

Nutrition during Infancy and Early Childhood

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This includes

- Adequate nutrition during pregnancy
- Promotion of breastfeeding
- Proper weaning
 - Balanced foods with enough protein/calories
 - Food safety
 - Correct weaning techniques
- Good nutrition during pre-school years

Costs of Malnutrition: Mother

- Maternal malnutrition was one of the most important factors contributing to death during pregnancy or childbirth (Mitra & Choudry 2002)
- Over 100,000 women worldwide die each year as a result of iron- deficiency anemia alone (UNICEF 2004)
- Deficiencies of iodine, folate, vitamin A, zinc, and protein also dramatically increase risk of maternal and infant mortality

Costs of Malnutrition: Child

- Preterm birth
- Infant mortality
- Low birth weight
- Growth retardation
 - Stunting
 - Low IQ
- Developmental delays
 - Physical and mental
- Predisposition to diseases
- Reduced earning capacity: up to 10% decrease in life long earnings (World Bank, 2006)

Cost of Malnutrition: Society

- Increased health care costs
- Degradation of human resources
 - Late schooling
 - Lower level of education and technical skills
- Disruption of family life
 - More time/money spent taking care of sick child
- Lower GDP: 2-3% loss (World Bank, 2006)

Invest in Childhood Nutrition

- Easy to accomplish
 - Education
 - Basic health care
 - Availability of proper weaning foods
 - Pre-school and elementary school feeding
- It pays for itself
 - In the US, every \$ spent in health care of children save \$4 over life time – W.I.C.
 - Improves social life
 - Increased productivity

Nutrition during Pregnancy

At no stage in life is nutrition more crucial than during fetal development and infancy

Adequate nutrition is essential for:

- Essential tissue formation
- Neurological development
- Bone growth

Breastmilk is best milk

- Human milk is unique in its physical structure, types and concentrations of protein, fat, carbohydrate, vitamins, minerals, enzymes, hormones, growth factors, host resistant factors, inducers and modulators of the immune system, and anti-inflammatory agents
- (IOM, 1991)

Characteristics of Breastmilk

- Breastmilk is a uniquely designed human infant food
- The first milk that is produced right after birth is called colostrum
- Colostrum is rich in immunoglobulins that protect against bacteria and viruses
- Colostrum with its high protein and low fat content is ideally designed to meet the nutritional needs of the rapidly growing newborn
- Breastmilk provides all the necessary nutrients in the right amounts for the first year of life

Contraindications to Breastfeeding

- In general there are very few true contraindications to breastfeeding
- Breastfeeding may not be possible when mother has serious infectious or other illnesses, addictions to drugs, medications or treatments are contraindicated during breastfeeding
- If an infant has a metabolic disease that requires special infant formula

Weaning

- By age 4 to 6 months, most infants reach a point in their development in which they can benefit from having foods other than breastmilk or infant formula added to their diets
- Recommendations for starting solid foods should take into account the infant's developmental stage and nutritional status; coexisting medical conditions; social factors; cultural, ethnic and religious preferences of the family; financial considerations and other pertinent factors

Readiness to tolerate solid foods

- Intestinal track is developing
- Ability to digest and absorb proteins, fats, and carbohydrates, other than those in the breastmilk or formula, increases rapidly
- Kidneys are developing the ability to excrete the waste products from protein foods
- The infant is developing the neuromuscular mechanisms needed for recognizing and accepting a spoon, masticating, and swallowing nonliquid foods

Protein-Calorie Recommendations

Age	Calories	Protein
Birth to 0.5 months	108Kcal/Kg	2.2 gms/Kg
0.5 to 12 months	98 Kcal/Kg	1.6 gms/Kg
1 to 3 years	102 Kcal/Kg	1.2 gms/Kg
4 to 6 years	90 K cal/ Kg	1.1 gms/Kg

Limitations of Traditional Weaning Foods

- Cereal based
 - Bulky
 - Stomach fillers
- Inadequate protein
 - Quantity
 - Quality
- Micronutrient deficiency
 - Iron
 - Vitamin A

Role of Soy Protein

- It contains
 - all 3 macro nutrients
 - all essential amino acids
 - Has good quality fatty acid profile
 - most minerals
 - all important vitamins
 - excellent source of fiber
 - Soy contains many phytochemicals
- Allergies
 - Rare

Developmental Delays Affecting Feeding skills

Infants may be developmentally delayed in their feeding skills due to:

- Prematurity
- Multiple hospitalizations
- Low birth weight
- Depression
- Failure to thrive
- Neuromuscular delay
- Being abused
- Absence of oral feeding (fed via tube or intravenously) for extended periods
- Cleft lip or cleft palate
- Medical condition, like Down's syndrome or cerebral palsy

Problems related to early and late introduction of solids

Infants who are fed solids before they are ready may:

- Choke on foods
- Develop food allergies
- Consume less than the adequate amount of breastmilk or formula

Infants who are not introduced to solids when ready may:

- Reject food when introduced at a later stage
- Not consume an adequate variety and amount of food to meet their nutritional needs