CHAPTER 11

REVIEW OF LITERATURE
REVIEW OF LITERATURE

Children are the most cherished possession of any society. They are the leaders and statesman of tomorrow. Childhood is the period of rapid physical and mental growth because they are constantly building up new tissues and replacing old ones, so if children are not provided with the proper nourishment they need, under-nutrition and malnutrition of one type or other will inevitably result, which will not only effect their physique, but also their mental growth, social abilities and behaviour at home and in the school.

Weaning is one of the most critical period in the life of an infant and therefore, has assumed greater significance in initiating proper growth and development which decides physical, mental and social fitness to enable to keep an individual in the society in its most idealistic fashion.

In the course of an exhaustive search by the author to locate, identify and isolate references appropriate for the present study, author came across with quite a large number of studies covering various aspects of the weaning process. This particular chapter- "Review of Literature" for the sake of convenience has been divided into following different sections.
1. Weaning - concept, meaning, need, importance and other relevant aspects.

2. Socio-economic characteristics of mothers of weaned infants.

3. Mothers and their knowledge relating to various aspects of weaning.

4. Adoption of recommended practices of weaning by mothers.

5. Constraints in the adoption of recommended weaning practices.

6. Suggestions offered for effective adoption of weaning practices by the mothers.

7. Nutritional status of infants.

8. Health status of infants.

9. Rural and urban weaning practices.

I. Weaning - concept, meaning, need, importance and other relevant aspects:

Definition and meaning:

According to "Venkatchalam" (1981), "Weaning is a gradual process. It begins from moment supplementary food is started till the child is taken completely off the breast. Thus weaning is the process of accustoming the baby to varieties of food so that food habits are developed."
According to "Berggren" (1981) "Weaning means more than removing the child from the breast. It includes the long critical period when the child slowly adopts to other adult food while continuing to breast feed."

According to "Cameron" (1983), "Weaning means to 'accustom' and it describes the process by which the infant gradually become accustomed to the adult food diet."

According to "Phadnis" (1984) "Weaning" is a gradual process which begins from the moment supplementary food is started till the child is taken completely off the breast.

According to "Raina" (1986), "The term weaning is used to denote the process in which an infant changes from breast milk to mixed diet starting with small quantity of supplementary food given regularly in increasing amounts."

The term weaning should be used to denote the process in which infant's diet changes from breast milk to a mixed diet, other foods being given regularly over a time in increasing amounts until replacement is virtually complete. The term also denotes the transitional period in which the infant is gradually introduced to new interactive experience within his environment, a period of emerging independence. It is therefore a very important period in the normal development of the child.
Schmitz and McNeish (1987) pointed out that in different countries and societies there is a variety of successful weaning practices. This empirical observation leads immediately to the conclusion that there is a range of practices—qualitative, quantitative and temporal within which infants can thrive. In the elusive search for the optimal feeding regime, the changing nutritional requirements of the growing and developing infant must be matched to the maturation requirements. The growing and developing infants, must be matched to the maturation of functions and capacities of the gastrointestinal tract. However, it must also be remembered that within limits, some functional adoptions can occur.

2. Need and importance of weaning:

In the vast biological stretch of early childhood, infancy is perhaps the most critical and vulnerable period. There is the time when the child needs acceptance, love, and nourishment to his body and stimulation for his mind (Deyal, 1983).

According to Schmitz and McNeish (1987) when a baby is about 4–6 month old, the mouth becomes ready to accept non-liquid foods. Teeth begin to appear and the tongue no longer automatically pushes solid foods out of the mouth. The stomach
also begins to digest starch better by about nine months. Babies are able to use their hands to put things into their mouths properly. During this time children are becoming ready to eat some solid foods.

Babies who begin to eat semi-solid foods before they are 4-6 month old usually take less breast milk because their small stomach are easily filled. As a result, they may not grow well. A child may start to cry more often than before because of hunger and malnutrition. On the other hand, after 4-6 months of age, children are growing too fast to thrive on breast milk alone. For these reasons, great care needs to be taken in deciding what foods to be given to babies, and when and how to give these foods. Every baby is different. Very big babies may need to start a mixed diet earlier than smaller ones.

In 1991 Khan, revealed that it is desirable for infants to fed for at least the first four months after birth. Among lower socio-economic groups, prolonging the duration of exclusive breast feeding up to six months may be advantageous in view of the poor environmental sanitation and lack of safe water. However, beyond this time, the child must be provided with supplementary food, as the breast milk output would not be adequate to provide the required nutrient intake for infants.
In general, breast milk alone is perfectly adequate until the baby is at least 4 months old, or weighs 6-7 kgs, other foods are unnecessary before this time, and can be harmful. On the other hand, if other foods as well as breast milk are not given by the age of 6 months, most babies will not get enough food to grow well.

3. Weaning Age:

Medivitt and Mudambi (1980) opine that the transition from breast milk to other foods often takes 18 months to 2 years, when the baby should be gradually accustomed to take solid foods containing protein, iron and vitamins before he is completely weaned.

The age of weaning when weaning foods can be introduced will depend partly on the development of the "Functional capacity" of the Gastrointestinal tract (GI) and also depend on maturation of "mechanical" factors, especially chewing and swallowing. Introduction of some special foods also depends on behavioral, psycho-social and cultural factors.

Ballabriga and Rey (1987) stated that the earliest age at which weaning foods can be tolerated lies in a balance of:

1. The digestive and absorptive capacity of the GI tract for different substrata.
ii. Mechanical factors - the development of sucking, chewing and swallowing.

iii. Lactose is one of the main nutrient that the intestine of the newborn has to digest and absorb immediately after birth.

In contrast to lactose, starch even given in sizeable amounts is well tolerated by newborn, even though a amylase activity is extremely low at this stage. Careful balance studies have shown that 30 months old normal infants are able to absorb perfectly 25 gm per day cooked wheat, corn, potato starch and upto 40 gm per day of cooked rice starches are absorbed without fermentation.

Regarding the age of weaning, Arora and Rao (1971) observed that the maximum percentage (42.00) of children completely weaned are in the age group of 12-24 months. As regards starting of weaning majority i.e. (36.00%) are in the age group of 0-3 months and (83.00%) are in the age group of 0-18 months while (49.00%) of children have breast milk for the first nine months.

During the studies of child rearing practices in the Chevella block (Hyderabad) Muthayya (1972) noted that majority of the children between 0-1 year age were breast fed. About 3.00 percent indicated that the age of weaning was between 2 to
3 years while 29.00% stated that the weaning was done at the age of 1 to 2 years. However, 13.00% respondents indicated that at weaning, the child was at 3 years of age. This pattern was familiar in all the areas in that region.

In Madhyapradesh Patodi et al. (1978) observed that the most common age of weaning in rural area was 13 to 15 months. While in the urban area it was 10 to 13 months.

4. Weaning Foods:

Human childhood may be divided into three stages, namely Infancy, Weaning stage and Pre-school stage.

In a child's life, each of these stages has its own importance as far as its nutritional needs are concerned. During infancy the child mostly depends on milk, mother’s milk, or in its absence or deficiency, milk from some other source. Mother’s milk has all the nutrients essential for the growth and maintaining sound health of the infant.

Several types of weaning foods are being marketed in many countries including India. Most of the weaning foods being nutritious, blends of cereals, legumes and milk, are excellent supplements to child’s milk food, and they are convenient to feed also. But many of the proprietary weaning foods are quite
expensive and are beyond the purchasing power of the parents belonging to middle and lower income groups in the developing countries.

Homo Prepared Weaning Foods:

Simple mixtures of malted cereals, pulses, and oilseeds in proportion of 4:1:1 are acceptable to mother and children.

Village Prepared Weaning Foods:

In Thailand, formulation of foods prepared at the home of village level is based on locally available raw ingredients. Manually packed bags may be kept for six to eight weeks (Tomtisirin et al. 1960).

Commercially Prepared Weaning Foods:

Several countries have projects to produce low cost weaning foods as an intervention for childhood malnutrition.

Weaning foods can be divided into three types,

i. Liquid food.

ii. Semi-solid food,

iii. Solid food.
1. Liquid Supplements:

The first food added to the child’s diet after four months should be in the liquid form. They can be given the cow milk or buffalo milk. While giving buffalo milk to the infants one thing should be remembered that the nutritive value of buffalo milk contains more fat than breast milk and cow milk. So till 6th month buffalo milk should be diluted with water. After 6th month undiluted milk should be given (Phadnis 1984).

Juice of fresh fruits like orange and sweet lime serves to supplement some of the protective nutrients not present in breast milk as well as in animal milk. The juice of boiled vegetables can be given to the infants. In place of fruits and fruit juice non-vegetarians can also give bone soup to the infants (Mcdevitt and Mudambi 1980).

ii. Semi-solid Supplements:

Some babies take semi-solids easily and happily while other panickly and resist new tastes and the feed of a spoon in the mouth. Whatever you do, do not start a battle with the baby.

At the age of 5-6 months different types of soft and mashed foods can be introduced to the babies. A ripe banana or a portion of mango is generally relished by them. Commercially
available "Farex" and "Bal Amul" are also recommended during these months. Rava, rice kanjee can be given. The green leafy vegetable, that are added to the khichadi or porridge provide more nutrients like vitamin A. These nutrients are essentially good for vision, blood formation and healthy bones (Anon, 1977).

iii. Solid Supplements:

When the baby starts cutting his teeth, it is the time to start changing him over to chopped and pounded foods. A piece of chapati, boiled egg, potatoes, biscuits can be added in the infants diet. After one year, infants can be fed with a diet almost that adult takes, but without any spices and condiments (Anon, 1977).

A large percentage of the mothers 70.00% introduced other milk and solid foods in addition to the breast milk to their children at three to five months of age (Agarwal and Udipi 1989).

Gopalan et al.(1977) observed that during the first 24 hours, the majority of the new born received water sweetened with sugar, jaggery, honey etc. A great majority of mothers, breast fed their new-borns on or around the third day of delivery. Tea, coffee, kanjee and porridge based on local cereals and milk formed most common supplement after 6 months.
In Madhya Pradesh, Patodi et al. (1976) observed that all the infants in urban areas were given plain water in addition to milk feeds but in rural areas, only 50.00 percent were given water. Rural mothers believed that water is a cold drink and the infants might develop respiratory infections. In the rural area, 42.70 percent infants received supplementary milk feed while it was 69.40 percent in urban areas.

Ghosh (1981) conducted studies on traditional patterns of weaning in various cities and revealed that banana, ragi gruel and some kanjee is given in Tamilnadu and Kerala. In Andhra Pradesh, boiled, polished rice is generally used with dal, or rice gruel is given with ghee. In some areas of the south, biscuits are preferred. In Calcutta, rice kanjee is usually the first non milk feed, later followed by various kinds of rice like puffed rice, flat rice or fried rice. Barley, sago and arrarot are sometimes given. In Mumbai too, rice gruel is usually the first food. In Rajasthan, preparations made of jawar and bajra flour are used. In and around Delhi, khichadi, dalia, roti, sago, suji or rabri is given. Mashed chapati with ghee is preferred in Punjab.

Chaudhari and Chatterjee (1991) revealed that in this study group breast feeding was universal irrespective of socio-economic and literacy status. Majority (83.00%) started breast
feeding on the 3rd day of life of infants. About (84.00%) of mothers gave some prelactoral or inaugural feeds e.g. honey, janamghutti, sweet-candy water etc. Usually within first 24 hours after birth with the belief of preventing cough and cold to the neonates and also as customary feeding. Janamghutti, a proprietary indigenous herbal preparation mixed with honey, was believed to promote growth and development of babies and act as a digestive tonic.

Novin and Barbara (1980) had revealed that, however, most infants need additional food by the age of six months. In several instance, it is observed that solid food in family were started only around the 18th month of life or later with the belief that as long as the baby is breast fed there was no need for any other type of food.

Weaning foods should depend mainly on the presence of appropriate biochemical pathways for digestion, absorption, and utilization of each nutrients. The quantity of each nutrient should also depend on the digestive and absorptive capacity of the gastro-intestinal tract for different substrata. It may also depend on appetite.

In his book Minturan (1966), stated that Rajputs of Kharapur says that they believe that the child gets mother's
milk when he cries. Mother’s milk is considered to be the best milk for the child. Supplementary milk is given when the mother has insufficient milk. Goat’s milk is supposed to be the best, while cow’s milk is next best and buffalow’s milk is inferior to these. Supplementary feeding is practiced at the age of 6th month to two years.

In his studies of 788 infants from Pondicherry in South India, Puri and Khanna (1978) observed that sugar water was the initial feed to (84.02%) of the infants. Breast feeding was delayed beyond the first 48 hours of life in (50.00%) of the cases. This was being attributed by the mothers to family tradition and also to avoid ingestion of the colostrum. Weaning with semi-solid food was done in (42.00%) of babies as early as at fifth month of age and in rest it was followed by the 9th month, 12th month and by 2 years of age. Most of the babies received their first solid food between 9th and 12th month of the age.

5. Guidelines to Develop Recipes of Weaning Foods:

It is necessary to pay more attention to the type, quality and quantity of weaning food. Growing infants as well as young child has need for greater amounts of nourishing food on the basis of unit body weight.
On the basis of unit body weight, the growing infants as well as young child has need for greater amounts of nourishing food than adult. The food suitable for a child vary from one place to another, depending on availability, cost, culture, food preferences and so on. A meal is usually made from several foods, each food supplies some energy and different nutrients. All of each combine together in the meal. It is important that the foods are in the right proportion so that there is an adequate balance between the nutrients, and between energy and the nutrients.

The food chosen for a weaning recipe should be easily available from local market, low in cost and used frequently in most households. Local methods for food preparation and cooking possible, should be recommended.

When a few simple recipes have been developed, they should be tested on a few children in one meal daily. A great deal can be learnt from such trial, for instance, how the children like the recipe, how much food can be given at one time, and how long it can be stored before it spoils.

The volume of meal must not be large because children aged 1-3 years can only eat about 150-200 gm of solid food at one time. If a child is eating only three small meals a day each one must have a high concentration of energy and nutrients in order
to meet the child's requirement over 24 hours. The proportion of staple and protein supplementary food in the recipe should give the best protein value possible.

How to Pick the Right Solid Food for Baby:

Weaning foods are not foods that are something very different but it is an imitation of adult food prepared by processing the ingredients to make them easily digestible. And of course, the food should be balanced and nutritious so that it can promote a healthy growth of the child. The characteristics needed in a weaning are:

1. The food should be rich in calories and adequate in protein, vitamins and minerals.
2. The protein should be of good quality and of high biological value.
3. The food when stirred up with cold warm water or milk should form a slurry or semi-solid mass of soft consistency enabling the child to swallow it easily.
4. The food prepared as above should have low dietary bulk or viscosity.
5. As far as possible, the food should be precooked and predigested or processed in such a way, that it needs minimum preparations prior to feeding and is easily digested by the child.
vi. The food should be free from anti-nutritional factors (substances that hinder the digestibility) or are otherwise, harmful such as enzyme inhibitor, gas producing factors and toxic components.

vii. The indigestible fiber content of the food should be low.

viii. It is advisable not to add artificial colours and flavours to weaning foods.

ix. As far as possible, the composition of the food must be as per the guidelines laid down and standards recommended by Indian Standards Institutes or other competent agencies.

An Ideal Food Mixtures For a Young Child Contains all the Following Types of Foods:

The staple is a good base for infant foods but it is not enough. Other foods are also needed as well. At first breast milk is needed, but as the baby gets older further types of foods are needed. Other types of food are as under:

i. Peas and Beans.

ii. Food from animal.

iii. Green leafy vegetables and orange vegetables.

iv. Oils and Fats.

v. Fruits.
1. Two Mixes :

When the staple has one other type of food added to it we call it a two mixes. Two mixes are quite nutritious and form the main part of many meals.

Examples of two mixes:
- Staple + peas or beans.
- Staple + food from animals.
- Staple + dark green leafy vegetables or orange vegetables.

2. Three Mixes :

Three mixes are better than two mixes. They are made up of the staple plus two more types of foods.

Examples of three mixes:
- Staple + peas or beans + food from animals.
- Staple + peas or beans + dark green leafy vegetables or orange vegetables.
- Staple + food from animals + dark green leafy vegetables or orange vegetables.

3. Four Mixes :

Best of all are four mixes. These contains all four major food types. They are a mixture of the staple, plus beans or
peas, plus food from animals, plus green leafy vegetables or orange vegetables.

Example of a four mixes:
Staple + peas + beans + food from animals + dark green vegetables or orange vegetables.

It is recommended that little oil or fat to a child’s meal be added whether it is a two mix, a three mix or a four mix. do not forget the breast milk and give some fruit or fruit juice either at meals times or as snacks between meals (Anon, 1988).

6. Techniques of Weaning:

Darwish et al. (1982) narrated different weaning techniques by locality in Egypt.

The most common techniques were those aimed at keeping the infant off the breast by discouragement. The chief way of doing this was to rub cactus juice, henna, strong spices, or other bitter or unpleasant tasting substances to the nipples. The mother might also scold the infant whenever it expresses a desire to breast feed or distract it by giving it something to play with. Some mothers altered their dress by stitching up the side opening originally designed for convenience in feeding or fastened the front of the dress near the neck so the child could
not reach the breast. These techniques were common in rural than in urban areas 85.08 percent and 52.09 percent respectively.

They further referred about another technique which was of substitution, in which mother gradually gave the infant semi-solid and solid foods. This was used more commonly by urban than by rural areas 9.05 and 4.03 percent respectively.

A third approach according to them was separation of the infant from the mother sending the child to relatives for a while until it forget about breast feeding.

According to Ahmed (1982) there was a group of mothers who could not specify any particular method of not specify any particular method of weaning and some of them stated that the infant weaned himself. They composed 13.02 percent of urban samples and 3.06 percent of rural ones.

Darwish et al. (1982) revealed that gradual weaning most often begun at anywhere from about 6 months up to 18 months.

According to Phadnis (1984) the weaning foods must be introduced gradually. Baby should be given small quantities of different supplementary foods while reducing the frequency of breast feeding. As the infant grows older, it should be shifted from liquid to semi-solid and then can be fed solid.
7. Reason For Weaning:

The predominant physiological reason for introducing solids is nutritional. A second important reason for introducing solids at the appropriate time is behavioral. There may be a "Critical period" of neuronal or brain development during which the normal infant learns to chew. If an infant misses this learning experience at the appropriate time (which probably extends from around 6 months till the end of the first year), severe feeding problems can ensure subsequently, infants respond to sweet taste by increased food consumption throughout the first 6 months of life. New born react to salt in a negative manner. On the other hand, children of 2 years of age prefer high salt concentrations to unsalted food, and this preference is maintained throughout childhood. All faction, as tested by facial expressions, leads to liking or disliking reactions that may arise from associative learning. Palatability involving taste, smell, and texture has also proven to be a factor in the decision for food consumption (Crook and Lipsett 1976).

Darwish et al. (1982) revealed that the onset of a second pregnancy was the reason for weaning in 5.03 percent of the total sample and was more common in rural than in urban groups.
8. Factors Affecting Weaning Process:

Sucking, chewing and swallowing capacity can be considered as oral, pharyngeal, and esophageal functions, which are also basically developed in the foetus. Postnatal functional developments, which prepare the capacity for acceptance of weaning food, concern chewing skills as well as functional changes in the lower esophagus (Schmitz and McNeish 1987).

Eating solids may be influenced by learned behavior, since there is a significant relation between the frequency of exposure and voluntary acceptance of food by a child (Birch and Marlin 1982).

The trend among some populations is to wean so early that the child is deprived of breast feeding and given substitutes of inadequate nutrition (Nevin and Barbara 1980).

In the studies Dodd and Dutta (1987) observed from the result of the survey that higher income groups infants are weaned earlier compared to infants from lower income group or middle income group. However, in none of the three socio-economic groups weaning was started before four months of age.

Gopalan et al. (1988) revealed that the mother's knowledge regarding the age for introducing solid foods and the type of solids to be given was significantly related to their
children’s weight for age and weight for height. Only 10 percent of the mothers knew the correct age and types of solid foods to introduce into the diets of their children, and most mothers incorrectly suggested delayed introduction of soft and semi-solid foods.

Majumdar (1962) reported certain aspects of child rearing in village Mohana in Lucknow district and observed that the child was fed on goat or cow’s milk for the first five to six months. Milk was given to the child till he was three years old. Feeding was done on child’s demand rather than on any time and interval considered desirable by the parents.

Modhok (1972) studied child rearing practices among rural women of Mohipalpur village, New Delhi. Study revealed significant difference in child rearing practices among the mothers belonging to different castes and families with different socio-economic status.

Subbulekshmi and Udipi (1990) stated that the environment plays a great role in a child’s growth and health. Micro-environmental conditions such as poor housing and sanitation have been implicated in the synergism of malnutrition and infection. The influence of the macro-environment, including social, economic, and cultural variables, on child rearing
practices is well established. In addition, various maternal attributes have been shown to be the most important cause of malnutrition.

Gupta and Bhandari (1972) revealed that household with complex structure discourage the early introduction of semi-solid food into the diet of child. In nuclear households about 4% of the children were introduced to the semi-solid food within the age of six months. Health education experts had a noticeable influence on mother’s behaviour in the introduction of semi-solid food to the child and subsequently the child feeding practices.

According to Gupta (1986) health education minimizes the negative influence of household with complex structure on the inclusion of semi-solid food into the diet of child. To determine the effectiveness, the chi-square test showed that it is statistically significant.

Similarly Khan (1991) conducted a study of child rearing patterns in 50 middle-class Muslim families in an industrial community in Bombay. It was revealed that feeding was done not on demand, but as per a fixed schedule. By one and half year, the child was weaned completely and supplementary food started.
Vijayasree and Satyavani (1992) studied in Vijayawada in the state of Andhra Pradesh, found that the family income and mother's education were found to be important influencing factors in infant weaning and health care practices.

Banik (1977) had conducted a survey among 2000 children upto 5 years old living in urban Delhi community, a comparison of the response by two groups of infants, one with early feeding of solids, the other with later, revealed little difference in growth rate, number of illness, incidence of digestive disturbances and food refusals. The time of adding solid foods is an individual matter influenced by maturity of the infant, appetite, digestion and tendency of the infant towards allergies.

Recently, Ganjoo and Rowlands (1988) conducted studies on weaning practices with urban housewives in Srinagar and they observed that breast feeding practice was good, but delayed weaning was the rule. Breast feeding was mainly terminated earlier by high income group mothers. However, illiterate mothers were generally ignorant about quantity or frequency of feeding semi-solids to their infants. Educational status had a determinantal effect on breast feeding.

Sehgal and Kapoor (1989) studied about food fads and fallacies regarding feeding practices among labourer and urban
mothers and they found that the majority of labourer mothers avoided curd, fruit juice, egg, dal and milk powder due to various reasons while less percentage of urban mothers avoided these food stuffs in infants' diet. Majority of labourer mothers were not aware of the importance of colostrum feeding and did not feed their infants mainly due to families' traditional belief.

9. Consequences of Weaning:

Protein energy malnutrition is an important nutritional deficiency condition that often occurs during the critical transitional phase of weaning in infants, crippling their physical and mental growth. This condition can be prevented to a large extent by introducing weaning foods of quality and quantity at the right time in the right proportion (Panda et al. 1990).

Nevin and Barbara (1980) have revealed that in most developing countries infants are breast fed during the first critical months of life. They become malnourished later because of inadequate complementary feeding practices.

Breast milk on its own is sufficient during the early life of infants. The rate of growth of solely breast fed infants may begin to slow down before six months. However, it is usually unwise to give complementary food to such infants at this age because the risk of contamination is very high.
Peter (1987) gave evidence that early, pre and postnatal nutrition and other factors have lasting effects on the further development of the individual. According to him both under and overnutrition in infancy can lead to later obesity. Since in obesity there is a greater tendency towards heart disease and hypercholesterolemia, it is logical to consider it as one of the negative consequences of early inadequate nutrition. However, we must underline here that a large percentage of obesity is genetically conditioned.

Serious objection to early introduction of weaning food is the increased salt intake with which it is generally associated. Immunity of renal function imposes limits on salts intake in addition to the salt content of human milk or formulas during the first 6 months of life. Healthy infants may adjust quite well to moderate changes in sodium intake, but although they may be able to sustain sodium deprivation almost as efficiently as adults, they show clear limitations in the ability to excrete a sodium load (Broberger et al. 1975).

The type of relationship between an increased salt intake in early infancy and later hypertension, however, has not yet been clearly elucidated. It further that there is at least a strong genetic element in mediating individual susceptibility to all environmental factors that induce hypertension.
ii. Socio-Economic Characteristics of Mothers of Weaned Infants.

In 1991 Khan revealed that it is desirable for infants to be fed for at least the first four months after birth. Among lower socio-economic groups, prolonging the duration of exclusive breast feeding up to six months may be advantageous in view of the poor environmental sanitation and lack of safe water. However, beyond this time, the child must be provided with supplementary food, as the breast milk output would not be adequate to provide the required nutrient intake for infants.

Modhok (1972) studied child rearing practices among rural women of Mohipalpur village, New Delhi. Study revealed significant difference in child rearing practices among the mothers belonging to different castes and families with different socio-economic status. Majority of women belonging to higher castes and higher classes started feeding their children earlier. Most of the women belonging to higher caste, higher education group and higher classes weaned their children within one year. A majority of low caste and low class women weaned their children after two years.

Studies carried out in Maharashtra by Dodd and Dutta (1987) revealed that high income group infants are weaned earlier compared to infants from low income group or middle income group.
However, in none of these three socio-economic groups weaning was started before four months of age. Insufficient milk was the main reason given by most of the mothers from higher income groups and middle income group. Whereas mothers from low income group stated the main reason for weaning as child was old enough to eat solid food or a subsequent pregnancy.

Differentials in nutritional status and morbidity were examined by Bhuiyo and Zimicki (1986) during the survey carried out of the household socio-economic indicators in Malta Ithana of Bangladesh and observed that household wealth indicators like size of land holdings, and cows, goats and modern foods owned, occupation of household head, amount of tax paid in the previous year and size and quality of housing were found negatively associated with the proportion of children who could be classified as malnourished using standard criteria. However, household sanitation was not correlated with nutritional status. The decline in the proportion of malnourished children was seen with increasing socio-economic status.

Perisse and Kamoun (1967) stated that for all urban and rural groups the average per-capita energy intake infants grows faster than requirements when the household income increases. In both affluent and poor household, the gap is always wider in rural than in urban areas.
While studying influence of nutritional education, Agarwal and Udipi (1989) found that nutrition education seemed to have been greatly influence the introduction of supplementary foods into infants diets by mothers. The data in this study showed that nutrition education can positively effect changes in the attitudes and practices of mothers and is an extremely valuable tool in alleviating the malnutrition which may occur as a result of delayed weaning.

In Maharashtra, Subbulakshmi and Udipi (1990) studied and concluded that high income group infants are weaned earlier compared to infants from lower income group or middle income group. In lower income group families, the main reason for weaning, as child was old enough to eat solid foods or a subsequent pregnancy. Most of the mothers took advice from their mother or mother in-laws about weaning practices.

During study of weaning practices in low socio-economic groups in Bombay city, Arora and Rao (1971) observed maximum percentage (42.00) of children completely weaned are in the age group 12-24 months. As regards length of weaning period, majority (36.00%) are in the age group 0-3 months and (83.00%) are in the age group 0-18 months, (49.00%) of children have breast milk for the first nine months.
Nirmala et al. (1981) had studied in Dharwad district about the social factors associated with prevalence of breast feeding and weaning practices among rural mothers and they found that most of the mothers are ignorant about the nutritive value of colostrum which is particularly rich in anti-infective factors. Mothers breast fed baby has good health for a longer period upto 2 to 3 years without giving adequate amount of supplementary foods. Foods given to the infants were the ones available to the families and not specially purchased or prepared for the infants as mothers did not feel the need for it.

iii. Mothers and their Knowledge Relating to Various Aspects of Weaning.

Gopaldas and Seshadri (1987) revealed that the mother's knowledge regarding the age for introducing solid foods and the type of solids to be given, was significantly related to their children's weight for age and weight for height. Only 10.00 percent of the mothers knew the correct age and types of solid foods to introduce into the diets of their children, and most mothers incorrectly suggested delayed introduction of soft and semi-solid foods. As per 't' test, the weight for age and weight for height of the children of the mothers who answered correctly, was significantly better than those of children whose mothers did not.
Devadas (1975) observed that the mother’s knowledge regarding the age for introducing solid foods and the type of solid to be given was significantly related with children’s weight for age and weight for height. Only 10.00 percent of the mothers knew the correct age and types of solid foods to introduce into the diets of their children and most mothers correctly suggested delayed introduction of soft and semi-solid foods.

Abbi et al. (1988) revealed that the mother knowledge regarding growth charts had a significant positive relationship with their children’s nutritional status as assessed by weight for height. All three Anthropometric measurements of children whose mothers were able to interpret the growth charts correctly were higher than those of the children whose mothers could not.

Devadas (1975) studied on nutritional status of 50 children below 30 months of age in rural community from two villages in Coimbatore district and observed that 32 children were breast fed fully up to eight month, after that period, they were partly bottle fed and partly breast fed. Mothers reported that they started breast feeding three days after delivery according to family tradition.

While studying nutritional status in infants in Tanzania, Yambi et al. (1991) observed that over one year period nutritional status was a significant predictor of...
mortality, with the probability of lower survival in children of low nutrition status. An overall linear relationship was found between nutrition status and mortality, suggesting a gradual increasing in mortality as nutritional status deteriorates. Incremental weight appears to be good short-term predictor of mortality.

Further Abbi et al. (1988) conducted study in rural area of Gujarat state and reported that most mothers incorrectly suggested delayed introduction of soft and semi-solid foods.

The mother's knowledge regarding growth chart had a significant positive relationship with their children's nutritional status as assessed by weight for age, height for age and a weight for height. All three anthropometric measurements of children whose mothers were able to interpret the growth charts correctly were higher than those of the children whose mother's could not (Folkner and Pernot 1958).

A significantly larger percentage of mothers who received nutrition education (18.00%) fed colostrum to their infants than of those who did not receive any education (5.00%). Approximately 60.00% of the mothers in all used other milk in addition to breast milk from the time the child was three to four months old. Nutritional education seemed to greatly influence the introduction of supplementary foods into infants
diets by mothers. Commercial cereals were rarely used, and the first food commonly given were rice and dal (Agarwal and Udipi 1989).

iv. Adoption of Recommended Practices of Weaning by Mothers.

During survey of the various regions, Gopalan et al. (1977) observed that breast feeding and weaning practices were delayed in all the regions. In the region of Bombay, Calcutta, and New Delhi, majority of rural children of 1-2 years were found to live exclusively on breast milk. Rural areas around poona had the highest percentage (89.04%) of entirely breast fed children. In Bombay 33.00% of children were breast fed till the age of 4 to 5 years, while this proportion varied from 1 to 10% at other places. More than 70.00% children received their supplementary feed between the age of 1-1/1/2 years, while majority of them in Hyderabad and Poona regions received late during second year of life. During the first 24 hours, the majority of the new born received water sweetened with sugar, jaggery, honey etc. A great majority of mothers, breast fed their new-borns on or around the third day of delivery. Tea, coffee, kanjee and porridge based on local cereals of milk formed most common supplement after 6 months.

During their study Darwish et al. (1982) revealed that mother’s who practiced abrupt weaning usually began at some
time from around the first year up to the age of two years. Gradual weaning most often began at any time from about 6 months upto 18 months. Weaning was adopted by about 6 months of age for 26.4% of the infants in urban areas and 8.00% of those in rural areas.

Khan (1991) noted that the practice of breast feeding is almost universal in India. However, many of the breast feeding and weaning practices being followed are not conducive to the proper growth of the child. The study shows that initiation of breast feeding is generally delayed and colostrum is discarded. The mode of pre-lactation is generally unhygienic. Similarly exclusive breast feeding often continues for 8-9 months after delivery often resulting in malnutrition of the children owing to inadequate feeding. The study also revealed that duration of lactation is reduced to almost half, if the women goes to work, leaving the child at home. Working status of mother does not influence duration of breast feeding if the child is taken to the work place.

v. Constraints in the Adoption of Recommended Weaning Practices.

It was also observed that all the mothers and other elderly members in the studied population, irrespective of their socio-economic and educational status, had the wrong attitude of
late. Introduction of liquid or solid supplements i.e. after one year age. It was also revealed that some cultural or traditional customs and beliefs associated with literacy and lack of awareness were the most important determinants of infant-feeding and weaning practices of this Non-Bengali Muslim community (Chaudhuri and Chatterjee 1991).

While discussing about weaning hazards, Berggren (1982) revealed that breast milk is a clean and contains valuable antibodies that protect the child against diarrhoeal diseases and other infection in his environment. As long as breast milk is the only food, diarrhoea is less common and not as severe. When weaning foods are introduced they must be hygienically prepared and stored and easily digestable or else they will cause diarrhoea.

A child with diarrhoea looses his appetite and also absorbs nutrients less efficiently. Thus prolonged diarrhoea leads invertebably to malnutrition.

Malnourished child bounces back rapidly from a cold nutritional illness, but malnutrition impairs the body’s resistance to infection. Children who are not properly nourished get sick more frequently than well fed ones.
Menon et al. (1980) carried out supplementary feeding with low cost locally available recipes in two villages for 18 months. A package of health activities including nutrition education was also given in one of these villages. The findings showed that in both villages only 25 to 30 percent of children bought the supplement. The pattern of buying did not appear to be related to the willingness expressed by mothers. It appeared from the study that economic factor is the most important constraint for utilization of weaning foods.

vi. Suggestions Offered for Effective Adoption of Weaning Practices by the Mothers.

Kansal and Chaudhary (1981) stated that after about three to six months, it is desirable to give easily digestible supplementary foods. Several weaning foods for this purpose are available in the local market. Since calcium, phosphorus and magnesium are extremely important for proper calcification of bones during childhood, these minerals in such foods should be in highly available form.

For babies of weaning age, it is best to use foods that are good for the baby, easily available to the family and not too expensive.

Usually these foods can be taken from those the family eats. Specially ready mixed "baby food" from stores and
pharmacies may be easy to prepare, but they may also be more costly and less nourishing than foods prepared at home. Also if a mother cannot really afford these foods, she may try to make them last longer by giving too little food, or too few foods, to meet the baby’s needs (Anon. 1988).

It is necessary to consider the appropriate timing and quality of complementary foods because of the prevalence of under nutrition beginning in late infancy.

During weaning period Soysa (1988) emphasizes that foods should be used in addition to breast milk and not as mere replacement.

The studies conducted by Ghosh (1981) that banana, ragi gruel and kanjee was given as weaning food in Tamilnadu. Similarly different weaning practices are adopted by different states.

The first food added to the child’s diet after four month should be in the liquid form. They can be given the cow milk or buffalo milk. While giving buffalo milk to the infants on thing should be remembered that the nutritive value of buffalo milk contains more fat than breast milk and cow milk. So till 6th month buffalo milk should be diluted with water. After 6th month undulated milk should be given (Phadnis 1984).
It has been revealed by Desor et al. (1973) that sweetness increases total intake of food, a fact that can be observed during the first 6 months of life with respect to the prevention of caries, there is strong tendency to restrict the intake of sugar in infancy, also through avoidance of early introduction of sweet solids. However, the prevention of caries does not depend solely on the use of sucrose but also on fluoride as well as on techniques of oral hygiene. It has also been shown that the reduction of daily sucrose intake of less than 30gm/day does not reduce frequency of caries any further. Thus a moderate amount of sucrose in bequest (weaning food used in America) should be acceptable.

vii. Nutritional Status of Infants:

Gupta and Bhandari (1972) studied nutritional status of pre-school children and revealed that the tribal children were more under-nourished than non-tribal children, though all children suffered from malnutrition.

Devdas (1975) observed that the mother’s knowledge regarding the age for introducing solid foods and the type of solid to be given was significantly related to children’s weight for age and weight for height.
Abbi et al. (1988) revealed that the mother knowledge regarding growth charts had a significant positive relationship with their children's nutritional status as assessed by weight for height. All three Anthropometric measurements of children whose mother were able to interpret the growth charts correctly were higher than those of the children whose mothers could not.

Devdas (1975) studied nutritional status of 50 children below 30 months of age in rural community from two villages in Coimbatore district and observed that 32 children were breast fed fully up to eighth month, after that period, they were partly bottle fed and partly breast fed. Mothers reported that they started breast feeding three days after delivery according to family tradition.

Regarding anthropometric measurements Berggren (1982) stated that weight for height, which is age independent, can be used and does give a measure of the adequacy of dietary energy, particularly beyond the second year. Mid-arm circumference is a good predictor of mortality risk across the weaning age. It is a simple age independent screening tool that can be used by the community to identify malnourished children.

Khan (1988) suggested that age should be included as a co-variety in the analysis since it is an underlying variable for
both nutritional and anthropometric measurements. It should also be noted that the effect of energy intake on various anthropometric measurements is expected to differ from one age group to another.

To assess the physical development by rural children a longitudinal study was conducted by Mehla et al. (1988) with 192 children of Hisar district. Weight, height and head, chest and arm circumferences were the parameters selected for recording the physical development. The data revealed that for all parameters, male children were higher than female children up to six months of age.

In their studies which comprised of infants born to families from different socio-economic classes in Faisalabad (Pakistan), Nagra and Gilani (1986) observed that body length during the first year of life varied significantly with socio-economic status. The rate of increase in body length was slightly better in high socio-economic class during the first five months. However, later growth curves of the infants ran in between the third 50 percent of the Harvard standard. The boys were longer than the girls in 1st year of life.

Hennart and Louis (1987) stated that the nutritional status of infants and young children in developing countries
depends not only on food intake (from both a qualitative and a quantitative quantities) but also upon infections mainly gastroenteritis and measles and parasitizes, especially intestinal parasitizes and malaria.

It was estimated that over 14 million infants and children under 5 years of age die annually in the tropical regions of the world. One of the major cause is a diarrohea (Anon, 1987).

viii. Health Status of Infants:

Crean and Ling (1988) While examining the number of problems relating to infant feeding and infant health in Dharavi area of Bombay, noted that amongst the various problem major ones were the low level of female education and literacy in improving the health of infants while living conditions remained so poor. It is suggested that proper social education is needed in such areas educating the females about need and importance of weaning to combat infant and child health problems.

Rogers and Youssef (1988) suggested that nutritional programmes in developing countries need to be recognized explicitly that nutritional problems have their origin in the social and economic systems, and that these problems can be solved only by bringing about changes in these systems,
particularly at household level. Social services are suffering from a shrinking of government resources in developing countries. Women must draw on their own resources to improve their nutrition and health. States should have proposals to promote not only more entrepreneurship for women but also organization of women, including unions. They also suggested the development of cooperative child care, which would help women to conserve some of their resources. Women groups which are started for economic purpose, can be successful forums for nutrition and health education.

IX. Rural and Urban Weaning Practices.

During the survey carried out by Swaminathan and Rao (1954) in South India among the children upto 5 years age, of the families with less income, observed that when weaning was attempted a child developed attack of fever or diarrhoea. The sickness was attributed to weaning which was, therefore, postponed and 98 percent of the children were weaned by the age of 3 years. However, among the urban population a tendency was observed to wean the children at an earlier age.

In Madhyapradesh Patodi, et al. (1976) observed that all the infants in urban area were given plain water in addition to milk feeds but in rural areas, only 50% were given water. Rural
mothers believed that water is a cold drink and the infant might develop respiratory infections. In the rural area 42.4% infants received supplementary milk feed while it was 69.4% in urban areas. The most common age of weaning in rural area was 13 to 15 months. While in the urban area it was 10 to 13 months. Infants in urban and rural areas were given semi-solid and solid food between 10 to 12 months and 18 to 20 months respectively. Most of the deficiencies were observed after the age of 6 months, in both the rural and urban areas.

There is agreement among the contributors that diets are more diversified in urban areas. Protein energy deficiency is less prevalent in urban than in rural areas, while the tendency to improve the quality of diet at the expense of quantity makes the urban population more susceptible to under nutrition. The pattern of weaning is different in low socio-economic groups in rural areas and among the most of the low-income mother in urban localities. The child is introduced to adult foods between ages of 12th to 24 months, with the reduce in the number of breast feeding.

Chaudhry and Parashar (1986) had studied weaning practices in urban and rural and tribal areas of Udaipur, district of Rajasthan. They revealed that the liquid supplementary weaning food were given by 60 percent of urban
mothers between the age of 3 to 6 months while 80 percent of rural and 50 percent tribal mothers were not giving any liquid food but semi-solid food known as "Raab".

The study conducted in Rangoon by Tin Tin Oo and Naing (1985) revealed that there were no significant differences in feeding patterns between rural mothers and urban housewives, although there was a tendency for more urban housewives to introduce solid early, that is before their children were six months old. Urban internal working mothers differed from the others; they breast fed infants in the first three months of life and have them more supplementary foods, a pattern that rejected their irregular working conditions.