
UNIT 12 NUTRITION DURING INFANCY

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12.1 INTRODUCTION

Do you remember our discussion on growth and development of infants in DECE-1? We mentioned how growth and development proceeds at such a rapid pace during the first year of life.

In this Unit we will talk about how growth influences the need for various nutrients. The importance of breast milk and planning suitable weaning or supplementary foods will be discussed. This would help you to communicate key messages to the parents of children in your care.

We will also talk about how breast feeding reinforces the emotional bond between mother and infant. As a child care worker, your role in infant feeding is also described.

Objectives

After studying this Unit, you should be able to:

- list the main reasons why breast feeding and supplementary foods are important in infancy
- discuss when and how supplementary foods should be included in an infant's diet
- suggest suitable supplementary foods for an infant.

12.2 IMPORTANCE OF BREAST FEEDING AND SUPPLEMENTARY FOODS IN INFANCY

You may have come across the slogan "breast feeding is best" many times. Do you know why breast milk is the best food for infants? Here is a list of reasons.

- Breast milk is nature's way of providing all the nutrients the baby needs in the right amounts and proportions till the infant reaches 4-6 months of age. No other type of animal milk or milk formula can substitute for this.
- The "first milk" or colostrum which the mother secretes in the first few days after delivery contains anti-infective substances which help the infant to remain healthy.
- Breast milk is free from contamination. This is an important advantage because bottle feeding greatly increases the chances of the infant being exposed to germs through contamination. This is because the bottle itself may be unclean and/or the water used to dilute the milk powder may be contaminated.
- Breast milk is easily digested by the infant as compared to milk from other animals or milk prepared from milk powder.
- Breast feeding costs very little compared to animal milk or tinned milk powders. The extra food that a lactating mother should consume does cost money but this is next to nothing when compared with the cost of bottle feeding the infant.

- The high cost of milk powder often forces mothers to over-dilute it. This can be dangerous because the diluted milk would not meet the infant's nutrient needs, and therefore lead to undernutrition.
- Breast milk does not cause allergies as may sometimes be the case in animal milk.
- Breast milk does not need any adjustment for temperature or consistency.

In addition to these physical, nutritional and economic advantages, breast feeding and the associated mother-child interaction are important sources of stimulation and emotional security for the growing infant.

This discussion would have made you realise how important breast feeding is for the infant. The key message you could communicate to mothers is as follows:

**UPTO 4-6 MONTHS BREAST MILK CAN MEET THE BABY'S
NUTRITIONAL REQUIREMENTS FOR GROWTH AND GOOD HEALTH.**

Why have we mentioned the period 4-6 months? By this age the infant needs more nutrients than can be provided by breast milk. This means we have to introduce foods other than breast milk in the diet of the infant by six months of age. These additional foods are called supplementary foods. Any delay in introducing supplementary foods would lead to slowing down of the growth of the infant. It is interesting to note that the traditional ceremony of "annaprasanna" in some communities corresponds to this age.

**SUPPLEMENTARY FOODS SHOULD BE INTRODUCED BY 4-6 MONTHS
OF AGE**

This is a general instruction. The reason why supplementary feeding is not highly recommended prior to the age of six months is the high risk of contamination.

We must also remember that the supplementary foods introduced should be rich in specific nutrients such as energy, protein, vitamin A, vitamin C, iron and calcium. The infant is born with stores of some of these nutrients such as vitamin A and iron. As growth and development continues in the first few months of life, these stores are used up. Breast milk contains only small/inadequate amounts of these nutrients. So you can realise how important it is for the diet to provide the necessary nutrients. Keeping this in mind is vital for ensuring normal growth of the infant.

It is important to continue breast feeding the infant even after supplementary foods have been started. The multiple advantages of breast feeding remain. It is only due to the increased needs of the infant that breast milk alone is not enough to meet nutrient needs. This idea of the continued feeding of breast milk along with inclusion of other foods is represented in Figure 12.1.

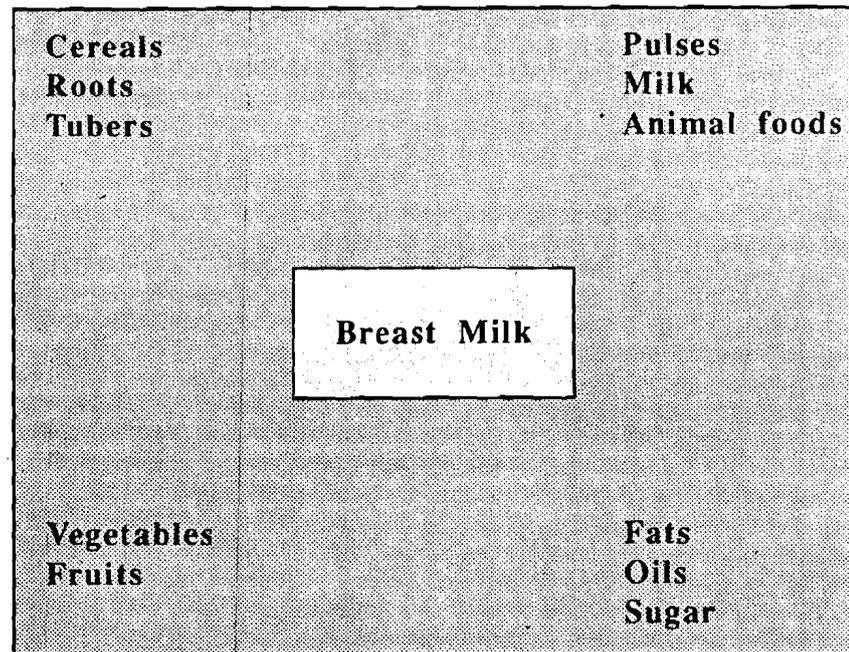


Fig. 12.1: Breast milk and other foods are included in the older infant's diet

12.3 RECOMMENDED DIETARY INTAKES FOR INFANTS

As we mentioned earlier in Unit 8, recommended dietary intakes for energy and protein in the case of infants are expressed on a per-kilogram-ideal-body-weight basis. This is indicated in Table 12.1.

Table 12.1: Recommended dietary intakes for energy and protein for infants

Age of Infant (months)	RDIs	
	Energy (Kcal) per kg ideal body weight	Protein (g) per kg ideal body weight
0-6	108	2.05
6-12	98	1.65

If you notice, RDIs expressed per kg body weight decrease in the second half of the first year of life. This is because the rate of growth gradually decreases from birth to one year of age.

Now how do we convert these figures into total RDI figures?

In order to calculate the total amount of energy and protein that we must include in the infant's diet, we need to know the "ideal body weight" of the infant. The ideal body weight is the weight expected at a particular age for a well nourished infant. The ideal body weights are also indicated in Table 12.2.

On the basis of this let us calculate the average energy and protein that should be consumed by the infant between 6 and 12 months. (Table 12.2 and Table 12.3.) We are concentrating on this group because the RDIs for infants in the first six months only serve as guidelines. This is because the infant is almost exclusively breast fed during this period. So we would not need to plan a feeding schedule keeping RDIs in mind.

Table 12.2: RDIs for Energy for Infants (6-12 months)

Age (months)	Average body weight of healthy infants (kg.)	RDI for energy (Kcal)	
		Per kg. body weight	Total intake in a day
6	7	98	686
8	8	98	784
10	8.5	98	833
12	9	98	882

Table 12.3: RDIs for Protein for Infants 6-12 months

Age (months)	Average body weight of healthy infants (kg.)	RDI for energy (Kcal)	
		Per kg. body weight	Total intake in a day
6	7	1.65	11.6
8	8	1.65	13.2
10	8.5	1.65	14.0
12	9	1.65	14.9

To understand these tables better, let us take the example of an infant 6 months old. She weighs about 7 kg. If we look at Table 12.2 we find that her RDI for energy is 98 Kcal/kg. Since she weighs 7 kg, her actual intake should be $7 \times 98 = 686$ Kcal in a day. Similarly if we look at Table 12.3 we would find that a 6 month infant weighing 7 kg on an average would need to consume $7 \times 1.65 = 11.6$ grams protein in a day.

Check Your Progress Exercise 1

1) Each of the following statements is true. What is the reason?

a) Colostrum must be fed to the new born infant.

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b) Supplementary feeding should begin by the age of 4-6 months.

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c) Recommended dietary intakes for 0-6 month old infants are higher than 6-12 month old infants in the case of energy and protein.

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d) Rich sources of iron and vitamin A should be given to the infant as part of supplementary foods from the age of six months.

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As we mentioned earlier, in the period from 0 to 6 months we can assume that all nutritional needs are met by breast milk alone. These figures for 0-6 month old infants therefore serve only as guidelines for infants who cannot be breast fed. Liquid supplements such as juices and soups may be offered. A few teaspoons may be given at a time initially. Quantities may be increased later to half a cup at a time. It is very important that these supplements be served with clean spoons and should have been

prepared hygienically. From 6 months onwards the figures indicate the total calories and protein that must be supplied by the diet of the infant. These calories and protein come from both breast milk and supplementary foods.

In Unit 8 we listed the nutrients of particular importance in infancy. Let us go over the list again at this point. The nutrients are:

- Energy (Carbohydrates and fats)
- Protein
- Vitamin A
- Vitamin C
- Calcium
- Iron

These nutrients need to be emphasized in the supplementary foods we plan for infants. This is because they are commonly consumed in inadequate quantities particularly in poor communities.

12.4 FEEDING INFANTS

In this section we will be discussing in detail how infants should be fed. One of the most important factors to be kept in mind while feeding infants is consistency. We must remember that:

- a 0-3 month old infant can take in only liquids.
- a 3-6 month old infant can swallow liquids which are thicker in consistency.
- a 6-9 month old infant can eat semi-solid foods which are smooth.
- a 9-12 month old infant can take in small mouthfuls of semi-solid or solid food. Foods need not be sieved or pureed. They can be finely chopped.

12.4.1 Feeding Infants from Birth to Three Months of Age

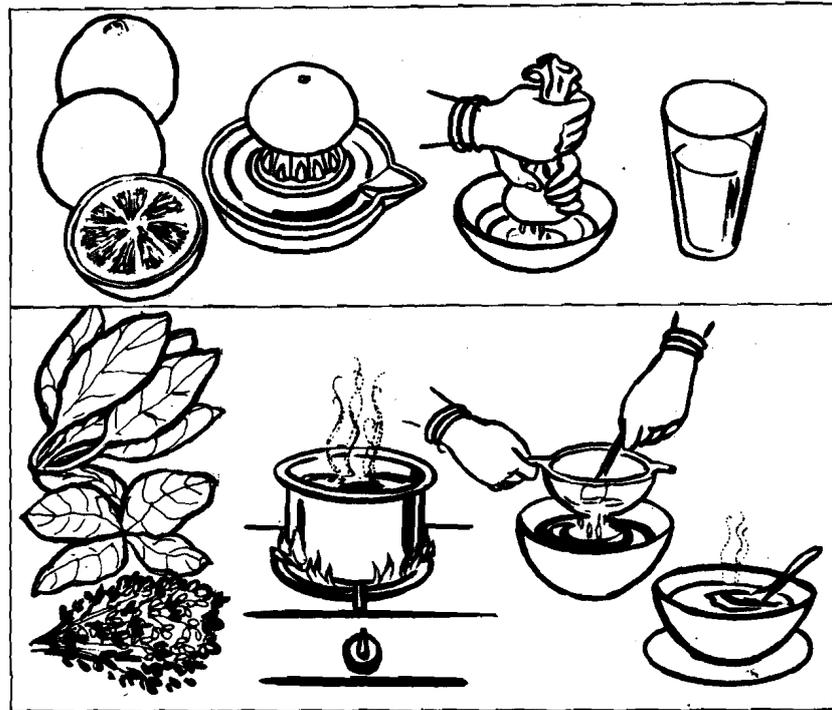
After a baby is born and is put to the breast, she opens her mouth and pulls the nipple in. As she sucks, she pushes the sides of the nipple. This makes the milk flow into the mouth. The fluid secreted by the mother in the first few days after child birth is called colostrum. This is a thick, sticky, yellowish fluid rich in substances which prevent infections in the new born infant. In addition, it also provides the infant with certain substances that promote growth. This is the reason why babies must always be fed colostrum and should be breast fed right after birth.

The breast milk starts being secreted a few days after birth. There is usually no need to give the child any drinks before the age of three or four months. A baby can be given water that has been boiled and cooled *after* a breast feed, not *before*. If a baby is given water before she is fed, her stomach will feel full and she would not drink the milk she requires. By the age of three to four months, juices and soups can be included in the infant's diet (Figure 12.2). These are the first supplementary foods in the infant's diet. Juices of seasonal fruits such as oranges and sweet limes provide much needed vitamin C. The water in which green leafy vegetables or dal is cooked can also be fed to the baby. Since the baby cannot chew, the dal or green leafy vegetable itself should not be given — only the strained juice or soup.

12.4.2 Feeding Infants from Three Months to Six Months

From three to five months, liquid supplements can be continued.

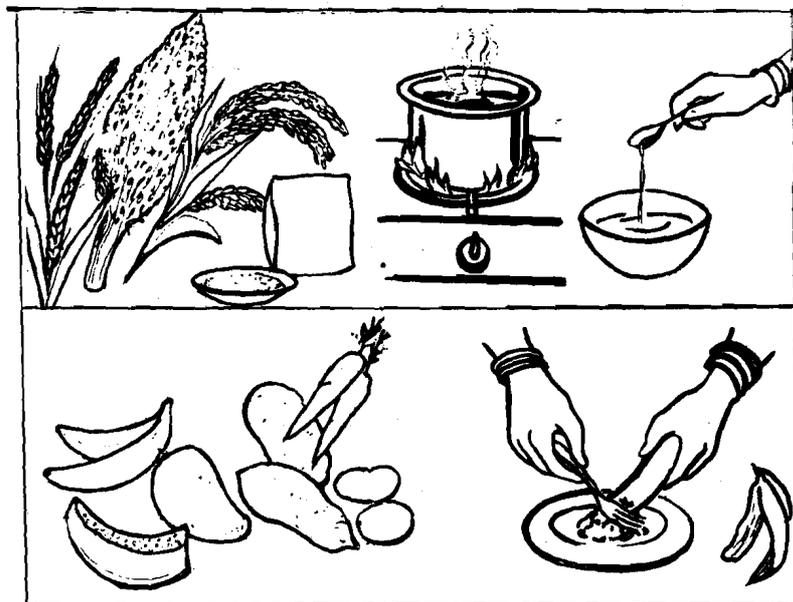
By the age of five or six months, the infant is ready for her first taste of porridge (Figure 12.3). The porridge for infants of this age should be thin and made with some milk. Suji, rice or dalia can be cooked in water or milk till it is soft and diluted into a smooth, liquidy form using milk. Sugar can be added. Once the infant accepts the supplementary food with cereal alone, she can be started on a "basic mix". A *basic mix* is prepared using a cereal and a pulse. Wheat flour and bengal gram flour, for example, can be roasted separately and then mixed when cool. This can then be mixed with milk



Introduce clean and strained juice or soup at 4-6 months.

Fig. 12.2: Liquid supplements for infants

or water to make a paste and then further diluted to a liquidy, smooth consistency. Another example is khichri made from rice and moong dal cooked together.



Serve thin, liquidy porridge and mashed fruits/vegetables at six months.

Fig. 12.3: Semi-solid supplements for infants

A common problem with cereal-pulse mixtures is that they get thick as they cool and therefore a lot of liquid has to be added before the 6 or 7 month old infant can eat it (Figure 12.4). Adding a little oil or butter improves the consistency and the taste as well. It also enables the child to take in more calories in two ways:

- oil itself is a source of calories
- oil reduces the amount of water needed to prepare a supplementary food with the right consistency.

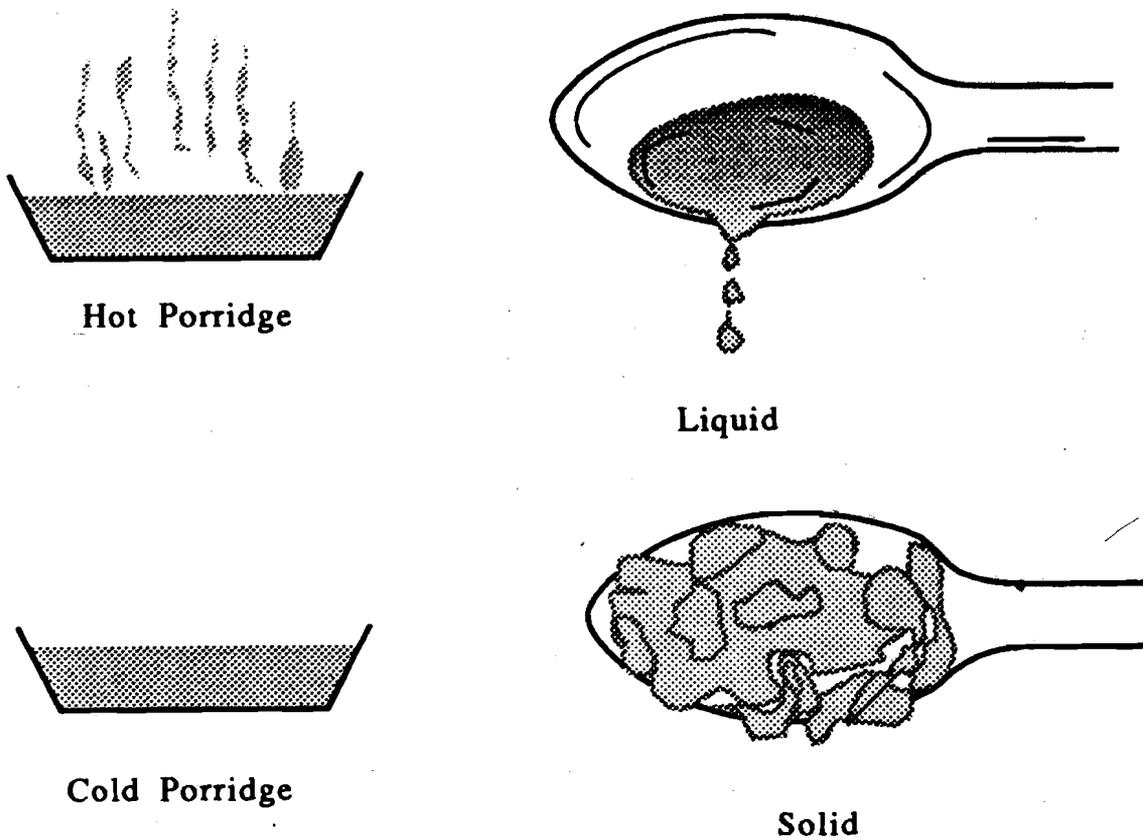


Fig. 12.4: Change in consistency of cereal-pulse porridges with temperature

There is another very effective way of reducing the bulk of supplementary foods made from cereal. This method is to add about one-fourth of a teaspoon of amylase rich food or ARF to the porridge. ARF is prepared by sundrying sprouted wheat grains, removing the sprouts and then grinding the grains (Figure 12.5). ARF is rich in substances (enzymes called amylases) which break down the starch in the cereal to simpler substances. This makes the consistency thinner.

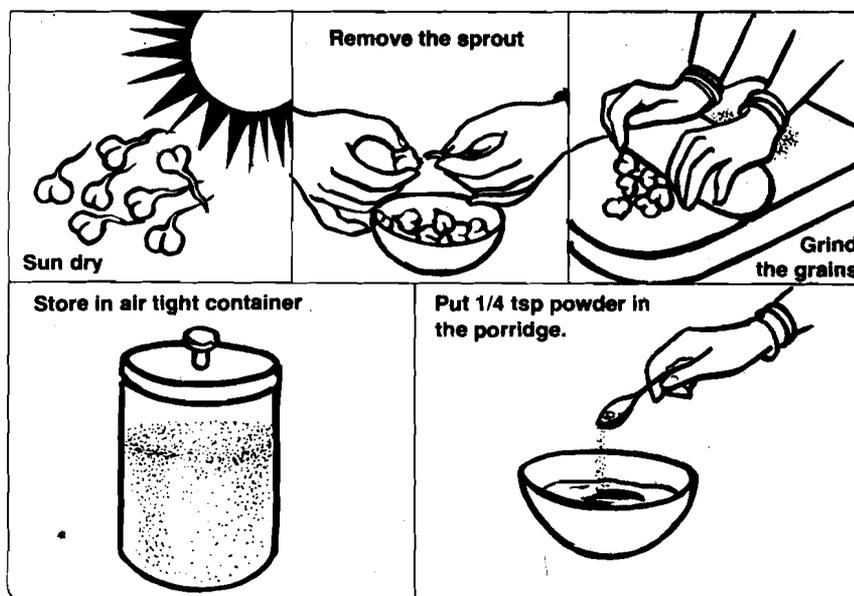


Fig. 12.5: Preparation of ARF powder

Vegetables or fruits which are cooked well can also be given to the 5-6 month old infant. Roots and tubers, vegetables that can be given in the boiled and mashed form include potatoes, sweet potatoes, yam, carrots. Spinach could be offered after fibrous parts have been removed. This can be done by pressing the cooked spinach through a sieve to get a puree.

At this age the infant cannot tolerate fibrous substances. So the skin and seeds of fruits/vegetables need to be removed. In order to preserve the nutrients, vegetables or fruits must be cooked in the minimum of water till they become tender and soft. The more the water used, the more the nutrients present in the food will dissolve in the water and these may be lost. Using the cooking water as well can help to save the nutrients.

Fruits such as banana, papaya, mangoes can be mashed and offered to the infant. However, fruits which are harder such as pineapple and peaches can be cooked first in the minimum of water after removing the skin and seeds. Sugar may be added to taste once the fruits have become soft. These can be mashed, and fed to the infant.

When the infant is first fed porridge, some of it falls out. This is because the infant has been sucking from the breast or drinking liquids from a spoon and does not know how to swallow food of thicker consistency. The tongue must get used to the feeling of such foods and the infant must learn to swallow foods which are thicker than breast milk. The mother can teach her these things by giving her a little of the new food (a spoon or two) for the first three or four days. She should give the infant only one new food at a time and wait till the infant gets used to it. When the mother is starting to give her child a new food, it should be before the infant has had her breast milk and when she is hungry. She will then accept the food and get used to it. However once the child likes a food well, she should be breast fed before the supplementary food is offered. This would make sure that she does take in breast milk too in adequate amounts.

If after several trials, the baby continues to spit out a food, it may be because she dislikes it. Then it is better to forget about that food for a while and try another. It is also possible, that a child may be allergic to certain foods — such foods need to be avoided.

Now let us consider the amounts that should be fed to a 4-6 month old baby.

In addition to breast feeding, a 4-6 month old infant can be offered about half a katori (small serving bowl) of khichri with vegetables or half a katori of porridge (cooked suji/dalia/ragi or rice mashed and mixed with sugar or jaggery and some oil/ghee). This quantity must be offered over five to six feeds since the infant cannot eat much at one time. A normal healthy baby can be fed whenever she demands it. The baby should not be force fed.

12.4.3 Feeding Infants from Six Months to One Year

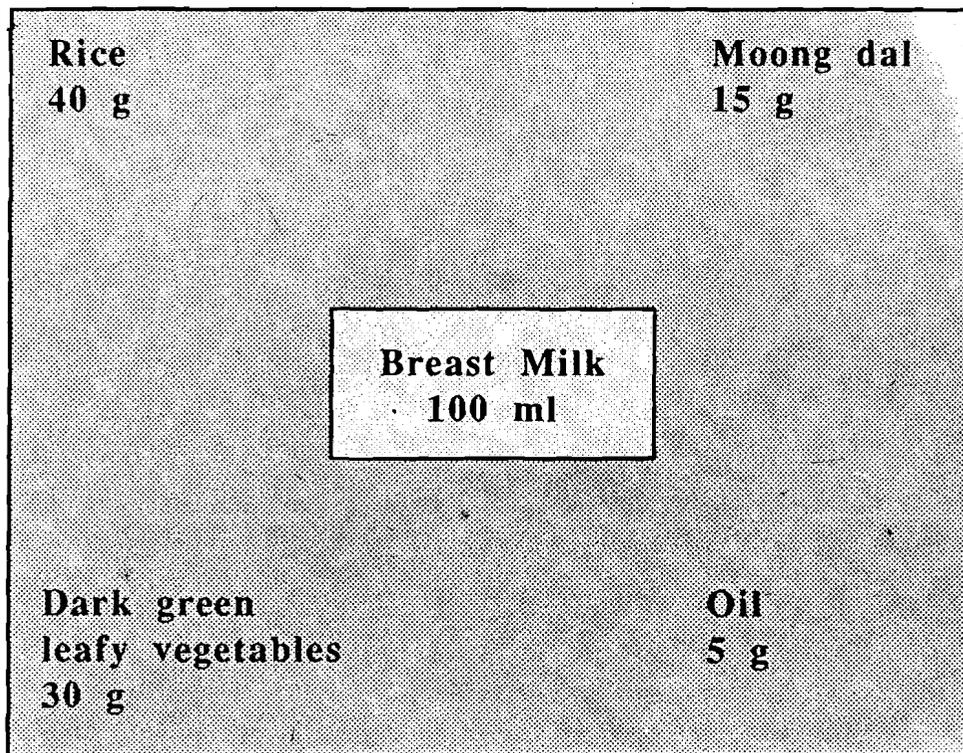
The infant gets her first teeth by the age of six to eight months. This makes it possible for the infant to take in foods which are semi-solid or even solid. At this age, the infant can swallow such foods better and without discomfort.

By the time the infant is eight months old, she should be eating most of the foods that the adults in the family eat, but these foods must not be fibrous and must be mashed till they are very soft. Where these are included in the family diet, soft egg yolk, finely minced and cooked meat, mashed fish, and mashed dals can be included in the diet. All food must be cooked without spices. The infant's tender digestive system cannot tolerate spices.

We have already discussed the basic mixes we can offer to infants who are 6 months old. After this age, we should introduce multi-mixes. Multi-mixes contain four basic ingredients:

- A staple as the main ingredient (e.g. rice or wheat, suji)
- A source of protein (e.g. milk, egg, pulses, chicken, fish, pounded groundnuts)
- A vitamin and mineral source (e.g. a vegetable and/or fruit)
- Fats, oils and/or sugar to increase the energy content of the mix.

The following figure shows you one example of a multimix given along with breast milk. The ingredients would be cooked and offered to the infant as khichri.



By the time the infant is eight or nine months old, finely cut foods such as boiled potatoes and carrots can be given. Biscuits or toast may be enjoyed by her because this lets her chew. Such foods provide exercise to the teeth and reduce the irritation in the gums sometimes associated with teething.

A 6-8 month old infant can take:

- about three fourths of a katori of khichri with vegetables *or* rice and dal *or* one chapati soaked in dal with vegetables.
- about half a katori of cooked suji/dalia kheer *or* rice mixed with sugar or jaggery.
- about half a ripe banana or boiled mashed potato.

The 9-11 month old infant could follow a meal pattern such as this:

On waking : Breast milk

Morning : About half katori upma *or* cooked suji, dalia, rice *or* chapati 'churi' with jaggery/sugar.

Mid-morning : One banana *or* boiled, mashed potato

Afternoon : About half katori khichri with vegetables *or* rice and dal *or* one chapati with curd *or* dal and vegetables.

Evening : One cup milk with sugar

Night : One fourth katori khichri *or* rice and dal *or* half chapati with dal and some vegetables.

Breast Milk

- You would have noticed the emphasis on foods from the "family pot". In other words, items commonly cooked for the rest of the members in the family could be offered to the infant before spices are added. Semi-solid and solid foods are easily consumed by the one year old.

Now let us go through the process of planning a feeding schedule for a 7 month old infant weighing 7.5 kg. Her RDI for energy would work out to $7.5 \times 98 = 735$ Kcal. Her RDI for protein would work out to $7.5 \times 1.65 = 12.4$ g. How much food should be included in her diet? The following chart gives you the answer.

Food items	Amount in grams (raw foods)	Amount in standard measures/size and number (raw foods)
Cereals	20	Little less than 1/4 cup of atta/maida. About half of the 1/4 cup you are provided of rice.
Roots and tubers	60	A small potato
Sugar	10	Two teaspoons
Fats and oils	7.5	One and a half teaspoons
Milk Breast	500 ml	—
Cow's milk	125 ml	Half a glass in household measures or as marked on standard measuring glass
Pulses	15	Less than half of the 1/4 cup you have been provided
Meat/fish/poultry/ eggs		—
Green leafy vegetable	50	One and a half cups of vegetable chopped into fine pieces and loosely filled
Other vegetable	20-25	Half a small carrot or a very small tomato or two pieces cluster beans etc.
Fruits	40-50	Half a medium sized fruit such as apple or orange

These foods could be given to the infant in the following way :

- Early morning : Breast milk
- Mid morning : Boiled, mashed potato
Breast milk
- Afternoon : Rice, dal and vegetables in Khichri form* (three fourths katori)
- Midafternoon : Mashed banana (half)
Breast milk
- Evening : Suji Kheer* (half katori)
- Night : Breast Milk

Notes: *Kheer, Khichri are of smooth, pouring consistency.

Do remember that this feeding schedule and the ones we discussed earlier are only examples. You could think of your own alternatives.

It is important to emphasize that *supplementary foods offered to the infant must be clean and safe*. The following points should be kept in mind.

- The hands of both mother and child should be washed before handling food.

- Utensils should be scrubbed, washed well, rinsed in boiling water if possible. They must then be allowed to dry in the sun and kept covered.
- Foods must be covered to protect them from insects and dirt.
- Porridges must be boiled for several minutes so that all harmful germs are killed.
- Cooked foods should not be kept for more than one or two hours in hot climates unless they have been thoroughly cooked. They should be stored in a very cool place and kept covered. Foods that have been kept overnight should only be given to infants if they have been stored at refrigeration temperature.
- Fruits should only be offered when freshly peeled and mashed. Otherwise they would get contaminated.

During the period when infants are introduced to supplementary foods and after this, they often suffer from infections like whooping cough, measles or diarrhoea. You may be aware that these diseases are caused by germs which may be present in our food/water or in the air we breathe. Poor intake of supplementary foods worsens the situation. *An infant who is well nourished may also get these infections but would recover sooner as compared to an infant who is undernourished.*

It is important to feed the infant well even during illness. A sick infant needs food so that she can fight infections without using up all the nutrient reserves in the body. However, often she is not hungry or she feels too exhausted even to eat.

Mothers sometimes believe that a sick child should get less food. We have all heard the saying "starve the fever". This belief is wrong and can harm the child. The following advice may help a mother feed her child as well as possible when she is sick.

- Breast feeding should continue even if the child has diarrhoea.
- An adequate fluid intake is essential especially when there is infection. Boiled and cooled water, cool weak tea, the water from a coconut or some fresh clean juice from a fruit like an orange can be offered. If there is diarrhoea, oral rehydration fluids should be given.
- Infections affect the appetite, and sometimes a sick child has a sore mouth or lips. She might be persuaded to eat if she is offered foods which are softer, non-irritating and perhaps more tempting than the usual diet. Sick children should therefore be given small frequent meals of mixtures of soft foods such as cereal porridge, boiled milk, tender fish, soft cooked eggs and non-fibrous fruit like banana. This is particularly important if the child has a sore mouth or a troublesome cough.
- Infants with measles, diarrhoea, respiratory infection and other serious infections should be given plenty of vitamin A rich foods.
- When the infant is recovering give her a well balanced diet with sufficient energy, protein and other nutrients to allow her to catch up on her growth and replenish nutrient stores in her body.

Check Your Progress Exercise 2

- 1) Complete the following table.

Age of the infant (months)	Consistency of supplementary foods offered	Types of foods offered
3-6	Liquid	Fruit juices, clear tomato or other vegetable soup or dal soup, mashed fruit such as banana by 5-6 months.
6-9		
9-12		

12.5 EMOTIONAL AND PHYSIOLOGICAL ASPECTS OF INFANT FEEDING

The infant's need for reducing her hunger becomes quickly associated with two activities: sucking the breast and drawing closer to the mother. As the mother feeds the infant again and again, she reinforces her image as the source of satisfaction and security. Her image, smell, feel, and voice become pleasurable stimuli. The mother's dependability, regularity and personal warmth shown through promptness in responding and close body contact provide this essential reinforcement.

A mother who devotes much attention to her infant at the times when she needs her the most is supportively reinforcing. The child, in turn, is more likely to behave in ways that would make sure that her mother gives her attention. This mutual interaction creates bonding between the mother and infant. You would remember our discussion on attachment in Block 2, DECE-1.

The infant gets her first lesson and learns both to control and to be controlled through the experience of breast feeding. This makes her first experience of a "dyadic" relationship — one that occurs between two persons who form a dyad.

Rewarding reinforcement in all "dyadic" situations depends upon the child's having regular and consistent caring contact with one or more persons. By the time a child is one year old, she has developed such an attachment to her mother that not only do many of her satisfying actions require her presence and cooperation, but her very orientation towards her — indeed her simple existence near her — is a source of satisfaction. She loves her mother; she is emotionally dependent on her.

This discussion tells us why it is so important to stop breast feeding gradually. Stopping breast feeding suddenly may make the baby feel neglected, unwanted and unloved. As a result, she may become very unhappy and may not eat any food at all. On the other hand, *gradually decreasing breast feeding till it is completely stopped by the age of 6 months is recommended.*

Stopping breast feeding gradually is important for the mother as well. If the mother of a young infant stops breast feeding suddenly, her breasts may get heavy with milk and become painful. This may be accompanied by soreness and infection.

A relaxed and happy mother maintains breast feeding well. However, the child's sucking is important too. If she sucks well, more milk would be produced and the infant's needs would be met. The baby's sucking action sends a "message" to the mother's brain to produce certain hormones. These hormones act upon the milk glands to produce milk and to release it through the milk ducts.

Hence, if the infant does not suck well or if the mother breast feeds less frequently, milk production decreases. This can seriously affect the health of the infant, unless supplementary foods are given.

A child should be eating enough porridge or other supplementary foods by the time breast feeding is stopped. If she is not eating the right amount of these supplementary foods, when breast feeding ends, she may not get enough to eat and may become thin and malnourished. If she is eating only a cereal porridge without added protein-rich foods (such as pulses, groundnut or soyabean flour or milk), she would get kwashiorkor when breast feeding stops. If too little supplementary food is given or supplementary feeding is delayed for too long, a nutritional deficiency called marasmus occurs. You would be learning more about marasmus and kwashiorkor in Unit 15 of Block 5 of this course.

A child should be eating a variety of foods in sufficient quantities by the time she is about 18 months old. If she is doing this, she will not miss breast feeding when it slowly ends, and she will not become malnourished.

Although an infant is beginning to eat adult food by the time she is one year old, she is still not able to eat as an adult eats. A young child is different from an adult and her needs are different. The following points show:

- She must be fed many times a day — at least three to four meals a day in addition to morning and night breast feeds.
- She needs foods which are not spiced
- Her food must be well mixed and warm (not too cold or too hot)
- Food for the infant needs to be cut into small pieces to make it easy to swallow and digest.
- The infant should be helped to eat with a spoon but soon she will learn to feed herself, with her hand or with a spoon.
- She should be given her own special plate or bowl and food should be served for her in this plate/bowl.

Close interaction with the mother during feeding is very important for the child. An infant who continues to receive the mother's care and loving attention would feel secure even when breast feeding is stopped. Meal times should always be pleasant. Negative associations are made with food if the infant is force fed or scolded for not eating fast or for spilling food. If the infant wants to participate in feeding herself by clasping the spoon, she should be encouraged.

12.6 ROLE OF CHILDCARE WORKER IN INFANT FEEDING

The childcare worker substitutes for the primary caregiver for the time the infant is in the creche. Hence it becomes an important task for you as a childcare worker to look after the needs of the infant.

The nature and extent of the childcare worker's role would depend on:

- whether the mother visits the creche for feeding the child
- facilities available in the creche for storage of foods sent from home for the infant
- facilities available for feeding the infant e.g. suitable cooking area, gas burner and utensils for warming food when necessary
- arrangements for keeping foods covered with wire mesh covers to prevent insects from contaminating the foods.

The childcare worker would be responsible for

- cleaning the utensils, cup and spoon for feeding infants
- supervising the work of the helper (if available) for keeping the cooking area clean and dry as well as storing foods sent from home/prepared in the creche.

Maintaining adequate standards of hygiene is an important part of the worker's role. Windows and ventilators should be fitted with fly proof screens/wire meshes. Infants and young children are very susceptible to diarrhoea and other gastrointestinal problems due to infection. Flies, cockroaches and rats are major sources of harmful germs. Regular cleaning of cupboards where utensils/food is stored is necessary. Feeding bottles used need to be sterilized. Utensils should always be kept inverted after washing and cooked food should be kept covered.

It is best to feed the infant using a bowl/cup and spoon. Both cup and spoon must be free of areas which can collect dirt such as ridges or thick rims. They should be easy to clean. If you are providing supplementary food in the creche itself, it would be best to prepare a "premix". Premixes are similar to the commercial infant formulas available in the market. They are made in powdered form. You would just need to add water or milk to reconstitute it. The quantity of premix and liquid to be added would depend on the age of the infant being fed. One suitable premix you could use is Shishu Ahar.

SHISHU AHAR

Roast 40 g puffed rice, 20 g bengal gram dal and 10 g groundnuts separately. Powder the roasted ingredients, mix and let it cool. Store in an air tight container. Mix sugar/jaggery in warm water or milk and add to this premix when you want to serve it. The amount and consistency would depend on the age of the infant.

The quality of interaction during feeding is most important. The childcare worker must remember that the infant has been separated from the mother and initially may have a problem in accepting food from someone else. However a warm, interested and animated childcare worker would be able to establish a bond with the infants in her care. Maintaining the interaction from day to day is necessary. On some days infants may cry more and respond less to stimulation. It requires patience to feed the infant at such times. On other days the infant may be playful and spill food or insist on feeling the cup, spoon and the food inside and may even attempt to feed herself. This should be encouraged and the infant should never be scolded at meal times. Keeping this in mind would help the childcare worker to ensure that feeding is a pleasurable experience for the infant.

Sometimes it is possible for the mothers to come to the creche and feed their infants. A separate room should be provided, if possible.

Check Your Progress Exercise 3

- 1) How does breast feeding promote bonding/attachment between mother and infant?

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- 2) "Both physiological and emotional factors play a role in successful breast feeding."

Do you agree with this statement?

Yes

No

Give reasons

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- 3) List the two major features of the role of the childcare worker in infant feeding.

a)

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b)

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12.7 SUMMING UP

The major points that have emerged from this Unit are:

- Nutritional requirements for energy and protein for infants are high when compared to their body size. RDIs per kilogram are much higher than for adults.
- Upto 4-6 months of age the infant should be fed on breast milk alone. Colostrum secreted in the breast in the first few days after delivery helps the child to resist infections. Breast milk is best for meeting the infant's nutritional needs. In addition it also contains substances which promote growth and fight infection.
- By the age of 4-6 months the infant can no longer meet her nutritional requirements from breast milk. By six months the infant should have started on supplementary feeding.
- Breast feeding should be continued as long as possible even after supplementary feeding has started.
- Supplementary foods can be varied in their composition and consistency depending on the age of the infant. The first supplementary food should be liquidy in consistency. As the child grows, thicker consistency foods can be offered and a greater variety of foods can be included in the diet. By the time the child can chew, grated foods can be offered; foods of crisp texture such as biscuits or rusks can be introduced. By the age of one year the infant can eat all the foods an adult eats except that spices cannot be tolerated, and that the foods should be essentially well-cooked with fibrous portions such as stalks, skin and seeds removed.
- Breast feeding should be reduced gradually over a period of time. It should never be stopped suddenly.
- Breast feeding is associated with important psychological and emotional features. Bonding develops between mother and infant. The close physical contact and the stimulation provided by the mother during feeding helps the infant to experience pleasure and satisfaction during feeding. This "dyadic" relationship helps the infant to feel emotionally secure.
- Close, warm interaction with the infant is important during supplementary feeding as well. The caregiver gets an opportunity to enable the child to participate in feeding herself. This may involve just holding the spoon as the caregiver takes it to the mouth but even this gives pleasure to the infant.
- The childcare worker's role in infant feeding is as important as the mother's. Serving food that is clean and nutritionally adequate in a pleasant manner is so vital for providing the infant a feeling of security and satisfaction.

12.8 GLOSSARY

Allergy	:	The condition when the body reacts to a substance (e.g. a food) and there is skin rash or diarrhoea.
Fibre	:	Substance present in food which cannot be digested by the enzymes present in the body.
Staple	:	The food consumed in relatively larger amounts that forms the main part of the meal e.g. wheat or rice.

12.9 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress Exercise 1

- 1) a) Colostrum contains substances which promote the growth of the infant and prevent infection.
- b) By 4-6 months breast milk alone cannot meet the infant's nutrient needs. Other foods need to be introduced by this age so that the infant can grow normally.
- c) Growth rates are higher for the 0-6 month old infant. Therefore the need for energy and protein is higher on a per kg basis.
- d) By the age of six months, the vitamin A and iron stored in the infant's body gets used up. Breast milk is not rich in iron. So supplementary foods must provide these nutrients.

Check Your Progress Exercise 2

Age of infant	Consistency of supplementary foods offered	Types of foods offered and their form
6-9 months	Thick, smooth liquidy to semi-solid with small pieces of vegetables and fruits	Basic cereal-pulse mixes or cereal-milk mixes at 6 months to multimixes later. Skin and seeds of fruits and vegetables need to be removed. Meat and meat products should be ground and in tender form. At 6 months pureed vegetables should be added. Later by 9 months they can be chopped.
9-12 months	Semi-solid to solid	Finely chopped foods such as vegetables and fruits can be added to supplementary foods made from cereal and pulse. Rusks, biscuits, carrots can be chewed. By 12 months almost all foods eaten by adults can be offered in softer form without spices.

Check Your Progress Exercise 3

- 1) During breast feeding the mother holds the infant very close, talks to her, fondles her. The infant begins to associate the mother with satisfying her hunger, with emotional security. This promotes attachment between mother and infant. The mother's promptness, dependability, regularity and personal warmth makes the bond stronger.
- 2) Yes. A relaxed and happy mother is better able to promote successful breast feeding. If the infant also has learned to associate feeding as a pleasurable experience, she will feel more secure. The infant's sucking is an important physiological factor that actually stimulates milk production.
- 3) a) Preparation/serving nutritionally adequate foods of suitable consistency
- b) Maintaining adequate standards of hygiene while cooking/reheating/serving/storing.