SOME ASPECTS OF INFANT FEEDING

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Contents

- Introduction
- Importance of proper nutrition in the infant
- Breastfeeding
- Nutritional requirements of infants
- Introducing solid food
- Vitamin requirements and supplementation
INTRODUCTION

- Adequate intake of food to meet all the nutritional requirements is of paramount importance during infancy.
- Recommendations and practices of feeding solid foods to infants can vary widely among doctors and parents.
- Though bottle-feeding is generally safe nowadays, the risks of infection, contamination as well as wrongly reconstituted milk are still present.
- There are a number of feeding practices that are harmful to the babies. These should be corrected and they include the use of fresh milk, early introduction of solids and other unnecessary supplements.
- Healthy and good eating habits should be cultivated when the children are young and infancy is the most appropriate age for nurturing good feeding habits.

IMPORTANCE OF PROPER NUTRITION IN THE INFANT

1. The first year of life is characterised by rapid growth and changes in body composition.
2. Adequate nutrition is required to promote optional growth and development, prevent illness, and promote health that will allow the infants to interact and explore their environment actively.
3. Infant nutritional requirements are different from those of adults.
4. Fat mass is primarily used for energy when diet is inadequate.
5. Bone contains a reserve of calcium, phosphorous and other minerals.
6. The following are a few working rules about healthy infant growth:

Weight

Infants double their birth weight at about 4 months i.e. during the first 4 months (excluding the first 10 days) healthy infants put on an average of about 25-30g/day.

Infants triple their birth weight at about 12 months i.e. they put on an average of 12.5-15g/day from 5-12 months.

Length

The length of normal full term infant is about 50cm. During the first year, infants grow about 25 to 30cm and an additional 12cm is attained by 2 years of life.

Head circumference

The average head circumference of normal term infant is about 35cm. There is a 5cm increment during the first 3 months after birth and additional 6cm increment during the later part of first year.
BREASTFEEDING

The advantages of breastfeeding are well known and shall not be elaborated. However there are a few points to note for breastfeeding.

1. Success in breastfeeding is enhanced by early initiation. The baby should be offered the breast immediately after birth. No test feeding with water is necessary among normal newborns who do not have excessive secretion and have good Apgar scores.

2. Breastfeeding is an infant driven process. Feeding should not be more than 4 to 5 hours apart. This is important to prevent dehydration, to provide adequate nutrition to the infants and to stimulate milk production.

3. Finishing off a feed with water, formula milk or glucose water is a recipe for lactation failure.

4. The average infant nurses every 2 hourly for up to 10 to 12 feedings a day. Gastric emptying time with human milk is about 90 minutes whereas with infant formula, it is more than 3 hours.

NUTRITIONAL REQUIREMENT OF INFANTS

• The Recommended Dietary Allowances (RDAs) are the intake of essential nutrients that are adequate to meet the known nutritional needs of practically all healthy persons. They are based on the average daily amount of nutrients that a population group should consume over time and are not the requirements for specific individuals.

• Energy requirements per kilogram of body weight gradually decline throughout infancy as a result of decreases in basal metabolic rate per kilogram and growth rate. The percentage of energy intake used for growth decreases from about 27% at birth to about 5% by 1 year of age.

• Human milk and infant formula provide approximately 90 ml of preformed water in each 100ml. In addition, the combustion of 1 gram of protein, fat and carbohydrate yields 0.41 ml, 1.07 ml and 0.55 ml of water respectively. Therefore, in human milk and formula milk, preformed and oxidation water amount to approximately 95% of volume consumed.

Carbohydrates

• The main carbohydrate in milk and formulas is lactose and carbohydrates usually comprise 35% to 65% of the total energy intake of term infants.

• Hypoallergenic formulas and soy milk contain sucrose, maltose, glucose polymers and dextrins as the carbohydrate source.
• Soy and other formulas that are lactose free are appropriate choice for infants with lactose intolerance.
• The digestion of maltose and glucose polymers does not need lactase and sucrase. Hence, such formulas are usually used for infants with severe mucosal injury and in other situation in which lactase and sucrase activities are expected to be low.

**Fat**
• 30% to 55% of the total energy intake is from fat and 2.7% from linoleic acid. The fat content of infant formula is derived from a variety of long chain vegetable triglycerides such as soy, iron and sunflower oil and from medium-chain triglycerides. Linoleic acid is found only in long-chain vegetable oils. Breast milk contains 8% to 10% of total calories as linoleic acid.

**Protein**
• The protein from commercial formulas is from cow protein. Several recently developed infant formula contain whey/casein ratio of 60:40 that is closer to the amino acid composition of human milk.
• It is recommended that 7% to 16% of total energy be derived from protein or 1.6 to 2.2g/kg/day. Healthy term infants may grow well with a protein intake slightly below 1.6g/kg/day.
• In infants with strong family history of atopy, breast-feeding or the use of hypoallergic formulas should begin from birth and continue for about 6 months.
• Though soy formulas are commonly prescribed, their role in the management of severe cow’s milk protein allergy is limited.
• Predigested formulas in which the proteins are broken down into small peptides are more suitable for feeding children with protein allergy. However they are more costly and not palatable.

**Minerals**
• It is recommended that a dietary calcium/phosphorous ratio of between 1:1 and 1:2 is more optimal for calcium absorption.
• Iron deficiency is the most common cause of anaemia in infant and children. In healthy term infants, there is no need for exogenous iron for babies from birth till 4 months of age.
• Iron deficiency is rare in the first four months unless there has been substantial loss of iron through perinatal and subsequent blood loss.
• Although human milk may contain not more than 0.3 mg iron per titre, about half of it is absorbed in contrast to the much smaller proportions that are absorbed from other foods.
**INTRODUCING SOLID FOOD**

**Age schedule for introducing solid food**

- <4 months : Breast milk or formula only
- 4 to 6 months : iron fortified cereal
- 6 to 7 months : fruits (strained, mashed), cup introduced
- 7 to 8 months : vegetables (strained or mashed)
- 8 to 9 months : finger food (eg. Banana, crackers), chopped baby food
- 9 months : meat and citrus food
- 10 to 12 months : Bite size cooked food
- 12 months : All table food

**Solid food**

- The timing for introduction of solid food should be based on the individual infant’s growth and neuromuscular development. Infants do not have the oral motor skills to consume solid food or take from a spoon until they are 4 to 6 months of age.
- The rule is to begin with single-ingredient foods and add one at a time. One new, single-ingredient food should be introduced every 3 to 5 days.
- Rice cereal is commonly the first food added during weaning because rice is the least allergic. However, the sequence of introducing food is not critical.
- Dry baby cereal diluted 1:6 by weight with milk provides approximately 108 cal/dl; diluted 1:6 with water, 52 cal/dl.
- Four level tablespoons of dry infant cereal fortified with iron, thiamine, riboflavin, niacin, calcium and phosphorus, and diluted with milk or formula provide approximately 7 mg of iron, of which 1-2% is absorbed.
- Provide solids with textures that are compatible with infant’s ability to chew and swallow.
- There is no need to add salt or sugar to baby foods.
- Solids should be fed to the infant with a spoon and not in a bottle.
- Canned foods that contain large amount of salt and sugar are unsuitable for the use in the home preparation of infant food.
- Eggs and wheat should be avoided during the first 6 to 9 months of age to minimize the possibility of an allergic reaction.
- Unsweetened fruit juice should be introduced when the infant can drink from a cup and not from bottle.

**VITAMIN REQUIREMENT AND SUPPLEMENTATION**
• The content of most commercial infant formulas is adequate to meet the requirements of most healthy infants.
• Vitamin supplementation may be necessary for infants whose milk intake is inadequate or when steatorrhoea is present. Prescribed medication may affect vitamin absorption or utilization and makes supplementation necessary.
• Vitamin K is effective in the prophylaxis against haemorrhagic disease of the newborn. It should be given as a single intramuscular dose of 0.5 to 1 mg or as an oral dose of 1 to 2 mg. Rarely, the dose may have to be repeated after 4 to 7 days.
• Multivitamin supplements should be given to breast-fed infants whose mothers are malnourished.
• Vitamin content of breast-milk is low. Vitamin D supplement (400 IU/d) is recommended for fully breast fed infants.
• Vitamin A deficiency rarely occurs in breast-fed infants.

Infants consuming adequate amount of commercial iron-containing formulas do not need vitamin and mineral supplementation in the first six months.