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NUTRITIONAL PROFILE OF PRESCHOOL CHILDREN OF FISHERMEN

**By
ANEENA, E. R.**

THESIS

**Submitted in partial fulfilment of the
requirement for the degree of**

Master of Science in Home Science
(FOOD SCIENCE & NUTRITION)

**Faculty of Agriculture
Kerala Agricultural University, Thrissur**

2003

**Department of Home Science
COLLEGE OF HORTICULTURE
VELLANIKKARA, THRISSUR - 680 656
KERALA, INDIA**

DECLARATION

I here by declare that the thesis entitled “**Nutritional profile of preschool children of fishermen**” is a bonafide record of research work done by me during the course of research work and that the thesis has not previously formed the basis for the award to me of any degree, diploma, fellowship or other similar title of any other University or society.

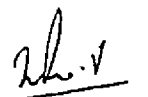
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ANEENA.E.R.

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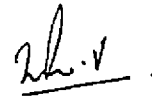


Dr.V.Usha
(Chairperson,Advisory Committee)
Associate Professor
Department of Home Science
College of Horticulture
Vellanikkara.

CERTIFICATE

Certified that the thesis entitled “**Nutritional profile of preschool children of fishermen**” is a record of research work done independently by **Miss.Aneena.E.R.**, under my guidance and supervision and that it has not previously formed the basis for the award of any degree, diploma, fellowship or associateship to her.

Vellanikkara



Dr.V.Usha
(Chairperson, Advisory Committee)
Associate Professor
Department of Home Science
College of Horticulture
Vellanikkara.

CERTIFICATE

We, the undersigned members of the advisory committee of **Miss.Aneena.E.R**, a candidate for the degree of Master of Science in Home Science with a major in Food Science and Nutrition, agree that the thesis entitled “**Nutritional profile of preschool children of fishermen**” may be submitted by **Miss.Aneena.E.R**, in partial fulfillment of the requirement for the degree.


Dr.V.Usha

(Chairperson, Advisory Committee)

Associate Professor

Department of Home Science

College of Horticulture

Vellanikkara.


Dr.V. Indira

Associate Professor and Head

Department of Home Science

College of Horticulture

Vellanikkara

(Member)


Smt. Omana Pavunni

Assistant Professor

Dept. of Fish Processing Technology

College of Fisheries

Panagad

(Member)


Sri. S. Krishnan

Assistant Professor

Department of Agri. Statistics

College of Horticulture

Vellanikkara

(Member)


15.11.2003
EXTERNAL EXAMINER

ACKNOWLEDGEMENT

With immense pleasure, I take this opportunity to express my sincere gratitude to Dr. V. Usha, Associate Professor, Department of Home Science, College of Horticulture, Vellanikkara and Chairperson of my advisory committee for suggesting the field of investigation and exceptional guidance extended throughout the study.

No words can truly represent my profound gratitude and indebtedness to Dr.V.Indira, Associate Professor and Head, Department of Home Science, College of Horticulture, Vellanikkara for her fervent interest, valuable suggestions and critical scrutiny of the manuscript.

I am extremely indebted to Smt. Omana Pavunni, Assistant Professor, Department of Fish Processing Technology, College of Fisheries, Panangad for the esteemed advice, timely and immense help rendered by her with understanding, forbearance and critical scrutiny of the manuscript.

I express my deep sense of gratitude to Sri. S. Krishnan, Assistant Professor, Department of Agrl. Statistics, College of Horticulture, Vellanikkara for his valuable suggestions, constructive criticism and critical scrutiny of the statistical analysis.

I extend my gratitude towards Dr. K.B. Sheela, Dr. V.K. Raju and Dr. V.K. Mallika for their timely help and interest through out the course of the study.

My special thanks to Mr. Santhosh and Jeo for all their help and support in doing the computer works.

My sincere thanks are due to Umayva chechi (Home Science), for her timely help and cooperation at various stages of the study.

The timely help and valuable suggestions rendered by my seniors and juniors are sincerely acknowledged.

I am deeply indebted to all my friends and colleagues especially Lincy, Lakshmi, Sharon, Lakshmisree, Sidha, Divya for the help rendered by them.

A special word of thanks to Joy chetan and family of J.M.J. Computer Centre, Thottappady for the neat and prompt typing of the manuscript.

I am thankful to KAU for awarding me the fellowship for the postgraduate study.

I duly acknowledge whole heartedly the personal sacrifices, moral support, timely persuasions and encouragement extended by my Achan, Amma and Arun.

I would like to dedicate this thesis to my beloved parents.

Above all, I bow my head before God Almighty whose grace and blessings enabled me to complete this venture successfully.

ANEENA. E.R.

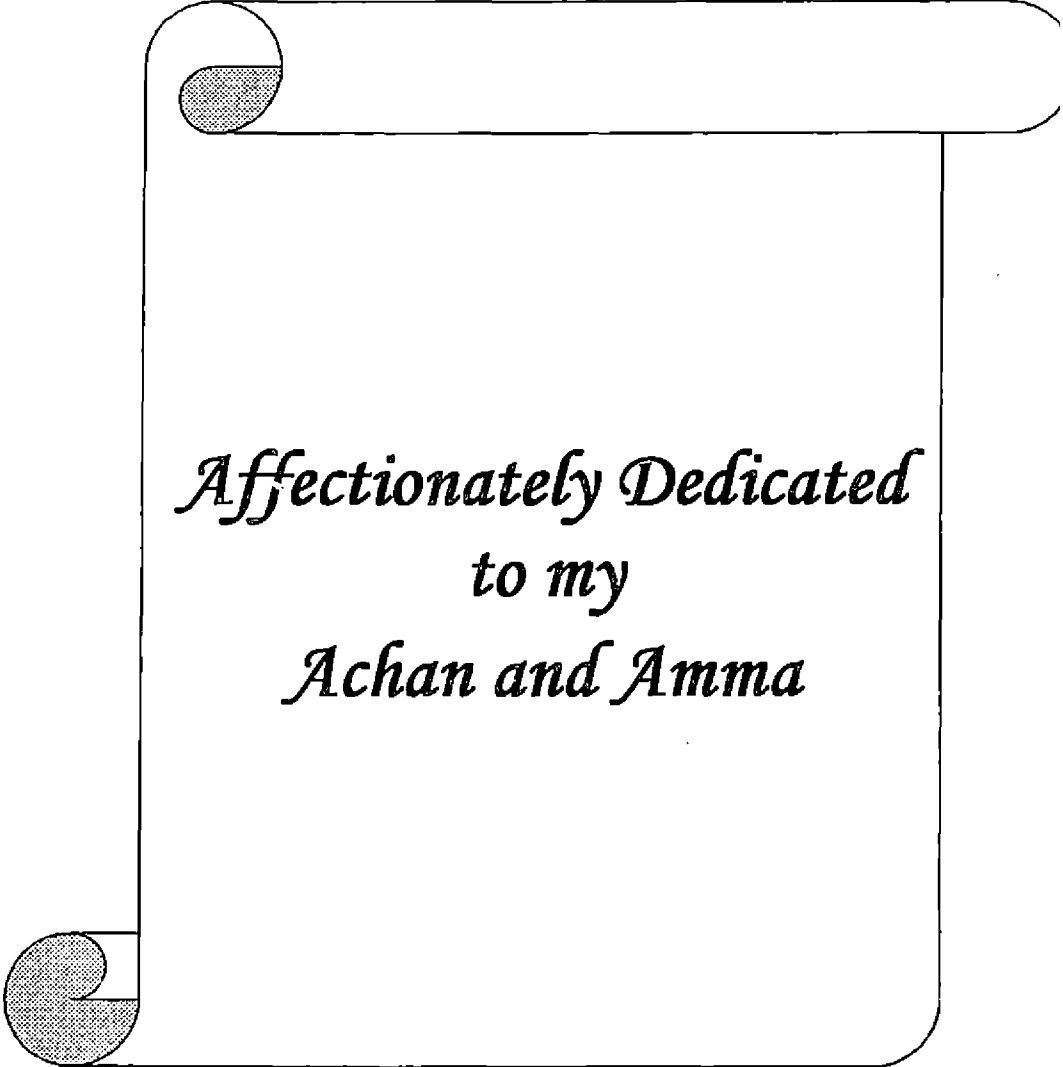
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*Affectionately Dedicated
to my
Achan and Amma*

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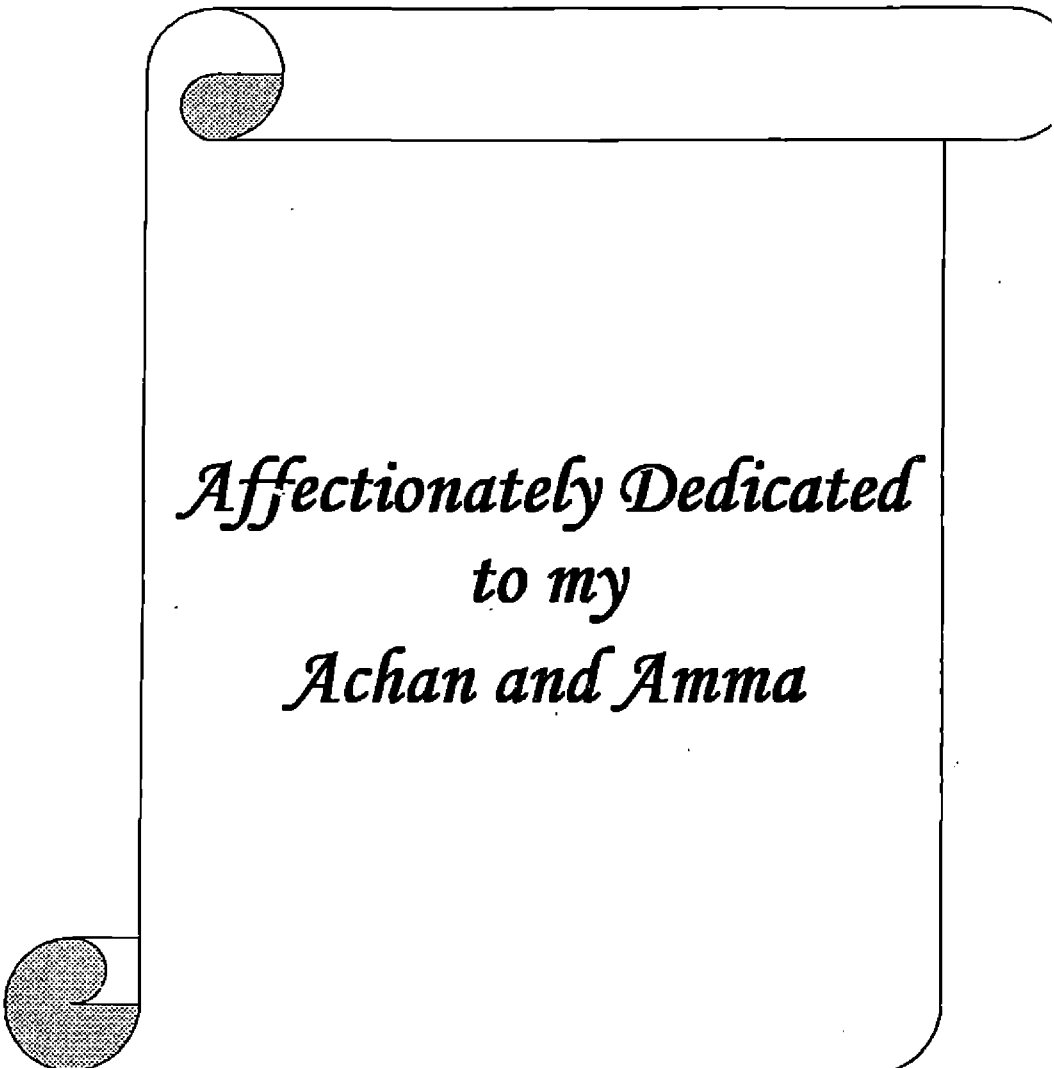
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*Affectionately Dedicated
to my
Achan and Amma*



INTRODUCTION

A decorative banner with a central rectangular section containing the word "INTRODUCTION" in bold, uppercase letters. The banner has a ribbon-like appearance with pointed ends and a shaded, three-dimensional effect.

INTRODUCTION

INTRODUCTION

Nutrition is one of the most indispensable factors that are closely associated with the physical and mental development of young children. Adequate food is the most important requisite for growth. While it is important throughout childhood it is more crucial during the first five years of life when rapid growth is occurring. Insufficient food will not only result in under nutrition in terms of adequate weight gain but also hinder growth (Rana and Hussain, 2001).

From the nutritional standpoint children below the age of five years who constitute over 20 percent of the population is the most vulnerable group. Majority of the preschool children belonging to poor income group in developing countries suffer from various degrees of growth retardation due to nutritional deprivation. Malnutrition especially among preschool children is one of the important public health problems of our country. A majority of India's children live in an economic and social environment, which impedes their physical and mental development. Hence our children do not attain their optimum growth. Growth failure among preschool children is quite common in the developing countries. During the growth period when the child is deprived of required nutrients and energy his development suffers.

The number of underweight children in under five years age group is rising in developing countries: it has gone from 164 million in 1980 to 184 million in 1990 with about 200 million by the turn of the century. About 14 million preschool children have eye problems due to deficiency of vitamin A. Between a quarter and a half of a million children go blind each year for lack of vitamin A, and two thirds of these die within months. (Adhiguru and Ramaswamy, 2003). Under five mortality has been chosen by United Nations Children's Fund (UNICEF) as a measure of end result of the development process resulting from wide variety of inputs such as nutritional and health status, mothers health awareness, level of immunization, use of Oral Rehydration Therapy (ORT), Maternal and child health (MCH) service, availability of clean water, sanitation and overall safe environment for a child. The health situation in Kerala is different from other parts of the country. In Kerala the health situation as measured by infant mortality is far superior to any

other states in India. Infant mortality rate (IMR) in India is 70/1000 births, while in Kerala it is much reduced to 11/1000 births (Manorama year book, 2002).

In spite of low IMR and high life expectancy the mortality of children is high. This calls for an indepth study on the dietary intake and growth pattern of children under the heterogeneous conditions of Kerala. Fishermen population as in every other part of the country have been at the margin of the society geographically, socio economically and nutritionally (Joshi, 1996). They have inadequate food and water facilities and are the victims of infectious diseases and malnutrition. In addition, the fishing households suffered from economic problems like underemployment, poverty, indebtedness and social problems like dowry and alcoholism. A sensitive index of a community's health situation is provided by the chance of survival and growth of its most vulnerable segment –the young children below 5 years of age. Hence, the present study was proposed to find out the food consumption pattern and nutritional status of preschool children (4-5 age group) belonging to fishermen families.



REVIEW OF LITERATURE

2. REVIEW OF LITERATURE

Literature relevant to the present study entitled "Nutritional profile of preschool children of fishermen" is reviewed under the following heads.

- 2.1 Demographic profile of fishermen
- 2.2 Socio-economic conditions of fishermen
- 2.3 Significance of preschool age
- 2.4 Malnutrition prevalence among preschool children
- 2.5 Factors contributing to malnutrition
- 2.6 Food consumption pattern of preschool children
- 2.7 Mortality and morbidity among preschool children
- 2.8 Consequences of malnutrition
- 2.9 Malnutrition and physical growth pattern

2.1 DEMOGRAPHIC PROFILE OF FISHERMEN

International conference of fish workers and their supports (ICFWS, 1984) defined fish workers as "children, women and men engaged as crew members, small fishers, processing workers and settlers". Fishermen community or fishing community means the society of those who are a part of the ancestry and culture of fish (Thadeus, 1999).

It is estimated that in India, 6 million people are directly engaged in marine fisheries and live in coastal areas (Srinath, 1998). Ananth (2000) reported that nearly 25 per cent of the total populations in India live in coastal areas. Kerala located in the southern part of Indian subcontinent has a narrow stretch of land with a long coastal line on the west side. With its 590 Km long coastal line, it enjoys one of the world's most productive seas bordering it.

There are 22 marine fishing villages in Kerala. Average fishermen population per village is 825. The ratio of men and women in the fishing sector is 1000:972 in Kerala (State Planning Board, 1997). According to the reports by Government of Kerala (1999) the population of marine fisher folk in Kerala is 7.97 lakhs. The coastal line of Kerala supports about 0.64 million fisher folk (Devraj *et al.*, 1999).

There are 716 households of fishermen in Thrissur district as reported by George (1998). Thrissur district has a coastal line of about 54 Km in length. There

are seven fishing centres in the district viz., Azhikkode, Nattika, Vadanappalli, Kadappuram, Blangad, Puthenkadappuram and Chettuva. The district has 18 coastal fisheries villages and three inland fisheries villages (Department of fisheries, 2002).

2.2 SOCIO-ECONOMIC CONDITIONS OF FISHERMEN

Achievement in the area of social sectors viz., health, education and social welfare of Kerala cannot be claimed in the case of 3 major categories of backward sections of state, i.e., tribal community, marine fish workers and floating Tamil Nadu population. Of these fisher folk is a community that contributes significantly to economic out put and nutrition of the people of Kerala. But the socio-economic conditions of fishermen community is one of the most backward in India (George and Domi, 2002).

A study by Kumar (1988) found that majority of fisher folk in India were deprived of primary education and the literacy rate was 48-75 per cent. According to Panikkar (1990) the percentage literacy of prawn farmers in Orissa ranged from 21 to 71.3 per cent. A study by Mathew and George (1992) on economic status of reservoir fishermen in Kerala, revealed that 79.17 per cent were illiterate.

In a study on coastal zone in Ernakulam and Alleppy districts by Devraj *et al.* (1999) reported that 96 per cent of male and 91 per cent females were literate. Tietze and Groenwold (2000) reported that 57 per cent of men in fishing villages had secondary education. Thirty three per cent had primary and 1 per cent had college education. Kumar (2001) revealed that 50 per cent of fisher women had secondary school education and 48 per cent primary school education.

Regarding the family size of fishermen households, Balakrishnan *et al.* (1992) reported that the average family size of fishermen at Vizhinjam area was 5.5. Raj (1997) revealed that average family size of the fisher folk in Kerala was 5.19. According to Kumar (2001), average household size of fishermen of Karamkulam fishing village is 5.3. Jameela (2002) observed that fishermen families in Thiruvananthapuram district have big family size.

Regarding different religion existed in the fishermen community. Tietze and Groenwold (2000) reported that less than one fourth of the fisher folk was Christians and more than three fourth of them were Hindus. George and Domi (2002) reported that Muslims predominate in the marine fishing village in northern districts and Christians and Hindus in southern districts of Kerala. According to

Udayabhanu (1990), 40 per cent fishermen belongs to Dheevera community. James (1999) reported that the major traditional fishermen communities were Araya, Marakkar, Valan etc.

The adage "Give a man a fish and feed him for a day, teach a man to fish and he can feed himself for a long time" no longer holds true in today's world. Families that rely on fishing for their sustenance and livelihood are facing poverty and food insecurity (Ananth, 2000).

Kurien (1980) analysed the social and economical conditions of these fishermen and reported that most of them were poor. Sukumar *et al.* (1987) reported that the low educational and income status of fishermen families were attributed to their general poverty and economic backwardness. Fishermen population like small scale farmers and land less pestherolists shared common disabilities such as limited assets, environmental vulnerability and lack of access to public services and amenities with special reference to education and special facilities (FAO, 1988). Kurien and Achari (1988) observed that the fisher folk community has remained at the margins of society geographically, economically, socio culturally and politically. Jessy (1989) stated that 10 per cent of fishermen were below poverty line and majority of them have monthly income less than Rs.3000. Bay of Bengal Programme (1990) revealed that for majority of fishermen in Orissa, the average monthly income is between Rs.1500 - Rs.3000. Kumari (1991); Sivasubramaniam (1991) and Ananth (2000) reported that fishermen stay as poor as ever and remains at the bottom of the social scale in terms of income and during lean seasons these people will be cut off employment and do not earn anything for their livelihood. Beena and Sehara (1993) reported that low living standards, poverty, unemployment, malnutrition and inequalities in income persist among coastal folk. Tietze and Groenwold (2000) found that the average annual income of fishermen households was Rs.46,400. According to Jameela (2002) poverty, low income and low purchase power are responsible for food and nutritional insecurity of fisher women at Thiruvananthapuram district.

A study by Beena and Sehara (1993) at Ernakulam coastal villages found that poverty and indebtedness are very much prevailing. Nayik (1993) found that indebtedness and borrowing are mainly for household expenditure during lean seasons. Sathiadas and Panikkar (1994) reported that a considerable number of

fishermen households took loans for household expenditure particularly to tide over the lean seasons.

Mani (1995) in his study in Kerala, reported that 9 per cent of the fishermen borrowed for marriage purposes, 8 per cent took loans for land purchase and the rest of the families availed loans for other purposes. Raj (1997) reported that majority of the loans taken by fishermen were used for purposes such as the purchase of fishing equipments and fish vending. Ananth (2000) reported that 45 per cent of the fishermen were caught in the vicious cycle of poverty and debts. Muhammad (2000) revealed that lack of alternate employment in off-seasons lead to indebtedness in fishermen community. So they are forced to borrow money from moneylenders at a very high interest rate. Though they work hard in peak season, they can hardly pay it back. Thus they are caught in the vicious cycle of indebtedness. Tietze and Groenwold (2000) conducted a study in the coastal zone of India and found that the average annual loans for each fishermen households is Rs.24,900.

Datta *et al.* (1988) studied the role of middlemen in marine fish marketing in Orissa. The study revealed that 90 per cent of both mechanised and non mechanised fishing units were compelled to sell their catch extensively to traders whom they are already indebted. It was observed that there was wide variation between the price of the fish when launched, and price of the fish when sold, particularly in the fishes of high quality. Nayik (1993) observed that the local moneylenders played an important role in giving credit. The borrowing was proportionately highest among fishermen who purchased motors individually. The interest rate charged by the moneylenders was comparatively high and the fishermen could not hope to come out of the vicious cycle of indebtedness (Sathiadas , 1994). Mani (1995) reported that the role of moneylenders and middlemen in the economic life of the fisher folk indirectly increased their liability and indebtedness. It was also found that even they were aware of these problems they were unable to avoid the moneylenders and were highly indebted.

Static labour pattern existing in the fisheries field and prevailing under employment are some other reasons for the proverbial poverty (Fernands, 1981 and Valiyakandathil, 1981).

Coastal fishing communities are typically characterised by intensive competition for scarce resources. The known consequences of habitat damages

include loss or lowering of productivity and associated threat to local food security, contaminated aquatic food products, reduced economic viability, increased levels of conflicts involving fishermen, physical displacement of communities increased unemployment and loss of trade opportunities (FAO, 1999).

Jessy (1989) observed poor health and hygiene and high morbidity and mortality among Kerala fishermen community. The much acclaimed social progress in Kerala has found to be lacking among fishing communities. The well being of fisherwomen measured on the basis of capabilities like morbidity, longevity, nutrition and education has been found to be low (Pushpangadan and Murugan, 2000). Study by Tietze and Groenwold (2000) also found poor hygiene and sanitary conditions among coastal fishing communities of India.

2.3 SIGNIFICANCE OF PRESCHOOL AGE

Preschool age, next to infancy is the most vulnerable period. Hence the need for good nutrition during preschool years gained immense response (Nagi and Sharmath, 1991; Murthy, 1993). Preschool years are the most vulnerable period, which required proper nourishment for normal growth and development. Lack of proper nourishment lead to many disastrous consequences like stunted physical growth, generalised functional impairment, disability, diminished productivity and increased chances for infections (Harris, 1992).

Gopalan (1992) stated that preschool years are otherwise known as the foundation years because it is during these years that the fundamental attitudes are formed and this formed the basis for future growth and development. According to Grant (1992) the child has only one opportunity for growth and since the process of that growth is so subtle and susceptible, the protection given to them should not be just a priority but an absolute.

UNICEF (1992) stated that from the nutritional standpoint, infants and children constituted the most vulnerable segment of any population. Most of the mental and physical development of the human being occurred in the first few years of life. If the nutritional foundation is not provided adequately to the child during his early years, it will affect his overall development (Cohen, 1993 and Choksi, 1995). It is extremely important for children to be allowed to develop all of their potential to the most during the first years of life, which are the formative period for their personality, intelligence and social behaviour (Pelletier, 1993).

Kathuria (1994) reported that preschool children comprise 18 per cent of our total population and constitute the most vulnerable section of the population nutritionally. These years are characterised by growth and development that has an effect on the human being's entire life as such. Limitation of one or more factors critical for growth may have serious repercussions on the realisation of full genetic potential, both physical and mental. Lahiri *et al.* (1994) stated that a child to have normal intelligence must be born in healthy social, educational and nutritional environment, because all these are pre-requisites for development of brain. To ensure proper nourishment during preschool years for growing to his or her genetic potential, a balanced diet is essential. Faulty nutrition during early life has been incriminated as a cause for disease during adulthood (Chandran, 1994).

Grant (1995) opined that, one of the main aims of development must be to break into the insidious 'inner cycle' of malnutrition and disease leading to poor mental and physical growth, leading to poor performance at school and at work, leading to reduced adult capacity for earning on income. Nutritional factors played a significant role in resistance to infection among infants and children. Adequate nutrition is needed for proper functioning of the immune system and for the digestive mechanism of the body during preschool years. Therefore a balanced nutrition is very important for the normal functioning of the immune system (Choksi, 1995). According to the report of the joint working of the Canadian Pediatric Society and Health (1995) growth pattern and energy needs during preschool years are highly variable. Growth rate slows, activity levels are generally high and appetite varies greatly, resulting in erratic food intake.

According to a report by World Bank (1995) in India 40 percent of its population belonged to the group of 1-6 year old children and they represent the most critical part of our human resources. There were about 127 million children in the age group 0-6 years constituting one sixth of the population. According to Kapil and Nayar (1996) India's child population of 0-6 years is around 18 per cent of the total population and out of this 30.76 million comprise the children from the household, living below the poverty line in rural areas. They are a weak and vulnerable group and are exposed to many health, environmental, social and economic hazards.

2.4 MALNUTRITION PREVALENCE AMONG PRESCHOOL CHILDREN

Beegum (1990) conducted a study in preschool children in Thiruvananthapuram and observed high incidence of anaemia, angular stomatitis and dental carries among them. Rao (1998) reported that 77 per cent of the preschool children in India were suffering from Anaemia. Gomber *et al.* (1998) examined the prevalence and aetiology of nutritional anaemia among preschool children in an urban slum in Delhi and found the prevalence of anaemia as 76 per cent. Pure iron deficiency anaemia was detected in 41.4 per cent of anaemic children, vitamin B₁₂ deficiency alone or in combination with iron was diagnosed in 14.4 and 12.2 per cent of anaemic children respectively. George *et al.* (2000) conducted a study on the pattern of anaemia and its relation to nutritional status and dietary habits of preschool children and found that prevalence of anaemia was 11.4 per cent. Normal nutritional status was seen among 46.7 per cent children. The percentage of anaemic and moderately under nourished children was 16.37 per cent. Ray *et al.* (2000) reported that India is facing human resource wastage of 11 per cent by the age of 5 years. Khosla *et al.* (2000) conducted a study on 76 anaemic preschool children in Ludhiana district of Punjab and found that 62 per cent were moderately anaemic, 30 per cent were mildly anaemic and 8 per cent were severely anaemic. Khosla and Singh (2001) in their study in preschool children in urban slums of Punjab found that majority of the preschool children studied had anaemia. Lakshmi *et al.* (2001) observed that 75 per cent of the children had signs of iron deficiency and 99 per cent of children were suffering from moderate to severe degrees of anaemia in rural households of Mysore. Kapur *et al.* (2002) concluded that the prevalence of anaemia among preschool children was 64 per cent and 78 per cent had severe anaemia.

Busi *et al.* (1991) in their study on the growth pattern of preschool children in urban slums of Vishakapatnam, revealed that majority of preschool children were suffering from long term malnutrition. According to Sharma and Vali (1991), 48 per cent of preschool children of urban slums in their study were normal, 37 per cent were severely malnourished and 8 per cent were suffering from nutritional deficiency diseases. The study also revealed that there were 2 per cent children with Kwashiorkor and marasmas and 4 per cent with anaemia. Arya and Devi (1997) in their study found that nutritional deficiency was apparent in 21 per cent of preschool children; the major deficiencies present were protein calorie malnutrition vitamin B complex, calcium and vitamin D. A study conducted on the

nutritional status of rural preschool children in different regions of Punjab, showed that 35.6 per cent children were normal, 34.5 per cent were mildly malnourished and 5.4 per cent were severely malnourished (Hira and sadana, 1998). Rao and Vijayaraghavan (1998) found that about 60 per cent of the preschool children in rural households of India were under weight and 62 per cent were stunted. About 15 per cent of the preschool children suffered from short duration malnutrition.

Yadav and Singh (1999) assessed the nutritional status of tribal preschool children in Bihar and found that calorie deficiency was present in 38 per cent, protein deficiency in 19 per cent, 60 per cent of children were stunted and 40 per cent were severely stunted. Naidu (1999) found that PEM was prevalent in 0.1 per cent of preschool population of India.

Rao (1999) stated that the prevalence of protein calorie malnutrition in rural preschool children was 80.9 per cent and 9.26 per cent were suffering from severe grades. Kumar *et al.* (2000) conducted a study on preschool children and found that 89.5 per cent of children had signs of nutritional deficiencies. Above 60 per cent of children were found to have protein energy malnutrition and approximately 50 per cent had vitamin B complex deficiency. According to Mahapatra *et al.* (2000) the prevalence of clinical protein energy malnutrition (marasmus) was found in 0.7 per cent of children, while Kwashiorkor was absent. Aneja *et al.* (2001) assessed the prevalence of PEM in preschool children in urban slums of Delhi and 11, 9, 2 and 4 per cent were on grades, I, II, III and IV category of under nutrition.

Swami *et al.* (2001) assessed the nutritional status of preschool children and found that the overall prevalence of PEM was 51.6 per cent while 65.4 per cent, 26.3 per cent, 5.3 per cent and 3 per cent of children had grades, I, II, III and IV category of PEM respectively. According to Ramalingaswami (2001) almost half of the children under 3 years of age are wasted. Parikh and Radhakrishnan (2002) observed that percentage of preschool children suffering from severe malnutrition declined from 15 in 1975-79 to 11.1 in 1990-91 and further to 6.4 in 2000-01. In 2000-01 the percentage of moderately/severely malnourished children varied between 29 in Kerala and 64 in Madhya Pradesh. A study on diet and nutritional status of rural preschool children of Punjab by Laxmaiah *et al.* (2002) revealed that about half of the preschool children (50.3%) were undernourished, 60 per cent were stunted and 12 per cent were wasted.

Chirumalay and Bhagwat (1998) in their study on preschool children in India found that 2.8 per cent of the children had Bitot's spots. Khandait *et al.* (1999) identified the prevalence of xerophthalmia, which is estimated to be 8.7 per cent among preschool children, 90.9 per cent of study subjects were identified as inhabitants consuming dietary intakes at below recommended levels. Naidu (1999) found that nutritional deficiencies such as PEM, vitamin A deficiency and B complex deficiency were prevalent among preschool population of India, 0.1 per cent, 1.4 per cent, and 0.3 per cent respectively. The prevalence of night blindness in children (5-6 yr age group) in India was found to be 1 per cent, 0.5 per cent children were found having Bitot's spots, and 0.01 per cent was suffering from corneal xerosis. According to Khandait *et al.* (2000) prevalence of vitamin A deficiency among preschool children in Nagpur was estimated to be 35.7 per cent.

2.5 FACTORS CONTRIBUTING TO MALNUTRITION

Gopalan (1991) stated that nutritional problems of developing countries are due to the fact that majority of the population subsist on inadequate diet both with respect to quantity and quality of food, necessary for the physiological needs and welfare.

According to Seckler (1982) severe malnutrition is caused by nutritional deficiencies and that moderate and mild malnutrition is due to environmental factors. According to Chaudhary and Rao (1983) the prevalence of severe and mild forms of malnutrition are due to abnormal environmental and socio economic status. Indian Council for Child Welfare (1984) reported that the low health profile of the children of our country is due to impoverished economic, social and environmental conditions existing within the country. Lahiri *et al.* (1994) reported that a child to have normal intelligence must be born in healthy social educational and nutritional environment, because all these are pre-requisites for the development of brain.

Devadas (1979), Pelletier (1993), WHO (1993), Jonsson (1995), Srilakshmi (1993) and Young (1995) observed that the determinants of malnutrition to be poverty, poor socio economic status, illiteracy, poor environmental hygiene, inadequate food intake, ignorance false believes, tradition, poor living conditions, poor recreational facilities, faulty food habits and lack of knowledge on child care and child rearing practices. Due to interlocking problems of grinding poverty of families, children grow in uncongenial environment characterised by non

availability of civic amenities, health care and lack of access to cognitive stimulation, skills and knowledge.

National Institute for Public Co-operation and Child Development (1992) and Abel and Kumar(1998) reported that PEM prevails among populations with poor socio-economic conditions. These populations are characterised by low levels of education, poor environmental sanitation and housing conditions, large family size and high prevalence of morbidity and clinical signs of under nutrition.

Abdullah *et al.* (1982) reported that family income along with mother's education affected nutritional status of children. Hunger and under nutrition at the household level is dependent on such factors as the total income, who is the earning member in the family and who controlled the expenditure (Islam, 1989 and Vazir, 1990). According to Vazir (1990), Saibaba (1991), National Institute of Nutrition (1993) and Devi and Geervani (1994) inadequate calorie intake was mainly due to poor purchasing power. Bhaskaram (1996) reported that poverty and food deprivation are the root causes of malnutrition. In a study on food security among preschool children, George and Daga (2000) revealed that per capita income ensures food availability at home. Kumar and Singh (2000) reported that the incidence of nutritional deficiencies declined with the increase in income level of the families under study.

Khandait *et al.* (2000) found that there is a significant association between female gender, illiterate mother, lower socio economic status, more than two children under five years of age at home, undernutrition, history of diarrhoea, measles, and acute respiratory infections. According to Agarwal *et al.* (2001) imbalanced diet, delayed weaning, unhygienic and improper method of food preparation, environment, illiteracy, infection, ignorance on vaccination and nutrition were responsible for enhancing the malnutrition in rural children.

Guerrant *et al.* (1992) stated that various infections common during childhood like diarrhoea, whooping cough, tuberculosis and measles, precede and precipitate malnutrition in children. World Bank (1995) reported that infections were another factor, which possessed a great risk among preschool children. Severely malnourished children developed severe cases of measles and measles in turn contributed to malnutrition. Measles related diarrhoea is an important factor in the interaction between measles and malnutrition.

Diarrhoea killed approximately one million children every year in India. Diarrhoea was also a cause of child malnutrition (UNICEF, 1990a and Gopalan, 1991).

Pelto *et al.* (1991), Devi and Geervani (1994) and Tuncbilek *et al.* (1995) reported that a large household is widely regarded as a risk factor for malnutrition in developing countries particularly for infants and young children. According to George and Daga (2000) household size probably ensure food distribution.

Roy (2000) observed that a large number of children below 6 years live in economic and social environments which impedes their physical and mental development. These conditions include poverty, poor environmental sanitation, diseases, infection, inadequate access to primary health care, inappropriate child rearing and feeding practices etc.

Saibaba (1991) and Mathai (1997) reported that lack of health services like immunization facilities, and maternal and child health services had a negative effect on the nutritional status of children.

According to Chirumalay and Bhagwat (1998) lower the coverage with complete primary immunization, higher the prevalence of severe malnutrition.

Jain and Choudhry, (1993); Devi and Geervani, (1994) and Tuncbilek *et al.*, (1995) reported that the child cared by own mother had better nutritional status than those of children who were cared by servants and other family members.

According to Engle (1991) and Sichieri *et al.* (1993) the birth weight of children was significantly correlated to their nutritional status. Vazir (1988) and Sichieri *et al.* (1993) identified poor child spacing as the major reason for the apparent risk at higher birth orders.

National Institute of Nutrition (1994) and Chandrasekar (1994) reported that the nutritional status of children participating in nutritional intervention programme were better off than the non beneficiaries. According to Bhasin *et al.* (2001) anganwadi attendance score, age, sex of the child and educational status of father showed statistically significant association with malnutrition.

2.6 FOOD CONSUMPTION PATTERN OF PRESCHOOL CHILDREN

Food consumption pattern of people is essential not only for assessing the nutritional status of the community but also for elucidating the food needs of population groups at national or regional levels (Thimmayamma and Rau, 1996).

A study conducted by Pushpamma, *et al.* (1983) found that the diets of 90 per cent preschool children in Andhra Pradesh were reported to be lacking in all vegetables. Kaur and Sharma (1988) observed that the diets of preschool children in Ludhiana were lacking in green leafy vegetables, other vegetables and tubers. Madhyastha *et al.* (1988) conducted a study on food and nutrient intake of preschool children of coastal India and found that intake of cereals, pulses, vegetables and milk was inadequate.

Usha and George (1990) studied the food and nutrient intake of 420 preschool children belonging to urban slums of Coimbatore city and indicated that intake of all foods except fleshy foods fall short of RDA. Pullikkottil (1993) found that intake of cereals and pulses alone met the RDA among preschool children in Malappuram district of Kerala. Shyna (1996) observed an inadequate intake of all food items among preschoolers of Thrissur district. Jose (1998) reported that the intake of food groups such as cereals, pulses, fruits, milk, fats and oils, sugar and jaggery by the preschool children was lower than the RDA. Intake of vegetables was also poor. Intake of roots and tubers was significantly higher than RDA. Jood *et al.* (2000) found that the mean daily food intake of cereals, pulses, green leafy vegetables, other vegetables, roots and tubers, milk products, fats and oils, sugar and jaggery and fruits were lower than their respective RDA in preschool children.

Metha *et al.* (1980) revealed that the intake of proteins was adequate and cereals were the chief source of proteins in the diet of preschool children. Calorie deficit was observed and this varied from 11-446 Kcal/day. There was a marginal deficiency of iron and calcium in their daily diet. Bai, *et al.* (1984) made an assessment on the nutrient intake of rural preschool children and reported that the intake of most of the children was adequate in terms of protein and energy, but vitamin A, iron and calcium was deficient.

According to Bhat and Dahia (1985) majority of preschool children in India received only ordinary home diets and those diets were deficient in many nutrients especially in vitamins and minerals. A study on dietary pattern of preschool children attending the institute of child health in Coimbatore revealed that the intake of calories, proteins, calcium, iron and β carotene was very much lower than the RDA (Geetha, 1986).

Brahman *et al.* (1987), Gopalan (1989), Shyna (1996) and Mathen (1998) stated that there is a calorie gap in the dietaries of preschool children in different

states of our country. Komalavally *et al.* (1988) conducted a study on 200 preschool children in Surat city and revealed that their diet provided 72-79 Kcal/kg body weight and 2.2 g protein/kg body weight/day. According to Rao *et al.* (1994) total daily consumption of iron and folic acid was about 50 per cent of the RDA in preschool children. Total energy intake was about 70 per cent of the daily consumption. Gopalan *et al.* (1995) revealed that the habitual diet of preschool children in India was adequate in protein, but deficit in energy or food inadequacy. Beegum (1995) reported that the results of food consumption survey conducted in urban poor preschool children in Thiruvananthapuram indicated that the mean dietary intake of energy, protein, calcium, iron, and vitamin A, were below the RDA for nutrients.

2.7 MORTALITY AND MORBIDITY AMONG PRESCHOOL CHILDREN

WHO (1990) opined that malnutrition directly or indirectly was responsible for 56 per cent of the mortality of children between 0-4 years. In India one of 100 children born was likely to die at or before birth. Another ten died before completion of one year. Another 6 to 7 died between the ages 4-5 years. Out of the remaining surveyed about 60-70 were destined to have a miserable existence. The rest progressed to anywhere close to their full potential (UNICEF, 1990). Kumar *et al.* (2000) reported that lack of good nutrition during the first years of life lead to poor health and high rate of mortality among preschool children.

According to WHO (1990) immediate consequences of malnutrition is high mortality and morbidity and the long term consequences are chronic undernutrition, retarded growth and mental development and stunted adult stature.

Gabar (1990) revealed that mortality in under 5 children decreased by 9 per cent in children born to mothers who have been educated even for one year. He had also pointed out that child mortality was about 5 times among illiterate mothers compared to graduate mothers. An inverse relationship has been documented between maternal literacy and infant mortality by Bamji and Thimmayamma(2000).

US agency of International Development (1989) reported that the high mortality and morbidity in the undernourished were due to lack of sanitation, impaired immunity and infectious diseases. Diarrhoea caused dehydration, which killed approximately one million children every year in India .It was estimated that about five million diarrhoeal deaths occurred among preschool children (UNICEF, 1992).

Out of the vaccine preventable diseases, measles was the most important cause of childhood mortality and morbidity in developing countries (Srinivasan, 1991).

Reddy (1991) reported that most children with corneal xerophthalmia also had other conditions such as severe protein energy malnutrition, history of measles, diarrhoea, respiratory illness and a variety of other infections which independently contributed to high mortality.

World Bank (1995) observed that about 12 million children under the age of five died in the developing world in 1990 and a quarter of it were linked to infection.

Naidu (1999) found that the preschool child mortality rate in India is 23.9, and 34.70 per cent male children (0-4 yr) and 38.6 per cent female children were subjected to death and 1.11 per cent children were found under the relative risk. According to South Indian Human Development Report (2000) total short duration morbidity (0-4 yrs) in Kerala is 2,16,000 populations. It is believed that in Kerala, the health situation, as measured by infant mortality rate is far superior to any other state in India. According to Rao (1999) preschool mortality rate in India is 23.9 per cent.

Rao *et al.* (2000) reported that higher morbidity affected significantly the growth velocities in weight through out preschool age. Higher morbidity in young children led to deterioration of nutritional status over time in 30 per cent to 5 per cent children.

2.8 CONSEQUENCES OF MALNUTRITION

Malnutrition during critical phases of early growth can lead to the stunting of physical growth, to sub-optimal intellectual development and poor-neuro integrative competence in children (Cravito *et al.* 1978). Beegum (1991) reported that malnutrition as a causative factor for various deficiency disorders like marasmus, kwashiorkor, xerophthalmia, scurvy, rickets, beri-beri, pellagra and anaemia.

A large number of young children in developing countries suffered from malnutrition either in mild, moderate or in severe form. The malnourished children and those have poor physical growth had experienced high rate of infection than those who were well nourished (Cohen *et al.*, 1980, Kadam *et al.*, 1983, Aswathi *et*

al., 1990 and Reddy, 1991). According to Espy (1996) protein calorie malnutrition is a disease, which increases malnutrition, is a disease, which increases the occurrence and severity of infections and ultimately affects growth and mental development of children. Desai (1999) reported that malnutrition depresses a child's sensitivity to infections. Thomkins (2002) identified that malnutrition and nutrient deficiencies like vitamin A and iron increases the severity of infections. According to Bhaskaram (2002), micronutrient deficiencies and infectious diseases co-exist and exhibit complex interactions leading to the vicious cycle of malnutrition and infections among under privileged populations of the developing countries, particularly in preschool children.

Seibel *et al.* (1986) suggested that children with iron deficiency and iron deficiency anaemia experience aberration in attention, cognitive function, activity level and ultimately diminished capacity to learn which may be permanent changes that occurred in the brain because of nutritional restrictions that occurred during the vulnerable period of brain growth. Patiroglu and Dogan (1991) reported that the patients with iron deficiency anaemia complained of fatigue, weakness and lack of ability to concentrate. They were irritable and anorexic also. Wyatt *et al.* (2000) in a study of iron deficiency in preschool children of Mexico reported that, iron deficiency anaemia impaired cognitive function and both motor and mental development. Iron deficiency was also associated with poorer performance on psychomotor and mental development and behavioral pattern. Sungthong (2002) in a study on young children of Thailand, found that poorest cognitive function was observed in children with iron deficiency anaemia. Lozoff *et al.* (1998) reported that children with iron deficiency anaemia exhibited wariness, hesitancy, tiredness, and inattentiveness and delayed motor development.

Sommer *et al.* (1984) found that vitamin A deficiency in children contributed to the development of respiratory diseases and diarrhoea at a higher rate than the normal children. Hussain *et al.* (1991), Reddy *et al.* (1993), Scrimshaw (1994), conducted a study among malnourished children and observed different manifestation of vitamin A deficiency like conjunctival xerosis (56%), Bitot's spots (11%), corneal xerosis (11%), corneal ulceration (11%), nyctalopia (4%) and corneal scars (2%). According to UNICEF (1995) around 60,000 children become nutritionally blind annually.

Saif *et al.* (2001) conducted a study among preschool children of Faisalabad and reported that many of them exhibited bitot's spots, angular lesion conjunctivitis, dermatitis and conjunctival dryness as signs of vitamin A deficiency. Souza (2002) reported that prolonged vitamin A deficiency may cause a severe disorder hypovitaminosis A, that in turn may result in xerophthalmia and blindness. Chakravarthy and Sinha (2002) reported that vitamin A deficiency resulted in bitot's spots and night blindness in young children.

According to Raman (1992), iodine deficiency disorders were another important disorder which have severe impact on children, with every passing hour, 10 children were being born in India, who did not attain their optimal mental and physical potential due to neonatal hypothyroidism. Over 100 million people in the South East Asian Region suffered from endemic goiter, 6 million suffered cretinism and more than 35 million were mentally or physically disabled. According to Vir (1994) goiter is the most common visible ill effect of iodine deficiency and its prevalence varied from 40-60 per cent with as much as 20 per cent prevalence grade II malnutrition.

2.9 MALNUTRITION AND PHYSICAL GROWTH PATTERN

An important quantifiable manifestation of under nutrition is growth retardation. Measurement of growth therefore has always been considered as a valuable trial for assessment of nutritional status of children (Gopalan, 1992).

Seckler (1982) claimed that half to 3/4th of children from developing countries possessed normal anthropometric measurements and also observed that malnourished children, were short for their age, but had weight for their short height. Severe and acute PEM resulted in early weight loss in children. If PEM was less general, it resulted in a failure to gain the weight for a given height. Height was selectively less affected by acute and short episodes of malnutrition but was affected by chronic or long duration malnutrition (NIN, 1983).

Usha and Beegum (1985) has shown that 70-80 per cent of children in preschool years suffered from various forms of growth retardation due to PEM. In early childhood years, growth is rapid and deviation from normal can be detected easily (Gopalan, 1988; Manan, 1991). Growth and physical development of infants and children were widely used as indicators of the overall health and nutritional status (Srikantia, 1989).

Sharma and Kalia (1990) conducted studies on anthropometric measurements of preschool children in Ghumaruin block of Himachal Pradesh and they concluded that nutritional anthropometry was one of the important and simple methods of assessment of growth and development especially in the rapidly growing children and hence the degree of malnutrition can be assessed through anthropometric measurements.

According to UNICEF (1990) the growth of privileged groups of children in developing countries did not differ significantly from the United States National Center for Health Statistics reference value.

ICMR (1994) has indicated that in field studies to assess the nutritional status, heavy reliance must be placed on measurement of extra morphology of the body. Although an under weight child may have same catch up growth, for the most part of the child whose growth has flattered in the first 2 years of life, will be on a different growth trajectory during the rest of his or her life (Alderman, 1993 and Anand *et al.*, 1994).

Varghese (1995) conducted studies on iron deficiency and behaviour pattern in preschool children in Thiruvananthapuram district. The anthropometric measurements revealed that in the normal group about 44 per cent of males and 8 per cent of females had head circumference higher than the standard values where as in the iron deficient group, both males (40%) and females (28%) were having head circumference values lower than the standard values. Chest circumference also revealed that the normal group of children had values higher than the standard, while those children who were iron deficient showed lower chest circumference when compared to standard values.

Shyna (1996) conducted a study among preschool children of Thrissur district and found that majority of boys and girls have normal growth and also the prevalence of grade I and grade II malnutrition was found more among girls. Nutritional status of preschool children of Thrissur district was assessed by Jose (1998) and found that weight, height, mid upper arm circumference, chest circumference and head circumference were below the Indian standards. A comparative study on the nutritional status of ICDS beneficiaries and non-beneficiaries of Thrissur district by Mathen (1998) revealed that as per weight/height² ratio, majority of the children in both the groups belonged to moderately malnourished group.



MATERIALS & METHODS

3.MATERIALS AND METHODS

This chapter discusses the method and procedures followed in various phases of research. It deals with the locale of the study, sample and sampling procedures, methods adopted for data collection, and statistical procedures used in the analysis of data. The details are presented under the following heads.

- 3.1 Locality of the study
- 3.2 Selection of samples
- 3.3 Plan of study
- 3.4 Methods adopted for the study
- 3.5 Development of tools
- 3.6 Conduct of the study and
- 3.7 Interpretation of data

3.1 Locality of the study

The study was conducted in the coastal areas of Thrissur district. A list of anganwadies, in the coastal areas was prepared and 10 anganwadies were randomly selected as samples for the study. The major panchayats included were Thalikkulam, Nattika and Valappad.

3.2 Selection of samples

From the list of preschool children in each anganwadi, families who were not engaged either in fishing or in activities related to fishing were excluded. From the remaining, 10 families were selected at random from each anganwadi. Thus a total of 100 preschool children (4-5 age group) formed the sample for the study.

A sub sample of 50 preschool children, were randomly selected from the above sample, for conducting clinical examination. Food weightment survey was conducted in a sub sample of 20 preschool children selected at random from the 50 children selected for clinical examination.

3.3 Plan of study

1. A pilot survey to locate anganwadies with children in 4-5 years of age group of fishermen community.
2. A base line survey to elicit information on the socio economic details of the families and also to collect details regarding the index child selected for the study.

3. A dietary survey to assess the food consumption pattern of the families especially the dietary habits of the preschool child in the family.
4. Assessment of nutritional status of preschool children by conducting
 - a) An anthropometric survey to record the height, weight, head circumference, chest circumference and mid upper arm circumference of preschool children.
 - b) Clinical examination of a sub sample (50 preschool children) to identify the manifestations of symptoms related to malnutrition.
 - c) A one day food weighing survey in a sub sample of 20 preschool children to determine the actual food and nutrient intake.

3.4 Methods adopted for the study

Details on socio economic background, personal informations, food consumption pattern and health aspects of the selected families and preschool children were collected by interviewing the women in the family with the help of a schedule.

The interview method is reported to be the most suitable way to collect data since it proceeds systematically and enables quick recording of data (Devadas and Kulandaivel, 1975). According to (Gupta, 1987) the information received from an interview schedule is more reliable as the accuracy of the statements can be checked by supplementary questions. According to Thimmayamma and Rau (1996) diet is a vital determinant of health and nutritional status. Diet surveys are mainly of two types one which concentrates on qualitative aspects of the foods i.e., what kind of foods are eaten, and the other which attempts to estimate the amounts of food consumed in quantitative terms, i.e., how much of food is eaten. Both these types were included in the study to elicit information regarding the dietary habits and food and nutrient intake of the preschool children.

Anthropometric indices, presence of clinical deficiency signs, dietary assessment, and actual food intake and biochemical estimation were widely used as direct parameters of nutritional status (Aebi, 1983 and Swaminathan, 1986).

Anthropometry has been accepted as an important method for assessment of nutritional status and it is a simple and useful practical index. Anthropometry can help in the assessment of sub clinical stage of malnutrition and it has been recognised as a reliable method for identification of nutritionally vulnerable group (Rao and Vijayaraghavan, 1996).

In the present study, anthropometric measurements like height, weight, mid arm circumference, head circumference and chest circumference of preschool children were recorded using standard methods.

Crown-heel length or height deficit is an indicator of long term malnutrition. The extent of height deficit in relation to age as compared to regional standards can be regarded as a measure of malnutrition (Gopaldas and Seshadri, 1987). According to Rao and Vijayaraghavan (1996), among the environmental factors, which influence the height of an individual, nutrition and morbidity, are very important because inadequate dietary intake or infections reduce nutrient availability at cellular level leading to growth retardation and stunting.

Body weight is the most widely used and the simplest anthropometric measurement for the evaluation of nutritional status (Rao and Vijayaraghavan, 1996). Measurements of weight at various ages have been used as an index of nutritional status and have proved very valuable when correctly interpreted (Beegum, 1991).

Mid upper arm circumference is an indicator of muscle development and reflects protein-calorie malnutrition (Jelliffe, 1966 and Kamath, 1986). MUAC measurement is the most useful and practical method for assessing muscle mass, as this region is easily accessible and measurement requires only a flexible fiber glass tape. MUAC is considered as a simple useful and more feasible method to assess the nutritional status of preschool children (Voorhoea, 1983 and Rao and Vijayaraghavan, 1996).

Head circumference relates mainly to size of the brain, which increases quite rapidly during infancy. The chest in a normally nourished child grows faster than the head during the second and third year of life. In a malnourished state, due to poor growth of chest, the head circumference may remain greater than the chest (Rao and Vijayaraghavan, 1996).

Monitoring anthropometric measurements like weight, height, MUAC, head circumference and chest circumference were considered as the best methods to detect various degrees of growth retardation, among children. Even before clinical manifestations, the growth pattern provides information regarding changes in nutritional status (George, 2000). Clinical examination is an important and sound method of assessing the nutritional status of a community (Jelliffe, 1966 and Kamath, 1986). According to Rao and Vijayaraghavan (1996) clinical examination

reveals the anatomical changes due to malnutrition that can be diagnosed by naked eye. Clinical examination provides direct information of signs and symptoms of dietary deficiencies prevalent among people (Swaminathan, 1986). In the present study clinical examination was conducted in a sub sample of 50 preschool children.

Food weighment method is the most reliable method to assess the actual food intake of an individual (Devadas and Easwaran, 1986). According to Gorre *et al.* (1977), weighment method can give accurate values of dietary intake. Mari (1995) reported that actual food consumption within the family by one day weightment could be better mentioned in micro samples. Food consumption surveys provide data on the type and amount of food consumed by a representative sample of the survey population (Schofield, 1985). Hence, in the study one day food weighment survey was conducted in 20 preschool children to assess their actual food and nutrient intake.

3.5 Development of Tools

Tools are certain instruments, which are used in research for gathering new facts. To elicit informations regarding the socioeconomic and dietary pattern of the families, interview method was used. The interview schedule for obtaining the socioeconomic characteristics of the families were structured to include data on the family size, income and expenditure pattern of the families, religion and educational level of the parents, nature of family, nature of occupation, living conditions, child rearing and hygienic practices, details regarding the preschool child like birth order, birth spacing, birth weight, morbidity pattern, immunization coverage, use of health care facilities etc. The pretested questionnaire is presented in Appendix I.

A dietary survey questionnaire was also structured to collect details regarding the dietary habits of the families mainly food expenditure pattern, intra family food distribution, food habits, frequency of use of various foods, foods on special occasion, infant feeding practices and food preferences of the preschool child in the family. The pretested questionnaire is presented in Appendix II.

Suitably structured schedule was also developed for clinical examination and is presented in Appendix III.

Separate schedules were structured for food weighment survey and presented in Appendix IV.



Plate no. 1. Procedure of measuring weight



Plate no. 2. Procedure of measuring Chest circumference

3.6 Conduct of the study

3.6.1 Survey of socio economic and dietary pattern of the families and that of preschool children in the family

The informations on the socio economic and dietary pattern of the families were collected with the help of pre tested schedules by interview method. Here the respondents were the mothers of the preschool children. The accuracy of the answers were checked by supplementary questions whenever necessary.

3.6.2 Anthropometric survey

In the anthropometric survey the height, weight, head circumference, chest circumference and mid arm circumference of the preschool children were recorded.

Height of the children was measured using a fiberglass tape. The subject was asked to stand erect without shoes, with the heels, buttocks, and shoulders and occipt against the wall. The height was read off from the scale on the wall.

Weight of the children was recorded using a bathroom balance, which was checked by calibration with standard weights. Weight was recorded with minimum clothing on the subject. The procedure is shown in plate no.1.

Head circumference was measured using a tape, placing the tape round the frontal bones just superior to supra orbital ridges, passing it round the head at the same level on each side and laying it over the maximum occipital prominence of the back (Mayers, 1972).

Chest circumference was also taken using the same tape. The measurement was taken at the level of xiphisterrium and in a place at right angles to the vertebral column below the inferior angle of the scapula. The procedure of taking chest circumference is shown in plate no.2

Mid upper arm circumference of children was measured using a tape at the level mid way between the acromial and olecranon process with the arm hanging freely relaxed, with the tape applied at right angles to the long axis of the humerous (Malima, 1972). The procedure of measuring mid upper arm circumference is shown in plate no.3.

3.6.3 Clinical examination

Clinical examination was conducted with the help of a qualified physician



Plate no. 3. Procedure of measuring MUAC



Plate no. 4. Clinical examination of children

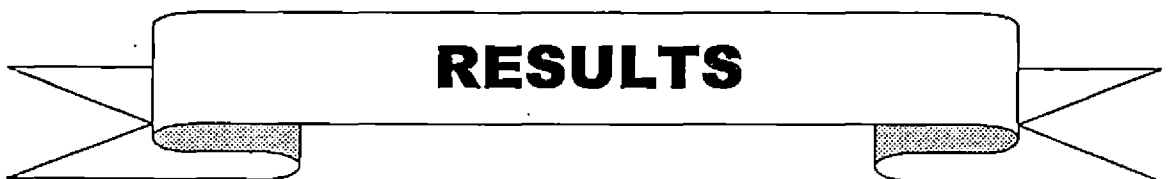
Clinical examination is an important and sound method of assessing the nutritional status of a community (Jelliffe, 1966 and Kamath, 1986). According to Vijayaraghavan (1996) clinical examination reveals the anatomical changes due to malnutrition that can be diagnosed by naked eye. Clinical examination provides direct information of signs and symptoms of dietary deficiencies prevalent among people (Swaminathan, 1986). In the present study clinical examination was conducted in a subsample of 50 preschool children (plate. no 4).

3.6.4 Food weighment survey

To assess the actual food and nutrient intake of preschool children, a one day food weighment survey was conducted in a sub sample of 20 preschool children. The weight of raw ingredients included in the meal for a day and the weight of cooked foods prepared by the family were recorded. Any other extra foods like snacks, biscuits, toffees etc. taken by the child outside the house was also recorded. All these weights were taken with standard measuring cups and spoons and also by means of a food weighing balance. The amount of cooked food consumed by the child was then converted to its raw equivalents. This was conducted for one day and the nutritive value of the food consumed was computed using food composition tables (Gopalan, 1989). The method of food weighment is shown in plate.no.5.

3.7 Interpretation of the data

To interpret the results, the data was analysed using analysis of variance technique, t - test, correlation and multiple regression analysis.



RESULTS

4.RESULTS

The results of research work entitled "Nutritional profile of preschool children of fishermen" are projected under the following heads.

- 4.1. Demographic details of the families selected which included socio-economic and cultural background of the families and details regarding the index child.
- 4.2. Dietary habits of families
- 4.3. Nutritional status of selected preschool children assessed by
 - a) Anthropometric measurements
 - b) Clinical examination
 - c) Food weighing survey

4.1. Demographic details of the families

Distribution of the families according to type of family, and family size (adults and number of children in the families) is presented in Table 1.

Table 1. Distribution of families according to type of the family and number of adults and children

(n = 100)

Details	Percentage of households
Type of the family	
Joint	67
Nuclear	33
Family size	
Number of adults	
2	33
3	10
4	17
5	6
6 and above	34
Number of children	
1	15
2	50
3	24
4 and above	11

Of the 100 families surveyed 33 per cent were nuclear families. Joint family system was found in 67 per cent of the families. In thirty four per cent of the families (34%) there were more than 5 adult members. Two adults were observed in 33 per cent of families. Four and 3 adults were observed in 17 and 10 per cent of the families respectively. Fifty per cent of the families studied had 2 children and 15 per cent families had only one child and 11 per cent families had more than 4 children.

Distribution of the families based on religion is presented in Table-2.

Table 2. Family distribution based on religion

(n = 100)

Religion	Percentage of families
Hindu	83
Araya (OEC)	65.06
Mukkuva (OEC)	28.9
SC	6.03
Muslim	16
Christian	1

Majority (83%) of the families surveyed were Hindus. Among them 65.06 per cent were Arayas, 28.9 per cent were Mukkuvvas and 6.03 per cent were Scheduled Castes. Sixteen per cent of the families were Muslims and only 1 per cent belonged to Christian community.

Educational status of the families were studied separately for both the parents and are given in Table 3.

Table 3. Educational status of the parents

(n = 100)

Educational status	Mother (Percentage)	Father (Percentage)
Lower primary	3	23
Upper primary	31	29
High school	56	46
College	10	2

In 56 per cent of families, mothers had high school education. Thirty one per cent of the mothers had upper primary education. In 10 per cent of families, mothers had college education.

Educational status of fathers revealed that 46 per cent of them had high school education. Twenty nine per cent of fathers studied up to upper primary level and 23 per cent had lower primary education. Fathers with college level education were at a minimum of two per cent.

Occupational status of the head of the families are presented in Table 4.

Table 4. Occupational status of head of the family

(n = 100)

Occupational status	Percentage of families
Fishing	82
Fish vending	14
Others	4
Total	100

Majority of the head of the families (82%) were involved in fishing. Fourteen per cent were involved in fish vending. Four per cent of them were involved in other works related to fishing like icing work, porter.

Distribution of the families based on average monthly income is given in Table 5.

Table 5. Distribution of families based on average monthly income

(n = 100)

Income levels (Rs.)	Percentage of families
500-1000	7
1001-1500	15
1501-2000	24
2001-2500	23
2501-3000	24
3001-3500	7

Twenty four per cent families had monthly income ranging between Rs.1501-Rs.2000 and another 24 per cent between Rs.2501-Rs.3000. Twenty three per cent of families had monthly income between Rs.2001-Rs.2500. Fifteen per cent families had income ranging between Rs.1001-Rs.1500. Monthly income between Rs.500-Rs.1000 and Rs.3001-Rs.3500 was found in 7 per cent of the families in each.

Details about dowry system prevailing in the community was enquired and is detailed below.

In 97 percent families, dowry system existed and 3 percent families didn't accept any dowry. In 55 per cent families they accepted less than or equal to 10 sovereigns gold as dowry. Thirty per cent families got gold as dowry and the amount ranged between 10-25 sovereigns. Five per cent families got gold as dowry and the amount ranged between 25-50 sovereigns. Eight per cent families got cash along with gold as dowry and the amount ranged between Rs.1000-Rs.5000 and another 8 per cent of the families received Rs.5000-Rs.10000 as dowry.

Living conditions of the families were assessed by observing their housing conditions like type of house, type of roof, structure of house and separate rooms in the house etc. The details are presented in Table 6. and also in fig. 1, fig. 2, fig.3 and fig.4

Table 6. Details of living conditions of households

(n = 100)

Housing conditions	Percentage of families
Ownership	
Own house	92
Rented house	5
Squatters	3
Type of house	
2 rooms	17
3-4 rooms	78
6-8 rooms	5
Type of roof	
Thatched	37
Tiled	53
Concrete	10
Structure of house	
Thatched	34
Brick built	66
Seperate kitchen	
Present	77
Absent	23

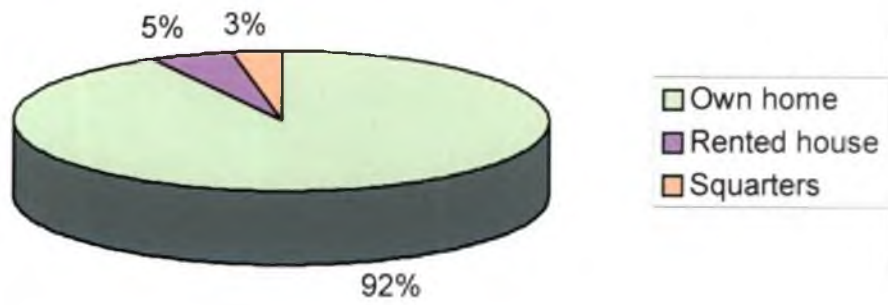


Fig.1 Details of house ownership

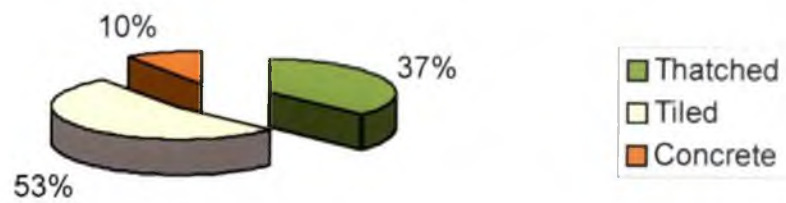


Fig.2 Distribution of families according to type of the house holds

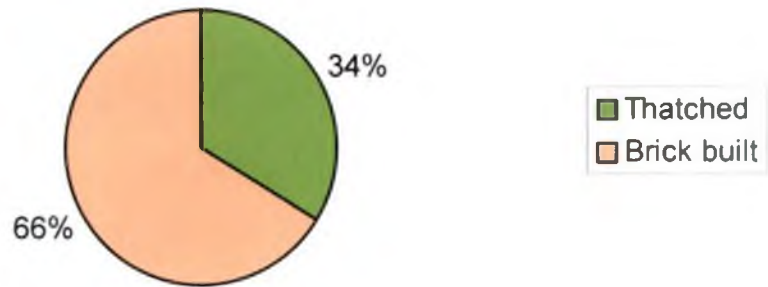


Fig.3 Distribution of families according to structure of house

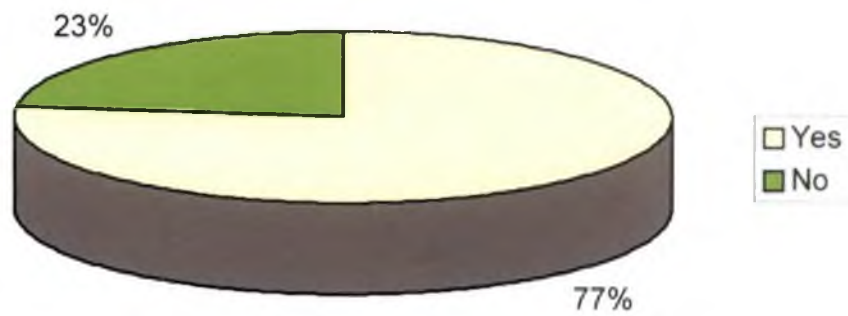


Fig.4 Possession of separate kitchen by the families

As shown in Table 6, 92 per cent of the families were living in their own houses. Five per cent had rented houses and three per cent were found to be living in quarters. In 78 per cent of the families there were 3-4 rooms and in 17 per cent families there were only 2 rooms. Six or more rooms were found in 5 per cent of the families. Most families (53%) had tiled roof and 37 per cent families had thatched roof for their houses. Only 10 per cent families had concrete roofing. Majority of the families (66%) had their houses built with bricks. Thirty four per cent of the families were having thatched walls. In majority of the houses (77%) they had a separate kitchen. Twenty three per cent of families did not have a separate kitchen.

The living facilities like electricity, lavatory facilities, drainage facilities, drinking water and transport facilities possessed by the families are presented in Table 7 and also in fig.5, fig.6 and in fig.7.

Table 7. Other living facilities of the families

(n = 100)

Living facilities	Percentage of families
Electricity	
Present	51
Absent	49
Drainage	
Present	0
Absent	100
Lavatory facilities	
Own latrine	91
Open field	9
Drinking water	
Own hand pump	67
Public tap	11
Own well/own pond	22
Transport facilities	
Bicycle	24
Motor bike	9
Catamarine	5
Ordinary boat	18
Autorikshaw	3
Nil	41

From Table 7, it was found that, 51 per cent families had electric connection in their houses. None of the families studied had drainage facility for their houses (plate.no.6). Ninety one per cent families had own latrines and 9 per cent families were found using open fields.

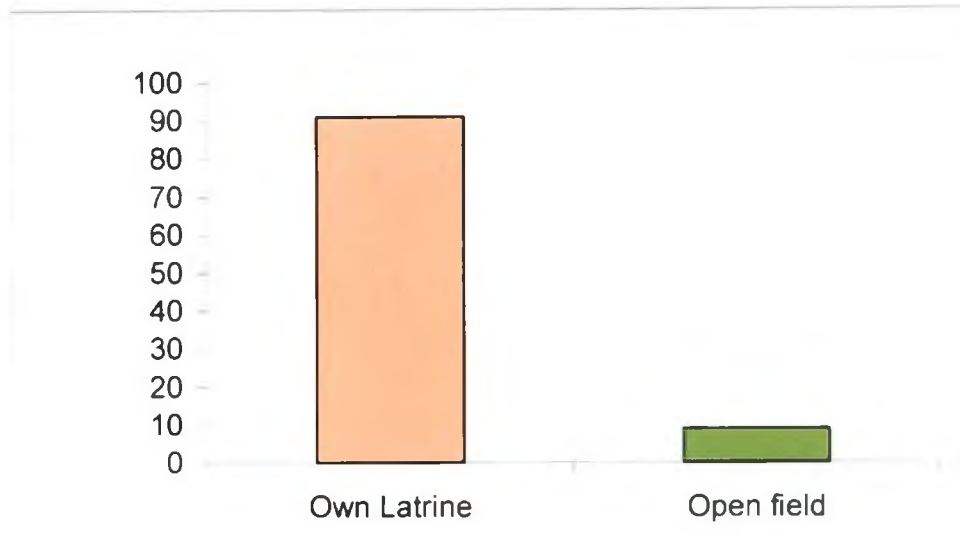


Fig. 5 Details about lavatory facilities

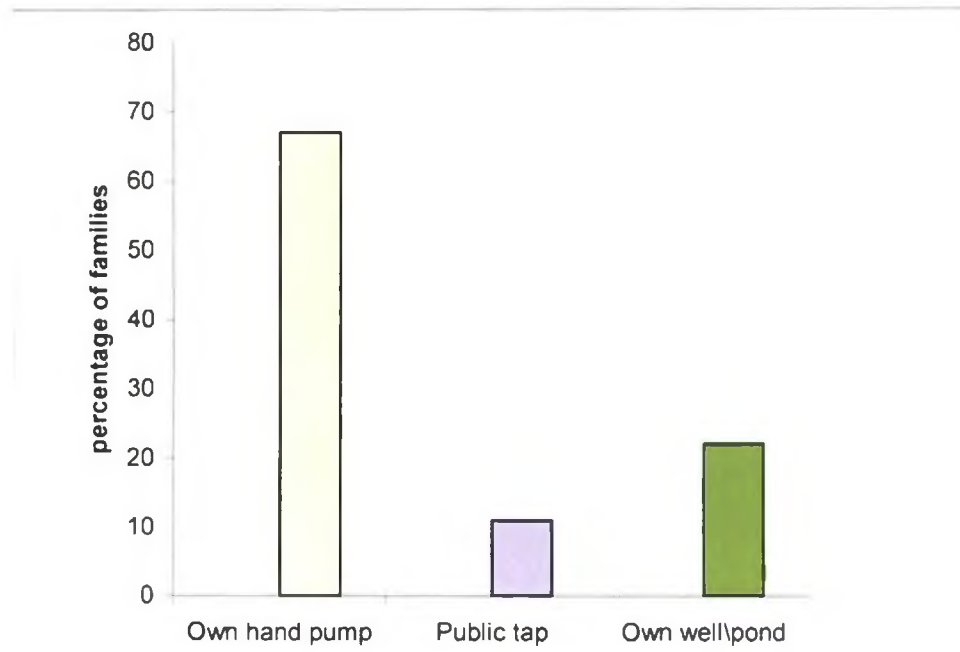


Fig.6 Details about source of drinking water



Plate no. 6. Poor drainage facility observed in the study area



Plate no. 7. Major sources of drinking water available to the families

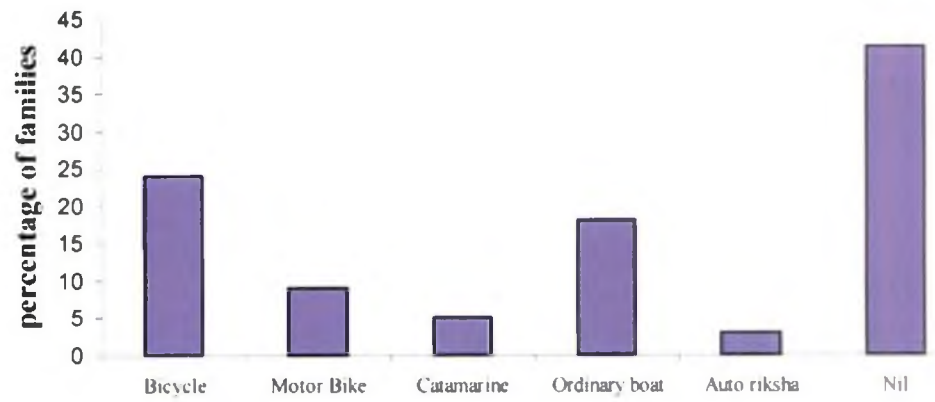


Fig. 7. Transprt facilities used by the families

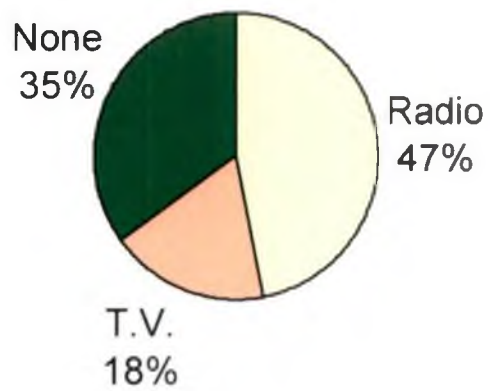


Fig.8 Sources of information

Sixty seven per cent families had their own hand pumps connected to bore wells (plate.no.7), 11 per cent of the families depended on public tap as their source of drinking water. Twenty two per cent families were found to have either their own well or a pond as a source of drinking water. Regarding transport facilities, 24 per cent of the families used bicycle, 9 per cent of the families had motorbikes and 3 per cent had autorikshaws for land transportation. Five per cent of the families had catamarine and 18 per cent of the families had their own ordinary boats for fishing. Majority of the families (41%) did not have any form of their own transportation facilities.

Exposure of the families to various information sources were analysed and is presented in Table 8 and also in fig 8

Table 8. Utilization of information sources

(n = 100)

Information sources	Percentage of families
Own Radio	47
Television	18
None	35

It was found that 47 per cent of families had radio and 18 per cent of families had their own television set. Thirty five per cent of families didn't have any of information sources.

When enquired about their participation in social organizations such as matsyafed, co-operative society, Mahila samajam etc. it was observed that 82 per cent of the families have membership in Matsyafed and 29 per cent of the women were members in local Mahila Samajam. Only 7 per cent of the families were members in Co-operative Society.

Monthly expenditure pattern is given in Table 9

Table 9. Monthly expenditure pattern

(n = 100)

Range of expenditure(%)	Percentage of families												
	Food	Clothing	Shelter	Rent	Transport	Education	Entertainment	Health	Savings	Personal expenses	Repayment of loans	Kuries	Others
<5	-	96	71	3	64	57	72	66	21	48	9	19	-
6-10	-	4	21	5	25	2	2	31	27	42	13	2	10
11-20	-	-	-	-	11	-	-	3	1	6	23	1	22
21-30	-	-	-	-	-	-	-	-	-	-	14	-	-
31-40	-	-	-	-	-	-	-	-	-	-	9	-	-
41-50	17	-	-	-	-	-	-	-	-	-	25	-	-
51-60	18	-	-	-	-	-	-	-	-	-	2	-	-
61-70	34	-	-	-	-	-	-	-	-	-	-	-	-
71-80	31	-	-	-	-	-	-	-	-	-	-	-	-
> 81	-	-	-	-	-	-	-	-	-	-	-	-	-
Nil	-	-	8	92	-	41	26	-	51	4	5	78	68

It was found that 17 per cent families spent less than 50 per cent of the total income for food. Eighteen per cent families spent 51-60 per cent of the total income for food. About 61-70 per cent of the total income was spent for food by 34 per cent families. Thirty one per cent families spent 71-80 per cent of the total income for food. None of the families were found to spend more than 80 per cent of the total income for food.

Ninety six per cent of the families were found to spend only up to 5 per cent of the income for clothing. Four per cent of families were found to spend 6-10 per cent of the total income for clothing.

Seventy one per cent of the families were spending only less than or equal to 5 per cent of the total income for shelter. Twenty one per cent were found to spend between 6 and 10 per cent of the total income for shelter. Eight per cent families didn't have any expenditure on shelter. Only 5 per cent of the families were found to have expenditure under rent ranging between 6-10 per cent of the total income. Three per cent families paid rent only less than or equal to 5 per cent of the total income. Majority of the families (92%) did not have any expenditure under this head. Sixty four per cent of the families spend up to 5 per cent of the total income for transportation. Twenty five per cent had an expenditure ranging between 6 to 10 per cent and 11 per cent of the families spend 11-20 per cent of the total income for transportation.

Fifty seven per cent of the families spent up to 5 per cent of their total income for education of children, only 2 per cent of the families spent 6 to 10 per cent for education. None of the families were found spending more than 10 per cent for educational purposes. Forty one per cent of families did not have any expenditure for education.

As revealed from Table 9, 72 per cent of the families spent up to 5 per cent of their total income for entertainment. Two per cent of the families spent 6 to 10 per cent of the total income for entertainment purposes. About 26 per cent of the families did not spend anything for this purpose.

Expenditure for health was enquired and found that majority (66%) of the families spent only up to 5 per cent of the total income for health. Thirty one per cent families spent 6-10 per cent of their income while 3 per cent families spent 11-20 per cent of their income for health aspects.

Twenty one per cent of the families reported that they saved up to 5 per cent of their total income. Twenty seven per cent families had savings ranging between 5-10 per cent of the total income. But majority of families (51%) did not have any savings.

Forty eight per cent of the families spent up to 5 per cent of the total income for personal expenses and 42 per cent of the families spent 6 to 10 per cent for personal expenses. About 6 per cent families spent 11-20 per cent of the total income for personal expenses. Four per cent of families did not spend anything for personal purposes.

Twenty five per cent families utilized their monthly income (about 50%) for the repayment of loans. Twenty three per cent of the families spent 11-20 per cent and 13 per cent families spent 6-10 per cent of their monthly income for loan repayment. Fourteen per cent families spent 21 to 30 per cent. While 9 per cent families spent 31-40 per cent of the repayment loans. Two per cent families spent 41-50 per cent while 5 per cent of families did not spend anything for repayment of loans. Majority of the families (78%) did not have any kuries while 19 per cent of the families saved less than 5 per cent of their income in kuries. Two per cent of the families had kuries ranging between 6-10 per cent of the total income. Only one per cent families had kuries in a range of 11-20 per cent of the total income.

Thirty two per cent families had other expenditures, which was up to 32 per cent of the total monthly income.

Money spent for the unhealthy habits were studied and presented in Table: 10

Table: 10 Details of money spent on unhealthy habits by the families (n=100)

Money Spent (%)	Percentage of Families
<5	40
5-10	34
11-20	9
>20	3
Nil	14

Forty per cent families spent less than 5per cent of the monthly income for unhealthy habits. Thirty four per cent families spent 5 to 10 per cent of their income on this. Eleven to twenty per cent of their total monthly income was spent for the unhealthy

habits by 9 per cent of the families. Only 3 per cent of the families were found to spend more than 20 per cent of the monthly income for unhealthy habits. About 14 per cent of the families did not spend any money for unhealthy habits.

4.1.1. Details regarding the index child

The preschool child (4-5 age group) in the family was considered as the index child and details regarding the index child is presented in the following tables. Gender distribution of index children is given in Table 11.

Table 11. Gender distribution of preschool children

Gender	Percentage of children
Male	42
Female	58
Total	100

As shown in Table 11, about 42 per cent of the preschool children were male children and 58 per cent were female children.

Birth order of the preschool children is presented in Table 12 and also in fig 9

Table 12. Birth order of the preschool children

Birth order	Percentage of children
1 st	50
2 nd	42
3 rd	8

About 50 per cent of the children selected belonged to the 1st birth order, 42 per cent in the 2nd birth order and 8 per cent in the third birth order.

Birth weight of the children were collected and the details are presented in Table 13 and also in fig. 10

Table 13. Distribution of preschool children based on birth weight

Birth weight (kg)	Percentage of children
1-2	10
2-3	66
3 and above	24

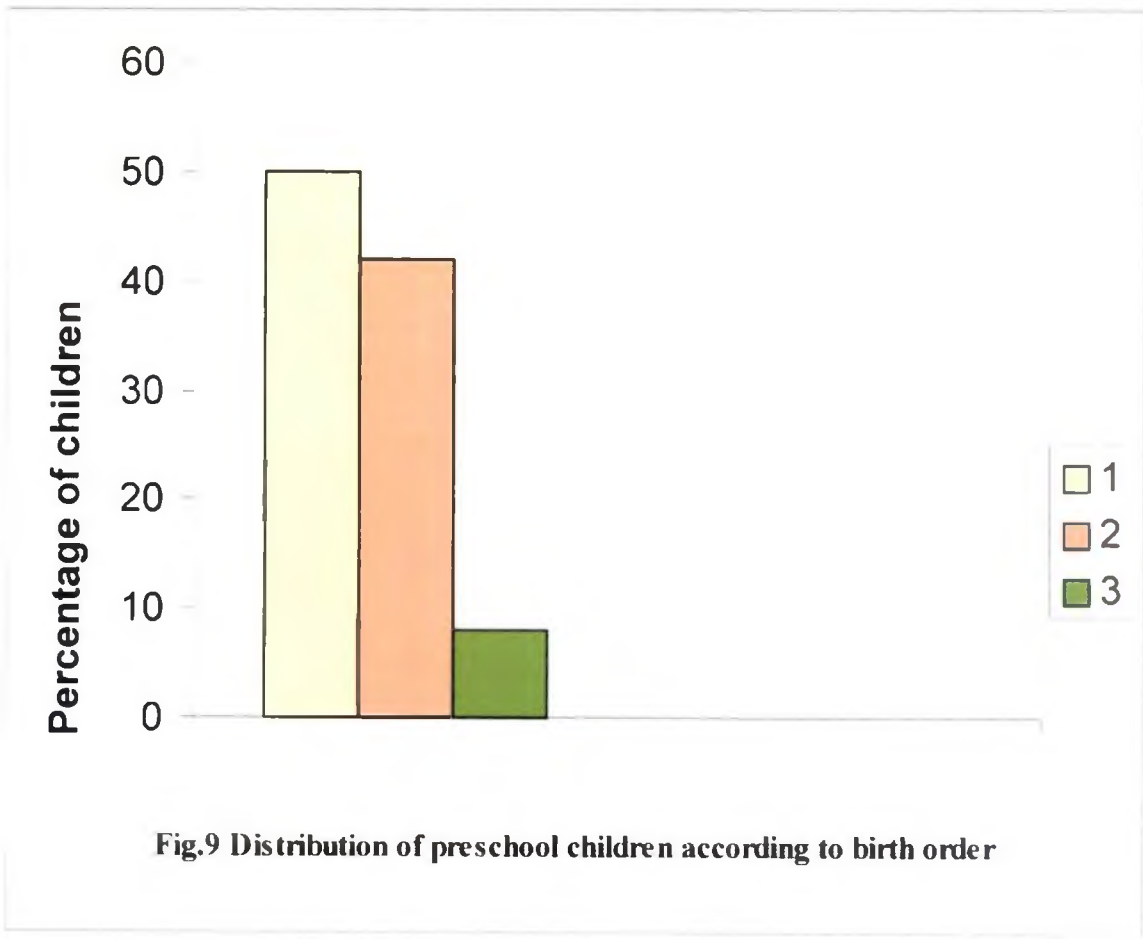
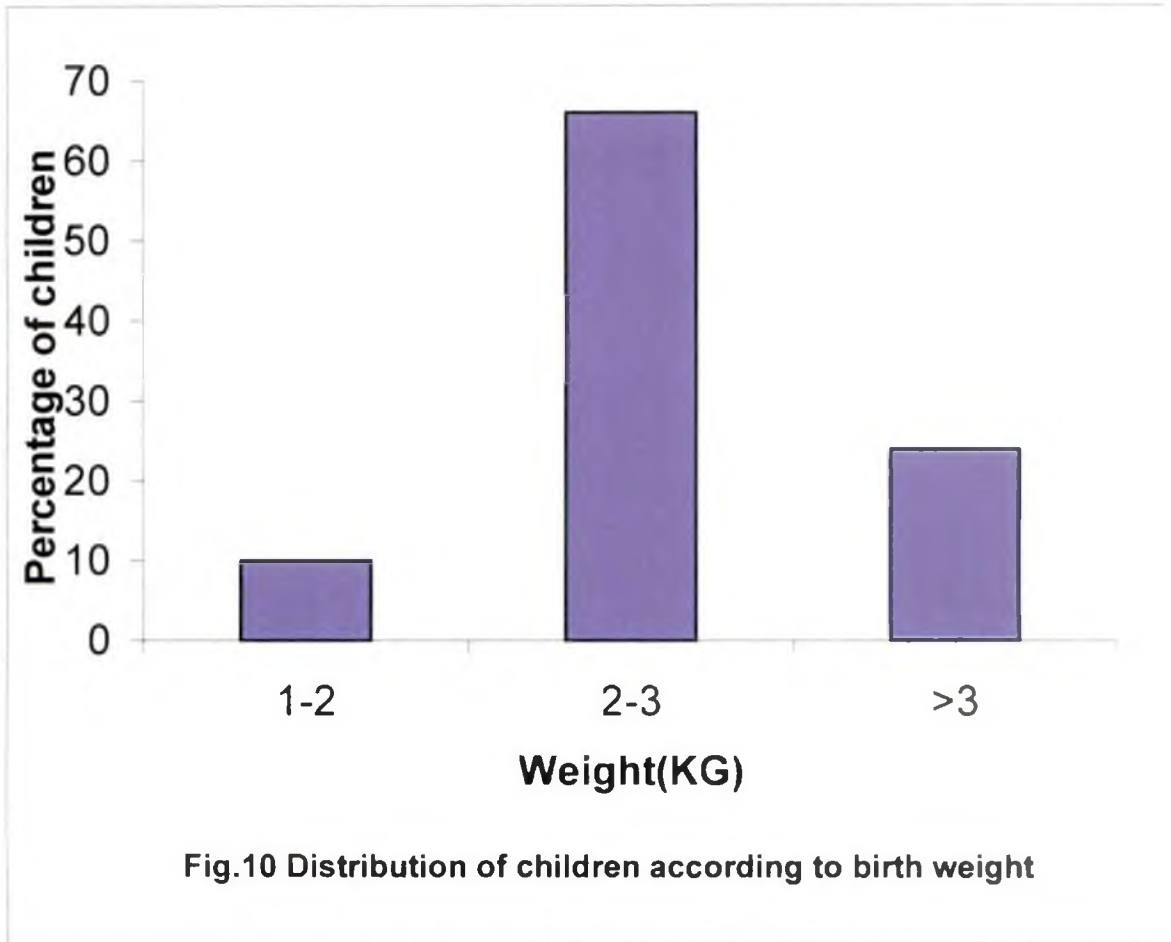


Fig.9 Distribution of preschool children according to birth order



Ten per cent of the children were found to have recorded a birth weight ranging in between 1-2 kg, majority (66%) of the selected preschool children were found to have a birth weight of 2-3 kg. Twenty four per cent of children were found to have birth weight of 3 kg and above.

Immunization status of the preschool children selected for the study are presented in Table 14.

Table 14. Immunization status of preschool children

(n = 100)

Immunization status	Percentage of children
Complete	92
Partially complete	8
Not taken	-

From Table 14, it was revealed that 92 per cent of the children had followed complete immunization schedule where as 8 per cent of the children were only partially immunized.

Birth spacing of the selected preschool children were recorded and is presented in Table 15.

Table 15. Birth spacing of preschool children

(n=100)

Birth spacing(years)	Percentage of children
1-2	61
2-3	19
3-4	14
>4	6

Sixty one per cent of the children were found to have a birth spacing of 1-2 years. Nineteen per cent of the children had 2-3 years difference with their siblings and 14 per cent children had 3-4 years and 6 per cent children had a spacing above 4 years.

As stated by mothers the incidence of various diseases for the last one year was recorded and is given in Table 16 and also presented in fig.11

Table 16. Morbidity pattern of preschool children

(n = 100)

Diseases	Percentage of children
Diarrhoea	5
Measles	4
Fever	12
Tuberculosis	9
Respiratory diseases	9
Jaundice	1
Nil	60

Only 5 per cent of the children were found to be affected by diarrhoeal disease. Four per cent of the children were reported to be affected with measles. Twelve per cent of children were found to be affected with severe fever, which prolonged more than a week. Nine per cent children were reported to have tuberculosis. About 9 per cent of the children were found to have respiratory diseases. Incidence of jaundice was reported only in 1 per cent of children. Majority of the children (60%) were reported to have no illness during the past one year.

Type of treatment taken is assessed and is presented in Table 17.

Table 17. Type of treatments followed

(n = 100)

Type of treatment	Percentage of children
Allopathy	95
Ayurvedic	3
Homeopathy	2

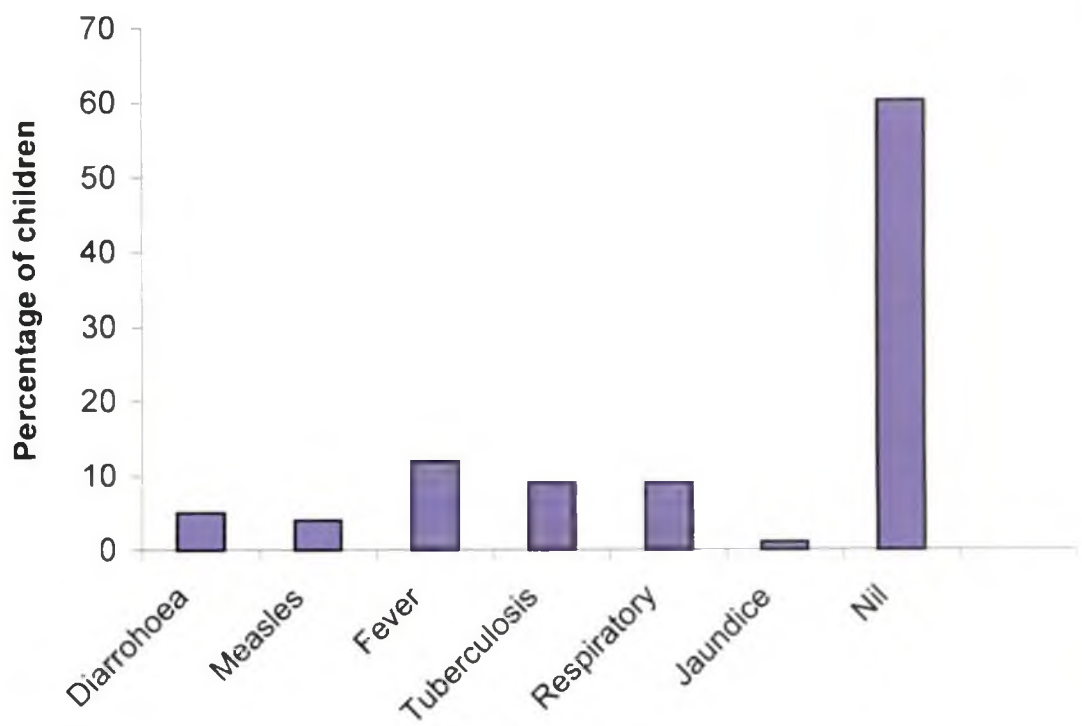


Fig.11 Prevalence of diseases among preschool children

Ninety five per cent of the children were given allopathic treatment for their illness. Only 3 per cent families followed Ayurvedic treatment and 2 per cent families were found to follow Homeopathic treatment.

Health facilities were utilised by all the families and the type of health care services utilized revealed that 66 per cent of their families utilised primary health centers for treatment. Thirty four per cent of the families resorted to private health facilities.

4.2 Dietary habits of the families.

Food habits of the families were studied and are presented in Table 18.

Table 18. Distribution of the families according to food habits

(n = 100)

Food habits	Percentage of families
Vegetarian	-
Non vegetarian	100

From the above table it was observed that all the families studied were non-vegetarians.

Meal pattern of the families were studied and is presented in Table 19.

Table 19. Distribution of families according to meal pattern

(n = 100)

Meal pattern	Percentage of families
One major meal	-
Two major meals	-
Three major meals	100

In all the families, a pattern of 3 major meals/day was observed.

Importance given for family members in food distribution was enquired and found that 89 per cent of the families gave equal importance for all members in food distribution. In 11 per cent of the families, priority was given for men and children in food distribution.

Percentage distribution of the families according to the frequency of consumption of various food items are given in Table 20.

Table 20. Frequency of consumption of food item by the families

(n = 100)

Food items	Percentage of families						
	Daily	Once	Twice	Thrice	4 times	Occasionally	Never
Cereals	100	-	-	-	-	-	-
Pulses	-	18	32	32	18	-	-
Green leafy vegetables	-	-	-	-	-	100	-
Roots and tubers	-	24	30	13	-	33	-
Other vegetables	2	21	45	25	-	7	-
Fruits	-	33	3	-	-	64	-
Milk and milk products	36	-	-	-	-	64	-
Meat	-	-	-	-	-	100	-
Fish	57	-	-	3	40	-	-
Egg	-	4	-	-	-	95	1
Fats and oil	100	-	-	-	-	-	-
Sugar	100	-	-	-	-	-	-
Bakery products	-	23	37	-	-	35	5

As revealed in table all the families included cereals like rice and wheat in their daily diet. Thirty two per cent of families used pulses thrice and another thirty two per cent consumed 4 times in a week. Pulse consumption was restricted to once in a week for about 18 per cent of families. Frequency of use of green leafy vegetables revealed that all families used it only as an occasional item in their dietaries.

With regard to roots and tubers, about 30 per cent of the families consumed it twice in a week and 24 per cent families used it once in a week. In about 13 per cent of the families, the frequency of consumption was found to be thrice in a week. Thirty three per cent of families used it occasionally.

Frequency of consumption of vegetables was found twice in a week in 45 per cent of the families and 25 per cent families consumed vegetables thrice in a week. Consumption of vegetables was found weekly once in 21 per cent of the families. Seven

per cent of the families consumed vegetables only occasionally. In 2 per cent of the families daily consumption of vegetables was observed.

Regarding the consumption of fruits, it was found that 33 per cent of the families consumed it once in a week. Three per cent of families used fruits twice in a week. About 64 per cent of families consumed it occasionally.

The daily consumption of milk and milk products was found in 36 per cent of families. Sixty four per cent of the families consumed milk occasionally.

With respect to the consumption pattern of meat, all families were found to use it occasionally. Fifty seven per cent of the families consumed fish daily. Forty per cent of the families consumed fish four times a week. Three per cent of the families used fish thrice in a week.

Egg was included in the diet as an occasional item in 95 per cent of the families. Only 4 per cent of the families used it once in a week. One per cent of families never used egg in their diet.

All families consumed fats and oils and sugar daily.

Thirty five per cent families consumed bakery products occasionally. Thirty seven per cent of the families used it twice in a week and 23 per cent families consumed it once in a week. Five per cent families never consumed this item in their diet.

Details regarding the food expenditure pattern of the families were studied and are presented in Table 21.

Table: 21. Monthly food expenditure pattern of families (n =100)

Range of expenditure (in %)	Percentage of families												
	Cereals	Pulses	Green leafy vegetables	Roots and tubers	Others vegetables	Fruits	Milk	Flesh foods	Nuts & oil seeds	Spices and condiments	Sugar	Oil	Others
5	-	52	100	78	25	67	52	-	81	97	86	24	31
6-10	-	48	-	22	75	33	34	88	-	3	14	72	66
11-20	-	-	-	-	-	-	14	10	19	-	-	4	3
21-30	13	-	-	-	-	-	-	2	-	-	-	-	-
31-40	52	-	-	-	-	-	-	-	-	-	-	-	-
41-50	29	-	-	-	-	-	-	-	-	-	-	-	-
51-60	6	-	-	-	-	-	-	-	-	-	-	-	-

Regarding the expenditure for cereals, it was found that, 52 per cent of the families spent 31 to 40 per cent of the total expenditure for food items, for the purchase of cereals. Twenty nine per cent of families spent 41 to 50 per cent of the total food expenditure for the purchase of cereals. Twenty one to thirty per cent of the total expenditure for food was spent for cereals by 13 per cent families. Six per cent of the families spent 51 to 60 per cent of their food expenditure for the purchase of cereals.

Majority of the families (52%) spent less than or equal to 5 per cent of the total expenditure of food for the purchase of pulses. Six to ten per cent of the total expenditure of food was spent for the purchase of pulses by 48 per cent families.

All families spent only less than or equal to five per cent of the total expenditure of food for the purchase of green leafy vegetables.

Seventy eight per cent of the families spent less than or equal to 5 per cent of the total expenditure of food for the purchase of roots and tubers. Twenty two per cent of the families spent 6 to 10 per cent of the total expenditure for food for the purchase of roots and tubers.

Up to 5 per cent of the total expenditure for food is spent for the purchase of other vegetables by 25 per cent of families. Seventy five per cent of families spent 6 to 10 per cent of the total expenditure of food for buying other vegetables.

Six to ten per cent of the total expenditure of food is spent for the purchase of fruits by 33 per cent of the families. Sixty seven per cent of the families spent less than or equal to 5 per cent of the total expenditure of food for the purchase of fruits.

Majority of the families (52%) spent less than or equal to five per cent of the total expenditure of food for the purchase of milk. Thirty four per cent families spent 6-10 per cent. Eleven to twenty per cent of the total expenditure of food was spent for the purchase of milk by 14 per cent of families.

Majority (88%) of families spent up to 10 per cent of their total expenditure of food for the purchase of flesh foods. Ten per cent of the families spent 11 to 20 per cent of their total monthly expenditure of food on flesh food item. Only 2 per cent families spent more than 20 per cent for the purchase of flesh foods.

Eighty one per cent of the families spent up to 5 per cent of the total expenditure of food for the purchase of nuts and oil seeds. About 19 per cent of families spent 11 to 20 per cent for this food item.

Majority (97%) of the families spent less than 5 per cent of the total monthly expenditure of food for the purchase of spices and condiments. Only 3 per cent of the families spent 6 to 10 per cent for the purchase of spices and condiments. Majority (86%) of families spent less than or equal to 5 per cent of their monthly expenditure of food for buying sugar and 14 per cent spent 6 to 10 per cent.

Twenty four per cent of families spent less than or equal to 5 per cent of their food expenditure for the purchase of cooking oil. A majority of 72 per cent spent 6 to 10 per cent for this purpose.

Thirty one per cent of families spent less than or equal to 5 per cent of their total monthly food expenditure for the purchase of other items like tea, coffee, bakery items, etc. Sixty six per cent of families spent 6 to 10 per cent and 3 per cent families spent 11 to 20 percent of their total monthly expenditure of food for the purchase of other food items.

Details about special foods prepared during various occasions in the family were collected and presented in Table 22.

Table 22. Foods prepared on special occasions

(n = 100)

Occasions	Preparations	Percentage of families
Birthday	Payasam	80
	Non vegetarian dishes	20
Marriage	Vegetarian dishes	85
	Non vegetarian dishes	15
Death	Uppuma	70
	Idli	17
	Rice with chammanthi	13
Festivals	Vegetarian dishes	80
	Non vegetarian dishes	20

It was found that 80 per cent of the families prepared payasam for birth days and 20 per cent families prepared non vegetarian items for birth days. Eighty five per cent families prepared vegetarian dishes for marriage whereas 15 per cent families prepared the non vegetarian dish 'Biryani' for marriage functions in the family. Majority of the families (70%) prepared 'Uppuma' and 13 per cent of the families prepared 'rice and chammanthi' and 17 per cent of the families prepared Idli, connected to the occasion of death in the family. During festivals majority of the families (80%) prepared vegetarian dishes.

Dietary pattern of the children was changed during diseased conditions. During fever condition, 57 per cent families provided milk. In the case of diarrhoea, cholera etc. 15 per cent families gave oral rehydration solution(ORS). Nine per cent families gave coconut water, to children with diarrhoea. They also included more liquids and liquid foods during diarrhoeal diseases. Medicines were also given to cure these illnesses.

Food processing methods adopted by the families are presented in Table 23

Table 23. Food processing methods followed in households

(n = 100)

Processed food item	Percentage of families
Dry fish	12
Pickles	35
Nil	53

As revealed from table: 23, fish drying was a method of processing adopted by 12 per cent of the families. While 35 per cent of the families prepared pickles. Fifty three per cent of families never resorted to any methods of food processing.

Details of breast feeding were collected and are presented in Table 24

Table 24. Breast-feeding practices

(n = 100)

Duration (years)	Percentage of families
<1	6
1-2	42
>3	48
Not breast fed	4

Six per cent children were breast fed only up to 1 year. Forty two per cent children were breast fed for 1-2 years and 48 per cent children were breast fed for more than 3 years. About 4 per cent children were identified as non breast-fed due to some health problems of the mothers.

Regarding the artificial feeding methods adopted by the families, it was observed that 21 per cent of the families followed artificial feeding methods.

Regarding the type of milk used, it was found that 18 per cent of the families used cow's milk and 3 per cent of the families used commercial milk powder.

Age at which other foods were introduced was enquired and are presented in Table 25

Table 25. Age of introduction of other foods (n=100)

Age	Percentage of children
3 rd month	25
4 th month	45
5 th month	17
6 th month	13

Introduction of other foods were found in the 4th month for forty five per cent of children. For 25 per cent of children other foods were introduced during the 3rd month. Seventeen per cent children were given solid foods during 5th month and 13 per cent children were given solid foods at 6th months of age.

Details regarding the consumption of snacks by the children were collected and found that 72 per cent of the children had the habit of eating snacks. Sixty five per cent of the families prepared snacks at home; while 3 per cent families bought snacks from shops and 4 per cent of the families used both home made and commercial snacks.

Details of the special supplementary foods given to the children were collected and found that 96 per cent of the families provided special supplementary foods to their children, while 4 per cent of the families did not provide any special supplementary foods.

The supplementary foods used was home made in 98 per cent of the families while 2 per cent of the families used commercial weaning foods. Five per cent of the families used both types of foods.

Details about the ingredients used for the preparation of the supplementary foods were collected .

Majority of the families (84%) used ragi as the main ingredient for the preparation of supplementary foods. Wheat flour, banana flour and cereal pulse mix were the other ingredients used for the preparation of supplementary foods.

Frequency of consumption of various food items by preschool children was collected and is presented in Table 26

Table 26. Frequency of consumption of foods by preschool children

(n = 100)

Food stuff	Percentage of children							
	Daily	Weekly					Occass- ionally	Never
		Once	Twice	Thrice	4 times	5 times		
Cereals	100	-	-	-	-	-	-	-
Pulses	19	-	-	-	-	81	-	-
Green leafy vegetables	-	-	-	-	-	-	100	-
Roots & tubers	-	24	35	11	-	-	25	5
Other vegetables	4	21	48	17	-	-	7	3
Fruits	-	47	19	18	-	-	16	-
Milk	36	-	-	-	-	64	-	-
Meat	-	-	-	-	-	-	100	-
Fish	61	-	-	-	-	39	-	-
Egg	-	28	16	7	-	-	49	-
Fats & oils	100	-	-	-	-	-	-	-
Sugar	100	-	-	-	-	-	-	-
Bakery items	-	31	25	11	-	-	33	-

All children consumed cereals, fats and oils and sugar daily. Majority (81%) of preschool children consumed pulses 5 times a week. Nineteen per cent of children consumed it daily. All children consumed green leafy vegetable as an occasional food item. Regarding the consumption of roots and tubers it was found that 35 per cent of children consumed it weekly twice. Twenty four per cent of children consumed it once in a week and 25. per cent children consumed it only occasionally. Eleven per cent of children consumed it thrice in a week and 5 per cent of children never consumed roots and tubers.

Consumption of other vegetables was found weekly twice in 48 per cent of children. Twenty one per cent of children consumed it once in a week and 17 per cent of children consumed it thrice in a week. Three per cent children never consumed it and in 7 per cent of children, the consumption was found to be occasional. Only 4 per cent children consumed it daily.

Forty seven per cent of the preschool children consumed fruits, once in a week. Nineteen per cent of them consumed it twice and 18 per cent consumed thrice in a week. Sixteen per cent of children consumed it only occasionally.

Consumption of milk was found to be weekly five times in 64 per cent of children. In 36 per cent of children, daily consumption of milk was observed.

Meat is an occasional food item for all children. Fish was consumed daily by 61 per cent of children. Thirty nine per cent of children consumed fish five times per week. Forty nine per cent of children consumed egg as an occasional food item. Twenty eight children consumed it once in a week and 16 per cent consumed egg twice in a week. Seven per cent children consumed it thrice in a week. Thirty three per cent of children consumed bakery products as an occasional food item. Thirty one per cent children consumed it once in a week and 25 per cent children consumed it twice in a week. Consumption of bakery products was found to be thrice in a week in 11 per cent of children.

Supplementary feeding programme operating in the locality was found to be beneficial for all families. The major supplementary feeding programme in the locality is ICDS. All children got supplementary foods, immunization and non formal education from ICDS. All children liked foods provided from the anganwadi. All families were found to be satisfied with the present programme in their locality and the preschool children were occupied in the anganwadi for the whole day.

4.3. Nutritional status of the preschool children

a) Anthropometric measurements

Mean heights and weights of preschool children are compared with ICMR standards (1990) and are presented in Table 27.

Table 27. Mean heights and weights of preschool children in comparison with ICMR* standards

Height (cm)	Mean height \pm SD		ICMR standards	
	Boys	Girls	Boys	Girls
	93.7619 \pm 6.28	94.98 \pm 6.44	109.1	108.2
Weight (kg)	Mean weight \pm SD		ICMR standards	
	13.24 \pm 2.09	12.9 \pm 1.83	17.7	17.8

(ICMR, 1990)

As revealed from the above table the mean heights and weights of both male and female children were found to be low when compared to Indian standards.

Student's test values for comparison of heights and weights of children with Indian standards are carried out and presented in Table 27(a).

Table 27(a). Comparison of mean height and weight of boys and girls with ICMR standards.

Measurements	't' values	
	Boys	Girls
Heights	15.83**	15.642**
Weights	13.828**	18.737**

** Significant at 1% level

The statistical analysis revealed that there was significant difference in height and weight in comparison with Indian standards.

Prevalence of malnutrition among children based on height for age according to Waterlow (1972) is presented in Table 28 and also in Fig. 12

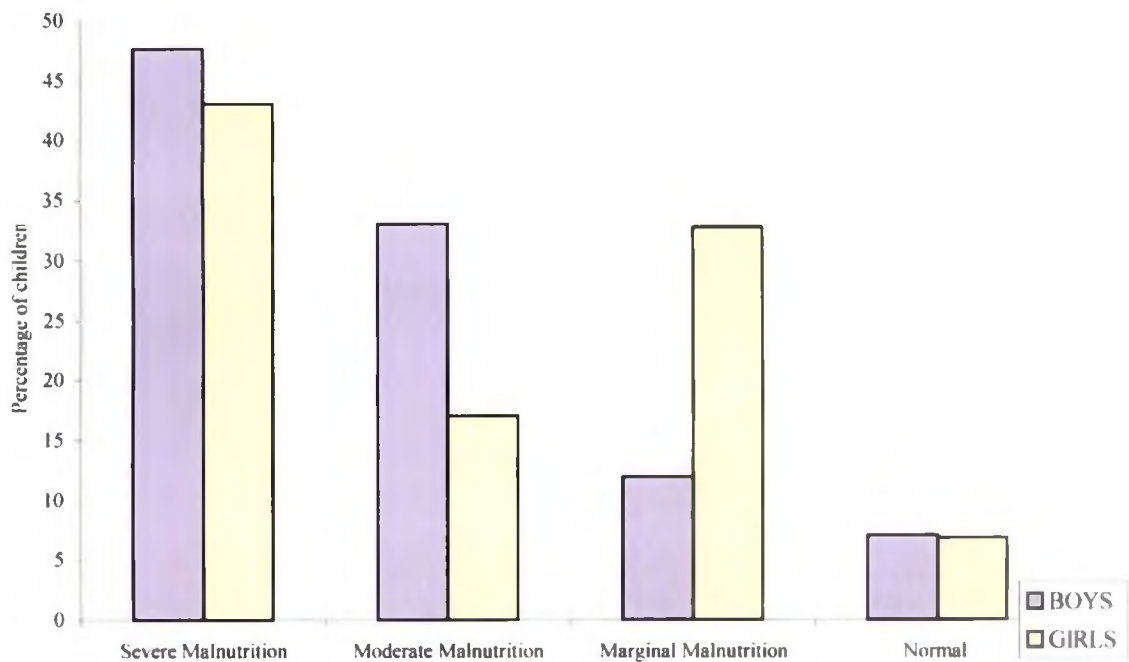


Fig.12 Prevalence of malnutrition according to Waterlow's classification (height for age)

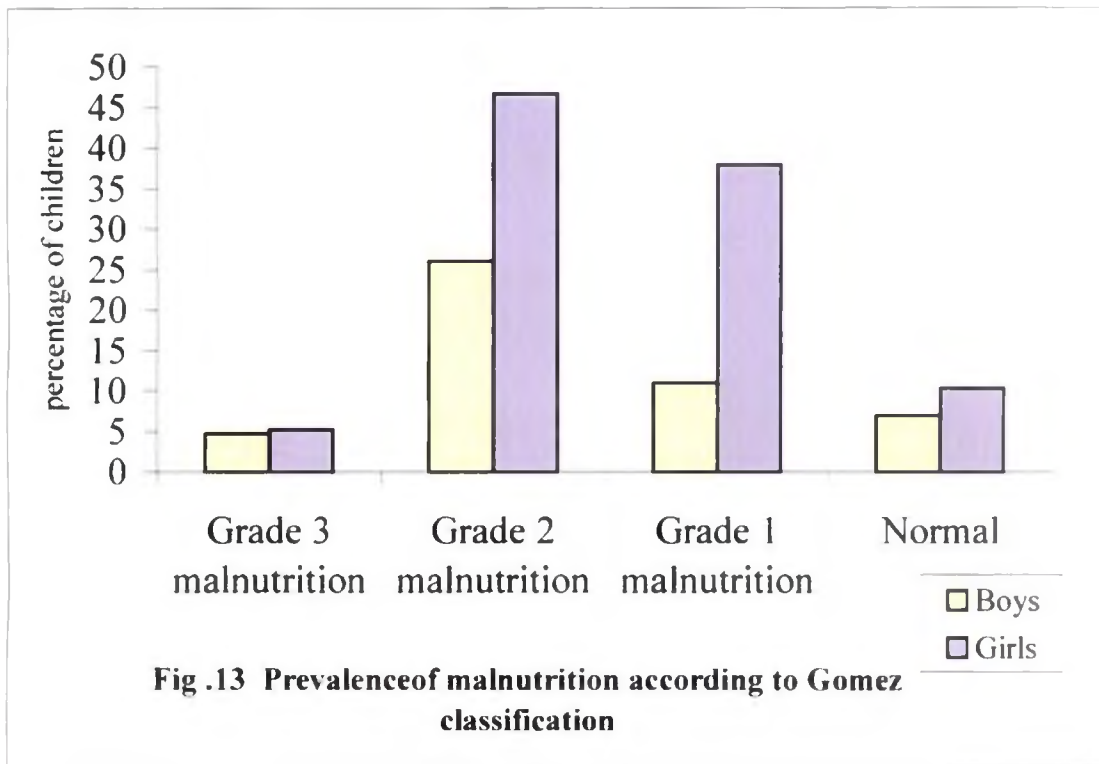
Table 28. Prevalence of malnutrition among preschool children (Height for age - Waterlows classification)

Waterlow's classification	Boys (n=42)		Girls (n=58)	
	Number	Percentage	Number	Percentage
<85% of standard (Severe malnutrition)	20	47.6	25	43.2
85-90% of standard (Moderate)	14	33.3	10	17.3
90-85% of standard (Marginal)	5	11.9	19	32.7
95% of standard (Normal)	3	7.2	4	6.8

Distribution of children as per height for age revealed that 47.6 per cent of boys and 43.2 per cent of girls were having heights below 85 per cent of their standard height. Prevalence of moderate malnutrition with respect to height for age was found to be more among boys (33.3%) when compared to girls (17.3%). Among girls 32.7 per cent and among boys 11.9% showed marginal malnutrition with respect to their height for age. Only 6.8 per cent girls and 7 per cent boys were found to be normal having heights above 95 per cent of the standard height. Prevalence of malnutrition based on weight for age according to Gomez classification is calculated and is presented in Table 29 and in Fig. 13

Table: 29. Distribution of children by nutritional status (weight for age - Gomez classification (1956))

Gomez classification	Boys (n=42)		Girls (n=58)	
	Number	Percentage	Number	Percentage
<60% of standard (Grade III malnutrition)	2	4.8	3	5.2
61-75% of standard (Grade II malnutrition)	26	61.9	27	46.6
76-90% of standard (Grade I malnutrition)	11	26.2	22	37.9
90% of standard (normal)	3	7.1	6	10.3



As revealed in the above table, 5.2 per cent of girls and 4.8 per cent boys were under Grade III malnutrition having body weights below 60 per cent of their standard weights. About 61.9 per cent boys and 46.6 per cent of girls came under Grade II malnutrition and 26.2 per cent of boys and 37.9 per cent of girls were under Grade I malnutrition. Only 7.1 per cent of boys and 10.3 per cent of girls were found to be normal with regard to their body weight for age.

Prevalence of malnutrition as per weight/height² ratio according to the classification given by Rao and Singh (1970) was calculated and is presented in Table 30 and Fig.14

Table: 30. Distribution of children by nutritional status (weight/height² - Rao and Singh (1970)

(n = 100)

Classification	Boys		Girls	
	Number	Percentage	Number	Percentage
Normal (>0.0015)	18	42.9	19	32.8
Moderate Malnutrition	19	45.2	31	53.4
Under nutrition (<0.0013)	5	11.9	8	13.8
Total	42	100	58	100

It has found that 42.7 per cent of boys and 32.8 girls were normal. About 45.2 per cent of boys and 53.4 per cent girls came under moderate malnutrition. Only 11.9 per cent boys and 13.8 per cent girls came under nutrition.

Head, chest and mid upper arm circumference (MUAC) were taken and the mean values were compared with NFI standards and are presented in Table 31

Table: 31. Comparison of mean head, chest and MUAC with NFI standards

Measurement	NFI standards		Mean values \pm SD	
	Boys	Girls	Boys	Girls
Head circumference (cm)	50	49.1	48.37 \pm 1.34	47.27 \pm 4.27
Chest circumference (cm)	53.1	52.1	50.11 \pm 2.47	49.38 \pm 2.56
MUAC (cm)	16	16	13.83 \pm 0.854	13.87 \pm 1.3359

As revealed in the above table, mean values of head circumference when compared to NFI standards found that it was lower than the standard value.

Regarding chest circumference, it was found that for both boys and girls, the mean values were lower than the standard values.

Student's 't' test for head and chest measurements with Indian standards were carried out and are presented in Table 32

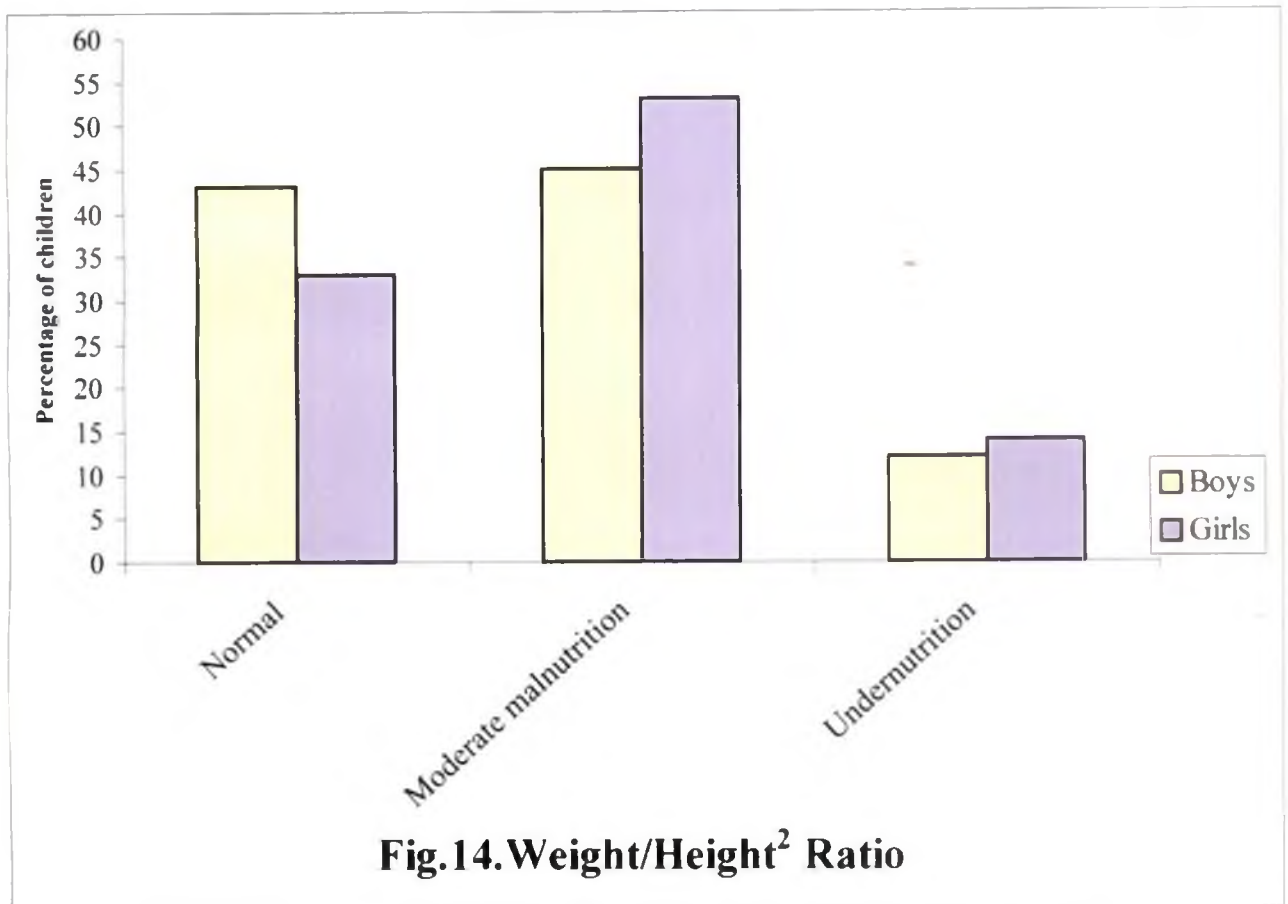
Table: 32. Student's 't' values of mean Head Circumference, Chest Circumference and MUAC

Measurements	't' values	
	Boys	Girls
Head circumference	7.833**	3.27**
Chest circumference	7.844**	8.096**
MUAC	19.1290**	10.185**

** Significant at 1% level

From table 32, it was found that the difference in the head and chest measurements with their corresponding standards were statistically significant.

Prevalence of malnutrition as per head/chest circumference ratio according to Gopaldas (1987) was worked out and is presented in Table 33 and also in Fig. 15



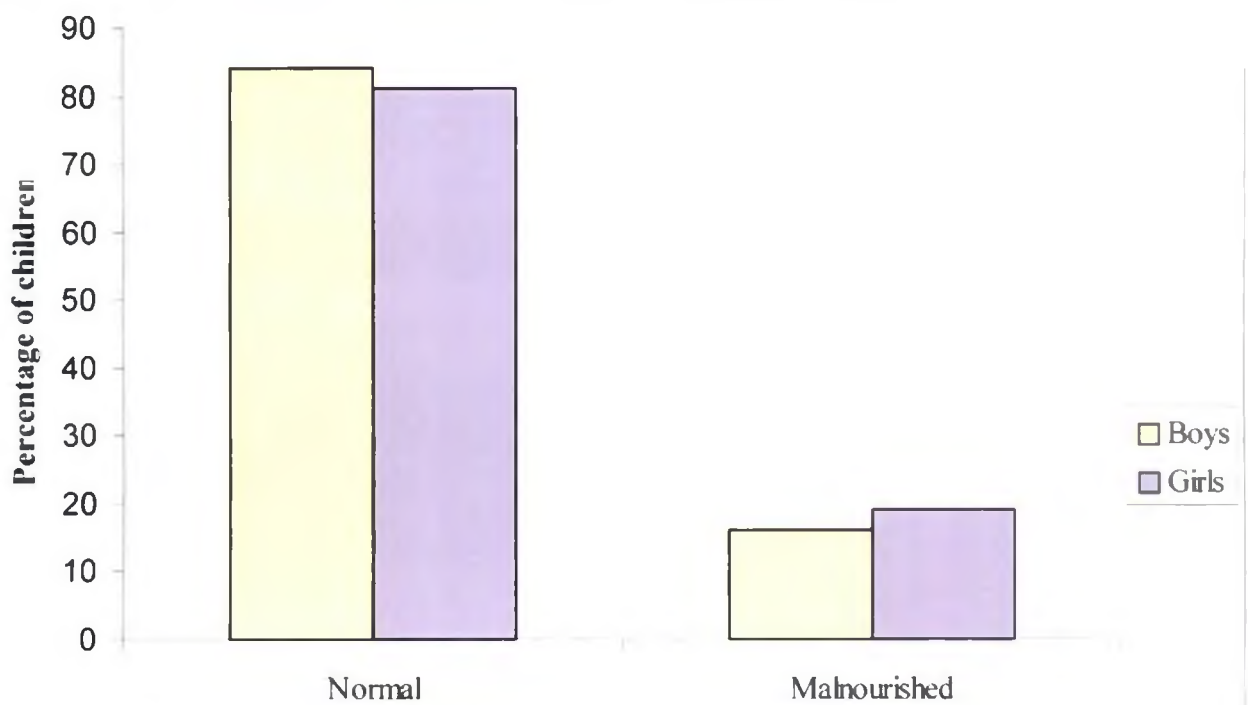


Fig.15 Distribution of children according to head/chest circumference ratio

Table: 33. Prevalence of malnutrition (Head/chest ratio - Gopaldas (1987))

Anthropometric ratio	Classification	Boys (n=42)		Girls (n=58)	
		Number	Percentage	Number	Percentage
Head/chest circumference	(<1) Normal	37	88.1	47	81
	(≥1) malnourished	5	11.9	11	19

As per the above table, majority (88.1%) of the boys were found to be normal, and 11.6 per cent of them were found to be malnourished. Among girls 81% were normal and 19 % were malnourished. Observations on the MUAC of the preschool children were interpreted according to Gopaldas (1987) and are presented in Table: 34 and also in Fig.16

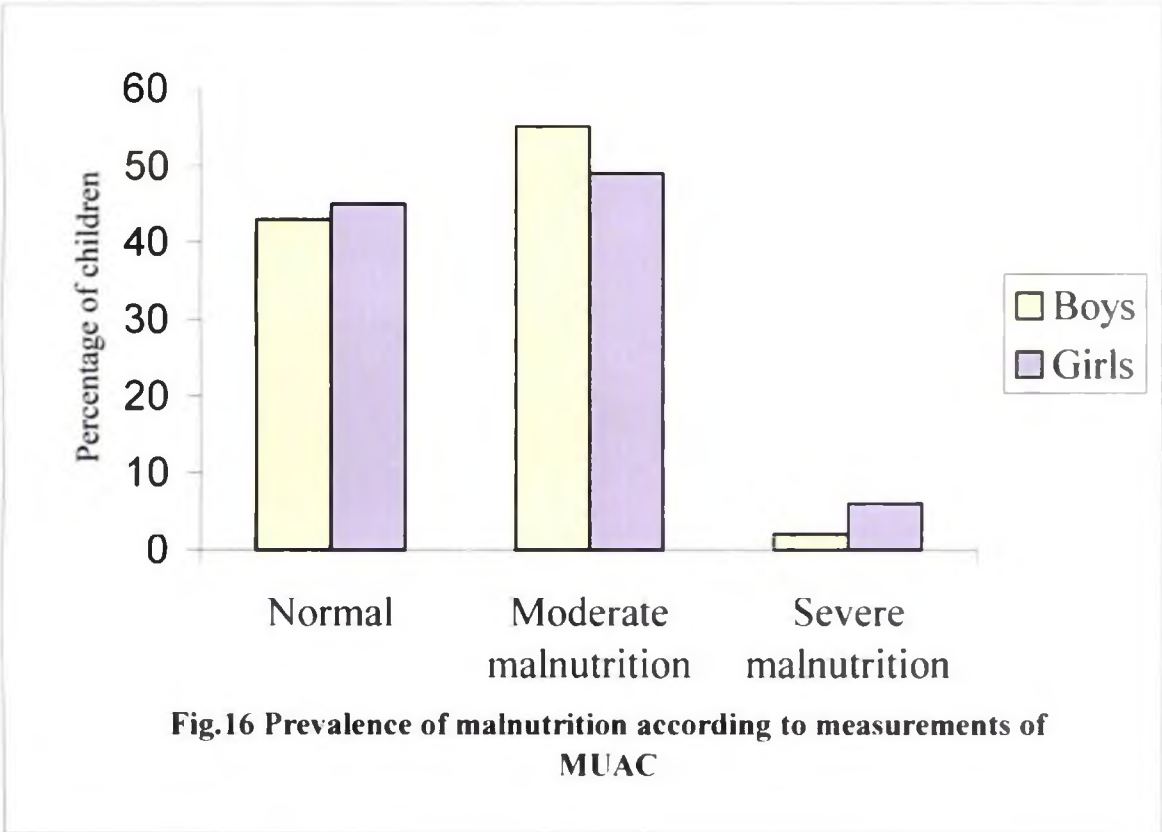


Table 34. Distribution of children by nutritional status (MUAC - Gopaldas (1987))

Classification of anthropometric measurements	Boys (n=42)		Girls(n=58)	
	Number	Percentage	Number	Percentage
MUAC (cm)				
Normal (> 13.5)	18	42.9	27	46.6
Moderate malnutrition (12.5-13.5)	23	54.8	26	44.8
Severe malnutrition (<12.5)	1	2.3	5	8.6

From the above table, it was found that 54.8 per cent of boys and 44.8 per cent of girls came under moderate malnutrition. Only 42.9 per cent of boys and 46.6 per cent of girls were found normal and 2.3 per cent of boys and 8.6 per cent of girls were found to be under severe malnutrition.

b) Clinical examination

Clinical examination was conducted in a sub sample of 50 preschool children and the results presented in table: 35

Table: 35. Details of clinical symptom observed among preschool children

Details of clinical symptom	Percentage of children
Present	84(42)
Absent	16(8)
Types of the clinical symptoms	
Pigmentation of eyes	14(6)
Dry conjunctiva	2(1)
Dental carries (slight)	36(15)
Dental carries (marked)	24(10)
Chalky teeth	5(2)
Phrynoderma	7(3)
Skin infections	12(5)
Total	100

(Figures in parenthesis indicate number of children)



Plate no. 8. An advanced stage of vitamin A deficiency observed

Among the children with clinical symptoms 14 per cent of the children had pigmentation in eye and dry conjunctiva was observed in 2 per cent. An advanced stage of this is shown in plate.no.8. Phrynoderma was observed in 7 percent children among 5 per cent of children fluorosis manifested as chalky teeth was observed, and among 24 per cent of preschool children, marked dental carries was observed. Among 36 per cent of children slight dental caries was observed.

c) Food weighment survey

Actual food and nutrient intake of preschool children was assessed by conducting a one day food weighment survey in a sub sample (20 preschool children) and the results are presented in the following tables.

Table: 36 presents the mean food intake of both boys and girls compared with RDA, which is also presented in Fig.17

Table: 36. Mean food intake of preschool children in comparison with RDA (g/day)

Boys (n=8) : Girls (n=12)

Food item	RDA (g)	Boys (g)	% of RDA	't' value	Girls (g)	% of RDA	't' value
Cereals	270	165	61	18.027*	145	54	11.287**
Pulses	20	16	80	1.179 ^{NS}	22	110	0.199 ^{NS}
Green leafy Vegetables	50	0	0	0	0	0	0
Other vegetables	30	13.8	46	3.395**	8	27	6.867**
Roots and Tubers	20	9.4	47	4.315**	11	55	2.23*
Fruits	50	7	14	12.849**	4	8	11.059**
Milk	250	200	80	173.2**	200	80	141.4**
Fish/meat	30	28	93	1.054 ^{NS}	28	93	0.493 ^{NS}
Fats and oils	30	24	80	4.733**	21	70	2.045**
Sugar	40	31	78	21.04**	32	80	21.04**

* Significant at 5% level

** Significant at 1% level

NS - Not significant

RDA - Recommended Dietary Allowances for Indians (ICMR, 1989)

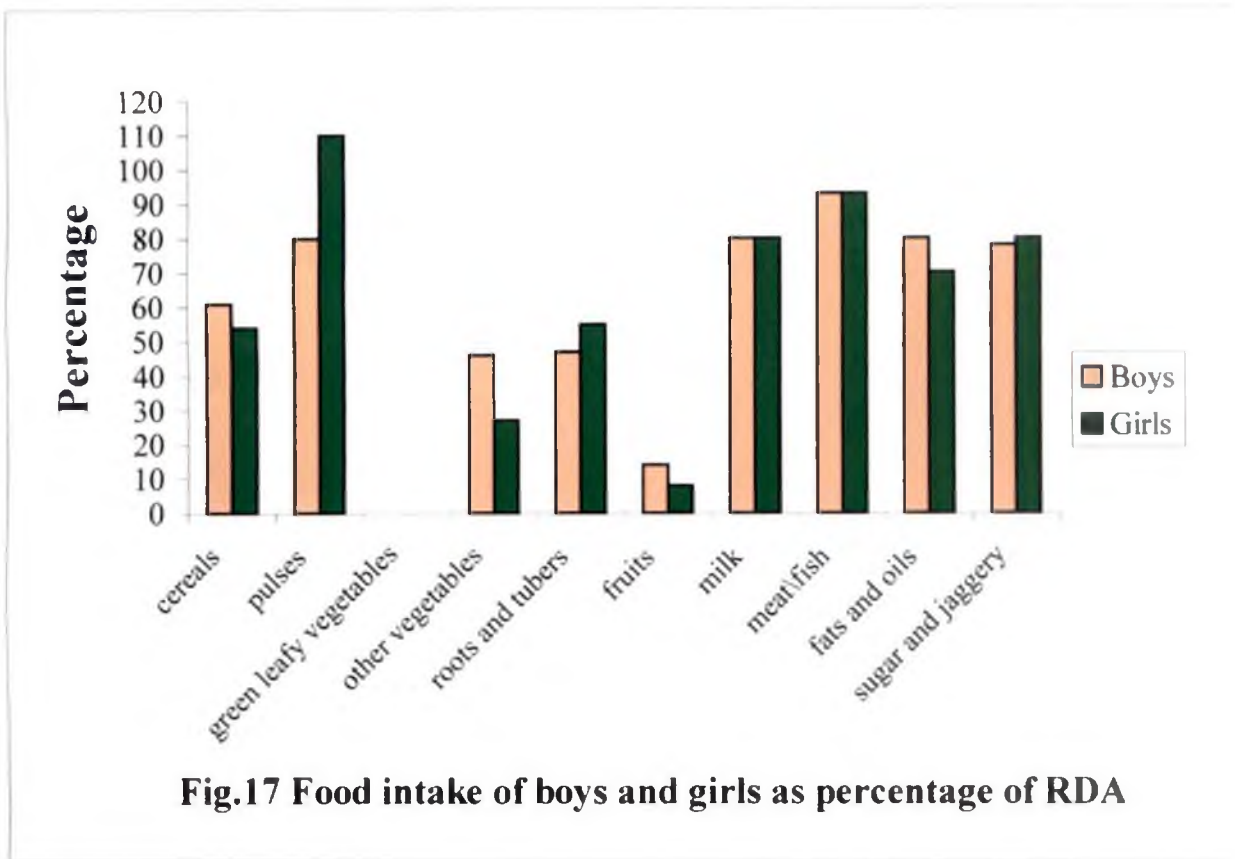


Table: 36 revealed that cereal consumption was only 61 per cent of the RDA in the case of boys and 54 per cent in the case of girls. This was found to be significantly low when compared to RDA. Regarding consumption of pulses, 80 per cent of the RDA was met by boys and the consumption by girls was above the RDA (110%) significant variation from RDA was not observed regarding pulse consumption. During the food weighing survey, it was observed that none of the families used green leafy vegetables. The consumption of other vegetables was 46 per cent of RDA in the case of boys and only 27 per cent in the case of girls, which was significantly low when compared to RDA. Regarding the consumption of roots and tubers, only 47 per cent of RDA was met by the boys and 55 per cent of RDA was met by girls. Consumption of fruits was below 20 per cent of RDA in both cases. Consumption of milk was 80 per cent of RDA in both boys and girls consumption of roots and tubers, fruits and milk was found to be significantly low in both boys and girls. Fish consumption was 93 per cent of RDA in both groups, which showed no significant variation from RDA. Consumption of fats and oils and sugar was in a range of 70-80 per cent of RDA in both groups. Consumption of all the food groups by both boys and girls were found to be significantly low when compared to RDA, except for pulses and fish/meat, which is shown in Fig. 17

Mean nutrient intake of both boys and girls were calculated using the food composition table and the results are presented in Table: 37 and also in fig. 18

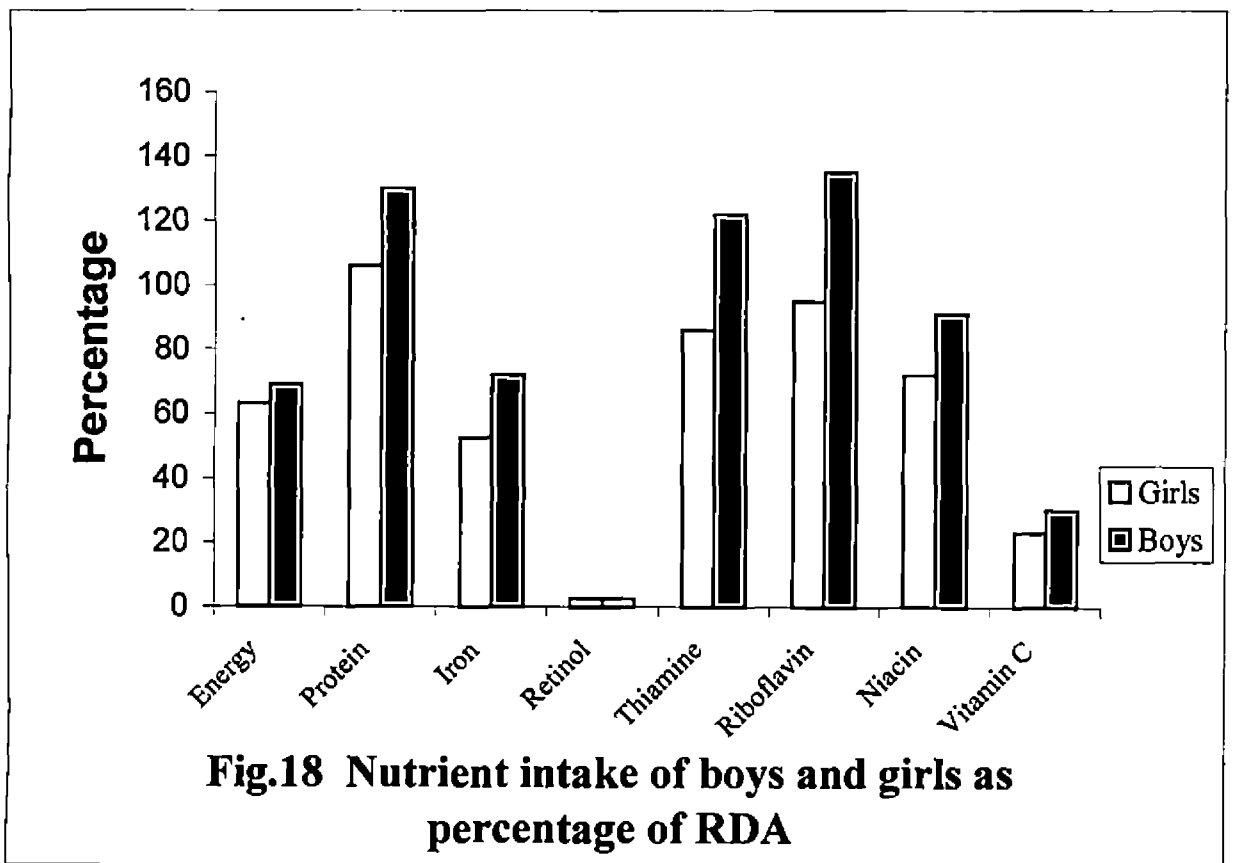
Table: 37. Mean nutrient intake of boys and girls in comparison with RDA:

Nutrients	Boys				Girls		
	RDA	Intake	% of RDA	't' value	Intake	% of RDA	't' value
Energy (Kcal)	1690	1159	69	0.4654 ^{NS}	1072	63	9.98**
Protein (g)	30	39	130	3.081*	32	106	0.871 ^{NS}
Calcium (mg)	400	331	83	5.69**	314	78	36.9**
Iron (mg)	18	12.87	72	0.4637 ^{NS}	4.48	53.6	3.488**
Retinol (µg)	400	118	30	205.4**	120	30	339.02**
Thiamine (mg)	0.9	1.1	122	1.080 ^{NS}	0.779	86	0.796 ^{NS}
Riboflavin (mg)	1	1.35	135	4.352**	1.0	95	0.0965 ^{NS}
Niacin (mg)	11	10	91	1.605 ^{NS}	7.87	72	2.834*
Vitamin C (mg)	40	12	30	8.068**	9.3	23	11.804**

* Significant at 5% level

** Significant at 1% level

NS - Not significant



The energy intake of boys was found to be 69 per cent of RDA which made no significant difference from RDA but for girls it was 63 per cent of RDA which made a significant difference from RDA. Protein intake was found to be 130 per cent of RDA for boys and 106 per cent of RDA for girls. The intake of protein was significantly high for boys, but for girls the high intake made no significant difference from RDA. Intake of calcium was 83 per cent in the case of boys and 78 per cent in the case of girls and this was found to be significant when compared to RDA. Iron intake was found to be 72 per cent of RDA in boys which was not statistically different from RDA but for girls the intake was found to be 53.6 per cent which was significantly low when compared to RDA. In both boys and girls retinol intake was only 30 per cent of RDA and it was significantly low.

The intake of thiamine and riboflavin was 122 per cent and 135 per cent of RDA respectively in boys and in girls it was 86 per cent and 95 per cent respectively. The intake of riboflavin in boys was significantly high but for girls the difference from RDA is not significant. With regard to niacin the intake was 91 per cent of RDA in boys the difference being not significant but in girls the intake was found to be only 72 per cent of RDA which was found to be significantly low when compared to RDA. Vitamin C intake was found to be significantly low in both boys (30% of RDA) and girls (23% of RDA).

Multiple regression of weight on major nutrients like energy, protein, calcium, iron vitamin A thiamine, riboflavin, niacin, and vitamin C were worked out and the parametric estimate of the model are given in table: 39

Table: 39 Multiple regression of weight on major nutrients

Variables	Regression coefficient	Student 't' value	Probability
Energy	3.3433	2.420	0.023
Protein	1.3253	2.457	0.024
Calcium	-1.1250	-1.213	0.174
Iron	1.3225	1.099	0.285
Vitamin A	-4.5659	-1.757	0.095
Thiamine	-8.9356	-0.33	0.974
Riboflavin	-1.0680	-1.414	0.174
Niacin	-2.2022	-1.255	0.255
Vitamin C	-2.6532	-0.722	0.479

Intercept = 11.820322

$R^2 = 0.554$

The coefficient of determination is 0.554 implying, that 55.4 per cent of variation in weight is determined by the major nutrients. The regression was found to be significant only in the case of energy and protein.



DISCUSSION

5.DISCUSSION

A critical and brief discussion of the major findings of the study are presented in this chapter.

5.1 Demographic variables

In the present study, it was found that majority (67%) of the house holds followed joint family system. This is in line with the findings of pullikkottil(1993) and Mathen (1998) who revealed that most of the rural households of Malappuram and Thrissur districts followed joint family system.

In contradictory to this, Shyna (1996), Jose (1998) and Jyothi (2003) observed that majority of agricultural labourers of Thrissur and Palakkad district followed nuclear family system. Similar results were also obtained by Karuna (1993) in a study among fisherwomen in Thiruvananthapuram district.

Family size is a major factor influencing the nutritional status of children. According to Tuncbilek *et. al* (1995), large families are more prone to have malnourished children. In the present study, it was found that thirty four per cent of the families had large family size constituting of more than 5 adult members. This finding is in line with the study by Usha *et al.* (1990) who reported that most of the labour families in Thiruvananthapuram district of Kerala had a large family size consisting of five to nine adult members. Shatrugna *et al.* (1993) and Swami *et al.* (2001) also reported larger families in the rural households of Hyderabad and Karnataka. Karuna (1993) in her studies on fishermen community in Thiruvananthapuram revealed that majority of the families were medium sized with less than five adult members.

About 15 per cent of the families were having only one child. In Kerala, small family norm is getting high practice even among the low income groups as established by NNMB studies (1989) and Gopalan (1988). This study agrees with their results, which revealed that about 50 per cent of the fishermen families had only 2 children.

In the present study, it was observed that majority of the families (83%) were Hindus, who belonged to Dheevera community (94%) and scheduled casts (6%). This is in line with the studies by Udayabanu (1990) who reported that majority of fishermen in Kerala belonged to Dheevera community (Araya and Mukkuva). Indeed, at the state level all the Hindu fishing castes have jointed into a

federal body called Akhila Kerala Dheevara Sabha an organization which aims at safeguarding the social, economic and political interests of these castes.

Education plays an important role in determining how resources are being utilised to secure food and care and health of children (Verma *et al.*, 1996). One of the indices ordinarily used for ascertaining the position of a group in the socio economic scale is the percent of literates in the population. Since fishermen as a group are known to be backward it would be expected that their literacy rate would be lower than among the populace as a whole. This however is not quite borne out by the information available with respect to the fishing population in the study area. The present study revealed that majority of the parents had up to high school education and none of them were found to be illiterates. That being so, it is reasonable to say that the literacy rate for the fisher community is not lower than for the total population. High educational standards is a very special feature of Kerala. According to Manorama year book (2001), literacy rate in Kerala is 90.02 per cent with a female literacy of 82.93 per cent. The present study also indicated a high education level for mothers when compared to father's educational level. This is very important since the level of education of mothers according to UNICEF (1990) affected the nutritional status of young children. Similar results were also observed by Shyna (1996), Udaya (1996) and Jose (1998) among agricultural labour families in Thrissur district of Kerala. But studies by Sujatha (1990) among women in unorganised sector in Thiruvananthapuram and Smitha (1999) among agricultural labour women in Thrissur district indicated high educational level of men than women.

In a report published by Government of Kerala (1990) it has been stated that in the marine sector of Kerala, 61.94 per cent of the fishermen were engaged in fishing and the rest in fish marketing and other related activities. In the present study also, most of the head of the families (82%) were involved in fishing and 14 per cent were involved in fish vending. In a few families (4%) the major occupation of the head of the families were works related to fishing like icing of fish, porter etc. It is observed that occupation of marine fishing is subject to relatively higher levels of risks. Many cases of accidents, deaths and loss of property are being reported every year. In the present study also most of them go fishing at sea and are exposed to greater than average risks to their fishing assets and their lives.

The economic status of the family is reflected by family income, number of earning members of the family and monthly expenditure pattern (Wood and Baylock, 1982). In the present study, monthly income for majority of the families (71%) ranged from Rs.1501-Rs. 3000. This is in line with the studies by Kurien and Achari (1988) who found that majority of fishermen of Thrissur district have monthly income of Rs.1000-3000.

Jessy (1989) also reported that majority of fisher folk of Kerala have monthly income less than Rs.3000. Karuna (1993) also observed a mean monthly income of below Rs.3000 among fishermen community.

The dowry system has casted an impossible financial burden for the community. In majority of the families studied (97%) they have received dowry in the form of gold (10-25 sovereigns) and as cash (Rs.1000-Rs.5000).

It is the right of every human being to have proper housing, sanitation, environmental hygiene and drinking water supply. However in many developing countries it still remains a dream. In this study on fishermen community, living conditions of the families revealed that most of the families (92%) had their own houses with 3-4 rooms (78%). The roof was tiled (53%) and thatched (37%) with brick (66%) or thatched walls (34%) and a separate kitchen (77%). As observed drinking water source for most of the families (67%) was common bore wells with their own hand pumps. About 22 per cent of the families had their own well as a source of drinking water. Environmental hygiene was poor with no proper drainage system. Most of the houses (91%) had own latrine.

Regarding other facilities in the house more than 50 per cent of the families had electric connections in their houses. Majority of the families (41%) resorted to public conveyance as their means of transportation. Only 18 per cent of the families were found to possess ordinary small boats to go for fishing and 5 per cent had their own catamarine. Karuna (1993) in her study among fisher women in Thiruvananthapuram district observed that 32 per cent of families owned either a catermarine or a small boat to go for fishing. Possessing a boat is considered to be very prestigious among the community, as they need not depend on others to go for fishing. Those who do not have a boat have to depend on some boat owners for their daily earnings.

Possession of a radio was found in 47 per cent of the families and 18 per cent had television which was their two main sources of information as well as

recreation. The families which do not have any of the information sources (35%) depended on their neighbors for this purpose. It is the lower quality of life (on the average) and the high occupational risk both to human and productive assets, which set marine fishing communities apart from the other occupational groupings in Kerala. It is also for this reason that social security measures attain paramount importance for them. One of the paramount reasons for the poor quality of life and the substandard condition of habitat of the marine fishing communities in Kerala state is the crowding of the whole community on a narrow strip of land along the length of Kerala's coastline. Every fisherman prefers to live on the sea front near the point where he lands his craft and from where he can observe the sea. As a result the population density in marine fishing villages was around 2652 persons/square kilometer. This is in comparable to the state figure of 742/square kilometer, which is already one of the highest in the country (Kurien and Paul, 2001).

A large section of these small households were built on land even beyond the cadastral survey (land beyond the cadastral survey on the sea front is under central government jurisdiction and cannot be assigned for private use). Consequently they are always prone to the perennial risk of their houses being "eaten by the monsoon sea". In the present study also 37 per cent of the houses had thatched roof and 34 per cent with thatched walls. When households have no land and have to erect a shelter on public property, it is but natural that they have to opt for some sort of temporary thatched roof and wall structure. Thatched roofing is very common in Kerala, but thatched walls characterise the housing of the very poor. As reported by Kurien (1995) compared to the state level, the basic amenities related to housing were also at far lower standards in the fishing villages.

One difficulty observed with toilet facilities in coastal villages is that septic tanks do not function effectively because of the high water level in the sandy soil and the risk this entails of leaching of sewage into wells used for drinking water. This may be the root of the much reported poor health conditions in fishing communities. In the present study also about 91 per cent of families had their own latrines.

Majority of the families (82%) were members in matsyafed and they were getting benefits from this organisation. Matsyafed had initiated 10 social security schemes. The coverage included housing, sanitation, alternative employment, education, training and accident insurance.

Among female members, 29 per cent were actively involved in the activities of local mahila samajams. They were involved in income generating cottage industries like food processing, umbrella making etc. as a part of 'Kudumbasree' scheme. Udaya (1996) in her study among farm women in Thrissur district also observed their active participation in mahila samajams and other income generating activities. Perhaps the educational level of women may be the motivation for such active involvement of women in income generating activities.

Monthly expenditure pattern of the families indicated that majority of the families (65%) spent 60-80 per cent of their monthly income for food. Similar findings were observed in the study conducted by Karuna (1993) among fishermen of Thiruvananthapuram district who spent 65-75 per cent of their monthly income for food. Generally, higher the level of income, lower the percentage of income spent on food and vice-versa. This study is in line with the study conducted by Rai and Sarup (1995) who found that in Kerala 60-80 percent of the total income was spent for food by the rural low income families while 45-58 per cent was spent on food by urban families. Usha *et al.* (1990), Mathen (1998), Smitha (1999) and Jyothi (2003) reported that majority of the labourer households in different segments of rural Kerala, spent 50-70 per cent of their income on food.

Majority of the families spent less than 5 per cent of their income on clothing, shelter, education, entertainment, health and for transportation. Similar expenditure pattern was observed by Udaya (1996), Jose (1998), Mathen (1998) and Devi (2000) in their studies in rural low income families in Thrissur district.

Savings from the income was observed only in 49 per cent of the fishermen families. Karuna (1993) also reported that majority of fishermen families did not have savings. Since the monthly income of majority of the families ranged between Rs.1500-3000, they found it very difficult to save money and also most of them have to repay their loans taken during their lean periods. But in contrast to this result, studies by Shyna (1996), Udaya (1996) and Smitha (1999), in agricultural labourer families of Thrissur district revealed that even in spite of their low income majority of the families had savings from their income. This may be due to the fact that agricultural labourers had job for 20-25 days in a month whereas for fishermen the number of working days is highly fluctuating during adverse conditions.

Results of the present study also highlighted that majority of the families have considerable amount of loans, which have to be paid from their monthly

income. Majority of them borrowed from private agencies and moneylenders to meet their daily household expenses, medical treatment etc. during off seasons. Karuna (1993) observed that 92 per cent of the fishermen households were under debts. A major reason for such a situation was the seasonality of the occupation.

The prevalence of certain unhealthy consumption habits revealed that 47 per cent of males were alcoholic addicts and 59 per cent of them were heavy smokers especially 'beedies'. Chewing tobacco with pan or betelnut was observed in 25 per cent and a small number of people do chew tobacco only. Inhalation of fine tobacco powder - "Sniff", was another type of habit. It may be argued that especially in the case of alcohol consumption, the percentage reported is found to be an under estimate of the real situation, since it is not a socially accepted habit in our society. But it should be noted that even this under estimate, constitute around 47 per cent, a fact which augurs ill for the status of health of this male population. George and Domi (2002) reported that majority of fishermen of Thiruvananthapuram district were addicts to alcohol. Thackur (1999) also identified unhealthy habits like alcoholism as a major cause for the economic backwardness among this community. Selvaraj *et al.* (1987) and Karuna (1993) also observed that majority of male members of the fishing households suffered from social problems of alcoholism and this habit is a major cause of the socio-economic backwardness of the community.

5.2 Details regarding the Index child

Out of the 100 preschool children selected for the study, 42 per cent of children were boys and 58 per cent were girls. The gender variation observed among the preschool children in the fishing community was not statistically significant. Fifty percent of the children (50%) were found to be of the 1st birth order and another fifty per cent of them had 2-3 years difference with their siblings. Increasing birth order is associated with poor nutritional status due to the fact that as the number of children increases in the family care given to each child will be decreased.

Birth weight of a child is the fundamental basis on which one yields an accurate picture about his prenatal nutrition level and his development pattern. The present study indicated that majority of preschool children had birth weights ranging between 2-3 kg. Majority of the children (92%) had followed their complete immunisation schedule and partial immunisation was observed in 8 per cent of children. The literacy level of mothers have its influence on their awareness about its

importance and also the easily reachable health care facilities and programmes like ICDS might have promoted this wide immunization coverage among their children. Morbidity estimates based on recall can be very misleading. Much of the illness reported depends on the perception of the respondent. Perception about what constitutes illness can vary according to predominant cultural and social mores of each society. In the present study also the occurrence of various infectious diseases revealed that only a very small percent of children had diarrhoea (5%) measles (4%), tuberculosis (9%) and respiratory diseases (9%). Fever was the most common illness reported (12%). It may be due to various infectious agents. It was reported that 60 per cent children do not have any type of illness for the past one year.

The same health indices of Kerala children were observed by Kutty (1990) and Shyna (1996) who revealed that Kerala occupied a unique position in world's public health map. In the economic development, though Kerala occupies a place inferior to other states, the health status of Keralites is much better and it is comparable to western industrialised countries. Studies by Shyna (1996) and Mathen (1998) also support this statement. Health care facilities provided by the primary health centers of the localities were utilized by 95 per cent of the families for treatment. The participation of preschool children in the ICDS programme was found to be satisfactory.

5.3 Food habits

All the families were habitual non vegetarians with a pattern of three major meals per day.

Frequency of use of different foodstuffs in the diet mainly depends upon the economic status of the families and the local availability of food items. The present study revealed that food groups like cereals, fats and oils and sugar were consumed daily by all the families. This is mainly because the staple food is rice and the main source of fats and oil is coconut oil, which is used for seasoning of food preparations. Source of sugar is the coffee or tea they consumed daily. Regular consumption of pulses was not observed and was found to be twice or thrice a week in many of the families. Udaya (1996), Smitha (1999) and Jyothi (2003) also observed pulses as a medium frequently consumed food item in the low income groups of rural Kerala. Green leafy vegetables were consumed only occasionally by all the families. Shyna (1996) also reported a low consumption of green leafy vegetables among the families of different communities in Thrissur district. This

may be due to the lack of awareness about the nutritional importance of this cheap and easily available food group.

Frequent consumption of roots and tubers was observed among fishing community. This may be due to the low price and easy availability of the roots and tubers like potato, tapioca, carrot, beetroot etc. When discussed with the women in the family they said that they usually prepared tapioca combined with fish and is consumed as a main dish.

This is supported by the findings of Lina and Reddy (1989) and Udaya (1996) who reported that the dietary pattern of rural households in Kerala is mainly based on frequent consumption of tapioca and fish.

Regarding the consumption of other vegetables, it was found that about 66 per cent of the families consumed this food group only once or twice in a week. Karuna (1993) also reported that fishermen families rarely included vegetables in their daily diet. Majority of families consumed fruits as an occasional food item. Karuna (1993) also reported that the frequency of consumption of fruits was very low among fishermen community. Only 36 per cent of the families consumed milk daily and that also the main source was from tea or coffee. Among non vegetarian foods, invariably fish was the most frequently consumed food. They obtained fish either free of cost or for a negligible price. Karuna (1993) also observed that daily diet of fishermen community consisted mainly of rice and fish. But in contrast, Shyna (1996) and Jyothe (2003) found that consumption of fish is less frequent in agricultural labourer families due to its high cost. Other non vegetarian foods like meat and eggs were consumed only occasionally.

Processed foods like bread, pappads, vattals, chips, biscuits etc. were consumed about twice in a week by 37 per cent of families. This is in line with the study by Shaw *et al.* (1993) who reported that the increase in the consumption of processed foods among Indians appeared to be due to the easy availability of these products in rural markets.

Regarding the pattern of expenditure on various food groups more than 50 per cent of the families spent 30 to 40 per cent of their food expenditure on cereals. So the major expenditure incurred by the families was mainly for the staple rice. This is in line with the findings of Panicker (1979), Sujatha (1990), Jayanthakumari (1993), Ranganathan (1993), Jose (1998) and Smitha (1999) among different low income families in rural Kerala.

Expenditure on food items like pulses, green leafy vegetables, roots and tubers, other vegetables, fruits, milk, meat, egg, nuts and oil seeds, spices and condiments, sugar, oil etc. for majority of the families were found to be less than 20 per cent of the food expenditure. Karuna (1993) also observed similar trends of food expenditure among fishermen community in Thiruvananthapuram.

Food prepared during different occasions differed. For celebrating birthdays, majority of families prepared payasam. Marriage in the family was also celebrated with vegetarian 'Sadyas'. But during the occasion of a death in the family, simple dishes like 'Uppuma', 'Idli', Rice with 'Chammanthi' etc. were prepared, since it was insisted by the community as a mark of mourning. They also prepared vegetarian dishes during festivals. This trend of consuming vegetarian dishes during special occasions may be because majority of the families were Hindus, with strong religious beliefs. Food items prepared for functions will differ depending on the religion, caste, tradition and income.

Food processing at home level was not very familiar among the families and only very few families prepared pickles and dried fish at home. Even though fish is the most available food item, they were not interested in its processing methods like pickling, drying etc. the reason being they preferred fresh fish than any of its processed products. Modification of the regular diet was observed during various illnesses. Exclusion of solid foods and inclusion of more liquid foods like kanji, milk, coconut water etc. were observed during diarrhoeal diseases. Some of the families (15%) were aware of the importance of ORS during diarrhoea. The educational level of the women in the community might have an influence on this type of positive dietary modifications during infectious diseases like diarrhoea.

Mothers were also aware about the importance of breast feeding, in the health of children. Forty two per cent of children were breast fed for a period of 1-2 years and 48 per cent children were breast fed for more than 3 years. Only about 4 per cent children were found to be not breast fed the reason being some illnesses of the mothers soon after delivery, lack of breast milk etc.

Artificial feeding methods were not followed by majority of mothers. But 21 per cent of the families followed artificial feeding methods for additional nourishment and also because of the lack of breast milk. Among those who followed artificial feeding methods for additional nourishment and also because of the lack of breast milk, majority of the mothers provided cow's milk for their infants. Karuna

(1993) in her studies revealed that in 98 per cent of the fishermen families breast milk was supplemented with either cow's milk or supplementary foods or commercially prepared baby foods.

Most of the families introduced foods other than milk to their infants from 3rd to 4th months onwards. They provided special home made supplementary foods specially made from ragi, wheat flour and banana flour. About 14 per cent of the families prepared weaning foods based on cereal pulse combination. The mothers were found to be aware of the importance of weaning foods, and the type of weaning foods to be introduced for the health of their children. This was mainly because of the ICDS programme operating in the locality and all the mothers were the beneficiaries of the programme.

Majority of preschool children in India received only ordinary home diets and those diets were deficient in many nutrients especially in vitamins and minerals (Bhat and Dahiya, 1985). In the present study, all the children were beneficiaries of ICDS programme, so their food consumption was found to be better when compared to the family food consumption pattern.

Even though the consumption of pulses was found to be only twice or thrice in a week in the family, majority of the children consumed pulses at least 5 times in a week. They got green gram cooked along with rice from anganwadies as supplementary food. Daily consumption of fruits, mainly banana was found in 47 per cent of children under study. Steamed banana was given to children as a special item. Since milk is provided in the anganwadies, consumption of milk was found to be 5 times/week. Consumption of fish was found to be high. In the family, consumption of egg was only occasional but for children, egg was provided at least once in a week, which showed that they gave some special foods for their young children. Similarly bakery items were also frequently used by the preschool children.

The influence and acceptance of ICDS programme was found to be very high among this community. All the children followed and preferred 'on spot' feeding programme. The reason for this preference was that the child relished the food and had the food completely when they were along with their peers. All children liked the food and found to be content with the quality and quantity of food. Thomas (2001) conducted a study among preschoolers in Nemam ICDS block in Thiruvananthapuram and found that the rate of participation was very high and also

found that the high participation was mainly because of the motivation by the anganwadi workers, nutrition education given to mothers and higher acceptability of the supplementary foods provided.

5.4. Nutritional status of preschool children.

5.4.1 Anthropometric measurements of preschool children

Growth is an outstanding characteristic of children. The pattern of growth is one of the most exciting studies and nothing can be more fascinating in life than the investigation of life itself. Anthropometric measurements such as height, weight and other measurements are classical tools for assessment of nutritional status. The following basic anthropometric measurements are made in nutrition surveys like height, weight, head circumference, arm circumference and chest circumference (Gibson, 1990; Carlier and Cecile, 1991 and Keeskoslermans, 1994).

For interpretation of anthropometric data, it has to be compared with standards. Such standards should be prepared from well nourished population groups who experience no constraints on food intake and who are not exposed to adverse environmental factors (Easwaran and Devadas, 1981). In the present study also, the data was compared with existing Indian standards such as ICMR (1990), NFI (1991) and Gopaldas and Seshadri (1987).

The mean heights and weights of both boys and girls were found to be significantly low when compared to ICMR standards.

Height for age of the preschool children was compared with the ICMR (1990) standards based on different grades of malnutrition as suggested by Waterlow (1972). Height is not normally modified by short duration (identified by short duration (acute) malnutrition. Thus height deficit for age may be regarded as a measure of long duration (chronic) malnutrition. As a result the children may look apparently normal but when compared to their age, it will be evident then, that there is considerable growth retardation. In the present study also, 47.6 per cent of the boys and 43 per cent of the girls were found to have severe growth retardation and 33 per cent of boys and 17 per cent of girls were having moderate retardation with respect to their height, which indicated chronic malnutrition among these children.

According to NIN (1995) moderate and severe malnutrition was observed among 34 per cent rural preschool children in Kerala. In contrast to this observation studies conducted by Shyna (1996) and Jose (1998) among rural

preschool children in Thrissur district revealed that based on height for age distribution, majority of the preschool children were coming under marginal deficit for height and normal height with respect to their age.

In the present study, height for age classification showed that more than 40 per cent of both boys and girls were having severe growth retardation. This high prevalence of severe growth retardation was observed only in the case of height for age. The maximum growth potential of an individual is determined by hereditary factors while in the environmental factors the most important being nutrition and morbidity determine the extent of exploitation of that genetic potential. So the observed deficit may be due to genetic factors and other environmental factors, which can contribute to high morbidity and thereby growth retardation.

Weight for age has been used as an index of malnutrition, which reveals current nutritional status (Sathy *et al.*, 1991; Lucas, 1992 and Narins, 1992). Weight for age was compared with ICMR standards based on different grades of malnutrition as suggested by Gomez *et al.*, 1956). Present study revealed that majority of the boys (61.9%) and girls (46.6%) were having grade II malnutrition followed by grade I malnutrition. Only 7.1 per cent of boys and 10.3 per cent of girls were having normal body weight for their age.

In general the pattern of prevalence of current malnutrition as shown by weight deficit in the present study is such that majority of the boys were having grade II malnutrition but the prevalence is less in girls when compared. But the prevalence of grade I malnutrition was more among girls than boys.

As per weight for age classification, which indicated current nutritional status, most of the children were having grade II and grade I malnutrition. This malnutrition can be attributed to their low nutrient intake as revealed by the multiple regression analysis which showed a significant relationship between the calorie and protein intake and their body weights. Even though protein intake was found to be satisfactory, due to energy deficiency the protein might have been spared.

Mathen (1998) also reported that majority of the normal preschool children in Kerala belonged to either grade I or grade II malnutrition. But Shyna (1996) observed a high prevalence of grade II malnutrition among preschool children in agricultural labourers families in Thrissur district.

A composite age independent index namely weight/height² ratio also known as Quetlet's index suggested by Rao and Singh (1970) is another means of

interpreting the state of malnutrition among preschool children, since it indicates weight in relation to height. In the present study, when children were distributed based on wt/ht^2 ratio, 45.2 per cent boys and 53.4 per cent girls were found to have moderate malnutrition. Shyna (1996), Mathen (1998) and Jose (1998) also reported similar findings in their studies in rural preschool children in Thrissur district.

The head and chest circumference ratio is a good indication of the nutritional status of the child. The mean values of chest and head circumference were significantly low when compared with NFI standards. Distribution of children based on head/chest circumference ratio revealed that 88.1 per cent boys and 81 per cent girls were among under normal group. Similar findings were observed by Shyna (1996) and Jose (1998) in their studies in rural preschool children.

Mid upper arm circumference (MUAC) is recognized to indicate the status of muscle development. It has been reported that MUAC may be useful not only in identifying malnutrition, but also in determining the mortality risk in children (Rao and Vijayaraghavan, 1996). Mean MUAC of boys and girls when compared with NFI standards(1991) there was significant deviation from the standard values. This observation was in line with the result of Jose (1998) in preschool children of Thrissur district. In the present study when MUAC values of children were distributed according to different grades of malnutrition suggested by Gopaldas and Seshadri(1987) it was found that 54.8 per cent of the boys were having moderate malnutrition where as the prevalence was 44.8 per cent among girls. About 46.6 per cent of girls was found to be in the normal group, where as it was only 42.9 per cent in boys.

Arm circumference runs a close second to body weight as an indicator of PEM since arm is compared of muscle and fat, any change in the muscle and fat due to malnutrition is usually reflected in arm circumference. In the present study also the prevalence of moderate PEM among preschool children with regard to MUAC was observed.

But the prevalence of the early symptom of vitamin A deficiency is a notable feature, which needs serious attention from health workers. Consumption of fruits and vegetables and green leafy vegetables, which was found to be very low, can be promoted by giving nutrition education to mothers through ICDS programme.

5.4.2 Clinical examination of the children

Clinical examination is considered to be an important part of nutritional assessment and give direct information on the manifestations of dietary deficiencies prevalent. Dental carries was the most commonly found clinical symptom among preschoolers. Jose (1998) and Mathen (1998) also reported the same among preschool children in Kerala. This may be due to poor oral hygiene of the children. About 14 per cent of children showed pigmentation in eyes, which can be an indication of early vitamin A deficiency. Dietary intake of vitamin A was found to be very low in both boys and girls. No other remarkable clinical symptoms were observed among preschool children. The clinical symptom associated with vitamin A deficiency was a striking feature among preschool children in the community, which needs immediate attention.

5.4.3 Actual food and nutrient intake of preschool children

The observation from the food weighing survey indicated that the consumption of all the food groups by both boys and girls were found to be significantly low when compared to RDA except for pulses and fish. Even though the pulse consumption of the family was found to be poor, the high consumption of pulses in this group was mainly due to the supplementary foods provided through ICDS programme.

Karuna (1993) reported that the consumption rate of pulses, green leafy vegetables, roots and tubers, fruits, fats and oils were negligible and the consumption of cereals was below the RDA in fisher folk of Thiruvananthapuram district.

The nutrient intake showed that intake of protein, thiamine and riboflavin was satisfactory for both boys and girls. For boys the intake of iron (72% of RDA) and niacin (91% of RDA) showed no significant variation from the RDA. But for girls the intakes of these nutrients were significantly low. The energy intake in both the groups were found to be below 70 per cent of the RDA, but for boys the variation was not significant when compared to RDA. Srinath (1987) also revealed that the food consumption pattern of fisher folk in Thiruvananthapuram district can satisfy only 75 per cent of caloric requirement. Jameela (2002) also observed that only 69.66 per cent of calorie and 75.80 per cent of protein requirement was met by the traditional fisher folk of Thiruvananthapuram district. Gopalan (1989) stated that energy adequacy among preschool children is seen only among 70 per cent or below



SUMMARY

The present study entitled "Nutritional profile of preschool children of fishermen" was conducted among 100 preschool children of 4-5 years of age in the coastal areas of Thrissur district.

Information regarding socio-economic conditions of the families indicated that majority of the families were Hindus who belonged to Dheevara community. Joint family system was found in most of the families. Majority of the parents were educated. Many families (37%) had thatched roof and many of them (34%) had thatched walls for their houses. Environmental hygiene was poor with no proper drainage system around their houses.

Most of the head of the families were engaged in fishing and the rest in fish marketing and other related activities and earned Rs.1500 to Rs. 3000 per month. A greater part of their income was spent on food by most of the families. They had considerable amount of loans, which have to be paid from their income. More than 45 percent of the head of the families were found to be alcohol addicts.

Among the selected preschool children, majority of them belonged to 1st and 2nd birth order. Most of them had birth weight between 2 kg and 3 kg. Majority of them were completely immunized. The birth spacing of the index child with their siblings was found to be 1-2 years. Morbidity pattern revealed a low incidence of infectious diseases among these children for the past one year. Health care facilities through primary health centers were better utilised by majority of families.

Dietary habits of the families revealed that all the families were habitual non-vegetarians. Food consumption pattern of the families indicated that their daily diet comprised of staple rice, fish, roots and tubers, and fats and oils. All the families followed a three major meal pattern. Consumption of green leafy vegetables, other vegetables meat and eggs were found to be negligible. For most of the families food expenditure was mainly on the purchase of cereals.

in Kerala. Shyna (1996) also reported the same energy consumption pattern among preschool children in the agricultural labourer families in Thrissur district.

The adequate protein intake among preschool children in the study is mainly due to the high consumption of pulses, and milk (80% of RDA), supplied from the anganwadis and their high fish consumption.

The intake of nutrients such as calcium, vitamin A and vitamin C was found to be significantly low in both boys and girls. This may be due to the low consumption of green leafy vegetables.

The low intake of foods such green leafy vegetables, other vegetables and fruits reflected in their low nutrient intake such as calcium, vitamin A and vitamin C. Low levels of iron intake was observed among girls (53% RDA) but for boys the difference was not found to be significant (72% of RDA). Singh *et al.* (1993) in their studies on rural preschool children observed that the iron intake was very low i.e., below 50 per cent of RDA mainly because of the inadequate consumption of cereals. In the present study also the low iron intake by girls may be attributed to the low cereal consumption (54% of RDA) when compared to boys (61% of RDA) whose iron intake was found to be satisfactory.

Thiamine, riboflavin and niacin were found to be satisfactory. Mathen (1998) reported that the nutrient intake of ICDS beneficiaries was found to be on par with RDA except for energy. In the present study adequate intake of nutrients were observed in boys with regard to energy, protein, iron, thiamin, riboflavin and niacin but for girls, adequacy was observed only for protein, thiamin and riboflavin even though both were beneficiaries of ICDS.

In general the anthropometric measurements of preschool children revealed that when compared with standards, values of all measurements namely height, weight, head circumference, chest circumference, and MUAC were significantly low. But when children were distributed based on different anthropometric indices to find out the degree of malnutrition prevalent, it was revealed that most of the children were having moderate malnutrition. This shows that nutritional status of preschool children in fishermen community is not less than the nutritional status of preschool children in other rural poor communities in Kerala.

Dietary modifications with more liquids or easily digestible foods were observed in many of the families during diarrhoea. Majority of children were found to be breast fed adequately and started weaning by the 4th month onwards.

Special supplementary foods based on ragi, wheat flour etc were provided to children by majority of families. Frequency of consumption of different foods items by the preschool children revealed more consumption of foods like cereals, pulses, milk etc. due to the ICDS feeding programme.

Dietary profile of preschool children indicated that all of the food groups included in their daily diet were consumed far below the Recommended Dietary Allowance (RDA) except for pulses, and fish. The nutrient intake of the preschool children showed that the intake of protein thiamine and riboflavin was satisfactory for both boys and girls. The intake of iron and niacin showed no significant deviation from RDA in boys but in girls these nutrients were significantly low. The energy intake in both the groups were found to be below 70 percent of RDA. Other nutrients like calcium, vitamin A and Vitamin C were also found to be significantly low.

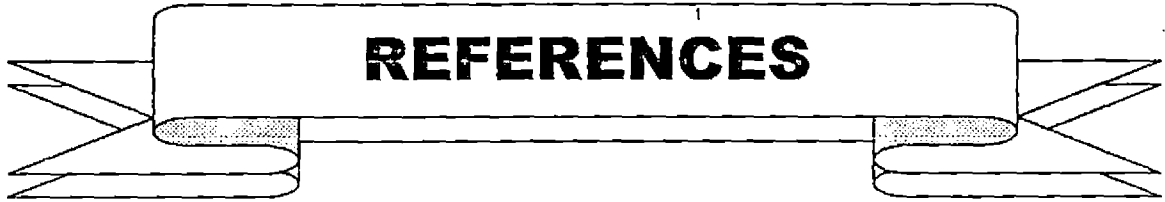
Clinical examination of the preschool children revealed that about 14 percent of children manifested mild Vitamin A deficiency as indicated by pigmentation of the eyes, which needs further investigations. Dental carries was also prevalent in all most all the children.

The anthropometric profile of preschool children was interpreted by comparing with the Indian as well as NFI standards. The mean heights and weights when compared with ICMR standards revealed that these measurements were significantly low. Distribution of children as per height for age given by Waterlow's classification revealed that 47.6 percent of boys and 43.2 percent of girls came under severe malnutrition. But classification of weight for age by Gomez and comparison of weight / height² ratio with the classification of Rao and Singh, revealed that majority of both boys and girls come under moderate malnutrition.

The anthropometric measurements of children revealed that, when compared with Indian standard values, all measurements viz. height, weight, head, arm and chest circumferences were significantly low. High prevalence of severe growth retardation (47.6% boys and 43.2% girls) was observed only in the case of height for age. But when children were distributed based on different anthropometric indices such as weight for age, Wt/Ht^2 ratio, head / chest circumference ratio etc to find out the degree of malnutrition prevalent, it revealed that most of the children were having moderate malnutrition.

More than 40 percent of both boys and girls were having severe height deficit for their age. Therefore, from this we can conclude that nutritional factors, hereditary factors, and other environmental factors, morbidity etc. have an important role in determining the growth potential of an individual. So poor environmental conditions, which can contribute to morbidity and genetic factors may be the reasons for the observed height deficits in these children for their age. Grade I and Grade II malnutrition as observed had a significant relationship with their low intakes of nutrients. Even though protein intake was found to be high this might have spared in a diet deficient in calories. All other indices showed the prevalence of moderate malnutrition.

Hence, from the results of the present study, it can be concluded that nutritional status of preschool children of fishermen community is not less than the nutritional status of preschool children in the rural poor communities in Kerala. For purposes of comparison with a heterogeneous population in our country, local reference standards for anthropometric measurements need to be evolved and used, which would make the comparison more realistic. But, when compared to other poor rural communities in Kerala the symptoms of vitamin A deficiency as manifested by pigmentation in the eyes is an important feature, which needs further medical investigations.



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APPENDIX - 1
KERALA AGRICULTURAL UNIVERSITY
DEPARTMENT OF HOME SCIENCE

INTERVIEW SCHEDULE TO ELICIT INFORMATION REGARDING
THE SOCIO ECONOMIC CONDITIONS OF THE FAMILIES

1. Name of the head of the family :
2. Address :
3. Place of Survey :
4. Block :
5. Panchayat :
6. Age of the respondent :
7. Type of the family : Joint / Nuclear
8. Family size : Adults Children
9. Religion & Caste :
10. Educational Status : Illiterate/LPS/UPS/HS/College
 - Father :
 - Mother :
 - Ist Child :
 - IInd Child :
 - Other Members :
11. Occupational Status :
 - Head of the family (Father) : Finishing/Fish vending / others
 - Mother :
 - Others :

12. Other source of Income :
13. Total income :
14. Do you have dowry system in your community : Yes / No.
If yes, how much dowry did you get ?
15. Details of housing condition :
- a) Type of house : 1 room / 2 room / 3-4 room /
6 - 8 room / 8 and above.
- b) Type of roof : Thatched / Tiled / Concrete
- c) Structure of the house : Mud-built/brick built / Thatched
16. Details of ownership
- a) Staying in own house : Yes / No
- b) Staying in rented house : Yes / No.
- c) Rent received if a portion
as let out : Rs.
17. Other characteristics
- a) Separate kitchen : Yes / No
- b) Usage of different rooms in
the house : Drawing room
Study room
Bed Room
Store Room
- c) Source of drinking water : Own well/public Tap/
Public well/Tank/River
- d) Lavatory facilities : Yes / No.
Own latrine / Public latrine /
Open field.
- e) Drainage facilities : Yes / No
- f) Electricity facilities : Yes / No.

- g) Information source utilisation or recreational facilities : Owns a radio/TV/Transister/VCR etc.
- h) Transport facilities : Bicycle/motor/bike/motor boat/Catamarine/Ordinary boat.
- i) Are you a member of any social organisation :
- 1) Mahila Samajam
 - 2) Co-operative Society
 - 3) Youth Club
 - 4) Matsya Fed
 - 5) Others
 - 6) Nil

MONTHLY EXPENDITURE PATTERN

Sl.No.	ITEM	EXPENDITURE / MONTH
1.	Food	
2.	Clothing	
3.	Shelter	
4.	Rent	
5.	Transport	
6.	Education	
7.	Entertainment	
19.	Details regarding index child	Male / Female
	Age	:
1.	Birth order of the index child	:
2.	Birth weight of the index child	:
3.	Birth spacing of the index child	:
4.	Immunisation details of children	Complete/Partially complete/Not taken
	If partially complete, give reason	
	If not taken, give reason	

5. Did your child get any serious illness
after birth : Yes / No

If yes, what type of illness, give details

No	Type of illness	Duration	Age at which it occurred	Type of the treatment
1.	Diarrhoea & vomitting			
2.	Measles			
3.	Chicken pox			
4.	Mumps			
5.	Fever			
6.	Jaundice			
7.	Respiratory disease			
8.	Others			
20.	Type of treatment used to take	:	Ayurvedic Homeopathy Allopathy	
21.	Type of the nearest health centre	:	Government / Private	
22.	Any member of the family having habits like alcoholism / Smocking / Chewing Pan/ Other	:	Yes / No	
23.	Money spent on unhealthy habits per month	:		
24.	Whether he is an addict or not	:	Yes / No	

If No.

Specify the consumption pattern

Weekly once	Weekly twice	Occasionally
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APPENDIX - II
KERALA AGRICULTURAL UNIVERSITY
DEPARTMENT OF HOME SCIENCE

INTERVIEW SCHEDULE TO ELICIT INFORMATION OF FOOD
CONSUMPTION EXPENDITURE AND DIETARY PATTERN
OF THE FAMILY

1. Serial No. :
2. Name of the house wife :
3. Address :
4. Place of the residence :
5. Food habit :
6. EXPENDITURE ON FOOD

Item	Frequency of Purchase		Price % of food expenditure	
	Daily	Weekly	Monthly	Occasionally
Cereals				
Pulses				
Leafy Vegetables				
Roots & Tubers				
Other Vegetables				
Fruits				
Milk & Milk Products				
Nuts & Oil seeds				
Spices & Condiments				
Others				

7. Frequency of use of different food material. Foods Frequency of use / week

Foods	Frequency of use / week				
	Daily	Once	Twice	Thrice	Four Times
Cereals					
Pulses					
Green Leafy Vegetables					
Roots & Tubers					
Other Vegetables					
Fruits					
Milk and Milk Products					
Meat					
Fish					
Egg					

Fats & Oils
 Sugar & Jaggery
 Bakery items

8. Frequency of use of different food materials by the index child.

	Frequency of use/week				
	Daily	Once	Twice	Thrice	Four times
Cereals					
Pulses					
Green Leafy					
Vegetables					
Roots & tubers					
Other vegetables					
Fruits					
Milk & milk products					
Meat					
Fish					
Egg					
Fats & oils					
Sugar & Jagger					
Backery items					

9. Meal pattern of the family : One major meal/twomajor meal/ three major meal
10. Snacking habit of the child
 Tye of snack food used : Yes
11. Snak food are : Prepared at home/shop
12. Do you give equal importance for
 family members in food distribution : Yes/No.
 if no, the order of importance:1
13. Do'you prepare special foods on special occasions : Yes/No
 if yes, give details

Oceassion	Food prepared	Reason
-----------	---------------	--------

Birthday

Marriage

Death

Festival

Feasts

Others

14. Do you process any foods at home : Yes/No
If yes, which foods in which form
15. Do you change dietary pattern of child during the following conditions
1. Cholera
 2. Diarrhoea
 3. Fever
 4. Vomiting
16. Have you breastfed the child : Yes / No
If Yes duration
If No reason
17. Have you followed any artificial feeding method : Yes / No.
If yes, reason
- Type of milk used : Cow's milk/goat's milk /milk powder
- Methods of feeding : Bottle / glass
18. At what age did you introduce other foods to the child other than milk ?
Months : 1,2,3,4,5,6,7,8,9
19. Do you give any special supplementary foods to the child
If yes, what type of food from which month
onwards : Home made / commercial
If no, give the reason.
20. Do you prepare any weaning foods in your home ? Yes / No.
21. Is there any supplementary feeding programme
present in your locality : Yes / No.

If yes, name the programme

22. Do you participate in that : Yes / No.
23. Do you get any benefit from this programme : Yes / No
If yes, what are the benefits you
get from this programme : 1. Foods
2. Medicine
3. Immunisation
4. Education
24. What type of foods are you getting and how many times :
25. Does your child get any benefit from this programme : Yes/ No
26. If yes, what type of benefit your child get
1. Food
2. Medicine
3. Immunisation
4. Education
27. What type of food your child is getting and how many times ?
28. Does the child like the food ?
29. Are you satisfied with the programme ?
30. How many hours a day your child spend in Anganwadi ?
half day / full day

If half day : Reason

APPENDIX - III
KERALA AGRICULTURAL UNIVERSITY
DEPARTMENT OF HOME SCIENCE

SCHEDULE FOR CLINICAL ASSESSMENT
(N.A.C.I.C. MR)

1. Sex :
2. Age :
3. Height (Cm) :
4. Weight (Kg) :
5. External appearance :
 - O. Good
 1. Fair
 2. Poor
 3. Very Poor
6. Eyes
 - (a) Conjunctiva :
 - O. Absent, glistening & moist
 - (i) Xerosis :
 1. Slightly dry on exposure for a minute, lack of lustre.
 2. Conjunctiva dry & wrinkled
 3. Conjunctiva very dry and bitot's spots present.
 - (ii) Pigmentation :
 - O. Normal colour
 1. Slight discolouration
 2. Moderate browning in patches
 3. Severe earthy discolouration.
 - (iii) Discharge :
 - O. Absent
 1. Watery, excessive lachrymation
 2. Mucopurulent
 3. Purulent
 - (b) Cornea
 - (i) Xerosis :
 - O. Absent
 1. Slight dryness & diminished sensibility
 2. Haziness and diminished transparency
 3. Ulceration
 - (ii) Vascularization :
 - O. Absent
 1. Circumcorneal injection
 2. Vascularization of Cornea

- c) Buccal mucosa
 - i) Condition : O. Normal
 - 1. Bleeding and / or gingivitis
 - 2. Pyorrhoea
 - 3. Retracted
- d) Gums
 - i) Condition : O. Normal
- e) Teeth : O. Absent
 - i) Fluorosis
 - 1. Chalky teeth
 - 2. Pitting of teeth
 - 3. Mottled & discoloured teeth
 - ii) Caries : O. Absent
 - 1. Slight
 - 2. Marked
- 8. Hair
 - i) Condition : O. Normal
 - 1. Loss of lustre
 - 2. Discoloured any dry
 - 3. Sparse & brittle
- 9. Skin
 - a) General
 - i) Appearance : O. Normal
 - 1. Loss of lustre
 - 2. Dry & rough or crazy pavement
 - 3. Hyperkeratosis, phrynoderma
 - ii) Elasticity : O. Normal
 - 1. Diminished
 - 2. Wrinkled skin
 - b) Regional
 - i) Trunk : O. Normal
 - 1. Collar like pigmentation and dermatitis around the neck.

(c) Lips

- (i) Excoriation : O. Absent
 - 1. Slight excoriation
 - 2. Blepharitis
- (ii) Folliculosis : O. Absent
 - 1. A few granules
 - 2. Lips covered with extensive granules
 - 3. Hypertrophy
- (iii) Angular conjunctivities : O. Absent
 - 1. Present

d) Functional

- i) Night blindness : O. Absent
 - 1. Present

N.B. Exclude othe eye diseases not associated with nutritional defects.

7. Mouth

a) Lips

- i) Condition : O. Normal
 - 1. Angular stomatitis, mild
 - 2. Angular stomatitis, marked

b) Tongue

- i) Colour : O. Normal
 - 1. Pale but coated
 - 2. Red
 - 3. Red & raw
- ii) Surface : O. Normal
 - 1. Fissured
 - 2. Ulcered
 - 3. Glazed & atrophic

- ii) Face : O. Normal
 1. Nasolabial Seborrhoea
 2. Symmetrical suborbit pigmentation
 3. Moon face
- iii) Perineum : O. Normal
 1. Scrotal or pudendal dermentation
- iv) Extremities : O. Normal
 1. Symmetrical dermatitis with pigmentation of glove or stocking.
10. Oedema
 i) Distribution : O. Absent
 1. Oedema on dependent parts
 2. Oedema on face and dependent parts
 3. Anasarca
11. Bones
 i) Condition : O. Normal
 1. Stigmata of past rickets
12. Heart
 i) Size : O. Normal
 1. Apex outside the nipple line
 2. Enlarged
13. Alimentary system
 i) Appetite : O. Normal
 1. Anonexia
 ii) Stools : O. Normal evaccuation
 1. Diarrhoea
 iii) Liver : O. Not palpable
 1. Palpable
 iv) Spleen : O. Not palpable
 1. Palpable
14. Nervous system
 i) Calf tenderness : O. Absent
 1. Present
 ii) Paresis : O. Absent
 1. Present

NUTRITIONAL ASSESSMENT SCHEDULE

State : District : Taluk :

Village :

Serial No: Family : Block :

Name of the Child : Sex :

Name of guardian :

Occupation of parent :

Annual income :

Date of birth of child : Years Month

Source - Parent / Record :

ANTHROPOMETRY

Height (Cm) :

Weight (Kg) :

Mid upper arm circumference (MUAC) (Cm) :

Head circumference (Cm) :

Chest circumference (Cm) :

APPENDIX - IV

INDIVIDUAL FOOD CONSUMPTION SURVEY -
WEIGHMENT METHOD

Name of the Investigator :

Name of the head of the family :

Name of the subject :

Serial No. :

Address :

Date :

Food consumption

Name of the meal	Ingredients	Weight of total raw ingredients used by the family (g)	Weight of total cooked food consumed by the family (g)	Amount of cooked food consumed by the individual (g)	Raw equivalents used by the individual

NUTRITIONAL PROFILE OF PRESCHOOL CHILDREN OF FISHERMEN

**By
ANEENA, E. R.**

ABSTRACT OF THE THESIS

**Submitted in partial fulfilment of the
requirement for the degree of**

Master of Science in Home Science
(FOOD SCIENCE & NUTRITION)

**Faculty of Agriculture
Kerala Agricultural University, Thrissur**

2003

**Department of Home Science
COLLEGE OF HORTICULTURE
VELLANIKKARA, THRISSUR - 680 656
KERALA, INDIA**

ABSTRACT

The present study entitled "Nutritional profile of preschool children of fishermen community" was conducted among 100 preschool children of 4-5 years age group in the coastal areas of Thrissur district.

Information regarding the socio economic conditions of the fishermen community indicated that the majority of them were Hindus. Joint family system was found in most of the families High educational status was an out standing feature observed. Poor housing conditions and living facilities were observed in majority of the households.

Majority of the families earned between Rs.1500-Rs.3000. Food consumption survey revealed that all of them were habitual non vegetarians and rice and roots and tubers were the staple foods used. Fish was the most frequently used food item. Foods like green leafy vegetables, vegetables, meat and eggs were rarely included in the diet. Dietary profile of preschool children indicated that all the food groups were far below the RDA except for pulses and fish. The nutritional intake was, satisfactory with respect to protein, thiamine and riboflavin. Energy intake was found to be below 70 percent of RDA. Other nutrients like calcium, vitamin A and vitamin C were also significantly low. Mild symptoms of vitamin A deficiency as manifested by pigmentation in the eyes is an important feature observed in clinical examination. Majority of them had dental carries due to poor oral hygiene.

More than 40 percent of children showed severe height deficit for their age, which may be due to nutritional, and other environmental factors. However, as per weight for age classification most of the children were coming under grade I and grade II malnutrition that had a significant relation with their nutrient intake showing the prevalence of current malnutrition. Distribution of children based on the anthropometric indices also revealed the prevalence of moderate malnutrition among preschool children in this community. The present study reveals that nutritional status of preschool children of fishermen community is not less than the nutritional status of preschool children in other rural poor communities of Kerala.