CHAPTER - I

INTRODUCTION

The biological anthropologist study complexity of problems which need holistic approach. The strong ecological emphasis of many biological anthropologists results in a focus upon the interactions of populations with their physical and social environments. The researchers emphasize upon multiple causes and responses. Biological anthropologists are concerned with variability and the quantification of variability in measuring growth and nutritional status has provided insight into effect of economic and dietary change in developing countries.

Haviland defines Physical Anthropology as “the field of Physical Anthropology (or bio-anthropology) includes the study of living and fossil non-human primates, human evolution and human genetic and physical variability” (2003 – C. D. Edition). Physical Anthropologists are interested in the differences and similarities among groups of people. The field of physical anthropology include population genetics, genetic demography, evaluation, human growth and development, forensic anthropology, environmental
anthropology, **nutritional anthropology**, health genetics and applied anthropology (Rami Reddy, 1992).

Nutritional studies in biological anthropology are varied in type. They may be directly concerned with nutritional factors and the way that they affect different aspects of human population, biology and ecology or they may be concerned with nutritional adaptation.

Nutritional anthropology is one of the main fields of Biological anthropology which deals with food, food ways and nutrition. The science of nutrition has been developed by using the combined knowledge of the physical and biological sciences. The study of nutrition is a bio-cultural issue. The consequences of food intake are biological but the nature of food intake that is, what people eat, how, when, where and how much is influenced by social, economical, political and cultural processes.

1.1 **FOOD AND NUTRITION**

Food is the basic need of all the living organisms. Food is anything eaten or drunk which can be digested and absorbed by the body. Further, it is used as an energy source for building, regulating or protective function.
Figure-1: Human nutrition involves the study and application of many disciplines.

Source normal and Therapeutic nutrition, Robinson C. H. et al., 1986
Proper quantity and quality of food intake ensures good health. In brief, food is a biochemical process and product which sustains life. However, food is also intimately woven into the physical, psychological, intellectual, economical and social life of man. Food is one of the main components of the culture and is filled with many different meanings and symbols for all individuals at various stages of their life.

Most of the cultural differences are expressed through the food they eat or what they need, but in the real life they chose what they like. Each human group has its own tastes, norms, values, laws and history of food ways which determine the acceptance or rejection.

Food and nutrition are interlinked as food supplies required nutrients for the normal function of the body. Food and nutrition are also very important factors that affect growth and development of the body.

Nutrition is food at work in the body. Different cells in different organs of the body require different types of nutrients for the normal function of the organs therefore, adequate quantity of food and nutrients are required for the body to grow, to develop, to maintain and for reproduction.
Food is available in many forms namely, cereals, pulses, fruits, vegetables, milk, flesh and milk products. All these kinds of food are made up of number of components, which are called nutrients. Each nutrient has its own special work to do. There are many essential nutrients which are used to produce thousands of substances necessary for the life and physical fitness (Shukla et al., 2001).

Food can be classified into three groups namely, energy yielding, body building and productive foods.

**Energy Yielding Foods**

These are rich in fats and carbohydrates. Both are burnt at the time of respiration further, energy is liberated in the body. This group includes food like cereals, roots, dried fruits, milk products and sugars. Cereals also contain proteins, minerals and vitamins.

**Body Building Foods**

This group includes foods like milk, meat, fish, eggs, pulses, oil seeds and nuts which are required for the body building.
**Protective Foods**

Foods rich in proteins, vitamins and minerals are termed as protective foods. Green leafy vegetables, fruits and water provide vitamins, minerals and protein to the body.

**1.2 COMPOSITION OF FOOD**

Food is composed of six kinds of chemical substances namely, proteins, carbohydrates, lipids, vitamins, minerals and water.

**Proteins**

Proteins are complex, organic and nitrogenous compounds which amount to about 16 per cent of proteins constitutes about 20 per cent of an adult body weight. Proteins are made up of smaller units which are called amino acids. Around 20 amino acids are needed by the human body. Among them 9 are called ‘essential’ because the body cannot synthesize them, hence they must be obtained from dietary proteins. The essential amino acids are Luccin, Isolucien, Lysine, Methionine, Phenylanine, Theonine, Valine, Tryptophian and Histidine. The non-essential amino acids are Arginine, Asparaginic acid, Serine,
Glutamic acid, Proline and Glycine. Amino acids are required for the synthesis of tissue proteins (Gibney et al., 2002).

Proteins are essential for growth maintenance of tissue, regulation of water balance and stimulation of antibody formulation. Protein plays an essential role in transport of nutrients (Guthrie, 1979).

**Carbohydrates**

Carbohydrates include starches and sugars; they are the major source of energy. In India most of the energy is derived from carbohydrates. The carbohydrates can be divided into three groups namely,

1. Monosaccharide (Glucose, Fructose and Galactose)
2. Disaccharides (Sucrose, Lactose and Galactose) and
3. Polysaccharides (Starch).

1 gram of carbohydrate fetches about 4 kilo calories. Carbohydrates also play a vital role in proper function of liver, heart, muscle contraction and central nervous system. Cereals like rice, wheat, barley, millet, jowar and maize are the few important sources of carbohydrates. Fruits like grapes, apples and bananas contain good amount of
carbohydrates. Milk is very important source of animal carbohydrate.

**Fats**

Fats and oils are concentrated source of energy. Oils are liquid at 20°C temperatures. Fats are classified into three categories namely,

1) Simple lipids (Triglycerides)
2) Compound lipids (Phospholipids) and
3) Derived lipids (Cholesterol).

Adipose tissue constitutes around 15 per cent of body weight. In normal humans 99 per cent body fat in the adipose tissue is of Triglycerides. Fatty acids are divided into two groups namely saturated and unsaturated acids. The latter is further divided into mono unsaturated (Oleic acid) and Poly unsaturated fatty acid (Linoleic acid). Fat also help in the absorption of beta carbonate and fat soluble vitamins namely A, D, E and K (Gibney et al., 2002).

**Vitamins**

Vitamins are organic substances present in several food stuffs and are essential for normal maintenance and functions of the body. A required amount of vitamins
should be taken into the body; anything excess or deficient is harmful to the body. The vitamins are further divided into two categories namely, fat soluble vitamins and water soluble vitamins.

**Water Soluble Vitamins**

The group of vitamin B is called Cynacodalbin. This B complex group includes Thiamine (Vitamin B-1), Riboflavin (Vitamin B-2), Pyridoxine (Vitamin B-6) and Vitamin B-12.

Thiamine is essential for the utilization of carbohydrates. The dietary source of Thiamine is whole grains, yeast, pulses and meat (Lippold and Cogdell, 1991).

Riboflavin is closely connected with biological oxidation and helps to maintain the integrity of mucocutaneous structures. Flesh foods, legumes, groundnuts and green leafy vegetables are a few where higher concentration of Riboflavin is present.

Pyridoxine required for the conversion of Tryptophan to Nicotinic acid in the body and it is associated with the metabolism of essential fatty acids. Meat, liver, whole grains and vegetables are a few examples which contain maximum amount of pyridoxine (Gopalan et al., 1980).
Vitamin B-12 plays an important role in the maintenance of myelin in the nervous system. Vitamin B-12 along with folic acid helps in the synthesis of nucleic acid. The vitamin B-12 is present only in animal foods (Passmore et al., 1986).

Ascorbic acid helps in the synthesis of collagen amino acids, carbohydrates and hormones. It also influences the absorption and metabolism of iron. Ascorbic acid is present in high concentrations in citrus fruits and leafy vegetables. Certain amount of ascorbic acid is also available in tomato, banana and potato (A Report of the ICMR, 2004). Excess intake of these water soluble vitamins is excreted through urine.

**Fat Soluble Vitamins**

Fat soluble vitamins are also essential for normal maintenance of the body. They are required in very small quantity. Excess of intake is stored in the body and are not excreted in the urine.

This group includes Vitamin A, Vitamin D and Vitamin E. Vitamin A is very essential for normal vision and for maintaining the integrity of epithelial tissues. Vitamin A
supports the skeletal growth. Fish liver oils are richest sources of Vitamin A but they are generally used as supplements rather than food sources. Mango, Papaya, and Carrots are a few that contain Vitamin A in good quantity.

Vitamin D helps in calcification process of the bone and helps in the absorption of calcium from the intestine (Marks, 1979). Sunlight and fish are chief sources of Vitamin D.

Vitamin E is a group of chemical components and called Tacopherol. Alpha-Tacopherol helps to stabilize poly saturated fatty acid in cell membranes and protect them against destruction due to oxidation. Source of Tacopherols are wheat grain oil, corn oil, soybean oil and sunflower oil (A Report of the ICMR, 2004).

Vitamin K helps in the synthesis of proteins. Chief sources of Vitamin K are from fresh leafy vegetables and beef liver. In India deficiency of Vitamin K is observed only in new born babies.

Water

Water is the most important of all nutrients and essential for life. It constitutes about 62 to 75 per cent of
the body mass. Water acts as a solvent for nutrients, minerals and for hormones. It acts as a catalyst in many biological reactions especially in the stomach and small intestine. Water also acts as a lubricant between joints and regulates body temperature.

The fluid requirement per kilogram of body weight is as follows,

- Infants: 110 ml per kg
- Children: 20 ml per kg
- Adults: 22 to 38 ml per kg.

In India, most of the water from the body is lost through sweat and urine. Hence, it is advised to consume more water than the above mentioned requirement.

1.3 MALNUTRITION

Malnutrition is inadequate supply of nutrients to the cell. Vazir (1998) defines malnutrition as a "state where inadequate nutrients are not delivered to the cells to provide the substrate for optimal functioning". There are so many factors which are responsible for malnutrition; it may be psychological, personnel, social, cultural, political, educational and economic. Malnutrition is a major public
health problem in many countries; it contributes to child mortality, lowered resistance to diseases, poor intellectual and physical development of children. Suppose the malnutrition is temporary phase, it can be all evicted rapidly and save the life but if it is continuous for a long period of time, malnutrition becomes chronic, irreparable and eventually fatal (Chatterjee, 2000).

Hence, malnutrition is a very complex problem where multifaceted strategies are required to combat. Malnutrition affects an individual in any stage of his life.

The effect of malnutrition may continue in childhood also. Children subjected to suffer frequent infections, underweight and stunting growth due to the inadequate intakes of nutrients; particularly iron, protein, vitamins and zinc. A child who is stunted at five years of age is likely to remain stunted throughout life.

A second and important period of rapid growth during adolescence may give an opportunity to come out of the malnutrition. However, even if child catches up some lost growth, the effects of early childhood under nutrition on cognitive development may not be fully recovered. A stunted
Figure 2: Malnutrition the Global Challenge

Disasters personal natural
Maldistribution of wealth, underdevelopment, improvidence
Maternal deprivation, psychological disorders
Lack of dietary adaptation emotional, somatic

Food habits, traditions
Poverty
Carelessness
Ignorance
Anorexia

Inadequate food intake

Quality Quantity Timing
Physical biochemical balance presentation

Diarrhea dysentery, parasites, toxins
Contaminated food

Lack of education, poor sanitation

Congenital defects, prematurely, metabolic errors, anatomical gastrointestinal defects

Increased diet needs (individual variation)
Growth injury
Pregnancy illness
Lactation work

MALNUTRITION

Other diseases: Infections, allergies

Bacterial changes, enzyme changes
Malabsorption
Gastrointestinal diseases

Source: Introduction to Human Nutrition Gibney et al.
girl is likely to become a stunted adolescent and later a stunted woman. There are many chances that her children will be born with lower birth rate and the chain continues (Frisancho, 1990). There are many categories of malnutrition. A few are explained below,

**Protein Energy Malnutrition (PEM)**

Protein Energy Malnutrition is the most dangerous form of malnutrition usually observed among children. The fast growth among children creates high nutrients demand which are supplied by proteins. Poverty and more number of siblings in the family may leads to protein deficiency. Children suffer with edema, stunting growth, body weakness and lack of immunity in the body (Reddy, 2003).

**Iodine Deficiency Disorders**

Iodine deficiency during pregnancy causes spontaneous abortions, still births and birth defects. Deafness, spastic paralysis and mental retardation are common in the newborn babies. Iodine deficiency is damaging at all ages and stages of life. Goiter is the clear cut indication of iodine deficiency.
Figure 3: Undernutrition throughout the life cycle

Vitamin A Deficiency

Vitamin A deficiency is harmful to infants, children, pregnant and lactating women. Children become blind as a result of Xerophthalmia, which is severe Vitamin A deficiency. Chronic Vitamin A deficiency leads to death of a person (Vijayaraghavan, 2003).

Iron Deficiency

Iron deficiency causes Anemia in all age groups. Anemia impairs psychomotor development, work capacity, learning capacity and resistance to disease. Severe Anemia causes profound fatigue and sometimes death.

Deficiency of Micronutrients

Deficiencies of calcium and zinc cause stunted growth among children and weaken immune function in all ages. Osteoporosis is due to the lack of calcium, often observed in old age.

1.4 CONCEPT OF HEALTH

According to World Health Organization the concept of health is defined as "state of complete physical, social and mental well being and not merely absence of disease or infirmity". Nutrition and health are related to each other as
without good nutrition, health cannot be at its best (HRD Report, 1995). Knowledge of nutrition helps to know the types and quantities of different foods to be taken in our regular diet to maintain good health.

1.5 REVIEW OF LITERATURE

Hanumantha Rao et al., (1975) evaluated the SNP in the tribal areas of Andhra Pradesh. Their results indicated that the supplemented children were found to be significantly taller and heavier than the non-supplemented children of the same tribal group.

Gore et al., (1977) conducted study in Indravathi river basin of Maharashtra and found that tribal diets were deficient in Calories but not in proteins. This was confirmed by the anthropometric measurements and morbidity patterns.

Makewa et al., (1977) have undertaken a nutritional survey on college girls in Japan. It was found that the mean energy intake was 1834 Kcal, fat 65.8 and protein 64.5g daily. Intakes of vitamins, especially ascorbic acid and of minerals tended to be below the requirements.
Pushpamma et al., (1981) reported results of a survey conducted on 731 adults (21 to 40 years old) and elderly members of above 50 years old in Andhra Pradesh, India. Cereals and legumes provided 75-85 per cent of energy and protein. Adequacy of calories in the diet ranged from 71-88 per cent and protein adequacy was 90 per cent. The intake of carotene rich fruits and green leafy vegetables was negligible. The most limiting nutrients were β-Carotene and vitamin C, which met only 10-20 per cent of requirements. Only 40-60 per cent of requirements for riboflavin, calcium and thiamine were met. Iron intake though was adequate in men and women met only 64 per cent of requirement.

Garg et al., (1982) studied 270 healthy elderly persons (above 60 years) in Albuquerque. The mean height and weight of men were 174.0 cm and 73.4 kg and of women were 159.4 cm and 60.5 kg respectively. Based on BMI classification, 18 per cent of the men and 15.1 per cent of women were obese, while 10.8 per cent and 3.9 per cent were thin respectively.

A study carried out by Pushpamma et al., (1982) showed a deficit in all foods except cereals among
adolescents of both males and females between 14 and 20 years of age in three rural regions of Andhra Pradesh. They found that the requirements of Vitamin C and Vitamin A were most inadequately met. Only 40-50 per cent of the requirements of calcium, riboflavin and thiamine were met, while the requirements of calories, protein and niacin were met up to 80 to 85 per cent. The intake of iron was just sufficient in boys and girls, only 62 per cent of the requirement was met.

Garn et al., (1983) have made a comprehensive study on the developmental differences in the triceps and subscapular fat folds during adolescence in boys and girls in USA. They found that the triceps skin fold thickness of boys had transient increase during early adolescence, followed by a rapid decrease and later by another increase. The series of change did not occur in sub-scapular skin fold thickness of boys or in either measurement of girls.

Purnima and Rao (1984) in their study compared the food consumption pattern of working and non-working women. The results reveal that the intake of green leafy vegetables fruit and milk were slightly higher in the families
of working women, than the non-working women. Intakes of vitamin A and vitamin C, calcium and iron though at higher levels in the working women were less compared to recommended diet allowances.

Prema (1984) has undertaken a comparative study on nutritional status of women working outside home with housewives. She found that working women’s weight was heavier (49.5 kg) when compared with housewives (45.2 kg), so also their mid-arm circumference and skin fold were higher than their counterparts. This may be partly attributed to socio-economic status.

Vijayalakshmi and Lakshmi (1985) conducted a study on nutrient intake of mothers belonging to low, middle high income groups was assessed and it was found that the intake of all nutrients were inadequate when compared with RDA of ICMR among low income group mothers. Mothers of the middle income and high-income groups were consuming diets adequate with regard to energy, protein, calcium, iron and vitamin B complex. The diets were partly adequate with regard to retinol and vitamin C.
The impact of dairy development activity on food consumption was studied by Bownder et al., (1986) in ten villages of the three states namely Karnataka, Andhra Pradesh and Maharastra. Only five villages had dairy development programmes while the other five adjacent villages had no dairy development activity. Data were collected on food consumption pattern between the two sets of villages. The mean total food intake per month per household was 23.64 kg in the dairying villages which was higher than the mean figure of 20.31 kg in the non dairying villages. Households in dairy villages consumed more cereals, pulses, fruits, milk and milk products, vegetables and foods of animal origin than did households in the non-dairy villages. Similar trend was seen in all four categories of households in the land less, marginal, small and large farmers.

Nag (1987) observed 107 women in the age group of 20-60 years, engaged in sewing operations. Anthropometric measurements reveal that mean weight and height was 47 ± 0.90 kg and 152 ± 0.5 cm respectively. Nutritional index (NI) was calculated by using weight and height. Of these 26 per cent of women were found to have poor nutritional status.
Usha et al., (1988) studied the validity of calorie intake of rural population in eight villages of Dharwad taluk, Karnataka. Data were collected from 160 families of large, small, marginal farmers and landless labourers covered under integrated rural development programmes. Large farmers had significantly higher calorie coefficient (0.7) than rest of the farmers whereas; landless labourers had the least calorie coefficient (0.46).

Usha and Chitra (1989) investigated the dietary pattern of Kota and Kodar tribal communities of Nilgiris and Annamalai hills respectively. Their studies showed that the nutritive value of selected foods eaten by Kota and Kodar tribal communities correlated well with the nutritive value of the uncommon foods.

The nutritional status of women working at Nuclear Power Corporation (Bombay) was assessed by Amita and Nina (1990). The results showed that mean height of the subjects was 1.52 m ± 0.103 while mean weight was 53.2 kg ± 9.96. Nearly 16 per cent of the women studied were under weight (BMI < 18.8), while obesity was prevalent in 9.5 per cent of subjects (BMI > 28). The mean energy and nutrient
intake was less than the RDA. Individual data showed that the energy intake was less than 80 per cent RDA for 45 per cent of the women surveyed. Calcium, iron, vitamin A and vitamin C intake were also less than 80 per cent of the RDA in more than half of the women studied.

Khan et al., (1990) conducted a dietary comparison between working and non-working women. The study revealed that the nutritional intake among working women was considerably less than that of their non-working counterparts. The protein intake of working women was 78.4 per cent of the RDA as against 84.2 per cent among housewives. The difference was still wider in the case of calorie intake which was reported to about 67 and 84 per cent of the RDA respectively. A similar difference was observed in the intake of carbohydrates and vitamins B1, B2 and vitamin C. In all these cases, the difference was statistically significant.

Sharma and Kuberan (1991) observed the effect of seasonal variation in consumption pattern of weaker section households in Saharanpur district. Data were collected from 195 weaker section households belonging to landless
laboureres, marginal and small farmers' categories. The study revealed that the consumption of food items were maximum in winter (Rs. 108.16). The per capita total expenditure was higher among small farmers than that of marginal and landless labourers in all the three seasons. It is also important to note that percentage expenditure on food item was less in case of small farmers than that of marginal farmers and landless labourers.

Brahmam et al., (1991) assessed the nutritional status of Jenu Kurubas, a primitive tribe inhabit in the districts of Mysore and Kodagu in Karnataka. The results indicated that the intakes of foodstuffs were lower than recommended dietary allowance as well as the intakes in rural Karnataka (NNMB). The average levels of nutrients were less than the recommended dietary allowance, except for calcium, thiamine and vitamin C. The protein energy malnutrition and vitamin A deficiency signs were less common. The prevalence of goiter is perceptible and Anemia seems to be universal problem. The extent and severity of malnutrition among preschool children were high compared to their rural counterparts.
De Groot, et al., (1991) conducted a multicentric study in 19 towns and cities across Europe, anthropometric data on body weight, height, skin fold thickness and arm circumference were obtained from 2332 elderly subjects. The mean body weight ranged from 70.1 ± 15.4 kg to 78.2 ± 10.7 Kg in men and from 56.8 ± 8.1 to 71.4 ± 11.4 kg in women. In the North European towns and cities both men and women were taller than their counter parts in the southern town. Triceps skin fold thickness suggested that females had more subcutaneous fat than males.

Thirunavakkarasu et al., (1992) analyzed the impact of operation flood on the consumption of food by rural poor in North Arcot District, Tamil Nadu. Data were collected from 30 beneficiary families in different categories namely SC, ST and OBC families. The study revealed that energy intake was 1030, 1434 and 1474 Kcal; the protein intake was 21, 30 and 30.03; the milk consumption was 35, 80 and 88 respectively for the beneficiary group. Among the non-beneficiary group the energy intake was 766, 1199 and 1174 Kcal; the protein intake was 20, 23 and 24; the milk consumption was 14, 32 and 34 ml per day respectively. It
is evident that total annual consumption was higher among the beneficiary families in all three categories compared to non-beneficiary group.

Chitra and Sushila (1993) assessed the food and nutrient intake of the women working in knitting industries of Tirupur. The study reveals that majority of the women showed negative energy balance and also their intake was less than ICMR recommendation. Anthropometric profile showed low weight for height. The weight for height percentage revealed that all the women have less weight than standard for their respective heights. Prevalence of nutritional deficiency diseases like, anemia, angular, stomatitis, red glazed tongue, bleeding gums, poor musculature, deficient subcutaneous fat and rough skin were seen. Hematological examinations revealed low levels of hemoglobin in majority of women.

Jaya, et al., (1993) showed that women belonging to low income group had more of poor signs of health. Iron deficiency was predominant among 42 per cent of the young women and instances of dental caries were seen in 32 per cent. Symptoms of B complex deficiencies were observed in
25 per cent of women and angular stomatitis was prevalent in 21 per cent of women.

Results of a study on health and nutritional status of rural communities in Bhagavati Kanipoor block by Nadamuni and Pralhad Rao (1994) showed that nearly one half (49%) of adult Indian rural population was suffering from one grade of chronic energy deficiency. The adult household BMI and child's nutritional status was associated. Mean BMI values were lower in landless agricultural occupational groups and in low per capital income groups.

Ramendra and Dabashis (1994) evaluated the nutritional status of the Jeme Naga of North Cahar Hill district in Assam. The results indicated that mean consumption of calorie per consumption unit per day is 2465.31 Kcal, which is lower than that of the recommended dietary allowance of Indian Counsel of Medical Research. They consume nutrient in lower amount than that of the recommended allowance, which indicate that their diet is deficient in most of the nutrients. The anthropometric profile revealed that only 14.81 per cent of the male was malnourished. In assessing the nutritional status by
estimating the hemoglobin level among males and females, it was found that 44.44 per cent and 45.10 per cent of the male and female sub samples are anemic, with reference to World Health Organization cut off points.

Khonsgdier and Basu (1994) have examined the nutritional status of 361 male and female individuals of the Dimasa tribal community of Cachar and Nagaon districts in Assam. It appears from the nutritional assessment that Dimasa population consumes cereals, vegetables, fish, and meat in higher amount than the recommended allowances of Indian Counsel of Medical Research Food groups like pulses, leafy vegetables, roots tubers, fruits, milks and milk products, fats and oils, sugar and jaggery are consumed in less amount than the recommend allowances. The mean consumption of calorie per consumption unit was 2455.32 kcal which is lower than that of the recommended allowance. The consumption of other nutrients like protein, calcium iron and vitamins are found to be deficient. An anthropometric measurement reveals that almost all the adult male and female sub samples seem to be normal.
Basu and Khonsgdier (1996) conducted the nutritional anthropometric study among the Sonowal Kachari living in the village of LepetKotta, Borbonia block of Dibrugarh district in Assam. The mean consumption of calorie per consumption unit in this tribal population was 2684.39 kcal, which is below the recommended allowance of the Indian Counsel of Medical Research. Anthropometric measurements were taken on the male and female individual between 25 years and 55 years of age. The mean heights of the male and female population are 162.41 cms and 149.76 cms respectively. Average weights are found to be 52.38 kg and 43.33 kg. Hemoglobin concentration shows that 13 gms/dl for the males and 12 gms/dl for females were taken into consideration 60.38 per cent of the males and 65.38 per cent of the females are anemic. This population is vulnerable to malnutrition.

Ramendra and Debeshis (1996) have analyzed the nutritional status among the Kaibarta a scheduled caste population of Dibrugarh district in Assam. It appears from the dietary intake that the consumption of calorie is slightly lower than that of the recommended allowance as
prescribed by the ICMR (1993). Some of the nutrients like protein, fats, vitamin B, Vitamin C and niacin are consumed more than the recommended allowance. Their diet was deficient in other nutrient like calcium, iron, carotenes and Vitamin B2 at the household level. The analysis of weight for height, weight height index, pignet index and also of hemoglobin level, reveal that a large number of them are undernourished. The anthropometric profile revealed that they exhibit poor development of muscle and fat for which inconsistent supply of some nutrients throughout the year may be held responsible. The metabolic impairment due to high incidence of interestingly parasite at population level or other pathogenic situation may also be responsible for poor physique.

Gajbhiye and Debashis (1999) evaluated the nutritional status and the related factors of 315 adult Male and Female individuals of the Bodo community of Sonitpur in Assam. It appears from the nutritional assessment that about 70 per cent of the population was living on low calorie intake. Only 35 per cent of the households nourish themselves with more protein than that of Indian Counsel of
Medical Research recommended dietary allowance. It was clear from the anthropometric assessment that 29.6 per cent of male and 3.9 per cent of female suffer from malnutrition.

Debashis and Gajbhie (1999) assessed that nutritional status of the 351 adult male and female individuals of the Mishing population from Baligaon village in the Balipura block of Sonitpur in Assam. It appears from the nutritional assessment that Mishing population consumes 2598.94 kcal which is lower than that of the ICMR recommended allowance. Nutritional anthropometric results revealed that the mean values of height and weight among the male and female lag behind the international standard. The mean hemoglobin content shows that more than 80 per cent male and 70 per cent female are anemic. It indicates that Mishing population seems to be in adverse nutritional situation.

Balgir et al., (2002) conducted the clinical assessment of health and nutritional status of 224 Gond tribal children (6 to 14 years of age group) in Kalahandi district of Orissa. It is found that the health and nutritional status of children
on the whole was very poor. Dental caries and contagious diseases like Scabies were common in these children due to lack of personal hygiene.

Bhattacharya and Chaudhuri (2004) analyzed the nutritional status of 328 individuals of both sexes of Shimong of zido, old zido, Ngaming and Tuting villages of East Siang district in Arunachal Pradesh. This study presents some aspects of demographic, body dimensions and dietary intake. Their diet is deficient with other nutrients like calcium, iron, Vitamin A, Vitamin B, Vitamin B2 and Vitamin C. The anthropometric results show that the people under study possess in general good physique.

1.6 AIMS AND OBJECTIVES OF THE PRESENT STUDY

By keeping the review of literature and other aspects discussed in the introduction, in the present investigation an attempt has been made to study the nutritional status among the Halakki Vokkalu of Karnataka, where adverse conditions prevail.

Following are the main objectives of the present study;
1) To assess the nutrition status among the Halakki Vokkalu by using different anthropometric parameters.
2) To estimate the prevalence of nutritional deficiency disorders and to study their causative and contributory factors.

3) To investigate the Hemoglobin of Halakki Vokkalu (Under biochemical parameter).

4) To assess the dietary pattern nutrient intake of the Halakki Vokkalu.

5) To analysis the influence, interrelationship of socio-economic conditions on the nutritional status of Halakki Vokkalu.

6) To map out the existing level at malnutrition among the Halakki Vokkalu and

7) To compare the results of the present study with ICMR (Indian Council of Medical Research) and NCHS (National Centre for Health Statistics-USA) Standards.