

COMPREHENSIVE PEDIATRIC MALNUTRITION MANAGEMENT APPROACHES: FROM SCREENING TO MULTIDISCIPLINARY INTERVENTIONS

Abstract

The need of managing pediatric malnutrition with an integrated approach is emphasized in this chapter. Detection of at-risk children and rapid intervention depends on early screening and detection. To provide comprehensive care, a multidisciplinary team of medical experts including paediatricians, nutritionists, nurses, and psychologists works together. Both physical and underlying health concerns are addressed using integrated medical and dietary therapy. It is possible to follow the development and make required corrections with regular monitoring and assessment of nutritional status. In order to promote good eating habits and mental well-being, psychological and behavioral treatments are essential. Telemedicine is one example of how technology has improved access to healthcare and made remote monitoring and consultations possible. Patient outcomes are improved by the multidisciplinary team's effective communication and teamwork. Participating in outreach programs within the community raises awareness, knowledge, and support networks, ultimately raising the standard for the treatment of malnourished children. Healthcare professionals may successfully manage pediatric malnutrition using this all-inclusive strategy, improving results and long-term well-being.

Keywords: pediatric malnutrition; malnutrition management; Multidisciplinary Interventions; nutritional; psychological;

Authors

Dr. N. Meenakumari

Junior Resident
Government Ramanathapuram Medical
College
Ramanathapuram, Tamilnadu, India

Dr. A. Vasanth

Intern
Department of Pharmacy Practice
Arulmigu Kalasalingam College of
Pharmacy
Tamilnadu, India

Dr. J. Mohamed Ali

Clinical Research Consultant
Department of Clinical Research, Medics
Research
Tamilnadu, India
jabarali2009@gmail.com

I. INTRODUCTION

Pediatric malnutrition is a serious health problem that, if not treated right once, might have long-term effects [1][2]. In order to effectively manage pediatric malnutrition, this chapter focuses on the value of screening and early detection, the roles of healthcare professionals in multidisciplinary management, integrated medical and nutritional interventions, psychological and behavioral interventions, as well as innovations, collaboration, and community involvement. Pediatric malnutrition screening is essential for identifying at-risk children and for early intervention. Children's nutritional status is assessed using various techniques, such as anthropometric measures, nutritional evaluations, and lab testing. Early detection enables prompt action, greatly enhancing results and stopping further issues. [3]To manage childhood malnutrition, a multidisciplinary strategy including healthcare specialists from several disciplines is necessary. Together with other experts, pediatricians, dietitians, nurses, psychologists, and others, they offer complete treatment. The medical, nutritional, emotional, and behavioral facets of childhood malnutrition are dealt with in distinct ways by each profession. Each child will receive a comprehensive examination and a unique treatment plan. [4] Essential elements of the management strategy are integrated medical and dietary therapies. Nutritional therapies comprise individualized therapeutic meals based on individual requirements, while medical management techniques target underlying health issues that lead to malnutrition. Regular nutritional status monitoring and assessment are essential to determine the success of therapies and make the required corrections. Psychological and behavioral therapies are essential. Psychologists and other mental health experts provide counseling and assistance to address emotional issues and mental health. Healthy eating practices, a good body image, and adherence to treatment programs are encouraged via the use of behavioral modification techniques and family-based strategies. Technology advancements have completely changed how juvenile malnutrition is handled. Remote consultations, monitoring, and education are made possible through telemedicine and digital tools, increasing access to care and enhancing treatment results. The seamless coordination of care is made possible by effective collaboration and communication among multidisciplinary teams, which improves patient outcomes. Additionally, involving communities and putting outreach initiatives into place fosters awareness, education, and support networks, ultimately enhancing the general standard of care for malnourished children. In conclusion, the treatment of pediatric malnutrition necessitates a comprehensive approach that incorporates early detection, screening, multidisciplinary collaboration, integrated medical and nutritional interventions, psychological and behavioral support, as well as innovations, collaboration, and community involvement. Achieving better results and long-term well-being, such a strategy enables healthcare providers to recognize and treat pediatric malnutrition.[5] Let's go through the content in detail.

II. SCREENING AND EARLY DETECTION

1. Importance of Screening:

- Malnutrition is rapidly identified with early screening, allowing for immediate intervention measures.
- Early interventions can prevent further decline in nutritional status and reduce long-term effects.

- Screening identifies children at risk of malnutrition, enabling preventive measures to be implemented.
- Results are improved when therapy is customized to meet individual needs.
- By utilizing healthcare resources efficiently, early identification of malnutrition may be made more affordable.[1]

2. Methods of Screening:

- Anthropometric measurements: Weight, height or length, body mass index (BMI), and mid-upper arm circumference (MUAC) are all important anthropometric parameters in detecting and monitoring pediatric malnutrition. These measures provide important information about a child's development and nutritional state.[7]
 - **Weight measurement:** provides information about a child's current nutritional status and allows for monitoring changes over time. Weight-for-age, weight-for-height, and weight-for-length are commonly used indices to compare a child's weight with reference values, identifying deviations from expected growth patterns.
 - **Measurement of height or length:** represents linear growth and aids in determining stunting or growth retardation. A child's linear development is compared to age-specific standards using height- and length-for-age indices, which reveal any persistent aberrations that can point to chronic malnutrition or growth problems.
 - **BMI:** calculated by dividing weight in kilograms by the square of height in meters, is a widely used indicator to assess nutritional status and identify abnormal weight conditions such as underweight, overweight, or obesity. Deviations from reference BMI values can signify malnutrition or abnormal weight status.
 - **MUAC measurement:** particularly useful in resource-limited settings, involves assessing the circumference of the upper arm. It is effective in identifying acute malnutrition, like severe acute malnutrition (SAM). Specific cut-off values determine the classification of children as malnourished or not.[8]
- **Nutritional Assessments:** Nutritional assessments are essential in pediatric malnutrition for precisely assessing a child's nutritional state, detecting particular deficits or imbalances, and developing suitable therapies. These evaluations include a variety of approaches and instruments that give a thorough picture of a child's nutritional needs and problems. The following are important features of nutritional evaluations in pediatric malnutrition.
 - **Dietary Assessment:** This involves evaluating a child's food consumption to establish nutrient sufficiency. It might comprise dietary recalls every 24 hours, meal frequency surveys, or food diaries. These evaluations include information on the child's eating habits, nutrient intake, and any deficits.

- **Nutritional History:** A thorough history of a child's nutritional habits, including dietary preferences, food allergies, feeding challenges, and mealtime behaviors, can give significant information for assessing nutritional status.
- **Nutrient Intake Assessment:** Evaluating particular nutrient consumption, such as vitamins, minerals, and macronutrients, aids in identifying potential shortages or imbalances. This evaluation may entail evaluating dietary data or employing specialist tools for nutritional analysis.[4]
- **Laboratory Tests:** Laboratory tests are important in assessing pediatric malnutrition because they provide objective data on nutritional levels, identify particular deficiencies, and guide suitable therapies. The following laboratory tests are frequently used to assess nutritional status.
 - **Complete Blood Count (CBC):** A CBC measures several blood components such as haemoglobin, hematocrit, and red and white blood cell counts. It aids in the detection of anemia and offers information about the child's general health.
 - **Serum Albumin:** Serum albumin is a protein produced by the liver that represents the protein status of the body. Serum albumin levels that are low may suggest protein-energy deficiency and poor nutritional status.
 - **Micronutrient Analysis:** Specific micronutrient levels, such as iron, vitamin D, vitamin B12, zinc, and folate, may be measured in laboratories. These tests aid in the identification of deficits that may have serious consequences for a child's growth, development, and general health.
 - **C-Reactive Protein (CRP):** CRP is an acute-phase protein that signifies cellular inflammation. CRP elevations may indicate underlying infections or inflammatory disorders that might impair food metabolism and absorption.
 - **Liver Function Tests:** Liver function tests, which include enzyme measures such as alanine aminotransferase (ALT) and aspartate aminotransferase (AST), aid in assessing liver health, which is necessary for adequate nutrition processing and absorption.
 - **Renal Function Tests:** Evaluating renal function through tests such as blood urea nitrogen (BUN) and serum creatinine helps assess kidney health, which plays a role in maintaining electrolyte balance and excreting waste products.[4]

3. Early intervention's role in enhancing outcomes:

- Pediatric malnutrition may be quickly identified and treated with early intervention, preventing additional declines in the child's nutritional condition.
- By correcting dietary shortages during critical times, it supports optimum growth and development and lowers the risk of stunting and developmental delays.
- Early management reduces the risk of malnutrition-related consequences including weakened immunity and increased susceptibility to infections.

- It enhances treatment results by making it possible to apply medical, dietary, and behavioral therapies more successfully.
- Early intervention improves overall quality of life and has a long-term effect on a child's health and well-being by lowering the likelihood of chronic health issues.[4]

III. INTEGRATED MEDICAL AND NUTRITIONAL INTERVENTIONS

In order to effectively treat pediatric malnutrition, integrated medical and nutritional therapies are essential.[6] This strategy tackles underlying health issues while improving the child's nutritional status by integrating medical treatments and individualized food programs. A comprehensive approach to treatment is ensured by cooperative efforts among medical specialists, including nurses, dietitians, and pediatricians.[10] The evaluation of therapy efficacy is made possible by routine monitoring and assessment, which allows for modifications as needed. Education of the family and the caregivers is essential for meeting the child's dietary needs and promoting long-term management. In general, combined medical and nutritional therapies offer thorough treatment for pediatric malnutrition, treating both medical and nutritional issues to improve results.[9]

1. Medical management strategies for treating underlying illnesses: With a focus on treating underlying medical conditions that cause malnutrition, medical management strategies are a crucial component of integrated medical and nutritional interventions in pediatric malnutrition. These tactics are designed to boost nutrient absorption, promote overall health, and support the success of nutritional interventions. The following are important details about medical management techniques:

- **Detection and treatment of infections:** Infections can have a serious impact on a child's nutritional status. Medical management involves recognizing and treating infections that may affect appetite, nutrient absorption, and utilization, such as respiratory or gastrointestinal infections.
- **Management of Gastrointestinal Disorders:** Gastrointestinal disorders, such as malabsorption syndromes, reflux, or inflammatory bowel disease, can impair nutrient absorption and lead to malnutrition. For the purpose of maximizing nutrient absorption and promoting healthy gastrointestinal function, medical management strategies involve the diagnosis and treatment of these conditions.
- **Correction of Metabolic Abnormalities:** Metabolic abnormalities, such as metabolic acidosis or electrolyte imbalances, can result from several underlying medical disorders in children with malnutrition. To promote adequate nutrition metabolism and enhance general health, medical care focuses on recognizing and addressing these anomalies.
- **Treatment for Nutritional deficits:** Integrated therapies focus on a variety of nutritional deficits that cause malnutrition. To address deficiencies and promote healthy growth and development, medical treatment options may include the prescription of particular vitamin or mineral supplements, such as iron, vitamin D, or zinc.

- **Monitoring and Follow-up:** Medical management includes routine monitoring and follow-up in order to evaluate the efficacy of therapies, track development, and make necessary modifications. The child's general health is regularly evaluated and any underlying medical issues are appropriately addressed with ongoing medical monitoring.[12]
- 2. Nutritional interventions and therapeutic diets tailored to individual needs:** These interventions are intended to provide adequate nutrition, correct nutrient deficiencies, promote growth and development, and promote overall well-being. The following are significant points about nutritional treatments and therapeutic diets:
- **Individualized Dietary Plans:** Nutritional therapies include designing personalized dietary plans based on each child's distinct needs. Age, weight, growth trajectory, underlying health concerns, and nutritional needs are all aspects considered in these regimens. Individualized techniques guarantee that each child obtains the nutrients he or she requires in sufficient quantities for maximum growth and recovery.
 - **Nutrient-Dense Foods:** Therapeutic diets in pediatric malnutrition focus on providing nutrient-dense foods to meet increased nutrient needs. Protein, carbohydrates, healthy fats, vitamins, and minerals are frequently included in these diets. Nutrient-dense meals aid in the treatment of nutrient deficits and promote overall nutritional rehabilitation.
 - **Specialized Formulas:** Specialized formulations may occasionally be provided as a part of nutritional intervention. These formulas can be used for children who have severe malnutrition, feeding issues, or unique nutritional requirements since they are made to fit specific nutritional needs (e.g., High-Protein Formulas).
 - **Gradual Rehabilitation:** A gradual rehabilitation strategy is frequently used in pediatric malnutrition nutritional therapy. This strategy enables a gradual increase in calorie intake, ensuring that the child's body can adjust to the increased nutritional supply and avoid issues like refeeding syndrome.
 - **Ongoing Monitoring and Adjustment:** Nutritional interventions require regular monitoring and assessment to evaluate the child's response to the therapeutic diet. This monitoring assists in determining whether dietary modifications are required to ensure appropriate nutrient intake and promote ongoing growth and development.[13]
- 3. Monitoring and evaluating nutritional status:** Regular assessment enables healthcare professionals to monitor the child's development, modify the treatments as needed, and guarantee the best results. The following are important considerations for monitoring and assessing nutritional status:
- Anthropometric measurements are used to assess growth and nutritional status.
 - Dietary intake assessment methods, including 24-hour dietary recall, food frequency questionnaires, or food diaries, provide insights into nutrient intake.

- Biochemical markers, such as blood tests, measure specific nutrients and indicators of inflammation or organ function.
- Clinical assessment evaluates signs of malnutrition, muscle wasting, edema, skin changes, and functional indicators like appetite and cognitive development.
- Regular follow-up visits allow healthcare professionals to monitor progress, evaluate interventions, and make necessary adjustments to the treatment plan.[13]

IV. MULTIDISCIPLINARY MANAGEMENT

1. Roles and Responsibilities of Healthcare Professionals: Collaboration between healthcare experts from diverse disciplines is necessary for the comprehensive therapy of pediatric malnutrition. In order to provide complete treatment, pediatricians, nutritionists, nurses, psychologists, and other professionals each have specific roles and duties. The following are the primary responsibilities that medical practitioners do in the multidisciplinary treatment of pediatric malnutrition:

- **Pediatricians:** Assess nutritional status, coordinate treatment, and manage medical disorders.
- **Dietitians:** Determine nutritional requirements, create tailored dietary programs, and guide parents.
- **Nurses:** Support medical operations, administer medications, and provide nutritional assistance.
- **Psychologists and mental health professionals:** Address psychological and behavioral aspects, and offer counseling and support.
- **Other experts:** Include social workers, occupational therapists, and specialists in managing underlying medical conditions and addressing feeding issues.

2. Collaboration of Healthcare Professionals:

Effective management of pediatric malnutrition requires cooperation among healthcare practitioners. Pediatricians, nutritionists, nurses, psychologists, and other medical specialists collaborate to offer complete treatment for malnourished children. They combine their knowledge and skills to evaluate the child's physical and mental health as well as his or her dietary requirements. By working together, they may create customized treatment plans, keep track of the kid's development, take care of underlying medical issues, assist the child's dietary needs, and give counseling and support to the child and their family. In managing pediatric malnutrition, this collaborative approach ensures that all facets of the child's health and well-being are taken into account.[4]

V. PSYCHOLOGICAL AND BEHAVIORAL INTERVENTIONS

The following are the common psychological and behavioral issues linked to childhood malnutrition:

1. **Depression:** Children who are malnourished may be more susceptible to depressive symptoms including sadness, hopelessness, and fatigue.
2. **Anxiety:** Worry, fear, and nervousness are some of the symptoms of anxiety that children with malnutrition may be more prone to suffer.
3. **Social withdrawal:** Children who are undernourished may stop participating in and interacting with social situations.
4. **Irritability:** Malnourished children may be more easily disturbed and have trouble managing their emotions.
5. **Feeding issues:** Children who are malnourished may have trouble eating or may even refuse to eat at all.[8]
6. **Ways to Overcome:** The psychological and behavioral effects of childhood malnutrition can be treated in a variety of ways. These consist of:
 - **Psychotherapy:** Addresses emotional and psychological aspects through therapeutic techniques like cognitive-behavioral therapy, psychodynamic therapy, and play therapy. Involves parents/caregivers for family-based approaches, fostering communication and healing. Treats underlying causes and promotes a healthy relationship with food.
 - **Behavioral treatment:** Targets and modifies eating habits and related issues through strategies like positive reinforcement and cognitive restructuring. Identifies unhealthy behaviors and replaces them with healthier alternatives. Encourages positive changes in eating habits.
 - **Family therapy:** Focuses on family dynamics, fostering open communication, and resolving underlying issues. Offers guidance on nutrition-related challenges. Creates a supportive environment for the child's well-being by involving the entire family.

In order to ensure a complete recovery, it is crucial to treat the psychological and behavioral elements of pediatric malnutrition. Children with this illness can overcome their emotional issues and reach their full potential by receiving the proper therapy.

In the treatment of pediatric malnutrition, it is important to promote good eating habits and a positive body image. The following are some key points:

- **Nutrition Education:** Giving children and their families nutrition education helps them realize the necessity of eating a balanced and healthy diet. It includes educating about food choices, portion sizes, and the advantages of eating a range of nutrient-dense foods.
- **Meal Planning and Structure:** Establishing good eating habits begins with establishing an organized mealtime schedule that includes regular, balanced meals and snacks. This entails consuming a diverse range of meals from various dietary categories as well as ensuring enough calorie and nutrient intake for optimal growth and development.
- **Positive Food Environment:** Promoting a peaceful and pleasurable mood during meals is one way to promote a positive food environment. Encouraging family dinners, minimizing distractions (e.g., screens), and involving children in meal preparation can all help youngsters develop good connections with food and mealtimes.
- **Body Positivity and Self-Acceptance:** Promoting self-acceptance and admiration of one's body at whatever size or form is part of encouraging positive body image. Emphasizing that health and well-being may take many forms helps in the prevention of negative body image disorders and harmful eating connections.
- **Supportive Counseling:** Counseling or assistance from healthcare experts, psychologists, or registered dietitians assists in addressing any psychological concerns impacting eating patterns and body image. It provides a secure environment in which to address issues and devise methods for improving body image and supporting healthy eating habits.[6]

VI. INNOVATIONS, COLLABORATION, AND COMMUNITY ENGAGEMENT

Innovations, collaboration, and community engagement are crucial in tackling pediatric malnutrition. Healthcare professionals, researchers, and communities collaborate to explore new techniques, encourage teamwork, and involve the community. By leveraging technology, interdisciplinary collaboration, and community involvement, we can enhance access to care, improve treatment outcomes, raise awareness, and establish support networks. These efforts aim to ensure the well-being and future of children affected by malnutrition.

1. Integration of Technologies:

- **Mobile Health (mHealth) Applications:** Mobile health applications enable caregivers and healthcare practitioners to monitor and track a child's nutritional status, food intake, growth measurements, and treatment plan adherence. These applications frequently include individualized recommendations, instructional tools, and reminders, allowing families to actively engage in pediatric malnutrition management.
- **Telemedicine and Digital Health:** By combining telemedicine and digital health technology, remote consultations, monitoring, and education are possible. This

vention expands access to specialist treatment, particularly in distant or underdeveloped locations, and allows healthcare professionals to deliver prompt interventions and support to malnourished children.

- **Wearable gadgets and Sensors:** Wearable gadgets and sensors provide novel ways to monitor a child's physical activity, sleep habits, and nutritional intake. These gadgets collect data in real-time, allowing healthcare experts to gain insight into a child's lifestyle and provide informed recommendations for improving eating habits and general well-being.
- 2. Collaboration and communication within multidisciplinary teams:** Multidisciplinary collaboration is vital for comprehensive care in pediatric malnutrition. A team consisting of pediatricians, dietitians, nurses, psychologists, and social workers ensures a holistic approach to assessment and treatment. Integrated therapies addressing dietary, medical, psychological, and social aspects are facilitated through effective communication. Collaborative decision-making and open communication enable treatment adaptation, coordinated care, and improved outcomes. Here are some Community engagement and outreach programs which play a crucial role in enhancing care for pediatric malnutrition:
- **Awareness and Education:** Community involvement helps raise knowledge about the prevalence, causes, and effects of malnutrition in children. Families, caregivers, and community members may learn about adequate nutrition, early diagnosis, and the necessity of getting medical treatment on time through educational efforts. Increased awareness can lead to earlier detection and intervention, resulting in better results for malnourished children.
 - **Support Networks:** Community involvement helps the formation of support networks for malnourished children's families and caregivers. Support groups, counseling services, and peer-to-peer interactions provide a forum for sharing experiences, offering emotional support, and exchanging knowledge on successful pediatric malnutrition management practices. These networks can assist to alleviate feelings of loneliness and enable families to take an active role in their child's care.[11]
 - **Collaborative Partnerships:** Community involvement includes working with local groups, schools, healthcare providers, and government agencies. Resources and knowledge may be pooled through collaboration to execute effective outreach programs such as nutrition education campaigns, screening efforts, and community-based treatments. Collaboration increases the effectiveness of therapies and ensures a coordinated approach to managing pediatric malnutrition.
 - **Sustainable Interventions:** Community involvement and outreach programs contribute to long-term interventions by incorporating community people in initiative conception, execution, and assessment. Empowering communities to take ownership of nutrition-related challenges and solutions improves initiatives' long-term efficacy and sustainability.[12]

VII. CONCLUSION

The management of pediatric malnutrition requires a comprehensive and multidisciplinary approach. Early screening and detection are essential in identifying at-risk children and allowing for timely intervention. Pediatricians, dietitians, nurses, psychologists, and other healthcare professionals work together to deliver integrated medical and nutritional interventions. Addressing emotional factors in pediatric malnutrition requires psychological and behavioral assistance, as well as fostering good eating habits and a positive body image. Innovations such as the integration of technology and telemedicine improve access to care and monitoring. Furthermore, coordination and communication across multidisciplinary teams promote coordinated and comprehensive care for malnourished children. By involving communities and establishing outreach activities, we can raise awareness, educate people, and build support networks, ultimately enhancing the overall level of care. Healthcare practitioners may improve results, promote long-term well-being, and effectively address the difficulties of pediatric malnutrition by combining these techniques and strategies.

REFERENCES

- [1] De Onis M, Blossner M, World Health Organization. WHO global database on child growth and malnutrition. World Health Organization; 1997.
- [2] Bhutta ZA, Berkley JA, Bandsma RH, Kerac M, Trehan I, Briend A. Severe childhood malnutrition. *Nature reviews Disease primers*. 2017 Sep 21;3(1):1-8.
- [3] Carter LE, Shoyele G, Southon S, Farmer A, Persad R, Mazurak VC, Brunet Wood MK. Screening for pediatric malnutrition at hospital admission: which screening tool is best?. *Nutrition in Clinical Practice*. 2020 Oct;35(5):951-8.
- [4] Mehta NM, Corkins MR, Lyman B, Malone A, Goday PS, Carney L, Monczka JL, Plogsted SW, Schwenk WF, American Society for Parenteral and Enteral Nutrition (ASPEN) Board of Directors. Defining pediatric malnutrition: a paradigm shift toward etiology-related definitions. *Journal of Parenteral and Enteral Nutrition*. 2013 Jul;37(4):460-81.
- [5] World Health Organization. (2013). Guideline: Updates on the management of severe acute malnutrition in infants and children. <https://www.who.int/publications/i/item/9789241506328>.
- [6] Worku BN, Abessa TG, Wonda frash M, Vanvuchelen M, Bruckers L, Kolsteren P, Granitzer M. The relationship of undernutrition/psychosocial factors and developmental outcomes of children in extreme poverty in Ethiopia. *BMC pediatrics*. 2018 Dec;18:1-9.
- [7] Hulst JM, Huysentruyt K, Joosten KF. Pediatric screening tools for malnutrition: An update. *Current Opinion in Clinical Nutrition & Metabolic Care*. 2020 May 1;23(3):203-9.
- [8] Klanjsek P, Pajnikihar M, Varda NM, Brzan PP. Screening and assessment tools for early detection of malnutrition in hospitalised children: a systematic review of validation studies. *BMJ open*. 2019 May 1;9(5):e025444.
- [9] Black RE, Victora CG, Walker SP, Bhutta ZA, Christian P, De Onis M, Ezzati M, Grantham-McGregor S, Katz J, Martorell R, Uauy R. Maternal and child undernutrition and overweight in low-income and middle-income countries. *The lancet*. 2013 Aug 3;382(9890):427-51.
- [10] Duggan C, Watkins JB, Koletzko B, Walker WA, editors. *Nutrition in pediatrics: basic science, clinical applications*. PMPH USA, Ltd; 2016 Jun 21.
- [11] Lock J, Le Grange D. *Treatment manual for anorexia nervosa: A family-based approach*. Guilford publications; 2015 Jun 22.
- [12] World Health Organization. *Infant and young child feeding: model chapter for textbooks for medical students and allied health professionals*. World Health Organization; 2009.
- [13] World Health Organization. *Community-based management of severe acute malnutrition: a joint statement by the World Health Organization, the World Food Programme, the United Nations System Standing Committee on Nutrition and the United Nations Children's Fund*. World Health Organization; 2007.