

Infant Feeding and Infant Formulas

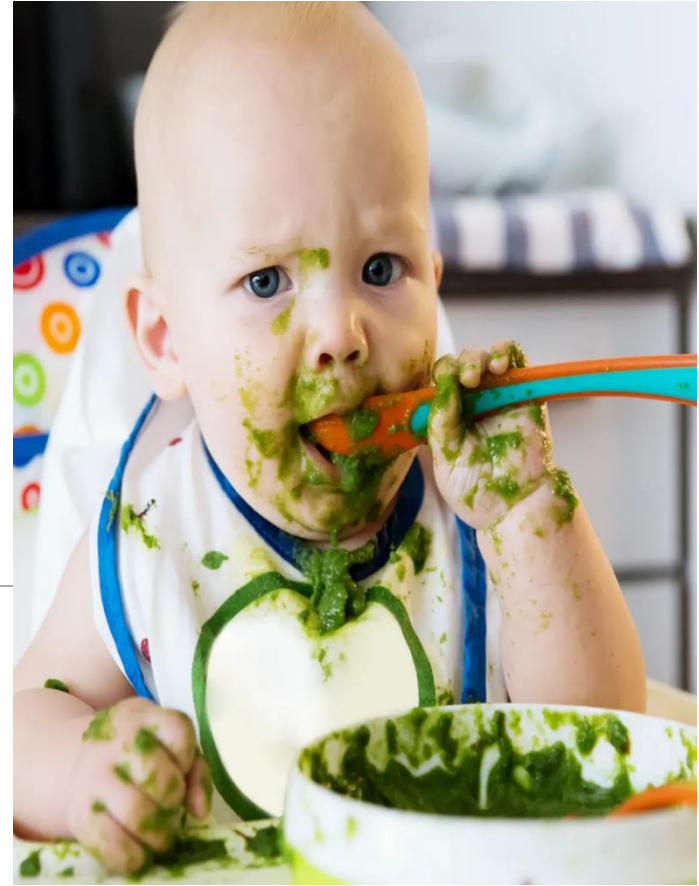
EYAD ALTAMIMI, MD

PROFESSOR OF PEDIATRICS

PEDIATRIC GASTROENTEROLOGIST, HEPATOLOGIST

FACULTY OF MEDICINE,

JORDAN UNIVERSITY OF SCIENCE AND TECHNOLOGY



Feeding is the process of delivering / ingesting the food nutrients

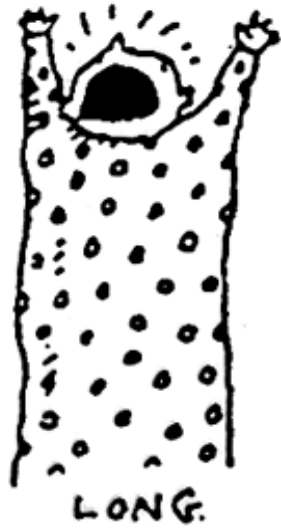


Feeding Infant

Infants have the ability to regulate their food intake relative to their nutritional needs

In doing so, they express signs of hunger and satiety and expect their caregiver to respond to these cues

A USEFUL GUIDE TO THE DIFFERENT TYPES OF BABIES



Hunger Clues :

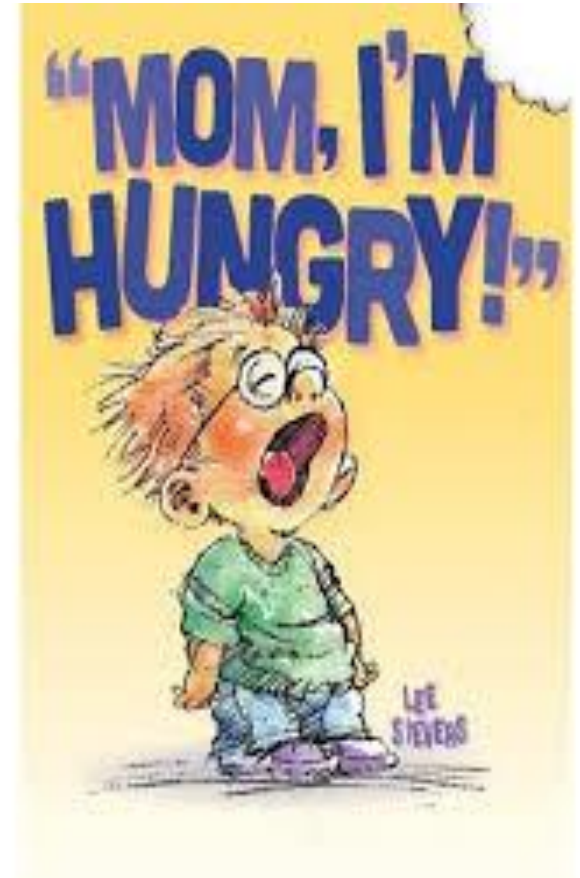
Wake and toss

Suck on a fist

Appear like he or she is going to cry

Cry or fuss

Caregivers should respond to the early signs of hunger and not wait until the infant is upset and crying from hunger



Satiety clues:

Sealing the lips together

A decrease in sucking

Spitting out the nipple

Turning away from the breast or
bottle

A caregiver should never force an
infant to finish what is in the bottle

Infants are the best judge of how
much they need



Young infants need to be fed small amounts of infant formula often throughout the day and night as their stomachs cannot hold a large quantity

How big is a newborn's stomach?



Day 1

size of a cherry

5-7 mL
1- 1.4 teaspoons



Day 2

size of a walnut

22-27 mL
0.75-1 oz



One week

size of an apricot

45-60 mL
1.5- 2 oz



One month

size of large egg

80-150 mL
2.5- 5 oz

Sleepy Infant

How to awake the baby:

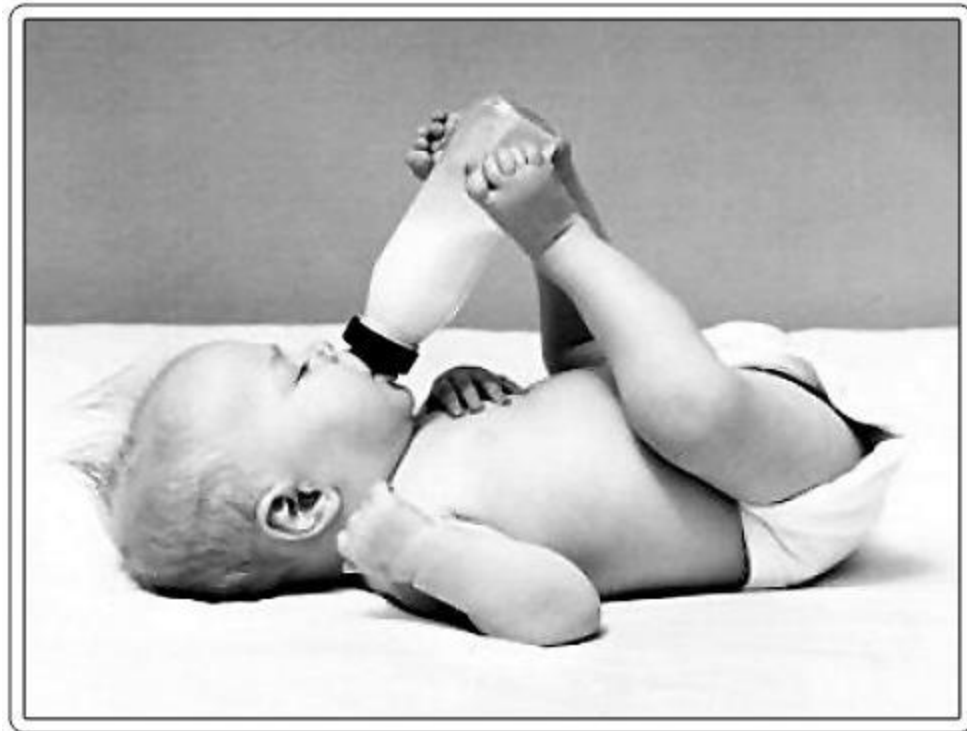
- Rubbing or stroking the infant's hands and feet
- Unwrapping or loosening blankets
- Giving the infant a gentle massage
- Undressing or changing the infant's clothing or diaper
- Playing with and talking to the infant



Formula Feeding Tips

- The caregiver should find a comfortable place in the home for feeding
- Interact with the infant in a calm and relaxed manner in preparation for and during feeding
- Show the infant lots of love, attention, and cuddling in addition to feeding

Guidelines on Feeding From a Bottle



Wash hands with soap and water before feeding

Hold the infant in your arms or lap during the feeding (with the infant in a semi-upright position with the head tilted slightly forward, slightly higher than the rest of the body, and supported by the person feeding the infant)

The infant should be able to look at the caregiver's face

Hold the bottle still and at an angle so that the end of the bottle near the nipple is filled with infant formula and not air



Ensure that the infant formula flows from the bottle properly by checking if the nipple hole is an appropriate size



Burp the infant at any natural break in or at the end of a feeding to eliminate swallowed air from the stomach





**"THAT LITTLE FELLA HAS
QUITE A BURP ON HIM!"**

Breastfeeding is the physiologic norm for mammalian mothers and babies



Breast milk is the optimal source of
nutrition for the infant

Commercial Formula Development

In 1867, Henri Nestlé created the first commercially sold formula



"THE BEST"

NURSER



EASY SUCTION.

Nipple Cannot Collapse.

**PREVENTS WIND-COLIC
AND BOWEL TROUBLE.**

At druggists, 25 cents, with a sample "Clingfast" Nipple, Free; or by mail, 35 cents, post-paid. Safe delivery guaranteed. Our "Clingfast" Nipple, warranted pure gum, 50 cents per dozen, post-paid.

THE GOTHAM CO., 82 WARREN ST., NEW-YORK.

Types of infant formulas

1. Cow's milk or Soya-based infant formulas (iron-fortified)
2. Hypoallergenic infant formulas
3. Other infant formulas designed to meet the nutritional needs of infants with a variety of dietary needs (e.g., lactose-free,..)

Milk-Based Infant Formula

1. Most commonly consumed
2. Made by modification of cow's milk with added vegetable oils, vitamins and minerals
3. Modified the protein to simulate the breast milk
4. In milk-based infant formulas:
 - protein provide 9 % of calories
 - fat provide 48–50 %
 - CHO provide 40–45 %

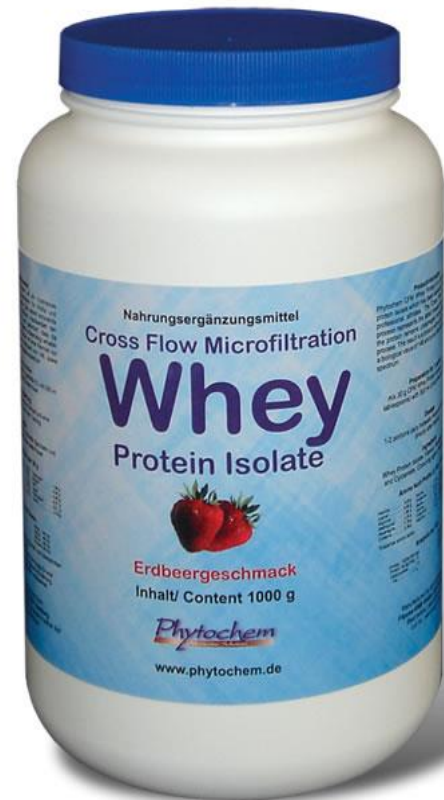
These infant formulas are lower in fat and higher in carbohydrate, protein, and minerals than breast milk

Whey : Casein ratio

- Breast milk 60 : 40
- Cow's milk 20 : 80

Human milk contains lower casein content and is easier to digest

Infant formula contains heat treated cow's milk proteins which results in smaller curds than pasteurized milk



Iron-Fortified Infant Formula



Iron-fortified cow's milk-based infant formula is the most appropriate milk feeding from birth to 12 months for infants who are not breastfed or who are partially breastfed

-
- Providing non-iron fortified infant formula is associated with poor cognitive performance and development in infants
 - Indication: normal, healthy infants
 - Examples: Enfamil, Similac, S-26, Saha



“Starter” Vs “Follow-on” formula

Starter:

Healthy infants < 6mo.

Follow-on:

Healthy infants 6-12 mo.

Slightly higher protein

Slightly higher Ca, Fe

There is no nutritional advantage for switching between

Formulas with added thickening agents:

Added rice starch, carob bean flour
or corn-starch

Limitations:

- contribute to allergy
- affect gastric emptying
- one degree of thickness



Soy-Based Infant Formula

Contain:

- › Soy protein isolate
- › Vegetable oils as the fat source
- › Carbohydrate (usually sucrose and/ or corn syrup solids), and vitamins and minerals

Fortified with methionine, and iron



Examples: ProSobee, Isomil SF



Soy-based infant formulas are safe and effective alternatives to cow's milk-based infant formulas, but have no advantage over them

Soy-based infant formulas may be indicated in the following situations:

- Galactosemia or hereditary/ secondary lactase deficiency
- Vegetarian
- Infants with documented IgE -mediated allergy to cow's milk protein

NI
means
Not Indicated
byallacronyms.com



-
- Acute gastroenteritis with no proven lactose intolerance
 - Infantile colic
 - Prevention of allergy in healthy or high-risk infants
 - Infants with documented cow's milk protein induced enteropathy or enterocolitis
 - Premature infants < 1800g (increases risk of osteoporosis and rickets)
 - CF patients

Hypoallergenic Infant Formula

They may contain partially hydrolyzed protein, extensively hydrolyzed protein, or free amino acids

Extensively hydrolyzed and free amino acid-based infant formulas have been demonstrated to be tolerated by at least 90 percent of infants with documented allergies

Currently available partially hydrolyzed infant formulas are not hypoallergenic and should not be used to treat infants with documented allergies

Extensively Hydrolyzed Protein Infant Formula :

Protein: casein hydrolysate and amino acids

Carbohydrate: modified starch, corn syrup, sucrose

Fat: blend of vegetable oils, DHA and ARA, some contain medium chain triglyceride (MCT) oil

Indications: allergy to intact cow's milk or soy protein; GI malabsorption

Examples: Pregestimil Lipil, Similac Alimentum Advance, Nutramigen Lipil ,Alfare`

Elemental Infant Formula:

Protein: free amino acids

Carbohydrate: corn syrup solids

Fat: blend of vegetable oils, DHA and ARA, some contain medium chain triglyceride (MCT) oil

Indications: severe protein allergy, severe GI impairment

Examples: Neocate Infant, Elecare, Puramino, Alfamino



Premature Infant Formulas:

Indication: preemies < 1.8 Kg, <36 wk gestation

Differences from standard formula:

- * ↑ Protein (whey predominant)

- * ↑ MCT oils (40-50%)

- * ↓ Lactose

- * Iron and vitamin E concentrations altered to prevent hemolytic anemia

Examples:

Enfacare, Enfamil Premature, Similac Neosure

The good news is that you don't have mad cow's disease. The bad news is you're lactose intolerant.





Whole cow's milk not be fed to infants during the first year of life

1. Inappropriate Nutrient Content

Low intakes of iron, linoleic acid (an essential fatty acid), and vitamin E

Excessive intakes of sodium, potassium, chloride, and protein

Most dramatic effect on iron status:

(little iron–milk composition inhibit the absorption)

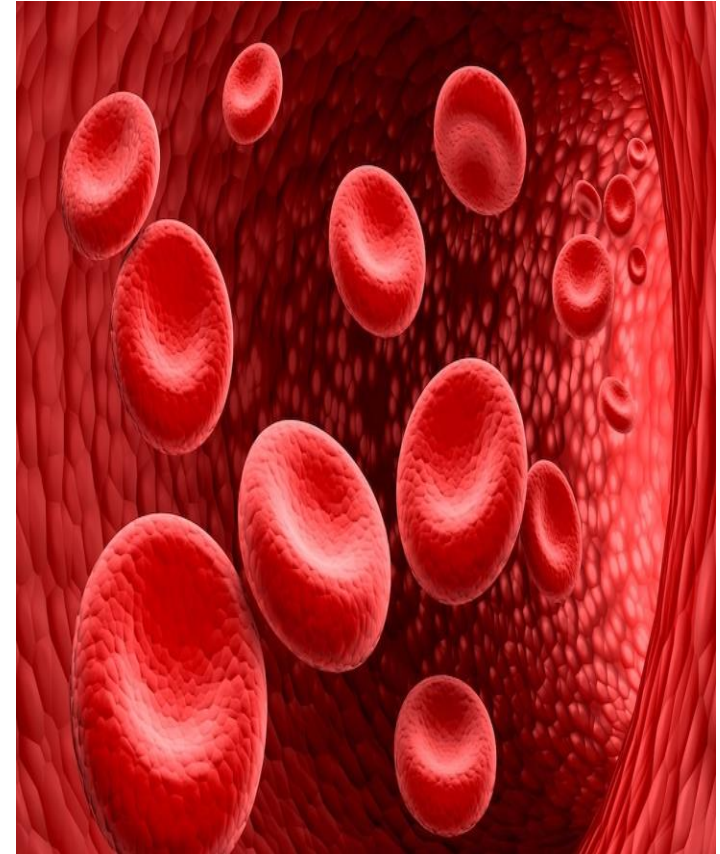


2. Microscopic gastrointestinal bleeding and blood loss

Due to an immaturity of infant's gastrointestinal tract

This bleeding promotes the development of iron deficiency anemia

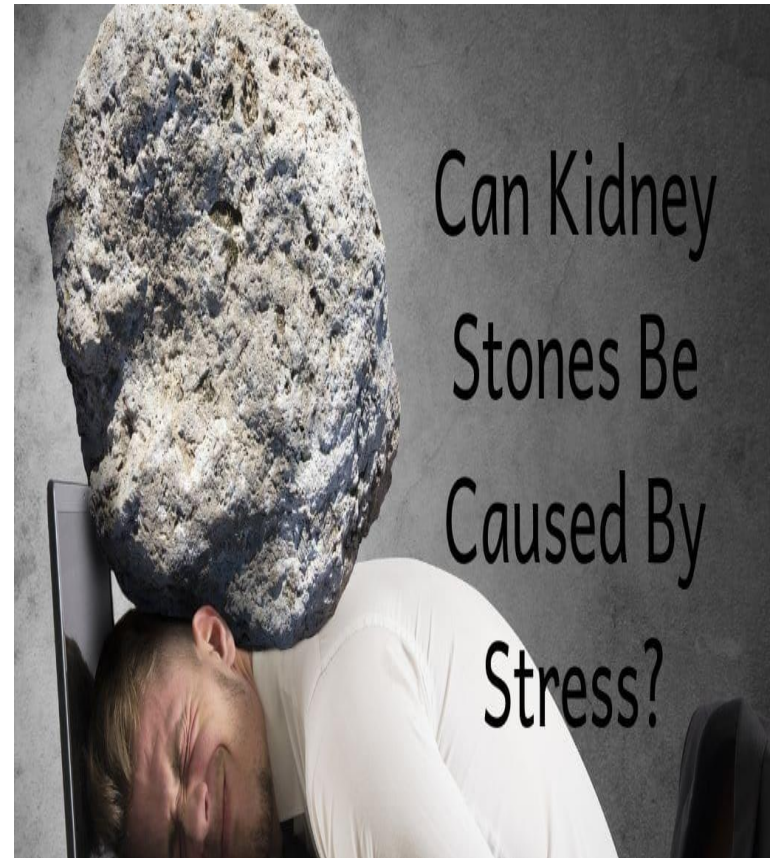
May lead to long-term changes in learning and behavior that might not be reversed even with iron supplement



3. Stress on the kidneys

High renal solute load which is two to three times higher than that of formula-fed infants

Greater risk for developing dehydration which is greatest during: an acute illness when intake is decreased



4. Hypersensitivity (allergic) reactions

Cow's milk contains proteins that may cause hypersensitivity (allergic) reactions in the young infant





Low-Fat or Skim Cow's Milk

Low-fat milk (1 or 2 percent low-fat milk) should not be fed to infants

These milks contain insufficient quantities of fat (including linoleic acid), iron, vitamin E, and vitamin C; and excessive protein, sodium, potassium, and chloride

The amount of protein and minerals in low-fat and skim milk is even higher than in whole cow's milk; these milks place a strain on an infant's kidneys in the same way as does whole cow's milk



Consumption of skim or low-fat milk is not recommended in the first 2 years of life because of the high protein and electrolyte content and low caloric density of these milks



Goat's Milk

Not recommended for infants

Contains inadequate quantities of iron, folate, vitamins C and D, thiamin, niacin, vitamin B6, and pantothenic acid

This milk also has a higher renal solute load compared to cow's milk and can place stress on an infant's kidneys

To cause a dangerous metabolic acidosis when fed to infants in the first month of life



Introduction of Solid Food



-
- Start when the baby is ready (around 6 months of age)
 - Start with single type of food and wait 3-5 days before introducing a new type
 - Only use a spoon to give food
 - Never mix infant foods in the baby's bottle
 - Use of an infant "feeder" is not recommended because baby won't develop proper feeding skills



Cow's, goat, rice, or soy milk—are not appropriate before 1 year of age

Do not give honey until 1 year of age

Avoid juice before 1 year of age.

When introduced, only give juice (100% only) in a cup, not a bottle

Sugar-containing foods and drinks and foods with added salt are not recommended for infants



What Can I Feed the Infants?

First Foods:

- baby cereals
- Vegetables and Fruits
- Meat

Don't Give infants:

- Popcorn, Peanuts, Raisins, whole grapes, hard, raw fruits or vegetables such as apples, green beans
- Sticky foods such as peanut butter, which can get stuck in the back of mouth
- Any other pieces of food that the infant cannot chew because they do not have advanced chewing skills yet



THANK YOU

