Infant feeding

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Objectives

- Recognize Basics of breastfeeding
- Recognize Composition of breast milk
- Recognize the importance of breast milk to infant and to the mother
- Recognize the duration for exclusive breastfeeding
- Recognize the problems which occur with breast feeding process
- Recognize the contraindication of breastfeeding
- Recognize the indication of artificial feeding
- Recognize how to prepare an artificial feed
- Recognize the optimal time to start weaning
- Recognize how the process of weaning should be done
- Recognize the hazards which will occur with faulty weaning
Stages of human milk production:

Colostrum: Appear within the 3<sup>rd</sup> trimester→1<sup>st</sup> week.

Transitional milk: 2<sup>nd</sup> wk

Established milk after 2<sup>nd</sup> wk
Basics of breastfeeding:

1. Early initiation (within 30-60 min):
   Low incidence of: hypoglycemia - jaundice - dehydration.
   Fewer B.F. problems.
   Longer duration of B.F.

2. Avoid prelacteal feeds

3. Exclusive breast feeding for first 6 m
Frequency and duration of feeding

- **1st week**: whenever the infant shows signs of hunger or when four hours have elapsed since the last feeding. This will usually result in 8 to 12 feedings in 24 hours.

- **After the first week**: decreases to seven to nine times per day by four weeks of age.

- **The duration of a feeding on each breast**: falls from 10 to 15 minutes soon after birth to 8 to 10 minutes at approximately one month of age.
“No two brain hemispheres of any learned professor are equal to two healthy mammary glands in the production of a satisfactory food for infants”

- Oliver Wendell Holmes
Composition of breast milk

Biologically active components of BM:

A Immune cells:

Macrophages, B lymphocytes, T lymphocytes

B: Proteins:

1. Lactoferrin (bacteriostatic for E. Coli)
2. Igs especially secretory IgA
4. Growth factors; Epidermal & CNS
5. Enzymes: digestive (Lipase, amylase) or protective (lactoperoxidase & Lysozymes
6. Complement for opsonization
7. Interferon: antiviral
8-Bifidus factor.
C. CHO

1. Lactose: + lactobacilli

2. Oligosaccharides: prevent attachment of organism to the gut mucosa.

3. Bifidus factor (glycoprotein): It stimulates the growth of lactobacilli
<table>
<thead>
<tr>
<th></th>
<th>Human milk</th>
<th>Animal milk</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Proteins</strong></td>
<td>0.9-1.2 gm/dl</td>
<td>4 gm/dl</td>
</tr>
<tr>
<td><strong>Soluble part</strong></td>
<td>60 %</td>
<td>25 %</td>
</tr>
<tr>
<td></td>
<td>No B-lactoglobulin</td>
<td>High B lactoglobulin -&gt; allergic</td>
</tr>
<tr>
<td></td>
<td>Contains lgs, enz., growth factors</td>
<td></td>
</tr>
<tr>
<td><strong>Insoluble part</strong></td>
<td>40 %</td>
<td>75 %</td>
</tr>
<tr>
<td></td>
<td>Fine curd, easily digestible.</td>
<td>thick curd difficult digestion</td>
</tr>
<tr>
<td><strong>Amino Acid Content</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Higher essential AA content</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Lower ph-ala-tyrosine-methionine</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Higher cystine - taurine</td>
<td></td>
</tr>
<tr>
<td>Fat</td>
<td>3.5gm%</td>
<td>4-5gm%</td>
</tr>
<tr>
<td>-------------</td>
<td>------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Quality</td>
<td>*Fine globules-&gt; easy digested</td>
<td>*Coarse globues</td>
</tr>
<tr>
<td></td>
<td>*Less volatile F.A.s -&gt; less distension and colics.</td>
<td>* More volatile F.As -&gt; distension and colics</td>
</tr>
<tr>
<td></td>
<td>*More essential F.A.s, (LC PUFAS)</td>
<td>*No essential F.As</td>
</tr>
<tr>
<td>CHO</td>
<td>7gm%</td>
<td>4gm %</td>
</tr>
<tr>
<td></td>
<td>*Mainly lactose</td>
<td></td>
</tr>
<tr>
<td></td>
<td>*Contains bitidus factor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>*Contains galacto-oligo-saccharides</td>
<td></td>
</tr>
<tr>
<td>Ash</td>
<td>0.2gm%</td>
<td>0.75 gm% too much minerals</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>Ca/P</td>
<td>2/1 -&gt; 70% of Ca absorbed</td>
<td>1/2 -&gt; 25% of Ca absorbed</td>
</tr>
<tr>
<td>Fe</td>
<td>Low content but Higher bioavailability</td>
<td>Low content &amp; low bioavailability</td>
</tr>
<tr>
<td>Zinc</td>
<td>increases to a peak on second day</td>
<td></td>
</tr>
</tbody>
</table>
Advantage of Breastfeeding

In the 42 developing countries wherein 90% of the world’s childhood deaths occur, exclusive breastfeeding for 6 months and weaning after 1 year is the most effective intervention, with the potential of preventing more than 1 million infant deaths per year.

AAP, 2012
Advantage of Breast feeding

A. Advantages for infant
   Easily digestible and well absorbed.

   Sterile, hygienic and fresh.

   High nutritive value.

   Emotional security

   Protects against allergic diseases.

   Proper development of orofacial muscles.

   Better mental development
• The risk of hospitalization for lower respiratory tract infections in the first year is reduced 72% if infants are breastfed exclusively for more than 4 months.

• Exclusive breastfeeding for more than 3 months reduces the incidence of otitis media by 50%.

• Acute lymphocytic leukemia is reduced by 20%, and acute myeloid leukemia is reduced by 15% in infants breastfed for 6 months or longer.

• The incidence of type 1 diabetes is reduced 30% in infants exclusively breastfed for at least 3 months.

• Breastfeeding is associated with a 31% reduction in the risk of childhood inflammatory bowel disease.
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• Exclusive breastfeeding for 3 to 4 months also is associated with a reduction in asthma
**Advantages for the mother:**

1- Involution of the birth canal.
2- Natural method of contraception.
3- ↓ Incidence of breast cancer.

**Advantages to society and country:**

1- It contribute Child survival and family planning
2- It decrease Health care costs and hospital admission
3- It decrease the government spending for formula milk
Colostrum: is the earliest form of breast milk

Color: is yellowish "↑ carotene".

Volume: 2 - 20 ml /feed up to 100 ml

higher concentration of:
Proteins & Igs esp IgA. Oligosaccharides. Cholesterol

Ash; Electrolytes (Na+, K+, Cl) & fat-soluble vitamins especially vit K

Lower concentration of:
Caloric supply lactose. Total fat
Advantages:
For the newborn:

1. Highly protective (↑ IgA, bifidus factor, cells)

2. Highly nutritive (↑ proteins).

3. less CHO -> less abdominal distension.

4. Low fat -> easily digested.

5. Epidermal GF-> maturation of GIT mcosa -> ↑ enzymes & absorptive power.

6. ↑ oligosaccharides -> + intestinal motility-> Passage of meconium, ↓ N. Jaundice
Ten Steps to Successful Breastfeeding developed by the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) as criteria for a Baby-Friendly Hospital

- Have a written policy on breastfeeding that is communicated routinely to all staff.
- Train all health care staff in the skills needed to implement the policy.
- Inform all pregnant women of the benefits and management of breastfeeding.
- Help mothers start breastfeeding within one hour after birth.
- Show mothers how to breastfeed and maintain lactation, even if they are separated from their infants.
- Give newborns only breast milk, unless other feedings are medically indicated. Hospitals must pay a fair market price for formula and feeding supplies.
- Allow mothers and infants to remain together at all times (continuous rooming-in).
- Encourage breastfeeding on demand.
- Provide no pacifiers or artificial teats to nursing infants.
- Foster the establishment of breastfeeding support groups and refer mothers to them.
How to do Appropriate positioning & Good attachment

Appropriate positioning:
* Infant’s neck is straight.
* Infant’s body is turned towards the mother.
* Infant’s body is close to the mother’s body.
* Infant’s whole body is supported.

Good attachment through:
* Chin touching the breast.
* Mouth widely open so that the nipple and as much of the areola as possible are in the mouth.
Adequacy of breast feeding

1. Post feeding satisfaction.

2-Baby sleeps well 2-4 hours after nursing.

3. Proper weight gain: Normal weight gain (20-30 gm/ day or 150-210 gm /week Can be assessed by :-

4. Passage of up to one motion after each feed
Common Breast feeding problems

Breast Feeding Problems
A) Local (Obstacles in mother)
1-Nipple Pain:
caused by:
1. Fissuring; bad attachment  
2. Candidiasis,

TTT:  
1. Proper attachment.  
2. Begin feeding on least involved side  
3. Nipple & areola dry.  
4. TTI' of candidiasis.

2- Engorgement: (swelling of the breast )
Due to: 1. inadequate milk removal.

TTT 1. Gentle hand massage  
2; Frequent & effective feedings.  
3. Cold compresses
3- **Mastitis:**
manifested by fever, local pain, hotness & tenderness
Mostly *Staphylococcus aureus*, *E. coli* reaching breast though nipple fissure or blood

**TTT:** 1. Antibiotics & analgesics   2. Warm packs to the breast.
3. Treat nipple fissures. 4. Continue breast-feeding.

4- **Breast abscess:**
due to delayed or inadequate treatment of mastitis.
**TTT:** 1. Surgical drainage. 2. Antibiotics & analgesics
3. affected side: A. incision away from areola -> continue BF
B. incision near areola -> stop BF until healing

5- **Scanty breast milk:** maternal malnutrition & hypoplastic breasts
**TTT:** 1. of the cause. 2. Improve GC of mother 3. Complementary feeding
Contraindications of BF

B) General (Contraindications of BF)

1) Absolute contraindications:
   Infant: IEM: 1- Galactosemia. Mother: 4- breast cancer

Temporary contraindications: -

1- Oral herpes simplex of the infant.

2- Breast abscess; incision near areola. 4- Maternal septicemia, typhoid & malaria.

3- Maternal chicken pox: ZIG to infant & separate from mother
III) Controversy

1. Maternal malignancy: maternal ill health & cytotoxic drugs

2. Maternal epilepsy: Precipitation of attacks or side effects of antiepileptics on infant

3. Maternal herpes simplex & zoster: only if there is active lesion near the nipples.
NB:

Maternal rubella: not a contraindication.

Maternal hepatitis B: not a contraindication. Give infant accelerated hepatitis B vaccination (0, 1, 2) & specific hepatitis B immunoglobulin.

Maternal AIDS: if there is a safe alternative -> stop BF. No safe alternative -> continue BF.

Maternal TB: ????????.
Drugs and Breast feeding

**Drugs completely contraindicated:**
cytotoxic drugs, radioactive Materials, ergotamine.

**Drugs that decrease breast milk:** Thiazide, ergotamine.
Vitamins supplementation during breast feeding

• Breast-fed infants require some form of iron supplementation (1 mg/kg per day).

• After four months of age, an additional source of iron should be added, first as an iron supplement, then transitioning to iron-fortified infant cereals.

• All exclusively breast-fed infants should receive 400 int. units per day of Vitamin D supplements in the first few days of life.
Artificial feeding

Types:
1- Fresh animal milk 2- Condensed & evaporated milk 3- Powdered milk

*Fresh animal milk: Not advisable before 1 year age as allergic & rachitogenic.

**Powdered milks:**
Sterile.
Easy storage.
Casein is altered.
specific types for specific indications.
Can be fortified
Artificial feeding

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Indication

*Contraindication of breast feeding: breast cancer, breast abscess, maternal epilepsy.

*Need for specific formula: PKU.

*Twins.

*Scanty breast milk.

*Absent mother.
Types:

**Adapted formula:** Substitute for BM ex: Bebelac, S26.

**Lactose free:** Substitute for milks lactose intolerance, Galactosserma. Bebelac LF, S26 LF.

**Soya based milks:** Substitute for Milk protein allergy Isomil, Nursoy.

**Phenylalanine free:** Substitute for PKU Lofenalac, Milupa PKU.

**Low-Sodium milk:** Substitute for Heart failure, Nephrotic syndrome Lonalac.

**Premature formula:** Substitute for PT, lBW ex: S26 LBW
**Predigested milk:** Substitute for Malabsorption, intractable diarrhea ex: Pregestimil.

**High protein milk:** Substitute for PEM, ex: Pediasure, Ensure

**Antireflux formula:** Substitute for GERD, ex: Babelac AR
Amount needed

3- Caloric method: \( \text{amount/ feed} = \frac{[\text{total calories} \times 100/67]}{\text{number of feeds}} \)

Reconstitution: Most types -> 1 scoop/ 30 mL water Except S26, similac, Promil, isomil -> 1 / 60.

Frequency: usually every 3 hours (may 2 or 4 hours).

Full term newborn: 100-120 cal /kg /day.
Weaning
Weaning

* Definition: addition of any food other than milk to infant feeding. Should be a gradual process.

**Why weaning should begin?**
At 6 months of age, the baby's growing body demands are more than the mother milk can provide.
Important Principles for weaning

1- Begin at = 6 mo of age
2- cup rather than a bottle.
3- Introduce 1 food at a time.
4- Strict hygiene before and after meals.
5- Avoid allergic foods (cow's milk, eggs, Hsh, nuts) & high phytate
6- Start by small amount that is gradually increased in frequency and amount.
7- Additions should be tried separately i.e One new food should be introduced at a time spaced by at least 3-4 days.
8- Color, odor, taste and form of food must be attractive.
9-The first feed to be replaced is the mid-day fed & the last feed to be replaced are the 1st & the last.

10-Additions should be at a fixed time of the day. This help the development of conditioned reflexes of the GIT.

11-Encourage eating with family members.

12-Avoid forcing infant to eat. Disliked foods are reintroduced 2-3 weeks later.

13-Parents should never show dislike toward any food.
What to feed

• iron-fortified infant cereal or puréed meats be offered first because they provide iron and zinc

• Once these foods are accepted, strained or puréed fruits and vegetables may be added

• At least one feeding per day should contain foods rich in vitamin C to promote iron absorption.

• The addition of sugar and salt is discouraged
• Fruit juices may be introduced at approximately six months of age.

• Fruit juice should be offered only from a cup.

• Consumption of fruit juice should not exceed 4 to 6 ounces per day (160ml-170ml)

• Fruit juice should be used as part of a meal or a snack and not be sipped throughout the day.
• **Finger foods** — By 8 to 10 months of age, infants begin to refine the skills necessary to eat finger foods independently.

• **Self-feeding** — By 9 to 12 months of age, most infants have the manual dexterity to feed themselves, drink from a standard cup using two hands, and eat foods prepared for the rest of the family with minor adaptations.
Foods to avoid

• Certain foods should be avoided in infants younger than one year of age.

• They include:

• **Hard, round foods** (eg, nuts, grapes, raw carrots, and round candies), which can lead to choking.

• Honey (because of the association of honey with infant botulism).
Hazards of faulty weaning:

I. Time of weaning:
1. Early weaning -> distension - colics - diarrhea (maldigestion).
2. Delayed weaning “prolonged exclusive breast feeding”:
   -> Marasmus (↓ calories), Anemia (↓ Fe), Rickets (↓ Vit D).

II. Amount of foods given:
1. Under nutrition. 2. Obesity.

III. Types of foods given:
1. Food allergy.
2. Low protein + excess CHO -> KWO.
IV. Contamination -> Gastroenteritis.