritional data documented from products available as of January 6, 2026.

The selection process involved a systematic search for ONS powders specifically formulated for children aged 2 years and above, intended for oral use, and widely available across the Indian market. Products were considered "widely available" if they were accessible across multiple regions of India through retail pharmacies or national distribution channels. A total of fourteen distinct products were identified for inclusion, covering major brands such as Prohance Junior, Pediagold, Pediasure, and others. The study excluded any formulations designed exclusively for parenteral nutrition or those indicated solely for adult populations to maintain a focus on pediatric enteral requirements.

For each eligible product, specific nutritional parameters were extracted directly from the "Nutrition Facts" panel on the packaging. The dataset included the brand name, available flavor variants, and recommended serving sizes. Macronutrient composition was recorded per 100 g of powder, specifically documenting energy content in kilocalories, protein, carbohydrates, and total fat in grams. Carbohydrate profiling further differentiated between total sugars and added sugars to assess glycemic implications. Additionally, manufacturer instructions regarding dilution, specifically scoop size and water or milk volume, were analyzed to calculate the caloric density (kcal/ml) of the reconstituted feed.

Beyond macronutrients, the study evaluated the inclusion of functional ingredients. The presence and concentration of DHA were noted, along with the inclusion of specific probiotic strains such as *Lactobacillus acidophilus, Bifidobacterium lactis*, and *Bacillus coagulans*. Clinical formulation characteristics were also categorized, specifically recording whether products were labeled as gluten-free, lactose-free, or vegan. The suitability for enteral tube feeding and specific clinical indications, such as gastrointestinal intolerance were also documented.

All extracted data were systematically tabulated into a structured format to facilitate a direct comparison of product specifications. No formal statistical analysis was conducted, as the primary objective was to comprehensively outline the ingredient profiles and highlight key formulation characteristics relevant to clinical practice. Instead, the study focused on outlining the specific nutrient compositions and functional additives present across the selected brands. Continuous variables, such as energy density and macronutrient content, were summarized using means and ranges to illustrate the extent of variation within the market, while categorical data were reviewed to underscore the diversity of specialized options available for pediatric patients with varying clinical needs. All nutritional data were extracted exclusively from manufacturer-declared product labels. No independent laboratory analysis or compositional verification was performed.

3 Results

A total of fourteen pediatric ONS meeting the inclusion criteria were identified in the Indian market (Table. 1). The majority of these formulations were available as powders intended for reconstitution with water or milk, typically in serving sizes ranging from 15 g to 55 g per feed. Flavor variety was noted across the products, with vanilla being the predominant option available in approximately 80% of the formulations, followed by chocolate; unique variants such as mango,

Table 1: Nutrient composition per 100 g powder of pediatric ONS marketed in India

Product	Energy (kcal)	Protein (g)	Carbohydrates (g)	Total Sugar (g)	Added Sugar (g)	Fat (g)	DHA (mg)	Manufacturer's Advice	Dilution (kcal/ml)	Available Flavours	Suitable For Tube Feeding	Gluten Free	Vegan	Probiotics	Lactose Free
Prohance Junior	444	20	51.6	31	15.5 Sucrose	16.6	100	5 scoops (~45g) in 170ml water or 3 scoops (~27g) 200ml milk	Water 1.302 Milk 2.603	Chocolate Vanilla	×	✓	×	×	×
Pedia-gold	462	15	59	28	8 Fructose	18.5	20	2 scoops (40g) in 160ml water or milk	1.16	Vanilla, Chocolate, Mango	✓	✓	×	×	✓
Pedia Gold Plus	475	14.25	63	32	32 Sucrose	18.5	20	2 scoops (40g) in 160ml water	1.19	Vanilla	✓	✓	×	×	×
Pedia-sure	452	14.1	64.74	39.89	22.92 Sucrose	15		5 tbsp (45.5g) in 190ml water	1.08	Vanilla, Chocolate, Kesar badam	×	✓	×	*Lactobacillus acidophillus*	×
Pedia Sure Advance Plus	493	14.1	56.34	32	30.3 Sucrose	23.4	20	5 scoops (45.5g) in 190ml water	1.18	Vanilla, Chocolate	✓	✓	×	*Lactobacillus acidophillus* *Bifidobacterium lactis*	✓
Peptamen Junior	463	12.9	65.8	14.2	14.2 Sucrose	16.5		7 scoops (55g) in 210ml water	1.21	Vanilla	✓	✓	×	×	×
Groviva	472	14	53	0	22 Sucrose	22	90	2 scoops (30g) in 100ml water	1.42	Mango, Vanilla, Strawberry, Chocolate	×	✓	×	*Lactobacillus acidophillus* *Bifidobacterium lactis*	×
Groviva Advance	471	16.5	47	0	0	23.5	30	1 scoop (15g) in 55ml water	1.28	Vanilla, Chocolate	✓	✓	×	*Lactobacillus acidophillus* *Bifidobacterium lactis*	✓
Nangrow	467	15.2	58.8	30	14.6 Sucrose	19	40	7 scoops (33.5g) in 120ml water	1.3	Vanilla	×	×	×	*Bifidobacterium lactis*	×
Incipro Gold	464	14.25	62	0	0	18	20	2 scoops (~40g) in 160ml water	1.16	Vanilla, Chocolate	✓	×	×	×	×
Go Go Fuel	392	21.5	65.78	45.6	36.3 Sucrose	5.86		2 scoops (33g) in 200ml water	0.65	Vanilla, Chocolate	×	✓	✓	*Bacillus coagulans*	×
Horlicks Junior	376	12	74	40	5 Sucrose	4	40	3 spoons (23g) in 200ml milk	0.43	Chocolate, Vanilla	×	×	×	×	×
Horlicks Growth Plus	400	25	50	28	11 Sucrose	11		2 spoons (24g) in 200ml milk or water	0.49	Vanilla, Chocolate	×	×	×	×	×
Graduate	406	25	54	20	0	10	70	2 scoops (20g) in 100ml water	0.81	Vanilla, Chocolate	×	×	×	×	×

Abbreviations: DHA, docosahexaenoic acid; g, grams; kcal, kilocalorie; ml, millilitres

strawberry, and kesar badam were available in select product lines like Groviva and Pediasure.

Nutritional analysis revealed a mean energy density of 442 kcal per 100 g across all products, with values ranging from a low of 376 kcal per 100 g in Horlicks Junior to a high of 493 kcal per 100 g in Pediasure Advance Plus. Upon reconstitution according to manufacturer instructions, the caloric density of the liquid feeds exhibited substantial variability. While most standard polymeric formulas provided between 1.0 and 1.3 kcal/ml, specific outliers were observed: Groviva provided the highest caloric density at 1.42 kcal/ml, whereas milk-based additives like Horlicks Junior yielded significantly lower densities of approximately 0.43 kcal/ml.

Protein content averaged 16.9 g per 100 g but demonstrated a wide range. The highest protein concentrations were found in Horlicks Growth Plus and Graduate, both providing 25.0 g of protein per 100 g. Conversely, standard maintenance formulas like Peptamen Junior and Horlicks Junior contained lower protein quantities, ranging between 12.0 g and 12.9 g per 100 g.

Carbohydrate profiles showed the most heterogeneity, particularly regarding sugar content. The mean total carbohydrate content was 59 g per 100 g, ranging from 47 g (Groviva Advance) to 74 g (Horlicks Junior). Total sugar content varied drastically from 0 g to 45.6 g per 100 g, with an average of 27.6 g. Notably, formulations such as Incipro Gold, Groviva, and Groviva Advance contained zero total sugar. In contrast, Go Go Fuel, which is indicated for children between 4 to 7 years of age, contained the highest recorded total sugar at 45.6 g per 100 g, with added sugars contributing 36.3 g to this total. Groviva Advance and Incipro Gold had zero added sugars. Regarding specific sweetening agents, sucrose was identified as the predominant added sugar in the majority of formulations, including Pediasure, Prohance Junior, and Peptamen Junior, whereas Pediagold uniquely utilized fructose.

Total fat content displayed observable variability across the surveyed products, ranging from a low of 4.0 g per 100 g in supplement additives like Horlicks Junior to a high of 23.5 g and 23.4 g per 100 g in energy-dense clinical formulas such as Groviva Advance and Pediasure Advance Plus, respectively. While the majority of standard polymeric supplements provided between 15 g and 19 g of fat per 100 g, formulations often differentiated their lipid profiles through the inclusion of functional fats. On the other hand, Semi-elemental formulae mostly consist of medium chain triglyceride (MCT) and peptides with different chain lengths.

DHA was another common addition with most ONS containing 20 mg of DHA. Prohance Junior had the highest amount of DHA (100 mg). Pediasure does not contain DHA but adds 20 mg DHA as an additive nutrient in the advance versions of Pediagold Plus and Pediasure Advance Plus. On the one hand Groviva contains 90 mg of DHA, while on the other hand Groviva Advance has only 30 mg DHA. Horlicks Junior has 40 mg of DHA while makes no mention of DHA in Horlicks Growth Plus which is indicated for children between 3 to 9 years of age.

Analysis of functional ingredients highlighted the inclusion of specific additives to support immune and gut health. Probiotics were present in several formulations; for instance, Pediasure Advance Plus, Groviva Advance Plus, and Groviva contained *Lactobacillus acidophilus* and *Bifidobacterium lactis*, while Go Go Fuel included *Bacillus coagulans*. Nangrow had only *Bifidobacterium lactis* and Pediasure had only *Lactobacillus acidophilus*.

Regarding clinical suitability, approximately 44% of the products, including Pediagold, Pediagold Plus, and Peptamen Junior, were labeled as compatible with tube feeding. Furthermore, most products were gluten-free, and several, including Pediagold and Peptamen Junior, were lactose-free. Go Go Fuel was the sole product identified as vegan, utilizing a plant-based protein blend of pea protein isolate and pumpkin seed protein. Notably, Peptamen Junior is indicated for children with gastrointestinal intolerance.

4 Discussion

The present study provides a comprehensive characterization of pediatric ONS currently marketed in India, revealing a landscape defined by high caloric density but significant heterogeneity in macronutrient composition. Our analysis demonstrates that while these formulations generally meet the energy requirements necessary to support growth, substantial variations exist in protein quality and carbohydrate profiles, particularly regarding sugar content. Given that the Indian pediatric ONS market is growing rapidly, these findings are critical for clinicians who must navigate a "one-size-fits-all" marketing approach to select the most appropriate therapeutic option for individual patients.

A primary consideration in prescribing pediatric ONS is the balance between energy provision and protein intake for lean mass accretion. Our data show a wide range in protein density, from 12 g to 25 g per 100 g of ONS. Products at the upper end of this spectrum, such as Horlicks Growth Plus and Graduate, may be particularly beneficial for children recovering from undernutrition where catch-up growth is the priority. Children and adolescents require more protein to fulfill their growth and developmental needs. Also, compared to adults, children are more susceptible to high quality protein malnutrition. However, protein consumption of more than 15% of diet in childhood is associated with an increased risk of obesity in adult life[23]. According to the ICMR-NIN guidelines (2024), the recommended dietary allowance (RDA) for children aged 4-6 years is established at 1360 kcal/day of energy and 16 g/day of protein. For the 7 to 9 year age group, these requirements increase to 1700 kcal/day and 23 g/day, respectively[21].

While several products demonstrated high total or added sugar content per 100 g of powder, actual sugar exposure depends on dilution, serving size, and frequency of intake. The World Health Organization (WHO) recommends limiting free sugar intake to less than 10% of total daily energy intake, with further benefit below 5%, though specific thresholds for ONS are not defined. Among the analyzed formulations, Go Go Fuel exhibited the highest added sugar content, sweetened with natural sweetness from coconut sugar and fruit powders, with no added refined sugar; although, this value must be interpreted in the context of its lower recommended reconstitution concentration (33 g in 200 ml water) and older target demographic (4-7 years). Products with zero added sugar may be advantageous for children with obesity risk, metabolic concerns, or dental health issues.

Semi-elemental formulae mainly comprised of MCT and peptides. Although semi-elemental diets are slightly more costly than polymeric diets (formulations that contain intact protein, complex carbohydrates, and long chain triglycerides), they are frequently used because it is believed that they are more palatable than traditional elemental formulations and are better absorbed and tolerated in patients with malabsorptive conditions. Collectively, Indian pediatric studies published between 2020 and 2025 demonstrate that structured nutrition support ranging from ONS to semi-elemental and enteral formulas plays a critical role in preventing cumulative nutrient deficits across varying severities of pediatric illness and malnutrition[24].

The correlation between specific ingredients and age-based indications further highlights the targeted nature of these formulations. For instance, Go Go Fuel is explicitly marketed for children aged 4-7 years, a period often characterized by increased physical activity and selective eating; its formulation with plant-based proteins (pea and pumpkin seed) and *Bacillus coagulans* aligns with the growing demand for allergen-free and gut-health-oriented options in early school-age children. Similarly, Horlicks Growth Plus targets a broader age range of 3-9 years and can help to address growth faltering which is common in this demographic. Functional ingredients also mirror these specific needs; the inclusion of DHA in brands like Groviva and Nangrow supports the critical window of cognitive development[13], while encapsulated MCT in Peptamen Junior cater to children with complex gastro-intestinal intolerance who require easily absorbable fats[25].

A randomized controlled trial was conducted in 223 undernourished Indian children aged 2–12 years with picky eating habits and height-for-age and weight-for-height percentiles below the 25th percentile, who were randomized to ONS plus dietary counseling or counseling alone. At 6 months, the ONS group showed significantly greater improvements in height-for-age, weight-for-age, and mid-upper arm circumference percentiles (all $p < 0.0001$), alongside higher intakes of energy, protein, and carbohydrates and a superior protein-to-energy ratio. Improved nutrient adequacy indicates that ONS effectively addressed dietary gaps not fully corrected by counseling alone. The supplement was well tolerated, with no significant adverse effects, supporting ONS as a safe and effective strategy to promote catch-up growth and nutritional sufficiency in undernourished Indian children[26].

These ONS help ensure adequate energy, protein, and micronutrient intake, thereby preventing or correcting growth failure, weight loss, and nutrient deficiencies in vulnerable pediatric populations. Disease-specific formulations such as lactose-free, hydrolyzed, amino-acid-based, and MCT-rich formulas improve digestive tolerance, nutrient absorption, and metabolic stability, particularly in children with lactose intolerance, cow's milk protein allergy, malabsorption syndromes, chronic liver disease, or inborn errors of metabolism. Rational selection of formulas based on the child's condition reduces gastrointestinal symptoms, supports recovery, and promotes optimal growth. Overall, the benefit of these nutritional interventions lies in their ability to provide safe, targeted, and effective nutritional support, leading to improved clinical outcomes and better long-term growth and health in medically compromised children[10, 27, 28].

The primary benefit of this study lies in its utility as a comparative tool for evidence-based practice, bridging the gap between marketing claims and nutritional reality. By consolidating dispersed label data into a structured analysis, it empowers healthcare providers to prescribe nutrition that precisely matches the physiological demands of the pediatric patient, whether that involves maximizing protein for catch-up growth or minimizing sugar for metabolic management. However, this study is limited by its reliance on manufacturer-declared label information without independent laboratory verification. Discrepancies between labeled values and actual content can occur, and the bioavailability of added micronutrients remains a variable that label data cannot capture. Additionally, the study did not evaluate the cost-effectiveness of these products, which is a significant factor in long-term adherence.

5 Conclusion

Appropriate selection of ONS provides a safe and targeted nutritional support that enhances tolerance, corrects nutrient deficits, and promotes optimal growth and long-term health outcomes in children. Pediatric ONS marketed in India exhibit diverse nutritional profiles that offer both opportunities and risks for clinical management. While the availability of high-energy, palatable options supports the management of malnutrition, the high prevalence of added sugars in many standard formulations warrants vigilance. The emergence of condition-specific products, ranging from vegan, zero-sugar options to those enriched with probiotics and DHA, enables more personalized nutritional therapy. Future research should focus on analytical validation of these nutrient profiles and

clinical studies to evaluate the real-world efficacy of these distinct formulations on growth outcomes.

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