Chapter "Review of Literature" is an important and useful, obviously because not only the author but also the readers can get an idea of the trend and direction of the findings reported by the earlier researchers besides, it's advantage in providing strength and support for the findings emerged out of the study. It also provides guideline for finalisation of methodology.

As a matter of fact, Food and Nutrition as an area basically belongs to the faculty of medical science however, from the time this area occupied a privileged position in the faculty of Home Science, in view of it's importance and utility, it has attracted the attention of scientists and researchers from this area. Therefore, quite a large number of studies focused on nutritional status of mothers and children. The significant component of the society have been undertaken. Author, as a result of exhaustive search could locate adequate number of references which had direct relevance and bearing with the study at hand only have been selected for the presentation. For the sake of convenience in its' presentation, references collected have been classified into following different sections as under:

2.1. General Information:

   Personal: Age, Education, Native background, Occupation Type of family and family size.

   Economic: Size of holding and Annual income.

   Environmental: Sanitation facilities.

2.2 Nutritional Status of Mothers and Children together with Different Selected Dimensions therein under:

   Food habits and practices,
   Food and nutrient intake,
   Anthropometry,
   Clinical signs,
   Bio-chemical assessment and Morbidity.
2.3. Nutritional problems of the tribes
2.4 Suggestions for improving Nutritional Status.
2.5 Association and relationship between selected characteristics of mothers, children and their nutritional status.

2.1 General Information

Age:

Chandrashekhar et al (1990) reported that higher percentage of males and females in both communities "Kota" and "Kadars" were between the age group of 19 and 27. About 34 to 41 percent of population were children under 6 years.

Rao et al (1993) found 44 percent being comprised of children below 14 years in Jenu Kurubas tribe of Karnataka.

Education:

Chandrashekhar et al (1990) stated that women were totally illiterate in both Kota and Kadar tribes.

Sharma et al (1990) observed that 27 percent of mothers were illiterate, 45 percent with primary education and 20 percent with middle school education. 8.33 percent matric and no mother had education above matric level.

Rao et al (1991) observed that the literacy rate was higher (70.3) amongst Thangkuls as against 32.2 among the Marrings.

Anonymous (1992): 58 percent of the fathers and 81% of the mothers were illiterate in their study on preschool children in villages around Hyderabad.

Yashoda devi et al (1994) observed that over 95% of the men and women were illiterate in a longitudinal study in 4 villages of Medak district in Andhra Pradesh.

Occupation:

Gulati L. (1978) stated that women’s contribution to the labour force was significant.

Chandrashekhar et al (1990) found that agriculture was the main occupation of majority of Kotas of Nilgiri Hills and Kadars of
Annamalai Hills were coolies in the forest department. Some were employed in factories.

Rao et al (1991) observed that though agriculture is the main stay of both the tribes, a considerable percentage (27.3) of Thangkuls were in service (Govt./Private), only 7.7% of Marrings belonged to this category. Agricultural or non-agricultural labour was the other source of livelihood.

Rao et al (1993) observed that agriculture was the main occupation in Jenu Kuruba tribe of Karnataka.

Shatruhna et al (1993) stated that according to the 1971 and 1981 census only 1.25% of Indian women worked and participated in the labour force. The figures for Punjab were as low as 2%.

Rao et al (1994) found that labour was the main occupation in Gonds of Bhamragad as against (66.2%) agriculture (69.9%) in Bastar area.

Yeshoda devi et al (1994) stated that their main occupation was agriculture labourer in villages of Medak district of Andhra Pradesh.

Family Type, and Family Size:

Chandrashekhar et al (1990) found that nuclear family system was the most prevalent practice among Kotas and Kadars of Nilgiris and Annamalai Hills.

Sharma et al (1990) observed that the percentage of joint and nuclear families were 62.50 and 37.50% respectively in the study of preschool children in Ghumarwin Block of Himachal Pradesh.

Rao et al (1991) found that more number of nuclear families (86.4%) were found among the Thangkuls than in the Marrings (63%) tribes of Manipur.

Devdas et al (1979) while studying nutrition profile of the selected rural communities found that the existence of joint and nuclear family system was in the ratio of 1:4. The average household size was five.
Rao et al (1991) observed that the average family size was more or less similar in Thangkuls and Marrings being 6.3 and 6.0 respectively in tribal groups of Manipur.

Size of Holding:

Rao et al (1993) found 46 percent of the 226 families surveyed owned less than 5 acres of land in Jenu Korubas tribe of Karnataka.

Income:

Devdas et al (1979) observed that 54 percent of the families were living below the poverty line in rural area nearby Coimbatore.

Chandrashekar (1990) observed that except for those employed in factories, all families in both the communities (Kota and Kadors) had a monthly income below Rs. 300/-. Sharma et al (1990) found that the analysis has also brought out that majority of the families (63.34 percent) in the sample fell in the low income, 29.16 percent in middle income and 7.50% in high income group.

Rao et al (1991) stated that the average monthly per capita income was Rs. 201/- among the Thangkuls and Rs. 168/- among the Marrings.

Rao et al (1993) observed that the average monthly per capita income was about Rs. 74/- in Junu Kurubas tribe.

Yeshoda devi et al (1994) has observed that a man's daily wage was Rs. 15/- and Woman's was Rs. 10/- in rural area of Andhra Pradesh.

Environment:

Sharma et al (1990) observed that 21 percent of the subjects lived in Pucca houses, 49 percent Kachcha houses and 30 percent in mixed dwellings in Ghumarwin Block of Himachal Pradesh.

Rao et al (1994) reported that tribal people lived in unfavorable conditions in Jhabua, Bastar and Sarguja districts of Madhya Pradesh.

Yeshoda devi et al (1994) has stated that most families lived in one room houses with poor ventilation and cooked in the same room,
where they lived. Health facilities to the respondents were limited. There were lack of toilet facilities in rural areas of Medak district of Andhra Pradesh.

2.2 Nutritional Status of Mothers and Children together with Different Selective Dimensions therein under:

Food Habits and Practices:

Devdas (1977) observed that breast feeding was continued up to 18 months by 68 % of the mothers. Only 39 % of the mothers started the supplementary foods during the period of 3-12 months.

Ali (1988) observed that usually breast feeding is done by mothers till the next pregnancy. Usually breast feeding lasted up to the age of three years and some exceptional cases up to four and half years. Supplementary feeding started generally with semi liquid food like gruel made of millets. The infants were gradually introduced to family foods in Bhuinje tribe of Orissa.

Pant et al (1988) observed that most mother avoided dals for the child because they were believed to be difficult to digest and produced gas in the child’s stomach in a study conducted in Baroda regarding breast feeding and weaning practices.

Sehgal and Kapoor (1988) observed that labourer mothers continued breast feeding for more than two years of age of the child, but urban mothers breast fed up to one or two years of age in Bhivani district. Further reported that supplementary feeding was started at the age of 9 months to 1 year by urban mothers while it was started after the age of one year by the labourer mothers to cover the insufficiency of mothers milk and meet the needs of the infants.

Chadha et al (1989) reported that breast feeding was established 2-3 days after birth. Colostrum was discarded by 78 percent of the mothers in the study of feeding practices of infants in 3 slums areas of Delhi.

Nagaraja Rao (1989) has opined that the process of weaning is also a major concern because of poor environmental hygiene, illiteracy, false beliefs and deep rooted customs which contribute to high morbidity and mortality and malnutrition in infancy and childhood.
Kanade and Rao, (1989) found that lack of knowledge of mothers about duration of complete breast feeding, initiation of weaning appears to be responsible for poorer health of children in the low socio economic group of Pune.

Rao (1989) stated that exclusive breast feeding upto 5 months of age is observed in different proportions of urban elite, middle income groups, urban poor and rural group.

Rao (1989) observed that the age of introduction of supplementation is 3-5 months in the urban elite and middle income group. The supplementation is delayed in urban poor by 7-9 months and rural poor by 9-11 months. Breast feeding is initiated within 12 hours after delivery only in a very small proportion of mothers with the majority do only after 2nd and 4th day. Colostrum is discarded by many mothers both in rural areas and urban slums. Demand feeding is the most common practice. Cereals, legumes, vegetable supplements and milk are given to most infants only after 6 months of age. Commercial baby foods are used only in urban groups. The median age for introduction of semi solid and solid foods being 12 months the commonly given foods were cereals like wheat and bajra (99.92 %) milk (100 %) pulses (64.45%) and vegetables (53.05%). Cereal based products like rabri (preperation of bajra and buttermilk) and wheat porridge (salted preparation prepared from broken wheat and buttermilk) were prepared for the family and same was also fed to the younger child.

Chandrashekhar et al (1990) reported that Kotas included an extract of a green leafy vegetable called Pulicha Keeral during lactation which they enhances milk secretion.

Anonymous (1992) reported that Higher proportion of boys (51%) were being breast fed at the time of the survey than the girls (30%). Prolonged breast feeding 36-59 months was more common in boys (85%) than in girls (76%).

Rao (1992). Observed that preparation containing fenugreek seed to be consumed during pregnancy and preparation containing gum acasia during lactation are preferred by more than 60% of the mothers as the traditional nutrition supplement. These preparation,
which contain cereals, pulses, sugar or jaggery, ghee or oil and ‘Battisa’ the requirement of this group.

Feeding during Illness and Food Restrictions in Different Stages

Devdas (1979) reported that during pregnancy, papaya was avoided in both the communities by more than 80% of mothers, jackfruit, greens and mango were avoided by the nursing mothers. During lactation, greens, dhal and fruits were avoided generally, for the fear of indigestion, customs and not good for the child.

Singh et al (1988) found that extra food in lactation was not considered to be important. Nearly half the population reported consuming less food during delivery. There is thus need for nutrition education among the young women of the Baiga tribe of Madhya Pradesh.

Kaur and Sehgal (1989) observed that large number of foods were avoided by the lactating mothers due to various food beliefs in lactating mothers from low and midle income groups residing in His sar.

Reddy (1989) reported that there are several mechanisms by which diarrhoea can affect the nutritional status. During acute infection, the appetite is impaired and food intake may be reduced. Apart from this, dietary restriction is imposed by the mothers when the child is ill.

Chandrashekhar and Chitre (1990) observed that during illness like chickenpox, rice kanji and liquid foods were given to cool the system by (Kota and Keedar tribes) the tribal communities. Besides, Kotas used paste of neem leaves and small onions on the rashes.

Cooking and Food Preservation Practices

Devdas (1977) while studying Nutrition Profile of the selected Rural Communities found that Boiling was the most commonly used method to cook all types of foods followed by steaming and frying. Deep fat frying was usually avoided due to low family economy.

Ali (1988) observed that people of Bhuinya tribe of Orissa collected and variety of edible fruits, mahua flowers (Basia latifolia) dried in sun and eaten after boiling in month of March. Mahua flowers, wild mangos were also consumed after drying and pounding into flour for chapatis.
Verma and Rawtani (1988) observed that pregnant and lactating mothers were practicing faculty cooking methods in selected desert areas of Jodhpur (Shergarh Block).

Chandrashekar and chitre (1990) Stated that there were no uncommon methods involved in cooking and preservation of foods by Kotas and Kadar tribe. The kadors however, preserved gooseberries for over a year by sundrying and used it instead of tamarind in cooking.

Devdas (1977) found that only 15% of the families used to preserve the fruits and vegetables.

Devdas and Venmathi (1977) found that majority of the families with four to six members (45%) were storing 11 to 20 bags of paddy for their consumption in gunny bag and mud bin. As new structures pacca kothis were constructed and metal bins were used. They further observed that sun drying was a common method to protect the grain against insects and moisture damage.

**Food Sharing Practices**

Gopalan et al (1974) stated that in most of the families, the earning members get the lion's share of the food.

Gopaldas (1986) in her study on tribes of Western India, found that the head of the family received major share of the food cooked.

Khan et al (1989) while studying women's health determinants of intra-house allocation of food, found that there is a skewed distribution of food in favour of males.

Verma et al (1996) observed that 53% of the families followed a two meal pattern and 40% followed a three meal pattern by backward classes of rural areas in Rajasthan.

**Expenditure On Food**

Devdas (1977) in the study of malnutrition and morbidity pattern in children in Coimbatore found that 73% of the families spent 60% of their income on food. More than 80% food expenditure was incurred on cereals by 10% of their households. Majority spent less than 15% of their food expenditure on pulses, 30-60% families spent less than two percent of food expenditure on green leafy vegetables.
Rao et al (1989) observed the major changes in the lifestyle of Onges, tribe in Little Andaman Nichobar Islands. Since the fifties had been shifted from nomadic to settled life. The staple food changed from flesh foods to cereals like rice and wheat.

Rao et al (1991) while studying diet and nutritional status of tribal groups of Manipur found that the consumption level of pulses was much low (139gm) in Thangkuls and practically nil in the diets of Marrings. The intake of leafy vegetables was about 80 gms among Thangkuls and 79 gm among Marrings which was higher than the recommended levels of 40 gm. The intake of other vegetables was 59 gms in Thangkuls and 37 gms in Marrings which was lower than the RDI. The consumption of roots and tubers was higher than the RDI among Marrings, while it was lower among Thankgkuls. Similarly the consumption of oils and fats, milk and milk products, sugar and jaggery was much lower than RDI among Thangkuls and almost nil in Marrings.

Rao et al (1992) oberserved that the intakes of roots and tubers, milk and milk products fats and oils, sugar and jaggery were considered deficient in low income group.

Rao et al (1994) stated that the average daily intake of cereals and millets was higher among Maria. Gonds of Bhamragad. The consumption of protective foods like fruits, milk and milk products, sugar and jaggery, oils and fats were much less than the RDI in both the tribal groups.

Rao et al (1994) observed that the intake of cereal was higher in Bastar (210g) than Sarguja (193 g) in 1 to 3 years age group while it was reverse in 4 to 6 years age group. Consumption levels of all other food stuffs in both the age groups in the three areas were less than the recommended levels. The intake of steple foods (cereals and millets was higher than the recommended dietary allowances of ICMR in both Sarguja and Bastar districts. The over all pulse intake was closer to recommended level in Sargija compared to Bastar and Jhabua district. Consumption levels of all other food stuffs in both the age groups in the three areas were less than recommended levels.
Jhabua district. Consumption levels of all other food stuffs in both the age groups in the three areas were less than recommended levels.

Verma et al (1996) reported that green leafy vegetables were not accorded a very high priority in the diet. Only 22% of families were found to consume. Children diets were monotonous comprising of cereals in the form of chapatis (unleavened bread) and seasonal vegetables in rural areas of Rajasthan.

**Nutrients Intake - Mothers.**

Devdas (1977) found that the protein intake of pregnant and nursing mother did not meet the recommended level.

Dhawan and Mann (1988) observed that the diet of pregnant women were deficient in Energy, calcium, Ascorbic acid and Vitamin B12 in Ludhiyana district of Punjab.

Sharma (1988) while studying on Dietary Pattern and Nutrient Intake of Pregnant Women in slums of Delhi found that all the nutrients consumed were much below the recommended allowances.

Kaur and Sehgal (1989) found that energy was the most deficient nutrient in the diet of lactating mothers. Average intake of foods like pulses, milk and milk products, fats and oils and vegetable especially the green leafy vegetables was far below the recommended levels.

Anonymous (1990) found that food intake of women in low income groups substantially deficient in calories. In respect of pregnant and lactating women, this daily deficiency had been estimated to be as much as 1000 kilo calories or more.

Anonymous (1990) studied that dietary intake of rural and urban women in India ranges between 1200 and 1600 kilo calories per day. But there is hardly any increase in intake during pregnancy over the preexisting levels, despite the fact that pregnant women from low income groups.
Senapati (1991) observed that nutrient intake of working women outside and inside the house in the urban areas, had not adequate nutritional intake and all had symptoms of nutritional deficiency.

**Nutrient Intake of Children:**

Anonymous (1974) reported in cross sectional study around Hyderabad, Poona, Bombay, Calcutta, Delhi and Vellore that preschool children get adequate protein through their dietary intake but suffer from calorie malnutrition.

Gopalan et al (1974) stated that according to the survey conducted by them in India 92% of the children diet were found to be deficient in calories, while only 85% of those were deficient in protein. Diet was also deficient in calcium, Iron, Vitamin A, Vitamin C. Due to lack of all nutrients growth was stunted and malnutrition developed.

Anonymous (1975) reported that Iron deficiency was by far the most common nutritional deficiency responsible for anemia in children.

Devdas (1977) observed that the intake of calories, protein, Beta carotene, calcium and Iron was very much lower than the recommended allowances.

Devdas (1977) found that the mean intake of calories of all age groups of both the communities was not upto the recommended level

Devdas et al (1979) observed that the gross deficit in food intake had resulted in their poor nutrient intake. The intake of all the nutrients by kwashiorkor children was less than half of the RDA levels which must have proned the children to high risk of malnutrition. The intake of Iron and calcium did not meet the recommended allowances due to gross deficit in the intake of green leafy vegetables.

Shah et al (1984) reported that poor bio availability of iron is the major cause of anemia.

Durge et al (1985) observed that food rich in vitamins and minerals was not satisfactory. The daily mean calorie consumption was 1,400 Kcal and protein intake was 42gms.

Gopaldas (1986) observed that intake of energy, iron, vitamin A and ascorbic acid was low in children.
Ali (1988) reported that the diet of the majority of house hold was both qualitatively and quantitatively deficit in Bhuinya tribe of Orissa.

Rajaji (1989) observed that 35 to 50% of children in India in rural areas anemia is commonly due to iron deficiency.

Rao (1991) found that the major cause of anemia in our country is iron deficiency to inadequate intake of irons or its bio availability, or both from diets predominantly based on cereals and other plant foods.

Rao et al (1994) reported that the consumption of all nutrients were higher than RDI except calcium and vitamin A among Maria Gonds of Bhamragad. The intake of vitamin A was much less than the recommended level among both Maria Gonds of Bhamragad and Bastar.

Rao et al (1994) observed that intake of nutrients was also lower than the recommended allowances in all the three areas of Jhabua, Bastar and Sarguja district. In preschool age groups were meeting only 35% of RDA of calories, while in other areas it was above 60% with regard to protein the intakes were more or less closer to RDA in Sarguja and Bastar and less in Jhabua. Thus the intake of both foods and nutrients appeared to be lower in Jhabua compared to Baster and Sarguja.

**Anthropometry of Mothers**

Durge et. al (1985) observed that anthropometric measurement like height, weight mid arm circumference and skin fold thickness were indicator of chronic malnutrition among expectant mothers.

Dhavan and Mann (1988) Stated that Anthropometric index showed 54% of the subject were normal, 31% over weight and 15% belonging to low income groups were ‘at risk’ and likely to deliver low birth weight infants in Ludhiana district.

Verma and Rawtani (1988) Reported that majority of the women in pregnant and lactating women were under weight and suffering from marginal to severe degree of malnutrition.

Naidu et al (1991) found that the birth weight invariably increased with increasing BMI status of mothers. The incidence of low
birth weight was highest (53%) in the III CED or severe malnourished group and gradually declined as the BMI status of mothers improved. Its incidence was lowest about 15% in mothers with BMI 25 to 30.

Rao et al (1991) found that 54 percent mothers were normal 31 percent overweight and 15 percent belonging to low income group were at risk and likely to deliver low birth weight infants.

Rao et al (1993) observed that high proportion of female adults (73.5%) had BMI of less than 18 as compared to male adults (64.7%) in Jenu Kuruba tribe of Karnataka.

**Anthropometry of Children**

Vijayraghavan and Shastri (1976) stated that the result indicated the existence of 57 % and 73 % agreement in the assessment using mid - upper - arm circumference on the one hand and weight for age and wait for height respectively on the other. Some children who were severely undernourished on the basis of weight for height and muscles circumference were classified as normal based on mid upper arm circumference.

Devdas (1977) observed that the height weight measurements of all the age groups were lower than the norms of those age group.

Prasad (1979) studied 1002 preschool children belonging to different economic groups for physical growth and development, who found that boys weighed more than girls, height was equal in both sexes and head circumference was equal in the two economic groups.

Rao et al (1980) studied that children with poor grades of growth status assessed in terms of weight, height arm circumference were found to have higher prevalence of severe anemia than in those with better grades of growth status.

Bogin et al (1981) observed that low socio-economic status Guatemalan children had low values for anthropometric measurement as mid upper arm circumference.

Devdas (1981) observed that the ratio of chest /heads circumference below on indicated that the children suffered from
severe malnutrition. This coincides well with the results reported by Devdas et al (1979).

Luwang et al (1981) observed that 57.53% children under five had normal weight, 42.67% had PEM, it was further observed that 28%, 10.67% and 4% had mild, moderate and severe forms of PEM respectively among Thangkul Hill tribal population of Manipur.

Anonymous (1982) reported that about 17% of children below five years suffer from severe malnutrition linked to a weight deficit of over 40% and nearly 45% of children of this age group were estimated to have suffered from moderate malnutrition with a weight deficit ranging from 25 to 45%.

Desai et al (1985) observed that by using weight-for-age parameter, 73 children were found to be severely malnourished. When weight for height was used 50 children were found to be suffering from severe grades of PEM. And when used weight for age index 29 children were found to be normal and 40 suffering from severe malnutrition. When other parameters were used the number of normal children increased the number of malnourished children decreased.

Vijayalaxmi and Rao (1988) reported that preschool children had lesser arm circumference compared the to Indian figures. Higher percent of tribal preschool children were following under moderate and severe malnutrition by using the mid arm circumference. According to Gomez classification higher percentage of preschool children fall under grade II and III degree of malnutrition showing that the tribal preschool children were subjected to Protein Calorie Malnutrition, 15% of children of Gangwa village of Hissar district also suffered from III degree of malnutrition based on body weight deficit.

Sharma et al (1990) in study of preschool children in Ghurwin block of Himachal Pradesh, found that the mean weight, mean height, head circumference, chest circumference and mid upper arm circumference measurements were found below the standard of ICMR. The chest-head circumference ratio was less than 1 in all age groups till age of 4 years.
Rao et al (1991) found that the Thangkuls preschool children of both the sexes were taller and heavier than their Marrings counterparts. Severe and moderate grade of malnutrition cases in preschoolers were higher in Marrings than Thangkuls.

Anonymous (1992) observed that the distribution of according Gomez and Waterlow classification based on weight for age weight for height and height for age was similar in both the sexes.

Rao et al (1993) reported that Jenu Koruba preschool children showed 7.4% suffering from severe grade of Malnutrition according to Gomez classification.

Rao et al. (1994) observed that the nutrition status of preschool children in terms of weight for age profile showed a higher proportion of children (42%) in normal and mild grades in Sarguja (11.7%) compared to Bastar (23.7%) and Jhabua (30%). In contrast the percentage of severely malnourished children was lowest in Sarguja (11.7%) followed Bastar (23.6%) and Jhabua (26%). Growth retardation the hallmark of PEM in young children, encountered in all the three districts of varying degrees. Stunted and wasted were 11.4% and stunted were 50%.

Rao et al (1994) observed the percentage distribution of preschool children according to body weight status (Gomez’s classification) as the percentage of children suffering from severe degree malnutrition (body weight less than 60% of standard) was significantly higher (9.8% among Maria Gonds of Bastar. Pre-school children of Bastar were worse of with greater extent of under nutrition reflecting long duration malnutrition.

Kielmann et al (1994) while working on nutritional status of Samburu tribesmen of the Northern Kenya found that among the preschool population 46% were mildly malnourished 7% were moderately to severely malnourished.

Mathur et al (1994) Studied that weight for anemic children were lower than those of normal and anemic children were smaller and grow at slower rate than their non anemic counter parts.
Nutritional Deficiency Signs of Mothers

Devdas (1977) found that nearly 50-60 percent of expectant and nursing mothers had anemia, vitamin A deficiency.

Rao et al (1980) reported that in India, anemia is the most common nutritional problems and it affects more than half the total population. Pregnant and lactating women, The estimated prevalence in our country amongst pregnant women and women of child bearing age is 50% and 10% respectively.

Durge et al (1985) reported as a result of clinical examination that 25% of the expectant mothers were apparently healthy and 75% showed signs of nutritional deficiency. However, 93 percent women were anemic.

Rao et al (1989) observed that 2 of 29 adult females showed signs of conjunctival xerosis, suggestive of vitamin A deficiency in Onge tribe of Little Andaman Island.

Reddy (1989) stated that, Iron deficiency anemia is a major nutrition problem in India affecting almost all segments of the population, the most affected groups being pregnant women.

Anonymous (1990) observed that the prevalence of anemia in pregnancy (Haemoglobin level below 11gm/dl) continues to be high specially among low income groups. Reported prevalence ranges from 40 to 50 percent in urban areas, 50 to 70 in rural areas.

Anonymous (1990) found that an estimated 44% of women in developing countries suffer from nutritional anemia compared with 12% of non pregnant woman, 55% pregnant women compared to 42% non pregnant women in developed countries.

Anonymous (1992) reported that an estimated 51% pregnant women, 35% non pregnant women and 36% lactating women suffer from nutritional anemia in the world.

Nutritional Defeciency Signs of Children

Luwang et al (1970) reported that sexwise prevalence of PEM revealed that female children suffered more (45.86%) than the male children 40.12%.
roots and tubers, other vegetables, milk and milk products and beverages. 10-30% families spent 3-4% of food expenditure on roots ‘tubers’, other vegetables, fruits milk and milk products, sugar and jaggery, prepared foods and beverages.

Gulati and Mann (1987) found that the percentage of income spent on food decreased with increase in income, in a study of dietary pattern and expenditure on food in rural families in Punjab.

Yashoda Devi et al (1992) observed that an average of 75% of the income was spent on food by Schedule caste and Shedule tribes respondents in Medak district of Andhra Pradesh.

Food Fads And Fallacies

Sehagal and Kapoor (1988) observed that there is a lack of awareness about the special nutritional needs of the children. Honey was given before breast feeding and colostrum was not fed to the infants as it was considered not good for the children by both urban and labourer mothers and prejudices regarding foods like groundnuts Jaggary, eggs and papaya limited the intake of nourishing foods.

Mahanthy (1989) reported that most of the mothers were ignorant about the nutritive value of colostrum which is particularly rich in anti infective factors and nutrients such as vitamin A.

Chandrashekhhar et al (1990) found that Kotas from Nilgiri Hills avoided “Ganji” during lactation as it is supposed to upset the stomatch Kadors had the peculiar habit of giving the delivered women red chilli salt paste in order to clean the uterus and enhance milk production. During lactation they avoid mango, jackfruit and honey as they consider it is not good for the infant.

Rao et al (1991) observed that consumption of goat meat is a taboo among ThangKuls Pregnant women of Manipur were forbidden from eating the flesh of animals dying of natural death. Marrings do not eat dog or cat meat. Women were forbidden to consume the flesh of animals that are sacrificed to ward off illness.

Food Intake-Mothers

Muthayya (1972) found that milk, eggs, meat , fruits were not generally given to the expectant mothers either because of they cannot
afford it or they might be guided by thinking that these additional food items were not necessary for expectant mothers.

Devdas (1977) found that the protein intake of pregnant and nursing mothers didn't meet the recommended levels.

Devdas (1980) observed that the average consumption of cereals was inadequate in pregnant and nursing mothers of rural communities. The intake of other vegetables, roots and tubers, fruits, fats, and oils sugars and jaggery, milk and milk products was not adequate. The green leafy vegetables had not found a place in the diet of these mothers.

Mathew (1988) reported that the average amount of fats and oils consumed by pregnant women ranged from 0-15g causing a total energy deficit of 30 to 45 percent of RDA in the diets of urban, rural and tribal populations of Udaipur district.

Rao et al (1991) while studying the diet and nutritional status of tribal groups of Manipur found that the consumption of flesh foods was higher among Thangkuls (89gm) than in the Marrings.

Rao (1992) studied dietary pattern, nutritional status and related socio-cultural aspects of pregnant and lactating mothers in Surat revealed that majority of them do not get even the desirable nutritional requirement of non-pregnant, non-lactating women and their socio-cultural practices rather than socio-culture determinants play a dominant role on their nutritional status.

**Food Intake of Children:**

Devdas (1977) observed that 30 percent of the families belonged to low socio-economic group did not used milk and milk products in their daily diet.

Devdas (1979) found that the intakes of cereals, pulses, milk and milk products, sugar and jaggery and fats and oils by the children suffering from Kwashiorkar were inadequate, when compared to recommended dietary allowances (ICMR 1981). The intake of milk and milk products, fruits and neglect of green leafy vegetables must have aggravated Vitamin A deficiency.
roots and tubers, other vegetables, milk and milk products and beverages. 10-30% families spent 3-4% of food expenditure on roots 'tubers', other vegetables, fruits milk and milk products, sugar and jaggery, prepared foods and beverages.

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**Food Fads And Fallacies**

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Mahanthy (1989) reported that most of the mothers were ignorant about the nutritive value of colostrum which is particularly rich in anti infective factors and nutrients such as vitamin A.

Chandrashekhar et al (1990) found that Kotas from Nilgiri Hills avoided “Ganji” during lactation as it is supposed to upset the stomach Kadars had the peculiar habit of giving the delivered women red chilli salt paste in order to clean the uterus and enhance milk production. During lactation they avoid mango, jackfruit and honey as they consider it is not good for the infant.

Rao et al (1991) observed that consumption of goat meat is a taboo among ThangKuls Pregnant women of Manipur were forbidden from eating the flesh of animals dying of natural death. Marrings do not eat dog or cat meat. Women were forbidden to consume the flesh of animals that are sacrificed to ward off illness.

**Food Intake-Mothers**

Muthayya (1972) found that milk, eggs, meat, fruits were not generally given to the expectant mothers either because of they cannot
afford it or they might be guided by thinking that these additional food items were not necessary for expectant mothers.

Devdas (1977) found that the protein intake of pregnant and nursing mothers didn’t meet the recommended levels.

Devdas (1980) observed that the average consumption of cereals was inadequate in pregnant and nursing mothers of rural communities. The intake of other vegetables, roots and tubers, fruits, fats, and oils sugars and jaggery, milk and milk products was not adequate. The green leafy vegetables had not found a place in the diet of these mothers.

Mathew (1988) reported that the average amount of fats and oils consumed by pregnant women ranged from 0-15g causing a total energy deficit of 30 to 45 percent of RDA in the diets of urban, rural and tribal populations of Udaipur district.

Rao et al (1991) while studying the diet and nutritional status of tribal groups of Manipur found that the consumption of flesh foods was higher among Thangkuls (89gm) than in the Marrings.

Rao (1992) studied dietary pattern, nutritional status and related socio-cultural aspects of pregnant and lactating mothers in Surat revealed that majority of them do not get even the desirable nutritional requirement of non-pregnant, non-lactating women and their socio-cultural practices rather than socio-culture determinants play a dominant role on their nutritional status.

**Food Intake of Children:**

Devdas (1977) observed that 30 percent of the families belonged to low socio-economic group did not used milk and milk products in their daily diet.

Devdas (1979) found that the intakes of cereals, pulses, milk and milk products, sugar and jaggery and fats and oils by the children suffering from Kwashiorkar were inadequate, when compared to recommended dietary allowances (ICMR 1981). The intake of milk and milk products, fruits and neglect of green leafy vegetables must have aggravated Vitamin A deficiency.
Shrivastav et al (1970) reported 43.1% PEM at Lucknow.

Bal Gopal et al (1977) studied that all types of malnutrition like marasmus, kwashiorkar and undernutrition predominantly occurred in preschool children. The analysis of the patients of the Madras Hospitals in 1968, 1969 and 1970 revealed that mortality in the preschool age groups was 1/3 of total deaths.

Devdas (1977) found that the preschool children are at the greater risks than the other age groups. The common symptoms are anemia, angular stomatitis, changes in hair, bleeding gums, rough and scaly skin in preschool children. Prevalence of malnutrition was more in the age group of 2-3 years. Protein Energy Malnutrition was present in 44 per cent of the children, varying from mild to severe forms. Next to PEM iron deficiency anemia and vitamin A deficiency were wildly prevalent. Fifty percent of the children in the preschool group suffered from anemia and vitamin A deficiency. The incidence of iron deficiency anemia topped the highest (26%) followed by symptoms of vitamin A deficiency (18%) and angular stomatitis (15%)

Goyet et al (1978) reported higher prevalence of PEM during second and third year of age.

Anonymous reported that 1979 at least 2,50,000 children were getting blind from Xerophthalmia or Keratomalacia per year.

According to (Chopdar and Samual) 1979 the maximum number of malnourished children(81.2%) were in the age group of 1-3 years. Grade IV malnutrition (9.4%) was in the age group of 1-3 years. In the study of tribal ICDS block of Subdega Orissa. The most pertinent causes of malnutrition were attributed to factors like poor socio-economic conditions, inadequate health and nutrition education, feeding babies with diluted milk and repeated pregnancy.

Gopalan (1979) found that one million children die in India every year due to malnutrition and non nutrition diseases resulting from poor resistance due to malnutrition and 17 percent preschool children suffer from severe malnutrition and 45 percent from moderate malnutrition.
Rao et al (1980) observed the prevalence of anemia was more or less same in male and female children. Severe forms of clinical PEM signs were more in anemic children. Prevalance of severe anemia was higher in those with chronic or current forms of malnutrition than other.

Shukla (1982) stated that every year 15000 of our children become blind before the age of six. About 5 % of children are suffering from severe protein calorie malnutrition and 90 % preschool children from growth retardation.

Vijayalaxmi et al (1988) stated that there was no frank cases of Kwashiorkor or Marasmus among tribal and non tribal children in Marodumilli Block of Andhra Pradesh.

Rajaji (1989) opined that nutritional anemia is the condition that results from the inability of the erythropoietic tissue to maintain a normal hemoglobin concentration on account of inadequate supply of one or more essential nutrient.

Rao et al (1989) observed that none of the preschool children exhibited signs of protein energy malnutrition in Onge tribe of Little Andaman Islands.

Bhaskaran (1990) observed that children suffering from severe vitamin A deficiency manifesting as Keratomalacia constitute 0.1 % of preschool population of children and these children in India invariably have an association with severe Protein Energy Malnutrition.

Sharma et al (1990) reported that the percentage of normal children was maximum in case of one year female children i.e. fifty percent and it was minimum in case of five years female children i.e. 7.14 percent. For all age groups, female children were having more percentage of normal children as compared to male children except in case of five years children where the trend was reverse.

Rao et al (1991) found that among Marrings and Thangkuls B complex deficiency in the form of angular stomatitis was observed in one percent of preschool children. The extent of severe and moderate grades of malnutrition among preschool children of Marrings was higher (60.2%) than in the Thangkuls (27.2%), consequently the
proportion of normal children was correspondingly higher among Thangkuls (20.5%) than in Marrings. A higher proportion of adult Marrings (18%) were observed to be in different grades of chronic energy deficiency than the adult Thangkuls (12%).

Rao et al (1994) observed that Marasmus and Kwashiorkar, the extreme forms of PEM were seen in Jhabua (1%) and Bastar (0.2%) and were absent in Sarguja. Angular stomatitis suggestive of B. Complex was negligible in all the three areas viz., Jhabua (1.4%) Bastar (0.3%) Sarguja (0.3%) Vitamin A deficiency Signs, Bilot spots was seen only in Jhabua (0.3%).

Verma et al (1996) found that the commonest nutritional deficiency signs were Energy Protein Malnutrition, anemia and vitamin A deficiency. To a lesser extent clinical symptoms related to the deficiency of vitamin C, riboflavin, vitamin D too were observed. Among the younger children frank symptoms of deficiency were observed the prevalence for the same being 3% for boys and 4% for girls. Anemia was observed in 1-3 years boys 26.71% and in girls 32.61%, in 1-3 years girls it was 25.39% and in 4-6 years girls it was 27.39%. The most frequently occurring sign for anemia was pale conjunctiva followed by koilonychia, pale, flabby tongue and pigmentation on ankles. Age and not sex of the child had an important bearing on the prevalence of malnutrition, the same being higher among the children between 1-3 years of age. Thus the younger children constitute the most vulnerable group of the child population. Conjunctival xerosis was the commonest sign of Vitamin A deficiency (17.52 percent). The prevalence of bitot spot was relatively lower, also observed that the presence of deficiency increased with age. Sex difference was also reported, in the prevalence of this deficiency it was marginally lower among the girls. In the study of nutritional status of preschoolers of rural areas in Rajasthan.

**Bio-chemical Studies**

Devdas et al (1977) found that there was a drastic decrease in haemoglobin content of children having protein energy malnutrition, anemia, marasmus, (less than 7.59/ 100 ml) All the children had values lower than 9.2g/100 ml.
Chitre et al (1983) reported that, mean hemoglobin level in women was 8.93 g/100 ml blood in Mahadeo Koli tribe from Kharishwer (Pune).

Gopaldas (1986) observed that the mean haemoglobin level was 7.4 g/ dl was found in 0-6 years children.

Rao et al (1993) reported that according to haemoglobin values in blood 100 % pregnant and non pregnant women and 16.3 % of preschool children were anemic (with <7 g/dl ) in Jenu Kurubas tribe of Karnataka.

**Morbidity - Children**

Devdas (1977) observed that morbidity pattern showed prevalence of respiratory tract infections in the highest order followed by gastro intestinal disease.

Devdas (1977) reported that non-nutritional disorders occurred most frequently in young preschool children as they are the most vulnerable sections of the population. In this study, respiratory tract infections ranked the highest (49.5 %) followed by gastro - intestinal infections (19.7%) and skin infections (16.6 %). These results are in accordance with the results reported by Banik (1978), Bhansali (1979) et al , Sharma et al (1979) and Devdas et al (1980).

Reddy (1989) stated that children with measles suffer from frequent attacks of diarrhoea and respiratory infection for nearly 6 months after recovery.

Anonymous (1990) reported estimate of deaths of children under 5 years from diarrhea is one and a half million each year, which gives some idea of the far higher order of episodes in the course of a year roughly estimated at some 300 million with each such about the child undergoes a further decline in health and nutritional status, already marginal on account of the inadequacy of the diet.

2.3: **Nutritional Problems of the Tribes .**

Ali (1988) stated that unfavourable enviromental conditions predisposing to communicable diseases and malnutrition. Inadequate health facilities, lack of sanitation and absence of drinking water facilities are the main problems. Economic stagnation and over all
poverty due to mainly lack of resources and ignorance are the problems of tribals.

Vijayalaxmi and Rao (1988) found that nutritional status is affected by socio ecological factors in the comparative study of the tribals in Andhra Pradesh.

Chandrashekhar and Chitre (1990) stated that in adequacy of nutrients in diet of tribals is because of their peculiar diatery pattern, food fads and low socio economic status.

Rao et al (1994) observed that because of tribal’s dependence on primitive agricultural practices, they often faced uncertainty of food supply and thus tend to suffer from undernutrition. They had always lack of proper health and education facilities, prevalence of certain irrational belief system in respect of health and nutrition aggravate the nutritional problems. The instable income from agriculture and poor forest resources are the problems of tribals.

Yashoda Devi (1994) confirmed the nutritional problems as lack of education of mother, health status during pregnancy, nutritional awareness, high morbidity, large family size, low per capita income, careless father and addictions etc.

2.4: Suggestions for Improving Nutritional Status

Devdas (1977) recommended to organise a well planned intensive nutrition education programme to reduce the problem of under nutrition and malnutrition, blended with nutrition and health aspects namely desirable wearing practices, supplementary foods, methods of preservation, immunization measures to be adopted, importance of small family, desirable age for marriage, methods of cooking to be adopted to retain the nutrients and significance of good nutrition during vulnerable period.

Swaminathan (1981) stated that a high rate of child mortality retards the prosperity of the country. In order to develop a scientifically sound and economically feasible nutrition strategy, it is necessary to understand the nature of the nutrition problem of pre-school children in the different parts of the country.
Swaminathan (1981) stated that a high rate of child mortality retards the prosperity of the country. In order to develop a scientifically sound and economically feasible nutrition strategy, it is necessary to understand the nature of the nutrition problem of pre-school children in the different parts of the country.

Shrikantia (1989) suggested that bridging the ‘food gap’ by using natural foods is also the most rational public health approach for preventing the development of PEM.

Rao (1989) suggested that all developing countries should feed the pregnant and lactating mothers with a mixed diet of locally available foods, breast feed exclusively for 4-6 months and introduce low cost weaning foods based on the concept of multimixes from 4-6 months onwards.

Vijayaraghavan (1989) suggested that the programme of control of nutritional blindness should be made an integral part of primary health care which includes early diagnosis, prompt treatment of minor illnesses, immunisation and health and nutrition education, so that the child survival can be substantially improved in the country.

Rao et al (1989) suggested that initiation of a programme with the packages of services (like in ICDS) should be considered since it encompasses primary health care, nutrition and education of children and mothers. Functional literacy to the adult member of the community with special reference to make them aware of various denominations of currency, household goods, importance of health, personal hygiene and environmental sanitation and the ill effect of consumption of tobacco and alcohol, should be ensured.

Mohankumar (1990) suggested that tribal development programme needs specific objectives, strategies and approaches for different programmes like afforestation, horticulture, sericulture, agricultural and allied activities and infrastructural facilities.

Reddy (1991) suggested that the eradication of ill health and under nutrition, and the reduction in morbidity and mortality among poor calls for action on a broad front, directed towards removal of
several socio economic and environmental constraints and improvement in health care services.

Rao et al (1991) recommended to plan suitable developmental programmes for economic upliftment in these tribal groups. Improvements in the agricultural infrastructure and development of horticulture, starting of forest based small scale industries, provisions of better health and drinking water facilities will go a long way in helping these tribes to better their economic and nutritional status. The main factors contributing to the poor nutritional status of the people were poverty, illiteracy and lack of proper health infrastructure.

Rao et al (1991) suggested that eradication of malnutrition needs comprehensive nutritional policy with clear-cut goals, and definite time frame for achieving these goals through programmes aimed at increasing the purchasing power of the poor on one hand and strengthening Public Distribution System on the other. Further efforts must ensure that household food security becomes an integral components of the current National Food Security to facilitate adequate adequate consumption of diet by all members of the family.

Naidu et al (1991) suggested that in the Indian context, inputs and out reach of programmes like ICDS need to be augmented and their scope extended to include girls of school age and adolescents, who are potential mothers. Adequate maternal nutrition is a central issue and should be viewed as a major factor in relation to progress and well being of not only children but of the family and society at large.

Rao (1991) has recognised two broad approaches to tackle the problem of anemia. One is to intervene with daily prophylactic supplementation of iron to the most affected groups, pregnant women and preschool children. The other is a blanket programme intended to increase the iron intake by the entire population by fortifying and commonly consumed food item with small amounts of iron. Further suggested that prevention and adequate treatment of nutritional deficiencies particularly nutritional anemia and vitamin A deficiency in expectant mothers and children, provision of safe delivery services for mothers, adequate home and institutional care for infants and children.
at risk, immunisation, prompt treatment of acute respiratory and gastro-intestinal disease in children.

Rao (1992) reported that energy and iron intakes in Indian diets are highly correlated (r=0.769) presumably because a major proportion of both dietary iron and energy were derived from cereals apart from inadequate content of iron reduced intake of energy (food) which was widely seen among the poor in the country, further reduces daily iron intake.

Rao et al (1994) suggested that there is an imperative need to improve the socio-economic conditions and provision of health care facilities to affect considerable improvement in their nutrition and growth. The villagers should be motivated to spend their income on health and nutrition rather than luxury items like TV, Refrigerator etc. and further he suggested that the villagers should be encouraged to benefit from the on going programmes like Jawahar Rojgar Yojna and from loans by Co-operatives rural banks.

Varma et al (1996) suggested that measures to provide potable water to the villages through pipe supply, repair of nonfunctional hand-pumps and deep boring of wells should taken up. Technology for low cost sanitary latrines should be extended to villages. Garbage bins should be installed to for proper waste/refuge disposal as garbage dumps were found scattered around in the villages.

2.5 Association and Relationship Between Various Characteristics Of Mothers, Children and their Nutritional Status.

Age and Nutritional Status:

Luwang et al (1970) reported that there was a significant association between the prevalence of PEM and age of the children. The moderate severe forms of PEM was also apparently higher in the second and third and fourth year in study of underfives of Thankul tribe of Manipur.

Devdas (1977) stated that there was a significant association between the prevalence of PEM and age of the children.
Agarwal et al. (1982) in a study from Jaipur on morbidity in urban children below five years observed higher incidence of anemia, worms, boils, acute respiratory tract infection, diarrhoea, dysentery, measles and whooping cough in the lower-socio-economic groups.

Sehgal and Kapoor (1988) found no significant influence of age education on feeding and weaning practices followed by urban elite mothers while significant influence of these variables was found in labour mothers of Bhivani city.

Tomar (1990) observed that Delayed Weaning and prolonged breast feeding were causes of prevalence of anemia.

Sharma et al. (1990) observed that the weight for age gradually increased with increase of age and at five years of age the weight for age was in I degree malnutrition. The children of two years of age were more sufferers from malnutrition as compared to other age groups.

Rao et al. (1991) observed that higher literacy among Thangkuls seem to be determining factors for their better nutritional status as compared to the Marrings.

Sockiran (1991) observed that the problem of anemia is found to be more prevalent in populations belonging to low socio-economic group, where 38-73% of children aged 6 months to 5 years, 21-92% of pregnant women, 35-85% of non-pregnant women, 30-68% of labours and plantation workers.

In the younger age group of 1-3 years, the per capita income of the families has shown an association with height and weight of the children.

**Relationship between Education of Mothers and Nutritional Status.**

Devdas (1977) observed that the percentage of children in mild to severe forms of malnutrition was found to be higher when the mothers had no education. When mothers education were above the high school level, there was complete absence of incidence of malnutrition among these children.
Jain and Mathur (1988) reported that a positive correlation was found between mother's educational level and her knowledge of nutrition.

Seth and Nanavati (1988) found that negative relationship between nutritional knowledge and the application in their food practices. With the increase in the educational qualification, there was an increase in their nutritional awareness.

Sehgal (1988) observed that education of mother had shown significant effect on most of the feeding and weaning practices followed by labourers mothers. With increase in the educational qualification there was an increase in nutritional awareness in pregnant women of Baroda city.

Sharma and Vali (1988) found that the nutritional status of children was positively correlated with the parent's education. In the study of preschool children in the urban slums of Nagpur.

Abbi et al (1988) observed that mother's literacy was significant intervening factor in child's growth.

Chadha et al (1989) reported that mother's educational status and the feeding patterns of the infants were significantly associated with their growth status.

Sharma et al (1990) observed that the children of the parents who had higher educational status were heavier than those, who had lower educational status and there was statistically significant association between educational status of parents and grades of malnutrition.

Anonymous (1995) observed that there is significant inverse relationship between in all age groups and education of the women, in the study of the state of child health in the Eastern Mediterranean region.

**Family Size and Nutritional Status**

Devdas (1977) found that the consumption of calories and protein was undoubtedly lower in the family size of 8-9 members.
More than 15 percent of the children from family size of 5 and above were in grade II and grade III malnutrition. The correlation analysis indicated a striking direct relationship between family size and severity of PEM. Similar results have been reported by Gopalan (1973) Devdas (1974) and Pralhad Rao (1975).

Shukla (1982) reported that in families with less than 3 children, calorie and protein intake was higher than in those having more family size.

Sharma & Vali (1988) observed that nutritional status of children was negatively correlated with the size of the family in the sums of Nagpur.

Sehgal and Kapoor (1988) found that significant effect of number of Children in family on feeding and weaning practices followed by labourer mothers.

Sharma (1988) reported that with increase in family size the weight/ height² considerably decreased. Mild and moderate forms of malnutrition are common in small and large size families respectively.

Rao et al (1991) reported that Mild and moderate forms of malnutrition are common in small and large size families respectively.

Caste, Culture & Nutritional Status:

Mathew (1988) observed that poverty, cultural practices, fads and fallacies and lack of knowledge regarding the importance of fat in the diet during pregnancy were found to be the main factors associated with the low intake of fats and oils.

Singh et al (1988) observed the socio-cultural aspects govern the nutrition related behavior of a population. This forms an important aspect of the situational analysis of a community and is crucial for bringing about positive changes in the overall nutrition status of population.

Sehgal and Kapoor (1988) had shown that caste has significant effect on most of the feeding and weaning practices followed by labourer mothers.

Environment
Abbi et al (1988) found that the type of house construction had significant effect on child's growth in Panchmahal district of Gujarat.

Reddy (1991) reported that inadequate dietary intake of vitamin A is the primary cause of xerophtalmia, while the poor environment is responsible for recurrent infections. In addition, there may be a direct link between the two, one promoting the other.

**Gender:**

Srivastava et al (1970) could not observe significant association between PEM and sex of the children.

Pratinidhi et al (1984) observed that males are more vulnerable than females to vitamin A deficiency.

Anonymous (1992) observed that there were no differences between the sexes to clinical deficiency signs.

Rao et al (1993) reported that the Jenu Kuruba boys were more malnourished than the girls in Karnataka.

**Nutritional Status and Income**

Devdas (1977) reported that, as the monthly income of the family was increasing, there was an increase in the percentage of well nourished children, there existed striking inverse relationship between higher income level and relationship between higher income level and severity of PEM.

Shukla (1982) stated that the main factor behind the low nutritional status of the slum population reduced food availability due to low purchasing power.

Gopalan (1986) opined that Vitamin A deficient children may be from poorer families subject to more severe socio-economic and dietary constraints, and more likely to encounter the multiplicity of threats to survival than also with adequate vitamin A status.

Abbi et al (1988) reported that per capita monthly income was significant intervening socio-economic factor which affected the growth of child in Chandrapur district of Maharashtra.
Dhawan and Mann (1988) reported that the iron status of middle income group was significantly better than the low income group of pregnant women in Ludhiana district of Punjab.

Sharma & Vali (1988) reported that Nutritional status was positively correlated to per capita income.

Adhikari et al (1989) stated that the influence of socio-economic factors is manifested in the nutrition and the entire environment which the children were compelled to adopt. Children from better socio-economic classes would naturally have better nutrition and better environment.

Sharma et al (1990) stated that when there is an increase in the annual income of the family there is an increase in the percentage of well nourished children and normal children. There is statistically significant association between the family income and nutritional grades.

Rao et al (1991) found that better socio-economic conditions among the Thangkuls seem to be determining factors for their better nutritional status.

Rao et al (1991) found that income levels among Thangkuls seem to be determining factors for their better nutritional status, as compared to the Marrings.

Rao et al (1991) in the study of Diet and Nutritional Status of Tribal Groups of Manipur observed that communications and other health facilities, among the Thangkuls seem to be determining factors for their better nutritional status as compared to the Marrings.

Naidu et al (1994) observed that mean BMI values were lower in landless agricultural occupational groups and in low per capita income groups.

Rao et al (1994) stated that in Sarguja district the income from agriculture and labour was relatively more stable resulting in better consumption levels which in turn led to better nutritional status of the population as evidenced among the preschoolers. Further he mentioned that the instable income from agriculture alone in Jhabua and poor forest resources in Bastar are mainly contributed to the
higher levels of under nutrition in these two areas. Primitive form of agriculture with low yields of food grains and lack of income generating activities resulted in low per capita income, which has contributed significantly to their poor nutritional status.

**Morbidity and Nutritional Status.**

Scrimshaw et al (1959) emphasized a synergistic interaction between nutrition and infection.

Shukla (1982) stated that poor personal hygiene leads to various intestinal infestations and parasitic, bacterial and viral infections. The infectious diseases do not reduce the assimilation of nutrients only. By increasing the rate of tissue break down they create need for extra nutrients also which remain unmet due to improper weaning, ignorance and poverty. Thus due to lowered immunity the sequence of events continues.

Bhaskaran (1989) observed that there is a strong association between PEM and infection. Infectious diseases due to significant morbidity and mortality in severely malnourished children.

Shrikantia (1989) stated that PEM is the outcome of a complex inter play of several socio-economic and cultural factors. Two immediate causes are, insufficient food intake and infective morbidity.

Saifee and Vali (1989) observed that inadequate nutrition can alter the immune commutance and thus increase susceptibility to infection which in turn lead to malnutrition.

Reddy (1989) stated that community studies show that the peak incidence of Kwashiorkor is preceded by peak incidence of diarrhoea confirming the role of diarrhea in malnutrition.

Yashoda Devi and Geervani (1994) observed that significant influence of socio economic status on weight for age, height for age, and weight for height.

**Nutrient and Morbidity.**

Sommer et al (1984) reported that there are several reports indicating the frequent association of xerophthalmia with infections particularly diarrhea and respiratory infections.
Christian et al (1988) observed that the effect of dietary practices during pregnancy showed that the weight of those who ate lees food was lower than that of those who ate at least the same amount or more.

Vijaya raghavan (1989) noticed that inadequate dietary intake of vitamin A is the most important cause for the widespread prevalence of the disease. In addition, other factors such as the poor nutritional status of the mother during pregnancy and lactation, delayed supplementary feeding, measles and frequent occurrence of other infections are important in determining the clinical manifestations of vitamin A deficiency.

Reddy (1991) reported that keratomalacia is often preceded by an episode of infection, acute diarrhea, respiratory infection and measles are common precipitating factors. Several potential mechanisms exists, by which infection can aggregate vitamin A deficiency. During acute infection, the appetite is impaired and the dietary intake of vitamin A is reduced.

**Breast Feeding And Nutritional Status**

Anonymous (1980) reported that while studying the association of clinical status with that of growth status (weight for age assessed by Gomez grades) in preschoolers, 15.6 percent of the children without nutritional deficiency signs were found to have ‘normal’ body weight status, while only 7.4 percent of children with signs of nutritional deficiency were found to fall under this category, while 3 percent of those without nutritional deficiency signs were suffering from severe growth retardation, 12 percent of the children exhibiting signs of nutritional deficiency fall under this category.

Shastri & Reddy (1981) observed that Children who were breast fed tend to have fewer attacks of diarrhoea, lower morbidity and mortality.

Abbi et al (1988) reported that mother’s knowledge regarding age of introducing solid foods, diet, perception of child’s growth and their composite nutrition knowledge score had a significant effect, on
child's nutritional status in Chandrapur district of Maharashtra and Panchamahal district of Gujarat.

Chadha et al (1989) observed a significant association between the feeding patterns and number of days of illness suffered by the infants. While studying infant feeding practices in slum areas of Delhi.

Rao (1989) stated that human milk contains a variety of protective factors such as lactobacillus bifidus, antistaphylococcal factors, lysozyme, lactoferrin components of complement system, immunoglobulins, A, G, & M, lymphocytes, neutrophils, Macrophases and lipids. The growth amongst breast fed infants is satisfactory up to 3 months in all groups while at 6 months the weights of urban elite and middle income group were higher.

**Gender Discrimination And Nutritional Status**

Anonymous (1962) believed that females are discriminated with respect to several benefits as compared to the males and consequently suffer from the ill effect on health and nutritional status.

Sharma et al (1990) observed that the mean weight, height, head-circumference measurements were found below the standard of ICMR. The female children of four to 5 year recorded higher mean body weight than that of the male children of the same age. The difference between the observed and standard measurement of weight, height and chest circumference was lower at one year of age group which increased with the increasing age also the disparity observed in and standard measurement of female was lower as compared to their counterpart male children. The chest head ratio was less than one in all the age groups till the age of 4 years.

Anonymous (1992) reported that during illness, higher proportion of boys (80%) compared to girls (63%) were taken to medical practitioners and the mean number of visits to the doctors was also higher in boys 2.3% than in girls (1.8%)

Anonymous (1992) indicated that though there is social preference for boys, there is no deliberate discrimination against girl
children with reference to diet and nutrition in the study on preschool children around Hyderabad.

Anonymous (1992) reported that there were no significant differences in the dietary intakes between boys and girls, access to nutritionally better foods like milk and milk was similar in both the sexes. But in general due to poverty, consumption of such foods is low in these households.

Verma et al (1996) observed that male siblings consumed significantly higher amount of milk and milk products and sugar than their female counterparts in the study on child nutrition problems and prospects in rural areas of Rajasthan.