

Clinical Perspectives on Pediatric Malnutrition

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DESCRIPTION

Pediatric malnutrition remains one of the most significant global health challenges, affecting millions of children and contributing substantially to morbidity and mortality, particularly in low- and middle-income countries. It encompasses a broad spectrum of conditions arising from deficiencies, excesses, or imbalances in a child's intake of energy and nutrients. Clinically, malnutrition in children is not limited to undernutrition alone but also includes overweight and obesity, both of which can have serious long-term health consequences. The clinical perspective on pediatric malnutrition has evolved significantly over time, moving from a simplistic view of weight deficits to a more comprehensive understanding that includes growth patterns, micronutrient status, metabolic function, and underlying disease processes.

One of the primary manifestations of pediatric malnutrition is undernutrition, which includes wasting, stunting, and underweight conditions. Wasting refers to acute weight loss or failure to gain weight appropriately, often resulting from inadequate dietary intake or acute illness. Stunting, on the other hand, reflects chronic malnutrition and is characterized by impaired linear growth due to prolonged nutritional deficiencies and recurrent infections. Underweight is a composite measure that may reflect both acute and chronic malnutrition. Clinically, these conditions are assessed using anthropometric measurements such as weight-for-age, height-for-age, and weight-for-height indices. Early identification of these patterns is critical, as prolonged malnutrition can lead to irreversible developmental delays and increased susceptibility to infections.

Micronutrient deficiencies are another critical aspect of pediatric malnutrition that often go unnoticed in routine clinical practice. Deficiencies in iron, vitamin A, iodine, zinc, and vitamin D are particularly common and can have profound effects on growth, immunity, and cognitive development. Iron deficiency anaemia, for example, is one of the most widespread nutritional disorders in children and is associated with impaired cognitive performance, reduced physical endurance, and increased risk of infections. Vitamin A deficiency can lead to visual impairment and increased mortality from infectious diseases, while iodine deficiency is a major cause of preventable intellectual disability. Clinicians must maintain a high index of suspicion for these

deficiencies, especially in populations with limited dietary diversity.

The clinical evaluation of pediatric malnutrition requires a comprehensive approach that includes detailed history-taking, physical examination, and laboratory investigations. Dietary history provides insights into the quality and quantity of food intake, feeding practices, and potential cultural or socioeconomic constraints. Physical examination may reveal signs such as muscle wasting, edema, skin changes, hair abnormalities, and delayed developmental milestones. Laboratory tests, including haemoglobin levels, serum albumin, electrolyte profiles, and micronutrient assays, help in assessing the severity and underlying causes of malnutrition. In many cases, malnutrition is secondary to chronic illnesses such as congenital heart disease, gastrointestinal disorders, or endocrine abnormalities, which must be identified and managed concurrently.

The pathophysiology of malnutrition in children is complex and involves metabolic, immunological, and physiological alterations. In states of undernutrition, the body adapts by reducing basal metabolic rate and conserving energy, but prolonged deficiency leads to muscle breakdown, impaired immune function, and organ dysfunction. Immune suppression is particularly concerning, as it increases vulnerability to infections, which in turn exacerbate nutritional deficits, creating a vicious cycle. Gastrointestinal changes, including reduced enzyme activity and altered gut permeability, further impair nutrient absorption. These physiological changes highlight the need for careful and staged nutritional rehabilitation in affected children.

Management of pediatric malnutrition requires a structured and individualized approach based on severity and clinical presentation. In cases of severe acute malnutrition, stabilization is the first priority, focusing on treating infections, correcting dehydration, and managing electrolyte imbalances. Therapeutic feeding with specially formulated diets is introduced gradually to avoid complications such as refeeding syndrome. Ready-to-use therapeutic foods have revolutionized community-based management of severe malnutrition, allowing for effective outpatient treatment in many cases. In less severe forms of malnutrition, dietary counseling and supplementation are key

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components of management, with emphasis on energy-dense and nutrient-rich foods.

Hospital-based management is often required for children with complications such as severe infections, hypoglycaemia, hypothermia, or failure to respond to outpatient therapy. Multidisciplinary care involving pediatricians, dietitians, nurses, and social workers is essential for optimal outcomes. In addition to medical treatment, psychosocial support plays a crucial role in addressing underlying factors such as neglect, food insecurity, and caregiver education. Long-term follow-up is necessary to monitor growth recovery and prevent relapse.

The double burden of malnutrition, where undernutrition and over nutrition coexist within populations or even individuals, is an emerging clinical concern. Childhood obesity, a form of over nutrition, is associated with long-term risks such as type 2 diabetes, cardiovascular disease, and metabolic syndrome. This dual burden reflects rapid nutritional transitions in many societies, driven by changes in dietary patterns and physical activity levels. Clinicians must therefore adopt a balanced approach that addresses both ends of the nutritional spectrum.

Preventive strategies are central to addressing pediatric malnutrition at the population level. These include promoting exclusive breastfeeding during the first six months of life, ensuring timely introduction of complementary feeding, improving maternal nutrition, and enhancing food security.

Public health programs focusing on micronutrient supplementation, food fortification, and school feeding initiatives have shown significant benefits in reducing the prevalence of malnutrition. Education of caregivers about appropriate feeding practices is equally important in ensuring sustained nutritional improvement.

Socioeconomic determinants play a major role in the prevalence and severity of pediatric malnutrition. Poverty, lack of access to healthcare, inadequate sanitation, and limited education contribute significantly to poor nutritional outcomes. Addressing these broader determinants requires coordinated efforts across health, education, agriculture, and social welfare sectors. Clinicians must therefore consider malnutrition not only as a medical condition but also as a reflection of underlying social inequities.

CONCLUSION

Pediatric malnutrition is a multifaceted condition with profound clinical, developmental, and societal implications. Its management requires early identification, comprehensive clinical evaluation, and a multidisciplinary approach tailored to individual needs. Advances in nutritional therapy and public health interventions have improved outcomes, yet challenges persist, particularly in resource-limited settings.