

Nutritional Requirements for Children

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Abstract

The supply and utilisation of nutrients are of greater biological relevance during early childhood than during any other period of life. The nutrient supply must cover maintenance requirements and the needs for physical activity. Children need large additional energy and substrate intakes for body growth. Healthy new-born infants double their body extremely rapidly in only 4-5 months after birth, and in preterm infants even in only about 6 weeks, which requires a very high substrate supply per kg bodyweight. The quantity and quality of nutrient supply during early life modulates the differentiation of tissues and organs and has short- and long-term consequences for health.

The rapid growth of infants and children, who double their body weight within only 6 weeks in utero and within 4-5 months after birth, respectively, depends on very large nutrient supplies per kg body weight. Healthy young infants need about 3 times more energy per kg body weight than adults, primarily due to the added metabolic requirements for growth. Premature infants who grow at rates similar to normal intrauterine growth have even greater metabolic needs.

Keywords: Macronutrients; Micronutrients; Deficiency; Injurious impact; CHO; Fats; Protein; Minerals.

Introduction

Nutrition is the science that interprets the interaction of nutrients and other substances in food in relation to maintenance, growth, reproduction, health and illness of an organism. Poor diet may have an injurious impact on health causing deficiency diseases. Nutrition the process of providing or obtaining the food necessary for health and growth.

Nutrients

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Nutrients are of Two Types

- Macronutrients, which are needed in larger amounts (CHO, fats, protein and water).
- Micronutrients, which are needed in smaller amounts (minerals and vitamins)

Nutrients Primary Functions

- **Water:** Dissolves and carry nutrients, removes waste and regulates body temperature.
- **Protein:** Builds new tissue, antibodies, enzymes hormones and other compounds.
- **CHO:** Provides energy.
- **Fat:** Provides long term energy insulation and protection.
- **Vitamins:** Facilitate use of other nutrients involved in regulating growth and manufacturing hormones.
- **Minerals:** Helps in growth of bones and teeth, aid in muscle function and nervous system activity

Nutritional Requirements in Children

Water and Calories

Age Range	Water Requirements	Calories Requirements
3 Days	80 – 100 ml/kg	120 cal/kg
3 – 10 Days	125 – 150 ml/kg	120 cal/kg
15 Days – 3Month	140 – 160 ml/kg	120 cal/kg
3 – 12 Months	150 ml/kg	105-110 cal/kg
1 – 3 Years	125 ml/kg	100 cal/kg
4 – 6 Years	100 ml/kg	90 cal/kg
7 – 9 Years	75 ml/kg	80 cal/kg
10 – 12 Years	50 ml/kg	70 cal/kg
13 – 15 Years	50 ml/kg	60 cal/kg
16 – 19 Years	50 ml/kg	50 cal/kg

Proteins

Age Range	Protein Allowance
0 – 3 Months	2.3 (Milk Protein)
3 – 6 Months	1.8 (Milk Protein)
6-9 Months	1.65 (Mixed Protein)
9 – 12 Months	1.5 (Mixed Protein)
1 – 3 YEARS	1.83gm/day
4 – 6 YEARS	1.52gm/day
7 – 9 YEARS	1.48gm/day
MALES	
10 – 12 YEARS	1.40gm/day
13 – 15 YEARS	1.31gm/day
16 – 18 YEARS	1.45gm/day
FEMALES	
10 – 12 YEARS	1.46gm/day
13 – 15 YEARS	1.33gm/day
16 – 18 YEARS	1.21gm/day

Carbohydrates

- CHO are main source of energy and supply bulk in the diet.
- They contribute taste and are essential for digestion and absorption of other foods.
- Carbohydrates play an important part, in infant nutrition as they spare proteins to be fully utilized for growth and various repair process.
- All CHO are ultimately oxidized and converts to glucose.
- Glucose is used as fuel by brain and muscle or converted to glycogen and stored in liver and muscle.
- Sources of carbohydrate in infants' diet is found in the form of lactose in both human

and cow's milk that should be provided up to 6 months.

- Lack of adequate CHO may produce symptoms of starvation, undernutrition, constipation, loss of body protein.

Fats

- Fat supplies 40 - 50% energy needed for the infant.
- It provides protection and support for organs and insulation of the body as adipose tissue.
- It as carrier of fat-soluble vitamins.
- Fats and oils are concentrated sources of energy and make the foods palatable.
- Fats and oils are termed as lipids.

Saturated fats: Animal sources such as meat, eggs, milk and dairy products.

Unsaturated fat: Commonly found in plant and fish (poly unsaturated), peas, beans, whole cereals, nuts, cooking oil.

- Fatter intake in diet can cause indigestion as it remains longer in the stomach.
- Deficiency of all fatty acids may result in growth retardation, skin disorders, susceptibility to infections, neurological and visual problems.
- ICMR has recommended a daily fat intake of 25 gm/ day in young children and 22 gm/ day in older children.

Vitamins

Vitamins are organic substances and essential micro nutrients for maintenance of normal health. Vitamins enables the body to use other nutrients and help in maintenance and protection of good health.

Vitamins are Classified Into Two Groups

1. Fat soluble vitamins
 2. Water soluble vitamins
- Vitamin requirement of individual child may vary with activity, age, body weight.
 - Vitamin requirement is more in preterm babies; infant get adequate vitamins from mother during lactation.

Minerals

- Minerals are inorganic element a, required by human body for growth, repair and regulations of vital body functions.

- A well-balanced diet is a sufficient quality of minerals.
- Minerals are required for maintenance of osmotic pressure, supply of necessary electrolytes. Minerals are classified into microminerals when the daily requirement is 100 mg or and micro minerals when the daily requirement is less than 100 mg.
- Iodine 0.2 mg
- Sodium 2 meq/kg
- Potassium 1.5 meq/kg
- Zinc 0.3 mg/kg
- Copper 0.5 -1 mg/kg
- Fluorine 0.5 - 1 mg/kg

Importance of Nutrition

Guidelines for Pediatric Nutrition

- Infant should be exclusively breastfed for first 6 months.
- After 6 months provide nutrients which are easily digestible.
- Contains various antibodies which help to build immune systems.
- Never overfeed or force the child to eat.
- Introduce new foods at regular intervals to increase acceptance of few foods.
- Provide small frequent meals.
- Provide food in colourful and appealing way.
- Balance food with physical activity.
- Provide plenty of grains, fruits and vegetables, low fat dairy products
- Never stop breakfast.
- Involve the child in making food choices.

Nutritional Counselling for Children

The important responsibility of the paediatric nurse is to provide nutritional counselling and guidance to the parents and also to the children, with the goal of achieving optimum nutrition throughout the year of growth and development.

At 6 Months: Complementary feeding to be initiated with fruit juices and then new foods to be introduced with vegetable soup, mashed banana, mashed and boiled potato ect. Each food should be given with one or two teaspoons at first for 3 to 6 times per day.

6 to 9 Months: Food items given in this period include soft mixture of rice and dal, khichadi, pulses, mashed and boiled potato, bread or roti soaked in milk or dal, mashed fruits like banana, mango, papaya, stewed apple etc. Egg yolk can be given from 6 to 7 months onwards Curd or khir can be introduced from 7 to 8 months onwards.

9 to 12 Months: New food items like fish, meat, chicken can be introduced during this period. Feeds should be soft and well-cooked Spices and condiments to be avoided Breastfeeding to be continued.

12 to 18 Months: The child can take all food cooked in family and needs half amount of mother's diet. Number of feeds can be 4 to 5 times or according to the child's need. Breastfeeding to be continued, especially at night.

Conclusions

Adequate knowledge, attitude and practices of application of nutritional requirements must be the basis of infant feeding. The health and nutritional status of an infant and subsequent growth and development through childhood depends upon successful feeding practices. Nutritional counselling is the important responsibility of the nurse to promote the nutritional status of the children and to prevent nutritional deficiency diseases.

References

1. Barker D.J. Maternal and foetal origins of coronary heart disease. J R Coll Physicians Lond. 1994 Nov-Dec; 28: 544.
2. Eeckels R. Vuylsteke J. Influence of nutritional status on child mortality in rural Zaire. Lancet. 1993; 341: 1491.
3. Corey M. McLaughlin F. J. Williams M. Levison H. A comparison of survival, growth, and pulmonary function in patients with cystic fibrosis in Boston and Toronto. J Clin Epidemiol. 1988; 41: 583.
4. Aggett P. Bresson J. Haschke F. Hernell O. et al. Recommended Dietary Allowances (RDAs), Recommended Dietary Intakes (RDIs), Recommended Nutrient Intakes (RNIs), and Population Reference Intakes (PRIs) are not "recommended intakes". J Pediatr Gastroenterol Nutr. 1997; 25: 236.
5. German Nutrition Society (DGE), Austrian Nutrition Society (ÖGE), Swiss Society for Nutrition Research (SGE), Swiss Nutrition Association (SVE). Reference Values for Nutrient Intake. 1st ed. 3-8295-7114.