NUTRITIONAL PROFILE OF FISHER WOMEN

By

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THESIS

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DECLARATION

I hereby declare that this thesis entitled **"Nutritional profile of fisher women"** is a bonafide record of research work done by me during the course of research and that this thesis has not previously formed the basis for the award to me of any degree, diploma, associateship, fellowship or other similar title of any other University or Society.

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CERTIFICATE

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CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

ABBREVIATIONS

ACU	Adult Consumption Unit
BMI	Body Mass Index
B	Boys
CMFRI	Central Marine Fisheries Research Institute
CED	Chronic Energy Deficiency
F	Female
FAO	Food and Agricultural Organization
G	Girls
Hb	Haemoglobin
ICMR	Indian Council of Medical Research
ICFWS	International Conference of Fish Workers and their Supports
M	Male
MOHFW	Ministry of Health and Family Welfare
NIN	National Institute of Nutrition
NNMB	National Nutrition Monitoring Bureau
n	Number
OEC	Other Eligible Community
RDA	Recommended Dietary Allowances
UNDP	United Nations Development Programme
WHR	Waist Hip Ratio
WHO	World Health Organization
%	Percentage

Affectionately
Dedicated to my Family

Introduction

1. INTRODUCTION

Kerala with a total terrestrial area of 38000 square kilometres has a coastal line of 590 kilometres. The fishermen population of the state are scattered through out the coastal line of Kerala. More than a million people belonging to the fishing communities live in 222 fishing villages in the state and is considered as an underprivileged section of the society (Government of Kerala, 2003). Because of social backwardness compounded by poor living conditions of this community, specific health and social problems are found to be the characteristic features of this population. In addition, the fishing households suffer from economic problems like under employment, poverty, indebtedness and social problems like dowry and alcoholism.

Nutritionally inadequate diets among the households coupled with the male biased intra-household food distribution and lack of care for the nutritionally vulnerable members of the households especially women and children may result in widespread nutritional disorders. Peculiar environmental situations prevalent in the coastal areas further negatively influence the nutritional status of women of the fishermen community. Fisher women constitute 47 per cent of the total adult population in the fishing villages of India (Thomas *et al.*, 1996).

In the fisheries sector women's social, economic and family status as well as their rank in the fish farming sector were found to be lower than that of men. The major factors contributing to this disparity were women's lower educational status, the traditional attitude of discrimination against women and lack of self-esteem and self confidence.

In Kerala, employment of women was found to benefit the working women and their families, since the income generated could increase the purchasing power and standard of living with consequent improvement in their nutritional status (Ramachandran, 1986). However, in a report published by NIN

(1985), it has been stated that dual stress and conflicting demands of the women in and outside home had an adverse effect on their health status.

Studies on the role of fisher women in the fisheries sector are few. The statistics now available are highly inadequate. A systematic and comprehensive investigation on the conditions of women in this complex occupation is necessary. Hence, the present study on the "*Nutritional profile of fisher women*" was undertaken with the following objectives.

1. To assess the socio-economic status of the fishermen families.
2. To assess their food consumption pattern and
3. To assess the nutritional status of fisher women.

Review of Literature

2. REVIEW OF LITERATURE

The review of literature relevant to the study entitled "Nutritional Profile of fisherwomen" is listed under the following headings.

2.1 Demographic profile of fishermen

2.2 Socio economic condition of fishermen

2.3 Food consumption pattern of women

2.4 Nutrient intake and prevalence of nutritional deficiency diseases among women

2.5 Factors influencing the nutritional status of women

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).

According to Kurien (1980) there are 1800 fishing villages in India, with about one million traditional fishermen who accounted for 65 per cent of the total marine fish production. According to Veeraputhiran (1988), the fishermen population of India is 5.38 million, representing about 0.80 per cent of the total population. Fishing has provided direct employment to about 1.80 million fishermen, 0.90 million being engaged in fishing and fish seed collection and rest in related activities such as fish curing and marketing. Srinath (1998) reported that in India, 6 million people are directly engaged in marine fisheries and live in coastal areas. According to Ananth (2000), nearly 25 per cent of the total population 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 boardering it. James *et al.* (1991) reported that the projection of the fishermen population in Kerala during 1990 was 66,100 the annual growth rate of the population being 0.3 per cent. The number of active fishermen formed 22.74 per cent and fishermen in the productive age group is about 53.74 per cent. According to the reports by Government of Kerala (2004) the population of fisher folk in Kerala is about 10.85 lakhs and the number of fishermen actively engaged in sea fishing is about 2.20 lakh.

More than a million people belonging to the fishing communities live in 222 fishing villages in the state. 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 and Government of Kerala, 2004). According to Devraj *et al.* (1999), the coastal line of Kerala supports about 0.64 million fisher folk.

Thrissur district has a long tradition in the field of fishing industry. There are 716 households of fishermen in Thrissur district (George, 1998). It has a coastal line of about 54 km from Azhikode to Puthenkadappuram. There are seven fishing centers in the district viz., Azhikkode, Nattika, Vadanappalli, Kadappuram, Blangad, Puthenkadappuram and Chettuva. The district has 18 coastal fisheries villages and three inland fisheries villages. There is a shrimp hatchery at Azhikode (Department of Fisheries, 2002 and Government of Kerala, 2004).

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 three 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 condition of fishermen community is one of the most backward in India (George and Domi, 2002).

Regarding the type of families, Karuna (1993) observed that majority of the fishermen families of Thiruvananthapuram district were of nuclear type. But in contrast, Aneena (2003) reported joint family system among in most of the fishermen families of Thrissur district.

In Orissa, Panikkar (1990) observed an average family size of 5.5 among the fisher folk families. In Kerala also Balakrishnan (1990) and Mani (1995) noticed an average size of 5.5 among the fisher folk households. Sehara *et al. (1992) observed an average family size of 6 among fishermen families of* Goa. Raj (1997) revealed an average family size of 5.19 among the fisher folk in Kerala. Kumar (2001) observed that average household size of fishermen of Karamkulam fishing village is 5.3. According to Jameela (2002) fishermen families in Thiruvananthapuram district have big family size. Patil and Jadhav (2002) reported an average family size of 4.47 in the fishermen household of Andaman and Nicobar Islands of India.

Different religions existed in the fishermen community. A study by Tietze and Groenwold (2000) reported that less than one fourth of the fisher folk were Christians and more than three fourth of them were Hindus. According to 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. A study by Aneena (2003) revealed that the majority of the fishermen families in Thrissur district were Hindus who belonged to Dheevara community. The main fishing castes in Kerala are Valan, Arayan, Mukkuvan and Marakkan (Government of Kerala, 2004).

In a study on coastal zone in Ernakulam and Alleppy districts Dev raj *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, 33 per cent had primary and one per cent had college education. Kumar (2001) observed that 50 per cent of fisher women had secondary school education and 48 per cent had primary school education. Akinbile (2003) reported that, a majority of the fishermen in Nigeria were literate, with only 6 per cent of them having no formal education.

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).

The study conducted by Kurien (1980) indicated that poor socio economic status among fishermen families. Sukumar *et al.* (1987) reported that the low educational and income status of fishermen families resulted in their general poverty and economic backwardness.

Kurien and Achari (1988) observed that the fisher folk community has remained at the margins of society geographically, economically, socio-culturally and politically. Edwin (1988) conducted a study on the socio economic conditions of the fishermen in Narakkal and Kandakadavu and found that the average income of the fishermen in both the villages ranged from Rs.5000/- to Rs.8000/- per annum. Sathiadas and Panikkar (1994) observed an average annual income of Rs.7600 among the fishermen households of Pudumanikuppam and an average annual income of Rs.4500 at Thiruvittiyoorkuppam. The per capita income was Rs.1417 in the former and Rs.837 in the latter. 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 majority of fishermen in Orissa had an average monthly income in between

Rs.1500-Rs.3000. The study conducted in Thiruvananthapuram district by Karuna (1993) revealed that, most of the fishermen families belonged to the income groups of Rs.1000 to 2000 per month. Tietze and Groenwold (2000) found an average annual income of Rs.46, 400 in fishermen households. Aneena (2003) also reported an average monthly income of Rs.1500 to 3000 among the fishermen community of Thrissur district.

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. Kumari (1991) and Beena and Sehara (1993) reported that low living standards, poverty, unemployment, malnutrition and inequalities in income persist among coastal folk. Jameela (2002) indicated poverty, low income and low purchase power among fisher women of Thiruvananthapuram district.

Beena and Sehara (1993) reported poverty, and indebtedness among fishermen community of Ernakulam coastal villages. Nayik (1993) and Sathiadas and Panikkar (1994) reported that a considerable number of fishermen households took loans for household expenditure particularly to tide over the lean seasons. Ananth (2000) also observed a vicious cycle of poverty and indebtedness among 45 per cent of fishermen.

Mani (1995) in his study in Kerala, reported that 9 per cent of the fishermen borrowed money for marriage purposes, 8 per cent took loans for land purchase and the rest of the families availed loans for other purposes. According to Raj (1997) majority of the loans taken by fishermen were used for purposes such as the purchase of fishing equipments. Muhammad (2000) reported that lack of alternate employment in off-seasons lead to indebtedness in fishermen community and 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 household is Rs.24,900. Balasubramanian (2003) conducted a study in the fishermen societies in different regions and found that most of the societies arranged loans for the purchase of the craft, gear and engine.

Datta *et al.* (1988) studied the role of middlemen in marine fish marketing in Orissa and revealed that 90 per cent of mechanized and non-mechanized fishing units were compelled to sell their catch extensively to traders whom they are already indebted.

Sehara *et al.* (1992) observed that, the household income during monsoon is very low and consequently fishermen become permanent debtors. During monsoon the level of employment is reduced to about 20 per cent. According to Nayik (1993) the local moneylenders played an important role in giving credit. The borrowing was proportionately highest among fishermen who purchased motors individually. Mani (1995) reported that the role of moneylenders and middlemen in the economic life of the fisher folk indirectly increased their liability and indebtedness. In a study on coastal zone in Thrissur district, Aneena (2003) reported that majority (95%) of the families have considerable amount of loans. Majority of them borrowed from private agencies and moneylenders to meet their daily household expenses and medical treatment during off seasons.

Sehara *et al.* (1992) revealed that, fishermen are not in the habit of saving and in most of the cases income is not sufficient to cover day to day expenses and they are forced to take further loans for repayment of loans during lean season.

Patil and Jadhav (2002) reported that in Andaman and Nicobar Islands 73.68 per cent fishermen, were members in socio-political institutions and their participation score was 0.74. Aneena (2003) also reported that majority (82%) of the fishermen families were members in matsyafed in Thrissur district and they received benefits.

Sirisena and Gamlath (1999) reported that, men took vital decisions in the family as they play the instrumental leadership role while women play only the supportive role in accordance with their gender role.

Fang *et al.* (1998) reported that women were more highly represented in the fish processing sector than men, and in other activities they were under represented. Government of Kerala (2004) revealed that employment opportunities for both men and women outside their traditional occupations such as fishing are low. It was also found that men engage themselves in agriculture and fishing, women find work in fish and vegetable vending, envelope making and petty trade. In a study conducted by Rao (2004) it was observed that fisheries provide direct employment to about 2.6 million full time fishermen, 1.4 million part time fishermen and 2.1 million occasional fishermen in India.

Coastal fishing communities are typically characterized 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) reported poor health and hygiene and high morbidity and mortality among Kerala fishermen community. The much acclaimed social progress in Kerala is found to be lacking among fishing communities. The well

being of fisherwomen measured on the basis of capabilities like morbidity, longevity, nutrition and education was found to be low (Pushpangadan and Murugan, 2000). Study by Tieze and Groenwold (2000) also found poor hygiene and sanitary conditions among coastal fishing communities of India.

Aneena (2003) reported poor housing conditions and living facilities in majority of the fishermen households of Thrissur district. In Kerala, fishing villages are densely populated, located by the side of the sea and have only very poor infrastructure facilities and nearly 80 per cent of the households did not have any sanitation facilities and 2/3rd of the villages lack safe drinking water sources (Government of Kerala, 2004).

Pickering *et al.* (1997) reported the sexual behaviour of men and women in a fishing village on the shores of Lake Victoria, South West Uganda and indicated very high rate of sexual mixing within the village but little contact with people from outside. The authors also observed that all sexually active men and women are at risk of sexually transmitted diseases including HIV.

2.3 FOOD CONSUMPTION PATTERN OF WOMEN

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).

Yegammai and Ambili (1992) found that majority of the fisher folk families of Alleppy district were non-vegetarians. Aneena (2003) in her study among fishermen families of Thrissur district showed that all the families were habitual non vegetarians with a pattern of three major meals a day.

Prema *et al.* (1982) reported that in Kerala, rice was the preferred cereal among the labourers but it was often replaced partly or wholly by roots and

tubers. Yegammai and Ambili (1992) observed rice as the staple food among the fisher folk families of Alleppy district. Aneena (2003) observed rice and roots and tubers as the staple foods among the fishermen households of Thrissur district. Fish was found to be the most frequently used food item and foods like green leafy vegetables, vegetables, meat and egg were rarely included in the diet.

Rajkumar and Premakumari (2000) in their studies among the women labourers of Coimbatore indicated decreased intake of protective foods in their diet. Rajuladevi (2001) in a study among the landless labour households of Tamil Nadu, indicated that majority of the households survived on cereals and the intake of most of the other food groups were low when compared with RDA. A lower intake of cereals and millets among the adults of Andhra Pradesh was observed by Rahman and Rao (2001). Among the food groups the pronounced deficit was observed in the intake of fruits and green leafy vegetables among men and women and least for pulses and cereals (Adhiguru and Ramaswamy, 2003).

Chadha *et al.* (1995) observed a lower intake of almost all food groups except cereals among the rural community. The study of Kumar (1996) and Singh (1998) among the rural people in India reported higher consumption of cereals, pulses and millets. Gogoi and Bhattacharya (2000) reported inadequate intake of cereals, roots and tubers and other vegetables, milk, sugar and fats and oils among the households of India and variation in the meal pattern on the basis of occupation was also observed by the authors.

Meena *et al.* (2000) observed adequate intake of other vegetables, milk and milk products and fats and oils by the women in the rural areas of Parbhani district. But in contrast, Agarwal (2001) in his study among the rural households of Delhi observed that intake of cereals and pulses were above the recommended dietary allowances whereas the intake of fruits, milk and milk products were much below the RDA. Jyothi (2003) observed pulses as a medium frequently

consumed food item in the low income groups of rural Kerala and green leafy vegetables were consumed only occasionally by all the families.

Cherian (1992) and Jayanthakumari (1993) observed deficient intake of pulses and green leafy vegetables among the rural households. Karuna (1993) reported that the consumption of vegetables, pulses, eggs and green leafy vegetables was less due to lack of knowledge about nutritious foods among the fishermen households of Thiruvananthapuram district. She also observed that daily diet of fishermen community consisted mainly of rice and fish.

A higher intake of roots and tubers was reported by Augustine (1993) among the women engaged in stone breaking. The study of Khadka (2001) among the rural households of Nepal revealed that majority of the villagers consumed vegetables and fruits on the basis of seasonal availability. Labadarios (2001) and Min *et al.* (2002) observed an increased consumption of vegetables, fruits and animal foods among the rural households of Brazil and South East China respectively.

2.4 NUTRIENT INTAKE AND PREVALENCE OF NUTRITIONAL DEFICIENCY DISEASES AMONG WOMEN

Women have been the focal point for family health and have been referred to as the producers of health and nutrition for the family (Swamy and Vijayalakshmi, 1999). Women occupy an important position in any effort for controlling malnutrition as they are entirely responsible for the nutritional status of the family and hence the nation. Good nutritional status of women is essential to improve the quality of their present and future life as well as their family (Hemalatha *et al.*, 2000).

The most important nutritional problems prevalent in India include protein calorie malnutrition, iron deficiency anaemia, iodine deficiency, vitamin A

and B complex deficiencies (Vijayalakshmi *et al.*, 1987; Perla and Estella, 1997; Chakravarthy and Ghosh, 2000, and Gopalan and Aeri, 2001).

The average diet of the working women in all less developed countries is almost invariably inadequate in calories, animal proteins, vitamins and minerals necessary for proper health and optimum work efficiency (ICMR, 1990). Nation wide surveys have indicated that the nutritional status and the psychological needs of the women received low priority in the family (Deshpande *et al.*, 2001).

In a study conducted by Naidu and Rao (1994) prevalence of under nutrition in adults of poor socio-economic group was observed.

Among the rural households of Maharashtra, Hyderabad and Delhi a deficient calorie intake was observed by Sar *et al.* (1991), Rahman and Rao (2000) and Singh and Agarwal (2001). But Farzana and Manay (2000) observed optimum energy consumption in the rural households of Karnataka.

Labadarios (2001) observed poor intake of energy among the rural families in South Africa. Dungarwal and Choudhary (2001) also reported deficient energy intake among the low income groups of Tamil Nadu.

Protein energy malnutrition was documented among women of both rural and urban population in India (Harris *et al.*, 1990 and Rasmussen and Habicht, 1992). The prevalence of malnutrition was found to be 3.9 per cent among men and 6.2 per cent among women in greater metropolitan Sao Paulo (Martins and Melendez, 1999). Getabum *et al.* (2001) observed protein energy malnutrition among the rural women in Ethiopia.

Gogoi and Bhattacharya (2000) conducted a study on the dietary habits of Mishimi women and the intake of energy, protein and niacin was found to be adequate for all age groups. The intake of other nutrients such as fat, iron, beta-

carotene, thiamin, riboflavin and ascorbic acid were lower than the recommended dietary allowances for all age groups.

Karuna (1993) reported adequate intake of protein in the diet of fish vending women in Thiruvananthapuram district. Survey carried out by NNMB during 2000-2001 in the rural areas in all states of India except Uttar Pradesh indicated that about 80 per cent of male and 88 per cent of female were consuming diets that were adequate in protein and energy (NIN, 2002).

Yegammai and Ambili (1992) and Karuna (1993) reported fish as the main source of protein in the diet of fisher folk families of Alleppy and Thiruvananthapuram districts. A case study conducted among women living in nontidal swamps of Indonesia, Yuliati and Widowati (1998) observed local fresh water fish as the main source of protein in their diet. Cereals and pulses were found to be the main sources of protein and calories in the diet of tribal and non-tribal households of Bihar (Singh and Kumari, 2001).

In the fisher folk families of Alleppy district, Yegammai and Ambili (1992) observed a deficient intake of all nutrients except vitamin C. Karuna (1993) also reported inadequate intake of vitamins and minerals in the diet of women engaged in fish vending in Thiruvananthapuram district. A study conducted by Rahman and Rao (2000) among the families of various economic status reported a lower intake of vitamins and minerals in middle, upper middle and higher income groups. Min *et al.* (2002) also observed lower intake of vitamins and minerals in the diet of women in South East China.

Yongok (2001) and Hua and Hage (2002) observed higher intake of most of the vitamins and minerals in the diet of women in Korea and China respectively. A district level survey conducted in West Bengal (NIN, 2002) to assess the food and nutrient intake of rural and urban communities indicated higher intake of all nutrients except the micronutrients such as iron, vitamin A and Riboflavin.

riboflavin. The extent of deficit with regard to micronutrients was higher among females with 40 per cent for iron, 35 per cent for vitamin A and 45 per cent for riboflavin.

Nutritional anaemia is common in 50-70 per cent women who took cereal based vegetarian diet because of excessive body needs of iron (NIN, 1984). *Anaemia is one of the main causes of maternal mortality* (UNDP, 1999). Negi (1999) revealed that anaemia to be an indirect cause of $1/5^{th}$ of maternal death (19.3%) in rural India. According to Singh *et al.* (2001) iron deficiency anaemia is a major health problem resulting in considerable mortality and morbidity in an early age. Rajkumar and Premakumari (2000) in their studies among women workers of different occupational sectors in Coimbatore also observed under weight and anaemia. For severe anaemia the highest and lowest prevalences were observed in rural areas, with the rural high standard of living group exhibiting the lowest (1%) and the rural low standard of living group the highest (3%) prevalence (Bentley and Griffiths, 2003).

Seralathan *et al.* (1993) observed that 16 per cent of farm women in Coimbatore district suffered from severe anaemia. Ramya and Devaki (2000) in their study among the women construction workers in Thirupathi observed increasing degrees of anaemia associated with deficient intake of iron, vitamin C, protein and energy.

Udaya (1996) and Smitha (1999) reported anaemia among 60 per cent of farmwomen and women agricultural labourers of Thrissur district respectively on the basis of haemoglobin status. Farzana and Manay (2000) and Singh and Baghe (2001) observed nutritional anaemia among women in rural areas of Karnataka. Jyothi (2003) revealed anaemia among 63.33 per cent of women labourers involved in rice cultivation in Palakkad district of Kerala.

Saxena and Taneja (1999) in their studies among the pregnant and lactating women of Jhabua district of Madhya Pradesh observed higher rate of morbidity and mortality among women during child bearing. Kapil *et al.* (1999) indicated that 4.8 per cent of pregnant women in three urban slum communities of Delhi had iron deficiency anaemia. Dietary intake showed that 8 to 85 per cent of women in this area were consuming less than 50 per cent of energy, protein, iron and β-carotene as compared to their RDA.

Biochemical indices indicated that about half of the women in Yewa South Local Government Area of Ogun state suffered iron deficiency, and that the deficiency was more pronounced in the first trimester of pregnancy (Okafor *et al.*, 2001).

Latafat *et al.* (2000) found iron deficiency anaemia among dairy and non-dairy families of coastal Andhra. Gopalan (2001) reported anaemia among pregnant women in the state of Orissa, Assam, Meghalaya, Tamil Nadu, Kerala, Punjab and Madhya Pradesh and indicted significant differences with respect to anaemia among the different states.

A study conducted by Sucharno *et al.* (1992) observed iron deficiency anaemia among 43.5 per cent pregnant women in West Java, Indonesia. Iron deficiency anaemia was also observed among the rural women of child bearing age in China (Liu *et al.*, 1992) and Costa Rica (Rodeguize *et al.*, 2000). Iron deficiency anaemia among the rural pregnant women in North West Eucador, Ethiopia, Tanzania, Burkina and Mexico was reported by Weiget *et al.* (1992), Haidar *et al.* (1999), Antelman *et al.* (2000), Meda *et al.* (2000) and Perez and Alamaguir (2002) respectively.

Anssary *et al.* (1999) observed iron deficiency anaemia among mothers in the rural areas of Kohrran Abad city. Sanchez *et al.* (2000) observed anaemia among 3 per cent of women above 18 years in the canary island

population. The authors also reported deficient ferritin levels among 25 per cent of women. Bentley and Griffiths (2003) reported that 32.4 per cent, 14.19 per cent and 22 per cent of women in Andhra Pradesh had mild, moderate and severe anaemia respectively.

A study conducted by Kupputhai and Mallika (1993) among women belonging to Khond, Gadaba and Porja tribes of Andra Pradesh observed anaemia in the form of pallor of conjuctiva and koilonychia.

Brabin *et al.* (1998) reported anaemia among women of different weight categories which was found to be 52 per cent for thin women, 50 per cent for normal weight women and 41 per cent for over weight women. In a study conducted by Kumar (2000) revealed that anaemia was observed among 40 per cent of women in the highest socio economic group while among urban poor and rural poor women the prevalence was found to be 62 per cent and 54 per cent respectively. National and regional surveys indicated that the prevalence of anaemia could be as high as 74 per cent in children below three years of age, and 85 per cent in expectant mothers in some population group (MOHFW, 1999 and ICMR, 2001).

The addition of 90-100 g of meat, fish or poultry to the daily diet improves the bioavailability of iron significantly (Johnson and Walker, 1992). A study conducted by Kapil *et al.* (1999) 22.9 per cent of pregnant women had iodine deficiency disorder. The prevalence of goitre is higher among females (Griffiths and Bentley, 2001).

Clinical manifestation of vitamin B complex deficiencies were reported among women agricultural labourers of Thiruvananthapuram district (Cherian, 1992) and women of fisher folk families of Alleppy district (Yegammai and Ambili, 1992). Augustine (1993) reported B complex deficiency symptoms among the women engaged in stone breaking.

Prevalence of vitamin B complex deficiency was seen in pregnant women and lactating mothers in both dairy and non-dairy farmers in coastal Andhra (Devi and Sarojini, 2000). Mohapatra *et al.* (2001) observed B complex deficiency signs mainly angular stomatitis, cheilosis and glossitis among the women labourers of Kalahandi district of Orissa.

Sucharno *et al.* (1992) reported vitamin A deficiency among 2.5 per cent of pregnant women in Indonesia. Christin *et al.* (1995) reported clinical symptoms of vitamin A deficiency among the pregnant women in rural Nepal.

Kapil *et al.* (1999) observed retinal deficiency among 4.8 per cent of pregnant women. The prevalence of inadequate levels of serum retinal levels was observed among mothers in Brazil (Ramalho *et al.*, 2001).

Sar *et al.* (1991) observed calorie deficiency among 53 per cent of women in the rural households of Maharashtra and 30 per cent of the households had protein deficiency. Karuna and Prema (1993) observed that 33.33 per cent of women engaged in fish vending in Thiruvananthapuram had different grades of energy deficiency. Smitha (1999) observed grade I and grade II chronic energy deficiencies (CED) among 18 per cent and 3.33 per cent of women agricultural labourers of Thrissur district respectively.

Kupputhai and Mallika (1993) conducted a study among Khond, Gadaba and Porja tribes of Andra Pradesh and reported that 82 to 92 per cent of the tribes had chronic energy deficiency of grade I type. Udaya (1996) also observed different grades of energy deficiency among the farmwomen in Thrissur district. A study conducted by NIN (2002) in West Bengal indicated different grades of CED among 49 per cent of the women. Jyothi (2003) reported various grades of CED among 43.33 per cent of women agricultural labourers in Palakkad district.

Gupta (1999) reported that greater proportion of female suffer from CED than male and are associated with progressive impairment in morbidity and function. Farzana and Manay (2000) observed CED among women in the rural households. Alam (2001) observed that about 50 per cent of women in rural Bangladesh had CED.

In China rural women had a higher incidence of CED than their urban counter parts (Ge, 1995). Women aged more than 35 years are twice as likely to have a BMI less than 18.5 compared to younger women (Ahmed *et al.*, 1998). Getabum *et al.* (2001) observed protein energy malnutrition among the rural women in Ethiopia. Studies carried out by NNMB in India indicated chronic energy deficiency among 39 per cent of women (NIN, 2002).

2.5 FACTORS INFLUENCING THE NUTRITIONAL STATUS OF WOMEN

Malnutrition is a condition when one or two nutrients are less or are in excess in the body (Robinson, 1990 and Begum, 1991). Malnutrition has been described as a biological state resulting from a relative or absolute deficiency or excess of one or more essential nutrients (WHO, 1993).

The maternal knowledge on nutrition is an important factor in influencing nutritional intake of household members (Behrmam, 1995). The nutritional status of each member of the household depends on several conditions being met: food available to the household must be shared according to individual needs, the food must be of sufficient variety, quality and safety and each family members must have good health status (Ravindran, 1996).

Poverty is the first source of limitation on the consumption of food by large sections of the population (Swaminathan, 1996 and Singh, 1998). According to King *et al.* (1997) an individuals occupation has been shown to have a

significant effect on the types of food consumed and hence their nutritional status and physical activity. Swamy and Vijayalakshmi (1999) in their study observed that women's poor health status is directly due to her low social status, unequal intrafamilial distribution of food and unequal provision of health care.

Diet varies from individual to individual due to variation in the social, economic, demographic status and seasons and the diet has a far-reaching influence on health and nutritional status. According to Yongok (2001) income and education are the most important variables influencing the food and nutrient consumption. The author also opined that individuals with high socio economic status had significantly higher intake of most of the nutrients.

Household income, educational level and occupation of the head of the household and size of household affect the nutritional status (WHO, 1995). The socio-economic factors such as income, occupation and migration have a profound influence on nutrient intake, while among the biological factors, sex and physiological status of women emerge as strong variables in influencing nutrient intake (Busi and Saileela, 1999).

Employment and economic improvement of women combined with education, health and social inputs would definitely serve as a motivation for consuming nutritious food (Vijayalakshmi, 1991). According to Rajkumar and Premakumari (2000) women's health and nutritional status are affected by socio-economic conditions like poverty, illiteracy, over work, repeated pregnancies, high infant and maternal mortality rates, defective health care services, faulty food habits, hazardous work environment, infections and infestations. The most important social, economic and cultural dimensions which affect women's provision of nutrition are women's employment, women's decision making power, the way of disposal of their income and their ability to cook and serve adequate quantities of food to individual household members (Khetarpaul and Grover, 2001).

Nayga (1994) observed several factors like urbanisation, region, race, ethnicity, sex, unemployment, food stamp participation, household size, weight, height, age and income as the factors which affect the consumption of certain food groups. Rothenberg *et al.* (1994) in their study observed that food choices and intakes were related to socio economic status and activity of daily living status in the homogeneous population.

Employment is the best and cheapest guarantee to enhance the nutritional status as it supplements household income and paves for better purchasing power (Hemalatha *et al.*, 2000). Roos *et al.* (2001) reported that unemployment and economic difficulties in the family decreased the level of food intake.

Variation in food consumption pattern and nutrient intake are due to the inequalities in income and occupational status (Brahmam *et al.*, 1987; Bigsten *et al.*, 1992 and Rahman and Rao, 2000). Rose *et al.* (1995) opined that economic factors especially income affect the dietary intake.

Studies conducted among the vulnerable rural segments of Hyderabad and Karnataka indicated more nutritional inadequacy among the lower socio-economic groups (Rao *et al.*, 1981; Swamy and Vijayalakshmi, 1999; Farzana and Manay, 2000).

Rao *et al.* (1986) observed that the dietary and nutritional status of urban population groups had a clear cut socio-economic difference with high income group showing higher level of nutrient consumption and better nutritional profile than the other two groups and slum registered the poorest level of nutrient consumption.

Behrmam (1995) indicated that generally, daily consumption of green leafy vegetables, vegetables and fruits were low in low income families. Income

status bears a relation with consumption of pulses, milk, fruits, fats and oils and sugar. Among these food groups fats and milk tended to show sharp differences between the income groups (NNMB, 1996). According to Farzana and Manay (2000) high income households spend more income for protein rich protective foods like pulses, milk, vegetables and fresh foods in their diet.

Behrmam (1995) reported that the kind of wages have better chances of directly benefiting the food intake particularly of the labour households. In Hyderabad, Rahman and Rao (2000) indicated an increased intake of qualitative foods with an increase in the income. Rahman and Rao (2001) also reported that the low income group families spent 82 per cent of their total income for food while the high and middle income groups spent only 40 and 43 per cent of their total income for food respectively.

Behrumram and Deolalikar (1986) opined that the seasonal variations in environmental conditions, food availability, food prices and labour demands in rural areas of developing countries produced considerable variations in food consumption pattern and also in the nutrition and health status of the people. Devadas and Easwaran (1986) opined that food habits of the people depended on availability of food. Adhiguru and Ramaswamy (2003) reported that non-availability of green leafy vegetables during the summer and monsoon month also produced considerable variations in food consumption pattern, nutrition and health status of the people.

Nazmul and Ahmed (1986) opined that socio-economic factors like land holding had a positive influence on healthy living of farmers. Tanner (1987) also indicated strong relationship between land holdings and prevalence of malnutrition. According to Haillu (1990) food habits of subsistence farmers depended mainly on the subsistence cropping system and the seasonalities and perishabilities of certain foods and food products.

According to Brahmam *et al.* (1987) and Farzana and Manay (2000) the average dietary consumption of various foods and the nutritional status among the urban groups differed according to their socio economic status. Brahmam *et al.* (1987) also indicated that the poor nutritional standards of the slum dwellers in urban area are due to poor food intake and environmental conditions. Kumar (1996) reported that among the rural and urban areas of India the changes in the food consumption pattern are due to the changes in faster urbanization and growth in the economy.

Genecaga and Huddleston (1986) reported that educational level of parents and their knowledge of sound dietary practices as the most important determinants of nutritional status. A positive association between parental literacy and nutritional status was reported by Vazir (1990) and Devadas *et al.* (1991). Alderman and Garcia (1992) reported that raising of the household food consumption had less impact on nutritional status than increasing the educational level of mothers.

Larger family size resulted in improper food distribution among family members of agricultural labourers mainly due to low purchasing power and faulty food habits (Thimmayamma, 1983). Swaminathan (1986) and Mary (1986) pointed out that persistence of under and malnutrition are largely due to inadequate purchasing power which in turn arises from a low growth rate in livelihood opportunities. According to Saxena (1986) nuclear families were better than joint families in health and development.

Among rural households, women's time use and opportunities for off farm employment might be the important variables mediating nutritional status of women and children (Ashmore and Curry, 1994 and Ashmore, 1996). Ashmore (1996) also reported that commercial live stock production may alter both food intake and the intrahousehold control of nutritional resources.

Dewalt (1993) reported that nature of the crop, control of production and income, allocation of household labour, maintenance of subsistence production, land tenure and pricing policies for both cash crops and food stuffs appear to be the most crucial factors in the nutritional status of rural people.

The volume and structure of food consumption were influenced mostly by changes in retail food prices and by the price of industrial goods and nominal wage levels (Stikova, 1994).

Sundari (1990) pointed out that for women employed as casual labourers, their job, inspite of providing greater economic freedom resulted in greater drudgery and consequently poor nutritional status. The working environment in which women spend a significant part of their functional life has a decisive influence on their health, safety, physical, mental and social well being (Rajkumar and Premakumari, 2000).

According to Suiter and Hunter (1980) physiological influences and thoughts, beliefs and emotions will affect the nutritional status of an individual. Gopalan (1991) indicated that the nutritional problems in the developing countries are due to the inadequate diet with respect to quantity and quality of food necessary for the physiological needs and welfare of the population. According to Perla and Estella (1997) other factors, which influence nutritional status, are political stability, gross domestic product, growth rate, agricultural production, poverty incidence and prevalence, annual per capita income, employment rate, infant mortality rate, occurrence of infectious and non infectious diseases and delivery of health, nutrition and other social services.

Women's access to and control over assets is an important determinant of their ability to lead a healthy life. According to Deshpande *et al.* (2001) nutrition, financial independence and education for women are being stressed as important pre-requisites to improve nutritional status of the community.

Materials and Methods

3. MATERIALS AND METHODS

This chapter discusses the methods and procedures followed in various phases of research. It deals with the locality 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.

1. Locality of the study
2. Selection of samples
3. Plan of study
4. Methods adopted for the study
5. Development of tools
6. Conduct of the study and
7 Interpretation of data

3.1. LOCALITY OF THE STUDY

The study was conducted in the coastal areas of Thrissur district. There are five taluks in Thrissur district viz., Thalappilli, Thrissur, Chavakkad, Mukundapuram and Kodungallore. Among these, Chavakkad and Kodungallore are the taluks in coastal area. Hence, these two taluks were selected for the study. There are 12 grama panchayats in Kodungallore and 17 grama panchayats in Chavakkad taluks that consist of coastal area. Among this, Thalikkulum and Nattika grama panchayats from Chavakkad taluk and Kaipamangalam grama panchayat from Kodungallore taluk were randomly selected for the study. From these 3 grama panchayats, 10 panchayat wards having fisher women families were randomly selected for the study.

3.2 SELECTION OF SAMPLES

From each of the selected panchayat wards, 10 fisher women families were selected randomly and thus a total of 100 fisher women (18-45 years) formed the sample for the study.

A sub sample of 50 fisher women was randomly selected from the above sample, for conducting clinical examination. Food weighment survey and biochemical estimation of blood were conducted in a sub sample of 20 fisher women selected at random from the 50 women selected for clinical examination.

3.3 PLAN OF STUDY

Based on the objectives of the study, the plan of study was designed. The study comprised of

1. A base line survey to collect the socioeconomic details of the selected families of fisher women using a structured and pretested interview schedule.
2. A dietary survey to assess the food consumption pattern of the families especially the dietary habits of the women.
3. Assessment of nutritional status of selected fisher women by conducting

   a) Anthropometric measurements namely height, weight, waist and hip circumferences of women.

   b) Clinical examination in a sub sample of 50 fisher women to identify the manifestations of symptoms related to malnutrition.

   c) A one-day food weighment survey in a sub sample of 20 fisher women to determine the actual food and nutrient intake.

   d) Biochemical estimation of blood for haemoglobin in a sub sample of 20 fisher women.

   e) Statistical analysis and interpretation of data using suitable statistical techniques.

3.4 METHODS ADOPTED FOR THE STUDY

Determination of suitable methods and procedures very important to get accurate and reliable data. Interview method was used with the help of structured and pretested schedules to collect the required information about the socio-economic background, personal information, and food consumption pattern of the selected families.

The interview method is the most suitable way to collect data since it proceeds systematically and enables quick recording (Bass *et al.*, 1979). 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 were mainly of two types one which concentrated on qualitative aspects of the foods i.e., kind of foods eaten, and the other which estimates the amount of food consumed in quantitative terms, i.e., how much of food was eaten.

Anthropometry has been accepted as an important method for assessment of nutritional status and it is a simple and useful practical index (Jelliffee, 1966; Cooper and William, 1982; Mc Laren *et al.*, 1984; Vijayaraghavan, 1987; Sharma and Kalia, 1990; Reddy *et al.*, 1993; and Rao and Vijayaraghavan, 1996). Anthropometric indices, presence of clinical deficiency signs, dietary assessment and actual food intake were widely used as direct parameters of nutritional status (Aebi, 1983).

According to Rao and Vijayaraghavan (1996), anthropometry can help in the assessment of sub clinical stages of malnutrition and it has been recognized as a reliable tool to identify nutritionally vulnerable groups.

In the present study, anthropometric measurements like height, weight, waist and hip circumference of the respondents were recorded using standard methods.

Body weight is the most widely used and the simplest anthropometric measurement for the evaluation of nutritional status (Swaminathan, 1987; Rao and Vijayaraghavan, 1996). A change in body weight may be the result of change in the health of an individual, change in dietary supplies or even changes in one's physical activity. Body weight is a sensitive indicator of nutritional status (Venkitalakshmi and Peramma, 2000).

Crown-heel length or height deficit is an indicator of long-term malnutrition. The extend 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 Mass Index (BMI) is used as an indicator of nutritional status of adults (Brahmam, 1999). In order to assess the Chronic Energy Deficiency (CED) of fisher women BMI was calculated by the formula.

$$BMI = \text{weight (kg)}/\text{height (m}^2\text{)}$$

According to Lean *et al.* (1995) waist circumference is used as a measure for indicating the need for weight management. The technique for waist measurement suggested by Chadha *et al.* (1995) was followed and the circumference of the waist at the umbilicus was measured. Again, the technique

suggested by Chadha *et al.* (1995) for hip measurement, where the circumference of the hip at the maximum point of protrusion was measured and recorded.

The waist hip ratio (WHR), according to Lean *et al.* (1995), reflects the proportion of body fat located intra abdominally as opposed to that in the subcutaneous region. Hence, after documenting the waist and hip measurements of the respondents their waist-hip ratio was calculated. As suggested by Chadha *et al.* (1995) the waist-hip ratio was calculated by dividing the circumference of the waist by the circumference of the hip.

Monitoring anthropometric measurements like weight, height, waist and hip circumference were considered as the best method to detect various degrees of growth retardation among adult. Even before clinical manifestations, the growth pattern provides information regarding changes in nutritional status (George, 2000).

Clinical examination provides direct information of signs and symptoms of dietary deficiencies prevalent among people [Swaminathan, 1986]. According to Rao and Vijayaraghavan (1996) clinical examination reveals the anatomical changes due to malnutrition that can be diagnosed by naked eye. In the present study clinical examination was conducted in a sub sample of 50 fisher women.

Food consumption survey provides data on the type and amount of food consumed by a representative sample of the survey population (Schofield, 1985). Devadas and Easwaran (1986) observed that food weighment method is the most reliable method to assess the actual food intake of an individual. Diet surveys constitute an essential part of any complete study of nutritional status of individuals or groups and provide essential information on nutrient intake levels, source of nutrients, food habits and attitudes (Gopaldas and Seshadri, 1987).

Since, the diets consumed by rural low income categories are more or less uniform with negligible variations in their day to day intake, the food intake pattern and quantities of food consumed can be obtained by following a one day food weighment method (Jansi and Sarojini, 1991). According to Mari (1995) actual food consumption within the family by one-day weighment could be better mentioned in micro samples. Hence, in the present study one-day food weighment survey was conducted in 20 fisherwomen to assess their actual food and nutrient intake.

Biochemical estimation represented the most objective assessment of nutritional status of an individual, providing pre or sub clinical information (Sausberlich *et al.*, 1977). Daphna (1979) pointed out that biochemical tests are of utmost importance in the assessment of individual nutritional status. Estimating the prevalence of anaemia depends upon the methods used for assessing haemoglobin concentration (Singh *et al.*, 2001). The authors also reported that for all degrees of anaemia, cyanmethaemoglobin method would give correct values of haemoglobin. Hence, in the present study biochemical estimation of blood was conducted in 20 fisher women to assess their haemoglobin level.

3.5 DEVELOPMENT OF TOOLS

Tools are certain instruments, which are used in research for gathering new facts. To collect information regarding the socio economic and dietary pattern of the families, interview method was used. The interview schedule for obtaining the socio economic 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, personal habits, living facilities, housing conditions, health facilities available in the locality, and hygienic practices. The pretested schedule is presented in Appendix-I.

A dietary survey schedule 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 occasions, infant feeding practices and food and nutrient intake of the respondents based on ACU. The pretested schedule is presented in Appendix-II.

A schedule was developed for clinical examination and is presented in Appendix-III.

Separate schedule was structured for food weighment survey and presented in Appendix-IV.

Haemoglobin was estimated by cyanmethaemoglobin method as suggested by NIN (1983).

3.6 CONDUCT OF THE STUDY

3.6.1 Socio economic and dietary pattern of the families

The information on the socio economic and dietary pattern of the families were collected with the help of pretested schedules by interview method. The accuracy of the answers were checked by supplementary questions whenever necessary.

3.6.2 Assessment of nutritional status

3.6.2.1 Anthropometric measurements.

Weight was recorded using a bathroom balance, which was checked by calibration with standard weights. Weight was recorded with minimum clothing on the subject and expressed in kilogram.

Height was measured using a fibreglass tape. The subject was asked to stand straight without slippers, with the heels, buttocks, shoulder and occiput against the wall. The height was recorded in centimeters.

The technique suggested by Chadha *et al.* (1995) was followed to measure waist and hip circumferences. The circumference of waist at the umbilicus was measured for waist circumference and the circumference of hip at the maximum point of protrusion was measured for hip circumference.

3.6.2.2 Clinical examination

Clinical examination was conducted with the help of a qualified physician.

Clinical examination is an important and sound method of assessing the nutritional status of a community (Jelliffee, 1966 and Kamath, 1986). In the present study clinical examination was conducted in a sub sample of 50 fisher women.

3.6.2.3 Food weighment survey

To assess the actual food and nutrient intake, a one-day food weighment survey was conducted in a sub sample of 20 fisher women. 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 outside the house were 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 respondent was measured and converted to its raw equivalents. The nutritive value of the food consumed was computed using food composition tables (Gopalan, 1989).

3.6.2.4 Estimation of blood haemoglobin level

Blood haemoglobin level of the sub sample of 20 fisher women was estimated using cyanmethaemoglobin method suggested by NIN (1983).

3.7 INTERPRETATION OF DATA

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

Results

4. RESULTS

The results of the study on "Nutritional profile of fisher women" are presented under the following headings.

4.1 Socio economic profile of the families

4.2 Food consumption pattern of the families

4.3 Nutritional status of the respondents assessed by

a) Anthropometric measurements

b) Clinical examination

c) Food weighment survey

d) Biochemical estimation of blood

4.1 SOCIO ECONOMIC PROFILE OF THE FAMILIES

Distribution of the families according to religion, caste, type of family and family size are presented in Table 1.

Table 1. Distribution of families according to religion, caste, type of the family and family size

n = 100

Sl.No.	Category	Number of families
1	Religion	
	Hindu	90
	Muslim	10
2	Caste	
	Mukkuva [OEC]	43
	Araya (OEC)	47
	Other Backward Caste	10
3	Type of family	
	Nuclear	96
	Joint	4
4	Family size	
	1	1
	2	5
	3	9
	4	28
	5	26
	>5	31

Table 1 reveals that most of the families (90%) Hindus and the remaining belonged to Muslim community.

Among them 47 per cent were Arayas, 43 per cent were Mukkuva and the remaining (10%) of the families surveyed were Muslims and they belonged to other backward communities. The table also showed predominance of nuclear type families which constituted 96 per cent, and the remaining were joint families.

Regarding the family size it was found that as much as 31 per cent of the families had more than 5 members in their family and 63 per cent had 3-5 members and the rest (6%) had 1-2 members.

Distribution of family members on the basis of age and sex is presented in Table 2.

Table 2. Distribution of family members on the basis of age and sex

Sl.No.	Age (year)	Number		
		Male n=259	Female n=255	Total n=514
1	>60	6 (1.17)	16 (3.11)	22 (4.28)
2	50-60	27 (5.25)	3 (0.58)	30 (5.84)
3	40-50	36 (7.00)	56 (10.89)	92 (17.90)
4	30-40	28 (5.45)	36 (7.00)	64 (12.45)
5	20-30	66 (12.84)	70 (13.62)	136 (26.46)
6	10-20	49 (9.53)	41 (7.98)	90 (17.51)
7	0-10	47 (9.14)	33 (6.42)	80 (15.56)

Numbers in parentheses are percentage

It was found that as much as 56.81 per cent of the total population was in the age group of 20 to 50 years and composed of 25.29 per cent male and 31.51 per cent female members. The people above 50 years constituted 10.12 per cent,

people between 10 to 20 years constituted 17.51 per cent and children below 10 years constituted 15.56 per cent of the total population.

Educational status of the family members above 18 years of age is presented in Table 3.

Table 3. Educational status of family members

n = 374

Educational status	Age in years						Total	
	18-45		45-55		>55			
	M	F	M	F	M	F	M	F
Lower primary	21 (15.79)	43 (24.29)	17 (47.22)	2 (66.67)	3 (37.50)	5 (29.41)	41 (23.16)	50 (25.38)
Upper primary	46 (34.59)	37 (20.90)	15 (41.67)	-	2 (25.00)	1 (5.88)	63 (35.59)	38 (19.29)
High School	47 (35.34)	57 (32.20)	1 (2.78)	-	-	-	48 (27.12)	57 (28.93)
College	11 (8.27)	24 (13.56)	-	-	-	-	11 (6.21)	24 (12.18)
Illiterate	8 (6.02)	16 (9.04)	3 (8.33)	1 (33.33)	3 (37.50)	11 (64.71)	14 (7.91)	28 (14.21)
Total	133 (100)	177 (100)	36 (100)	3 (100)	8 (100)	17 (100)	177 (100)	197 (100)

Numbers in parentheses are percentage

Among 177 male and 197 female members above 18 years of age 7.91 per cent male and 14.21 per cent females were illiterate. It can be seen that the percentage of illiterates increased with increase in age group and in the highest age of above 55 years 37.5 per cent male and 64.71 per cent female were illiterate. About 27.12 per cent male and 28.93 per cent female members had studied up to high school level and only 6.21 per cent male and 12.18 per cent female members had received college level of education. None of the male and female members above 55 years of age had attained high school level of education.

Details regarding the educational status of the respondents is presented in Table 4.

Table 4. Educational status of respondents

n = 100

Sl.No.	Educational status	Number of respondents
1	Illiterate	13
2	Lower primary	40
3	Upper primary	26
4	High school	15
5	College	6

About 40 per cent of the respondents attained lower primary education and 26 per cent had studied upto upper primary level. Only a minority (6%) of the respondents had studied upto college level and 15 per cent had studied upto high school level. The rest (13%) were found to be illiterate.

Details regarding educational status of children and adolescents are given in Table 5.

Table 5. Educational status of children and adolescents

n = 140

Sl. No.	Educational status	0-4 years		5-9 years		10-12 years		13-15 years		16-17 years		Total	
		B	G	B	G	B	G	B	G	B	G	B	G
1	Not started studies	18 (69.24)	9 (56.25)	-	-	-	-	-	-	-	-	18 (21.95)	9 (15.52)
2	Anganwadi	6 (23.08)	6 (37.5)	-	-	-	-	-	-	-	-	6 (7.32)	6 (10.34)
3	Lower primary	2 (7.69)	1 (6.25)	20 (90.91)	15 (88.24)	1 (8.33)	2 (22.22)	-	-	-	-	23 (28.05)	18 (31.03)
4	Upper primary	-	-	2 (9.09)	2 (11.76)	11 (1.67)	7 (77.78)	-	1 (11.11)	1 (6.67)	- 1 (14.29)	14 (17.07)	11 (18.97)
5	High school	-	-	-	-	-	-	7 (100)	8 (88.89)	9 (60)	5 (71.43)	16 (19.51)	13 (22.41)
6	College	-	-	-	-	-	-	-	-	5 (33.33)	1 (14.29)	5 (6.09)	1 (1.72)
7	Illiterate	-	-	-	-	-	-	-	-	-	-	-	-
		26 (100)	16 (100)	22 (100)	17 (100)	12 (100)	9 (100)	7 (100)	9 (100)	15 (100)	7 (100)	82 (100)	58 (100)

Numbers in parentheses are percentages

It was observed that about 69.24 per cent of boys and 56.25 per cent of girls below four years did not start their studies. About 23.08 per cent boys and 37.5 per cent girls below four years were attending anganwadies. About 28.05 per cent of boys and 31.03 per cent of girls had attained lower primary education where as 17.07 per cent of boys and 18.97 per cent girls had upper primary education. It could be seen that about 19.51 per cent boys and 22.41 per cent girls had attained high school level of education and only 6.09 per cent of boys and 1.72 per cent of girls had college level of education. None of the children between 4 to 17 years were illiterate.

Occupational status of family members above 18 years of age is presented in Table 6.

Table 6. Occupational status of family members

n=374

Sl. No.	Category	Age in years						Total	
		18-45		45-55		>55			
		M	F	M	F	M	F	M	F
1	Fish related work	94 (70.68)	108 (61.02)	35 (97.22)	-	4 (50)	5 (29.41)	133 (75.14)	113 (57.36)
2	Coolie	3 (2.26)	1 (0.56)	1 (2.78)	-	-	-	4 (2.26)	1 (0.51)
3	Driver	2 (1.50)	-	-	-	-	-	2 (1.13)	-
4	Gulf	2 (1.50)	-	-	-	-	-	2 (1.13)	-
5	Beedy maker	-	16 (9.04)	-	-	-	-	-	16 (8.12)
6	Other work	1	2 (1.13)	-	-	-	-	1 (0.56)	2 (1.02)
7	No work	31 (23.31)	50 (28.25)	-	3 (100)	4 (50)	12 (70.59)	35 (19.77)	65 (32.99)
	Total	133 (100)	177 (100)	36 (100)	3 (100)	8 (100)	17 (100)	177 (100)	197 (100)

Numbers in parentheses are percentage

Out of the total population above 18 years, 65.78 per cent were engaged in fish related work which included 75.14 per cent male and 57.36 per

cent female members. Among this group majority of male and female members were from the age group of 18 to 45 years which included about 70.68 per cent male and 61.02 per cent female members.Only1.3 per cent were working as coolies other than fish related work and a minority of 0.53 per cent were engaged as driver. About 4.28 per cent were engaged in beedy making work and 0.8 per cent were engaged in other work. Out of the total population 26.74 per cent were not engaged in any work.

Occupational status of the head of the families are presented in Table 7.

Table 7. Occupational status of head of the family

n = 100

Sl.No.	Occupational status	Number of families
1	Fishing	73
2	Fish vending	8
3	Fish processing	2
4	Fish packaging	2
5	Others	1
6	Nil	14

Majority of the head of the families (73%) were involved in fishing. About 8 per cent were involved in fish vending and 2 per cent each involved in fish processing and fish packaging. Only a minority of 1 per cent was engaged in other work. Rest of the 14 per cent did not go for work.

Occupational status of respondents is presented in Table 8.

Table 8. Occupational status of the respondents

Sl.No.	Occupational status	Number of respondents
1	Fish processing	69
2	Fish processing and fish handling	23
3	Fish handling	5
4	Fish packaging and fish handling	2
5	Fish vending	1

Majority of the respondents (69%) were involved in fish processing. About 23 per cent of the respondents were involved in both fish processing and fish handling depending upon the availability of work. Five per cent respondents involved only in fish handling and 2 per cent respondents were involved in both fish handling and fish packaging. Only a minority of 1 per cent respondents was engaged in fish vending.

Marital status of respondents is presented in Table 9.

Table 9. Marital status of respondents

n = 100

Sl.No.	Category	Number of respondents
1	Married	86
2	Unmarried	2
3	Widow	12

It was observed that 86 per cent of the respondents were married and 2 per cent were unmarried and the rest (12%) were widow.

Distribution of the families based on average monthly income is given in Table 10.

Table 10. Distribution of families based on average monthly income

n=100

Income level (Rs.)	Number of families
< 500	3
500-1000	59
1001-1500	26
1501-2000	9
2001-2500	1
2501-3000	0
> 3000	2

Fifty nine per cent of families had monthly income ranging in between Rs.500-1000 and another 26 per cent between Rs.1001-1500. About 9 per cent of families had monthly income between Rs.1501-2000. Only 3 per cent families had an income less than Rs.500 and 1 per cent had an income ranging between

Rs.2001-2500. Only 2 per cent families had monthly income greater than Rs.3000/-.

Details about dowry system prevailing in the community were enquired and found that fourty six per cent of families got dowry in the form of cash or gold. Fifty four per cent of families did not accept any dowry.

Living conditions of the families were assessed by observing their housing conditions like ownership, type of house, type of roof, structure of house and separate kitchen in the house.

The details are presented in Table 11.

Table 11. Details of living conditions of households

n=100

Housing conditions	Number of families
Ownership	
Own house	97
Rented house	3
Type of house	
1 room	5
2 rooms	34
3-5 rooms	58
> 6 rooms	3
Type of roof	
Thatched	45
Tiled	38
Concrete	17
Structure of house	
Mud	9
Brick	60
Thatched	31
Separate kitchen	
Present	77
Absent	23

As shown in Table 11, 97 per cent of the families were living in their own house and 3 per cent of the families lived in rented house. In 58 per cent of the houses there were 3-5 rooms and in 34 per cent there were only 2 rooms. Six or more rooms were found in 3 per cent of the houses. Most of the houses (45%) had thatched roof and 38 per cent had tiled roof. Only 17 per cent houses had concrete roofing. Majority of the houses (60%) were built with bricks as the wall material and thirty one per cent of the houses had thatched walls and only 9 per cent of the houses are built with mud. Majority of the houses (77%) had a separate kitchen.

The living facilities like electricity, drainage facilities, lavatory facilities, drinking water and transport facilities possessed by the families are presented in Table 12.

Table 12. Other living facilities of the families

n=100

Living facilities	Number of families
Electricity	
Present	79
Absent	21
Drainage	
Present	0
Absent	100
Lavatory facilities	
Own latrine	77
Open field	23
Drinking water	
Own hand pump	98
Own well	2
Transport facilities	
Bicycle	15
Motor bike	9
Catamarine	4
Ordinary boat	7
Nil	65

From Table 12, it was found that, 79 per cent families had electric connection in their houses. None of the families had proper drainage facilities for

their houses. Seventy seven per cent of the families had own latrines and 23 per cent families were using open fields for defecation.

Ninety eight per cent families had their own hand pumps connected to bore wells, 2 per cent families were found to have their own well as the source of drinking water. Regarding transport facilities, 15 per cent of the families used bicycle, 9 per cent of the families had motorbikes for transportation. Four per cent of the families had catamarine and 7 per cent of the families had their own ordinary boats for fishing. Majority of the families (65%) did not possess any form of transportation facilities as their own.

Exposure of the families to various information sources were analyzed and is presented in Table 13.

Table 13. Utilization of information sources

n=100

Information sources	Number of families
Radio	40
Television	33
Transistor	4
None	23

It was found that 40 per cent of families had radio and 33 per cent of families had their own television set. Four per cent of families had transistor and 23 per cent of families did not have any of information sources.

Monthly expenditure pattern of the families are given in Table 14.

Table 14. Monthly expenditure pattern

n = 100

Range of expend-iture (%)	Number of families												
	Food	Cloth ing	Shelter	Transport	Recretat-ion	Educat-ion	Health	Electricity	Fuel	Personal expenses	Repay-ment of loans	Savings	Debt
0- 5	-	88	60	64	82	33	78	12	37	53	-	9	8
5- 9	-	12	1	31	1	12	22	49	53	1	1	8	13
10-19	-	-	-	5	-	7	-	19	8	1	6	11	24
20-29	-	-	-	-	-	2	-	1	-	-	9	2	10
30-39	2	-	-	-	-	-	-	-	-	-	8	2	3
40-49	4	-	-	-	-	-	-	-	-	-	1	-	5
50-59	17	-	-	-	-	-	-	-	-	-	1	-	3
60-69	19	-	-	-	-	-	-	-	-	-	1	-	-
70-79	32	-	-	-	-	-	-	-	-	-	-	-	1
80-89	24	-	-	-	-	-	-	-	-	-	-	-	-
>90	2	-	-	-	-	-	-	-	-	-	-	-	-
Nil	-	-	39	-	17	46	-	19	2	45	73	68	33

Majority of the families (94%) spent above 50 per cent of their monthly income for food and the rest (6%) spent less than 50 per cent. All the families spent less than 10 per cent of their income for clothing and health.

Majority of the families spent less than 10 per cent of their income for shelter (61%), transportation (95%), recreation (83%) and fuel (90%).

Fifty four per cent of the families spent up to 30 per cent of their total income for education of children while 46 per cent did not make any expenditure for education. Up to 20 per cent of the monthly income was spent for electricity and personal expenses by 80 per cent and 55 per cent of the families respectively.

Majority of the families (73%) did not spent any money for loan repayment while the rest (27%) spent 5 to 69 per cent of their income for this purpose. Sixty seven per cent of the families had debt and at the same time 33 per cent did not have any debt. About 68 per cent of the families had no savings.

Details regarding personal habits of the respondents are given in Table 15.

Table 15. Details regarding personal habits

n=100

Sl.No.	Habits	Number of respondents
1	Tobacco chewing	16
2	No tobacco chewing	84

Table 15 reveals that 84 per cent of the respondents were not having the habit of tobacco chewing and 16 per cent of the respondents chewed tobacco regularly.

Distribution of families based on major crisis occurred in the family is presented in Table 16.

Table 16. Distribution of families by crisis

n=100

Details	Number of families
Disease	6
Handicap	3
Accident	1
No crisis	90

Only 6 per cent of the families were found to be affected by permanent disease like asthma, diabetes and kidney stones. Three per cent of the families were found to be handicapped and one per cent of the families had accidents. Most of the families (90%) did not have any crisis.

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

Table 17. Type of treatment followed

n = 100

Type of treatments	Number of families
Allopathy	96
Allopathy and Homeopathy	3
Allopathy and Ayurvedic	1

All the families adopted allopathic treatment for treating illnesses. Among this three per cent followed both allopathic and homeopathic treatments and one per cent used both allopathic and ayurvedic treatments.

Details of availing health care facilities in the locality are given in Table 18.

Table 18. Details of availing health care facilities

n =100

Sl.No.	Facilities	Number of families availing the facility
1	District hospital	44
2	District hospital and Public health center	40
3	District hospital and private doctor	14
4	District hospital and medical college hospital	2

All the families depended on the district hospital for treatment of their illnesses. Among this 40 per cent of the families depended on the district hospital as well as public health centre, fourteen per cent of the families depended on the district hospital and private doctor and a minority of 2 per cent depended on both district hospital and medical college hospital for treating diseases.

Details regarding social participation of the families are presented in Table 19.

Table 19. Details regarding social participation of the families

n =100

Sl.No.	Details	Number of families
1	Matsya fed	79
2	Kudumbhashree and Matsya fed	7
3	Sthree shakthi	3
4	Sthree shakthi and Matsya fed	1
5	Mahila samajam and Matsya fed	1
6	Ayal kuttam and Matsya fed	1
7	Not a member of any organization	8

When enquired about the participation of family members in social organizations such as matsya fed, mahila samajam, sthree shakthi, kudumbhashree and ayal kuttam, it was found that majority (79%) of the families were members of matsyafed and 7 per cent of families had membership in both kudumbhashree and matsya fed. Three per cent of families were members of sthree shakthi and only 1 per cent of the families were members in both sthree shakthi and matsya fed. Only one per cent of the families were members of matsya fed and mahila samajam and another one per cent in matsya fed and ayal kuttam. Eight per cent of the families did not have membership in any social organization.

Details regarding use of family planning methods adopted by the respondents are given in Table 20.

Table 20. Details regarding use of family planning methods adopted by the respondents

n=100

Sl.No.	Details	Number of families
1	Condom	-
2	Oral contraceptives	7
3	Abortion	-
4	Not used any method	93

It was observed that majority (93%) of the respondents did not use any family planning methods and only a minority (7%) of the respondents used oral contraceptives as family planning method.

4.2 FOOD COSUMPTION PATTERN OF THE FAMILIES

All the families studied were found to be non-vegetarians

Meal pattern of the families were studied and are given in Table 21.

Table 21. Distribution of families according to meal pattern

n=100

Meal pattern	Number of families
Two major meals	1
Three major meals	99

Ninety nine per cent of families followed 3 meals a day pattern.

Details regarding the monthly food expenditure pattern of the families are presented in Table 22.

Table 22. Monthly food expenditure pattern of families

n = 100

Range of expenditure (%)	Number of families												
	Cereals	Pulses	Green leafy vegetables	Other vegetables	Roots and tubers	Fruits	Fats and oils	Spices and condiments	Sugar	Milk and milk products	Meat	Fish	Egg
0- 5	-	64	80	18	79	66	-	24	6	5	3	26	48
5-9	-	22	-	78	16	4	16	75	75	8	26	12	8
10-19	-	1	-	2	-	-	80	1	19	17	19	3	1
20-29	8	-	-	-	-	-	4	-	-	2	1	-	-
30-39	29	-	-	-	-	-	-	-	-	-	-	-	-
40-49	40	-	-	-	-	-	-	-	-	-	-	-	-
50-59	20	-	-	-	-	-	-	-	-	-	-	-	-
60-69	2	-	-	-	-	-	-	-	-	-	-	-	-
>70	1	-	-	-	-	-	-	-	-	-	-	-	-
Nil	-	13	20	2	5	30	-	-	-	68	51	59	43

From the above table, it was found that 63 per cent of the families spent above 40 per cent of the total food expenditure for the purchase of cereals and 37 per cent of the families spent less than 40 per cent of the total food expenditure for the purchase of cereals.

Majority of the families spent less than 10 per cent of the total expenditure of food for the purchase of pulses (86%), green leafy vegetables (80%), other vegetables (96%), roots and tubers (95%), fruits(70%), spices and condiments(99%),sugar(81%) and egg (56%).

Ninety six per cent of the families spent 5 to 19 per cent of their total food expenditure for the purchase of fats and oils.

Sixty eight per cent, fifty one per cent and fifty nine per cent of the families never spent money for the purchase of milk and milk products, meat and fish respectively.

Details of frequency of purchase of food by the families are presented in Table 23.

Table 23. Details of frequency of purchase of foodstuffs in the families

n=100

Food items	Daily	Weekly	Monthly	Occass-ionaly	Never
Cereals	-	95	5	-	-
Pulses	-	22	4	61	13
Green leafy vegetables	1	19	-	60	20
Other vegetables	1	46	-	51	2
Roots and tubers	-	23	-	72	5
Fruits	-	-	-	70	30
Fats and oils	-	96	4	-	-
Sugar	-	96	4	-	-
Spices and condiments	-	5	95	-	-
Milk and milk products	28	-	-	4	68
Meat	-	10	4	35	51
Fish	-	1	-	40	59
Egg	3	6	-	48	43

From Table 23, it is clear that majority of the families purchased cereals (95%), fats and oils (96%), sugar (96%) once in a week whereas 95 per cent of the families purchased spices and condiments once in a month. Majority of the families purchased pulses (61%), green leafy vegetables (60%), Other vegetables (51%), roots and tubers (72%), fruits (70%) and egg (48%) occasionally. About 68 per cent, 51 per cent and 59 per cent of the families never purchased milk and milk products, meat, fish respectively.

Percentage distribution of the families according to the frequency of consumption of various food items are given in Table 24.

Table 24. Frequency of consumption of food item by the families

n=100

Food items	Number of families							
	Daily	Once in a week	Twice in a week	Thrice In a week	4 times/ week	Monthly	Occass-ionally	Never
Cereals	100	-	-	-	-	-	-	-
Pulses	1	31	24	9	2	-	20	13
Green leafy vegetables	1	52	7	-	1	-	26	13
Other vegetables	2	16	54	15	-	-	11	2
Roots and tubers	-	15	6	-	-	-	64	5
Fruits	-	3	-	-	-	-	68	29
Milk and milk products	32	-	-	-	-	-	3	65
Meat	-	14	2	-	-	6	31	47
Fish	99	-	-	-	-	-	1	-
Egg	3	2	-	2	-	-	57	36
Fats and oils	100	-	-	-	-	-	-	-
Sugar	100	-	-	-	-	-	-	-
Spices and condiments	100	-	-	-	-	-	-	-

It was found that all the families included cereals, fats and oils, sugar and spices and condiments in their daily diet. About 64 per cent and 85 per cent of the families used pulses and other vegetables one to three times in a week. Fifty nine per cent of the families used green leafy vegetables one to two times a week. While roots and tubers, fruits and egg were used occasionally by 64 per cent, 68 per cent and 57 per cent of the families respectively.

Almost all families (99%) used fish daily in their diet. Fourty seven per cent and sixty five per cent of the families never included meat and milk and milk products in their diet.

Details regarding meal pattern of the families indicated that none of the families plan their meals in advance and keep specific time schedule for the intake of meals.

Details regarding the preference given to family members in food distribution are given in Table 25.

Table 25. Details regarding food distribution pattern of the families

n = 100

Preference given to family members in food distribution	Number of families
Equal importance	45
More importance to male members	55

In food distribution, equal importance to all family members was given by 45 per cent of the families whereas 55 per cent gave preference to male members.

Distribution of the families according to their nutritional awareness are given in Table 26.

Table 26. Details regarding nutritional awareness of the families

n = 100

Sl.No.	Details	Number of families
1	No. of times washing cereals	
	1	1
	2	4
	3	95
2	Use soaked pulses	74
	Not using soaked pulses	26
3	Washed green leafy vegetables before cutting	94
	Washed green leafy vegetables after cutting	6
4	Washed vegetables before cutting	95
	Washed vegetables after cutting	5
5	Eat raw vegetables	46
	Did not eat raw vegetables	54
6	Eat raw fruits	54
	Did not eat raw fruits	46
7	Use sprouted pulses	7
	Did not use sprouted pulses	93
8	Use boiled water for drinking	53
	Use water without boiling for drinking	47

Majority (95%) of the families washed cereals three times before cooking. Most (74%) of the families were aware about the importance of soaking pulses before cooking. Ninety four per cent of the families washed green leafy vegetables before cutting. Similarly 95 per cent of the families washed vegetables before cutting. Fifty four per cent of the families did not have the habit of eating raw vegetables whereas 46 per cent consumed raw vegetables. Among the families, 93 per cent were not aware about the importance of sprouted pulses. The habit of drinking water without boiling was practiced by 47 per cent of the families.

Food processing methods adopted by the families are presented in Table 27.

Table 27. Food processing methods followed in households

Processed food item	Number of families
Dry fish	19
Pickles	23
Nil	58

As revealed in table 27, 19 per cent of the families adopted drying as a method of processing fish and 23 per cent prepared pickles. Fifty eight per cent of families never resorted to any method of food processing.

Details about the foods prepared during special occasions were collected and are given in Table 28.

Table 28. Foods prepared during special occasions

n = 100

Occasions	Preparations	Number of families
Birth day	Payasam	5
	Vegetarian dishes	1
	Nil	94
Marriage	Vegetarian dishes	91
	Non vegetarian dishes	9
Death	Vegetarian dishes	24
	Non vegetarian dishes	2
	Nil	74
Festival	Vegetarian dishes	71
	Non vegetarian dishes	8
	Nil	21

As revealed in Table 28, majority of the families did not prepare any special food during birth day (94%) and 5 per cent and 1 per cent of the families prepared payasam and special vegetarian dishes respectively to celebrate birth day. Nine per cent of the families prepared non-vegetarian dishes for marriage whereas majority (91%) of the families prepared vegetarian dishes during marriage. Twenty four per cent of the families prepared vegetarian dishes and only two per cent of the families prepared non vegetarian dishes, connected to the occasion of death and seventy four per cent of the families never prepared any

special food. During festivals, majority of the families (71%) prepared vegetarian dishes and 8 per cent prepared non-vegetarian dishes. Rest of them did not prepare any special food for festive occasions.

Special foods given during special conditions are presented in Table 29.

Table 29. Special foods given during special conditions

n = 100

Details	Type of food	Number of families
Pregnancy	Fruits	2
	Fruits and egg	1
	No special food	97
Lactation	Fruits and egg	1
	Non vegetarian dishes	2
	No special food	97
Infant	Ragi	3
	Biscuit	1
	Commercial infant food	5
	Ragi and commercial infant food	3
	No special food	88

From the above table, it was observed that majority of the families did not give any special food during pregnancy (97%), lactation (97%) and infancy (88%). Two per cent of families gave fruits and only one per cent gave fruits and egg during pregnancy. During lactation two per cent of the families gave non-vegetarian dishes and one per cent gave fruits and egg as a special food. Five per cent of the families gave commercial infant foods and 3 per cent gave ragi during infancy. Three per cent of families gave both ragi and commercial infants foods. Only one per cent gave biscuit as a special food for infants.

Distribution of families based on special food given for sick persons are presented in Table 30.

Table 30. Special food given for sick persons.

n = 100

Details	Type of food	Number of families
Fever	Rice porridge	10
	Bread	5
	Rice porridge and bread	8
	Biscuit	1
	Not give	76
Diarrhoea	Rice porridge	10
	Coconut water	1
	Not given	89
Asthma	Porridge	1
	Not given	99

About 10 per cent of the families gave rice porridge during fever and 5 per cent of families gave bread. Eight per cent of families gave both rice porridge and bread during fever.Only 1 per cent of families gave biscuit as a special food during fever. In the case of diarrhoea 10 per cent of families gave rice porridge and 1 per cent gave coconut water. In the case of asthma one per cent of families gave porridge as a special food.

Details regarding the duration of breast-feeding, it was found that six per cent of the respondents gave breast milk up to 1 year,while 89 per cent children breast fed for 1-2 years and 7 per cent upto three years. Weaning foods were introduced during the third month by sixty one per cent of respondents and 36 per cent gave weaning food during 4^{th} month and 7 per cent gave after fifth month.

4.3 NUTRITIONAL STATUS OF THE FISHER WOMEN

4.3.1 Anthropometric measurements

Distribution of respondents on the basis of weight and height are presented in Table 31.

Table 31. Distribution of respondents on the basis of weight and height.

$n = 100$

Weight (kg)	Percentage of respondents	Height(cm)	Number of respondents
30-39	3	140-145	1
40-49	30	145.1-150	10
50-59	45	150.1-155	18
60-69	20	155.1-160	62
70-79	2	160.1-165	7
		165.1-170	2

Anthropometric measurements like weight and height of all the 100 respondents indicated that weight varied from 39 kg to 72 kg with a mean weight of 53.43 kg and the height varied from 142 cm to 168 cm with an average height of 156.69 cm.

Comparison of weight and height of the respondents with standard weight and height are presented in Table 32.

Table 32. Comparison of weight and height of the respondents with standard weight and height

n = 100

Sl. No.	Category	Standard weight (kg)	Percentage of respondents	Standard height (cm)	Number of respondents
1	Below normal	<50	33	<155	24
2	Normal	50	10	155	6
3	Above normal	>50	57	>155	70

ICMR (1990)

Table 32 reveals that only 10 per cent of the women had normal weight and the body weight of 33 per cent women was found to be less than reference weight suggested for an Indian reference women(*ICMR, 1990*). *Fifty seven per cent of the women had* body weight above normal level. In the case of height, about 6 per cent of the women had normal height and the height of 70 per cent respondents was found to be higher than the height suggested for a reference women. About 24 per cent women had height less than normal height when compared with ICMR standards.

The prevalence of chronic energy deficiency among the respondents on the basis of Body Mass Index (BMI) are presented in Table 33 and Fig.1.

Table 33. Prevalence of CED among the respondents on the basis of Body Mass Index.

n = 100

Sl. No.	Category (BMI)	*Grades of malnutrition*	Number of respondents
1	CED grade III (<16)	Severe	-
2	CED grade II (16-17)	Moderate	2
3	CED grade I (17-18.5)	Mild	11
4	Low weight normal (18.5-20)	Normal with low weight	12
5	Normal (20-25)	Normal	62
6	Over weight (>25)	Obese	13

About 62 per cent of the women were normal with the BMI ranging between 20 and 25. About 12 per cent of women were normal with low body weight and their BMI ranged between 18.5 and 20. About 11 per cent of the women had grade I (mild) chronic energy deficiency and their BMI varied from 17 to 18.5. About 2 per cent of the women had grade II (moderate) chronic energy deficiency with a BMI ranging from 16 to 17. Over weight was prevalent among

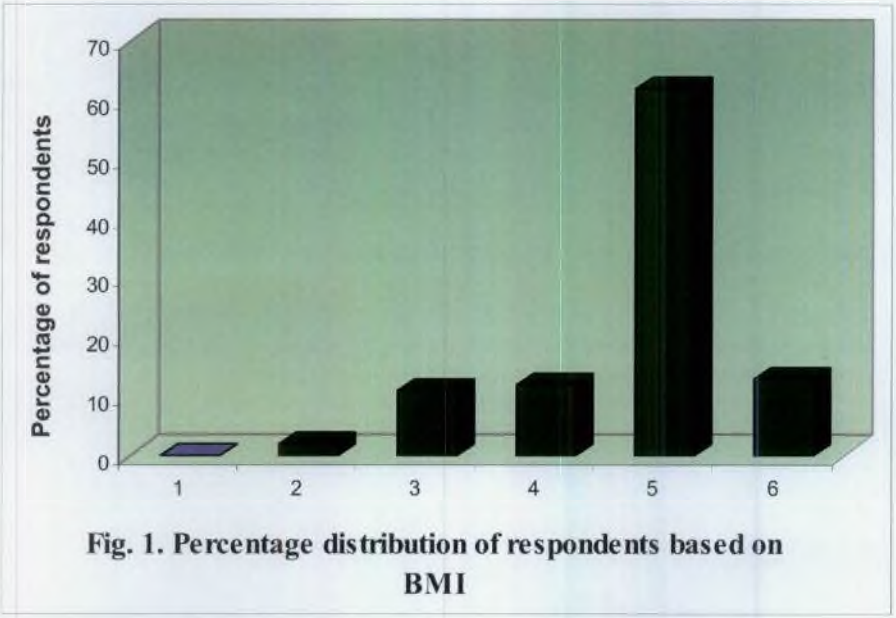

Fig. 1. Percentage distribution of respondents based on BMI

1. CED Grade III
2. CED Grade II
3. CED Grade I
4. Low weight normal
5. Normal
6. Over weight

13 per cent of the women and their BMI were above 25. None of the respondents showed grade III malnutrition.

Distribution of respondents with respect to their waist circumference are given in Table 34.

Table 34. Distribution of respondents with respect to their waist circumference

n = 100

Waist circumference (cm)	Number of respondents
67-74	37
75-81	63

From Table 34 it is clear that 37 per cent of the respondents had a waist measurement that ranged between 67 cm to 74 cm and 63 per cent of the women had a measurement that ranged from 75 cm to 81 cm.

Distribution of respondents with respect to their hip circumference are presented in Table 35.

Table 35. Distribution of respondents with respect to their hip circumference

n = 100

Hip circumference (cm)	Number of respondents
89-99	62
100-109	38

Data presented in Table 35 reveals that the hip circumference of 62 per cent of the respondents varied between 89 cm to 99 cm and 38 per cent of the women had a hip measurement in between 100 cm to 109 cm.

Distribution of respondents with respect to their waist-hip ratio are given in Table 36 and Fig. 2.

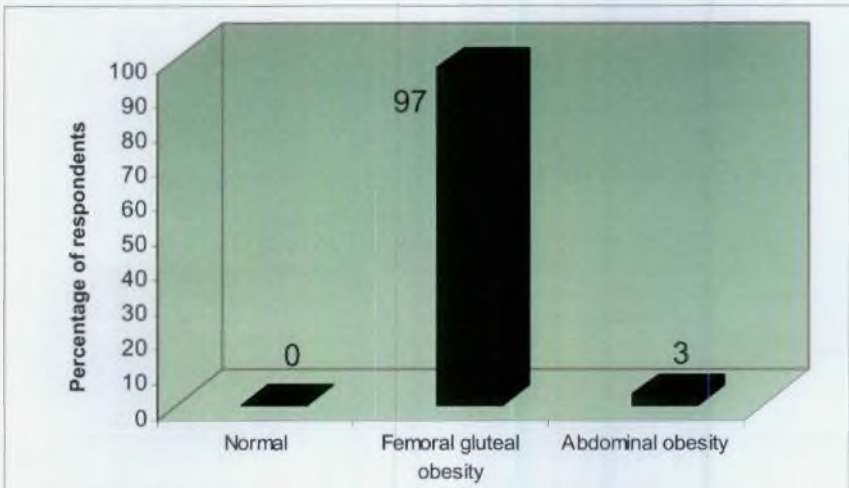

Fig. 2. Percentage distribution of respondents based on waist hip ratio

Table 36. Distribution of respondents with respect to their waist-hip ratio

n = 100

Waist-hip ratio	Number of respondents
0.7 (normal)	-
0.71-0.8 (Femoral gluteal obesity)	97
0.81-0.9 (Abdominal obesity)	3

Ninety seven per cent of the respondents had femoral gluteal obesity where the waist-hip ratio ranged from 0.71 to 0.8 and 3 per cent had abdominal obesity. None of the respondents showed normal waist-hip ratio.

Mean food intake of respondents and their requirements based on ACU are presented in Table 37 and Fig.3.

Table 37. Mean food intake of respondents and their requirement based on ACU

Food items	Requirement based on ACU (g)	Mean Intake (g)	Percentage of requirement	Paired t value ACU verses intake	Correlation ACU verses intake
Cereals	453.61	319.22	70	14.8957**	0.015^{NS}
Pulses	26.87	7.87	29	29.0662**	-0.005^{NS}
Green leafy vegetables	74.08	13.48	18	38.9016**	0.048^{NS}
Other vegetables	54.63	49.71	91	2.1976*	9.299**
Roots and tubers	49.09	30.02	61	10.7273**	0.231*
Fruits	63.96	8.47	13	49.0952**	-0.082^{NS}
Milk and milk products	221.83	16.36	7	39.5625**	-0.131^{NS}
Fish/Meat/Egg	31.99	137.03	428	25.1429**	0.066^{NS}
Fat and oils	35.57	17.89	50	23.2114**	-0.016^{NS}
Sugar	33.56	29.47	88	3.7765**	0.050^{NS}

** - Significant at 1% level

* - Significant at 5% level

NS - Not significant

ACU - Adult consumption unit

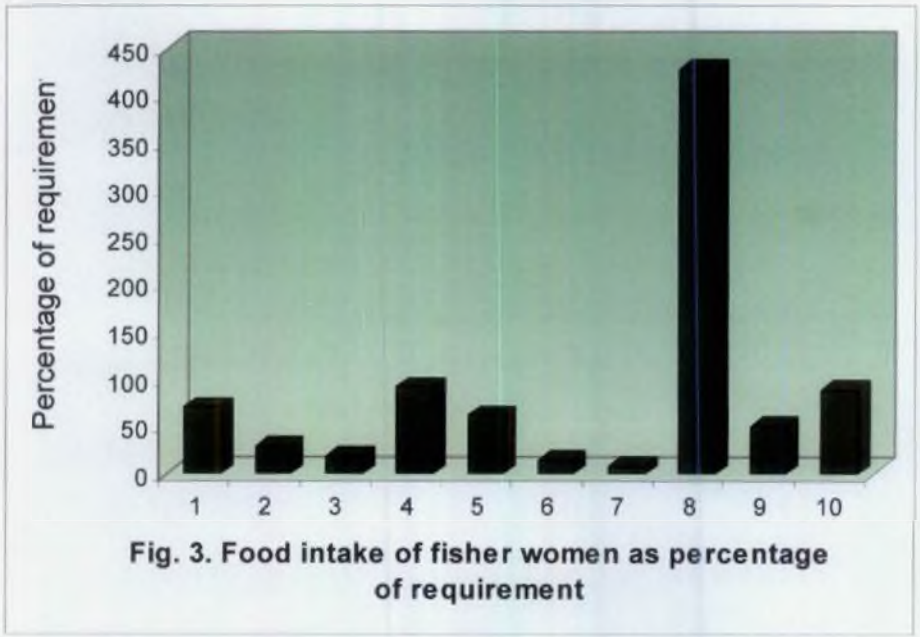

Fig. 3. Food intake of fisher women as percentage of requirement

1. Cereals
2. Pulses
3. Green leafy vegetables
4. Other vegetables
5. Roots and tubers
6. Fruits
7. Milk and milk products
8. Fish/ meat/ egg
9. Fats and oils
10. Sugar

Paired t-test of different food items with requirement based on ACU verses intake was found to be significant. The percentage intake of cereals, other vegetables, roots and tubers, flesh foods, fats and oils and sugar were above 50 per cent of requirement, which were found to be highly significant except other vegetables. Percentage intake of pulses, green leafy vegetables, fruits and milk and milk products were below 50 per cent of the requirement that was found to be highly significant. The requirements based on ACU had a positive correlation with the intake of other vegetables and roots and tubers.

Nutritional status of fisher women was assessed mainly by observing their food consumption and anthropometric measurements and the results are presented in Table 38.

Table 38. Mean food intake of respondents and their BMI and WHR

Food items	Intake (g)	Correlation	
		Intake verses BMI	Intake verses WHR
Cereals	319.22	0.168^{NS}	-0.137^{NS}
Pulses	7.87	0.292**	0.110^{NS}
Green leafy vegetables	13.48	0.463**	0.106^{NS}
Other vegetables	49.71	0.320**	0.271**
Roots and tubers	30.02	0.168^{NS}	0.083^{NS}
Fruits	8.47	0.264**	0.036^{NS}
Milk and milk products	16.36	0.285**	0.135^{NS}
Meat/Fish/Egg	137.03	0.408**	0.270**
Fats and oils	17.89	0.185^{NS}	0.101^{NS}
Sugar	29.47	0.277**	0.055^{NS}

** - Significant at 1% level
* - Significant at 5% level
NS - Not significant

Regression equation is

BMI = 17.9 + 0.0003^{NS} cereals + 0.07^{NS} pulses + 0.09** green leafy vegetables - 0.006^{NS} other vegetables - 0.01^{NS} roots and tubers + 0.05^{NS} fruits + 0.004^{NS} milk and milk products + 0.02* meat/fish/egg - 0.06^{NS} fats and oils + 0.04^{NS} sugar

Intercept = 17.9

R^2 = 33%

WHR = 0.76 - 0.00005^{NS} cereals + 0.00007^{NS} pulses + 0.0001** green leafy vegetables - 0.0003^{NS} other vegetables - 0.0001^{NS} roots and tubers + 0.0001^{NS} fruits + 0.00006^{NS} milk and milk products + 0.000097* meat/fish/egg + 0.0003^{NS} fats and oils + 0.0002^{NS} sugar

Intercept = 0.76

R^2 = 16.9%

The results revealed that the respondents had an average BMI of 21.75 and WHR of 0.77. The mean intake of cereals was 319.22 g and its correlation with BMI and WHR was not significant. The mean intake of pulses and green leafy vegetables were 7.87 and 13.48 g respectively and their correlation with BMI was found to be highly significant where as no relationship was found with WHR. Similar to the results with cereals, though the mean intake of roots and tubers was 30.02 g, the same did not have any correlation with BMI and WHR. Fruits and milk and milk products with an average intake of 8.47 g and 16.36 g respectively had a high correlation with BMI and no relationship with WHR. Though the intake of fats and oils was 17.89 g no relationship was noticed with BMI and WHR. In contrast fleshy foods like meat, fish, egg with an average intake of 137.03 g had a significant relationship with both parameters. Sugar with an average intake of 29.47 g established high correlation of BMI with no relationship at all with WHR.

The multiple linear regression of BMI on different food items had an R^2 of 33 per cent only the green leafy vegetables and meat/fish/egg had a

significant contribution towards increase of BMI. WHR had a still poorer relationship with all the above food items as the multiple linear regression of WHR with food items had an R^2 of only 16.9 per cent.

Mean protein and energy intake of respondents and their requirement based on ACU are given in Table 39.

Table 39. Mean protein and energy intake of respondents and their requirement based on ACU

Nutrients	Requirement based on ACU	Intake	Percentage of requirement	't' value	Correlation
Protein (g)	48.82	49.68	102	0.7373^{NS}	-0.124^{NS}
Energy (Kcal)	2492.74	1637.69	66	20.4687**	-0.093^{NS}

** - Significant at 1% level

* - Significant at 5% level

NS - Not significant

Paired t-test for comparison of ACU and intake was found to be highly significant in the case of energy but non significant in the case of protein.

Nutritional status of fisher women assessed by their nutrient intake and anthropometric measurements and presented in Table 40.

Table 40. Mean protein and energy intake of respondents and their BMI and WHR

Nutrients	Intake	Correlation	
		Intake verses BMI	Intake verses WHR
Protein (g)	49.68	0.393**	0.146^{NS}
Energy (Kcal)	1637.69	0.252*	-0.012^{NS}

** - Significant at 1% level

* - Significant at 5% level

NS - Not significant

Regression equation is

$BMI = 17.4 - 0.003^{NS}\ Energy + 0.17^{**}\ Protein$

Intercept = 17.4

$R^2 = 18.7\%$

WHR = 0.76 - 0.00003** Energy + 0.001** Protein

Intercept = 0.76

$R^2 = 9.9\%$

It was revealed that the respondents had an average BMI of 21.75 and WHR of 0.77. The mean intake of protein was 49.68 g and its correlation with BMI was found to be highly significant and WHR was not significant. The mean intake of energy was 1637.69 kcal and its correlation with BMI was found to be highly significant where as no relationship was found with WHR.

The multiple linear regression of BMI on protein and energy had an R^2 of 18.7 per cent and only the protein had a significant contribution towards the increase of BMI. WHR had a highly significant relationship with both protein and energy though the multiple linear regression of WHR with them had an R^2 of only 9.9 per cent.

4.3.2 Clinical examination

Incidence of clinical signs and symptoms observed among the respondents are presented in Table 41.

Table 41. Clinical manifestations observed among respondents

n = 50

Sl.No.	Clinical details	Number of respondents
1	Hair	
	Lack of luster	7 (14)
	Thin and sparse	5 (10)
	No symptoms	38 (76)
2	Eyes	
	Pale conjunctiva	28 (56)
	No symptoms	22 (44)
3	Lips	
	Angular stomatitis	12 (24)
	No symptoms	38 (76)
4	Tongue	
	Oedema	2 (4)
	Scarlet and raw tongue	1 (2)
	Atrophic palpillae	1 (2)
	No symptoms	46 (92)
5	Teeth	
	Caries	15 (30)
	No symptoms	35 (70)
6	Gums	
	Spongy, bleeding gums	14 (28)
	No symptoms	36 (72)
7	Skin	
	Xerosis	6 (12)
	No symptoms	44 (88)
8	Nerves	
	Motor weakness	1 (2)
	No symptoms	49 (98)

Numbers in parentheses are percentages

It was found that different clinical symptoms related to nutritional deficiencies like lack of luster in hair (14%) and thin and sparse hair (10%), pale conjunctiva (56%), angular stomatitis (24%), oedema in tongue (4%) and scarlet and raw tongue(2%) and the atrophic palpillae (2%), teeth caries (30%), spongy, bleeding gums (28%), xerosis in skin (12%) and motor weakness in nerves (2%) were observed among the respondents.

4.3.3 Food weighment survey

The mean nutrient intake of respondents was compared with the RDA and the results are presented in Table 42 and Fig. 4.

Table 42. Mean nutrient intake of the respondents in comparison with RDA.

n = 20

Nutrients	Intake	RDA	% RDA
Energy (Kcal)	1532.11	2225	68.86
Protein (g)	44.31	50	88.62
Fat (g)	21.19	20	105.95
Calcium (mg)	870.80	400	217.7
Iron (mg)	17.78	30	59.27
Retinol (µg)	360.37	600	60.06
Thiamin (mg)	0.66	1.1	60.00
Riboflavin (mg)	0.40	1.3	30.77
Niacin (mg)	10.40	14	74.29
Vitamin C (mg)	65.09	40	162.73

The result revealed that the percentage intake fat (106%), calcium (218%) and vitamin C (163%) to be above the RDA suggested for women engaged in moderate activity. About 69 per cent, 89 per cent, 59 per cent, 60 per cent 60 per cent and 74 per cent of energy, protein, iron, retinol, thiamine and niacin intake respectively were met by the respondents while riboflavin intake was found to be below 31 per cent of RDA.

4.3.4 Biochemical estimation of blood

Blood haemoglobin was estimated among 20 respondents and the haemoglobin values were compared with the standard values for adult non

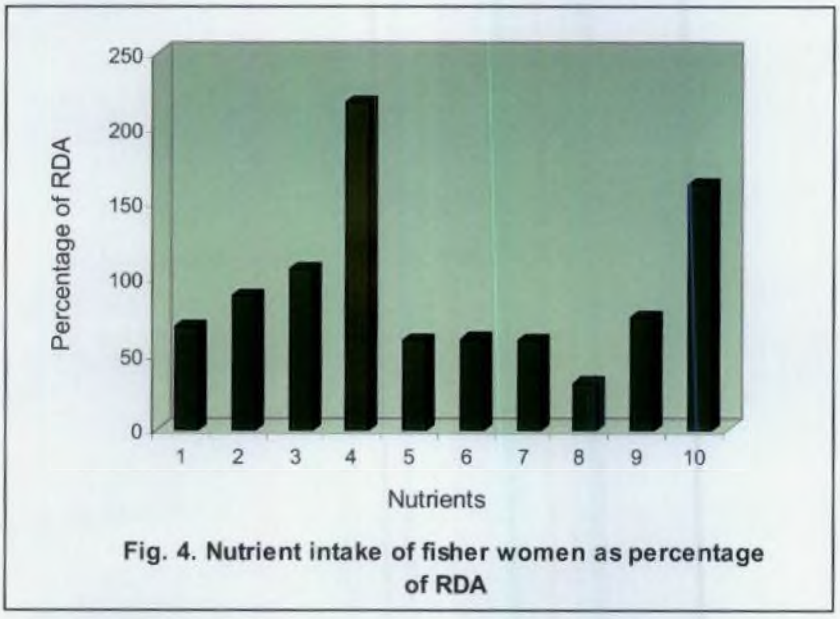

Fig. 4. Nutrient intake of fisher women as percentage of RDA

1. Energy
2. Protein
3. Fat
4. Calcium
5. Iron
6. Retinol
7. Thiamin
8. Riboflavin
9. Niacin
10. Vitamin C

pregnant women suggested by WHO as given in Gopaldas and Seshadri (1987) (Table 43).

Table 43. Distribution of respondents on the basis of haemoglobin level

n = 20

Hb level (g/dl)	n	%
10-10.9	3	15
11-11.9	4	20
12	5	25
>12	8	40
Total	20	100

It was revealed that the haemoglobin values of 25 per cent respondents were normal and 40 per cent respondents were higher than the normal level. Among 20 per cent of the respondents the haemoglobin values varied between 11-11.9 g 100 ml^{-1} while for 15 per cent the level was found to be in between 10 and 10.9 g 100 ml^{-1}. The haemoglobin values of 35 per cent of respondents were lower than the normal .

To interpret the iron level of responderts, they were grouped according to the criteria suggested by Gopaldas and Seshadri (1987) with reference to haemoglobin level and the details are given in Table 44 and Fig. 5.

Table 44. Distribution of respondents based on iron status

n = 20

Sl.No.	*Category*	*n*	%
1	Deficient (10g 100 ml^{-1})	-	-
2	Low (10-11.9 g 100 ml^{-1})	7	35
3	Acceptable (>12 g 100 ml^{-1})	13	65

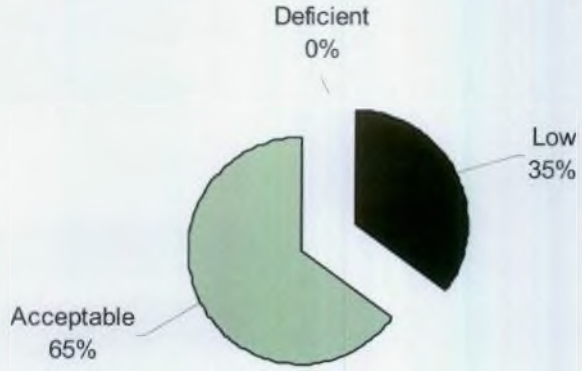

Fig. 5. Iron status of fisher women on the basis of haemoglobin level

The result indicated that none of the *respondents* had deficient iron status. About 65 per cent of the respondents had acceptable iron level and the rest 35 per cent had low iron level on the basis of haemoglobin values.

Discussion

5. DISCUSSION

A critical and brief discussion of the major findings of the study are presented in this chapter. The discussion is categorised into the following broad sections.

5.1. Socio economic profile of the fishermen households
5.2. Food consumption pattern of the fishermen households
5.3. Nutritional status of fisher women

5.1 SOCIO ECONOMIC PROFILE OF THE FISHERMEN HOUSEHOLDS

In the present study, it was observed that majority of the families (90%) were Hindus, who belonged to Araya (47%) and Mukkuva (43%) castes. This is in line with the studies by Udayabanu (1990) who reported that majority of fishermen in Kerala belonged to Dheevara community (Araya and Mukkuva). Similar results were also observed by Aneena (2003) among fishermen families of Thrissur district of Kerala. Indeed, at the state level all the Hindu fishing castes have joined into a federal body called Akhila Kerala Dheevara Sabha, an organization which aims at safe guarding the social, economic and political interests of these castes.

Due to urbanization and changes in social values, joint family system is disintegrating in different communities of Kerala. In the present study also nuclear family system was seen in most (96%) of the households. According to Saxena (1986) nuclear families are better than joint families in health and development. Similar findings were observed among the different labour groups of Kerala by Seshadrinath (1993), Karuna (1993), Ranganathan (1996), Shyna (1996), Jose (1998), Smitha (1999), Anil *et al.* (2001), Pratheesh (2002), Jyothi (2003) and Lawrence (2003). Nuclear type family system was also reported by

NIN (1995) in the households of Kerala, Gujarat and Andhra Pradesh. Similar findings were reported by Swamy *et al.* (2000) in the households of Karnataka. Mathen (1998) on the other hand revealed that most of the rural households of Thrissur districts followed joint family system. Similar results were also obtained by Aneena (2003) in a study among fishermen families of Thrissur district.

In Kerala, unlike other states, small family norm has become very popular even among the low income groups probably due to the availability of medical and educational facilities as well as the constant exposure of the public to small family norm through different media.

Family size is a major factor influencing the nutritional status of family members. Majority of the families (54%) in the study were found to be medium sized with 4-5 members. A similar finding of a small family norm was observed among the households of labourers of different categories in Kerala by Jayanthakumari (1993), Karuna (1993), Jose (1998), Smitha (1999), Anil *et al.* (2001) and Jyothi (2003). Contrary to this finding Usha *et al.* (1990) reported that most of the labour families in Thiruvananthapuram district of Kerala had a large family size consisting of five to nine members. Shatrugna *et al.* (1993) and Swamy *et al.* (2001) also reported larger families in the households of Hyderabad and Karnataka respectively.

Kerala is a state, which represents a different spectrum as far as sex ratio is concerned. Among the different states, Kerala has the highest sex ratio with 1058 females for 1000 males (Government of Kerala, 2002; Farm guide, 2002) and is a solitary exception, while in all other states and union territories the sex ratio is adverse to women. The sex ratio of India according to the 2001 census was 933. In the present study, the sex ratio was found to be 985. Jyothi (2003) in a study conducted among agricultural labourers of Palakkad district of Kerala observed a sex ratio of 933. In contrast to this finding Pratheesh (2002) in a study conducted among agricultural labourers observed a sex ratio of 1092 in Thrissur

district. Lawrence (2003) in her study among agricultural labourers observed a sex ratio of 1170 in the organized sector and 1277 in the unorganized sector.

Literacy is an important demographic characteristic, which is an indicator of the level of advancement of the people. Education is considered to be a catalyst of change and its role in the process of national development cannot be over emphasized (Manorama Year Book, 1996). The present study revealed that most of the male (92.09%) and female (85.79%) members were literate. Similar findings were reported by Aneena (2003) in which the literacy rate of the fisher men community was found to be not lower than for the total population. Smitha (1999) also observed a higher percentage of literacy among men (91.07%) and women (86.51%) agricultural labourers. Jyothi (2003) revealed that majority of the male (60.25%) and female (78.09%) agricultural labourers involved in rice cultivation in palakkad district were literate. The census of India 2001 also ranked Kerala as the most literate state with a higher literacy rate of 90.02 per cent (Manorama Year Book, 2001). In contrast, studies conducted by Shyna (1996) and Jose (1998) observed a higher percentage of illiteracy among the labourers of different sectors of Kerala.

In India, even though literacy level is very high, men have better education than women probably because of social discrimination against women (Ingle and Khai, 1987 and Joseph, 1991). In the present study also male members were found to be more educated than their female counterparts. In contrast, to this finding Anil *et al.* (2001) reported female members more educated than their male counter parts among the dairy farmers of Kerala. The studies conducted by Sujatha (1990) and Choudhary (1990) indicated higher percentage of literacy among the male members.

Occupational status of the family members indicated that majority of the male (75.14%) and female members (57.36%) were engaged in fish related works like fishing, fish vending, fish processing, fish packaging and fish handling.

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 rest in fish marketing and other related activities. Aneena (2003) also reported that most of the head of the families (82%) in the fishermen families were involved in fishing, 14 per cent were involved in fish vending and a few families (4%) were engaged in 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. But in the present study no such crisis occurred in most of the families (90%).

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 (85%) ranged from Rs.500 - Rs.1500. This is in line with the findings of Kurien and Achari (1988) who found that majority of fishermen of Thrissur district have a monthly income of Rs.1000 - 3000. Aneena (2003) also reported that majority (71%) of fishermen of Thrissur district have a monthly income of Rs.1501 - Rs.3000. Jessy (1989) and Karuna (1993) also observed a mean monthly income of below Rs.3000 among fishermen community of Kerala.

The dowry system has casted an impossible financial burden for the community. In the present study fourty six per cent of families got dowry in the form of cash or gold. Fifty four per cent of families did not accept any dowry. Aneena (2003) revealed that majority (97%) of the fishermen families 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 as a dream. In this study on fishermen community, living conditions of the families revealed that most of the families had their own houses with 3-5 rooms with thatched roof, brick as the wall material and a

separate kitchen. Similar results were obtained by Aneena (2003) in her study among fishermen community of Thrissur district. Smitha (1999) Lawrence (2003) and Jyothi (2003) also reported similar housing conditions among the households of agricultural labourers. Contrary to these observations Karuna (1993) revealed that fish vending women of Kerala stayed in one room apartments.

Regarding other facilities in the house it was seen that majority (79%) of the families had electric connections in their houses and source of drinking water for most of the families (98%) was common bore wells with their own hand pumps. Only 2 per cent of the families had their own well as source of drinking water. Environmental hygiene was found to be poor with no proper drainage system. Majority of the houses (77%) had own latrine. Similar findings were reported by Aneena (2003) in her study among fishermen community of Thrissur district.

Majority of the families (68%) resorted to public conveyance as their means of transportation. Only 7 per cent of the families were found to possess ordinary small boats to go for fishing and 4 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 a catemarine or a small boat to go for fishing. Aneena (2003) also reported that only 18 per cent of the fishermen families in Thrissur district had ordinary small boats to go for fishing and 5 per cent had their own catamarine. 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 40 per cent of the families, 33 per cent had television and only 4 per cent had transistor, which was their three main sources of information as well as recreation. The families which did not have any of the information sources (23%) depended on their neighbours for this purpose.

Aneena (2003) and Lawrence (2003) also observed recreational facilities among the fishermen families and agricultural labour families of Thrissur district. However, the finding of Jose (1998) was found to be contradictory to the present finding in which the author observed fewer recreational facilities among the casual labourer households. It is the lower quality of life 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 45 per cent of the houses had thatched roof and 31 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 characterize the housing pattern 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 of leaching of sewage into the 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 77 per cent of families had their own latrines.

Monthly expenditure pattern of the families indicated that majority of the families (94%) spent above 50 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. Similar findings were also reported by Aneena (2003) among fishermen of Thrissur district 65 per cent of the families spent 60-80 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 is in line with the study conducted by Rai and Sarup (1995) who found that in Kerala 60-80 per cent of the total income was spent for food by the rural low income families while 45-58 per cent 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, health, recreation, education, transportation and personal needs. 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. Similar findings were also reported by Aneena (2003) in the fishermen households of Thrissur district. Contrary to this Jyothi (2003) observed that majority of the agricultural labourers involved in rice cultivation in Palakkad district spent less than 20 per cent of their monthly income for clothing, shelter, transportation, recreation, health, fuel and personal needs.

Savings from the income was observed only in 32 per cent of the fishermen families. Karuna (1993) and Aneena (2003) also reported that majority of fishermen families did not have savings. Since the monthly income of majority of the families ranged between Rs.500 and Rs. 1500, they found it very difficult to save money and also most of them have to repay their loans taken during lean periods. But, in contrast to this result, studies by Shyna (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 27 per cent of the families have considerable amount of loans. Majority of them borrowed from private agencies and moneylenders to meet their daily household expenses, house construction, marriage and medical treatment during off seasons. Karuna (1993) observed that 92 per cent of the fishermen households were under debts. In the present study also it was observed that 67 per cent of the households were under debts. A major reason for such a situation was the seasonality of the occupation.

Sixteen per cent of the respondents had the habit of tobacco chewing. Family crisis like diseases, handicap and accident were found among 10 per cent of the families.

Regarding health care facilities it was revealed that all the families mainly followed allopathic treatment in the district hospital. Health care facilities provided by the primary health centres of the localities were also utilized by 40 per cent of the families. Aneena (2003) in her study among fishermen families observed that about 95 per cent depended mainly on the primary health centre.

Majority of the families (89%) were members in matsyafed and they were getting benefits from this organisation. Matsyafed had initiated 10 social

security schemes. The coverage include housing, sanitation, alternative employment, education, training and accident insurance. Among female members, 7 per cent were involved in the activities of kudumbhashree and 4 per cent in sthree shakthi.

5.2 FOOD CONSUMPTION PATTERN OF THE FISHERMEN HOUSEHOLDS

Precise information on the 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).

The present study revealed that all the families were habitual non-vegetarians with a pattern of three major meals per day except for one family, where they followed two major meals per day.

Regarding the pattern of expenditure on various food groups majority (63%) of the families spent above 40 per cent of the total food expenditure for the purchase of cereals. So, the major expenditure incurred by the families was mainly for the staple food. This is in line with the findings of Panicker (1979), Sujatha (1990), Jayanthakumari (1993), Ranganathan (1993), Jose (1998), Smitha (1999), Lawrence (2003) and Aneena (2003) among different low income families of rural Kerala.

Expenditure on food items like pulses, green leafy vegetables, other vegetables, roots and tubers, fruits, fats and oils, spices and condiments, sugar, milk and milk products, meat, fish and egg for majority of the families was found to be less than 20 per cent of the food expenditure. Karuna (1993) and Aneena (2003) also observed similar trends of food expenditure among fishermen communities of Thiruvananthapuram and Thrissur districts respectively.

Frequency of purchase of different food items indicated that, most of the families purchased the different food items including cereals and pulses daily or weekly or occasionally since they used to get wages daily. Similar result was reported by Jose (1998) and Lawrence (2003) among casual labourers in Thrissur district.

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. Rice was found to be the staple food of the fishermen households. The present study revealed that cereals, fats and oils, spices and condiments 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 for food preparations and source of sugar is coffee or tea they consumed daily. Similar findings were reported by Sujatha (1990), Karuna (1993) and Ranganathan (1996) in Thiruvananthapuram district and Udaya (1996), Mathen (1998), Jose (1998), Smitha (1999), Aneena (2003) and Lawrence (2003) in Thrissur district and Jyothi (2003) in Palakkad district among the families of different sectors. Stephanie (1984) also did not observe regular consumption of pulses in South Indian and was found to be once or twice a week in many of the families. Udaya (1996), Smitha (1999), Jyothi (2003) and Aneena (2003) observed pulses as a medium frequently consumed food item in the low income groups of rural Kerala.

Regarding the consumption of green leafy vegetables, it was found that about 52 per cent of the families consumed this food once in a week. Shyna (1996) and Aneena (2003) reported low consumption of green leafy vegetables. The present study revealed that 13 per cent families never used green leafy vegetables in their diet. This may be due to the lack of awareness about the nutritional importance of this cheap and easily available food.

Regarding the consumption of other vegetables, it was found that about 70 per cent of the families consumed this food only once or twice a week. Karuna (1993) and Aneena (2003) also reported that fishermen families rarely included vegetables in their daily diet. About 64 per cent of the families consumed roots and tubers occasionally. Udaya (1996) and Smitha (1999) also observed that roots and tubers were used medium frequently by the farm families and agricultural labourer households of Thrissur district. Contradictory to the present finding Aneena (2003) observed frequent consumption of roots and tubers among fishing community.

Majority (68%) of the families consumed fruits as an occasional food item. Karuna (1993) and Aneena (2003) also reported that the frequency of consumption of fruits was very low among fishermen community. Only 32 per cent of the families consumed milk daily and the main source was from tea or coffee. Among non-vegetarian foods, invariably fish was the most frequently consumed food. The present findings is that about 99 per cent of families included fish in their daily diet. They obtained fish either free of cost or for a negligible price. Karuna (1993) and Aneena (2003) also observed that daily diet of fishermen community consisted mainly of rice and fish. Shyna (1996) and Jyothi (2003) found that consumption of fish is less frequent in agricultural labourer families due to its high cost. Majority of the families never consumed or consumed only occasionally other non vegetarian foods like meat and egg.

Though advance meal planning helps in better organization and faster completion of household chores, the present study revealed that none of the families plan their meals in advance. This is in line with the findings of Jyothi (2003) among the agricultural labourers involved in rice cultivation in Palakkad district. Contrary to these observations Lawrence (2003) revealed that majority of the agricultural labourer families in Thrissur district planned their meals in advance.

The present study revealed that none of the families maintain a routine time schedule for consuming meals. Similar findings were observed by Jyothi (2003) in her studies among women agricultural labourers involved in rice cultivation in Palakkad district. Karuna (1993), Ranganathan (1996), Jose (1998) and Lawrence (2003) observed a routine time schedule for consuming meals among the rural households of Kerala.

It was observed that majority of the families gave more importance to male members with regard to food distribution. Usha *et al.* (1990), Seshadrinath (1993) and Udaya (1996) reported priority in food distribution for male members, children, head of the family and employed members among the families of labourers and farmwomen in Kerala. Jose (1998), Smitha (1999), Shyna (2001) and Jyothi (2003) observed that all the families gave equal importance in food distribution to all members among the labourer households in Kerala.

Majority of the families washed cereals three times before cooking and majority washed green leafy vegetables and other vegetables before cutting. Only 46 per cent of the families were having the habit of eating raw vegetables, which included tomato, carrot and cucumber. Udaya (1996), Smitha (1999) and Jyothi (2003) observed that majority of the poor households did not include any raw vegetables in their daily diet though seventy four per cent of the families included soaked pulses in their diet, only 7 per cent of the families included sprouted pulses in their diet.

Boiled water was used by 53 per cent of families for drinking. Jose (1998) reported that about 60 per cent of the families of casual labourers in Thrissur district used only boiled water for drinking. In contrast to this, Ranganathan (1996), Udaya (1996), Smitha (1999) and Jyothi (2003) reported that majority of the rural household did not have the habit of drinking boiled water. Lawrence (2003) in her study among agricultural labourers of Thrissur district observed that majority of the households in the unorganized sector drank water

without boiling. This may be due to their ignorance about the hazards of water born diseases.

Food processing at home level was not very familiar among the families and only 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 preference for fresh fish than any of its processed products.

Food prepared by the families during different occasions differed. For celebrating birthday, only 5 per cent of families prepared payasam and majority of the families did not prepare any special food during this occasion. Nine per cent families prepared non vegetarian dishes for marriage whereas majority (91%) of the families prepared vegetarian dishes during marriage. During the occasion of death majority of the families did not prepare any special food, only 24 per cent of the families prepared vegetarian dishes and 2 per cent prepared non vegetarian dishes. Seventy one per cent of the families prepared vegetarian dishes during festivals. This trend of consuming vegetarian dishes during special occasions may be because majority of the families are Hindus, with strong religious beliefs. Food items prepared for functions differed depending on the religion, caste, tradition and income.

An in depth study of the food given during different special conditions indicated that foods like ragi, biscuit and commercial infant foods were the supplementary foods given to infants. Eighty eight per cent of the families did not give any supplementary food to their infants. No special food was given to preschool children, school going and adolescents. Similar findings were reported among the families of agricultural labourers involved in rice cultivation in Palakkad district (Jyothi, 2003). Bhat and Dahiya (1985) reported that majority of the preschool children in India received only ordinary home diets and their diet was deficient in many nutrients especially vitamins and minerals. Similar results

were reported by Usha *et al.* (1990), Cherian (1992), Jayanthakumari (1993) and Jose (1998) among preschool children of labourer families.

During pregnancy and lactation majority of the women did not include any special food item in their diet. Similar findings were reported among the families of farm women (Udaya, 1996), casual labourers (Jose, 1998) and agricultural labourers(Smitha, 1999 and Jyothi , 2003).

Modification of the regular diet was observed during various illnesses. Exclusion of solid food and inclusion of more semisolid and liquid food like rice porridge, coconut water etc were observed during diarrhoeal diseases. Similar results were reported by Aneena (2003) in her study among the fishermen community of Thrissur district. Educational level of women in the community might have an influence on this type of positive dietary modifications during infectious diseases like diarrhoea. Some of the families gave rice porridge, bread and biscuit during fever.

5.3 NUTRITIONAL STATUS OF FISHER WOMEN

The nutritional problems of developing countries are due to the fact that majority of the population subsist on an inadequate diet in terms of quality and quantity (Gopalan, 1991). Hence, determination of food and nutrient intake of different groups is of utmost importance.

In the present study, anthropometry, clinical examination, actual food and nutient intake and biochemical estimation of blood for haemoglobin were reckoned as the major determinants of nutritional status of fisher women.

The mean weight and height of fisher women were found to be 53.43 kg and 156.69 cm respectively. Smitha (1999) in her study among the women agricultural labourers of Thrissur district observed a mean body weight of 46.71

kg and a height of 151.60 cm. Mohapatra *et al.* (2001) reported a mean weight and height of 41.1 kg and 148.9 cm respectively among the Oriya women. Jyothi (2003) reported that mean weight and height of women agricultural labourers involved in rice cultivation in Palakkad district were 43.1 kg and 149 cm respectively.

Weight for age is the most sensitive index to evaluate the current nutritional status. In the present study it was observed that the body weight of 57 per cent of the respondents was higher than the reference body weight for an Indian reference woman suggested by ICMR (1990). Similar results were observed by Jayanthakumari (1993) among the farm women of Trivandrum district. In contrast, studies by Cherian (1992), Smitha (1999), and Lawrence (2003) reported a lower weight for age among the farm women and agricultural labourers. Karuna and Prema (1993) observed that average weight and height of fisher women was found to be below the ideal weight and height suggested for a reference woman.

Height is an indicator of long term nutritional status. The height of majority of the respondents was higher than the reference height for an Indian reference woman. Karuna and Prema (1993) and Lawrence (2003) reported a lower body weight and height among women engaged in fish vending and agricultural activities.

Body mass index describes the chronic energy deficiency among adults and is an important indicator of current nutritional status. The BMI of the respondents revealed that about 62 per cent were in the normal group. The incidence of various grades of CED was found among 13 per cent of respondents. This is in line with the study by Smitha (1999) who observed normal nutritional status among 50.67 per cent of the agricultural women labourers on the basis of BMI while mild and moderate chronic energy deficiencies were noted among 18 per cent and 3.33 per cent of women. Karuna (1993) in her study among fisher

women in Thiruvananthapuram district reported that 24 per cent of the respondents had normal BMI and 33.33 per cent of the respondents had various grades of CED. Mohapatra *et al.* (2001) indicated various grades of CED among 52.2 per cent of Oriya women.

Waist to hip ratio of fisher women was computed and femoral gluteal obesity and abdominal obesity were found to be present in 97 per cent and 3 per cent of respondents respectively.

Agarwal (1980) reported lower food consumption among rural population than the minimum requirement for physical sustenance required for healthy living. In the present study, food intake of the respondents showed that the intake of all the food except fish was lower than the requirements based on ACU. The requirement based on ACU had a positive correlation with intake in the case of vegetables and roots and tubers. Paired t-tests of different food intake compared to requirement were found to be significant. In concordance to the results of this study, Seshadrinath (1993) and Seralathan *et al.* (1993) reported that the diet of women agricultural labourers and farm women respectively were deficient in all food groups recommended for a balanced diet. Usha *et al.* (1990) also reported a lower intake of all food groups except roots and tubers among the farm families. However, Smitha (1999) reported a higher intake of cereals and other vegetables by the women agricultural labourers and the intake of green leafy vegetables was found to be very low. Jyothi (2003) reported that the actual food intake of the agricultural labourers involved in rice cultivation for all food groups except other vegetables was lower than the recommended levels. Lower intake of green leafy vegetables in the diet of women agricultural labourers of Kerala was reported by Rao *et al.* (1976), Pushpamma *et al.* (1982), NNMB (1989), Cherian (1992) and Smitha (1999). Lawrence (2003) also reported that the intake of cereals, pulses, roots and tubers, fruits and fats and oils was lower than the RDA among women agricultural labourers in Thrissur district.

The intake of energy was lower than the requirement and that of protein was found to be sufficient based on ACU. Paired t-test for comparison of intake with requirement was found to be highly significant in the case of energy and non significant in the case of protein.

Intake of food groups like cereals, roots and tubers and fats and oils had no significant correlation with increase in BMI and WHR. Food groups like pulses, green leafy vegetables, other vegetables, fruits, milk and milk products, meat, fish, egg and sugar had highly significant correlation with increase of BMI. Food groups like other vegetables, meat, fish and egg had a highly significant correlation with increase of WHR.

Intake of nutrients like energy and protein had highly significant correlation with increase of BMI and no significant correlation with increase of WHR.

Multiple linear regressions of BMI and WHR on green leafy vegetables, meat, fish and egg have good contribution towards BMI and while is not influence by them WHR. Intake of protein had a significant contribution towards increase of BMI, WHR had highly significant relationship with both protein and energy.

Results of the clinical examination among the respondents indicated different clinical manifestations related to nutritional deficiencies. Lack of luster of hair, thin and sparse hair, pale conjuctiva, angular stomatititis, oedema in tongue, scarlet and raw tongue, atrophic palpillae in tongue, dental carries, spongy bleeding gums, xerosis and motor weakness in nerves were the important symptoms observed among the respondents. In accordance with these findings incidence of corneal xerosis, cheilosis, spongy gum and dental carries were reported by Augustine (1993) in a study among the women engaged in stone breaking in Trivandrum district. Seralathan *et al.* (1993) reported severe anaemia

and clinical symptoms of vitamin A and iron deficiencies among farm women of Coimbatore. Udaya (1996) also observed mild prevalence of angular stomatitis, bad gums and dental carries among the farm women. Angular stomatitis, bleeding gums and dental carries among women agricultural labourers were reported by Smitha (1999). Jyothi (2003) reported diffuse depigmentation in face, angular stomatitis, odema in tongue, diffuse or local skeletal deformities, goitre, xerosis in skin, pale conjunctiva, koilonychia, and dental carries among 10 to 67 per cent of agricultural women labourers involved in rice cultivation. Lawrence (2003) reported mild conjunctival xerosis, pale conjunctiva, mild angular stomatitis, gingivitis, dental carries, hyperkeratosis and diminished elasticity in the skin, diffuse pigmentation in face and oedema on dependent parts among agricultural women labourers. Contradictory to this finding, Jayanthakumari (1993) and Chandralekha (1993) reported absence of clinical manifestations of nutritional deficiencies among farm women and women workers of Tata Tea Estates of Kerala.

Results of the one day food weighment survey showed that the intake of all nutrients except fat, calcium and vitamin C was lower than the RDA suggested by ICMR (1990). Reduced energy consumption in the dietaries of the people in Southern and Northern India was reported by various authors (Ajula *et al.* (1983), Augustine (1993), ICMR (1990) Udaya (1996) and Smitha (1999).

Nutritional anaemia has been reported to be a major micro nutrient deficiency prevalent among Indian women of reproductive age. Agarwal (1991) reported that nutritional anaemia is characterized by inadequate erythropoeisis and reduced haemoglobin concentration which is due to inadequate supply of iron, folic acid and vitamin B_2. The biochemical estimation of blood showed that the haemoglobin level of only 35 per cent of the respondents were lower than the normal haemoglobin level of 12 g/dl. Sixty five per cent of the respondents had acceptable iron status on the basis of haemoglobin content of blood. Jyothi (2003)

in her study among agricultural women labourers involved in rice cultivation found lower haemoglobin level among all the respondents.

Results of the study revealed based on BMI majority (62%) of the fisher women were belonging to normal group. But the rest (38%) were malnourished. This poor nutritional status is mainly due to lack of intake of balanced and nutritious food and lack of awareness of nutrition. Even though, majority of respondents were literate they were not aware about the importance of intake of nutritious food.

Summary

6. SUMMARY

The present study entitled "Nutritional profile of fisher women" was conducted among 100 fisher women of 18-45 years of age in the coastal areas of Thrissur district.

The study threw light on the socio economic and dietary habits of the fishermen families and also the nutritional status of fisher women.

Information regarding socio economic condition of the families indicated that majority of the families were Hindus and belonged to Araya and Mukkuva (Dheevara) communities. Nuclear family system was followed by most of the families and 63 per cent of the families were in the size group of three to five.

Composition of the families showed that 56.81 per cent of the total population were in the age group of 20 to 50 years. Most of the male and female members were literate.

Most of the male and female members of the families were engaged in fish related work like fishing, fish vending, fish processing, fish packaging and the rest as coolies, beedy makers etc and earned Rs.500 to Rs.1500 per month.

Majority (97%) of the families had own houses with brick as the wall material and with thatched or tiled roof and three to five rooms and separate kitchen. Majority of the families had adequate drinking water and lavatory facilities. The drainage facilities of the houses were found to be inadequate. Adequate recreational and electricity facilities were found in majority of the houses. Majority of the families depended on public transport facilities for transportation.

Regarding the monthly expenditure pattern, majority of the families spent maximum proportion of their income on food items. The expenditure on clothing, shelter, transport, recreation, health, fuel and personal expenses were less than 20 per cent. About 46 per cent and 19 per cent of the families did not spend money for education and electricity respectively. Thirty two per cent of the families had the habit of saving money and 67 per cent of the households were under debts. Majority of the families borrowed money from private chitties and moneylenders mainly for purposes like house construction, marriage, daily household expenses and medical treatment. Sixteen per cent of the respondents had the habit of tobacco chewing. Majority of the male members of the families were found to be alcohol addicts.

Family crisis like diseases, handicap and accident were found among 10 per cent of the families. Health care facilities revealed that majority of the families followed allopathic treatment and depended on district hospital.

Regarding social participation, majority of the families were found to be members of Matsya Fed and only few of the families were found to be members of Kudumbhashree, Sthree shakthi, Mahila Samajam and Ayalkuttam.

Majority of the respondents did not use any family planning method.

Dietary habits of the families revealed that all families were habitual non vegetarians. Ninety nine per cent of the families followed three major meals per day.

Food expenditure pattern of the families revealed that maximum amount was spent on the purchase of cereals. With regard to the purchase of all other food items majority of the families spent less than 20 per cent of the total food expenditure.

Purchasing pattern revealed that most of the families purchased different food items either daily or weekly or occasionally. Most frequently used food items were cereals, fish, fats and oils, sugar and spices and condiments for all the families.

Food consumption pattern of the families indicated that their daily diet comprised of rice, fish, sugar, spices and condiments and fats and oils. Majority of the families used pulses and other vegetables 1-3 times in a week. Majority of the families used roots and tubers only occasionally and consumption of egg, meat, milk and milk products and fruits was found to be negligible.

None of the families planned their meals in advance and did not have any strict time schedule for taking meals. In food distribution, equal importance to all family members was given by 45 per cent of the families.

Boiled water was used by 53 per cent of families for drinking. 95 per cent of the families washed cereals three time before cooking. Only 46 per cent and 54 per cent of the families were having the habit of eating raw vegetables and fruits respectively. Sprouted pulses were used only by 7 per cent of the families but 74 per cent of the families used soaked pulses. Majority of the families washed green leafy vegetables and other vegetables before cutting.

Pickling and drying of fish were found to be the processing methods adopted by 42 per cent of the families.

Special foods were prepared during marriage, birthday, death ceremony and other festive occasions.

Diet during different stages indicated that only few families gave special foods during infancy, pregnancy and lactation. No special food was prepared for preschool children and adolescents.

Diet modification during diseased conditions was observed. Semisolid foods like rice porridge was included during diseases like fever, diarrhoea and asthma.

Nutritional status of the respondents was assessed through anthropometric methods, clinical examination, one day food weighment method and biochemical estimation of blood.

Anthropometric measurements revealed that body weight of 33 per cent and height of 24 per cent of the respondents were lower than the reference body weight and height suggested for an Indian reference woman. The body mass index of the respondents indicated that about 62 per cent of the respondents were having normal BMI and 13 per cent had different grades of CED. The waist hip ratio indicated that about 97 per cent of the respondents had femoral gluteal obesity and 3 per cent had abdominal obesity.

Food intake of the respondents showed that the intake of all the food groups except fish was lower than the requirements based on ACU. In the case of nutrients energy intake also was lower than the requirement but protein intake was sufficient based on ACU.

Clinical examination showed various nutritional deficiency symptoms such as lack of lustre of hair, thin and sparse hair, pale conjunctiva, angular stomatitis, oedema in tongue, scarlet and raw tongue, atrophic palpillae in tongue, dental carries, spongy bleeding gums, xerosis and motor weakness in nerves.

Actual nutrient intake of the respondents by weighment method of dietary survey indicated that except fat, calcium and vitamin C the intake of all nutrients was lower than the RDA.

Biochemical examination of blood showed that haemoglobin level of 35 per cent of the respondents were lower than the normal haemoglobin level of

12 g/dl. Sixty five per cent of the respondents had acceptable iron status on the basis of haemoglobin content of blood.

References

REFERENCES

Adhiguru, P. and Ramaswamy, C. 2003. *Agricultural Based Interventions for Sustainable Nutrition Security.* National Center for Agricultural Economics and Policy Research Committee, New Delhi, p.100

Aebi, H.E. 1983. *Biochemical parameters as indicators for the nutritional status. Fourth Asian Congress of Nutrition Programme and Abstracts*, Technical monograph no.6. Willey Interscience Publication, New York, p.70

Agarwal, A.N. 1980. *Indian Agricultural Problems, Progress and Prospects.* Vikas Publishing House Pvt. Ltd., Uttar Pradesh, India, p.110

Agarwal, D. 2001. Empowerment of rural women. *Intensive Agric.* 39: 3-5

Agarwal, K.N. 1991. Functional consequences of nutritional anaemia. *Proc. Nutr. Soc. India* 37: 127-130

Ahmed, S.M., Adams, A. and Chowdhury, A.M.R. 1998. CED in women from rural Bangladesh. Some socio-economic determinants. *J. Biosocial Sci.* 30: 349-358

Ajula, P., Miglani, S. and Singh, A.J. 1983. A comparative study on the nutrient intake among different income, occupation and family size categories in rural areas of Punjab. *Indian J. Nutr. Dietet.* 20: 344-349

Akinbile, L.A. 2003. Farmers perception of effectiveness of fisheries extension services in Nigeria. *J. Ext. Systems.* 19: 33-44

Alam, D.S. 2001. Maternal and child nutrition in rural Bangladesh: special reference to the effect of dietary fat supplementation on vitamin A status *Int. J. Epidemiol.* 27: 231-237

Alderman, H and Garcia, M. 1992. Food security and health security: explaining the levels of nutrition in Pakistan-policy, research and experimental affairs. *Working papers*, Agriculture and Rural Development, World Bank, Washington, 865: 48-55

Ananth, P.N. 2000. *Marine Fisheries Extention.* Discovery Publishing House, New Delhi, p.158

Aneena, E.R. 2003. Nutritional profile of preschool children of fishermen. M.Sc.(Home Science) thesis, Kerala Agricultural University, Trichur, p.77

Anil, S.S., Geevarghese, P.I. and Anil, L. 2001. Socio-personal and socio-economic profile of dairy farmers in Kerala. National Conference on Strategies for Safe Food Production, 22 November, 2001. Association of Food Scientists and Technologists, Trichur. *Abstract*: 30

*Anssary, F., Keshavarz, S.A., Djazayeri, A., Mahmoody, M., Djarollahi, N. and Kyghobady, K. 1999. Prevalence of iron deficiency anaemia among mothers living in rural areas of Kohrram-Abad city, iron and some factors affecting it. *Iranian J. Pbl. Health* 28: 175-184

*Antelman, G., Misamanga, G.I., Spiegelman, D., Urassa, E.J. and Narh, R. 2000. Nutrition factors and infectious disease contribute to anaemia among pregnant women with human immuno deficiency virus in Tanzania. *J. Nutr.* 130: 1950-1957

Ashmore, H.R. 1996. Livestock, nutrition and intra-household resource control in Vasin Gishu district, Kenya. *Human Ecol.* 24: 191-213

Ashmore, H.R. and Curry, J. J. 1994. Diet, nutrition and agricultural development in Swaziland-3-household economics and demography. *Ecol. Fd Nutr.* 33: 107-121

Augustine, J. 1993. *Factors influencing the working efficiency of women engaged in stone breaking with special reference to nutritional status.* M.Sc. (Home Science) thesis, Kerala Agricultural University, Thrissur, p.121

Balakrishnan, N. 1990. Malnutrition and its manifestations. *Proc. Nutr. Soc. India.* 36: 21

Balasubramanian, S. 2003. Studies on human resource development and economic evaluation in fisheries. *Annual Report 2002-2003*, Central Institute of Fisheries Technology, Cochin, p.198

Bass, M.A., Wakefield, L. and Kolara, K. 1979. *Community, Nutrition and Individual Food Behaviour*. Burgers Publishing Company, Minesota, p.153

Bay of Bengal Programme. 1990. *Factors that Influence the Role and Status of Fisher Women*. Report No.42. Bay of Bengal Programme, Madras, p.35

Beena, K.B. and Sehara, B.S. 1993. Socio-economic study of prawn farmers in Ernakulam district. Mariculture research under the post graduate programme in mariculture (eds. Rengarajan, K., Noble, N., Prathiba, S., Kripa, V., Sarida, V and Zakhariah, M.). CMFRI, Cochin, p.120

Begum, M.R. 1991. *A Textbook of Foods, Nutrition and Dietetics.* Sterling Publishers Pvt. Ltd., New Delhi, p.225

Behrman, J.R. 1995. Household behaviour, preschool child health and nutrition and the role of information. *Child growth and nutrition in developing countries* (eds. Anderson, I.P., Pelletier, D. and Harold, A.). Oxford University Press, New Delhi, pp.97-116

*Behrumram, J.R. and Deolalikar, A. B. 1986. Seasonal demands for nutrient intakes and health status in rural South India. *Fertility Determinants Res. Notes.* Population Council, U.S.A. 13:4-9

Bentley, M.E. and Griffiths, P.L. 2003. The burden of anaemia among women in India. *European J. Clin. Nutr.* 57: 52-60

Bhat, C.M. and Dahiya, S. 1985. Nutritional status of preschool children in Gangwa village of Hissar district. *Indian J. Nutr. Dietet.* 22: 206-214

Bigsten, A., Braun, V.J. and Von, B.J. 1992. Emerging features of absolute poverty and strategies for its rapid reduction. *Rur. Dev. Stud.* 29: 41-51

Brabin, L., Nicholas, S., Gogate, K. and Karaude, A. 1998. High prevalence of anaemia among rural women. *Indian Fd Nutr. Bull.* 19: 205-222

Brahmam, G.N.V. 1999. How nutritionally sound are our elderly? *Nutrition* 33: 13-21

Brahmam, G.N.V., Sastry, J.G. and Rao, N.P. 1987. The urban people - their dietary and nutritional status. *Nutrition* 21: 14-22

Busi, B.R. and Saileela, M. 1999. Energy and protein intake of adults in an urban area - effect of biological and socio-economic factors. *Indian J. Nutr. Dietet.* 36: 405-411

Chadha, S.L., Gopinath, N., Katyal, I. and Hawat, S.S. 1995. Dietary profile of adults in an urban and rural community. *Indian J. Med. Res.* 101: 258-267

Chakravarthy, I. and Ghosh, K. 2000. Micro nutrient malnutrition - Present status and future remedies. *J. Indian Med. Ass.* 98: 539-542

Chandralekha, V. 1993. Study of nutritional status of women workers in the Tata Tea Estates of Kerala. Souvenier and Abstracts of Fourth World Congress on Clinical Nutrition, 2-5 October 1993. Malabar Hotel, Cochin, Little Flower Medical Research Center, Angamali. *Abstract*: 78

Cherian, L. 1992. Food consumption and energy expenditure pattern of agricultural labourers of Trivandrum district. M.Sc. (Home Science) thesis, Kerala Agricultural University, Trichur, p.133

Choudhary, B.N. 1990. Strategies for development of farm women - their roles and status. Workshop on Women in Agriculture. October 29th-November 1st 1990. National Institute of Rural Development, Hyderabad. *Background papers*, p.1-21

Christin, P., West, K.P., Katz, S.K., Shrestha, S.K. and Pradham, E.K. 1995. Night blindness of pregnancy in rural Nepal - nutritional and health risks. *Int. J. Epidemiol.* 27: 231-237

Cooper, A. and William, C.H. 1982. Nutritional assessment of children. *Am. J. Nutr. Dietet.* 35: 119-122

*Daphna, W.N. 1979. Biochemical appraisal of vitamin nutritional status in man. *J. Am. Med. Ass.* 18: 49-52

Datta, K.K., Dan, S.S. and Datta, A.K. 1988. Role of middle men in marine fish marketing process. A case study in Orissa. *Financial Agric.* 20: 30-32

Department of Fisheries. 2002. *Fisher Folk Density in Kerala.* Monograph No.8. Government of Kerala, Thiruvananthapuram, p.45

Deshpande, S.S., Mishra, A. and Mishra, M. 2001. Nutritional profile of farm women of Madhya Pradesh and impact of nutrition education. XXXIV Annual Meeting of Nutrition Society of India, December 5-6, 2001. Bhopal. *Abstract*: 65

Devadas, R.P., Chandrasekhar, U., Premakumari, S. and Geetha,G. 1991. Female literacy and family improvement correlation between female literacy, birth rate and infant mortality rate. *Indian J. Nutr. Dietet.* 28: 31-40

Devadas, R.P. and Easwaran, P. 1986. Intra family food intake of selected rural households and food consumption pattern of the pregnant. *Indian J. Nutr. Dietet.* 23: 343-348

Devi, L. 2000. Nutritional and health impact of substituting green gram by soya products in school lunch programme in Thrissur district. M.Sc.(Home Science) thesis, Kerala Agricultural University, Trichur, p.120

Devi, T.R. and Sarojini, G. 2000. Food and nutrient intake, deficiencies and KAP of pregnant and lactating women belonging to dairy Vs non dairy families. *J. Res. ANKRAU 28: 65-68*

Devraj, M., Menon, N.G. and Pillai, V.K. and Balachandran, K. 1999. Coastal zone governance: Kerala in relation to national and international situations. *Mar. Fish Infor. Serv.* 36: 162-172

Dewalt, K.M. 1993. Nutrition and the commercialization of agriculture: ten year later. *Social Sci. Med.* 36: 1407-1416

Dungarwal, M. and Choudhary, M. 2001. Nutritional status of farm labourers. XXXIV Annual Meeting of Nutrition Society of India, 5-6 December 2001. All India Institute of Medical Sciences, New Delhi. *Abstract*: 57

Edwin, L. 1988. *A Report on the Socio-Economic Survey of the Fishermen of Narakkal and Kandakadavu.* Central Institute of Fisheries and Technology, Cochin. p. 86

Fang, Y.X., Yang, H.Z., Liu, Z.Y. and Xu, P. 1998. The role and status of Chinese women integrated fish farming. *Proceedings of a workshop on Integrated fish farming held in Wuxi, Jiangsu Province, People's republic of China* (eds. Mathaias, J.A., Charles, A.T. and Baotony, H.). CRC Press, pp.279-293

Farm Guide. 2002. *Selected indicators of progress in agriculture sector.* Farm Information Bureau, Thiruvananthapuram, p.4

Farzana, C. and Manay, S. 2000. Dietary and nutritional adequacy of rural households. XXXIII Annual Meeting of Nutrition Society of India. 1-2 December 2000. National Institute of Nutrition, Hyderabad. *Abstract*: 20

Food and Agricultural Organisation. 1999. The State of World Fisheries and Acquaculture. FAO of the United States, Rome, p.412

*Ge, K. 1995. Dietary pattern and physical development in China based on the 1992 national nutrition survey. *Asia Pacif. J. Clin. Nutr.* 4: 19-23

Genecaga, H. and Huddleston, B. 1986. Explorations of food consumption and nutritional status: Turkey. *Fd Policy* 23: 80-93

George, J. 2000. Influence of amla products on the nutritional and health status of SOS children in Thrissur district. M.Sc. (Home Science) thesis, Kerala Agricultural University, Trichur, p.88

George, M.K. 1998. An enquiry into the extend and causative factors of educational backwardness among the marine fish workers of Kerala. Ph.D. thesis, Indian Institute of Education, Pune, p.215

George, M.K. and Domi, J. 2002. *Residual Literacy in a Coastal Village: Poovar Village of Thiruvananthapuram District.* Centre for Development Studies, Thiruvananthapuram, p.121

*Getaburn, Z., Urga, K., Ganebo, T. and Nigatu, A. 2001. Review of the status of malnutrition and trends in Ethiopia. *Ethiopian J. Health Dev.* 15: 55-74

Gogoi, M. and Bhattacharya, R. 2000. Dietary habits of reproductive aged Mishimi women of Arunachal Pradesh. *J. agric. Sci. Soc. N.E. India*. 13: 139-148

Gopalan, C. 1989. Malnutrition among preschool children. *Fd Nutr. Bull.* 10: 16-18

Gopalan, C. 1991. The national nutrition scene - The challenging profile. *Proc. Nutr. Soc. India.* 37: 10-11

Gopalan, C. 2001. Early childhood malnutrition in India - inter state differences. *J. NFI Bull.* 22: 5-8

Gopalan, C. and Aeri, B.T. 2001. Strategies to combat under nutrition. *Econ. Political Weekly* 36: 3159-3169

Gopaldas, T. and Seshadri, S. 1987. *Nutrition Monitoring and Assessment.* Oxford University Press, New Delhi, p.221

Government of Kerala. 1990. *Kerala Fisheries - An Overview.* The Department of Fisheries, Thiruvananthapuram, p.260

Government of Kerala. 2002. *Selected Indicators of Progress in Agriculture Sector.* Farm Information Bureau, Thiruvananthapuram, p.4

Government of Kerala. 2003. The official web portal. www.prd.kerala.gov.in

Government of Kerala. 2004. The official web portal. www.prd.kerala.gov.in

Griffiths, P.L. and Bentley, M.E. 2001. The nutrition transition is under way in India. *J. Nutr.* 131: 2692-2700

Gupta, S.P. 1987. *Statistical Methods.* Sultan Chand Sons, New Delhi, p.310

Gupta, S.P. 1999. Nutrition: an Indian perspective. *Indian J. Pbl. Health* 43: 11-16

*Haidar, J., Nekatibeb, H. and Virga, K. 1999. Iron deficiency anaemia in pregnant and lactating mothers in rural Ethiopia. *E. Afr. Med. J.* 29: 618-622

*Haillu, W. 1990. Agricultural system household activities and family nutrition. Sidarmia province, Ethiopia. *E. Afr. Med. J.* 20:73-105

Harris, B.S., Gillespic, M. and Prior, J. 1990. Poverty and malnutrition at extremes of South Asian food systems. *Econ. Political Weekly* 25: 1901-1913

Hemalatha, G., Chandrasekhar, U. and Sylvia, M. 2000. Iron profile of working women in comparison with housewives. *Indian J. Nutr. Dietet.* 37: 319-324

Hua, Z. and Hage, H. 2002. Longitudinal changes in nutrient intake in the Melbourne Chinese. *J. Pbl. Health Nutr.* 5: 433-439

Indian Council of Medical Research. 1990. Nutrient Requirements and Recommended Dietary Allowances for Indians. National Institute of Nutrition, Hyderabad, p.126

Indian Council of Medical Research. 2001. *Micronutrient deficiency disorders in 16 districts of India. Part I.* Report of an ICMR Task Force Study - District Nutrition Project, New Delhi, p.69

Ingle, P.O. and Khai, D.N. 1987. Personal and socio-economic status of agricultural women labourers. *Maharashtra J. Ext. Education* 6: 23-27

International Conference on Fish Workers and their Supports. 1984. *Report on the Study of Health in Relation to Socio-Economic Status of Fishing Communities*. Bay of Bengal Programme, Madras, p.25

Jameela, M. 2002. Food and nutritional security of women in the traditional fishing households of Thiruvananthapuram district of Kerala. *Women in Fisheries* (eds. Singh, M. P; Kohli, S.M.P. and Tewari, M.S.). Indian Societies of Fisheries Professionals, Mumbai, pp.42-45

James, P.S., Kurup, K.N. and Pillai, N.G.K. 1991. A Review of Present Status of Marine Fisheries of Kerala. *Mar.Fish.Infor. Serv.* 114:3-6

Jansi, G. and Sarojini, G. 1991. Analogy of health and nutritional status of preschoolers in fishing families. *J. Res. AAU.* 21: 2-15

Jayanthakumari, S. 1993. Food consumption pattern of selected farm families in Thiruvananthapuram district. M.Sc.(Home Science) thesis, Kerala Agricultural University, Trichur, p.102

Jelliffee, D.B. 1966. *The Assessment of the Nutritional Status of the Community*. WHO Monograph Ser. 33. WHO, Geneva, p.50

Jessy, T. 1989. *Socio-Economic Factors Influencing Educational Standards in a Marginalized Community: A Case on the Marine Fisherfolk of Kerala*. JNU Report No.12, JNU, New Delhi, p.215

Johnson, J.M. and Walker, P.M. 1992. Zinc and iron utilization in young women consuming a beef-based diet. *J. Am. Dietet. Ass.* 92: 1474-1478

Jose, M.P. 1998. Maternal employment and nutritional status of preschool children. M.Sc.(Home Science) thesis, Kerala Agricultural University, Trichur, p.118

Joseph, S. 1991. Girl child workers - A victim invisible. *Kurukshethra* 39: 11-14

Jyothi, R. 2003. Nutritional profile of women labour in rice cultivation. M.Sc.(Home Science) thesis, Kerala Agricultural University, Trichur, p.119

Kamath, S. 1986. *Nutritional Assessment in Health Assessment.* Third edition. The CV Mosby Company. Princeton, p.132

Kapil, U., Pathak, P., Tandon, M., Singh, C. and Pradhan, R. 1999. Micronutrient deficiency disorders among pregnant women in three urban slum communities of Delhi. *Indian Paediatrics* 36: 983-989

Karuna, M.S. 1993. Nutritional status of women engaged in fish vending in Thiruvananthapuram district. Ph.D. thesis, Kerala Agricultural University, Trichur, p.128

Karuna, M.S. and Prema, L. 1993. Factors influencing the nutritional status of women engaged in fish vending in Trivandrum district. Souvenir and Abstracts of IVth World Congress on Clinical Nutrition, 2-5 October 1993. Malabar Hotel, Cochin, Little Flower Medical Research Centre. Angamali. *Abstract*: 73

*Khadka, N.B. 2001. Vitamin A deficiency, fruit and vegetable consumption and nutrition education: villagers perceptions in Nepal. *Aust. J. Nutr. Dietet.* 58: 186-191

Khetarpaul, N. and Grover, I. 2001. Strategic measures for improving nutritional status of women. *Intensive Agric.* 39: 14-15

King, N.A., Trambley, A. and Blundell, J.E. 1997. Effects of exercise on appetite control implications for energy balance. *Med.Sci. Sports and Exercise.* 29: 1076-1089

Kumar, K.P. 2001. *Quality of Life of Low Income Groups: A Micro Level Study.* Centre for Development Studies, Thiruvananthapuram, p.43

Kumar, P. 1996. Long term change in dietary pattern and food demand in Asia. *Palawija News* 13: 1-2

Kumar, S. 2000. Country profile: India nutritional disorders - old and changing. *Lancet* 351: 1268-1269

Kumari, L. 1991. *Food and Nutrition Status of Small Fisher Folk in India's East Coast States.* Technical Report 204. FAO of United Nations, Rome. P.105

Kupputhai, U. and Mallika, N. 1993. Nutritional status of adult women belonging to Khond, Gadaba and Porja tribes of Andra Pradesh. *Indian J. Nutr. Dietet.* 30: 173-179

Kurien, J. 1980. Social factors and economic organization of the traditional small scale fishermen of India. *J. Soc. Action.* 30: 111-127

Kurien, J. 1995. The Kerala Model: It's central tendency and the outlier. *Social Sci.* 23: 1-3

Kurien, J. and Achari, T. 1988. Fisheries development policies and fishermen struggle in Kerala. *Soc. Action.* 38: 15-36

Kurien, P. and Paul, A. 2001. Social Security Nets for Marine Fisheries. Working Paper No. 318. Centre for Development Studies, Thiruvananthapuram, p.67

Labadarios, D. 2001. The national food consumption survey children aged 1-9 years. *S. Afr. J. Psychiatry* 14: 62-66

Latafat, T., Hakeem, M.H. and Khan, A.B. 2000. Clinical efficacy of Kushta-e-Faulad and Sharbat-e-Faulad in iron deficiency anaemia during pregnancy. *Hamdard Medicus* 43: 25-29

Lawrence, L. 2003. Household food security and nutritional status of women agricultural labourers. M.Sc. (Home Science) thesis, Kerala Agricultural University, Trichur, p. 126

Lean, M.E.J., Han, T.S. and Morrison, C.E. 1995. Waist circumference as a measure for indicating need for weight management. *Br. Medical J* .11: 638-641

Liu, D., Kothr, E.D. and Fronters, G. 1992. Strategies to combat iron deficiency anaemia in China. *Ecol.Fd Nutr.* 30: 22-36

Mani, J. 1995. Traditional fishermen community in Kerala. A study on the problems of marginalization. Ph.D. thesis, University of Kerala, Thiruvananthapuram, p.145

Manorama Year Book. 1996. Thirty first year of publication, Malayala Manorama, Kottayam, p.240

Manorama Year Book. 2001. Malayala Manorama Press, Kottayam, p.836

Mari, J. 1995. Individual dietary survey, purpose and methods. *Wld Rev. Nutr. Dietet.* 13: 105-161

Martins, I.S. and Melendez, U.G. 1999. Nutritional status of social groups in greater metropolitan Sao Paulo, Brazil. *Cadernos-de-Sande-Publica.* 15: 71-78

Mary, A.B.F. 1986. Nutrition, health and population in strategies for rural development. *Econ. Dev. Cultural Change* 26: 1-23

Mathen, M.M. 1998. Nutritional status and integlligence of preschool beneficiaries of ICDS and non beneficiaries of Thrissur District. M.Sc. (Home Science) thesis, Kerala Agricultural University, Trichur, p.148

Mc Laren, D.S., Johnston, E.E., Lampl, M., Martorell, R., Waterlow, J.C., Hansen, J.D.L. and Mora, J.O. 1984. Forms and assessment of protein energy malnutrition. *In: Malnutrition and Behaviour - Critical Assessment Key Issues* (eds. Brozek, J. and Schurch, B.). Nestle Foundation, Switzerland, p.130

*Meda, N., Chevalier, P. and Daude, M. 2000. Ocular manifestations of vitamin A deficiency in rural areas of Burkina Faso. *J. med. Trop.* 60: 57-60

Meena, J., Vijaya, N. and Reddy, S.N. 2000. Food and nutrient intake, anthropometric measurements and haemoglobin status of lactating women in urban and rural areas of Parbhani district. *Indian J. Nutr. Dietet.* 37: 288-295

*Min, Z., Binn, C.W. and Lee, A.H. 2002. Dietary pattern and nutrient intake of adult women in South-East China: a nutrition study in Zhejiang province. *Asia Pacif J. Clin. Nutr.* 11: 13-21

Ministry of Health and Family Welfare. 1999. *Key Findings: National Family Health Survey-2.* Government of India/International Institute of Population Studies, Mumbai, p.108

Mohapatra, A., Geddam, J.J.R., Marar, N., Mallick, G., Murmu, B., Acharya, A.S., Bulliya, G. and Satyanarayana, K. 2001. Nutritional status of rural Oriya women from drought affected Kalahandi district of Orissa. *Indian J. Nutr. Dietet.* 38: 403-404

Muhammad, P.B. 2000. *Matsyavipaniyude Kanapurangal.* Extension division of Matsyafed, Thiruvananthapuram, p.56

Naidu, A.N. and Rao, N.P. 1994. Body mass index: a measure of the nutritional status in Indian populations. *Eur. J. Clin. Nutr.* 48: 131-140

National Institute of Nutrition. 1983. A Manual of Laboratory Techniques (eds. Raghuramulu, N., Nair, K.M. and Kalyasundaram, S.). Indian Council of Medical Research, Hyderabad, p.140

National Institute of Nutrition. 1983a. *Relative importance of various anthropometric measurements and indices for evaluation of nutritional status.* Annual Report, Indian Council of Medical Research, New Delhi, p.219

National Institute of Nutrition. 1984. Nutritional surveys in urban slums. *Nutr. News* 5: 5-8

National Institute of Nutrition. 1985. Nutritional status and reproductive performance of working women. *Nutr. News* 6: 1-6

National Institute of Nutrition. 1995. *The Impact of Women's Work on Child and Maternal Health*. A Summary Report of the Women's Work and Child Development Network. National Institute of Nutrition, Hyderabad, p.15

National Institute of Nutrition. 2002. National Nutrition Monitoring Bureau - Results of rural surveys. *Annual Report 2001-2002*. National Institute of Nutrition, Hyderabad, p.160

National Nutrition Monitoring Bureau. 1989. *Children and Women in India-A Situation Analysis*. Report of NNMB surveys. National Institute of Nutrition, Hyderabad, p. 37

National Nutrition Monitoring Bureau. 1996. *Nutritional Status of Rural Population*. Report of NNMB Surveys. National Institute of Nutrition, Hyderabad, p.11

Nayga, R.M. 1994. Effects of socio-economic and demographic factors on consumption of selected food nutrients. *Agric. Resour. Econ. Rev.* 23: 171-182

Nayik, N. 1993. *A Study of Socio-Economic Conditions of Artisanal Fishing Community on the South West Coast of India Following Motorisation of Traditional Crafts*. Research report 40, Programme for Community Organisation, Thiruvananthapuram, p.49

Nazmul, H. and Ahmed, K. 1986. House distribution of energy intake and its relationship to socio economic and anthropometric variables. *Fd Nutr. Bull.* 8:3-7

Negi, E.F. 1999. Death of Social Causes: Perceptions and Responses to Female Infanticide in Tamil Nadu. M.S. Swaminathan Research Foundation, Chennai, p.54

Okafor, J.C., Oloyo, R.A. and Addo, A.A. 2001. A study of iron status of pregnant women in Yewa South local government area of Ogun state. *Indian J. Nutr. Dietet.* 38: 394-402

Panicker, P.G.K. 1979. Employment, income and food intake among selected agricultural labourer households. *Com. Polit. Wkly.* 14: 1464-1470

Panikkar, K.K.P. 1990. A socio- economic analysis of prawn farming in Orissa state. *Mar. Fish. Infor. Serv.* 106:3-10

Patil, H.N. and Jadhav, S.T. 2002. Socio-Economic Profile of Fishermen in Andaman and Nicobar Islands of India. Second Indian Fisheries Science Congress Bhopal, 24-25 Oct. 2002. Indian Society of Fisheries Professionals, Mumbai. *Abstract*: 8

*Perez, J.J.C. and Alamaguir, G. 2002. Iron stores in low-income pregnant Mexican women at term. *Archives med. Res.* 33: 81-84

Perla, D. and Estella, M. 1997. Main nutritional problems in the Phillippines. Asian Regional Meeting on Nutritional Problems, 24-25 October, 1997. Bangkok. International Society of Pediatric Nutrition. *Abstract*: 40

Pickering, H., Okongo, M., Bwanika, K., Nnalusiba, B. and Whitworth, J. 1997. Sexual behaviour in a fishing community on Lake Victoria, Uganda. *Health-Transition-Rev.* 7: 13-20

Pratheesh, V.S. 2002. Investment pattern in rural households of Ollukkara block panchayat in Thrissur district. M.Sc.(Agriculture) thesis, Kerala Agricultural University, Thrissur, p.138

Prema, L., Menon, A.G.G. and Aiyer, R.S. 1982. Changing the dietary habits of a tribal population through the introduction of new food crops. *Philip. J. Nutr.* 35: 60-6

Pushpamma, P., Geervani, P. and Devi, N.L. 1982. Food intake, nutrient intake and anthropometry of adolescents in Andra Pradesh. *Indian J. Med. Res.* 75: 61-67

Pushpangadan, K. and Murugan, G. 2000. Gender Bias in a Marginalized Community - A Study of Fisher Folk in Coastal Kerala. Centre for Development Studies, Thiruvananthapuram, p.84

Rahman, M. and Rao, V.K. 2000. Variation in dietary pattern and nutrient intake by economic status. *Indian J. Nutr. Dietet.* 37: 172-180

Rahman, M. and Rao, V.K. 2001. Effect of socio-economic status on food consumption pattern and nutrient intake of adults - a case study in Hyderabad. *Indian J. Nutr. Dietet.* 38: 292-300

Rai, S.C. and Sarup, S. 1995. Pattern of rural development in southern India. *Kurukshetra.* 44: 27-36

Raj, J. 1997. Socio-economic status of traditional fisher folk in Kerala - A study in Thiruvananthapuram district. M.Sc.(Agricultural Economics) thesis. Kerala Agricultural University, Trichur, p.134

Rajkumar, H. and Premakumari, S. 2000. Health and nutritional status of working women in Coimbatore and their exposure to occupational hazards. *Indian J. Nutr. Dietet.* 37: 381-390

Rajuladevi, A. 2001. Food poverty and consumption among landless labour households. *Econ. Political Weekly* 36: 2656-2664

Ramachandran, P. 1986. Nutritional status of working women. *Nutrition.* 20: 22-31

*Ramalho, A., Saunders, C., Paiva, F.,Accioly, E., Cardoso, L. and Deo, E. 2001. Vitamin A status of mothers and newborn infants and maternal anthropometric status. *J. Revista de Ciencias Medicas* 10: 5-10

Ramya, M. and Devaki, B. 2000. Body iron status of women construction workers in Tirupati and their work performance. XXXIII Annual Meeting of Nutrition Society of India, 1-2 December 2000. National Institute of Nutrition, Hyderabad. *Abstract:* 46

Ranganathan, L. 1996. Nutritional status of women engaged in the coir industry. M.Sc.(Home Science) thesis, Kerala Agricultural University, Trichur, p.385

Rao, D.H. and Vijayaraghavan, K. 1996. Anthropometric assessment of nutritional status. *Text Book of Human Nutrition* (eds. Bamji, M.S., Rao,

P.V. and Reddy, V.). Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi, pp.507-515

Rao, N.R., Syamalamba, C.H., Ahmed, M. and Reddi, Y.R. 1976. Nutritional status of residential school children in Andra Pradesh - A rural study. *Indian Paediatrics* 13: 249-353

Rao, N.S. 2004. *Current Scenario and Future Needs of Indian Fisheries*. Forum of fisheries professionals, Vishakapattanam, p.268

Rao, P.N., Ramnath, T. and Sastry, G. J. 1986. Diet and nutrition in urban areas. *Proc. Nutr. Soc. India* 32: 1-9

Rao, V.K., Pant, K.C. and Balakrishnan, N. 1981. Pattern and trends on food production and needs in India. *Dimensions of Development Planning* (eds. Panday, D.C. and Tiwari, P.C.). Criterion Publishing, New Delhi, pp.415-431

Rasmussen, K.M. and Habicht, J.P. 1992. Malnutrition among women-indicators to estimate prevalence. *Fd Nutr. Bull.* 11: 29-37

Ravindran, T.K.S. 1996. *Health Implications of Sex Discrimination in Childhood*. World Health Organisation, Geneva. p.165

Reddy, V., Rao, N.P., Sastry, J.G. and Kashinath, K. 1993. *Nutrition Trends in India*. National Institute of Nutrition, Hyderabad, p.158

Robinson, C.H. 1990. *Normal and Therapeutic Nutrition*. Mac Millan Publishing House, New York, p.168

*Rodeguize, S., Bilanco, A., Cunningham, L., Ascencio, M. and Chavez, M. 2000. Prevalence of nutritional anaemia in women of child bearing age in Costa Rica. *J. Boktin INCIENSA* 12: 2-3

*Roos, E.B., Hirvonen, T., Mikkila, V., Karvonen, S. and Rimpela, M. 2001. Household educational level as a determinant of consumption of raw vegetables among male and female adolescents. *J. Preventive Med.* 33: 282-291

Rose, D., Wood, S.D. and Baylock, J. 1995. Socio economic factors associated with the iron intake of preschoolers in the United States. *Nutr. Res.* 15: 1297-1309

*Rothenberg, E., Bosaeur, I. and Steen, B. 1994. Food habits, food believes and socio-economic factors in an elderly population. *Scand. J. Nutr.* 38: 159-165

*Sanchez, H., Romero, D.C., Rodriguez, R.E., Blanco, L.F., Majem, S.L. and Ferrer, P.M.C. 2000. Biochemical assessment of nutritional status in the Canary island population. *Archivos-Latino americanos-de-Nutrition* 50: 43-54

Sar, S.S., Thakkare, G.G. and Gupta, D.N. 1991. Inadequacies in daily diet of rural people in Thane district of Maharashtra. *Indian J. Nutr. Dietet.* 28: 334

Sathiadas, R. and Panikkar, K.P. 1994. Socio economic conditions of the fishermen of Madras coastal areas. *Marine Fish. Inf. Serv.* 44: 9-13

Sausberlich, H.E., Dowdy, R.P. and Skala, S.H. 1977. *Laboratory Tests for the Assessment of Nutritional Status*. CRC Press, Cleveland, Ohio, p.142

Saxena, K.J. 1986. The joint and nuclear family - A personal experience. *Indian J. Social Work* 6: 32-36

Saxena, M. and Taneja, P. 1999. Dietary intake and energy expenditure of Bhil women of Thabua district of Madhya Pradesh. XXXII Annual Meeting of Nutrition Society of India, 25-26 November 1999. National Institute of Nutrition, Hyderabad. *Abstract*: 48

*Schofield, S.M. 1985. *Development and Problems of Village Nutrition* (Part III). The English Language Book Society and Crom-Helm, London, pp.83-105

Sehara, D.B.S., Panikkar, K.K.P. and Karbhari, J.P. 1992. Socio-economic aspects of the monsoon fisheries of the west coast of India. *CMFRI Spec.l Publ.* 45: 242-250

Seralathan, M.A., Thirumaran, A.S. and Neelakandan, S. 1993. Study of socio economic and nutritional status of farm women. Souvenier and Abstracts of IVth World Congress on Clinical Nutrition, 2-5 October 1993. Malabar Hotel, Cochin, Little Flower Medical Research Centre, Angamali. *Abstrat*: 76

Seshadrinath, R. 1993. The factors influencing the intrafamily distribution of food among agricultural labour families of Thiruvananthapuram with special reference to nutritional status. M.Sc.(Home Science) thesis, Kerala Agricultural University, Trichur, p.112

Sharma, S.D. and Kalia, M. 1990. Anthropometric measurements of preschool children in Ghumarwin Block of Himachal Pradesh. *Indian J. Nutr. Dietet.* 27: 47-53

Shatrugna, V.P., Sagar, V., Vasanthi, G. and Sujatha, T. 1993. Women's work and time-critical issue for women's development programmes. *Proc. Nutr. Soc. India* 40: 83-88

Shyna, K.P. 2001. Traditional food habits of different communities in Thrissur district. M.Sc.(Home Science) thesis, Kerala Agricultural University, Trichur, p.128

Shyna, P.K. 1996. Nutritional profile and mental functions of preschool children belonging to agricultural labour families in Trichur district. M.Sc.(Home Science) thesis, Kerala Agricultural University, Trichur, p.114

Singh, A. and Baghe. 2001. Prevalence of nutritional anaemia in slum women. XXXIV Annual Meeting of Nutrition Society of India, 5-6 December 2001. All India Institute of Medical Sciences, New Delhi. *Abstract*: 38

Singh, I.J. 1998. Farm poverty, household food security and agricultural sustainability in India. *J. rur. Dev.* 17: 619-631

Singh, P. and Agarwal, K.N. 2001. Nutritional assessment of residents of different types of colonies in Delhi. *Indian J. Nutr. Dietet.* 38: 223-230

Singh, P., Pathak, P., Kapoor, S.K. and Kapil, U. 2001. Comparison of hemocue method with cyanmethaemoglobin method for estimation of haemoglobin. XXXIV Annual Meeting of Nutrition Society of India, 5-6 December 2001. All India Institute of Medical Sciences, New Delhi. *Abstract*: 38

Singh, S. and Kumari, S. 2001. Nutritional status of children (6-12 years) belonging to scheduled caste-a study in Samastipur district of Bihar. *Indian J. Nutr. Dieter.* 38: 428-436

Sirisena, W.M. and Gamlath, S. 1999. Women and decision-making: Participation of rural women in household decision-making in three villages in Hambantota district in Sri Lanka. *J. Rural Development Administration.* 31: 32-45

Sivasubramaniam, K. 1991. *Kattamaram Fisheries and Fisherfolk.* Bay of Bengal Report. Bay of Bengal Programme, Madras. p.41

Smitha, M.E. 1999. Food consumption pattern and nutritional status of women agricultural labourers of Ollukkara block, Trichur district, M.Sc. (Home Science) thesis, Kerala Agricultural University, Trichur, p.126

Srinath, T.T. 1998. Educational standards in marginalized community. *Soc. Action.* 38:15-36

State Planning Board. 1997. *Report on the Task Force on Fisheries.* Government of Kerala. Thiruvananthapuram, p.272

Stephanie, P.R. 1984. Observations on dietary practices in India. *Nutr. Planning.* 7: 286-295

*Stikova, O. 1994. *Nutrition and Food Policy.* Faculty of farm economics and management, Agricultural University, p. 457

Sucharno, D., West, C.E., Dewaart, F.G. and Karyadi, D. 1992. Cross sectional study on the iron and Vitamin A status of Pregnant Women in West Jawa, Indonesia. *Am. J. Clin. Nutr.* 56: 988-993

Suiter, C.W. and Hunter, M.F. 1980. *Nutrition: Principles and Application in Health Promotion.* J.B.Lippinett Co; Philadelphia, Toroli, p.150

Sujatha, A.S. 1990. Food consumption and energy expenditure pattern of self employed women in unorganized sector. M.Sc. (Home Science) thesis, Kerala Agricultural University, Trichur, p.124

Sukumar, P., Vasanthakumar, R. and Selvaraj, P. 1987. Training of fisher folk and coastal development: Symposium on Research and Development in Marine Fisheries. CMFRI, Cochin, p.142

Sundari, T.K. 1990. Indian women having to run to stay in place? An overview of the status of Indian women. *Proc. Nutr. Soc India* 17: 27-29

Swaminathan, M. 1986. *Principles of Nutrition and Dietitics.* The Bangalore Printing and Publishing Co., Ltd., Bangalore, p.512

Swaminathan, M.C. 1987. Non invasive parameters for field monitoring and evaluation: their sensitivity, specificity and cost. *Nutrition Monitoring and Assessment* (eds. Gopaldas, T. and Seshadri, S.). Oxford University Press, New Delhi, pp.22-25

Swaminathan, M.S. 1996. *The increasing Role of Science and Technology in National Development in the 21st Century.* Published by the state on science, technology and environment, Kerala, p.180

Swamy, H.M., Thakur, J.S., Bhatia, S.P.S. and Bhatia, V. 2001. Nutritional status of Preschool Children in an Integrated Child Development Services Block of Chandigarh, *J. Indian Med. Ass.* 99: 554-556

Swamy, S.N. and Vijayalakshmi, D. 1999. Nutritive knowledge and health practices among rural women. XXXII Annual Meeting of Nutrition of Society of India, 25-26. November 1999. National Institute of Nutrition. Hyderabad. *Abstract:* 36

Swamy, S.N., Vijayalakshmi, D. and Surendra, H.S. 2000. Dietary pattern and nutritional status of farm women labourers. XXXIII Annual meeting of nutrition society of India, 1-2 December 2000. National Institute of Nutrition, Hyderabad, *Abstract*: 17

Tanner, S. 1987. Malnutrition and the development of households in Agreste Paraiba State of North East Braiyin. *J.Dev. Stud.* 23:242-246

Thadeus, P. 1999. *Fishing Community: Backwardness and Prospects.* Policy paper 2. Programme for Community Organisation, Thiruvananthapuram, p.145

Thimmayamma, B.V.S. 1983. Nutrition and welfare of family. *Swasth Hind* 27: 265-268

Thimmayamma, B.V.S. and Rau, P. 1996. Dietary Assessment as Part of Nutritional Status. *Textbook of Human Nutrition.* (eds. Bamji, M.S., Rao N.P. and Reddy V.). Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi. pp.125-135

Thomas, M., Balasubramanian, S. and Kandoran, M.K. 1996. Role performance of fisher women and the associated variables. *Fish Technol.* 33: 51-57

Tietze, U. and Groenwold, G. 2000. *Demographic change in Coastal Fishing Communities and its Implications for the Coastal Environment.* FAO Fisheries Technical Paper 403. FAO of the United Nations, Rome, p.150

Udaya, P.K. 1996. Food consumption pattern and nutritional status of farm women in Thrissur district. M.Sc. (Home Science) thesis, Kerala Agricultural University, Thrissur, p.99

Udayabanu, K.M. 1990. Dheevara community and social change in Kerala. Ph.D. thesis, University of Kerala, Thiruvananthapuram, p.123

United Nations Development Programme. 1999. *Human Development Report.* Oxford University Press, New York, p.254

Usha, V., Thomas, S.P. and Prema, L. 1990. The nutritional status of farm women of instructional farm. *Workshop on Women in Agriculture, 29 October November 9, 1990.* National Institute of Rural Development, Hyderabad. Background papers, pp.35-36

Vazir, S. 1990. Undernutrition and intelligence. *Nutr. News* 11: 5-6

Veeraputhiran, K. 1988. Training needs of fisherwomen. M.Sc.(Agriculture) thesis, Tamil Nadu Agricultural University, Coimbatore, p.109

Venkitalakshmi, P. and Peramma, D. 2000. Body weight and physical work capacity. *Indian J. Nutr. Dietet.* 37: 255-258

Vijayalakshmi, P. 1991. Impact of income generation by women on family nutritional improvement. *Proc. Nutr. Soc. India.* 38: 381-393

Vijayalakshmi, P., Kupputhai, U. and Umamaheswari, V. 1987. Anaemia and work output of farm women. *Indian J. Nutr. Dietet.* 12: 9-12

Vijayaraghavan, K. 1987. Anthropometry for assessment of nutritional status. *Indian J. Paediatrics* 54: 511-520

*Weiget, M., Armijos, R.M. and Monaco, M.H. 1992. Nutritional and health status of rural women colonies in the subtropical lowlands of North Ewador. *Ecol. Fd Nutr.* 29: 25-43

Wood, S.D. and Baylock, T. 1982. Impact of household size and income and food spending patterns. *Wld agric. Econ. Rur. Social Abstr.* 24: 2364-2367

World Health Organisation. 1993. World Health. WHO Magazine 3: 298-301

World Health Organization. 1995. *The World Health Report: Bridging the Gaps*. World Health Organisation, Geneva. p.245

Yegammai, C. and Ambili, G.V. 1992. Nutritional profile of the selected fisher folk families in Thirukunnapuzha village of Alleppey district. *Indian J. Nutr. Dietet.* 29: 186-192

*Yongok, K. 2001. Food and nutrient consumption patterns of Korean adults by socio economic status. *Korean J. Community Nutr.* 6: 645-656

*Yuliati, K. and Widowati, T. 1998. Food consumption pattern and nutritional status of community living at non tidal swamps - a case study in South Sumatra. Afro-Asian regional conference on irrigation and drainage, 19-26 July 1998. Denpasar, Indonesia. *Abstract: 8*

* Originals not seen

Appendices

APPENDIX - I

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

1. Name of the respondent :
2. Name of the head of the family :
3. Address :

4. Place of survey :
5. Panchayat :
6. Age of the respondent :
7. Type of the family : Joint/Nuclear
8. Religion and caste :
9. Family size :
   No. of adults : Male: Female:
   No. of children :
10. Composition, education and occupation of family members:

Sl. No.	Name	Relationship with the head	Age	Sex	Occupation					Educational status					Income
					Fishing	Fish vending	Fish handling	Fish processing	Others	Illiterate	LPS	UPS	HS	College	

11. Do you have any other source of income:

    a) If yes, specify :

    b) Amount :

12. Total income :

13. Do you have dowry system in your community :Yes/No

    If yes, how much dowry did you get/give.

14. 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/others

    c) Structure of the house : Mud-built/brick built/Hollow brick/others

15. Details of ownership :

    a) Staying in own house : Yes/No.

    b) Staying in rented house : Yes/No.

    c) Rent received if a portion, if let out : Rs.

16. 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 utilization or recreational facilities
    :Owns a radio/ TV/transsister/
    VCR/ magazine/newspaper etc.

h) Transport facilities : Bicycle/motor bike/motor boat/
Catamarine/ordinary boat

i) Are you a member of any social organization

If yes, specify : Mahila Samajam

Co-operative

Society

Youth Club

Matsya fed

Others

Nil

17. Monthly expenditure pattern:

Sl. No.	Items	Expenditure
1	Food	
2	Clothing	
3	Shelter	
4	Transport	
5	Recreation	
6	Education	
7	Health	
8	Electricity	
9	Fuel	
10	Personal expenses	
11	Repayment of loans	
12	Kuries	
13	Savings	
14	Others	

18. Type of treatment followed : Ayurvedic

Homoeopathy

Allopathy

19. Do you have any health facilities in your locality : Yes/No.

If yes, specify : PHC/Private hospital/ District Hospital/Medical college hospital/ Private doctor/ clinic ayurvedic doctor/ homoeopathic doctor/others.

20. Details regarding personal habits

Do you have the habit of :

a) Smoking : Yes/No.

If yes, cigarette/beedies?

b) Tobacco chewing : Yes/No.

c) Others (Specify) :

21. Do you/family members have any crisis in the family? : Yes/No.

If yes specify:

i) Diseases

ii) Handicaps

iii) Accidents

iv) Death of close relatives

22. Family planning measures: Yes/No.

If yes, which measures are taken:

a) Condoms

b) Oral contraceptives

c) Abortion

APPENDIX - II

INTERVIEW SCHEDULE TO ELICIT INFORMATION ON FOOD CONSUMPTION PATTERN OF THE FAMILIES

1. Serial No. :
2. Name of the house wife :
3. Address :

4. Place of residence :
5. Food habit : Vegetarian/Non vegetarian
   No. of family members : Male/Female
6. Expenditure on food

Sl. No.	Food items	Frequency of purchase					Total amount spend/ month	% of total income
		Daily	Weekly	Mont-hly	Occas-ionally	As requ-ired		
1	Cereals							
2	Pulses							
3	Green leafy vegetables							
4	Other vegetables							
5	Roots and tubers							
6	Fruits							
7	Fats and oils							
8	Spices and condiments							
9	Sugar and jaggery							
10	Milk and milk products							
11	Meat							
12	Fish							
13	Egg							
14	Others (Specify)							

7. Frequency of use of different food material

Sl. No.	Food items	Frequency of use							
		Daily	Weekly				Monthly once	Occasionally	Never
			4	3	2	1			
1	Cereals								
2	Pulses								
3	Green leafy vegetables								
4	Other vegetables								
5	Roots and tubers								
6	Fruits								
7	Fats and oils								
8	Spices and condiments								
9	Sugar and jaggery								
10	Milk and milk products								
11	Meat								
12	Fish								
13	Egg								
14	Others (Specify)								

8. Number of meals/day

   1) One major meal :

   2) Two major meals :

   3) Three major meals :

   Snacks taken : Yes/No.

9. Snack foods are : Prepared at home/shop

   Do you prepare snacks at home: Yes/No.

   If yes, give details

   Do you purchase snack : Yes/No.

   If, yes give details

10. Do you give equal importance for family members in food distribution

: Yes/No.

If no, the order of importance: 1)

2)

3)

4)

11. Do you prepare special foods on special occasion: Yes/No.

    If yes, give details

Occasion	Food prepared	Reason
Birthday		
Marriage		
Death		
Feasts		
Others		

12. Do you process any foods at home: Yes/No.

    If yes, which foods in which form?

13. Daily meal pattern of the family

    a) Early morning :

    b) Break fast :

    c) Lunch :

    d) Dinner :

14. Special considerations in feeding family members

15. Types of special foods given to them

16. Meal serving pattern followed by the family

17. Special foods given/avoided during special conditions

	Food given	Avoided
a) Pregnancy		
b) Lactation		
c) Infancy		
d) Pre-school		

e) School going		
f) Adolescent		
g) Food restriction given to sick person		
h) Fever		
i) Cold		
j) Diarrhoea		
k) Vomiting		
l) Asthma		
m) Chicken pox		
n) Measles		
o) Diabetes		
p) Whooping cough		
q) Others		

18. Details regarding nutritional awareness:
    a) Do you plan your meals in advance:
    b) Do you keep any time schedule for taking meals :
    c) Do you boil the drinking water:
    d) How many times do you wash cereals :
    e) Do you soak pulses before cooking:
    f) Do you wash green leafy vegetables before cutting :
    g) Do you wash other vegetables before cutting:
    h) Do you eat any raw vegetables:
    i) Do you eat any raw fruits:
    j) Do you use sprouted pulses:
19. Infant feeding practices
    a) Duration of breast feeding:
    b) Weaning foods :
    c) Time of introduction :
    d) Type of foods :

APPENDIX - III

SCHEDULE FOR CLINICAL ASSESSMENT

1. Sex
2. Age
3. Height
4. Weight
5. General appearance
   a) Good
   b) Fair
   c) Poor
   d) Very poor
6. Hair
   a) Lack of lustre
   b) Thin and sparse
   c) Straight
   d) Dyspigmentation
   e) Flag sign
   f) Easy pluckability
7. Face
   a) Diffuse depigmentation
   b) Naso-labial dyssebacea
   c) Moon face
8. Eye
   a) Pale conjunctiva
   b) Bitot's spot
   c) Conjuctival xerosis
   d) Corneal xerosis
   e) Keratomalacia
   f) Angular palpebritis
9. Lips

a) Angular stomatitis
b) Angular scars
c) Cheilosis

10. Tongue
    a) Oedema
    b) Scarlet and raw tongue
    c) Magenta tongue
    d) Atrophic papillae
11. Teeth
12. Gums
    a) Spongy, bleeding gums
13. Glands
    a) Thyroid enlargement
    b) Parotid enlargement
14. Skin
    a) Xerosis
    b) Follicular hyperkeratosis - types 1 and 2
    c) Petechiae
    d) Pellagrous dermatosis
    e) Flaky paint dermatosis
    f) Scrotal and vulval dermatosis
15. Nail
    a) Koilonychia
16. Subcutaneous tissue
    a) Oedema
17. Muscular and skeletal systems
    a) Muscle wasting
    b) Craniotabes
    c) Frontal and parietal bossing
    d) Epiphyseal enlargement (tender or painless)
    e) Beading of ribs

f) Persistently open anterior fontanelle

g) Knock-knees or bow-legs

h) Diffuse or local skeletal deformities

i) Deformities of thorax (selected)

j) Muscle-skeletal haemorrhages

18. i) Gastro-intestinal

a) Hepatomegaly

ii) Nervous

a) Psychomotor change

b) Mental confusion

c) Sensory loss

d) Motor weakness

e) Loss of position sense

f) Loss of vibratory sense

g) Loss of ankle and knee jerks

h) Calf tenderness

iii) Cardiovascular diseases

a) Cardiac enlargement

b) Tachycardia

APPENDIX - IV

SCHEDULE FOR INDIVIDUAL FOOD WEIGHMENT SURVEY

(One day weighment method)

1. Name of the respondent :
2. Age of the respondent :
3. Place of survey :

   No. of family members :

4. Details of food consumption:

Name of the meal	Menu	Food consumption		
		Weight of raw ingredients used by the family (g)	Weight of total cooked food used by the family (g)	Weight of total cooked food consumed by the individual (g)
Breakfast				
Lunch				
Evening tea				
Dinner				
Others				

NUTRITIONAL PROFILE OF FISHER WOMEN

By

SALEENA. K.

ABSTRACT OF THE THESIS

Submitted in partial fulfilment of the
requirement for the degree of

Master of Science in Home Science

(FOOD SCIENCE AND NUTRITION)

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ABSTRACT

A study on "nutritional profile of fisher women" was conducted among 100 fisher women of 18-45 years age group in the coastal areas of Thrissur district.

The result of the study indicated that majority of them were Hindus. Nuclear family system was found in most of the families and family size ranged in between 3 to 5.

Most of the male and female members were literate and engaged in fish related work.

Majority of the families had a monthly income in between Rs.500 to Rs.1500.

Maximum proportion of income was spent on food items and majority of the families did not have the habit of saving money.

Majority of the families had their own houses with brick as wall material and with thatched or concrete roof. Majority of the houses had separate kitchen with 3 to 5 rooms. Drinking water, electricity and lavatory facilities were satisfactory whereas drainage facilities were found to be inadequate.

As a medical aid majority of the families depended on district hospital, primary health centre as well as private doctors for their medical care.

Majority of the families were members of matsyafed.

All the families were non vegetarians and consumed rice as the staple food. Maximum percentage of the food expenditure was for cereals.

The most frequently used food items were cereals, fish, fats and oils, sugar and spices and condiments.

None of the families planed their meals in advance and maintain time schedule for taking meals.

Majority of the families consumed food three times a day and did not give equal importance to all family members in food distribution.

Special foods were included in the diet during pregnancy, lactation and infancy. Diet modification during disease conditions was observed.

The nutritional profile of the respondents indicated that the body weight of 33 per cent and height of 24 per cent of the respondents were lower than the reference body weight and height for an Indian reference woman. About 13 per cent of the respondents had various grades of CED. The waist hip ratio indicated that about 97 per cent of the respondents had femoral gluteal obesity and 3 per cent had abdominal obesity.

Dietary profile of respondents indicated that all the food groups were far below the requirement except for fish. The nutrient intake was satisfactory only with respect to protein.

Clinical examination showed various symptoms of nutritional deficiencies among the respondents.

Actual nutrient intake of the respondents indicated that except fat, calcium and vitamin C, all nutrients were lower than the RDA.

Biochemical estimation of blood showed 35 per cent of respondents had low haemoglobin values, indicating anaemia.