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4th grade

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Formula feeding

Although breast feeding is considered superior to formula feeding for normal infant, many receive formula from birth due to:

1-they are employed outside the home.

2-many mothers reluctant to nurse their infant.

3-other believes that nursing will limit their activities.

4-they fear failure at nursing.

**Proper Technique of formula feeding**

comfortable position for infant and caregiver.

unhurried. free from distraction.

the infant should be hungry, awake, warm, and dry.

bottle milk is warmed to body temp.

nipple holes should be at size that milk will drop slowly.

eructation of air swallowed during feeding is important for avoiding regurgitation and abdominal discomfort.

feeding last 5-25 m.

spitting up occurs more often in artificially fed than in breast fed infant.

**Comparison of human milk and cow’s milk**

Water: Relative amount of water and solid in human and cow’s milk about the same.

Calories: Vary slightly and it is 20kcal/oz.

Protein: Quantitative difference. *Human milk* contains 1-1.5%. 75%whey protein (lactalbumin) is soluble and easy to be digested.25% casein is the insoluble part. *Cow’s milk* contains 3.3%. 80% casein. The ratio reversed.

Carbohydrate:

Human milk contains 6.5-7% lactose.

Cow’s milk contains 4.5%.

10% of carbohydrate in human milk consists of polysaccharide and glycoprotein.

 Fat:

Fat is the main source of energy (50%) of calories.

Fat globules 10-15 times bigger than that of cow milk.

Human milk contains lipase enzyme so 92% of triglycerides are digested and absorbed.

Essential F.A is lighter in breast milk than cow milk, it is important for growth.

Cholesterol in human milk is higher and it is important for CNS myelination and needed in early life to ensure proper development of enzyme system for metabolism.

Qualitative difference, human milk contains twice as much of the more absorbable olein.

The volatile F.A contains 1.3% of human milk fat and 9% of cow’s milk fat

|  |  |  |
| --- | --- | --- |
| components  | BREAST MILK | STANDARD FORMULA |
| protein  | 1.1 per dl | 1.5 per dl |
| Fat | 4.0  per dl | 3.6 per dl |
| carbohydrates  | 7.2 per dl | 6.9-7.2 per dl  |

Minerals:

Cow’s milk contains much more of all minerals except iron (Breast milk iron

although it is low but is better, rapid absorbed, is in ferrous form), copper

than human milk.

Calcium: phosphate ratio is 1.5:1 unlike cow milk where ratio is 1:1.

High phosphate content in cow milk 7 times leads to impairment of ca

absorption and later convulsions.

 **Vitamins:**

Human milk enriched with enzymes, hormones, and coagulation factors.

Human milk contains vitamin binders that of lactoferrin so it has vitamin carriers.

vitamins contain varies with maternal intake. -cow’s milk is low in C, breast milk contains adequate C

-cow’s milk contains more (K, B2, B6, B12) than human milk, they are synthesized by the gut flora, so no need to add such vitamins.

-formula contain 5 times the amounts of E and double amount of A, D in human milk.

-Both contain same adequate amount of A, B complex.

**Bacterial content:**

Human milk, uncontaminated by bacteria.

Tubercle, typhoid, bacilli, herpes, hepatitis B, rubella, Mumps, HIV, CMV, may found at time in milk of women infected with these.

Cow’s milk regularly contaminated but in most case by bacteria that are not harmful to human.

Certain bacteria that may not affect older children may cause diarrhea in infant**.**

 Digestibility: Stomach empties more rapidly after human milk than cow’s milk.

 **Types of formula feeding:**

1.substitutive (no breast milk).

2.breast and formula:

--complementary (in each feed, uses breast and formula).

--supplementary: one feed breast milk and the other is by formula.

**MILK USED IN FORMULA:**

RAW MILK: Not advised for feeding: (slowly digested/ easily contaminated)

PASTEURIZED MILK:

\*Destroy many pathogenic bacteria, modifies casein.

\*raw milk heated (63c for 30m) or (72c for 15 sec) then rapidly cooled.

\*pasteurized milk should be boiled when used for infant feeding.

\*can stand in the refrigerator for 48h.

HOMOGENIZED MILK

\*during the process of homogenization, the fat globules are broken in to minute particles.

\*the advantage of this milk is the smaller, less tough curd produce in the stomach.

EVAPORATED MILK:

Almost universal availability.

\*the casein curd produced in the stomach is softer and smaller

than that in boiled whole milk.

**Most formulas in the following forms:**

* Ready-to-use formulas -- do not need to add water; are convenient, but cost more.
* Concentrated liquid formulas -- need to be mixed with water, cost less.
* Powdered formulas -- must be mixed with water, cost the least.

DRIED WHOLE MILK:

\*fat content adjusted to 3.5%.

\*has advantages of evaporated milk but does not keep well when exposed to air.

DRIED SKIM MILK:

\*nonfat skim milk 0.5%, half skim milk 1.5%, both available.

\*not used in the first 2y of life.

\*its high protein and mineral content in proportion to calories may cause severe

dehydration.

HYPOALLERGENIC MILK: evaporated goats’ milk.

others

\*non milk foods, in which the protein is derived from soybeans.

\*not containing lactose are useful for infant with galactocemia.

\*powdered casein and medium chain triglyceride for special purpose

Un modified cow’s milk is not suitable for feeding in infancy????

1- It contain too much proteins and electrolytes.

2- Inadequate in iron and vitamins.

**Lactose-free formula —LF**

This formula is suitable for babies who are [lactose intolerant](https://www.nhs.uk/conditions/lactose-intolerance/).

This means they cannot absorb lactose, which is a sugar that's naturally in milk and dairy products.

there are several brands of lactose-free formulas that have had all the milk sugar removed and replaced with a vegetable sugar (such as corn syrup).

Symptoms of lactose intolerance: diarrhea (the loose stools may be frothy), colic which persists for more than 2 weeks, abdominal bloating, excessive flatulence, perianal redness and irritation and possibly damage to the perianal tissue. Vomiting can also occur.

The symptoms are transient and usually secondary to a gastrointestinal (GI) insult e.g. rotavirus infection.

Blood in the stools is not a feature of lactose intolerance.

**MILK FORMULA COMBINES:**

**\*\*\*milk.**

**\*\*\*sugar.**

**\*\*\*water.**

**\*\*\*some modification**

 **20 kcal/oz=30ml=1 oz**

CALORIE REQUARIED:

For full term infant 80-120kcal/kg for first few m.

100kcal/kg by 1y.

FLUID REQUIRMENT:

Ist 6m 130-190 mL/kg/24h

And increase during hot weather.

NUMBER OF FEEDING DAILY:

1w-1m 6-8

1-3m 5-6

3-7m 4-5

4-9m 3-4

8-12m 3

QUANTITY OF FORMULA:

1st-2nd w 60-90ml

3w-2m 120-150ml

2-3m 150-180ml

3-4m 180-210ml

5-12m 210-240ml

Preparation:

* water first then add milk powder
* One small scoop for each ounce ,one large scoop to two ounces

sterilization:

 there are several recommended ways to sterilize bottles including

1- boiling.

2-microwaveable bottle sterilizers

3- electrical steamer sterilizers

One is not necessary superior to the other

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Weaning

Between 6 and 12 mo of age, after they become accustomed to solid foods and liquids by bottle and/or cup, most infants decrease the volume and frequency of breast-feeding .

As the infant demands less milk, the mother's supply gradually diminishes without causing discomfort from engorgement.

 Weaning can be initiated when mutually desired by the mother and infant by substituting formula by bottle or cup for part and, subsequently, all of a breast-feeding.

Breast-feeding is eventually replaced with formula-feeding, at which time the infant is weaned completely.

These changes should be made gradually and should be a pleasant experience, not a conflict, for both the mother and the infant.

**Aims**

the child can not tolerate more than liter/day, so this increasing need for energy more solid foods should be added.

\*with growth, babies required more food items such as minerals and vitamins, that cannot be supplied by milk.

\*to train GIT digest starch, and other solid foods.

\*to induce independence using spoon and cup, by himself.

**Technique of weaning:**

\*should start at age of 4-6m.

\*replacing one meal for milk fed.

\*gradual increase in amount of new food.

\*the presentation of food is important (colored dishes, spoon.).

**Principle of weaning:**

 Begin at 6 mo. of age

 Avoid foods with high allergenic potential (cow's milk, eggs, fish, nuts, soybeans).

  At the proper age, encourage a cup rather than a bottle.

  Introduce 1 food at a time.

  Energy density should exceed that of breast milk.

  Iron-containing foods (meat, iron-supplemented cereals) are required.

  Zinc intake should be encouraged with foods such as meat, dairy products, wheat, and rice.

  Phytate intake should be low to enhance mineral absorption.

  Breast milk should continue to 12 mo.; formula or cow's milk is then substituted.

 Give no more than 24 oz/day of cow's milk.

 Fluids other than breast milk, formula, and water should be discouraged.

 Give no more than 4–6 oz/day of fruit juices. No soda.

NOTE: When cessation of nursing is necessary at an early age, use of a tight breast binder and application of ice bags may help decrease milk production.

Restriction of the mother's fluid intake and small doses of estrogen for 1–2 days also may help decrease milk production.

VITAMINS:

\* formula milk is fortified with vitamin D.

\*400 IU/day should be added early if formula not fortified.

\*low birth weight infant and black infant need supplementation.

IRON:

\*need 2mg/kg total 15mg/day beginning at 6w of age to prevent iron deficiency.

calories:

\*egg yolk, cereals, meats, have greater caloric density than milk.

\*vegetable and fruits have energy value similar or lower than that of milk**.**

**CEREALS:**

\*excellent for infants.\*contain iron, B complex.

FRUITS:

\*have mild laxative.\*raw ripe banana is readily digested and enjoyed by most infants.

**VEGETABLES:**

\*good source of iron and other minerals and B complex vitamins.

\*add at 7m of age.

**MEATS, EGGES, STARCHY FOODS:**

\*egg and starchy food usually introduced during second 6m of life.

\*potatoes, rice, bread introduce they are not included in the diet until the

more essential foods mentioned earlier are being taken regularly.

\*meat used initially by 6m of age.