Chapter 1

Introduction

Children are the wealth of any nation as they constitute one of the important segments of the population. Children in the age group of 5-14 years are often considered as school age. United Nations Educational Scientific and Cultural Organization (UNESCO) since 1972, for the purpose of statistics consider 6-11 years as primary school age and 12-17 years as secondary school age. It is recorded that in India one fifth population comprises of children between 5 and 14 years, the age group covering primary and secondary school age (Suvarna, 2007).

School-aged children grow significantly, but at slower rate, whilst being very physically active in general. As a result, their nutritional needs are high and critical. Additionally, genetic background, gender, body size and shape are all important determinants of nutrient requirements (Westenhoefer, 2001). The school age period has been called the latent time of growth. The rate of growth slows and body changes occur gradually. Girls usually out distance boys by the latter part of this period. The slowed rate of growth during this period results in a gradual decline in the food requirements per unit of body weight (Srilakshmi, 2003).

Nutrition is important for everyone, and it is more important for children because it is directly linked to all aspects of their growth and development, factors which will have direct ties to their level of health as adults. Both nutrition and diet are vital determinants of the health and nutritional profile of children. The nutritional status of a child is often the result of many interrelated factors and is influenced by food intake, its quantity and quality, and physical health.
A balanced diet suitable of protein, vitamins, and minerals will be good for a school age child. Overemphasis on limiting foods is not advised. Diets should not be restricted because of the energy, fat or sugar content of any one food nor should be labeled good or bad. In the first case food may be regarded as medicine and in the second as forbidden fruit (Birch, Fisher and Davison, 2003).

Nutrition is a major environmental influence on physical and mental growth and development. Studies support that good nutrition contributes to improving the wellbeing of children and their potential learning ability, thus contributing to better school performance. Children and young people, who learn healthy eating habits, are encouraged to be physically active, to avoid smoking and to learn to manage stress, have the potential for reduced impact of chronic diseases in adulthood. Food habits are complex in nature and multiple conditioning factors interact in their development. (Perez and Arancenta, 2001).

School going children go through remarkable physical changes of all kinds; their food intake becomes a critical aspect for the growth and development. Recent research shows that nourishing food not only makes a child healthier, but also makes them emotionally more stable, and improves school performance. Children of school going age constitute a highly vulnerable and important group. During their growing period, care should be taken to include all the nutrients in their diet. Nutrition affects the overall development of the child for which a balanced diet has to be followed. Proper nutrition can also prevent many medical problems, including becoming underweight, developing weak bones, and degenerative diseases. It will also ensure that the child physically grows to his/her full potential.

A more recent and pressing problem that has emerged is the problem of overweight and obesity among young children. Life style changes and
intake of high caloric foods have resulted in a marked increase in these problems. Unnithan (2007) has reported that the percentage of overweight and obese children is growing in Kerala also, like in other states of India and other parts of the world. Obesity and overweight were seen more in boys, underweight and severe underweight seemed to be more in girls indicating an increasing trend in the percentage of overweight in boys compared to girls.

The foundation of good health and sound mind is laid during the school age period. So it is a basic milestone in the life of an individual and responsible for many changes that take place during later life. Children who fail to grow optimum during this crucial period may not make-up the loss in growth even on excellent diet in later life. Studies have shown that the performance of children, who had earlier suffered from malnutrition, was clearly inferior to that of children who had not gone through malnutrition. Good nutrition is important throughout childhood because under nutrition during the first few years of life decreases adult body size and physical output when the growth rate is high. The high level of nutritional deprivation combined with heavy burden of disease at young age has negative consequences which will be expressed during adult life. Hence the school age period is nutritionally significant and children are considered to be the special risk group. Malnutrition during this period results in inferior school performance, working ability and physical growth (Kumari, 2005).

Prevalence of childhood overweight and obesity among school-going children has been extensively explored, and many interventions have been implemented for the prevention of childhood obesity in early school years (Summerbell, 2005).

In India 30 percent of the school age children have moderate to severe malnutrition. Major nutrition problems reported to be are anaemia, scurvy, ricket and PEM (Chandna, 1994). Nutritional problems not only affect their
growth and development but also affect future adversely. High prevalence of malnutrition among young children is also due to lack of awareness and knowledge regarding their food requirements, food choice and absence of a responsible adult care giver along with other causes (Ghosh, 2004).

According to Mehta (2003), school children consume inadequate diet and are malnourished. School children usually skip their meals due to various reasons like poverty, ignorance and disturbed emotional status due to maladjustment in schools which produce malnutrition among the school children. Malnutrition during school age period can interfere with school performance; impair body function, working ability and physical growth (Kumari, 2005). The nutritional and health status of children may detrimentally affect their learning resulting in poor performance and also affect their physical fitness.

Malnutrition reduces memory, hearing ability and impairs intellectual functioning. Optimal nutrition is necessary for physical and mental growth and development in children (Church and Katigblack, 1991 and Contento et al., 1992). The mental performance of iodine-deficient school going children is positively influenced by iodine supplementation, whether through the use of iodized salt or the administration of iodized oil (Briel, 2000). A research on the effects of deficiencies in Zinc, Iodine, Iron and Folate on the cognitive development of school-aged children showed that nutrition has an impact on children’s ability to think. For example, deficiencies in iron and zinc have been associated with impairment of neuropsychological function, retardation of growth and development, reduced immunity and increased vulnerability to infectious diseases (Sandstead, 2000).

According to World Health Organization (WHO, 1997), the school going age is a dynamic period of physical growth and development, when children undergo mental, emotional and social changes. The health status of
school children varies from one place to another and also varies in urban, rural and tribal areas. School age children constitute 25 percent of the world’s population i.e. approximately one-fifth of Indian population comprises of school age children.

India is one among the many countries where child malnutrition is severe and also malnutrition is a major underlying cause of child mortality in India. The problem has caught the attention of policy makers and researchers for several decades. Various studies and surveys have been conducted to find out the root causes of child malnutrition. All these studies including the three National Family Health Surveys (NFHS) reveal that malnutrition is not the result of a single cause; the problem is multifaceted, the causes acting singly or in combination with other complex factors like poverty, purchasing power, health care, ignorance on nutrition and health education, female illiteracy, social convention etc.

The variety of junk foods being manufactured and heavily advertised through the media makes the young child compel the parents to procure these items with the child missing regular meals. Most of these food items are high on calories or even empty calories since they are devoid of other important nutrients like vitamins, iron, calcium etc. It is postulated that consumption of extra 100 calories per day will result in 5 kg weight gain in one year time. Children have access to video games and computers and also mushrooming cyber joints have made these accessible. This contributes to the child becoming a ‘couch potato’ rather than spending that time in outdoor activity. Consequently, children are gaining more weight than they should leading to obesity. Earlier, children had more time to play, run about or work out compared to the children of this generation. Without activity, even the recommended calories lead to a positive energy balance, which accumulates as body fat contributing to obesity.
Child Nutrition Scenario of India

After India became independent in 1947, several steps were taken for the improvement of the health situation and wellbeing of the children. Yet malnutrition is a major problem in India. At present, 46 percent of India’s children under the age of three are underweight. India has the highest percentages of undernourished children in the world (NFHS-3). The 26 percent of India’s population lives below the poverty line and yet 46 percent of children under three years are malnourished. It indicates no linkage between levels of child malnutrition and poverty. The child survival is the important matter of concern in India. 87 percent of every 1000 born still have the probability of dying between birth and five years of age. The significant severe problem of malnutrition throughout India and inequalities in nutritional status worsened in the 1990s, between income groups, urban-rural dwellers, castes and genders (Chandran, 2010).

Prabhakaran (2003) has opined that children leading poor lifestyle by watching too much TV and playing on electronic goods and not having enough physical activity and games have poor nutritional and health status and mental capacities. Nutrition often consists of skipped or sketchy meals, fast food orgies and in whole some snacking at any hour of the day or night.

The child mortality scenario varies widely across the states, ranging from moderate level of child mortality in some states to alarmingly high rates in some other states. The Sample Registration System, in 2010, estimated that, out of the total deaths reported, 14.5% are infant deaths (< 1 years), 3.9% are deaths of 1 - 4 years children, 18.4% are deaths of children of 0 - 4 years and 2.7% deaths pertained to children of 5 -14 years.

According to NFHS – 3 Children in India suffer from some of the highest levels of stunting, wasting and underweight in the world, and the situation has not improved markedly in recent years. Malnutrition levels are
higher among young girls. Almost half of the girls in the age group of 15-19 years are undernourished, under nutrition declines and over nutrition increases with age of women. Overweight and obesity are more than three times higher in urban than in rural areas.

**Child Nutritional Status in Kerala**

Kerala is a model state in the country as far as human development is concerned. The convincing performance of Kerala in achieving demographic transition, in spite of low economic development, has received global attention. The overall status of Kerala state with regard to the health as well as social status is of developed countries. The apparent paradox of low average nutritional intake leading to high nutritional outcome in aggregate can perhaps be explained to some extent in terms of the remarkable reach of the public distribution system in Kerala, in providing a wider access to food which is complemented by free noon meal for children at school and supplementary nutritional programs for pre-school children, pregnant and lactating mothers (Human Development Report, 2006).

The Government of India and Government of Kerala in particular have taken enormous efforts to increase the health and nutritional status of the school going children. Several development programs have been implemented by the government with a view to make children healthy. Kerala government has rolled out school health programme to the students of the Government schools with an aim of helping the nation build a bright and healthy generation, equipping them to make healthy choices and for planning to maintain a healthy population in the future but still it is a fact that the status of children in the state of Kerala is not so good, although Kerala has achieved high standards in child health and education (Kerala Institute of Local Administration, 2011).
The Kerala school health programme under the National Rural Health Mission (NRHM) is the only public sector programme specifically focused on school age children. Its main focus is to address the health needs of children, both physical and mental, and in addition, it provides nutrition interventions, yoga facilities and counseling. It responds to an increased need, increases the efficacy of other investments in child development, ensures good current and future health, better educational outcomes and improves social equity and all the services are provided for in a cost effective manner (NRHM, 2011).

An effective school health programme can be one of the most cost effective investments a nation can make to simultaneously improve education and health. Although each individual enters life with a genetic potential for varying degrees of health, the quality of the diet throughout life is a major determinant to cope with environmental stress, infection, lifestyle variables, acute and chronic diseases.

Apart from the health programmes initiated by the government, it is important that the children and the mothers and the care givers are educated on proper dietary habits and awareness on good nutrition to bring about a change in the young which will have a lasting effect later in life. Nutrition education is the foundation for improvement in the dietary habits and nutrition awareness is essential to bring changes in dietary habits and creating nutrition awareness which entirely depends on education and training.

Ismail et al., (2011) in their study conducted in the school going children of Piravom constituency of Ernakulam District of Kerala, state the nutrient intake was far below the Indian Council of Medical Research (ICMR, 2000) recommendations of dietary allowances of Indians. Jacob (2011) in her study on the assessment of nutritional status and feeding practices of children conducted in Trivandrum noted stunting in 29 percent of children and 50 percent of children were underweight revealing the poor nutritional status.
Gangadhran (2007) has also reported that most of the children in the school going age group among deprived sections and marginals in Kerala are suffering from nutritional anemia. Anemia is a major health problem in Kerala, especially among women and children. Anemia can result in maternal mortality, weakness, diminished physical and mental capacity, increased morbidity from infectious diseases, perinatal mortality, premature delivery, low birth weight, and in children impaired cognitive performance, motor development, and scholastic achievement.

The report given by Kerala Institute of Local Administration (2011) states that malnutrition adversely affects the growth, immunity, learning, stamina and intelligence of child. It may even give rise to mental disorder as a consequence. Malnutrition occurs in Kerala not only because of poverty but also because of ignorance about the importance of nutrition. Studies have shown that 60 percent of girls studying in unaided schools in Kerala are anemic. Anaemia is seen even in wealthy and educated families. Nutrition education also should be given along with nutritious food to address the problem. It is a major concern by many people that they don’t even know to prepare food without losing nutrients.

Chandran (2010) in his study on rural children of Kerala has opined that child health as an area of policy option has been given much attention by health economists, public health experts, planners etc. Children are vital to the nation’s present and her future. The increasing interest on child health and nutrition has been justified on many ways. Under five years old children are targeted for priority care under various maternal and child health programmes, but these age groups 5 – 15 years remain a neglected lot. The recent health statistics of Kerala tell a dark narrative of degenerating public health system. The multivariate analysis of the effects of selected demographic and socioeconomic factors on child malnutrition indicates that the strongest predictors of child nutrition in rural Kerala are child’s age, child’s birth order,
mother’s education, and household standard of living. Nutritional deficiency among children adversely affects children’s overall health, educational attainment, physical and mental development.

Children’s nutritional status in Kerala has improved slightly since NFHS-2 by some measures but not by all measures. Children under age three years (the age group for which nutritional status data are available in NFHS-2 are slightly less likely to be stunted (by 2 percentage point) and underweight (by 1 percentage point), but they are slightly more likely to be wasted (by 3 percentage points) today than they were seven years ago. Under nutrition is more common in rural areas, among teenagers, among never married, among the scheduled castes and the less wealthy (NFHS-3, 2005-2006).

Despite Kerala having the best indicators on child development, certain disturbing trends have emerged in recent years affecting this developmental status, especially in the child population. The important anthropometric indicators of child nutritional status are wasting and underweight are increasing in Kerala by 11 to 16 percent and 27 to 29 percent respectively in 1998-99 to 2005-06 (NFHS-3; Thankappan, 2007). Although a majority of children in Kerala are underweight, the State is fast catching up with the West in child obesity, and unless addressed on the family and social fronts with seriousness, Kerala could soon be faced with yet another health-care challenge. Obesity and malnutrition among children are two ends of the spectrum. The overall prevalence of obesity is 2.2 per cent.

According to NFHS 3 (2005 – 2006) children suffering from malnutrition is 40.79 percent, of this 30 percent are underweight children, 33.8 percent children are having stunted growth, 4.5 percent children showed prevalence of Iodine deficiency disorders, 23 percent adolescent girls are anemic and 0.1 percent blindness is due to Vitamin A deficiency.
Importance of Nutrition Education

Nutrition education is an important way to encourage healthy eating and build good lifelong habits. Imparting nutrition education to the children and their mothers will help to improve the nutrient intake of children. School children are easily accessible, capacitive, responsive and in a mouldable age. Educating them on healthy eating is very important. They can be gathered together and education at this age is very easy. The only nutrition education some children get is what is taught at school. Young children can learn the difference between nutritious foods and unhealthy foods through both education and educational activities. At home, parents can teach their children even more about the importance of eating a well-balanced, nutritious diet, which can help them to live a long and healthy life. When children are taught the difference between nutritious food and junk food, they are more likely to make healthy choices as they grow older.

Nutrition education is a significant factor in improving nutrition knowledge, attitudes and practices (Knowledge, Attitude and Practice - KAP) of school children, family and the community at large (Contento, 2007). It is important to note however, that though nutrition education is an important entry point to teaching nutrition, it is not the only source of nutrition knowledge. There are other entry points such as school environment, school meals, health and nutrition clubs and school gardens among others (Mbithe, 2008). In addition, the family and community play an important role in the acquisition of nutrition knowledge and nutrition related practices. Nutrition education is the process by which people gain knowledge, attitudes and skills necessary for developing appropriate dietary habits. Schools, families and communities are the main social contexts in which lifestyles are developed. They are excellent settings for promoting nutrition knowledge, attitudes and practices (KAP). Nutrition education contributes to acquisition of KAP which may lead to improved nutrition status (WHO / FAO, 1998).
Background of the study

School age is considered as a dynamic period of growth and development because children undergo physical, mental emotional and social changes. Promoting good health and nutrition in school children are essential for effective growth and development. Malnutrition has an effect on the children’s wellbeing and their ability to learn and play normally. It is therefore important to have healthy food choices. Malnutrition (both under and over nutrition) is widespread among school children in many developing countries. It is a major threat to the normal growth and development of children. Under nutrition, both protein energy malnutrition and micro nutrient deficiencies, directly affects many aspects of children’s development. In particular, it retards their physical and cognitive growth and increases susceptibility to infection, further increasing the probability of malnutrition (Gragnolati et al., 2005). Inadequate diet and unhealthy eating patterns may produce severe forms of malnutrition in children; these are protein energy malnutrition, nutritional anaemia, vitamin A deficiency and iodine deficiency disorders. The higher prevalence of overweight and obesity in school children is due to their faulty food habits and lack of awareness of proper eating habits. The problem of consumption of high caloric foods combined with inactivity has resulted in an increase in overweight and obesity along with the increase in the incidence of non-communicable diseases at a younger age in our country.

The Kochi city in Kerala State was selected for the study because the researcher has an overview of the nutritional problems prevalent among school going children in this geographical location. The city has innumerable number of schools both run by the government and private bodies. The government schools which provide free education mostly cater to lower socio economic children while private schools are for children of upper middle and upper
classes of the society. Children of both the schools suffer from malnutrition and have poor dietary habits.

Therefore the present study is of relevance in focusing attention on the nutritional status of school children and imparting nutrition education. An attempt has been made to examine the impact between the nutritional knowledge and mental capacities and physical activity level and to bring about a change in their nutritional profile through nutrition counseling of the children and KAP of their mothers.

According to Nestle Nutrition Institute (NNI, 2014) the WHO predicts that overweight and obesity is expected to soon replace the current public health challenges of under nutrition and infectious diseases. Mounting evidence justifies early intervention for treating and preventing childhood obesity. Almost 4 in 10 Indian children suffer from overweight and obesity. Improving child nutrition has a significant advantage of improving physical, cognitive and social abilities. Nutrition for school age is important as it lays a sound foundation for adult life and will also impact on the quality of human capital to our country.

The provision of adequate nutrition to school children is important for a variety of reasons such as improving growth and development, mental capacities and overall wellbeing. The education of children and their parents on nutrition and health will help to support and sustain improvement in the care of school children by developing the right practice through direct nutrition education.

There are a large number of studies conducted on providing noon meals to school children, however very little research has been done on basic nutrition education focusing on altering their dietary habits. The significance of improving nutrition knowledge through nutrition education in order to have a positive influence on healthy food choices has to be emphasized in all
children more specifically school children as they are about to step into adolescent age at which age healthy eating is not a priority. The importance of appropriate nutrition for school children has to be emphasized.

Nutrition education in schools offers an excellent and unique opportunity to integrate the teaching of nutrition and its application to achieve behavioral change. It is an effective tool to change the food habits of the children as well as community members. Nutrition education will bring a permanent and favorable solution to the problem of malnutrition in school children. It is a process by which knowledge, attitudes and practices about food and health are channelized into actual practices which are sound and consistent with the individual needs, purchasing power, food availability, health and socio-cultural background.

Nutrition education which has a potential to address malnutrition has not been given much emphasis in the school curriculum in Kerala. School-based nutrition education can improve dietary practices that affect young persons' health, growth, and intellectual development.

Statement of Problem

Kerala has progressed well in the field of education compared to the other states of India. However the achievements in the field of health have not been uniform across all sections of society. There is very little data regarding the difference in nutritional status across the socio-economic classes and their effect on mental capacity and Physical Activity Level (PAL). Social factors that tend to reduce/increase the nutrient intake of children may be unequal food distribution, harmful dietary practices, lack of nutrition knowledge and lack of awareness about their nutritional requirement. Therefore the nutritional status of school children can be assessed by anthropometric, biochemical, clinical and dietary measurements. Determining the nutritional status is important as it helps to define the health status of children.
Nutrition education assumes importance as a long term strategy for the promotion of good health by bringing about desirable changes in the Knowledge, Attitude and Practice (KAP) of mothers. Nutrition education of mothers has improved the feeding practices of children. Strengthening women’s education has the strongest influence on child malnutrition. Also, imparting nutrition education to children improves their knowledge and dietary habits. Therefore nutrition education is imperative both to the children and mothers.

The goal of the study is to assess the nutritional status of the school going children as well as to see the impact of nutrition counseling on their nutrition knowledge, mental capacities and PAL.

**Objectives**

1. To assess the nutritional status of the selected school going children,

2. To find out the impact of nutrition counseling on the nutrition knowledge, mental capacities and PAL of school going children, and

3. To determine the effect of nutrition education on the KAP of the mothers of the selected school going children.

**Scope of the Study**

The findings of the study will throw light on the current nutritional status and how best nutritional counseling will help in improving the same. Assessment of nutritional status of school going children will help to quantify the deficit/excess and will be of immense help in intervention. It will also help in bringing forth healthy children who will eventually contribute to a highly productive nation. Nutrition education of the mothers will also help to remove ignorance and myths about foods, inculcate proper dietary practices to the school going children. The study will also help to suggest effective
methods of nutrition education to improve the nutritional and health status of children.

Children of today are the citizens of tomorrow, and hence improving nutritional status of children becomes extremely important to ensure healthy citizens. Knowledge about food habits and eating behavior of children is also very important for developing nutritional awareness programs for the promotion of health and healthy lifestyles. Appropriate diet and physical activity during childhood is essential for optimum body composition. The study will help in designing strategies to reach school children to help them to obtain adequate information to form healthy food habits and lifestyles.

It is also established that mother’s education has positive effects on child nutrition in developing countries. In school, children can acquire skills which are later used to access several services and comprehend health and nutrition services. Nutrition education of mothers has positive effects on child nutrition and includes changes in behavior which in turn leads to changes in the eating behavior.