

Lecture2

Formula Feeding, feeding problems during 1st year of life

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Learning objectives: : By the end of this lecture the students should know:

- Why some mothers used formula feeding?
- What are the Differences between breast and formula milk.?
- What are the Types of formula commonly used?
- How to prepare the formula?
- What are the common Problems may associated with feeding during first year of life?
- Complementary feeding: Weaning , Why?!, Timing, Type of food.

Despite efforts to promote exclusive breastfeeding through 6 months, less than 50% of women continue to breastfeed at 6 months. The causes include: -

- Parental preference.
- Medical problems of the infant (e.g. Inborn errors of metabolism).
- Maternal factors: Medical, social or psychological reasons or other health reasons.
- As a supplement to support inadequate weight gain in breast fed infant.

Comparison of breast milk, cow`s milk and infant formula :-

| | Mature Breast Milk | Cow's Milk | Infant Formula (Modified cow's milk) |
|-------------------|--------------------|------------|--------------------------------------|
| Energy (kcal) | 62 | 67 | 60-65 |
| Protein (g) | 1.3 | 3.5 | 1.5-1.9 |
| Carbohydrate (g) | 6.7 | 4.9 | 7.0-8.6 |
| Casein:whey | 40:60 | 63:37 | 40:60 to 63:37 |
| Fat (g) | 3.0 | 3.6 | 2.6-3.8 |
| Sodium (mmol) | 0.65 | 2.3 | 0.65-1.1 |
| Calcium (mmol) | 0.88 | 3.0 | 0.88-2.1 |
| Phosphorus (mmol) | 0.46 | 3.2 | 0.9-1.8 |
| Iron (µmol) | 1.36 | 0.9 | 8-12.5 |

Infant formulas are available in: *Ready-to-feed*, or *Concentrated liquid* or *Powder forms*.

* The caloric density of formulas is 19- 20 kcal/30 ml (oz) , similar to that of human milk. Care must be taken in following the mixing instructions to avoid over- or under dilution, to use boiled or sterilized water, and to use the specific scoops provided by the manufacturer as scoop sizes vary. Water that has been boiled should be allowed to cool fully to prevent degradation of heat labile nutrients, specifically vitamin C. Parents should be instructed to use proper hand washing techniques when preparing formula and feedings for the infant.

* Once prepared, all bottles, regardless of type of formula, should be used within 24 hr. Formula should be used within 2 hr of removal from the refrigerator, milk should never be microwaved, and once a feeding has started, that formula should be used within 1 hour or be discarded.

- Clean and sterilize bottle-feeding equipment after every feed.
- First, clean equipment by washing with hot, soapy water.
- Next, sterilize by boiling, using chemicals, steaming or microwaving.
- Last, store cleaned and sterilized equipment in a clean container in the fridge or in sterilization solution.

Bottles need to be clean before sterilization by either of:

- **Boiling** : Put the washed bottles, teats, rings and caps in a large pot. Then fill the pot with water until everything is covered, boil for 5 min is the **simplest and most reliable way of sterilization**.
- **Chemicals**: using **antibacterial solution** that comes in liquid or tablet form.
- **Steam sterilisation**: are **automatic units that heat the bottle** to a temperature high enough to kill bacteria.
- **Microwave sterilisation**. Check the microwave power needed – not all microwave ovens are the same. Don't put any metal inside these sterilisers.

➤ **Types of formula**

1. **Cow's-milk-based formula**: commonest formula available.
2. **Soy-based formula**: Indications for soy formula include galactosemia, cow's milk allergy, hereditary lactase deficiency; and situations in which a vegetarian diet is preferred.
3. **Hydrolyzed formula**: Protein hydrolysate formulas may be partially hydrolyzed, containing oligopeptides or extensively hydrolyzed.
4. Specialized infant formula
 - Formulas for (premature and low-birth-weight babies)
 - Lactose free formula.
 - Others.

Problems associated with formula feeding

1. Risk of cow's milk protein intolerance: GIT bleeding, anemia, wheezing, and eczema
2. Infections :risk of contamination.
3. Obesity due to over feeding.

Complementary feeding:

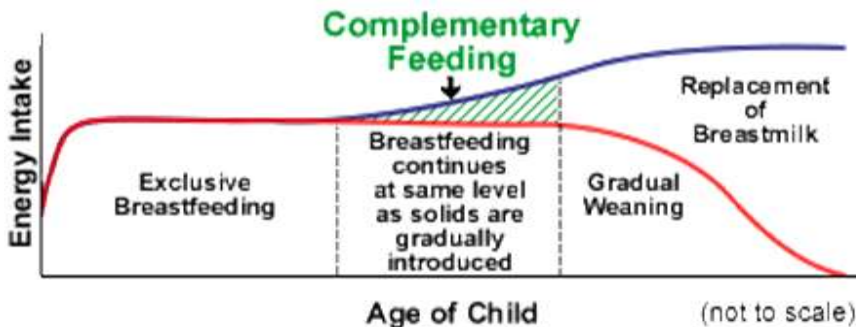
After 6 months of age, breast milk becomes increasingly nutritionally inadequate as a sole feed, as it does not provide sufficient energy, vitamins or iron. Solid foods are recommended to be introduced from around 6 months of age, **not before 17 weeks and no later than 26 weeks**. This is done gradually, initially with small quantities of pureed fruit, root vegetables or rice. *Foods high in salt and sugar should be avoided.* The timely introduction of complementary foods (solid and liquid foods other than breast milk or formula, also called **weaning foods** during infancy is necessary to enable transition from milk feedings to other table foods and is important for nutritional and developmental reasons. The most commonly fed complementary foods between 4 and 11 months of age are infant cereals. The complementary foods should be varied to ensure adequate macro- and micronutrient intake. In addition to complementary foods introduced at 6 months of age, continued breastfeeding or the use of infant formula for the entire 1st year of life should be encouraged.

- Begin at 6 mo of age Breast milk should continue to 12 mo
- Introduce 1 food at a time.
- Whole cow milk should not be introduced until 12 mo of age.
- Iron-containing foods (meat, iron-supplemented cereals) are required
- Encourage Zinc intake with foods such as meat, dairy products, wheat, and rice
- Phytate intake should be avoided to enhance mineral absorption

- Give no more than 24 oz/day of cow milk.
- Fluids other than breast milk, formula, and water should be discouraged
- Give no more than 4-6 oz/day of fruit juices; no sugar sweetened beverages.

Complementary food should be:

- Right consistency
- Soft
- Easy to digest
- Inexpensive
- Locally available
- Culturally acceptable
- Easily prepared at home



Calories supplied by breastmilk — red line
 Total calorie intake — blue line

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Feeding problems during the 1st year of life

- Underfeeding and Overfeeding
 - Regurgitation and vomiting
 - Constipation and Diarrhea stool
 - Colic
- ❖ **Underfeeding and Overfeeding** It is difficult to know if a baby is getting enough breast milk except by demonstrating normal weight gain through regular weight checks. Insufficient milk intake and dehydration in the infant can become evident within the first week of life. Inadequate milk intake may be caused by *insufficient milk production, failure of established breastfeeding, and health conditions in the*

infant that prevent proper breast stimulation. Parents should be counseled that breastfed neonates feed 8-12 times a day with a minimum of 8 times per day. Direct observation of breastfeeding can help identify the cause.

In formula fed infant the usual intake of formula feed baby is to allow a weight gain of 25-30 g/day will be 140-200 mL/kg/ day in the first 3 months of life. The rate of weight gain declines from 3-12 months of age.

Adequacy of milk intake can be assessed by voiding and stooling patterns of the infant. A well-hydrated infant voids 6-8 times a day. Each voiding should soak, not merely moisten, a diaper, and urine should be colorless. By 5 to 7 days, loose yellow stools should be passed at least four times a day. Rate of weight gain provides the most objective indicator of adequate milk intake(25-30 g/day)

➤ **Strategies for increasing energy intake**

Dietary

- Three meals and two snacks each day
- Increase number and variety of foods offered
- Increase energy density of foods (e.g. add cheese, margarine, cream)
- Limit milk intake to 500 ml/day
- Avoid excessive intake of fruit juice and squash

Behavioral

- Offer meals at regular times with other family members
- Praise when food is eaten, ignore when not
- Limit mealtime to 30 minutes
- Eat at same time as child , avoid mealtime conflict and Never force feed.

❖ **Possetting and regurgitation** are terms used to describe the non-forceful return of milk, but differ in degree.

Possetting describes the small amounts of milk that often accompany the return of swallowed air (wind) whereas

Regurgitation describes larger, more frequent losses. Possetting occurs in nearly all babies from time to time, while regurgitation may indicate the presence of more significant gastrooesophageal reflux.

Vomiting is the forceful ejection of gastric contents.

Vomiting in infants Common chronic cause is gastrooesophageal reflux.

- Feed volumes should be calculated as overfeeding is common in bottle-fed infants.
- If transient, with other symptoms, e.g. fever, diarrhea or runny nose and cough, most likely to be gastroenteritis or respiratory tract infection, but consider urine infection, sepsis or meningitis.
- If projectile at 2–8 weeks of age, exclude pyloric stenosis.
- If bile stained, potential emergency – exclude intestinal obstruction, especially intussusception, malrotation and a strangulated inguinal hernia. Assess for dehydration and shock.

❖ **Infant ‘colic’**

The term ‘colic’ is used to describe a common symptom complex that occurs during the first few months of life. Paroxysmal, inconsolable crying or screaming often

accompanied by drawing up of the knees and passage of excessive flatus takes place several times a day, Often crying occurs in the evening.

Definition: *the episodes of crying for more than 3 hours a day, for more than 3 days a week for a 3week duration in an otherwise healthy child between the ages of two weeks and four months.* The condition occurs in up to 40% of infants typically in the first few weeks of life and resolves gradually from 3–12 months of age.it is a benign condition but it is very frustrating and worrying for parents.

The Diagnosis: exclude any organic cause: cow`s milk protein allergy, gastro-esophageal reflex, obstructed inguinal hernia,etc. **Fewer than 5% of infants evaluated for excessive crying have an organic etiology.**

Treatments: Techniques for calming infants include soothing vocalizations or singing, swaddling, slow rhythmic rocking, walking, white noise, and gentle vibration (e.g., a ride in a car).

Medications: phenobarbital, diphenhydramine, simethicone, dicyclomine, and lactase, **are of no benefit in reducing colic and should be avoided.**

In most circumstances **dietary changes** are not effective in reducing colic but should be considered in certain specific circumstances. There is rationale for change to a non-cow`s milk formula if the infant has signs of cow`s milk protein colitis. If the infant is breastfeeding, the mother can eliminate dairy products from her diet.

Infants who have been tightly swaddled for sleep and rest during the first weeks of life often calm to swaddling during a crying episode; this is not true for infants who have not experienced swaddling before a crying episode.

References:

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