NUTRITIONAL PROFILE OF WOMEN LABOUR IN COIR SECTOR

By

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THESIS

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KERALA, INDIA

2009

DECLARATION

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

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4 -4 -2009

CERTIFICATE

Certified that this thesis entitled **"Nutritional profile of women labour in coir sector"** is a bonafide record of research work done independently by **Ms. Deepa,R.** under my guidance and supervision and that it has not formed the basis for the award of any degree, diploma, fellowship or associateship to her.

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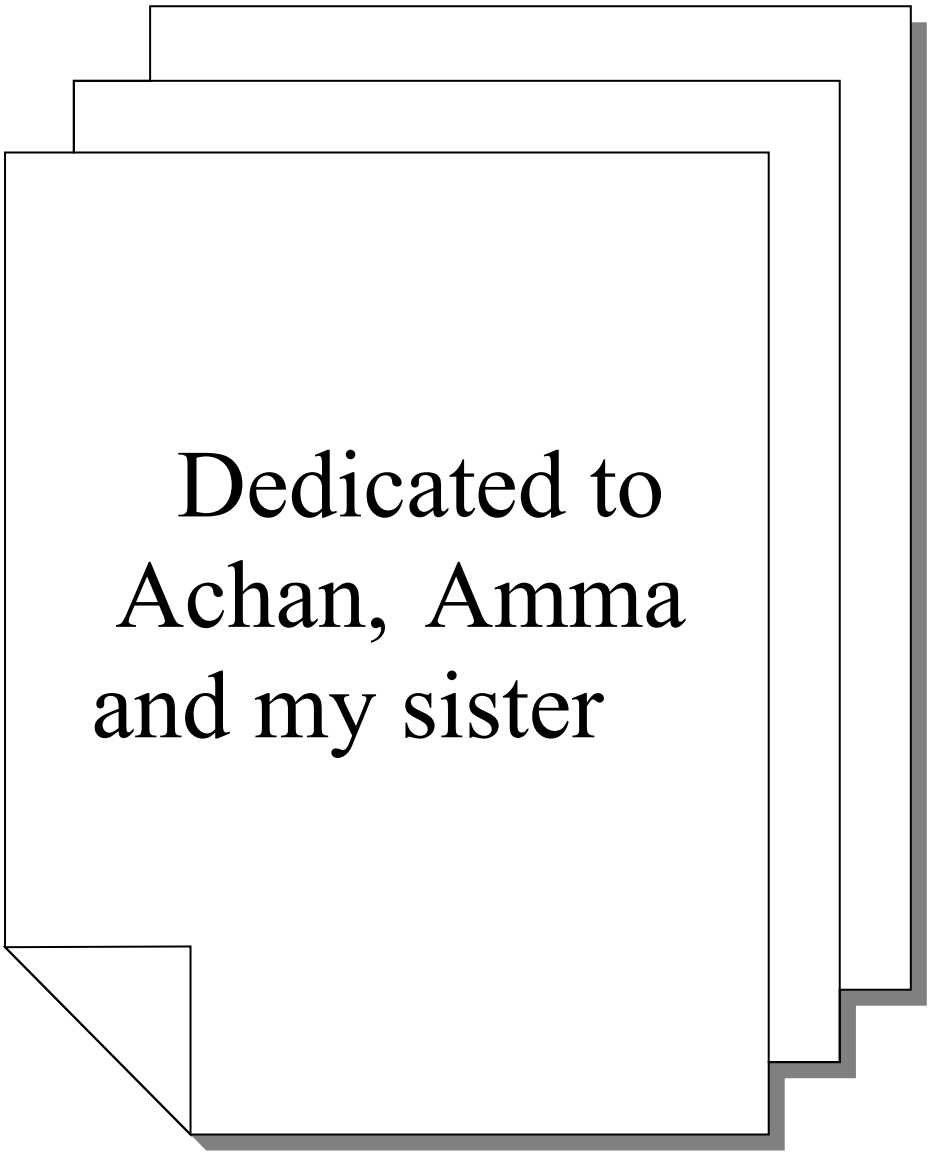
Dedicated to
Achan, Amma
and my sister

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ABBREVIATIONS

BMI	Body Mass Index
CED	Chronic Energy Deficiency
Org	Organized
Unorg	Unorganized
ICMR	Indian Council of Medical Research
NIOH	National Institute of Occupational Health
ROHC	Regional Occupational Health Centre
LPG	Liquid Petroleum Gas
NIN	National Institute of Nutrition
NNMB	National Nutrition Monitoring Bureau
NS	Not Significant
RDA	Recommended Dietary Allowances
PDS	Public Distribution System
Allo	Allopathy
Ayur	Ayurveda
Hom	Homeopathy
WHO	World Health Organization
BMR	Basal Metabolic Rate

Introduction

1. INTRODUCTION

The coir industry, one of India's foreign exchange earners provides livelihood to a large number of workers in the rural areas. In Kerala, coir industry enjoys the status as the largest cottage industry and 80 per cent of the industry in India is located in Kerala (Anonymous, 2004a).

Alappuzha is the nerve centre and cradle of Kerala's famous coir industry which is spread along the entire backwater coast. The long coastal line and the good network of lagoons and lakes spread over in the southern part of Kerala as well as the abundant availability of coconut husks, the chief raw material for the industry could be the reasons for starting coir industry in this part of Kerala (Ravi, 2007).

The coir industry has two distinct components, the traditional, labour intensive, largely feminized white fibre industry and the more modern mechanized, export oriented brown fibre industry. In India, white fibre industry is predominant and relies on non mechanized labours that are time and labour consuming and entail extreme drudgery (Bajaj, 1999). The production in the coir industry is highly decentralized and comprises varied production sites including the workers-own small homestead that uses family labour, the producer capitalist who employs wage-labour and the co-operative yard where several member workers concentrate.

Coir industry employs large number of workers in the different sectors of its production, manufacture and trade. This is considered as one of the major traditional industries in Alappuzha which provides employment to about 2 lakh workers, of whom 80 per cent are women (Anonymous, 2004b). Though, men and women are involved in different activities in coir industry, women are mainly involved in yarn spinning sector and the men in the production sector.

The workers in coir industry face various problems like low wages, wage disparities between men and women workers, long duration of work, non availability of raw materials, unhygienic working environment, inadequate facilities, decentralized production units, lack of mechanization, inadequate service benefits, irregular employment, insecurity in work, occupation related health problems etc. Most of these problems have direct or indirect consequences on the health and nutrition of the workers and family members. Women who constitute the major work force of coir industry will suffer from these adverse consequences to a greater extent due to their dual role as a wage earner, and as a home maker. In this context, the present study entitled "Nutritional profile of women labour in coir sector" was carried out with the following objectives:

1. To assess the socio-economic status of women labour in coir sector.
2. To assess the food consumption pattern of women labour in coir sector.
3. To assess the nutritional status of women labour in coir sector.
4. To identify the occupation related diseases and to assess the time and energy expenditure pattern of women labour in coir sector.

Review of literature

2. REVIEW OF LITERATURE

A comprehensive review of past studies related to the objectives of the study is presented in this chapter. For convenience and clarity, this chapter is divided into five sections as given below:

2.1. Demographic profile of coir workers
2.2. Women in work force
2.3. Nutritional status of women
2.4. Factors influencing the nutritional status of women
2.5. Health and occupational hazards among women

2.1. DEMOGRAPHIC PROFILE OF COIR WORKERS

The coir industry, which forms the main plank of the economy of the coastal areas of Kerala, is one of the oldest and most traditional industries in the state (Ravi, 2007). The author also indicated that coir industry in India is an export-oriented one from very early days and the prosperity of the industry depended on foreign buyers. After the sluggishness over the past three decades, the author also pointed that the coir industry in India is on the come back tract and the export figure moved up from 250 crores in 1997 to 605.17 crores during 2006-07.

About eighty per cent of the coir industry in India was found to be located in Kerala and had a long history of trade union involvement and struggles (Bajaj, 1999). Ravi (2007) indicated that out of 10573 coir processing units in India excluding the small units in the unorganized sector, 7794 units were present in Kerala. Out of this total unit in Kerala, 7323 units were product-manufacturing units and 395 were spinning and rope making units. Others included 47 fibre extraction units, 20 rubberized coir units, 5 pith processing units and 4 units involved in other work.

Coir industry, which is considered as the largest cottage industry in Kerala, provided employment to over a million people (Anonymous, 2004a). Gouriamma (2005) indicated that about 5 lakh workers depended on coir industry for their livelihood in Kerala and reported that coir industry earned more than Rs 450 crores as foreign exchange during 2003-2004. The author also indicated that apart from coir fed, the apex society functioning in the coir sector, more than 10,000 small-scale producers and nearly 200 exporters were functioning in Kerala's coir industry.

Jairam (1995) reported that about five lakh workers were employed in the coir industry in Kerala, out of which 70 per cent were found to be women. Ramanathan (2007) indicated that coir industry provided direct and indirect employment to over 0.64 million workers in Kerala and bulk of them were found to be women. According to Ravi (2007), coir industry employed a staggering 6 lakh people directly or indirectly and most of them were found to be from the economically disadvantaged classes and 80 per cent of the workers were women.

Alappuzha District is considered as the nerve centre of Kerala's famous coir industry (Anonymous, 2004a). A report published by Government of Kerala (2004) indicated that coir industry is one of the major traditional industries in Alappuzha District providing employment to approximately two lakh workers, of whom 84 per cent were women. Nair (2007) reported that there were about six lakh coir workers in Alappuzha District, out of which 50 per cent were found to be women.

The socio demographic and economic characteristics of coir workers were reported by Bajaj (1999). In terms of demographic profile, the survey showed that about 57 per cent were in the age group of 35 to 54 years, 32 per cent below 35 years and 12 per cent over 55 years. Rammohan and Sundersan (2003) indicated that most of the women workers in coir industry were in the age group of above 45 years.

Women working in the coir sector belonged to the economically poor and socially backward sections of the society (CSR, 2002). The report also indicated illiteracy, lack of skill and other occupations in the area as the factors which forced women to join the coir industry.

The coir workers represented the lowest strata of the rural poor in Kerala and they were of 'low' and 'out' castes and mostly women (Rammohan and Sundersan, 2003).

Eighty one per cent of the respondents in coir industry were married and women had over 10 years of schooling (Bajaj, 1999).

About 77 per cent of coir workers earned an income as low as Rs 1000/- month (Bajaj, 1999) and indicated that a large number of the workers were involved in other manual labour, petty trading and other supplementary activities to meet the basic survival needs.

Though, statutory minimum wages had been fixed for coir workers, often these were not paid to the workers even in the worker's co-operatives (Rajalakshmi, 2006). The wage received by a defibering worker was found to be less than Rs 60/day and spinning Rs 70/day.

Gouriamma (2005) indicated the major issues in the coir sector as lack of fibre and the non- receipt of coolie for the women working in the basic level and pointed out that the women workers engaged in spinning did not even receive the minimum wages from the co-operatives. Rajalakshmi (2006) reported that though the minimum daily wage of coir workers was fixed as Rs 100/-, the workers usually get as little as Rs 60 and Rs 70/ day.

A report published by Government of Kerala (1978) indicated that about 72810 households were engaged in yarn spinning in the coir industry.

Government of Kerala (1990) also indicated that spinning sector accounted for seventy per cent of the coir workers and the beating sector accounted fourteen per cent and only less than one per cent of the workers were engaged in finishing and packing of coir products.

Coir workers who were employed in factories or societies were mainly engaged in the tasks of extraction of fibre from the husk, spinning and folding and the selling of yarn (CSR, 2002).

Kerala accounts for about 0.38 million coir workers (Rammohan and Sundersan, 2003) out of which 0.35 million were engaged in defibering and spinning nodes. The authors also indicated that a sizeable section of coir workers in Kerala were found to be employed in co-operatives, which undertook defibering and spinning operations.

Gender discrimination was observed in the coir sector with respect to work, wage, bonus and other benefits of employees (CSR, 2002). The report also indicated that men workers dominated in production sector while the women dominated in the spinning sector and men usually worked at machines and women with hands. It is reported that women were the victims of low remuneration, frequent layoffs and loss of jobs. Though, both men and women were actively involved in the coir production, women were mainly involved in yarn spinning sector and men in the product weaving sector (Anonymous, 2004a). Rammohan and Sundersan (2003) indicated that entire defibering and spinning operations in coir sector were done by women manually.

According to Rajalakshmi (2006), women formed the backbone of the coir industry and were employed in various stages of coir production-right from the peeling of the coconut husk to the making of ropes from fine fibers and most of the operations were found to be non-mechanized.

In a report published by CSR (2002), it was observed that women engaged in self employed category in coir sector faced difficulties like poor income and shortage of raw materials and found it difficult to combine family responsibilities with the time and work demands of the job. Rajalakshmi (2006) also indicated irregular employment and insufficient wages among the coir workers of Kerala.

In contrast to the situations in Kerala where the industry is spread along the entire backwater coast, in Tamil Nadu, the coir industry is mostly confined to the South West part of the state (Rammohan and Sundersan, 2003). The authors also indicated that in Kerala, organization of production is highly decentralized while in Tamil Nadu, the production is centralized in mechanized factories and co-operative form of organization observed in Kerala was absent in Tamil Nadu. Inspite of the technologically superior organization of production, the wage of coir workers in Tamil Nadu was found to be lower with long duration of work.

2.2. WOMEN IN WORK FORCE

India's working women constitute about 89 per cent in the informal sector (Arunachalam, 1985). According to Kharbanda (1991) 94 per cent of the women workers of the third world and 89 per cent of the Indian women belonged to the informal sector.

Women constituted about half of India's population. Women have been an integral part of social structure not only because of their importance in the perpetuation of human race but also by virtue of their significant contribution to socio-economic progress (Gowda, 1998). According to Loganathan (2003), women formed a vital part of Indian economy constituting one third of the national labour and a major contributor to the survival of the family. Singh and Prasad (2007) also indicated that in rural India, women played a major role in managing domestic affairs inside and outside their homes.

According to 2001 census report, women constituted 57.42 per cent of the total population as against 48.58 per cent of male in Kerala (Farm Guide, 2002).

Women earned on an average, 60 to 70 per cent as much as men (World Bank, 1995). Alva (1998) stated that working women in the organized sector constituted 10 per cent of the working force while in the unorganized sector it was 90 per cent. Working women constituted 22.7 per cent of total population in India as against 51.5 per cent of the male workers (Rajkumar and Premakumari, 2000a).

Raihana and Asiya (1990) reported illiteracy, family size and non-availability of jobs in other sectors as the reasons why women choose jobs from the unorganized sector. Sundari (1990) and Rajuladevi (2001) indicated that strenuous and hardous, non-skill requiring jobs were kept aside exclusively for women and were paid less for the same reason.

Historically, the position of women in Kerala was found to be relatively favourable, especially by South Asian Standards (Agarwal, 1994). In terms of social development indicators such as education and health also, the women of Kerala were found to be in a better position (Economic Review, 2005).

The status of women in a society is seen as a significant reflection of the level of social justice in that society (WHO, 1984). In many developing countries, majority of women had inferior social status compared to men, and occupied the lowest paid and most insecure positions which require least skill (Kevany *et al.,* 1990). According to McGuire and Popkin (1990) in low income countries women faced crucial conflicts as they forced to fulfill their economic, biological and social roles and had detrimental effects on their health.

In the female-headed households, women had to work longer, harder and simultaneously at multiple jobs and being the head of the household, the entire

responsibility of maintaining the household also fell on women (Paterson, 1997). Desai and Ahma (1998) indicated that in addition to a higher work burden and lower income, female-headed households also suffered in terms of access to housing, land and other resources.

Lack of comprehensive employment legislation, discrimination, wage structure, and lack of job security were found to be the problems of rural women workers (Kalaimathy, 1990). Sundari (1990) indicated that the position of Indian women is characterized by arduous working condition, with no job security and low wages. Ramachandran (2007) pointed out that women in India, especially in rural areas, performed a variety of strenuous tasks within the household and on family lands, and in some regions, for wages.

Mukherjee (1992) found that employment in the informal sector is strenuous and provided low returns. Venugopalan (1992) emphasized the need of imparting necessary training, technical know how and support to women so as to realize the production potentials.

Wide variations in the working pattern of women were reported by various authors. Augustine (1993) and Batliwala (1998) indicated that women engaged in stone breaking and women agricultural labourers used to get work for six days in a week. However, working pattern of women labourers involved in rice cultivation indicated that nearly 82 per cent of them used to get work only for three days in a week (Jyothi, 2003). The author also indicated differences in the mandatory working days among women labourers due to seasonal variation.

Women engaged in stone breaking used to work for almost 7 ½ hours in a day (Augustine, 1993). However, Smitha (1999) indicated that women agricultural labourers used to work for 8 to 10 hours daily in the field. Jyothi (2003) also indicated work duration of 7 ½ hours in a day among women agricultural labourers.

Sharma and Sharma (1981) indicated that wage rate of labourers depended upon the labour availability and its demand in a particular society. Sethi (1982) reported that in Punjab the wages of agricultural labourers depended upon the nature of agricultural operations. Variation in the wage rate of men and women labourers were observed by Balaraman (1985) and Jyothi (2003) and indicated that the wage paid to the female worker is roughly two third to three fourth of the wages paid to male labourer.

2.3 NUTRITIONAL STATUS OF WOMEN

Women have been the focal point for family health and have been referred to as the producers of health and nutrition for her 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 (Hemalatha *et al.,* 2000). 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). Generally, the health conditions of women workers in India were dismal and due to unfavourable working conditions and workplace environment they suffered from various illnesses (Ranjwan and Zend, 2007).

The most important nutritional problems prevalent in India include Protein Calorie Malnutrition, iron deficiency anaemia, iodine deficiency, vitamin A and B complex deficiencies (Vijayalaksmi *et al.,* 1987, Perla and Estella, 1997, Chakravarthy and Ghosh, 2000 and Gopalan and Aeri, 2001).

In tropical countries adult malnutrition has received much less attention than that of children. The prevalence of adult under nutrition was found to be high in poor socio-economic groups and continues to be an important public health problem in India (Naidu and Rao, 1994).

Protein Energy Malnutrition was documented among women of both rural and urban population in India (Harris *et al.,* 1990 and Rasmussen and Habicht, 1992). Sreenivasan *et al.,* (1991) and Dungarwal and Choudhary (2001) reported deficient energy intake among the low income groups in Tamil Nadu and the farm labourers of Agriculture Research Station, Rajasthan. 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 Thiruvanathapuram had different grades of energy deficiency.

Cherian (1992) and Udaya (1996) observed different grades of energy deficiency among farm women. Ranganathan (1996) who conducted a study among coir workers in Thiruvanathapuram district reported that 60 per cent of the women suffered from different degrees of energy deficiency. Smitha (1999) observed mild and moderate CED among 18 per cent and 3.33 per cent of women agricultural labourers.

A study conducted by NIN (2002a) 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. Lawrence (2003) revealed that 22 and 32 per cent of the women agricultural labourers in organized and unorganized sectors respectively suffered from different degrees of Chronic Energy Deficiencies. Different grades of malnutrition was observed by Trivedi and Goyal (2004) among 69.5 per cent of adult females in Rajasthan. Mild to moderate forms of malnutrition was observed among women construction workers on daily wages in Namakkal District (Saraswathi and Renuka, 2004). Yenagi *et al.,* (2007) reported lower energy and protein intake among women entrepreneurs involved in food processing activities in Dharwad District and indicated that 25 per cent of women suffered from different grades of malnutrition.

Kupputhai and Mallika (1993) conducted a study among Khond, Gadaba, Porja tribes of Andra Pradesh and reported that 82 to 92 per cent of the tribes had chronic energy deficiency of grade I type. Taneja and Saxena (1998) in their study among Bhil women in Madhya Pradesh also reported malnutrition among 95 per cent of women and only 2.72 per cent women had normal grade BMI.

Rabe *et al.,* (1996) and Gupta (1999) observed greater proportion of chronic energy deficiency among females than males. Women aged more than 35 years were twice as likely to have a BMI less than 18.5 compared to younger women (Ahmed *et al.,* 1998). Naik and Prakash (2007) indicated higher incidence of CED among rural women and observed significant differences in the nutritional status of urban and rural women.

Dietary intakes of women in the urban slum communities of Delhi showed that 8 to 85 per cent of women in this area consumed less than 50 per cent of energy, protein, iron and β-carotene as compared to their RDA (Kapil *et al.,* 1999). However, surveys 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 females consumed diets that were adequate in protein and energy (NIN, 2002b). Studies conducted by Narayanan and Sathiya (2004) indicated lower calorie intake among the women textile workers when compared to home makers.

A district level survey conducted in West Bengal (NIN, 2002a) to assess the food and nutrient intakes of rural and urban communities indicated higher intake of all nutrients except the micronutrients such as iron, vitamin A and 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. Shobha and Sheela (2004) indicated lower intake of most of the food groups and nutrients among women participating in sericulture technologies of Karnataka.

Nutritional anaemia is common among 50-70 per cent of 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). In almost $1/5^{th}$ of maternal deaths (19.3%) in rural India, anaemia was reported to be an indirect cause (Negi, 1999). For severe anaemia the highest and lowest prevalence 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).

Roy (1991), in a study conducted among the tea garden workers of North Bengal observed the occurrence of iron deficiency anaemia more frequently among women than among male workers. Seralathan *et al.,* (1993) observed that 16 per cent of farm women in Coimbatore district suffered from severe anaemia. Haemoglobin surveys conducted by Reddy *et al.,* (1993) among Indian women revealed that 87.5 per cent were anaemic, about 3 per cent were severely anaemic and 33.6 per cent were moderately anaemic. According to Singh *et al.,* (2001) iron deficiency anaemia is a major health problem resulting in considerable mortality and morbidity at an early age.

Cherian (1992) and Augustine (1993) observed iron deficiency anaemia among the agricultural labourers and women engaged in stone breaking in Thiruvanathapuram district. Ranganathan (1996) observed anaemia among 85 per cent of women coir workers in Thiruvanathapuram district. Study conducted by Udaya (1996) and Smitha (1999) reported anaemia among 60 per cent of farm women and women agricultural labourers on the basis of haemoglobin status. Jyothi (2003) also observed anaemia among 63.33 per cent of women labourers involved in rice cultivation in Palakkad district of Kerala. Yenagi *et al.,* (2007) indicated mild to moderate anaemia among 72 per cent of rural women entrepreneurs involved in food processing activities of Dharwad district.

Joshi *et al.,* (2004) observed anaemia among 82 per cent of non pregnant women and indicated that the prevalence of anaemia increased significantly with age, wasting, stunting and with parity. Studies conducted by NIN (2007) in 9 states of India indicated anaemia among 75.2 per cent of non pregnant non lactating women with an highest prevalence of 94.7 per cent in Gujarat and lowest prevalence of 48.6 per cent in Tamil Nadu. The study also indicated prevalence of anaemia among 89.2 per cent of women in Kerala.

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 conjunctiva and Koilonychia. Rajkumar and Premakumari (1999 and 2000b) in their studies among women workers of different occupational status in Coimbatore observed under weight and anaemia. Farzana and Manay (2000) and Singh and Baghe (2001) reported nutritional anaemia among women in rural areas of Karnataka. Ramya and Devaki (2000) observed increasing degrees of anemia associated with deficient intake of iron, vitamin C, protein and energy among women construction workers in Tirupati.

Study conducted by Mathuravelli *et al.,* (2002) among the urban slums of Madhurai district also observed anaemia among 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. Trivedi and Goyal (2004) observed moderate to mild haemoglobin deficiencies among majority of adult women in Rajasthan. Machado and Prakash (2004) noticed anaemia even in population residing in coastal areas of Karnataka and reported that 92 per cent of women had an haemoglobin values less than 12 g/100 ml.

Devi and Elizebeth (2004) in a study conducted among the coir workers of Alleppey district indicated significantly higher work output among non-anaemic women than women who had anaemia.

Gopalan (2001) reported the occurrence of anaemia among pregnant women in the state of Orissa, Assam, Meghalaya, Tamil Nadu, Kerala, Punjab, and Madhya Pradesh and indicated significant differences with respect to anaemia among the different states.

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 and 41 per cent for over weight women. Kumar (2000) observed anaemia 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.

The prevalence of goitre was found to be higher among females (Griffiths and Bentley, 2001). In India, 200 million people were estimated to be at risk of iodine deficiency disorder. A study conducted by Kapil *et al.,* (1999) observed that 22.9 per cent of pregnant women had iodine deficiency disorders.

Clinical manifestation of vitamin B complex deficiencies were reported among women agricultural labourers of Thiruvanathapuram district (Cherian, 1992) and women of fisher folk families of Alleppey district (Yegammai and Ambili, 1992).

Augustine (1993) observed B complex deficiency symptoms among the women engaged in stone breaking. The prevalence of vitamin B complex deficiency was seen in pregnant women and lactating mothers in both dairy and non dairy farmers in Coastal Andra (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.

In a study conducted among the working women of Delhi, Babu (1989) indicated negative energy balance. Cherian (1992) and Smitha (1999) noticed

negative energy balance among women belonging to farming and agricultural labourer households. Augustine (1993) also reported negative energy balance among the women engaged in stone breaking. Negative energy balance was noticed among women construction workers at Nammakkal district of Tamil Nadu (Saraswathi and Renuka, 2004). Jyothi (2003) also observed negative energy balance among women engaged in rice cultivation.

Dungarwal and Choudhury (2000) revealed negative energy balance of 378 kilo calories/day among the farm labourers of Agriculture Research Station, Sumerpur. They also indicated that by increasing their energy intake and reducing energy expenditure by labour saving agricultural implements, the labourers will be able to maintain energy balance.

Sharan and Puttaraj (2000) exhibited positive energy balance among the women working in an electronic industry and indicated overweight or obesity of varying degrees among women. Rao *et al.,* (2004) also observed positive energy balance among adult women belonging to middle income groups in Mysore city.

2.4. FACTORS INFLUENCING THE NUTRITIONAL STATUS OF WOMEN

Malnutrition is a condition when one or more nutrients are less or are in excess in the body (Robinson, 1990 and Beegum, 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 nutritional status of each member of the household depends on several conditions being met: the food available to the household must be shared according to individual needs: the food must be sufficient in variety, quality, and safety and each family member 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). Swamy and Vijayalakshmi (1999) indicated the reasons for women's poor health as low social status and unequal intrafamilial distribution of foods and unequal provision of health care. Socio-economic factors such as income, occupation and migration had a profound influence on nutrient intake, while among the biological factors, sex and physiological state of women emerge as strong variables influencing nutrient intake (Busi and Saileela, 1999).

Rajkumar and Premakumari (2000) reported poverty, illiteracy, over work, repeated pregnancies, high infant and maternal mortality rates, faulty food habits, hazardous work environment, infections and infestations as the different factors influencing the health and nutritional statues of women. The most important social, economic and cultural dimensions which affect women's provision of nutrition were found to be 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).

Kumar *et al.,* (1976) reported the influence of family size on the nutritional status of individuals of low socio-economic groups. Household income, educational level and occupation of the head of the household and size of the household also affected the nutritional status (WHO, 1995).

Nayga (1994) observed that factors like urbanization, religion, race, ethnicity, sex, unemployment, household size, weight, height, age and income affected the consumption of certain food groups. Rothenberg *et al.,* (1994) in their study observed that food choices and intakes are related to socio-economic status and daily living status in the homogenous population. Unemployment and economic difficulties in the family decreased the level of food intake (Ross *et al.,* 2001).

According to King *et al.,* (1997) an individual's occupation had a significant effect on the type of food consumed and their nutritional status and physical activity. Kawatra and Sehgal (1998) reported that labourers are the most neglected segment of our society and were found to be unaware of the importance of maintaining their own health and nutritional status. The authors also reported poverty and ignorance, along with their involvement in earning bread for the family as the limiting factors which affected their food and nutrient intake. According to Hemalatha *et al.,* (2000), employment is the best and cheapest guarantee to enhance the nutritional status as it supplements the household income and paves for better purchasing power.

Variation in the food consumption pattern and nutrient intake was reported to be due to the inequalities in income and occupational status (Thimmayamma *et al.,* 1973, Brahmam *et al.,* 1987: Bigston *et al.,* 1992 and Rahman and Rao, 2000). Rose *et al.,* (1995) opined that economic factors especially income affected the dietary intake. 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.

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 difference between the income groups (NNMB, 1996). According to Farzana and Manay (2000) high income households spent more proportion of their income for protein rich protective foods like pulses, milk, vegetables and flesh foods in their diet. In Hyderabad, Rahman and Rao (2000) indicated an increase 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.

Nazmul and Ahmed (1980) opined that land holding had a positive influence on healthy living of farmers. Tanner (1987) also indicated strong relationship between land holdings and prevalence of malnutrition.

Women's access to and control over assets were found to be the important determinants of their ability to lead a healthy life. Nutrition, financial independence and education for women were stressed as important pre-requisites to improve nutritional status of the community (Deshpande *et al.,* 2001).

Genecaga and Huddleston (1986) reported that educational level of parents and their knowledge of sound dietary practices were the most important determinants of nutritional status. Alderman and Garcia (1992) reported that raising of the household food consumption had less impact on nutritional status than increasing the education level of mothers.

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 differentials with high income group showing higher level of nutrient consumption and better nutritional profile and slum dwellers registering the poorest level of nutrient consumption.

Diet varies from individual to individual due to variation in the social, economic, demographic status and season and the diet had a far-reaching influence on health and nutritional status (Rahman and Rao, 2000). According to Yongok (2001) individuals with high socio-economic status had significantly higher intake of most of the nutrients. He also opined income and education as the most important variables influencing the food and nutrient consumption.

Behruman 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) indicated that food habits of the people depended on availability of food. 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.

Brahmam *et al.,* (1987) indicated the reasons for the poor nutritional standards of the slum dwellers in urban areas due to poor food intake and environmental conditions. Among the rural and urban areas of India, the changes in the food consumption pattern were found to be due to the changes in faster urbanization and growth in the economy (Kumar, 1996).

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

Nutritional problems in the developing countries were found to be due to the inadequate diet with respect to quality and quantity of food necessary for the physiological needs and welfare of the population (Gopalan, 1991).

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

According to Suiter and Hunter (1980) physiological influences and the thoughts, beliefs and emotions will affect the nutritional status of an individual. Dual stress of increasing demands of work in and outside the home was found to have adverse effect on nutritional status of women (Jain and Singh, 2003)

Pant (1992) revealed that the highly deficient diet of the rural people had adverse effect on their health and working capacity. Variation in the diet due to social, economic, demographic status and seasons also influenced the health and nutritional status of women (Rahman and Rao, 2000).

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).

Dewalt (1993) reported nature of the crop, the control of production and income, the allocation of household labour, the maintenance of subsistence production, land tenure and pricing policies for both cash crops and food stuffs as the most crucial factors influencing 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, 1984).

According to Perla and Estella (1997) other factors which influenced 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.

Optimum health and work capacity of working women could be achieved and maintained if adequate steps are taken to reduce occupational stresses,

improve their diets and provide adequate occupational health care and nutrition education (Rajkumar and Premakumari, 2000).

2.5. HEALTH AND OCCUPATIONAL HAZARDS AMONG WOMEN

Various occupation related health problems were reported among coir workers. Studies conducted by ROHC (1978) and NIOH (1980) revealed very high prevalence of elephantiasis among coir workers particularly among women coir workers. Asthma and skin diseases were also found commonly among coir workers. The above studies also indicated a morbidity rate of 27.5 per cent among male and 23.3 per cent among female coir workers.

In a study conducted by Nair (1997) in the co-operative coir segment in Kerala, allergy and respiratory infections (68%), chest pain (49%), rheumatic problems (39%) and body ache (52%) were reported among coir workers and indicated that the health status and working conditions of the workers were not significantly different from the capitalist sites.

Rammohan and Sundersan (2003) observed strenous work and unhygenic working environment in coir sector. Defibering demanded working in an uncomfortable squattering position and in spinning the worker has to walk forward or backward repeatedly. The author also indicated high morbidity among coir workers and observed allergic problems of the skin and respiratory system, body ache, chest pain, rheumatism, gynaecological complaints, head ache, stomach ache and vomiting as the common health problems among coir workers.

Nair (2007) indicated that a large number of coir workers in Alappuzha District suffered from lung and chest problems, besides the epidemics like viral fever and chikungunia. He also indicated asthmatic and allergic diseases among the coir workers.

Outbreaks of chikungunia was indicated by Nair (2007) in the coastal belt of Alappuzha and Kollam Districts where the coir industry is concentrated affecting coir workers in the public and private sectors.

Rajkumar and Premakumari, (2000b) indicated that major occupational hazards occur due to chemical, physical, and biological agents and also due to psychological factors and occupational accidents.

Newman and Beeter (1980) observed higher worker morale, work efficiency, lower occupational hazards and better health status in workers working in better and healthier work environment. Kaur and Sood (1988) reported impaired health condition among the workers employed in the spinning mills due to lack of windows, sheet-metal roofs, limited access to natural ventilation and cramped working area.

Study conducted by the National Institute of Occupational Health (1994) indicated byssionosis and respiratory irritation among textile workers of Ahemadabad. Kannan and Lalitha (1994) observed abnormal eosinophil counts among industrial workers of Neyveli Lignite Corporation of India.

Musculo- skeletal disorders, especially pain, sprain, disfigurement of the lower back, wrist, joints of fingers and soles of feet were the occupational diseases observed among 60 per cent of the women working in construction sites and textile factories (Rajkumar and Premakumari, 2000). The authors also observed high eosinophil count among the workers. Health problems like lung diseases, particularly asthma were observed among the employees working in explosive industry (Ravindran and Premakumari, 2003). Lakhani (2004) in a study among women construction workers in the unorganized sector reported headaches and backaches, as well as pain in the limbs. A study on women engaged in papad-making in Kolkata, by Dasgupta and Roy (2008), reported musculoskeletal problems, generalized weakness, acidity, excessive sweating, swelling of feet and problems with vision as the common health problems.

Materials and Methods

3. MATERIALS AND METHODS

This chapter presents the methods and procedures followed in the various phases of the study and the details are presented under the following sections:

1. Locality of the study
2. Selection of sample
3. Plan of the study
4. Methods adopted for the study
5. Development of tools and conduct of the study
6. Analysis of the data

3.1. Locality of the study

The study was conducted in Alappuzha district. Among the two revenue divisions of Alappuzha district namely Alappuzha and Chengannur, Alappuzha division was selected purposively to conduct the study, since majority of the coir related industries and production units are in Alappuzha division. From the three taluks in Alappuzha division namely Cherthala, Ambalappuzha and Kuttanad, Cherthala and Ambalappuzha taluks were selected for the study since main coir related industries and units are located in these two taluks.

3.2. Selection of sample

From each of the selected taluks, a sampling frame of 720 women coir workers in the organized and unorganized sectors was prepared. The workers in organized sector were the employees of coir societies and coir industries with a fixed income and the workers of unorganized sector were working in small coir units who were paid on the basis of their work. From this sampling frame, 30 respondents in the age group of 18-55 years from organized and unorganized sectors were selected from each taluk. Thus, a total of 120 respondents were

selected comprising 60 respondents from organized sector and 60 from unorganized sector.

For conducting the detailed study, 10 respondents each from organized and unorganized sectors were selected randomly from each taluk. Thus, a total of 40 respondents were selected as sub sample, comprising 20 from organized sector and 20 from unorganized sector.

3.3. Plan of the study

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

3.3.1. A base line survey to collect relevant data on the socio-economic status of the families and to collect details on the working pattern and occupational hazards of the respondents.

3.3.2. A dietary survey to collect the food consumption pattern of the families.

3.3.3. Assessment of nutritional status of the respondents through

3.3.3.1. Anthropometric measurements namely weight and height and computing the Body Mass Index (BMI).

3.3.3.2. One day food weighment survey to assess the actual food and nutrient intake. (sub sample).

3.3.3.3.Clinical examination to identify the deficiency symptoms and occupational related diseases (sub sample).

3.3.3.4. Biochemical estimation of blood for haemoglobin (sub sample).

3.3.3.5. Computation of energy expenditure and energy balance (sub sample).

3.3.4. Statistical analysis and interpretation of data.

3.4. Methods adopted for the study

Determination of suitable methods and procedures is 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 status, and food consumption pattern of the families. Working pattern of the respondents and details on occupational hazards was also collected using the interview schedule.

The interview method is the most suitable way to collect reliable data since it proceeds systematically and enables quick recording (Bass *et al*., 1979).

The information received through interview schedule was found to be more reliable as the accuracy of the statements could be checked by supplementary questions Gupta (1987). Britten (1995) also indicated the importance of interview method as an important research technique.

To assess the nutritional status of respondents the following methods were employed.

1. Recording of anthropometric measurements.
2. Monitoring actual food and nutrient intake.
3. Conducting clinical examination.
4. Biochemical estimation of blood for haemoglobin.

Jelliffe (1966) indicated anthropometry as a simple and useful practical index to assess nutritional status. Anthropometric indices, presence of clinical deficiency signs, dietary assessment and actual food intake were widely used as direct parameters of nutritional status (Aebi, 1983). Swaminathan (1993) also suggested the effectiveness of combination of methods like diet survey, anthropometric measurements and clinical examination in the assessment of

nutritional status when used together. Anthropometry is widely used as a screening tool for diseases in adults (Cole, 1993).

Gorstein *et al.,* (1994) also reported anthropometry as a tool to estimate the nutritional status of populations and to monitor the growth and health of individuals. Bakshi *et al* (2007) indicated that anthropometry is a systematic measurement of human body with the view to determine its average dimensions.

Measurements of weight at various ages have been used as an index of nutritional status and proved very valuable when correctly interpreted (Beegum, 1991).

Swaminathan, (1987) and Rao and Vijayaraghavan, (1996) indicated body weight as the most widely used and the simplest anthropometric measurement for the evaluation of nutritional status. Venkitalakshmi and Peramma, (2000) also considered body weight as a sensitive indicator of nutritional status.

According to Gopaldas and Seshadri (1987) height or the total length is influenced not only by hereditary factor but also by nutritional and other environmental factors. 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 (Rao and Vijayaraghavan, 1996).

In this study, anthropometric measurements like weight and height of all the respondents were taken to assess their nutritional status.

According to Anderson, (1979) and James *et al.,* (1988) Body Mass Index is used to assess the current form of malnutrition. Brahmam, (1999) also indicated Body Mass Index as a good parameter to grade Chronic Energy Deficiency (CED), and regarded as a good indicator of nutritional status.

In order to assess the grades of nutritional status of the respondents BMI was calculated by the formula:

$$BMI = \frac{\text{Weight (kg)}}{\text{Height (m}^2\text{)}}$$

Food consumption survey provides data on the type and amount of food consumed by a representative sample of the survey population (Schofield, 1985). Gopaldas and Seshadri (1987) indicated that 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.

Sundararaj *et al.,* (1971) reported weighment method as the ideal choice for assessment of food intake of individuals. Devadas and Easwaran (1986) also considered food weighment method as the most reliable method to assess the actual food intake of an individual.

Since, the diets consumed by rural low income categories are more or less uniform with negligible variations in their day to day intakes, the food intake pattern and quantities of food consumed could be obtained by following a one day food weighment method (Jansi and Sarojini, 1991).

Hence, in the present study one day food weighment survey was conducted among the sub sample to assess their actual food and nutrient intake.

Clinical examination is an important tool and a sound method of assessing the nutritional status of a community (Jelliffe, 1966 and Kamath, 1986). Swaminathan, (1993) also indicated the importance of clinical examination as a direct method to assess nutritional status, since it provides information on signs and symptoms of dietary deficiencies prevalent among the people.

In this study, clinical examination of the sub sample was conducted to assess the signs and symptoms associated with nutrient deficiencies.

Sood, (1967) reported that the haemoglobin level formed a satisfactory index for determining iron deficiency for survey purposes. Biochemical estimation represents the most objective assessment of nutritional status of an individual (Sausberlich *et al.,* 1977).

Daphna (1979) also pointed out the importance of biochemical tests in the assessment of individual nutritional status. An ideal biochemical test should be able to carry out by non invasive method (Raghuramulu, 1993).

Park (2000) considered the estimation of haemoglobin as a useful index of the overall state of nutrition irrespective of its significance in anaemia. However, Singh *et al.,* (2001) indicated that accuracy of prevalence of anaemia depends upon the methods used for assessing haemoglobin concentration.

In the present study, haemoglobin content of blood was estimated to find out the prevalence of anaemia.

Energy requirement can be assessed in a better way in terms of energy expenditure rather than energy intake (ICMR, 1990 and Gokhale *et al.,* 2001). Hence, the energy expenditure for different activities for a day was computed among the sub sample.

3.5. DEVELOPMENT OF TOOLS AND CONDUCT OF THE STUDY

According to Sindhu (1985) selection of suitable tools is vital in conducting a research work as they are the instruments which are used in research for gathering new facts. To collect information on socio- economic status and food

consumption pattern of the families and working pattern and occupational hazards of the respondents two schedules were prepared.

3.5.1. The methodology framed for the survey of socio- economic profile is detailed below

The schedule to find out the socio-economic conditions of the families comprised of information pertaining to the type of family, details of family members, education and occupation of family members, monthly income, size of land holding, crops cultivated, domestication of animals, savings, indebtedness, loans, source of loans, membership in societies and other agencies, monthly expenditure pattern, housing conditions, health facilities available in the locality, availability of safe drinking water and morbidity pattern. The schedule also included the details on the working pattern of the respondents like discrimination faced by women labourers in terms of wage, time allocation, occupational hazards, quantum of work, number of days of labour, type of work involved, implements used and working days during different season.

3.5.2. Operationalisation and measurement of the socio-economic profile characters

1. Religion and caste

In the present study, respondents were categorized based on the religion in which they belong as Hindu and Christian. The categories of caste, under the above listed religion were also collected.

2. Type of family

Type of family was operationally defined as the type of family to which the respondents belong. Two types of families were considered which are nuclear family and joint family.

3. Family size

Family size was categorized into two groups based on the number of members present in the family. The family size was categorized as 1-3 and 4-6 members.

4. Educational status

The educational status of the family members (adults, respondents and children) were measured based on their completion of education as lower primary, upper primary, high school, college, higher secondary and illiterate.

4. Occupational status

Occupational status of the family members was measured based on their livelihood sources.

5. Monthly income

The income level was measured in total amount of rupees earned by the family through the earnings of all members and was grouped as less than 1000, Rs 1001 to Rs 2000, Rs 2001 to Rs 3000, Rs 3001 to Rs 4000, Rs 4001 to Rs 5000.

6. Size of land holdings

Extend of land owned by the families was measured in cents and was categorized into four groups <10, 11 to 20, 21 to 30 and above 30 cents.

7. Details of loan taken

The number of families was calculated based on the source of loan received and the purpose. Sources of loan were classified as co-operative society,

bank, kudumbasree, ayalkoottam and indira vikas and the purposes of loan were classified as for, house construction, marriage, business and purchase of vehicles. The money borrowed from neighbours and friends was also taken into account as informal sources.

8. Monthly expenditure pattern

Based on the percentage of expenditure for different purposes such as food, clothing, shelter, transport, recreation, education, electricity, health, fuel, luxury, remittance, and savings the families were grouped into different groups as no expenditure, <5 per cent, 5 to 10 per cent, 10 to 15 per cent, 15 to 20 per cent, 20 to 25 per cent, 30 to 35 per cent 35 to 40 per cent, 40 to 45 per cent, 45 to 50 per cent 50 to 55 per cent and above 55 per cent of monthly income.

9. Housing conditions

Regarding the housing conditions, number of families was calculated by grouping the families based on their type of house, number of rooms, roofing material, type of wall, separate kitchen, source of drinking water, lavatory facilities, drainage facilities, electricity facilities, recreational facilities and transport facilities.

10. Morbidity pattern

Details on diseases among the family members during the past one year were collected.

11. Working pattern, time expenditure pattern and occupational hazards

The following details regarding the working pattern like place of employment, working days, working time, wage, leave, medical benefits, work

under taken, work during different seasons and implements used were collected. The details on occupation related diseases and time expenditure pattern among the respondents were also collected.

3.5.3. The methodology framed for the details of food consumption pattern is detailed below

The schedule to find out the food consumption pattern of the families included food habits, meal pattern, food expenditure pattern, frequency of purchase and use of various foods, preservation and storage practices adopted, foods included and avoided during physiological conditions.

3.5.4. Operationalisation and measurement of the details of food consumption pattern

1. Food expenditure pattern

Based on percentage of expenditure for different food items like cereals, pulses, other vegetables, root and tubers, green leafy vegetables, fruits, milk and milk products, meat, fish, egg, fats and oils, nuts and oil seeds, sugar, spices and condiments, the families were grouped as no expenditure, <5 per cent, 5 to10 per cent, 10 to 15 per cent, 15 to 20 per cent, 20 to 25 per cent, 25 to 30 per cent, 30 to 35 per cent, 35 to 40 per cent, 40 to 45 per cent and 45 to 50 per cent of the amount spent on food.

2. Frequency of purchase and use of various food items

The number of families was worked out based on the frequency of purchase of various foods such as daily, weekly, monthly, occasionally, never and as required. The frequency of use of various food items by the families was also

worked out as used daily, weekly thrice, weekly twice, weekly once, monthly and occasionally.

Based on the frequency of use of various food items by the families, the food items were classified as most frequently used, medium frequently used, less frequently used on the basis of per cent frequency score.

3. Meal pattern

Details of meal pattern was observed with regard to meal planning, number of meals per day and time schedule for taking meals.

4. Preservation and storage practices

Common preservation and storage practices adopted by the families were collected

5. Foods given and avoided during physiological conditions

Special conditions were categorized as pregnancy, lactation, old age and diseased conditions. Based on the type of food used by the families during these special conditions, the number of families were observed and analyzed.

The schedules used to elicit information on socio- economic status and food consumption pattern of the families are given in Appendix I and II respectively. The details of respondents and their working pattern, time expenditure pattern and occupational hazards were also included in Appendix I.

3.5.5 Anthropometric measurements

The anthropometric measurements like height and weight of the subjects were measured using standard procedures given by Jelliffe (1966).

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

Height was measured using a fiberglass 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.

BMI was computed on the basis of weight and height and the respondents were grouped into different categories as suggested by IOTF-WHO (2000) as detailed below.

Category	BMI
Undernourished	<18.5
Normal nutritional status	18.5-22.9
At risk	23-24.9
Obesity	>25

3.5.6. Weighment survey

To conduct one day food weighment survey among the sub sample the investigator weighed the raw foods included in the meal for a day and the cooked weight of each preparation. The amount of cooked food consumed by the respondents was also weighed, and also the plate wastage to get the exact amount of foods consumed. Any other extra food consumed was also taken into account. All these weightments were done using standard measuring cups and spoons and also by means of a food weighing balance. The amount of cooked food item

consumed by the respondents was then converted to its raw equivalent. The nutritive value of the foods consumed was computed using food composition tables (Gopalan *et al*., 1989).The schedule is given in the appendix III.

3.5.7. Clinical examination

Clinical examination of the sub sample was conducted with the help of a qualified physician using a schedule formulated for this purpose and the schedule is given in Appendix IV. The occupational hazards among the sub sample was also examined by the physician using the same schedule.

3.5.8. Biochemical estimation of blood

Blood haemoglobin level of the sub sample was estimated using cyanmethaemoglobin method suggested by Raghuramulu *et al.,* (2003).

3.5.9. Energy expenditure and energy balance

Energy expenditure for different activities was computed among the sub sample. Using the prediction equation proposed by ICMR expert group for Indians (ICMR, 1990) the value of Basal Metabolic Rate (BMR) in terms of kilo calories was computed for each individual. The prediction equation for women in the age group of 18 to 30 years is 14 × body weight (kg) + 471 and 30 to 60 years is 8.3 × body weight (kg) + 788. By substituting body weight of the respondents, BMR in terms of kilo calories per day was computed. Using the BMR units calculated by activity breakup method for moderate worker for sleep (1.0), occupational (2.8) and non occupational (2.0) activities the energy expenditure of the respondents for a day was computed by multiplying the BMR with the mean BMR unit of 1.9.

The total energy expenditure was compared with the energy intake of the respondents for a day obtained from one day food weighment survey to find out the energy balance.

3.6. STATISTICAL ANALYSIS

Statistical techniques like percentage analysis and ‘t’ test were used to analyse the observations.

Results

4. RESULTS

The results of the study on "Nutritional profile of women labour in coir sector" are presented under the following headings.

1. Socio-economic profile of the families
2. Food consumption pattern of the families
3. Details of respondents and their working pattern and occupational hazards
4. Nutritional profile of the respondents
5. Energy intake and expenditure pattern of the respondents

4.1. SOCIO-ECONOMIC PROFILE OF THE FAMILIES

The socio-economic profile of the families was studied with special reference to their religion, caste, type of family, age, marital status, composition of family, educational status, occupational status of family members, monthly family income, other sources of income, total land holdings, cultivation of crops, domestication of animals, kitchen garden, savings, indebtedness, monthly expenditure pattern, housing conditions, use of fuel, use of health care facilities, availability of safe drinking water, membership in societies and other agencies.

4.1.1. Religion, caste and type of family

Details of religion, caste and type of family are presented in Table 1. The Table reveals that most of the families in the organized (86.67%) and unorganized (96.67%) sectors were Hindus. In the organized and unorganized sectors, 13.33 per cent and 3.33 per cent of the families respectively were found to be Christians.

Among Hindus, the families belonging to scheduled caste constituted only 1.92 per cent in organized and 5.17 per cent in unorganized sectors. About 71.16

per cent of the families in the organized sector and 72.42 per cent in the unorganized sector belonged to the Ezhava community. Families belonging to forward caste comprised of 26.92 per cent and 22.41 per cent in the organized and unorganized sectors respectively.

Nuclear family system was followed by 80 per cent and 85 per cent of the families in the organized and unorganized sectors respectively.

Table. 1. Details regarding religion, caste and type of family

Sl No	Category	Number of families	
		Organized (n=60)	Unorganized (n=60)
1	Religion		
	Hindu	52 (86.67)	58 (96.67)
	Christian	8 (13.33)	2 (3.33)
	Total	60 (100)	60 (100)
2	Caste		
	Forward caste	14 (26.92)	13 (22.41)
	Other backward caste (Ezhava)	37 (71.16)	42 (72.42)
	Scheduled caste	1 (1.92)	3 (5.17)
	Total	52 (100)	58 (100)
3	Type of family		
	Joint	12 (20)	9 (15)
	Nuclear	48 (80)	51 (85)
	Total	60 (100)	60 (100)

(Figures in parenthesis are percentages)

4.1.2. Family size and head of family

Details on the family size and head of family are given in Table 2. Regarding the family size, it was found that as much as 66.67 per cent and 61.67 per cent of the families in the organized and unorganized sectors respectively had

4 to 6 members and 33.33 per cent and 38.33 per cent of the families in the organized and unorganized sectors respectively had up to 3 members.

Majority of the families in the organized (90%) and unorganized (86.67%) sectors were male headed while the rest were female headed.

Table 2. Details of family size and head of family

Sl No	Category	Number of families	
		Organized (n=60)	Unorganized (n=60)
1	Family size		
	1-3	20 (30.33)	23 (38.33)
	4-6	40 (66.67)	37 (61.67)
	Total	60 (100)	60 (100)
2	Head of family		
	Male	54 (90)	52 (86.67)
	Female	6 (10)	8 (13.33)
	Total	60 (100)	60 (100)

(Figures in parenthesis are percentages)

4.1.3. Composition of the family

Details on the composition of the families are given in the Table 3. It was found that as much as 48.91 per cent and 42.13 per cent of the total population in the organized and unorganized sectors respectively were in the age group of 21 to 50 years which was composed of 47.95 per cent males and 49.62 per cent females in the organized sector and 33.34 per cent males and 50 per cent females in unorganized sector. The members above 51 years constituted 18.78 per cent and 23.14 per cent in the organized and unorganized sectors respectively. Children below 10 years comprised of 12.22 per cent in organized and 8.80 per cent in unorganized sectors.

4.1.4. Educational status of family members

The educational status of family members above 18 years of age is presented in Table 4. Among 75 male and 92 female members above 18 years of age in the organized sector, 32 per cent of male and 25 per cent of female members had studied up to lower primary, while in the unorganized sector the members who studied up to lower primary level was found to be 44.59 per cent (male) and 24.46 per cent (female). About 28 per cent of male and 41.31 per cent of female members in the organized and 24.33 per cent of male and 25.55 per cent of female members in the unorganized sectors had attained education up to high school level. Only 8 per cent of male and 14.13 per cent of female members in the organized sector and 14.87 per cent male and 10.64 per cent female members in the unorganized sector had received college level education. None of the male and female members above 55 years of age in both sectors had attained college level education.

Table 3. Distribution of family members on the basis of age and sex

Sl No	Age (Years)	Number of members					
		Males		Females		Total	
		Org	Unorg	Org	Unorg	Org	Unorg
1	0-10	15(15.31)	6(5.88)	13(9.92)	13(11.40)	28(12.22)	19(8.80)
2	11-20	14(14.29)	30(29.41)	32(24.42)	26(22.81)	46(20.09)	56(25.93)
3	21-30	8(8.16)	7(6.87)	28(21.38)	12(10.53)	36(15.72)	19(8.80)
4	31-40	17(17.34)	9(8.82)	22(16.79)	18(15.79)	39(17.03)	27(12.5)
5	41-50	22(22.45)	18(17.65)	15(11.45)	27(23.68)	37(16.16)	45(20.83)
6	51-60	16(16.33)	28(27.45)	17(12.98)	17(14.91)	33(14.41)	45(20.83)
7	>60	6(6.12)	4(3.92)	4(3.05)	1(0.88)	10(4.37)	5(2.31)
	Total	98(100)	102(100)	131(100)	114(100)	229(100)	216(100)

(Figures in parenthesis are percentages)

Table 4. Educational status of family members above 18 years of age

Educational Status	18 – 45 years				46 -55 years				> 55 years				Total			
	Male		Female		Male		Female		Male		Female		Male		Female	
	Org	Unorg	Org	Unorg	Org	Unorg	Org	Unorg	Org	Unorg	Org	Unorg	Org	Unorg	Org	Unorg
Lower primary	7 (17.07)	6 (16.22)	3 (4.84)	7 (14.59)	8 (40)	17 (65.38)	16 (69.57)	15 (34.09)	9 (64.29)	10 (90.91)	4 (57.14)	1 (50)	24 (32)	33 (44.59)	23 (25)	23 (24.46)
Upper primary	15 (36.59)	4 (10.81)	10 (16.13)	9 (18.75)	3 (15)	6 (23.08)	5 (21.74)	14 (31.81)	2 (14.28)	1 (9.09)	1 (14.29)	-	20 (26.67)	11 (14.86)	16 (17.39)	23 (24.46)
High school	12 (29.27)	16 (43.24)	36 (58.06)	19 (39.58)	9 (45)	2 (7.69)	2 (8.69)	5 (11.37)	-	-	-	-	21 (28)	18 (24.33)	38 (41.31)	24 (25.55)
College	6 (14.63)	11 (29.73)	13 (20.97)	10 (20.83)	-	-	-	-	-	-	-	-	6 (8)	11 (14.87)	13 (14.13)	10 (10.64)
Higher secondary	1 (2.44)	-	-	3 (6.25)	-	-	-	-	-	-	-	-	1 (1.33)	-	-	3 (3.19)
Illiterate	-	-	-	-	-	1 (3.85)	-	10 (22.73)	3 (21.43)	-	2 (28.57)	1 (50)	3 (4)	1 (1.35)	2 (2.17)	11 (11.70)
Total	41 (100)	37 (100)	62 (100)	48 (100)	20 (100)	26 (100)	23 (100)	44 (100)	14 (100)	11 (100)	7 (100)	2 (100)	75 (100)	74 (100)	92 (100)	94 (100)

Org-Organized
Unorg-Unorganized
(Figures in parenthesis are percentages)

4.1.5. Occupational status of family members

The details on the occupational status of the family members are given in Table 5. Out of the total population above 18 years, 37.34 per cent and 5.44 per cent of male and female members in the organized sectors were engaged in private jobs while in the unorganized sector it was 24.32 per cent (male) and 4.26 per cent (female). About 16 per cent and 24.32 per cent male members in the organized and unorganized sectors respectively were engaged as coir workers when compared to 65.22 per cent and 68.08 per cent of females in organized and unorganized sectors respectively.

In the organized sector 20 per cent male and 28.26 per cent female members were not going for any work where as in the unorganized sector it was 27.03 per cent and 27.66 per cent respectively.

4.1.6. Monthly income of the families

About 51.66 per cent and 48.33 per cent families in the organized and unorganized sectors had monthly income in between Rs.2001 to Rs.3000, while 6.67 per cent of the families in the unorganized sector had an income less than Rs.1000/ per month. Only 6.67 per cent and 5 per cent of the families in the organized and unorganized sectors respectively had an income in the range of Rs.3001 to Rs.4000. The details are presented in Table 6.

Table 5. Occupational status of family members

tegory	18 – 45 years				46 -55 years				> 55 years				Total			
	Male		Female		Male		Female		Male		Female		Male		Female	
	Org	Unorg	Org	Unorg	Org	Unorg	Org	Unorg	Org	Unorg	Org	Unorg	Org	Unorg	Org	Unorg
vt Job	2 (4.88)	-	1 (1.61)	-	1 (5)	1 (3.84)	-	-	-	-	-	-	3 (4)	1 (1.35)	1 (1.08)	-
ivate Job	17 (41.46)	9 (24.32)	3 (4.84)	4 (7.40)	9 (45)	9 (34.62)	2 (8.69)	-	2 (14.29)	-	-	-	28 (37.34)	18 (24.32)	5 (5.44)	4 (4.26)
siness	2 (4.88)	3 (8.11)	-	-	2 (10)	1 (3.84)	-	-	-	-	-	-	4 (5.33)	4 (5.41)	-	-
oolie	6 (14.63)	7 (18.92)	-	-	6 (30)	2 (7.69)	-	-	1 (7.14)	4 (36.36)	-	-	13 (17.33)	13 (17.57)	-	-
Coir orkers	9 (21.95)	8 (21.62)	44 (70.97)	32 (59.26)	1 (5)	9 (34.62)	16 (69.57)	32 (84.22)	2 (14.29)	1 (9.09)	-	-	12 (16)	18 (24.32)	60 (65.22)	64 (68.08)
work	5 (12.20)	10 (27.03)	14 (22.58)	18 (33.34)	1 (5)	4 (15.39)	5 (21.74)	6 (15.78)	9 (64.28)	6 (54. 55)	7 (100)	2 (100)	15 (20)	20 (27.03)	26 (28.26)	26 (27.66)
Total	41 (100)	37 (100)	62 (100)	54 (100)	20 (100)	26 (100)	23 (100)	38 (100)	14 (100)	11 (100)	7 (100)	2 (100)	75 (100)	74 (100)	92 (100)	94 (100)

Org-Organized
Unorg-Unorganized
(Figures in parenthesis are percentages)

Table 6. Monthly income of the families

Sl. No.	Income (Rs)	Number of families	
		Organized (n=60)	Unorganized (n=60)
1	<1000	-	4 (6.67)
2	1000-2000	21 (35)	24 (40)
3	2001-3000	31 (51.66)	29 (48.33)
4	3001-4000	4 (6.67)	3 (5)
5	4001-5000	4 (6.67)	-
	Total	60 (100)	60 (100)

(Figures in parenthesis are percentages)

4.1.7. Other sources of income

Apart from the main source of income of families only five per cent of families in organized sector were generating income from cultivation of crops.

4.1.8. Availability of land

About 58.33 per cent families in the organized sector and 63.33 per cent in unorganized sector owned less than 10 cents of land while 33.33 per cent and 31.67 per cent had 11-20 cents of land. About 6.67 per cent and five per cent of the families in the organized and unorganized sectors respectively owned 21-30 cents. The details are presented in Table 7.

Table 7. Details regarding availability of land

Sl No	Area (cents)	Number of families	
		Organized (n=60)	Unorganized (n=60)
1	<10	35 (58.33)	38 (63.33)
2	11-20	20 (33.33)	19 (31.67)
3	21-30	4 (6.67)	3 (5)
4	>30	1 (1.67)	-
	Total	60 (100)	60 (100)

(Figures in parenthesis are percentages)

4.1.9. Possession of land

Details on the possession of land is given in Table 8. Most of the families in the organized sector (70%) and unorganized sector (63.33%) indicated that they inherited land from their ancestors, while 18.34 per cent of the families each in organized and unorganized sectors purchased land as their own.

Table 8. Details on the possession of land

Sl No	Details	Number of families	
		Organized (n=60)	Unorganized (n=60)
1	Purchased	11 (18.34)	11 (18.34)
2	Inherited	42 (70)	38 (63.33)
3	Received from Government	2 (3.33)	7 (11.66)
4	Purchased and Inherited	5 (8.33)	4 (6.67)
	Total	60 (100)	60 (100)

(Figures in parenthesis are percentages)

4.1.10. Management of land

Details on management of land are furnished in Table 9. From the Table it is clear that, the land was managed by male members in 91.67 per cent of the families in organized and 90 per cent of families in unorganized sector. Regarding

the ownership of land it was seen that the land was owned by male members in 88.33 per cent and 83.33 per cent of. families in organized and unorganized sectors respectively.

Table 9. Management and ownership of land

Details	Org		Unorg		Total
	Male	Female	Male	Female	
Management of land	55 (91.67)	5 (8.33)	54 (90)	6 (10)	60 (100)
Ownership	53 (88.33)	7 (11.67)	50 (83.33)	10 (16.67)	60 (100)

Org- Organized
Unorg-Unorganized
(Figures in parenthesis are percentages)

4.1.11. Cultivation of crops

From Table 10, it is clear that though all the families owned land, only 10 per cent and 5 per cent families from the organized and unorganized sectors respectively cultivated crops like cow pea, coconut, ladies finger, plantain, kachil, cucumber etc. Among the families who cultivated different crops, only 50 per cent of families in organized sector received income from the crops. None of the families in the unorganized sector received income from the crops.

4.1.12. Domestication of animals

The details regarding domestication of animals are presented in Table 11. It is clear that none of the families in the organized sector had domestic animals, where as in unorganized sector, 6.66 per cent had domestic animals. None of the families in the organized and unorganized sectors received any income from domestic animals.

4.1.13. Kitchen garden

It was observed that only 3.33 per cent of the families in organized sector had kitchen garden in their house and received income. None of the families in unorganized sector had a kitchen garden as their own.

Table 10. Details of cultivation of crops

Sl No	Category	Number of families	
		Organized (n=60)	Unorganized (n=60)
1	Coconut	2 (3.33)	2 (3.33)
2	Coconut, Cow pea & Ladies finger	1 (1.67)	1 (1.67)
3	Cucumber and Cow pea	1 (1.67)	-
4	Plantain and Kachil	1 (1.67)	-
5	Plantain	1 (1.67)	-
6	No crops	54 (90)	57 (95)
	Total	60 (100)	60 (100)
	Details on income from cultivation		
1	Received income	3 (50)	-
2	No income	3 (50)	-
	Total	6 (100)	-

(Figures in parenthesis are percentages)

Table 11. Details of domestication of animals

Sl No	Category	Number of families	
		Organized (n=60)	Unorganized (n=60)
1	Goat	-	2 (3.33)
2	Duck	-	2 (3.33)
3	No domestic animals	60 (100)	56 (93.34)
	Total	60 (100)	60 (100)

(Figures in parenthesis are percentages)

4.1.14. Indebtedness

From the study, it was found that majority of the families in the organized (81.66%) and unorganized (83.33%) sectors had not taken any loan. Among the families who took loan, nearly 46 per cent in organized sector and 70 per cent in unorganized sector took loan for construction of house, and the amount of loan varied from Rs.10,000 to 1 lakh.

The details of the source, purpose and the amount of loan taken by the families are presented in Table 12.

It was also seen that all the families in both sectors borrowed money from neighbours and private money lenders to meet their day to day household necessities and hence details with respect to these aspects were also collected.

It was seen that all families borrowed money from neighbours and private money lenders and the amount borrowed varied from Rs 101 to 500 per month among 55 per cent of the families in organized sector and 80 per cent of the families in unorganized sector (Table 13).

Table 13. Distribution of families based on monthly debt

Amount (in Rs)	Number of families	
	Organized (n=60)	Unorganized (n=60)
<100	12 (20)	8 (13.33)
101-200	5 (8.33)	11 (18.34)
201-300	5 (8.33)	20 (33.33)
301-400	6 (10)	8 (13.33)
401-500	17 (28.34)	9 (15)
500-800	15 (25)	4 (6.67)
Total	60 (100)	60 (100)

(Figures in parenthesis are percentages)

Table 12. Details of loan taken by the families

Sl. No.	Category	Number of families		Purpose	Number of families		Amount (Rs.)	Number of families	
		Org n=60	Unorg n=60		Org n=11	Unorg n=10		Org n=11	Unorg n=10
1	Co-operative society	3 (5)	3 (5)	House construction	5 (45.45)	7 (70)	Up to 10,000	3 (27.28)	2 (20)
2	Bank	4 (6.67)	4 (6.67)	Marriage	2 (18.18)	2 (20)	20,000-30,000	4 (36.36)	4 (40)
3	Kudumbasree	3 (5)	2 (3.33)	Business	3 (27.28)	1 (10)	30,000-40,000	-	1 (10)
4	Ayal koottam	-	1 (1.67)	Vehicles	1 (9.09)	-	40,000-50,000	4 (36.36)	1 (10)
5	Indiravikas	1 (1.67)	-	-			50,000-60,000	-	-
6	Nil	49 (81.66)	50 (83.33)	-			60,000-70,000	-	1 (10)
				-			70,000-1 lakh	-	1 (10)
	Total	60 (100)	60 (100)		11 (100)	10 (100)		11 (100)	10 (100)

Org -organized
Unorg -unorganized
(Figures in parenthesis are percentages)

4.1.15. Savings

About 35 per cent of families in the organized sector saved money when compared to 15 per cent in unorganized sector. Most of these families in both the sectors (66.67% and 77.78%) saved money in bank. The details are presented in Table 14.

Table 14. Categorisation of families based on saving and mode of saving

Sl. No	Details	Number of families	
		Organized (n=60)	Unorganized (n=60)
1	Saved money	21 (35)	9 (15)
	No saving	39 (65)	51 (85)
	Total	60 (100)	60 (100)
2	Mode of saving		
	Bank	14 (66.67)	7 (77.78)
	Post office	1 (4.76)	1 (11.11)
	Chitty	2 (9.52)	-
	Ornament	4 (19.05)	1 (11.11)
	Total	21 (100)	9 (100)

(Figures in parenthesis are percentages)

4.1.16. Monthly expenditure pattern of the families

Table 15 and 16 depict the percentage of income spent on food, clothing, shelter, transport, recreation, education, electricity, health, fuel, luxury, remittance and savings by the families in the organized and unorganized sectors respectively.

Table 15. Monthly expenditure pattern of the families in the organized sector

Percentage of monthly income	Food	Clothing	Shelter	Transport	Recreation	Education	Electricity	Health	Fuel	Luxury	Remittance	Savings	Others
Nil	-	-	-	12 (20)	52 (86.67)	17 (28.33)	4 (6.67)	11 (18.34)	37 (61.66)	31 (51.66)	-	39 (65)	60 (100)
<5	-	48 (80)	60 (100)	1 (1.67)	-	-	49 (81.66)	5 (8.33)	3 (5)	12 (20)	49 (81.66)	2 (3.33)	-
5-10	-	8 (13.33)	-	41 (68.33)	6 (10)	7 (11.67)	7 (11.67)	30 (50)	11 (18.34)	13 (21.67)	1 (1.67)	4 (6.67)	-
10-15	-	1 (1.67)	-	6 (10)	2 (3.33)	11 (18.33)	-	2 (3.33)	9 (15)	1 (1.67)	-	5 (8.33)	-
15-20	-	3 (5)	-	-	-	19 (31.67)	-	5 (8.33)	-	3 (5)	7 (11.67)	5 (8.33)	-
20-25	-	-	-	-	-	6 (10)	-	7 (11.67)	-	-	3 (5)	5 (8.33)	-
25-30	-	-	-	-	-	-	-	-	-	-	-	-	-
30-35	3 (5)	-	-	-	-	-	-	-	-	-	-	-	-
35-40	-	-	-	-	-	-	-	-	-	-	-	-	-
40-45	18 (30)	-	-	-	-	-	-	-	-	-	-	-	-
45-50	2 (3.33)	-	-	-	-	-	-	-	-	-	-	-	-
50-55	26 (43.34)	-	-	-	-	-	-	-	-	-	-	-	-
>55	11 (18.33)	-	-	-	-	-	-	-	-	-	-	-	-
Total	60 (100)	60 (100)	60 (100)	60 (100)	60 (100)	60 (100)	60 (100)	60 (100)	60 (100)	60 (100)	60 (100)	60 (100)	60 (100)

(Figures in parenthesis are percentages)

Table 16. Monthly expenditure pattern of the families in the unorganized sector

Percentage of monthly income	Food	Clothing	Shelter	Transport	Recreation	Education	Electricity	Health	Fuel	Luxury	Remittance	Savings	Others
Nil	-	-	-	17 (28.33)	51 (85)	19 (31.67)	13 (21.67)	12 (20)	29 (48.33)	42 (70)	-	51 (85)	60 (100)
<5	-	57 (95)	57 (95)	2 (3.33)	1 (1.67)	1 (1.67)	35 (58.33)	-	8 (13.33)	-	52 (86.66)	-	-
5-10	-	2 (3.33)	1 (1.67)	31 (51.67)	7 (11.66)	6 (10)	12 (20)	10 (16.67)	13 (21.67)	11 (18.33)	3 (5)	2 (3.33)	-
10-15	-	-	1 (1.67)	10 (16.67)	1 (1.67)	12 (20)	-	12 (20)	7 (11.67)	3 (5)	-	1 (1.67)	-
15-20	-	1 (1.67)	1 (1.67)	-	-	11 (18.33)	-	16 (26.67)	3 (5)	3 (5)	1 (1.67)	6 (10)	-
20-25	-	-	-	-	-	11 (18.33)	-	5 (8.33)	-	1 (1.67)	1 (1.67)	-	-
25-30	-	-	-	-	-	-	-	5 (8.33)	-	-	-	-	-
30-35	7 (11.67)	-	-	-	-	-	-	-	-	-	3 (5)	-	-
35-40	2 (3.33)	-	-	-	-	-	-	-	-	-	-	-	-
40-45	13 (21.67)	-	-	-	-	-	-	-	-	-	-	-	-
45-50	3 (5)	-	-	-	-	-	-	-	-	-	-	-	-
50-55	13 (21.67)	-	-	-	-	-	-	-	-	-	-	-	-
>55	22 (36.66)	-	-	-	-	-	-	-	-	-	-	-	-
Total	60 (100)	60 (100)	60 (100)	60 (100)	60 (100)	60 (100)	60 (100)	60 (100)	60 (100)	60 (100)	60 (100)	60 (100)	60 (100)

It is clear that 76.67 per cent and 48.34 per cent of the families in the organized and unorganized sectors respectively spent between 40 to 55 per cent of their income for food. About 18.33 per cent and 36.66 per cent of the families in organized and unorganized sectors respectively spent more than 55 per cent of their income for the purchase of food items. Upto 10 per cent of the monthly income was spent for transport by 70 per cent and 55 per cent of the families in organized and unorganized sectors respectively.

It was observed that upto 25 per cent of the family income was spent for education by 71.67 per cent of families in organized sector and 68.33 per cent of the families in unorganized sector. About 61.66 per cent, 86.67 per cent and 18.34 per cent of the families in the organized sector did not spend money for fuel, recreation and health respectively.

Most of the families in the organized (81.66%) and unorganized (58.33%) sectors spent less than 5 per cent of their income for electricity.

About 15 per cent of the families in the unorganized sector saved below 20 per cent of their income, whereas in the unorganized sector 35 per cent of the families saved below 25 per cent of their income.

4.1.17. Housing conditions

Details of the housing conditions of the families are presented in Table 17. Majority of the families in the unorganized sector (96.67%) and all families in the organized (100%) sector had own houses, built with brick as the wall material. Most of the houses in organized (66.67%) and unorganized (75%) sectors had tiled roofs. Nearly 75 per cent of houses in organized and 63.33 per cent in unorganized sectors had 2-3 rooms.

Table. 17. Housing conditions of the families

Sl. No.	Facilities	Number of families	
		Organized (n=60)	Unorganized (n=60)
1	**Type of house**		
	Own	60 (100)	58 (96.67)
	Rented	-	2 (3.33)
2	**Type of wall**		
	Mud	-	2 (3.33)
	Brick	60 (100)	58 (96.67)
3	**Roofing material**		
	Tiled	40 (66.67)	45 (75)
	Terraced	20 (33.33)	15 (25)
4	**Number of rooms**		
	2	4 (6.67)	5 (8.33)
	3	41 (68.33)	33 (55)
	4	12 (20)	22 (36.67)
	5	3 (5)	-
5	**Separate kitchen**	60 (100)	60 (100)
6	**Single storeyed**	60 (100)	60 (100)
7	**Source of drinking water**		
	Own well	42 (70)	37 (61.67)
	Public tap	18 (30)	23 (38.33)
8	**Lavatory facilities**		
	Own latrine	60 (100)	60 (100)
9	**Drainage facilities**		
	Open drainage	51 (85)	56 (93.33)
	Closed	9 (15)	4 (6.67)
10	**Electricity facilities**		
	Present	60 (100)	55 (91.67)
	Absent	-	5 (8.33)
11	**Recreational facilities**		
	Radio	4 (6.67)	13 (21.66)
	Radio, TV, VCR	3 (5)	-
	TV & VCR	2 (3.33)	3 (5)
	TV	46 (76.67)	34 (56.67)
	No facilities	5 (8.33)	10 (16.67)
12	**Transport facilities**		
	Bus	24 (40)	15 (25)
	Bicycle	17 (28.33)	30 (50)
	Bike	7 (11.67)	1 (1.67)
	Bus and cycle	6 (10)	6 (10)
	No facilities	6 (10)	8 (13.33)

All the houses in both the sectors had separate kitchen and proper lavatory facilities. Majority of the families in organized (70%) and unorganized (61.67%) sectors had their own well as source of drinking water. About 30 per cent in organized and 38.33 per cent in unorganized sectors depended on public tap.

Regarding the drainage facilities, majority in the organized (85%) and unorganized sectors (93.33%) had open drainage facilities. All the houses in organized sector and 91.67 per cent of the families in unorganized sector had electricity facilities. Majority of the families in the organized (91.67%) and unorganized sectors (78.34%) had recreational facilities in their home. Only 10 per cent of the families in the organized and 13.33 per cent in the unorganized sectors indicated about lack of proper transport facilities in their locality.

4.1.18. Type of fuel used

About 55 per cent of the families in the organized sector used LPG as well as wood as the source of fuel while in unorganized sector only 33.34 per cent of families used these materials as fuel. In the unorganized sector 35 per cent of families indicated that they used kerosene and wood for fuel. The details are presented in Table 18.

Table 18. Details regarding type and source of fuel

Sl. No.	Type of fuel	Number of families	
		Organized n=60	Unorganized n=60
1	Wood	9 (15)	9 (15)
2	Wood and kerosene	13 (21.67)	21 (35)
3	Firewood, kerosene and waste from coir industry	-	1 (1.67)
4	Wood and LPG	33 (55)	20 (33.34)
5	LPG and kerosene	2 (3.33)	4 (6.66)
6	Wood and waste from coir industry	2 (3.33)	4 (6.66)
7	Wood, kerosene and LPG	1 (1.67)	1 (1.67)
	Source of fuel		
1	Collected from surroundings	12 (20)	21 (35)
2	Purchased	20 (33.33)	14 (23.33)
3	Collected from surroundings and purchased	28 (46.67)	25 (41.67)

(Figures in parenthesis are percentages)

4.1.19. Details of health care facilities

In the unorganized sector 56.67 per cent depended on primary health centre for medical care, where as in the organized sector 40 per cent depended on ESI hospital and 45 per cent depended on primary health centre. The details are provided in Table 19.

Table 19. Details regarding use of health care facilities

Sl No	Type of health care facilities	Number of families	
		Organized n=60	Unorganized n=60
1	Primary Health Center	27 (45)	34 (56.67)
2	Private hospital	4 (6.67)	9 (15)
3	Medical college	4 (6.67)	5 (8.33)
4	Ayurvedic hospital	-	2 (3.34)
5	Maternal and child health center	-	5 (8.33)
6	Homeopathy	1 (1.66)	5 (8.33)
7	ESI hospital	24 (40)	-
	Total	60(100)	60(100)

(Figures in parenthesis are percentages)

4.1.20. Epidemics prevalent in the locality

From Table 20, it is clear that 85 per cent and 90 per cent of families in organized and unorganized sectors respectively indicated chikungunia as the most important epidemic prevalent in the locality during the previous year. Few families also indicated the prevalence of chicken pox (3.33%) and typhoid (1.67%) in the locality during the previous year.

Table 20. Details regarding epidemics prevalent in the locality

Sl. No.	Epidemics	Number of families	
		Organized (n=60)	Unorganized (n=60)
1	Chikungunia	51 (85)	54 (90)
2	Chicken pox	2 (3.33)	1 (1.67)
3	Typhoid	1 (1.67)	1 (1.67)
4	Nil	6 (10)	4 (6.66)
	Total	60 (100)	60 (100)

(Figures in parenthesis are percentages)

4.1.21. Families affected by the disease

Among the families surveyed, it was observed that in 63.33 per cent and 65 per cent of families in organized and unorganized sectors respectively, the family members suffered from chikungunia during the previous year. Only 1.67 per cent of families each suffered from chicken pox and typhoid also. All the families in organized sector and 89.74 per cent in unorganized sector adopted allopathy medicines for treatment of chikungunia, and the rest of the families adopted ayurvedic or homeopathy medicines for treating the diseases.

Among the families who had chikungunia, 77.5 per cent in organized and 92.31 per cent in unorganized sectors indicated after effects like pain in muscles due to the disease. The details are provided in Table 21.

4.2. FOOD CONSUMPTION PATTERN OF THE FAMILIES

The food consumption pattern of the families was assessed with respect to the food habits, meal pattern, frequency of purchase and use of foods, food expenditure pattern, preservation and storage of food items and foods avoided and included during physiological conditions. The details are given from 4.2.1 to 4.2.10.

Table 21. Details regarding families affected by diseases and the treatment adopted and after effects

Name of disease	Number of families											
	Organized						Unorganized					
	Number n=60	Treat-ment adopted Allo	Total	After effects			Number n=60	Treatment adopted				
				Present	Absent	Total		Allo	Ayur	Hom	Total	Presen
Chicken pox	1 (1.67)	1 (100)	1 (100)	-	-	-	1 (1.67)	-	1 (100)	-	1 (100)	-
Chikun gunia	38 (63.33)	38 (100)	38 (100)	31 (77.5)	9 (22.5)	40 (100)	39 (65)	35 (89.74)	2 (5.13)	2 (5.13)	39 (100)	36 (92.3)
Typhoid & chikun gunia	1 (1.67)	1 (100)	1 (100)	-	-	-	1 (1.67)	1 (100)	-	-	1 (100)	-
Nil	20 (33.33)	-	-	-	-	-	19 (31.66)	-	-	-	-	-

Allo- Allopathy
Ayur- Ayurveda
Hom- Homeopathy
(Figures in parenthesis are percentages)

4.2.1. Food habit

All the families in both the sectors were non-vegetarians and they consumed rice as their staple food.

4.2.2. Food expenditure pattern

From Table 22 and 23, it is seen that 48.33 per cent of the families in organized sector spent 35 to 50 per cent of their total food expenditure for the purchase of cereals, while in unorganized sector 25 per cent of families spent 35 to 45 per cent of the total food expenditure for the purchase of cereals

For the purchase of pulses, fruits, meat, fish, egg and sugar upto 10 per cent of food expenditure was spent by 76.67 per cent, 60 per cent, 61.67 per cent, 55 per cent, 90 per cent and 100 per cent of families in organized sector and 91.67 per cent, 55 per cent, 30 per cent, 18.33 per cent, 80 per cent, and 100 per cent of families in unorganized sector.

4.2.3. Frequency of purchase of food items

The details on the frequency of purchase of various food items by the families of the two sectors are furnished in Table 24. It is clear that 85 per cent of the families in the organized sector and all families in unorganized sector purchased cereals once in a week.

Roots and tubers and other vegetables were purchased once in a week by 80 per cent and 76.67 per cent of families in organized sector and 36.67 per cent and 66.67 per cent of families in unorganized sector. The frequency of purchase of fats and oils was also found to be once in a week in 55 per cent and 80 per cent of families in organized and unorganized sectors respectively.

Table 22.Monthly expenditure pattern for different food items (organized sector)

Food items	No expenditure	<5%	5-10%	10-15%	15-20%	20-25%	25-30%	30-35%	35-40%	40-45%	45-50%	Total
Cereals	-	-	-	-	-	-	9 (15)	22 (36.67)	7 (11.67)	16 (26.66)	6 (10)	60 (100)
Pulses	-	11 (18.33)	35 (58.34)	14 (23.33)	-	-	-	-	-	-	-	60 (100)
Green leafy vegetables	9 (15)	51 (85)	-	-		-	-	-	-	-	-	60 (100)
Vegetables, roots &tubers	-	2 (3.33)	21 (35)	29 (48.34)	8 (13.33)	-	-	-	-	-	-	60(100)
Oils & fats	-	2 (3.33)	25 (41.67)	26 (43.33)	7 (11.67)	-	-	-	-	-	-	60 (100)
Milk & milk products	8 (13.33)	6 (10)	13 (21.67)	16 (26.67)	6 (10)	3 (5)	3 (5)	5 (8.33)	-	-	-	60 (100)
Fruits	23 (38.33)	29 (48.33)	7 (11.67)	1 (1.67)	-	-	-	-	-	-	-	60 (100)
Meat	14 (23.33)	3 (5)	34 (56.67)	9 (15)	-	-	-	-	-	-	-	60 (100)
Fish	-	8 (13.33)	25 (41.67)	24 (40)	3 (5)	-	-	-	-	-	-	60 (100)
Egg	6 (10)	52 (86.67)	2 (3.33)	-	-	-	-	-	-	-	-	60 (100)
Spices &condiments	-	41 (68.33)	19 (31.67)	-	-	-	-	-	-	-	-	60 (100)
Sugar	-	49 (81.67)	11 (18.33)	-	-	-	-	-	-	-	-	60 (100)

(Figures in parenthesis are percentages)

Table 23.Monthly expenditure pattern for different food items (unorganized sector)

Food items	No expenditure	<5%	5-10%	10-15%	15-20%	20-25%	25-30%	30-35%	35-40%	40-45%	45-50%	Total
Cereals	-	-	-	-	-	3 (5)	22 (36.67)	20 (33.33)	10 (16.67)	5 (8.33)	-	60 (100)
Pulses	-	12 (20)	43 (71.67)	5 (8.33)	-	-	-	-	-	-	-	60 (100)
Green leafy vegetables	11 (18.33)	49 (81.67)	-	-	-	-	-	-	-	-	-	60 (100)
Vegetables, roots &tubers	-	2 (3.33)	33 (55)	25 (41.67)	-	-	-	-	-	-	-	60 (100)
Oils & fats	-	10 (16.67)	42 (70)	8 (13.33)	-	-	-	-	-	-	-	60 (100)
Milk & milk products	24 (40)	13 (21.67)	13 (21.67)	10 (16.66)	-	-	-	-	-	-	-	60 (100)
Fruits	27 (45)	30 (50)	3 (5)	-	-	-	-	-	-	-	-	60 (100)
Meat	18 (30)	1 (1.67)	17 (28.33)	22 (36.67)	2 (3.33)	-	-	-	-	-	-	60 (100)
Fish	-	-	11 (18.33)	26 (43.34)	23 (38.33)	-	-	-	-	-	-	60 (100)
Egg	12 (20)	47 (78.33)	1(1.67)	-	-	-	-	-	-	-	-	60 (100)
Spices &condiments	-	20 (33.33)	40 (66.67)	-	-	-	-	-	-	-	-	60 (100)
Sugar	-	56 (93.33)	4 (6.67)	-	-	-	-	-	-	-	-	60 (100)

(Figures in parenthesis are percentages)

Table 24. Distribution of families on the basis of frequency of purchase of foods (organized and unorganized sector)

Food items	Daily		Weekly		Monthly		Occasionally		Never		As required		Total	
	Org	Unorg	Org	Unorg	Org	Unorg	Org	Unorg	Org	Unorg	Org	Unorg	Org	Unorg
Cereals	-	-	51 (85)	60 (100)	9 (15)	-	-	-	-	-	-	-	60 (100)	60 (100)
Pulses	-	-	19 (31.67)	27 (45)	41 (68.33)	33 (55)	-	-	-	-	-	-	60 (100)	60 (100)
Green leafy vegetables	-	-	6 (10)	35 (58.33)	24 (40)	25 (41.67)	30 (50)	-	-	-	-	-	60 (100)	60 (100)
Other vegetables	14 (23.33)	20 (33.33)	46 (76.67)	40 (66.67)	-	-	-	-	-	-	-	-	60 (100)	60 (100)
Roots &tubers	-	-	48 (80)	22 (36.67)	-	20 (33.33)	-	-	-	-	12 (20)	18 (30)	60 (100)	60 (100)
Fruits	-	-	7 (11.67)	19 (31.67)	27 (45)	4 (6.66)	-	-	-	-	26 (43.33)	37 (61.67)	60 (100)	60 (100)
Fats & oils	-	-	33 (55)	48 (80)	27 (45)	12 (20)	-	-	-	-	-	-	60 (100)	60 (100)
Sugar	-	-	12 (20)	-	48 (80)	42 (70)	-	-	-	-	-	18 (30)	60 (100)	60 (100)
Spices &condiments	-	-	-	-	49 (81.67)	-	11 (18.33)	-	-	-	-	60 (100)	60 (100)	60 (100)
Milk & milk products	34 (56.67)	14 (23.34)	22 (36.66)	15 (25)	-	17 (28.33)	4 (6.67)	5 (8.33)	-	9 (15)	-	-	60 (100)	60 (100)
Meat	-	-	17 (28.33)	26 (43.33)	31 (51.67)	27 (45)	12 (20)	-	-	-	-	7 (11.67)	60 (100)	60 (100)
Fish	26 (43.33)	38 (63.33)	34 (56.67)	22 (36.67)	-	-	-	-	-	-	-	-	60 (100)	60 (100)
Egg	-	-	19 (31.66)	35 (58.33)	23 (38.34)	-	-	-	-	-	18 (30)	25 (41.67)	60 (100)	60 (100)

The frequency of purchase of pulses, sugar, and meat was found to be once in a month among 52 to 80 per cent of the families in organized sector and 45 to 70 per cent of the families in unorganized sector. Fish and milk were purchased daily by 43.33 per cent and 56.67 per cent of families in organized sector and 63.33 per cent and 23.34 per cent of families in unorganized sector

4.2.4. Place of purchase of food items

Details of the place of purchasing of food items are given in Table 25. Majority of the families in organized (70%) and unorganized (85%) sectors purchased food items from PDS and nearby shops. About 15 per cent in organized and 13.33 per cent in unorganized sectors purchased food items from PDS and wholesale shop. Majority of the families purchased food items like rice, wheat, atta and kerosene from PDS.

Table 25. Categorisation of families on the basis of place of purchase of food items

Sl No	Category	Number of families	
		Organized (n=60)	Unorganized (n=60)
1	PDS and nearby shops	42 (70)	51 (85)
2	Wholesale shop	2 (3.33)	-
3	Supply co margin supermarket	3 (5)	1 (1.67)
4	PDS and wholesale shop	9 (15)	8 (13.33)
5	Wholesale and nearby shop	4 (6.67)	-
	Total	60 (100)	60 (100)

(Figures in parenthesis are percentages)

4.2.5. Frequency of use of different food items

The details on the frequency of use of various food items by the families of two sectors are presented in Table 26 and 27.

The Tables show that all families of both the sectors used cereals, fats and oils, spices and condiments, and sugar in their daily diet. All families in both sectors used pulses one to three times a week. The use of fruits was found to be once in a month among 45 per cent of families in organized sector and 68.33 per cent families in unorganized sector. About 23.33 per cent, 56.67 per cent and 43.33 per cent of families in organized sector used other vegetables, milk and milk products and fish daily while in unorganized sector 41.67 per cent, 23.34 per cent and 63.33 per cent of families used these food items on a daily basis. Egg was used once in a month by 56.67 per cent of the families in organized sector while in unorganized sector 63.33 per cent used egg once in a week.

The frequency of use of different food items among the families was assessed by the formula suggested by Reaburn *et al.,* (1979) and the percentage score is presented in Table 28.

The results indicated that the maximum score of 100 per cent was obtained for food items like cereals, fats and oils, sugar and spices and condiments for both the sectors. The food frequency scores obtained for pulses (77.66%), green leafy vegetables (54.33%), other vegetables (85.23%), meat (77.22%), fish (90.71%) and egg (59%) were higher in the unorganized sector compared to organized sector (72.49%, 17.08%, 81.66%, 54.16%, 88.66%, and 43.75%). In the case of roots and tubers, milk and milk products organized sector scored the highest score of 67.22 per cent and 83.33 per cent compared to unorganized sector (55.83% and 43.33 %).

Table 26.Distribution of families on the basis of frequency of use of various foods (organized sector)

Food items	D	W3	W2	W1	M	O	Total
Cereals	60(100)	-	-	-	-	-	60(100)
Pulses	-	17(28.33)	20(33.33)	23(38.34)	-	-	60(100)
Green leafy vegetables	-	1 (1.67)	3(5)	2(3.33)	24(40)	30(50)	60(100)
Other vegetables	14(23.33)	37(61.67)	9 (15)	-	-	-	60(100)
Roots & tubers	-	-	13(21.67)	35(58.33)	12(20)	-	60(100)
Fruits	-	-	-	7(11.67)	27(45)	26(43.33)	60(100)
Fats & oils	60 (100)	-	-	-	-	-	60(100)
sugar	60 (100)	-	-	-	-	-	60(100)
Spices& condiments	60 (100)	-	-	-	-	-	60(100)
Milk & milk products	34(56.67)	18 (30)	-	4(6.67)	-	4(6.66)	60(100)
Meat	-	-	-	17(28.33)	31(51.67)	12(20)	60(100)
Fish	26(43.33)	34(56.67)	-	-	-	-	60(100)
Egg	-	6 (10)	7(11.67)	13(21.66)	34(56.67)	-	60(100)

D-Daily, W_3-weekly thrice, W_3-weekly twice, W_1-weekly once, M-monthly, O-occasionally

(Figures in parenthesis are percentages)

Table 27. Distribution of families on the basis of frequency of use of various foods(unorganized sector)

Food items	D	W4	W3	W2	W1	M	O	N	Total
Cereals	60(100)	-	-	-	-	-	-	-	60(100)
Pulses	-	-	11(18.33)	31(51.67)	18(30)	-	-	-	60(100)
Green leafy vegetables	-	-	3(5)	2(3.33)	30(50)	25(41.67)	-	-	60(100)
Other vegetables	25(41.67)	8(13.33)	27(45)	-	-	-	-	-	60(100)
Roots & tubers	-	2(3.33)	5(8.33)	18(30)	22(36.67)	13(21.67)	-	-	60(100)
Fruits	-	-	-	3(5)	16(26.67)	41(68.33)	-	-	60(100)
Fats & oils	60(100)	-	-	-	-	-	-	-	60(100)
sugar	60(100)	-	-	-	-	-	-	-	60(100)
Spices& condiments	60(100	-	-	-	-	-	-	-	60(100)
Milk and milk products	14(23.33)	-	-	-	15(25)	17(28.33)	5(8.33)	9 (15)	60(100)
Meat	-	-	-	-	26(43.33)	27(45)	7(11.67)	-	60(100)
Fish	38(63.33)	5(8.33)	17(28.34)	-	-	-	-	-	60(100)
Egg	-	-	3(5)	5(8.34)	38(63.33)	14(23.33)	-	-	60(100)

D-Daily, W_3-weekly thrice, W_3-weekly twice, W_1-weekly once, M-monthly, O-occasionally, N-never

(Figures in parenthesis are percentages)

Based on the percentage scores obtained for different food items, the food items were classified into three groups viz, most frequently used (percentage score above 75 %) medium frequently used (percentage score 50 to 75%) and less frequently used (percentage score below 50%) food items.

Table 28 . Frequency score (%) of different food items

Food items	Organized	Unorganized
Cereals	100	100
Pulses	72.49	77.66
Green leafy vegetables	17.08	54.33
Other vegetables	81.66	85.23
Roots and tubers	67.22	55.83
Fruits	34.17	59.16
Fats and oils	100	100
Sugar	100	100
Spices and condiments	100	100
Milk and milk products	83.33	43.33
Meat	54.16	77.22
Fish	88.66	90.71
Egg	43.75	59

Table. 29. Classification of various food items on the basis of percentage frequency score

Frequency of use	Organized	Unorganized
Most frequently used (Scores above 75%)	Cereals, other vegetables, fats and oils, spices and condiments, sugar, milk and milk products and fish	Cereals, pulses, other vegetables, fats and oils, spices and condiments, sugar, meat and fish
Medium frequently used (Scores 50-75%)	Pulses, roots and tubers and meat	Green leafy vegetables, roots and tubers, fruits, and egg
Less frequently used (Scores below 50%)	Green leafy vegetables, fruits and egg	Milk and milk products

The results (Table 29) indicated that cereals, other vegetables, fats and oils, spices and condiments, sugar and fish were the most frequently used food items in both the sectors. The respondents in organized sector used milk and milk products and unorganized sector used pulses and meat also most frequently. The medium frequently used food items included pulses, roots and tubers and meat among the respondents of organized sector and green leafy vegetables, roots and tubers, fruits, and egg among unorganized sector. The respondents of organized sector used green leafy vegetables, fruits and egg less frequently and among unorganized sector milk and milk products were found to be the less frequently used food items.

4.2.6. Meal pattern of the family

The analysis of the meal pattern of the families (Table 30) indicated that majority of the families in organized (86.67%) and unorganized sectors (81.67%) followed three meal a day pattern. It was found that 96.67 per cent of families in

the organized and 88.33 per cent in unorganized sectors planned their meals in advance.

Regarding the specific time schedule for taking meals, it was observed that all families in organized sector adopted a specific time schedule for taking meals and in the unorganized sector only 81.67 per cent followed specific time schedule.

Table 30. Details regarding meal pattern of the families

Sl. No	Details	Number of families	
		Organized n=60	Unorganized n=60
1	Frequency of meals (daily).		
	3	52 (86.67)	49 (81.67)
	>3	8 (13.33)	11 (18.33)
2	Meal planning		
	Plan meals in advance	58 (96.67)	53 (88.33)
	No meal planning	2 (3.33)	7 (11.67)
3	Specific time schedule for taking meals	60 (100)	49 (81.67)
	No time schedule	-	11 (18.33)

(Figures in parenthesis are percentages)

Details regarding consumption of foods and cooking of meals are furnished in Table 31. Majority of the families in the organized (68.33%) and unorganized (80%) sectors did not consume any raw food items. Only 11.67 per cent and 18.33 per cent of the families in the organized and unorganized sectors used left over food items like rice and fish curry. All families in both sectors used boiled water for drinking purpose.

In unorganized sector none of the respondents consumed food from outside, while in organized sector 6.67 per cent of respondents consumed food

from outside. About 58.33 per cent of the families in the unorganized sector cooked meals twice in a day, while in organized sector 51.67 per cent of the families cooked meals once in a day.

Table 31. Details regarding consumption of food and cooking of meals

Details	Number of respondents	
	Organized (n=60)	Unorganized (n=60)
Consumption of raw foods		
Consumed raw foods	19(31.67)	12(20)
Not consumed raw foods	41(68.33)	48(80)
Use of left over foods		
Used left over foods	7(11.67)	11(18.33)
Not used	53(88.33)	49(81.67)
Drinking water		
Used boiled water	60(100)	60(100)
Consumption of food from outside		
Consumed food from outside	4(6.67)	-
Not consumed food from outside	56(93.33)	60(100)
Frequency of cooking meals		
Once	31 (51.67)	25 (41.67)
Twice	29 (48.33)	35 (58.33)

(Figures in parenthesis are percentages)

4.2.7. Preservation and storage of foods

Majority of the families in the organized (73.33%) and unorganized sectors (61.66%) preserved mango, lime and amla, in the form of pickles. Most common storage method adopted by the families in both the sectors was found to be drying and storing in tight containers in the case of cereals and pulses.

4.2.8. Intrafamily food distribution

Majority of the families in the organized (73.34%) and unorganized sectors (65%) gave equal importance to male and female members of the families for giving meals, while 26.67 per cent in unorganized sector and 20 per cent in organized sector gave importance to the male members of the family. About 6.66 per cent in organized and 8.33 per cent in unorganized sectors gave importance to children. Details are presented in Table 32.

Table 32. Details of intrafamily food distribution

Details	Number of families	
	Organized n=60	Unorganized n=60
Equal importance to male and female members	44 (73.34)	39 (65)
Importance to male members only	12 (20)	16 (26.67)
Importance to children	4 (6.66)	5 (8.33)
Total	60 (100)	60 (100)

(Figures in parenthesis are percentages)

4.2.9. Foods avoided and included during physiological conditions

It was observed that all the families avoided foods like papaya and pineapple during pregnancy. During diseased conditions like fever and diarrhoea all families included semisolid foods like gruel and avoided non vegetarian foods and fried food items.

4.3. DETAILS OF RESPONDENTS AND THEIR WORKING PATTERN AND OCCUPATIONAL HAZARDS

4.3.1. Age of the respondents

From Table 33, it is clear that the age of the respondents varied from 23 to 55 years. About 28.34 per cent and 8.34 per cent of respondents selected for the study from organized and unorganized sectors respectively were in the age group of 20-30 years. Only 35 per cent and 30 per cent of respondents in the two sectors were aged 31 to 40 years. Rest of the respondents in organized sector (36.66%) and unorganized sector (61.66%) were in the age group 41 to 55 years.

Table 33. Distribution of respondents on the basis of age

Age (years)	Number of respondents	
	Organized (n=60)	Unorganized (n=60)
23-25	5 (8.34)	1 (1.67)
26-30	12 (20)	4 (6.67)
31-35	6 (10)	7 (11.67)
36-40	15 (25)	11 (18.33)
41-45	6 (10)	8 (13.33)
46-50	8 (13.33)	17 (28.33)
51-55	8 (13.33)	12 (20)
Total	60 (100)	60 (100)

(Figures in parenthesis are percentages)

4.3.2. Marital status of the respondents

The details of marital status of the respondents are presented in Table 34. It was found that majority of the respondents in the organized (86.67%) and unorganized (81.67%) sectors were married. Only 6.67 per cent of respondents in the unorganized sector were found to be widows. The respondents who were

separated or divorced contributed a minority in both the sectors and were equal in number (3.33%).

Table 34.Marital status of respondents

Sl No	Marital status	Number of respondents	
		Organized n=60	Unorganized n=60
1	Married	52 (86.67)	49 (81.67)
2	Unmarried	6 (10)	5 (8.33)
3	Widowed	-	4 (6.67)
4	Divorced/separated	2 (3.33)	2 (3.33)
	Total	60 (100)	60 (100)

(Figures in parenthesis are percentages)

4.3.3. Educational status of respondents

Details regarding the educational status of the respondents are presented in Table 35. In the organized and unorganized sectors 50 per cent and 21.67 per cent of the respondents attained high school level of education and 21.67 per cent and 26.67 per cent respondents attained upper primary level of education. About 18.33 per cent of respondents in the unorganized sector were found to be illiterate. Only 6.66 per cent and 3.33 per cent of respondents in organized and unorganized sectors attained college level of education.

Table 35. Educational status of respondents

Sl. No.	Educational status	Number of respondents	
		Organized (n=60)	Unorganized (n=60)
1	College	4 (6.66)	2 (3.33)
2	Higher secondary	-	1 (1.67)
3	High school	30 (50)	13 (21.67)
4	Upper primary	13 (21.67)	16 (26.67)
5	Lower primary	13 (21.67)	17 (28.33)
6	Illiterate	-	11 (18.33)
	Total	60 (100)	60 (100)

(Figures in parenthesis are percentages)

4.3.4. Food consumption pattern at the worksite

Majority of the respondents in the organized (90%) and minority in unorganized sector (26.66%) took packed food to the worksite. The details are presented in Table 36.

Table 36. Details regarding food consumption pattern at the worksite

Details	Number of respondents	
	Organized n=60	Unorganized n=60
Packed food taken to the work site	54 (90)	16 (26.67)
Packed food not taken to the worksite	6 (10)	44 (73.33)
Total	60 (100)	60 (100)

(Figures in parenthesis are percentages)

4.3.5 Working pattern of the respondents

From Table 37 it was observed that majority (80%) of the respondents in the organized sector were working in industries, and the rest (20%) were involved in the work of coir society. In unorganized sector, all respondents were working in small coir units. All respondents in organized sector were permanent employees and in unorganized sector only 78.33 per cent were permanent employees of the coir units.

In organized sector all respondents used to get work for 6 days in a week while in unorganized sector only 40 per cent of the respondents used to get work for 6 days in a week and the rest of the respondents used to get work for 3-5 days in a week. In the organized sector all the respondents start their work at 8.30 am and stop at 5.30 pm with an interval of 15 minutes each in the morning and evening and one hour interval at noon. In the unorganized sector, no specific time schedule was adopted by the respondents. About 36.67 per cent and 53.33 per cent of the respondents in organized and unorganized sectors indicated that they used to get Rs 200-300/- as their weekly wage. About 41.67 per cent and 13.33 per cent of the respondents in the organized sector used to get Rs 300 to 400/- and Rs 400 to 500/- respectively in a week. In organized sector 8.33 per cent of respondents received Rs 500 to 600/- in a week. It was also found that all respondents in both sectors used to get their wages at the end of the week. The wage disparity among men and women shows that men were getting higher wage compared to women. But the type of work undertaken by the men was different. All respondents in the organized sector had medical leave and 73.33 per cent of respondents used to receive medical benefits also. In unorganized sector neither medical leave nor medical benefits were received by the respondents.

It was also seen that all respondents in the organized sector and 90 per cent in unorganized sector used to get festival allowance of Rs.1500 to 2500/- and 500 to 1500/- respectively. Except one respondent in the unorganized sector all respondents indicated that they did not go for any other work.

Table 37. Details on the working pattern of the respondents

Sl. No.	Category	Number of respondents	
		Organized (n=60)	Unorganized (n=60)
1	Place of Employment		
	Coir units	-	60 (100)
	Society	12 (20)	-
	Industry	48 (80)	-
2	Permanent Employee		
	Permanent	60 (100)	47 (78.33)
	Temporary	-	13 (21.67)
3	Manadatory working days per week		
	3	-	19 (31.67)
	4	-	9 (15)
	5	-	8 (13.33)
	6	60 (100)	24 (40)
4	Timing of work		
	8.30-5.30	60 (100)	-
	9.00-5.30	-	-
	10.00-6.00	-	-
	No specific time schedule	-	60 (100)
5	Interval		
	Morning (10-10.15)	60 (100)	-
	Lunch (12.45-1.45)	60 (100)	-
	Evening (3.30-3.45)	60 (100)	-
	No specific interval	-	60(100)
6	Wage (weekly)		
	150-200	-	21 (35)
	200-300	22 (36.67)	32 (53.33)

	300-400	25 (41.67)	7 (11.67)
	400-500	8 (13.33)	-
	500-600	5 (8.33)	-
7	Tenure of payment		
	Monthly	-	-
	Weekly	60 (100)	60 (100)
8	Leave facilities		
	Medical leave	60 (100)	-
	Casual leave	-	60 (100)
9	Medical benefits from organization		
	Present	44 (73.33)	-
	Absent	16 (26.67)	60 (100)
10	Festival allowance		
	Amount received		
	500-1500	-	54 (90)
	1500-2500	60 (100)	-
	Nil	-	6 (10)
11	Engagement in other work		
	Engaged in other work	-	1(1.67)
	Not engaged in other work	60(100)	59(98.33)

(Figures in parenthesis are percentages)

Considering the details regarding the work during different seasons it was found that all respondents in the organized sector used to get work through out the year. In the unorganized sector during rainy season they used to get work for 5 to 10 days in a month.

4.3.6. Work undertaken by the respondents

Among the respondents in organized sector 23.33 per cent were involved in work like loading and drying and 18.33 per cent were involved in general work of the coir industry. Rest of the respondents performed the tasks like, stenciling and colouring (11.67%), spooling (16.67%), tailoring (8.33%), cleaning and shaping of mat (15%) and in packing (6.67%). In the unorganized sector 60 per cent of the respondents were involved in spooling work while the rest were found to be engaged in defibering (11.67%), yarn spinning (16.66%), and tailoring (11.67%). The details are given in the Table 38.

Among the respondents who were engaged in coir yarn spinning, 80 per cent of respondents in unorganized sector used to spun 11 to 30 kg of yarn per day. All respondents in organized sector used to spool 21 to 30 kg of coir daily while in unorganized sector 58.33 per cent of respondents spooled 11 to 20 kg per day.

Table 38.Details of work undertaken by the respondents

Category	Number of respondents	
	Organized (n=60)	Unorganized (n=60)
Defibering	-	7 (11.67)
Coir yarn spinning	-	10 (16.66)
Coir spooling	10 (16.67)	36 (60)
Mat tailoring	5 (8.33)	7 (11.67)
Mat stenciling and colouring of mat	7 (11.67)	-
Loading and drying	14 (23.33)	-
Cleaning and shaping of mat	9 (15)	-
Packing section	4 (6.67)	-
General work	11 (18.33)	-
Total	60 (100)	60 (100)
Quantum of work		
Coir yarn spinning (kg/day)		
5-10	-	2 (20)
11-20	-	5 (50)
21-30	-	3 (30)
Total	-	10 (100)
Coir spooling (kg/day)		
5-10	-	-
11-20	-	21 (58.33)
21-30	10 (100)	15 (41.67)
Total	10 (100)	36 (100)

(Figures in parenthesis are percentages)

4.3.7. Work environment

From Table 39, it is clear that 85 per cent of the respondents in organized sector worked in the facilities given by the industries where as in unorganized sector 25 per cent of respondents worked on ordinary sheets and 68.33 per cent worked in the sheds.

It was found that all the respondents in the organized sector had proper lavatory facilities and resting place in the working area, while in the unorganized sector only 78.33 per cent respondents indicated that there are proper lavatory facilities and resting place in the work area.

Regarding the cleanliness and the hygiene of the working area, 53.33 per cent of the respondents in organized sector had good facilities in the working area while in unorganized sector only 8.34 per cent of the respondents had proper cleanliness and hygiene in the working area.

Table 39. Details regarding work environment

Sl. No.	Work environment	Number of respondents	
		Organized n=60	Unorganized n=60
1	Place of work	9 (15)	4 (6.67)
	Open place	-	15 (68.33)
	Shed	-	41 (25)
	Ordinary sheets	51 (85)	-
	Aluminium sheets		
2	Facilities		
	Toilet facilities	48 (80)	10 (16.67)
	Resting place	2 (3.33)	8 (13.33)
	Toilet facilities and resting place	10 (16.67)	29 (48.33)
	No facilities	-	13 (21.67)
3	Cleanliness and hygiene		
	Good	32 (53.33)	5 (8.34)
	Fair	25 (41.67)	42 (70)
	Poor	3 (5)	11 (18.33)
	Absent	-	2 (3.33)
	Total	60 (100)	60 (100)

(Figures in parenthesis are percentages)

4.3.8. Details of implement/equipment used by the respondents

About 51.66 per cent of the respondents in unorganized sector indicated that they use handspun (vandi) as the equipment for work and the rest used spinning wheels (11.67%), pamparam (8.33%) and needle and tape (11.67%) while in organized sector handspun, pamparam, tailoring machine, dispenser and scissors were used by 13.33 per cent, 3.33 per cent, 8.33 per cent and 33.34 per cent of respondents. The details are given in the Table 40.

Table 40. Details regarding implement/equipment used for work

Sl. No.	Implement/Equipment	Number of respondents	
		Organized (n=60)	Unorganized (n=60)
1	Spinning wheels/ Charka	-	7 (11.67)
2	Hand spun	8 (13.33)	31 (51.66)
3	Pamparam	2 (3.33)	5 (8.33)
4	Tailoring machine	5 (8.33)	-
5	Big needle, tape	-	7 (11.67)
6	Scissors	9 (15)	-
7	Dispenser	4 (6.67)	-
8	Dispenser/scissors	7 (11.67)	-
9	Paint/stenciling board	7 (11.67)	-
10	Sweeping material	2 (3.33)	-
11	Nil	16 (26.67)	10 (16.67)
	Total	60 (100)	60 (100)

(Figures in parenthesis are percentages)

4.3.9. Time expenditure pattern of the respondents

The details on the time expenditure pattern of respondents are presented in Table 41. It was found that all respondents in the organized sector worked in the coir sector for 7-8 hours daily, while in the unorganized sector only 40 per cent of respondents worked for 7-8 hours in a day. About 21.67 per cent of respondents in the unorganized sector worked for 8-9 hours daily. All the respondents in organized and unorganized sectors spent 6-7 hours for household activities.

Regarding the time spent for rest and sleep, all respondents in organized sector spent 8-9 hours daily and in unorganized sector 61.67 per cent and 38.33 per cent of respondents spent 7-8 and 8-9 hours daily.

Table 41. Details regarding time expenditure pattern of the respondents

Sl. No.	Details	Number of respondents	
		Organized (n=60)	Unorganized (n=60)
1	Time spent for work (hr)		
	6-7	-	23 (38.33)
	7-8	60 (100)	24 (40)
	8-9	-	13 (21.67)
2	Time spent for house hold activities (hr)		
	5-6	-	-
	6-7	60 (100)	60(100)
3	Time spent for rest and sleep (hr)		
	6-7	-	-
	7-8	-	37 (61.67)
	8-9	60 (100)	23 (38.33)
	Total	60 (100)	60 (100)

(Figures in parenthesis are percentages)

4.3.10. Social participation of the respondents

About 55 per cent of the respondents in the organized and 53.33 per cent in unorganized sectors were found to be the members of Ayalkootam. Nearly 33.33 per cent in organized sector and 26.67 per cent in the unorganized sector were members of Kudumbasree. All respondents who had membership in social organizations indicated that they used to attend the meetings organized by the respective groups. The details are presented in Table 42.

Table 42. Details regarding social participation of the respondents

Sl. No.	Social participation	Number of respondents	
		Organized (n=60)	Unorganized (n=60)
1	Ayalkootam	33 (55)	32 (53.33)
2	Kudumbasree	20 (33.33)	16 (26.67)
3	Mahila samajam	-	2 (3.33)
4	Nil	7 (11.67)	10 (16.67)
	Total	60 (100)	60 (100)

(Figures in parenthesis are percentages)

4.3.11. Morbidity Pattern among respondents

From Table 43 it is seen that about 53.33 per cent and 65 per cent of the respondents from organized and unorganized sectors suffered from chikungunia, during the previous year. About 18.33 per cent of respondents in organized sector and 30 per cent in unorganized sector suffered from asthma during the previous year.

Table.43 Morbidity pattern among respondents

Sl. No.	Name of disease	Number of respondents	
		Organized (n=60)	Unorganized (n=60)
1	Chicken pox	1 (1.67)	-
2	Chikungunia	32 (53.33)	39 (65)
3	Asthma	11(18.33)	18 (30)
4	Nil	16 (26.67)	3 (5)
	Total	60 (100)	60 (100)

(Figures in parenthesis are percentages)

4.3.12. Occupational hazards observed among the respondents

About 41.66 per cent of the respondents in the organized and 61.66 per cent in unorganized sector indicated occupation related health problems mainly asthma, allergy and skin lesions. About 30 per cent and 16.67 per cent of the respondents in the organized and unorganized sectors had back pain and pain in hands and legs (Table 44).

The occupational hazards among the sub samples when assessed by the physician also indicated asthma, allergy, skin lesions, pain in the hands and legs and back pain among the respondents. About 20 per cent and 25 per cent of respondents in organized and unorganized sectors suffered from asthma and allergy. Allergy was also observed among 30 per cent of respondents in organized sector and 40 per cent in unorganized sector. Lesions in the skin was noticed among 20 per cent and 15 per cent of respondents in organized and unorganized sectors respectively. Rest of the respondents suffered from pain in legs and hands and back pain (Table 45).

Table 44. Details regarding the occupational hazards

Sl. No.	Health problem	Number of respondents	
		Organized (n=60)	Unorganized (n=60)
1	Asthma	-	10 (16.66)
2	Allergy	14 (23.33)	16 (26.67)
3	Skin diseases	-	3 (5)
4	Pain in hands, legs and back pain	18 (30)	10 (16.67)
5	Asthma and allergy	8 (13.33)	5 (8.33)
6	Allergy, asthma and skin problems	3 (5)	3 (5)
7	Nil	17 (28.34)	13 (21.67)
	Total	60 (100)	60 (100)

(Figures in parenthesis are percentages)

Table 45. Details regarding occupation related diseases (sub sample)

Health Problem	Number of respondents	
	Organized n=20	Unorganized n=20
Asthma and allergy	4 (20)	5 (25)
Allergy	6 (30)	8 (40)
Skin diseases	4 (20)	3 (15)
Pain in hands and legs and back pain	6 (30)	4 (20)

(Figures in parenthesis are percentages)

4.4. NUTRITIONAL PROFILE OF THE RESPONDENTS

Nutritional status of the respondents was ascertained through anthropometric measurements, one day food weighment method, clinical examination to identify the deficiency symptoms and biochemical estimation of blood for haemoglobin.

4.4.1. Anthropometric measurements

4.4.1.1. Weight and Height

Details regarding the weight and height of the respondents are presented in Table 46 & 47.

The weight of the respondents in the organized sector varied from 35 kg to 66 kg and in the unorganized sector it varied from 35 kg to 74 kg. The height of the respondents in the organized and unorganized sectors varied from 134 cm to 167 cm and 138 cm to 167 cm respectively. The weight and height of the respondents between the two sectors were found to be statistically insignificant.

The weight and height of the respondents were compared with the reference body weight and height suggested by ICMR (1990) for a reference woman. The results (Table 48) indicated that only 8.33 per cent of the respondents

in the unorganized sector had their weight equal to the standard weight suggested for a reference Indian woman. The weight of 51.67 per cent and 48.33 per cent of respondents in organized and unorganized sectors respectively were lower than the standard body weight.

The height of 55 per cent of respondents in organized sector and 50 per cent in unorganized sector were found to be lower than the standard height suggested for a reference Indian women while the height of rest of the respondents were found to be higher than the standard height.

Table 46.Distribution of respondents on the basis of weight

Weight (kg)	Number of respondents	
	Organized (n=60)	Unorganized (n=60)
35-39	11 (18.33)	1 (1.67)
40-49	20 (33.33)	28 (46.66)
50-59	23 (38.34)	19 (31.67)
60-69	6 (10)	11 (18.33)
70-79	-	1 (1.67)
Total	60 (100)	60 (100)

(Figures in parenthesis are percentages)

't' value between the sectors = 1.52 NS

Table 47. Distribution of respondents on the basis of height

Height (cm)	Number of respondents	
	Organized (n=60)	Unorganized (n=60)
130-135	3 (5)	-
135.1-140	7 (11.67)	9 (15)
140.1-145	10 (16.67)	6 (10)
145.1-150	13 (21.66)	16 (26.67)
150.1-155	7 (11.67)	14 (23.33)
155.1-160	16 (26.67)	12 (20)
160.1-165	2 (3.33)	2 (3.33)
165.1-170	2 (3.33)	1 (1.67)
Total	60 (100)	60 (100)

(Figures in parenthesis are percentages) 't' value between the sectors = 0.269 NS

Table 48. Comparison of weight and height of respondents with standard weight and height

Sl No	Category	Standard *		Number of respondents			
		Weight (kg)	Height (cm)	Organized n=60		Unorganized n=60	
				Weight	Height	Weight	Height
1	Less than Standard	<50	<151	31 (51.67)	33 (55)	29 (48.34)	30 (50)
2	Equal to standard	50	151	-	-	5 (8.33)	-
3	Above standard	>50	>151	29 (48.33)	27 (45)	26 (43.33)	30 (50)
	Total			60 (100)	60 (100)	60 (100)	60 (100)

(Figures in parenthesis are percentages)

*** ICMR (1990)**

4.4.1.2. Body mass index of respondents

The respondents were categorized on the basis of their Body Mass Index (BMI) which was computed from their weight and height measurements. The respondents were graded into different categories on the basis of the classification suggested by IOTF-WHO (2000). The details are given in Table 49.

The results indicated that 11.67 per cent and 8.33 per cent of respondents from organized and unorganized sectors were undernourished. Women belonged to normal nutritional status with a BMI in between 18.5 to 22.9 was found to be 58.33 per cent in the organized and 51.67 per cent in the unorganized sectors. Only 11.67 per cent and 18.33 per cent of the respondents in the organized and unorganized sectors respectively had obesity. There was no significant difference in the BMI of both the sectors. The comparison of BMI of respondents in organized and unorganized sectors is given in Figure 1.

Table 49. Distribution of respondents based on their body mass index

Category (BMI)	Number of respondents	
	Organized(n=60)	Unorganized(n=60)
Undernourished (<18.5)	7 (11.67)	5 (8.33)
Normal nutritional status (18.5-22.9)	35 (58.33)	31 (51.67)
At risk (23-24.9)	11 (18.33)	13 (21.67)
Obesity (>25)	7 (11.67)	11 (18.33)
Total	60 (100)	60 (100)

(Figures in parenthesis are percentages)

't' value between the sectors = 1.68 NS

To find out the chronic energy deficiency among the respondents who were undernourished they were grouped into different grades as CED Grade I (mild malnutrition), CED Grade 2 (moderate malnutrition) and CED Grade III (severe malnutrition). The details are given in Table 50.

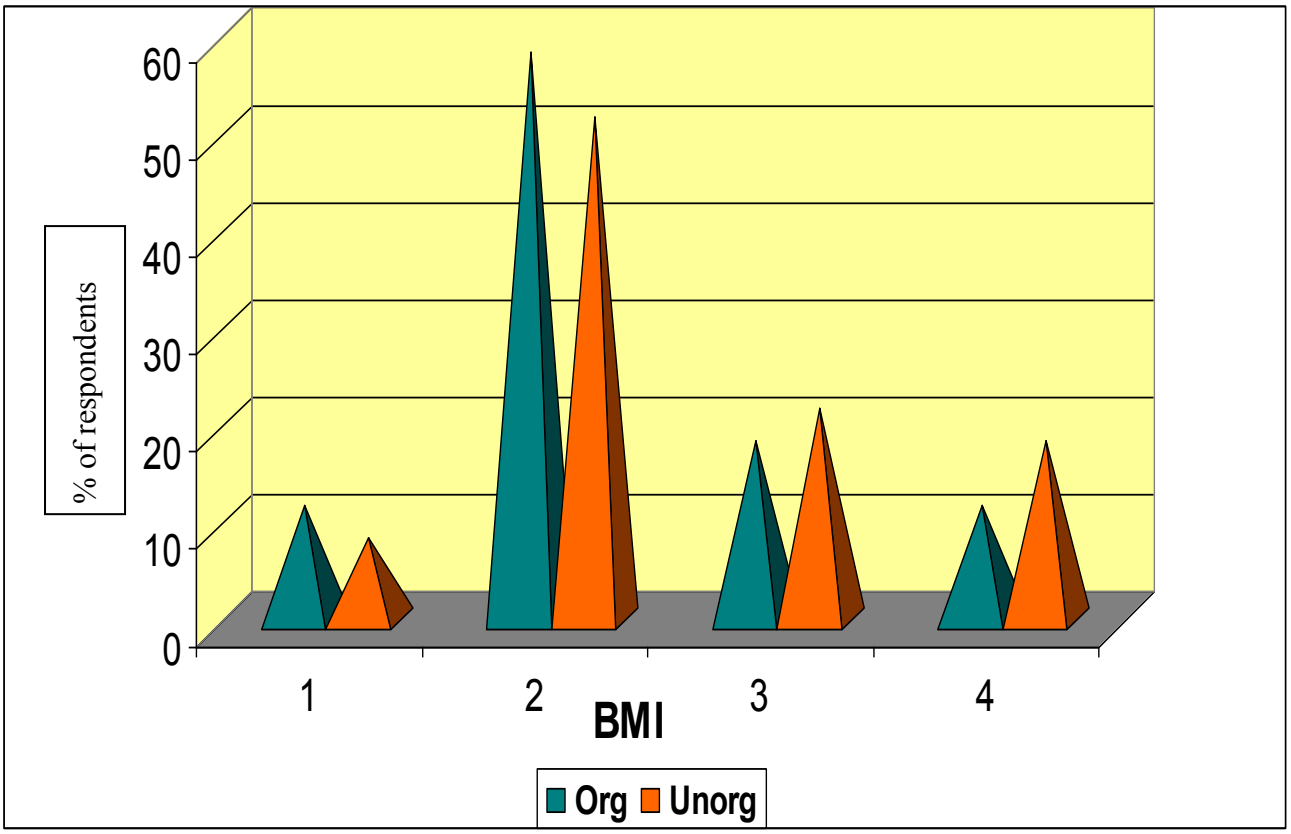
Table 50. Prevalence of CED among the respondents

Chronic energy deficiency grade (BMI)	Grades of malnutrition	Number of respondents	
		Organized (n=7)	Unorganized (n=5)
CED Grade III (<16)	Severe	1 (14.28)	1 (20)
CED Grade II (16 to 17)	Moderate	-	-
CED Grade I (17 to 18.5)	Mild	6 (85.72)	4 (80)

(Figures in parenthesis are percentages)

From Table 50 it was observed that among the respondents who were undernourished 85.72 percent in organized and 80 per cent in unorganized sector had mild malnutrition with a BMI of 17-18.5. Only 14.28 and 20 per cent

Figure 1. Comparison of BMI of respondents of organized and unorganized sectors



Org-Organized
Unorg-Unorganized
1- Undernourished, 2- Normal, 3- At risk, 4- Obesity

of respondents in organized and unorganized sectors had severe malnutrition with a BMI less than 16.

4.4.2. Food weighment survey

4.4.2.1. Actual food and nutrient intake

An indepth observation among a sub sample of 40 women coir workers (20 respondents in each category) was conducted by one day food weighment survey to determine their actual food and nutrient intake and to assess the quantity and quality of the foods consumed by the respondents.

The quantity of each food item was compared with the quantity specified for a balanced diet suggested by ICMR (1984) for women engaged in moderate activity. The nutrients were compared with the Recommended Dietary Allowances (RDA) of nutrients for adult woman engaged in moderate activity suggested by ICMR (1990). Both the food and nutrient intake of the respondents were statistically analysed. The results are furnished in Table 51 and 52.

4.4.2.1.1. Food intake

From Table 51, it was observed that in organized sector the intake of pulses, other vegetables, roots and tubers, fruits and flesh foods were found to be higher than the RDA suggested by ICMR (1984) for a woman engaged in moderate activity. In the case of the respondents in unorganized sector also the intake of other vegetables, roots and tubers and flesh foods were found to be higher than the RDA. About 94.92 per cent of RDA of pulses was met by the respondents in the unorganized sector. The intake of other food groups was found to be lower than the RDA. The results when analysed statistically, it was seen that the mean intake of cereals, green leafy vegetables, milk and milk products, fats and oils and sugar was significantly lower than the recommended allowances in both organized and unorganized sectors. Significant difference in the intake of

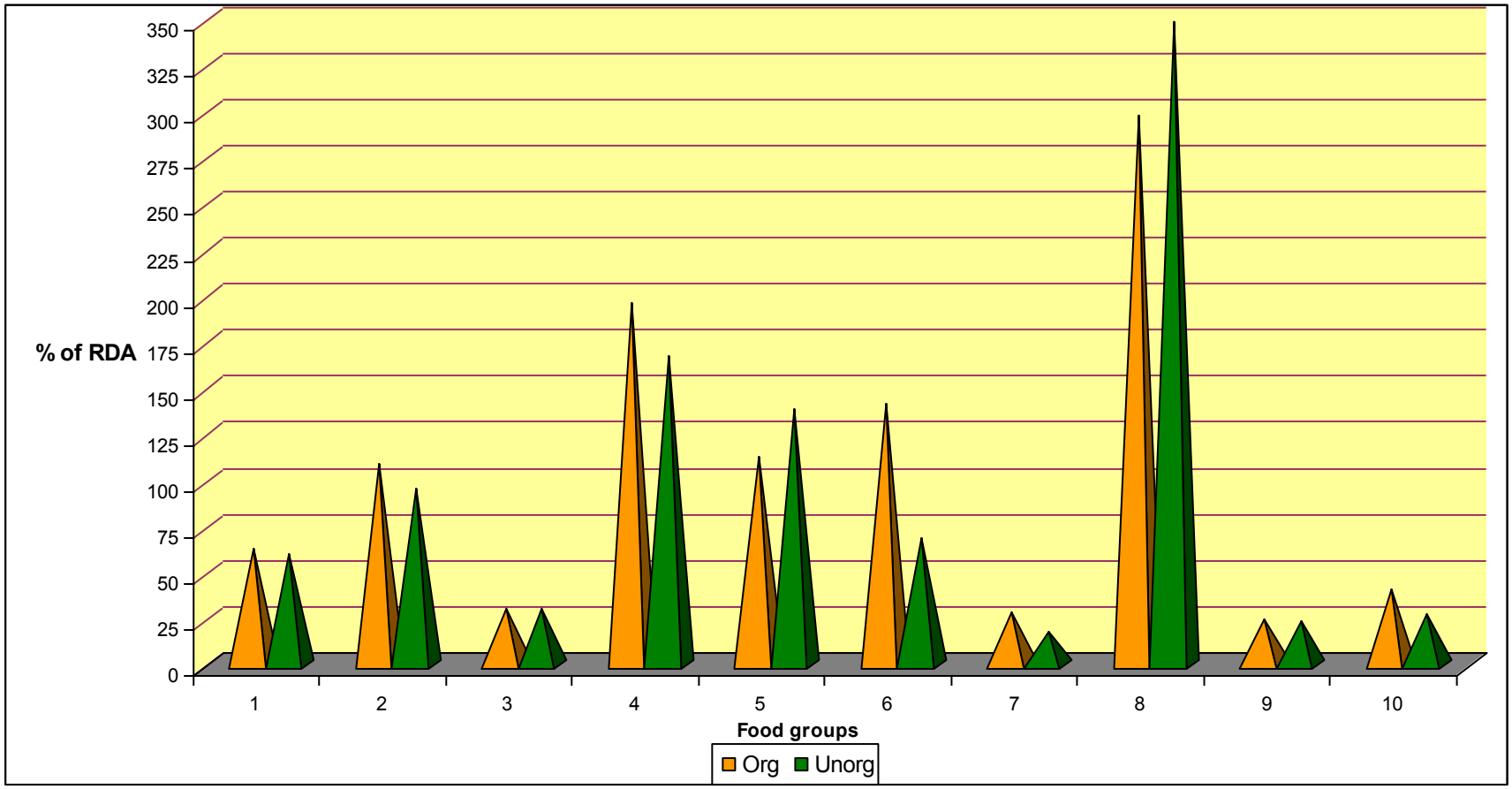
Table 51.Comparison of the mean food intake of respondents in organized and unorganized sectors

Food items	RDA (g)	Organized sector (n=20)			Unorganized sector (n=20)			t value between the groups
		Mean (g) ± SE	% of RDA	t value (compared with RDA)	Mean (g)±SE	% of RDA	t value (compared with RDA)	
Cereals	440	276.54 ± 11.94	62.85	13.68**	265.53 ±12.83	60.34	14.14**	0.64NS
Pulses	25	27.20 ± 5.22	108.8	0.42NS	23.73± 4.52	94.92	0.28NS	0.50NS
Green leafy vegetables	100	30.42 ± 9.80	30.42	7.09**	29.95± 7.93	29.95	8.82**	0.037**
Other vegetables	40	78.47 ±10.02	196.17	3.84**	66.81 ±6.75	167.02	3.96**	0.96NS
Roots and tubers	50	56.25 ± 9.99	112.5	0.62NS	69.29± 11.82	138.58	1.63NS	8.42**
Fruits	30	42.30 ± 7.82	141	1.57NS	20.62± 5.14	68.73	1.82*	2.31**
Milk and milk products	150	42.16 ± 9.30	28.10	11.58**	26.62± 8.56	17.74	14.41**	1.22NS
Flesh foods	30	89.36 ± 11.14	297.86	5.32**	104.54± 10.90	348.46	6.83**	0.97NS
Fats and oils	30	7.19 ± .49	23.96	45.89**	7.10± .49	23.66	46.28**	0.12NS
Sugar	20	8.09 ± .84	40.45	14.04**	5.50± .20	27.5	71.79**	2.97**

** Significant at 1% level * Significant at 5% level

NS Not significant

Figure.2 Comparison of mean food intake of respondents as percentage of RDA



Org-Organized Unorg-Unorganized

1-Cereals 2-Pulses 3-Green leafy vegetables 4-Other vegetables 5-Roots and tubers 6 -Fruits 7-Milk and milk products, 8-Flesh foods 9-Fats and oil 10-sugar

green leafy vegetables, roots and tubers, fruits and sugar was also observed between the respondents of organized and unorganized sectors. The intake of cereals, pulses, other vegetables, milk and milk products, flesh foods and fats and oils were found to be statistically insignificant between the two sectors. The comparison of the food intake of respondents as percentage of RDA is given in Figure 2.

4.4.2.1. 2. Nutrient intake

The nutrients consumed by the respondents were computed from the quantity of the food consumed and compared with the RDA suggested by ICMR (1990) for a woman engaged in moderate activity. The details are furnished in Table 52.

The results indicated that in the organized sector the intake of all nutrients except fat was found to be lower than the RDA. In unorganized sector the intake of proteins and fat was found to be higher than the RDA. More than 75 per cent of RDA of energy, iron, thiamine and niacin was also met by the respondents of both organized and unorganized sectors. The intake of energy, calcium, iron, retinol, riboflavin, niacin and vitamin C was found to be significantly lower than the RDA in both the sectors. The intake of all nutrients among the respondents of organized and unorganized sectors was found to be statistically insignificant. The comparison of the nutrient intake of respondents as percentage of RDA is given in Figure 3.

4.4.3. CLINICAL EXAMINATION

The clinical examination of the respondents (sub sample) indicated different clinical symptoms related to nutritional deficiencies in both organized

Table 52. Comparison of the mean nutrient intake of respondents in organized and unorganized sectors

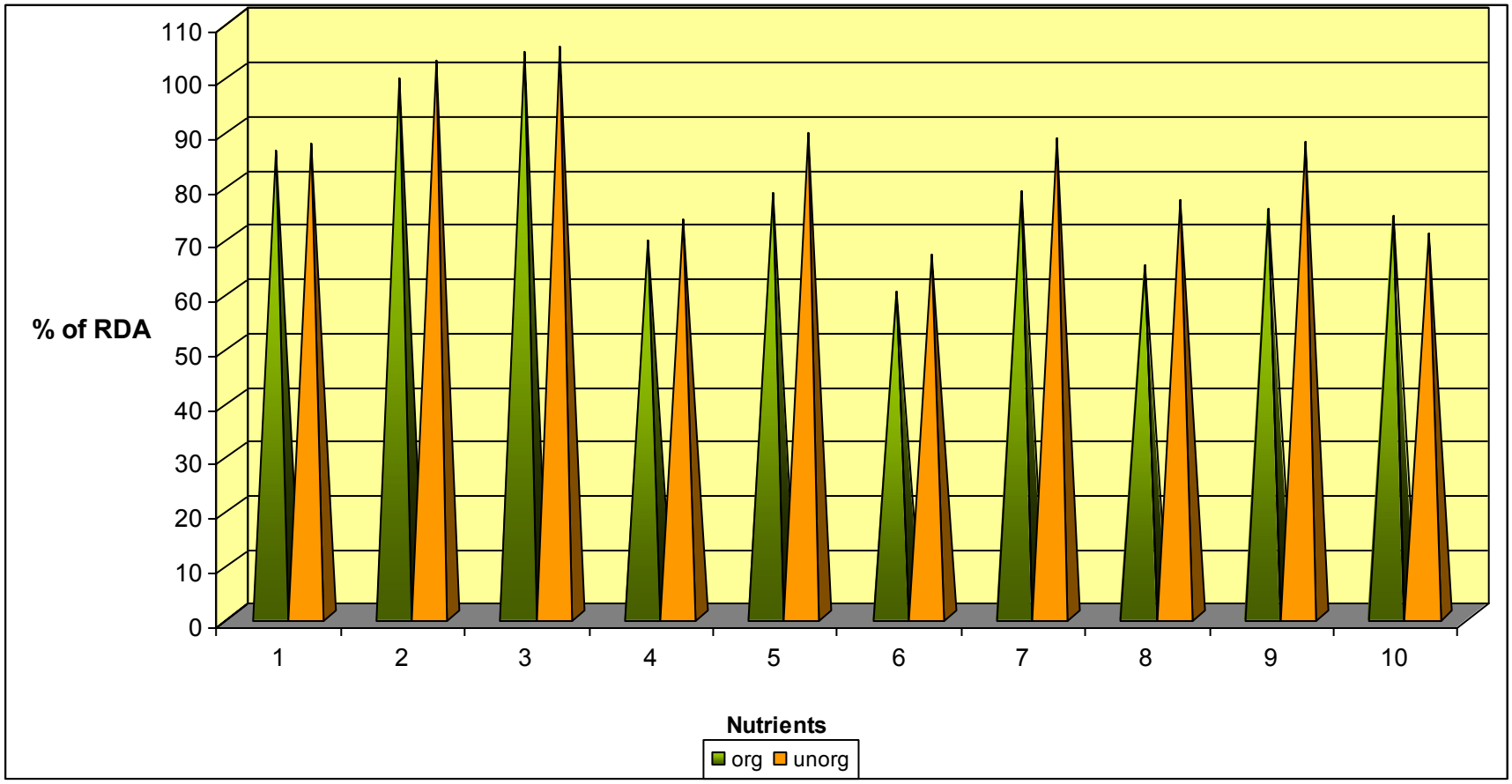
Nutrient	RDA (g)	Organized sector (n=20)			Unorganized sector (n=20)			t value between the groups
		Mean (g) ± SE	% of RDA	t value (compared with RDA)	Mean (g)±SE	% of RDA	t value (compared with RDA)	
Energy(k cal)	2225	1912.61± 55.63	85.96	5.61**	1942.63 ±79.82	87.30	3.53**	0.30NS
Protein (g)	50	49.65 ± 1.95	99.3	0.17NS	51.27± 2.58	102.54	.49NS	0.50NS
Fat (g)	20	20.83 ± .83	104.15	0.99NS	21.0± 1.33	105.02	.75NS	0.11NS
Calcium (mg)	400	276.83 ±9.71	69.20	12.67**	292.93 ±11.15	73.23	9.59**	1.08NS
Iron (mg)	30	23.48 ± 1.35	78.26	4.79**	26.72± 1.62	89.06	2.01*	1.52NS
Retinol (µg)	600	360.16 ± 34.11	60.02	7.02**	400.72± 45.17	66.78	4.41**	0.71NS
Thiamine (mg)	1.1	.862 ± .106	78.36	2.42NS	.97± .125	88.18	0.98*	0.69NS
Riboflavin (mg)	1.3	.846± .097	64.61	4.67**	1.0± .111	76.92	2.66**	1.07NS
Niacin (mg)	14	10.54 ± .65	75.28	5.27**	12.25± .60	87.5	2.86**	1.91NS
Vitamin C (mg)	40	29.51 ± 1.59	73.77	6.56**	28.25± 1.41	70.62	8.30**	0.87NS

** Significant at 1% level

* Significant at 5% level

NS Not significant

Figure.3 Comparison of mean nutrient intake of respondents as percentage of RDA



Org-Organized Unorg-Unorganized

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

and unorganized sectors. The important clinical manifestations observed included conjuntival xerosis (20% and 25%), mild angular stomatitis (30% and 25%), chalky teeth (40% and 45%) and dental carries (15% and 35 %), loss of luster in hair (25% and 30%), oedema on dependent parts (10% and 30%), and magenta coloured tongue (10% and 15%) among the respondents of the organized and unorganized sectors. The details are presented in Table 53.

4.4.4 BOCHEMICAL ESTIMATION OF BLOOD

The blood haemoglobin was estimated among the respondents (sub sample) and the haemoglobin values were compared with the standard values for adult non pregnant women suggested by WHO as given in Gopaldas and Seshadri (1987). The distribution of respondents on the basis of haemoglobin values are given in Table 54.

From Table 54 it is evident that 20 per cent and 25 per cent of respondents in organized and unorganized sectors respectively had haemoglobin value lower than 10g/100 ml. About 30 per cent and 15 per cent of respondents from organized and unorganized sectors had normal haemoglobin level of more than 12g/dl. Nearly 50 per cent of respondents in organized sector and 60 per cent in unorganized sector had haemoglobin level in between 10 to 11.9g/100 ml of blood. The comparison of the haemoglobin level of respondents in organized and unorganized sectors are given in Figure 4.

Table 53. Clinical manifestation observed among respondents

Sl No	Clinical details	Number of respondents	
		Organized (n=20)	Unorganized (n=20)
1	**Eyes**		
	a) Xerosis		
	Lack of luster	3 (15)	4 (20)
	Conjuntiva dry and wrinkled	1 (5)	1 (5)
	b) Pigmentation		
	Slight discolouration	1 (5)	5 (25)
	Excoriation	-	2 (10)
	Folliculosis	1 (5)	-
2	**Lips**		
	Angular stomatitis, mild	6 (30)	5 (25)
3	**Buccual mucosa**		
	Gingivitis	-	1 (5)
4	**Teeth**		
	Chalky teeth	8 (40)	9 (45)
	Carries	3 (15)	7 (35)
5	**Hair**		
	Loss of luster	5 (25)	6 (30)
6	**Skin**		
	a) Loss of luster	-	6 (30)
	b) Dry and rough or crazy pavement	1 (5)	1 (5)
	c) Hyperkeratosis, Phyrnoderma	2 (10)	1 (5)
7	**Face**		
	a) Nasolabial seborrhea	1 (5)	3 (15)
	b) Symmetrical suborbit pigmentation	-	1 (5)
8	**Oedema on dependent parts**	2 (10)	6 (30)
9	**Nervous system**		
	Calf tenderness	1 (5)	3 (15)
10	**Tongue**		
	a)Pale but coated	2 (10)	3 (15)
	b)Magenta	2 (10)	3 (15)
11	**Surface**		
	Fissured	2 (10)	-

(Figures in parenthesis are percentages)

Table 54. Distribution of respondents on the basis of haemoglobin level

Hb level (g/dl)	Number of respondents	
	Organized(n=60)	Unorganized (n=60)
<10	4 (20)	5 (25)
10-11.9	10 (50)	12 (60)
>12	6 (30)	3 (15)
Total	20 (100)	20 (100)

't value between the sectors=.053 NS

(Figures in parenthesis are percentages)

To find out the severity of anaemia, the respondents who had haemoglobin level lower than 12 g/100 ml were categorized into different grades of anaemia as suggested by WHO (1968).

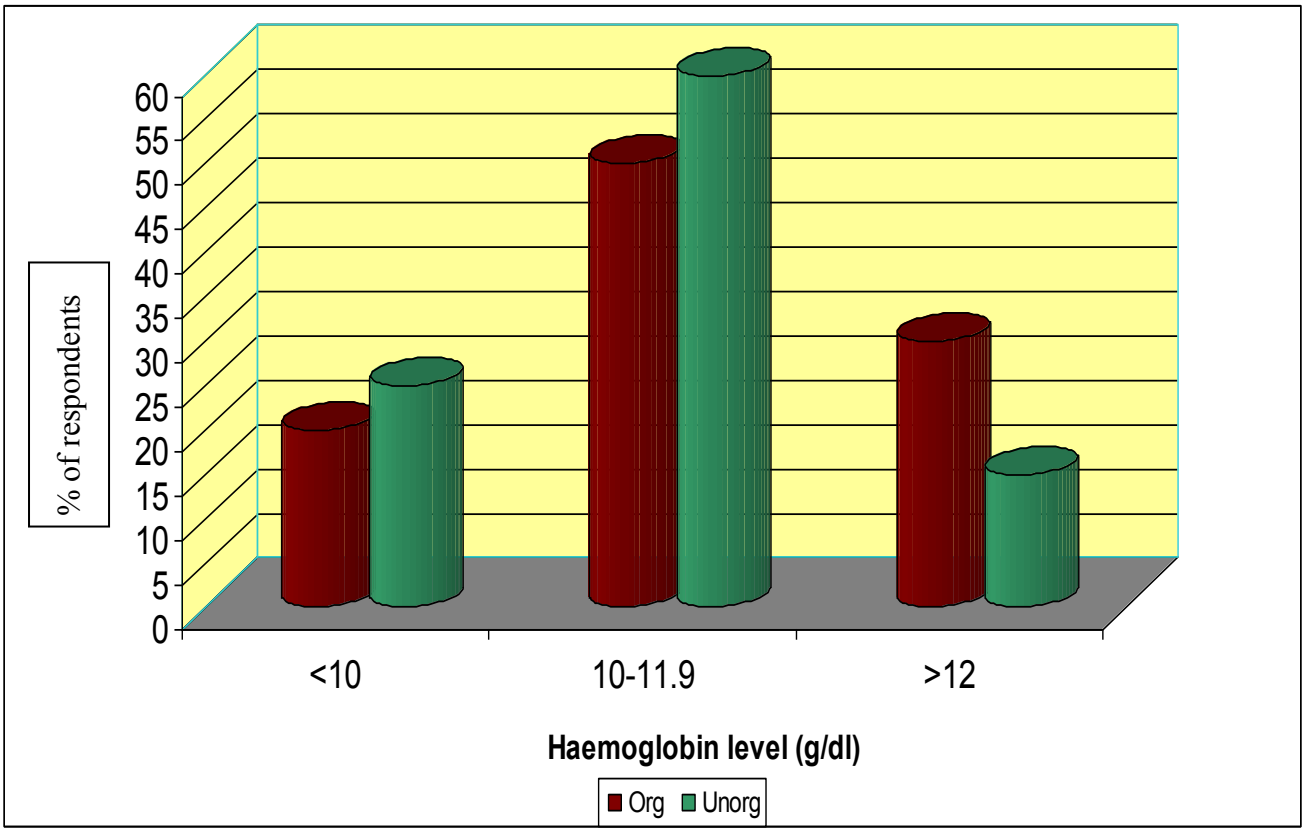
Table 55. Severity of anemia among respondents

Grades of anaemia	Haemoglobin level (g/dl)	Number of respondents	
		Organized (n=14)	Unorganized (n=17)
Severe	<7	0	0
Moderate	7-10	4 (28.57)	5 (29.41)
Mild	10-11.9	10 (71.43)	12 (70.59)

(Figures in parenthesis are percentages)

It was observed that 71.43 per cent of respondents in organized sector and 70.59 per cent of respondents in unorganized sector had mild anaemia and 28.57 per cent and 29.41 per cent respondents in organized and unorganized sectors respectively were found to have moderate anaemia.

Figure 4. Comparison of the haemoglobin level of respondents



Org-Organized
Unorg-Unorganized

4.6. ENERGY EXPENDITURE PATTERN AND ENERGY BALANCE OF RESPONDENTS

Details about the daily energy intake and energy expenditure of the respondents (sub sample) are presented in Table 56 & 57. The energy intake of the respondents in organized sector varied from 1127 to 1959 kilo calories and the energy expenditure varied from 1905 kilo calories to 2506 kilo calories. Negative energy balance was observed among all the respondents in organized sector. In the unorganized sector the energy intake varied from 1101 to 2060 kilo calories and energy expenditure varied 2038 to 2459 kilo calories. All respondents had negative energy balance.

The women labourers were classified based upon the difference between energy intake and energy expenditure. The details are given in (Table 58). The maximum difference of 900-1200 kilo calories was observed among 10 per cent of respondents in both organized and unorganized sectors. Difference of 600-900 was observed among 30 per cent and 20 per cent of respondents in organized and unorganized sectors respectively and difference of 300-600 was observed among 55 per cent of respondents in organized sector and 45 per cent of respondents in unorganized sector.

Table 56. Comparison of the energy intake and expenditure pattern of respondents in organized sector (n=20)

Sl No	Age (year)	Weight (Kg)	Energy intake (Kilo calorie/day)	Energy expenditure (Kilo calorie/day)	Difference
1	33	47	1661	2238	-577
2	28	60	1678	2490	-812
3	50	42	1673	2159	-486
4	42	49	1843	2269	-426
5	47	52	1127	2317	-1190
6	38	55	1823	2364	-541
7	29	60	1844	2490	-646
8	20	53	1928	2304	-376
9	42	44	1716	2191	-475
10	28	60	1842	2490	-648
11	48	57	1625	2396	-771
12	44	60	1959	2443	-484
13	45	64	1901	2506	-605
14	52	38	1800	2096	-296
15	23	44	1673	2065	-392
16	36	43	1844	2175	-331
17	38	56	1346	2380	-1034
18	42	51	1625	2301	-676
19	23	38	1428	1905	-477
20	26	50	1916	2224	-308

Table 57. Comparison of the energy intake and expenditure pattern of respondents in unorganized sector (n=20)

Sl No	Age (year)	Weight (Kg)	Energy intake (Kilo calorie/day)	Energy expenditure (kilo calorie/day)	Difference
1	46	44	1409	2191	-782
2	52	42	1240	2159	-919
3	51	40	1897	2128	-231
4	47	46	1742	2222	-480
5	43	56	2060	2380	-320
6	23	43	1101	2038	-937
7	32	56	1525	2380	-855
8	40	58	1601	2411	-810
9	48	42	1745	2159	-414
10	38	54	1840	2096	-256
11	52	50	1765	2285	-520
12	44	52	1475	2317	-842
13	44	48	1862	2254	-392
14	32	45	2028	2206	-178
15	54	49	1949	2269	-320
16	42	49	1944	2269	-325
17	37	44	1943	2191	-248
18	48	61	2042	2459	-417
19	46	38	1959	2096	-137
20	54	40	1625	2128	-503

Table 58. Classification according to difference of daily energy intake from daily energy expenditure

Difference of energy intake from energy expenditure (Kilo calories)	Number of respondents	
	Organized (n=20)	Unorganized (n=20)
900-1200	2(10)	2(10)
600-900	6(30)	4(20)
300-600	11(55)	9(45)
0-300	1(5)	5(25)
Total	20(100)	20(100)

Discussion

5. DISCUSSION

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

1. Socio-economic profile of the families of coir workers
2. Food consumption pattern of the families of coir workers
3. Details of respondents in coir sector and their working pattern and occupational hazards
4. Nutritional profile of women in coir sector
5. Energy expenditure pattern and energy balance of women coir workers

5.1. SOCIO-ECONOMIC PROFILE OF THE FAMILIES OF COIR WORKERS

Socio-economic conditions of the families are considered as the most important factors influencing the nutritional status of the family members. Poor socio-economic conditions are the root causes for most of the nutritional problems observed in our country. Better socio-economic status of women will lead to better literacy, better work participation and greater independence within and outside the family. The socio-economic profile of the coir workers engaged in organized and unorganized sectors ascertained in this study indicated that majority of the families in both sectors belonged to the Hindu community. Ranganathan (1996) among coir workers in Trivandrum district also indicated predominance of Hindu community among the population. Various studies conducted in Thrissur district and Trivandrum district among the labour families by Sujatha (1990), Karuna (1993) Augustine (1993), Smitha (1999) and Lawrence (2003) also indicated the predominance of Hindu community.

According to Government of India (1981) the caste system is reported to be responsible for perpetuating poverty in rural areas. The caste system of the families in the present study when analyzed, it was observed that nearly 72 per cent of the families belonged to the backward communities mainly the Ezhava community. A study conducted among the coir workers in Kerala by Mathew and Nair (1986) also reported that ⅔rd of the women coir workers belonged to the backward communities. Kannan (1986) also reported that 80 per cent of the workers in the coir factories of Kerala came from Ezhava community. Ranganathan (1996) also indicated that 86 per cent of the families of coir workers belonged to backward communities. Issac (1990) remarked that it was women of the Ezhava caste and to a lesser extent Muslims, Latin Catholic, and Cheruma communities who took to the coir as their chief vocation. However, Jayasree (1994) observed that only 30.67 per cent of the coir workers belonged to the Ezhava community followed by Nair (23.83%) and Scheduled Caste (20.17%).

The results of the present study indicated that nuclear type families were more popular among the households of coir workers. The results of the present study reveals the social trend universally observed, where there is fading of joint family system, which was brought due to urbanization and changes in social values. Studies conducted in Andhra Pradesh by Rajagopal (1993) and in Kerala by Shah and Rathore (1993), Udaya (1996), Ranganathan (1996), Smitha (1999) and Jyothi (2003) also indicated the predominance of nuclear type families among the women labourers. As revealed in the present study, Lawrence (2003) also indicated higher percentage of nuclear type families in the organized and unorganized sectors of agricultural labourer households. In a nuclear family system the per capita availability of food and other resources will be higher than in the joint family and hence the nuclear family system observed among the families of coir workers might influence the nutritional status of the family members favourably.

The family size when analyzed, it was observed that 67 per cent and 62 per cent of the families in the organized and unorganized sectors had 4-6 members and the rest had 1-3 members. Thus, almost all families in the present study can be categorized under the small family system. The average family size was found to be 3.88 in organized and 3.65 in unorganized sector. The study conducted among the households of coir workers in Alleppey district by Sunil (1986) indicated an average family size of five among the families. Rajagopal (1993) also found that majority of the families of coir workers in Andhra Pradesh had 4-5 members.

One of the important reasons for the small family size of coir workers might be due to the nuclear family system observed among the households. The nuclear family system as well as the small family norm observed in the present study will have a direct influence on the per capita income and percapita availability of food and these in turn will have a direct and favourable impact on the nutritional status of the family members.

Male headed households outnumbered the female headed households in both sectors. Nearly 87-90 per cent of the households were found to be male headed. Ranganathan (1996) also observed more number of male headed families among the coir workers.

Age and sex based distribution of the family members in the present study indicated that among the total population 12 per cent and 9 per cent in the organized and unorganized sectors respectively had child population in the age group of 0-10 years. The child population was found to be low when compared to adults. A similar trend was reported by Kerala Statistical Institute (1992) in their survey where they observed a decrease in the percentage of population in the younger age group and an increase in the population in the older age group of 60 and above in Kerala. This trend observed among the coir workers households with respect to the child population is a favourable social phenomena, since children in

the family demand more time, attention and better food than adults and economically they are depended on adults.

Kerala is a state, which represent different spectrum as far as sex ratio is concerned. Among the different states in India, Kerala has the highest sex ratio with 1058 females for 1000 males and is a solitary exception while in all other states and in Union Territories the sex ratio is adverse for women. The sex ratio of India according to the 2001 census was found to be 933. In the present study also the sex ratio of coir workers households was found to be 1337 in organized sector and 1118 in unorganized sector, which was similar to the general trend of sex ratio in Kerala. In contrast to the present observation, Ranganathan (1996) observed a sex ratio of 956 among the households of coir workers in Trivandrum District which was favourable to males.

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 majority of the male and female members in the organized and unorganized sectors were literate. More percentage of female members in both organized and unorganized sectors had attained college level of education. Lawrence (2003) in a study conducted among the women agricultural labourers indicated better education among female members than their male counter parts in the organized sector while in the unorganized sector male members were found to be more literate. Various studies conducted by Augustine (1993), Shyna (1996), Mathen (1998), Anil *et al.,*(2001) and Jyothi (2003) also indicated higher percentage of literacy among the male members.

The occupational status of the family members is an important factor influencing the health and nutritional status (Reddy *et al.,* 1993). In the present study, it was seen that in both sectors employed members outnumbered the

unemployed members. The high level of employment will have a favorable impact on the nutritional status of the family members since it has a direct influence on income and purchasing power. The distribution of family members by sex and occupational status indicated that among the employed members male members dominated the female members except in the case of coir workers. The increased number of male breadwinners would in turn increase the purchasing power of families leading to better nutritional status of family members. Ranganathan (1996) also observed domination of male employed members in the households of coir workers. Among the family members, 65 per cent and 68 per cent of female members in organized and unorganized sectors respectively were engaged in coir related work. Apart from the female respondents selected for the study none of the female members in the organized sector were involved in coir related work. Ranganathan (1996) observed that 79 per cent of the employed members of the families of coir workers were involved in coir related work and 21 per cent in other occupation. Thus, the result of the present study with respect to occupational status of family members indicates the present trend of taking up other occupations by the family members of coir workers.

Family income is one of the important factors contributing to the economic status of the family. About 65 per cent of the families in organized sector and 53 per cent in unorganized sector had a monthly income in the range of Rs 2001 to Rs 5000. Ranganathan (1996) in a study conducted among coir workers of Thiruvanathapuram district indicated a monthly income in between Rs 1001 to 2000 among 69 per cent of the families and only one family had an income of above Rs 3000 per month. Various studies conducted by Karuna (1993), Smitha (1999), Lawrence (2003) and Jyothi (2003) in unorganized sector also indicated a monthly income of less than Rs 3000 among majority of the families. The decrease in the total monthly income earned by the families of the unorganized sector may be due to less work they get from the coir societies/coir industries.

Land is one of the chief determinants of resource position. The present study indicated that all families in both organized and unorganized sectors possessed land and most of them inherited the land from their ancestors. It was also found that in more than 90 per cent of the families male members managed the land and in 88 per cent of the families in organized sector and 83 per cent in unorganized sector the ownership of the land was in the name of male members of the family. Only 11.67 per cent of the families in organized sector and 16.67 per cent in unorganized sector, the land was owned by female members of the family.

Though, all the households had land as their own, only very few families in both sectors cultivated different crops and among the families who cultivated crops only 50 per cent of the families in organized sector received income from the land. Among agricultural labourer families also, Smitha (1999), Jyothi (2003), and Lawrence (2003) observed that majority though possessed land as their own did not cultivate any crop.

Possession of cattle, poultry, kitchen garden and use of home produce are positively linked with the nutritional status of the family (Immink *et al.,* 1981). From the study it was observed that only 6.66 per cent of the families in the unorganized sector possessed domestic animals like goat and duck and none of the families in organized sector had domestic animals. None of the families in unorganized sector had kitchen garden in their house. Though, the government is giving greater emphasis for kitchen garden in the households, so as to achieve nutritional security, only very few households (3.33%) that also in the organized sector had kitchen garden. Similar reports with respect to domestication of animals and kitchen garden were given by Smitha (1999) and Lawrence (2003). Contradictory to the present finding Udaya (1996) reported that about 78 per cent of the farm families possessed domestic animals and received income from animals.

All the families in organized and unorganized sectors used to borrow money from their neighbours and private money lenders so as to meet their day to day needs. It was also seen that about 18 per cent of families in organized sector and 16.67 per cent in unorganized sector had taken loan for house construction, marriage purpose, for business and for the purchase of vehicle and the amount varied from Rs 10,000 to Rs one lakh. Studies conducted by Smitha (1999), Jyothi (2003) and Lawrence (2003) also indicated indebtedness among the families of labourers.

Majority of the families in both the sectors did not have the habit of saving money for future purpose. Lawrence (2003) also indicated that majority of the agricultural labourers did not save money. However, studies conducted by Cherian (1992), Shyna (1996) and Smitha (1999) among the farm families and agricultural labourer households of Kerala reported that majority of the families saved money to meet their future necessities.

Monthly expenditure pattern of the families indicated that about 76.67 per cent and 48.34 per cent of the families in the organized and unorganized sectors respectively spent 40-55 per cent of their income for food. In the unorganized sector 36.66 per cent of the families spent above 55 per cent of their income for food while in organized sector it was only 18.33 per cent. Jyothi (2003) also observed a similar finding among the households of labourers involved in rice cultivation in Palakkad district, where about 54.17 per cent of the families spent 50-70 per cent of their monthly income on food. In contrast to the present finding studies by Murthy *et al.,*(1993) and Devadas and Easwaran (1986) indicated that the rural households of Hyderabad and Tamil Nadu spent nearly 84 per cent and 94 per cent of the monthly income respectively on food. Studies conducted by Augustine (1993) and Karuna (1993) among labourers of unorganized sector also indicated that families spent 65-75 per cent of monthly income on food.

Majority of the families in organized and unorganized sectors spent less than 10 per cent of their income for clothing, shelter and transportation. Studies conducted by Jose (1998) also observed that majority of the families of casual labourers spent less than 10 per cent of their income on clothing, shelter and transportation.

The results of the housing conditions revealed that all the families in organized sector and 96.67 per cent in unorganized sector had their own house which are single storeyed with brick walls and with separate kitchen and proper lavatory and electricity facilities. Sixty seven to seventy five per cent of the houses used tiles as the roofing material and the rest of the houses were terraced. Most of the houses had 3-4 rooms with open drainage facilities. Closed drainage facilities were observed only among 15 per cent of the houses in organized sector and 6.67 per cent in unorganized sector. Thus, the drainage facilities in the houses were found to be unsatisfactory. Ranganathan also observed similar type of housing conditions among coir workers. Sujatha (1990), Jose (1998), Smitha (1999) and Jyothi (2003) also reported similar housing conditions among the households of unorganized sectors in Kerala. Most of the houses used their own well as the main source of drinking water. Udaya (1996) and Smitha (1999) also observed similar findings. However, Sujatha (1990), Usha *et al*. (1990), Ranganathan (1996) and Jyothi (2003) observed that the households of different unorganized sectors of Kerala depended on public wells and taps as their source of drinking water. In the present study also nearly 30 per cent in organized sector and 38 per cent in unorganized sector depended on public tap as the source of drinking water.

Recreational facilities were present in majority of households in both sectors. Udaya (1996), Shyna (1996), Smitha (1999), Jyothi (2003) and Lawrence (2003) also observed the same result. However, the findings of Jose (1998) were found to be contradictory to the present finding in which the author observed fewer recreational facilities among the casual labourer households.

Majority of the families surveyed used wood, LPG and kerosene as the major sources of fuel for household purpose. Contrary to this report, Smitha (1999), Jyothi (2003) and Lawrence (2003) reported wood as the major source of fuel among the households of agricultural labourers.

Regarding the local health care facilities it was observed that 45 per cent and 56.67 per cent of the families in organized and unorganized sectors respectively depended mainly on the primary health center and 40 per cent in organized sector depended on ESI hospital for medical facilities. Shyna (1996), Smitha (1999), Jyothi (2003) and Lawrence (2003) in their studies among the labourer households also observed that majority of the families depended on the local primary health centre for immediate medical care.

Chikungunia was found to be the most important epidemic prevalent in the locality during the previous year and it was also seen that the family members of about 63 to 65 per cent of the families included in the present study suffered from this disease.

5.2 FOOD CONSUMPTION PATTERN OF THE FAMILIES

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 and regional levels (Thimmayamma and Rau, 1996). The present study revealed that all families in both sectors were non- vegetarians. Similar findings were reported by Sujatha (1990), Karuna (1993) and Ranganathan (1996) in Thiruvanathapuram district and Udaya (1996), Mathen (1998), Jose (1998), Smitha (1999) and Lawrence (2003) in Thrissur district and Jyothi (2003) in Palakkad district among the families of different unorganized sectors.

Food expenditure is an important factor influencing the dietary habits. Food expenditure pattern of the families revealed that in both the sectors maximum amount was spent on cereals. Similar findings were reported by Sujatha (1990), Jayanthakumari (1993), Ranganathan (1996), Jose (1998), Smitha (1999), Jyothi (2003) and Lawrence (2003) among different labour categories of Kerala.

Majority of the families in both the sectors spent less than 10 per cent of the total food expenditure for the purchase of pulses, green leafy vegetables, fruits, egg, sugar and spices and condiments. This is in line with the findings of Lawrence (2003) among the agricultural labourers of Thrissur district.

It was also seen that 81.67 per cent of families in organized sector and 61.67 per cent of families in unorganized sector spent 5-15 per cent of their monthly income for the purchase of fish. Lawrence (2003) also indicated that majority of the agricultural labourers in organized and unorganized sectors spent upto 15 per cent of their monthly income for the purchase of fish. Contrary to this finding, Jyothi (2003) in her study among women labourers involved in rice cultivation revealed that though all the families were non vegetarians the money spent for the purchase of meat, fish and egg among 90 per cent of the families was less than 5 per cent of their monthly income.

Regarding the purchase of food items it was seen that 70 per cent and 85 per cent of the families in organized and unorganized sectors respectively purchased food items like rice, wheat and atta from PDS and nearby shops on weekly basis. Eighty five per cent in organized sector and all families in unorganized sector purchased cereals once in a week. Contrary to this, Lawrence (2003) indicated that the agricultural labourer families in the organized sector purchased most of the food items in bulk on monthly basis due to their fixed monthly income while in the unorganized sector most of the families purchased different food items including cereals and pulses either daily or weekly. In the present study also, the labourers working in the coir industry in both organized

and unorganized sectors used to get their wages once in a week and this may be the reason for the purchase of main food items on weekly basis.

The economic status of the families and local availability of food items are the two important factors which influence the frequency of use of various food items in the diet. The frequency score with respect to the use of foods revealed that most frequently used food items were cereals, other vegetables, fats and oils, sugar, spices and condiments and fish in both organized and unorganized sectors. However, the families in the organized sector included milk and milk products and unorganized sector included pulses and meat also as the most frequently used food items. Contrary to the present finding, Lawrence (2003) in her study among agricultural labourers found pulses as the most frequently used food item along with cereals, other vegetables, milk and milk products, fats and oils, sugar, and spices and condiments in the organized sector. Almost similar dietary pattern among different categories of labour households was reported by Augustine (1993), Seshadrinath (1993), Ranganathan (1996), Jose (1998), Smitha (1999) and Jyothi (2003). Though, milk and milk products was used less frequently by the households of unorganized sector they tried to supplement the diet with other protein rich food stuffs like meat, fish and pulses.

Advance meal planning helps in better organization and faster completion of household activities. Majority of the families in both the sectors planned their meals in advance and consumed and followed three meal a day pattern and adopted specific time schedule for taking meals. Similar findings were observed by Cherian (1992), Jayanthakumari (1993), Karuna (1993), Udaya (1996), Smitha (1999), Rahman and Rao (2001), and Lawrence (2003). However, Jyothi (2003) indicated that majority of the agricultural labourer families in Palakkad district did not plan their meals in advance and did not maintain a routine time schedule for consuming meals. The routine time schedule adopted by all the respondents of organized sector may be due to the specific intervals they used to get in between their work during morning, noon and afternoon. Ranganathan (1996) also

observed a routine time schedule for consuming meals among the coir workers of Thiruvanathapuram district.

Majority of the families in both the sectors did not have the habit of consuming raw vegetables. In accordance to this Udaya (1996), Smitha (1999), Jyothi (2003) and Lawrence (2003) also observed that the labourer house holds did not include raw food items in their daily diet. All the families in both sectors indicated that they used boiled water for drinking purpose. In contrast to this Ranganathan (1996), Udaya (1996), Smitha (1999) and Jyothi (2003) reported that majority did not have the habit of drinking boiled water.

Most common storage method adopted by the families was drying and storing in tight containers for cereals and pulses. This is in line with the results obtained by Cherian (1992), Udaya (1996), Smitha (1999), Jyothi (2003) and Lawrence (2003) among the farm families and agricultural labourers. Though, food preservation in large scale was not practiced by majority of the families in both sectors about 73 per cent and 62 per cent of the families in organized and unorganized sectors respectively prepared mango, lime and amla pickles. Studies conducted by Jyothi (2003) and Lawrence (2003) also observed salting and pickling as the most common preservation methods adopted by agricultural labourer families.

Majority of the families in both sectors gave equal importance to male and female members with regard to food distribution. It was seen that 20-27 per cent of the families gave importance to male members of the family in giving meals. Various studies conducted among the labourer families in Thrissur district by Shyna (1996), Jose (1998), Smitha (1999), and Jyothi (2003) also indicated that the families gave equal importance to all family members with regard to food distribution. Contrary to the present finding Usha *et al.,* (1990), Seshadrinath (1993) and Udaya (1996) indicated that the families gave priority to male members in food distribution.

The present study indicated that the families did not include any special food items in their diet during pregnancy. However, the respondents indicated that all of them avoided papaya and pineapple during pregnancy. During diseased conditions also the respondents avoided non vegetarian and fried food items and included semi-solid foods. Almost similar observations were reported among the families of farm women (Udaya 1996), casual labourers (Jose 1998) and agricultural labourers Jyothi (2003) and Lawrence (2003) of Thrissur District.

5.3. DETAILS OF RESPONDENTS IN COIR SECTOR AND THEIR WORKING PATTERN AND OCCUPATIONAL HAZARDS

Age, being a vital factor, was taken into consideration since a number of socio-economic factors and certain health and nutrition related characteristics are dependent on the respondent's age. According to Jayasree (1994) for those who are working in the unorganized sector there is no upper age or lower age limit for women. In the present study, the respondents were between the age group of 23 to 55 years. Among this itself 36.67 per cent in organized sector and 61.66 per cent in unorganized sector were in the age group of 40 to 55 years. This indicates that there is no age specification pertaining to women who took up the activities related to coir work. Ranganathan (1996) who conducted a study among coir workers in Thiruvanathapuram district observed that women in the age group of 16 to 51 years worked in coir sector. Bajaj (1999) also reported similar findings among coir workers. Contrary to this, Rammohan and Sundersan (2003) indicated that most of the women workers in coir industry were in the age group of above 45 years.

Next to age, the marital status plays an important role with respect to the socio-economic differentiation women have to face. From the data in the present study, it is clear that an overwhelming majority of the respondents were married. The result of the present study is similar to the observations reported by other

workers in the same field (Jayasree (1994), Ranganathan (1996) and Bajaj (1999)).

Literacy is an important variable determining personality achievement, career and social status. Among the female respondents selected for the study, illiteracy was found only among 18 per cent of the respondents in unorganized sector. All the respondents in the organized sector were found to be literate and among them 50 per cent had attained high school level of education. Women's education is hypothesized to exert a major influence on health and nutritional status. Even though poverty restricts food availability, proper education of the mothers would improve the nutritional status and health of the family members. Ranganathan (1996) in her study revealed that 24 per cent of the respondents in the coir sector were illiterate.

Regarding the food consumption pattern at the work site it was seen that 90 per cent of respondents in organized sector took packed food to the worksite while in the unorganized sector 73.33 per cent of the families did not take food to the work site. The difference observed may be due to the easy access to the worksite among the respondents working in the unorganized sector.

The position of Indian women in the unorganized sector is characterized by increasing concentration of the work force with no job security, ardous working condition and low wages.

In the present study, the working pattern of the respondents was observed by number of days of work, working time, wage, tenure of payment, leave facilities, medical benefits, festival allowance, working days during different season, type of work involved, place of work, facilities in the work area and implements used. Time expenditure pattern, social participation, morbidity pattern and occupational hazards of respondents were also taken into account.

Majority of the respondents (60%) in the unorganized sector used to get work for 3 to 5 days in a week whereas in the organized sector all the respondents used to get work for the whole week except Sundays. Lack of work in the field is the main reason for the decrease in the working days among unorganized sector. Contrary to this finding Augustine (1993), Batliwala (1998) and Jyothi (2003) reported that women in the unorganized sectors worked almost six days in a week.

Variation in the working time was also observed in the two sectors in which the respondents in the organized sector worked for 7 ½ hours while in the unorganized sector no specific time schedule for work and interval was adopted by the respondents. Ranganathan (1996) also observed similar working time among coir workers. Bajaj (1999) observed that majority of women in the coir sector worked for 4 to 6 hours daily and few of them worked beyond 8 hours also. However, Jayasree (1994) indicated that coir workers in coir units worked for more than ten hours per day in addition to their household duties.

Wide disparity in the wages was observed among the respondents of the organized and unorganized sectors. All respondents in both sectors used to get their wages at the end of the week. Majority in the organized sector used to get Rs 300 to 400 as their weekly wage while in the unorganized sector the wage varied from Rs 200 to 300 per week. Rajalakshmi (2006) also reported similar findings among coir workers. Bajaj (1999) observed that about 77 per cent of coir workers earned an income as low as Rs 1000/- month.

Though, all respondents of organized sector were entitled with medical leave and 73.33 per cent with medical benefits, the respondents of unorganized sector neither received any medical leave nor medical benefits. All respondents in the organized sector received an amount of Rs 1500 to 2500 as festival allowance annually and in the unorganized sector 90 per cent of respondents received an amount in the range of Rs 500 to 1500 as festival allowance.

Seasonal variation in the working days was noticed only among unorganized sector in which during monsoon season they used to get work for 5 to10 days in a month. Since, all the respondents in the organized sector, were permanent employees, no variation in the working days was noticed during different seasons. Ranganathan (1996) also observed that during May to September the coir workers did not get work due to heavy rains.

Wide variation in the type of work undertaken by the respondents of organized and unorganized sectors was also observed. About 60 per cent of the respondents in unorganized sector were involved in coir spooling while in organized sector only 16.67 per cent of the respondents were involved in coir spooling. Ranganathan (1996), Jayasree (1994) and Rammohan and Sundersan (2003) indicated that majority of the women workers in coir sector were involved in spinning and husk beating sectors.

All the respondents in the organized sector and 78.33 per cent of respondents in unorganized sector indicated about proper lavatory facilities and resting place in the working area. Jayasree (1994) indicated that the coir workers of Trivandrum were not provided with even basic amenities like drinking water, shade, resting place and lavatory facilities. Ranganathan (1996) observed that though shade and resting place were available for the coir workers they were not provided with toilet facilities.

About 90 per cent of respondents in unorganized sector indicated that they use charka, handspun, pamparam, needle and tape as the implements for their work in the coir sector. In organized sector none of the respondents used charka and needle/tape for their work. Apart from handspun and pamparam they also used tailoring machine, scissors, dispensers, paint/stenciling board etc for doing their work.

Occupational hazards among the respondents indicated that majority had occupational diseases like asthma, allergy, skin lesions and body ache. Similar findings were reported by Nair (1997) and Rammohan and Sundersan (2003) and Nair (2007) among coir workers. Chikungunia was the most important epidemic observed among coir workers during 2007. About 53.33 per cent of respondents in organized sector and 65 per cent of respondents in unorganized sector respectively suffered from chikungunia.

Though occupation related diseases were observed only among 71.66 per cent and 78.33 per cent of coir workers selected for the study, the detailed checkup conducted by the physician among the sub sample indicated occupational hazards among all respondents in both sectors.

The social participation of the respondents indicated that majority of the families in both the sectors were members of Ayalkootam, Kudumbasree or Mahila Samajam and attended the meetings regularly.

5.4. NUTRITIONAL STATUS OF THE RESPONDENTS

To determine the nutritional status of the respondents anthropometry, actual food and nutrient intake, clinical examination and biochemical estimation of blood for haemoglobin were reckoned as the major determinants of nutritional status of women workers engaged in coir sector.

Weight for age is the most sensitive index to evaluate the current nutritional status. In the present study the body weight of 51.67 per cent and 48.34 per cent of the respondents in organized and unorganized sectors respectively were found to be lower than the reference body weight of 50 kg suggested for an Indian reference woman. Only 8.33 per cent of respondents in the unorganized sector was found to be having a normal body weight of 50 kg. None of the respondents in the organized sector had a normal body weight of 50 kg. Lawrence (2003) also

indicated a lower body weight among 43.33 per cent of agricultural labourers in the organized and 51.67 per cent in unorganized sectors. Contrary to the present finding the study of Lawrence (2003) indicated lower body weight among more percentage of women in the unorganized sector.

Height is an indicator of long term nutritional status. In the present study the height of 55 per cent of the respondents in organized sector and 50 per cent in unorganized sector was found to be lower than the reference height suggested by Indian reference woman. Karuna and Prema (1993) also indicated lower body height among women engaged in fish vending.

The weight and height of the respondents in the organized and unorganized sectors were found to be statistically insignificant. However, Lawrence (2003) observed significant variation in the weight of the agricultural labourers working in organized and unorganized sectors.

Body mass index (BMI) describes the CED among adults and is an important indicator of current nutritional status. The BMI of the respondents in the present study revealed that about 58.33 per cent of respondents in organized sector and 51.67 per cent in unorganized sector were having normal nutritional status with a BMI in between 18.5 to 22.9. Ranganathan (1996) also indicated normal nutritional status on the basis of BMI among 40 per cent of the coir workers in Thiruvanathapuram district. Lawrence (2003) indicated normal nutritional status on the basis of BMI among 42 per cent and 47 per cent of the women agricultural labourers in the organized and unorganized sectors respectively. Contrary to the findings of Lawrence (2003), in the present study higher per cent of women in unorganized sector had a normal BMI when compared to women working in organized sector. Only 11.67 per cent and 8.33 per cent of respondents in the two sectors were found to be undernourished. Contrary to this, Lawrence (2003) observed more prevalence of various grades of under nutrition among 21.6 per cent and 31.67 per cent of women agricultural

labourers in organized and unorganized sectors. When the respondents with undernutrition were classified to find out the different grades of Chronic Energy Deficiencies it was found that among the respondents who were undernourished 85 per cent in organized sector and 80 per cent in unorganized sector were found to be having mild grade of malnutrition. Here also, higher percentage of under nutrition and CED was found among the respondents of organized sector.

More percentage of respondents in the unorganized sector had obesity (18.33%) and are at risk for obesity also (21.67%) when compared to 11.67 per cent and 18.33 per cent of the respondents in the organized sector. Contrary to the present finding Lawrence (2003) indicated more percentage of obesity among agricultural labourers in the organized sector (21.67%) than in the unorganized sector (5%). However Jyothi (2003) observed only 3.3 per cent of obesity among the women labourers in rice cultivation.

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 the food and nutrient intake of different groups is very important. The actual food intake of coir workers revealed that the mean intake of cereals, green leafy vegetables, milk and milk products, fats and oils and sugar was significantly lower than the recommended levels suggested by ICMR (1984) in both organized and unorganized sectors. The intake of other vegetables, roots and tubers and flesh foods was found to be more than the RDA in both the sectors. Out of which the intake of other vegetables and flesh foods was found to be significantly higher than the RDA. Significant difference in the intake of green leafy vegetables, roots and tubers, fruits and sugar was also observed between the respondents of organized and unorganized sectors.

In contrast to the results of the study, Seshadrinath (1993) and Seralathan *et al.,* (1993) reported that the diets of women agricultural labourers and farm women were deficient in all food groups recommended for a balanced diet. Jyothi

(2003) also indicated lower intake of all food groups except other vegetables among women agricultural labourers. Lawrence (2003) indicated lower intake of cereals, pulses, roots and tubers, fruits, milk and milk products and fats and oils among women agricultural labourers working in organized and unorganized sectors. In the present study, only 30 per cent of RDA of green leafy vegetables and18 to 28 per cent RDA of milk and milk products was met by the respondents of both sectors. In contrast to the present study, Cherian (1992) and Udaya (1996) reported higher intake of milk and milk products among women agricultural labourers and farm women in which they met about 112 to165 per cent of RDA. Just like the result observed in the present study with respect to lower intake of green leafy vegetables, Cherian (1992), NNMB (1996) and Smitha (1999) also indicated lower intake of green leafy vegetables among women. Higher intake of flesh foods was noticed among the respondents of organized and unorganized sectors. However, Lawrence (2003) in her study among agricultural labourers observed higher intake of flesh foods only among the respondents of organized sector.

With respect to the nutritional quality of the diet consumed by the respondents it was seen that the intake of energy, calcium, iron, retinol, riboflavin, niacin and vitamin C was significantly lower than the RDA suggested by ICMR (1990). Reduced energy intake by the people in southern and northern India was reported by ICMR (1990), Ajula *et al.,* (1993), Augustine (1993), Udaya (1996), Smitha (1999) and Jyothi (2003). Lawrence (2003) also indicated lower intake of all nutrients among the agricultural labourers of organized and unorganized sectors.

Clinical examination is the most effective measure to find out the nutritional deficiencies among individuals. The result of the present study indicated different clinical symptoms related to nutritional deficiencies among the respondents in organized and unorganized sectors. Conjuctival xerosis, angular stomatitis, chalky teeth, dental carries, loss of luster in hair, oedema on dependent

part and pale tongue were the most important deficiency symptoms observed among the respondents working in coir sector. Except angular stomatitis all the other clinical symptoms mentioned above were found to be more among the respondents of unorganized sector. Similar to the present observation Lawrence (2003) also observed lower percentage of clinical manifestations among the respondents in the organized sector working as agricultural labourers. In accordance to the clinical manifestations observed in the present study 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 and dental carries among farm women. Angular stomatitis, bleeding gums and dental carries among women agricultural labourers was reported by Smitha (1999). In contrast to the result of the present study, Jayanthakumari (1993) reported absence of clinical manifestations of nutritional deficiencies among farm women. Chandralekha (1993) also did not observe any clinical manifestations of malnutrition or undernutrition among the women workers of Tata tea estate of Kerala.

Nutritional anemia has been reported as a major micronutrient deficiency among Indian women of reproductive age. NIN (2007) indicated 89.2 per cent prevalence of anaemia among non pregnant non lactating women of Kerala and 75.2 per cent prevalence in India. The biochemical estimation of blood for haemoglobin to assess the prevalence of anaemia among the respondents of the present study indicated anaemia among 70 per cent of respondents in organized sector and 85 per cent of respondents in unorganized sector with a haemoglobin level of less than 12g/dl. Among the respondents with anaemia 71.43 per cent in organized sector and 70.59 per cent in unorganized sector were suffering from mild degree of anaemia with an haemoglobin level in between 10 to 11.9 g/dl. Ranganathan (1996) also observed lower haemoglobin level among 85 per cent of women coir workers in Thiruvanathapuram District. The prevalence of anaemia observed in the present study is almost similar to the prevalence noted by NIN (2007) among non pregnant non lactating women of Kerala. Jyothi (2003) also

indicated lower haemoglobin level among 100 per cent women agricultural labourers involved in rice cultivation.

5.5 Energy expenditure pattern of respondents

The energy expenditure and energy intake revealed that all respondents had negative energy balance. The negative energy balance of the respondents may be due to their lower food intake and heavy work load. Ranganathan (1996) also observed similar findings among coir workers in Thiruvanathapuram District.

Summary

6. SUMMARY

The present study entitled "Nutritional profile of women labour in coir sector" was conducted among 120 women coir workers in the age group of 18 to 55 years in Alappuzha district working in organized sector and unorganized sector.

Socio-economic status and food consumption pattern of the family and working pattern, nutritional status, occupational hazards and energy expenditure pattern of the respondents were studied.

Information regarding socio-economic condition of the families indicated that majority of the families in organized and unorganized sectors were Hindus and belonged to backward caste. Nuclear family system was followed by 80 to 85 per cent of the selected families and 62 to 67 per cent of the families had 4 to 6 members.

Composition of the families showed that 48.91 per cent and 42.13 per cent of male and female members in organized and unorganized sectors respectively were in the age group of 21 to 50 years. Majority of the family members in organized and unorganized sectors were literates.

Monthly income of 35 to 40 per cent of the families varied from Rs.1001 to 2000 and 51.66 and 48.33 per cent of families in organized and unorganized sectors respectively earned an income in between Rs. 2001 to 3000 per month.

Majority of the families (58.33%) in organized sector owned less than 10 cents of land and 10 per cent of families in organized sector and 5 per cent in unorganized sector cultivated crops like coconut, cow pea, ladies finger, plantain, kachil and cucumber.

All the families in both sectors borrowed money from private lenders and majority of the families in both sectors did not have the habit of saving money for future purpose.

The expenditure pattern of the families indicated that 76.67 per cent and 48.34 per cent in organized and unorganized sectors respectively spent 40 to 55 per cent of their monthly income for food.

All the families in organized sector and 96.67 per cent in unorganized sector had their own houses with brick as the wall material and tiles as the roofing material with two to three rooms. All the houses in both groups had separate kitchen and proper lavatory facilities. The drainage facilities of the houses in both groups were found to be inadequate. The recreational and electricity facilities of the houses were found to be adequate. All the families used water from well and public tap for drinking purposes.

Wood and LPG were used as fuel materials by 55 per cent of families in organized sector wheras in unorganized sector 35 per cent of families used wood and kerosene for cooking foods.

About 45 per cent and 56.67 per cent of the families in organized and unorganized sectors used the facilities available in Primary Health Center for health care.

Details of morbidity pattern for the past one year revealed chikungunia as the most important epidemic prevalent in the locality during the previous year.

Food consumption pattern of the respondents indicated that they consumed rice as their staple food and followed non vegetarian food habit. Food expenditure pattern of the families revealed that in both sectors maximum amount was spent on cereals. With regard to the purchase of pulses, fruits, egg and sugar majority of

the respondents in both the sectors spent upto 10 per cent of the total expenditure. For the purchase of meat and fish 40 per cent and 81.67 per cent of families in unorganized sector spent 10 to 20 per cent of their monthly income while in organized sector only 15 per cent and 45 per cent of families spent this much of income for the purchase of these food items.

Majority of the families in organized (70%) and unorganized (85%) sectors purchased food items from PDS and nearby shops on a weekly basis. Cereals, other vegetables, fats and oils, spices and condiments, sugar and fish were the most frequently used food items in both the sectors.

Advance meal planning was popular in both groups with three major meals a day pattern.

Pickling was the only method of food preservation observed in the families. Majority of the families in both sectors gave equal importance to male and female members in serving dishes. Most common storage methods adopted by the families for cereals and pulses were drying and storing in tight containers.

The age of the respondents varied from 23 to 55 years and nearly 71.66 per cent of respondents in organized sector and 91.66 per cent of respondents in unorganized sector were above 30 years of age. Majority of respondents in both sectors were married.

The educational status of respondents indicated that all respondents in organized sector were literate and 50 per cent of them attained high school level of education. About 18.33 per cent of respondents in unorganized sector were found to be illiterate.

Majority (80%) of the respondents in the organized sector were working in coir industries and all the respondents in unorganized sector were working in

small coir units. All the respondents in organized sector and 40 per cent of respondents in unorganized sector used to get work for six days in a week.

Specific time schedule was followed by the respondents in organized sector and all of them worked from 8.30 am to 5.30 pm with 15 minutes interval each in fore noon and after noon and one hour at noon. In the unorganized sector specific time schedule was not followed by the respondents.

All respondents in both sectors used to get their wages on weekly basis. In organized sector the wage of the respondents varied from Rs 300 to Rs 400/ week and in unorganized sector it varied from Rs 200 to 300 in a week among 41.67 per cent and 53.33 per cent of respondents.

Neither medical leave nor medical benefits were provided for respondents working in unorganized sector. However, they used to get a festival allowance in the range of Rs 500 to 1500 per year. All respondents working in organized sector had medical leave but only 73.33 per cent were entitled with medical benefits.

Seasonal variation in the number of working days was observed only among the respondents working in unorganized sector.

The major tasks done by the women coir workers in unorganized sector were defibering, yarn spinning, coir spooling and tailoring. None of the respondents in organized sector did defibering as well as spinning. Instead, they were involved in spooling, tailoring, stenciling, colouring, loading and drying, cleaning and shaping of mat, packing as well as in general work.

Toilet facilities and resting place were found to be adequate in the work place of all respondents in organized sector and most of the respondents in unorganized sector. About 21.67 per cent in unorganized sector indicated improper facilities in the working area.

Handspun, charka, pamparam, needle and tape were the main implements used by the workers in unorganized sector while in organized sector they used handspun, pamparam, scissors, dispenser, paint/stenciling board as the implements for doing their work.

Details of morbidity pattern among the respondents for the past one year revealed chikungunia as the most important epidemic during the previous year and 53 per cent of the respondents in organized and 65 per cent in unorganized sector suffered from chikungunia during 2006-2007.

Asthma, allergy, skin lesions and body ache were the prominent occupation related problems noted among the respondents of both organized and unorganized sectors.

The nutritional status of the respondents was assessed through anthropometric measurements, one day food weighment method, clinical examination and biochemical estimation of blood for haemoglobin.

Anthropometric measurements revealed that the weight of the respondents in the organized sector varied from 35 to 66 kg and in the unorganized sector the weight varied from 35 to 74 kg.

The height of the respondents in organized sector varied from 134 to 167 cm and in the unorganized sector the height varied from 138 to 167cm.

Body mass index showed that about 58.33 per cent in organized and 51.67 per cent of respondents in unorganized sector had normal BMI in the range of 18.5 to 22.9.

Among the respondents who were undernourished 85.72 percent in organized and 80 per cent in unorganized sectors were found to be having mild grade of malnutrition with a BMI 17-18.5.

The intake of the other vegetables, roots and tubers and flesh foods were found to be higher than the recommended allowances in both sectors. The nutritional quality of diet revealed that the intake of all nutrients except fat was found to be lower than the RDA in organized sector and in unorganized sector except the intake of protein and fat the intake of all other nutrients were found to be lower than the RDA. Significant variation in the intake of green leafy vegetables, roots and tubers, fruits and sugar was observed between the respondents of organized and unorganized sectors. The variation observed in the intake of all nutrients between the two sectors was found to be statistically insignificant.

Clinical examination showed symptoms like xerosis, pigmentation, angular stomatitis, chalky teeth, dental carries, loss of luster in hair and pale but coated tongue among the respondents of both sectors. Most of the clinical manifestations were found to be more among the respondents of unorganized sector.

Biochemical estimation of blood for haemoglobin showed that 70 per cent of respondents in organized sector and 85 per cent of respondents in unorganized sector had anaemia with an haemoglobin level less than 12g/100 ml of blood. Among the respondents who were anaemic 70 per cent had mild degree of anaemia and the rest suffered from moderate anaemia.

Energy balance of the coir workers indicated that all of them had negative energy balance when the daily energy intake was compared with daily energy expenditure.

Thus, the nutritional profile of women coir workers indicated that nearly 50 per cent had normal nutritional status on the basis of BMI. The quantity and nutritional quality of the diet consumed by the respondents of organized and unorganized sectors were inadequate. Different clinical manifestations of nutritional deficiencies were noticed among the respondents of both sectors. Seventy per cent of women in organized sector and 85 per cent in unorganized sector were found to be anaemic. Thus, to improve the nutritional profile of women coir workers following recommendations are suggested.

1. Increase the minimum wage of coir workers in both organized and unorganized sectors.
2. Health insurance schemes and pension schemes may be provided to the coir workers of both sectors.
3. Medical benefits may be provided to the workers in unorganized sector on par with the workers in organized sector.
4. Nutritional awareness programmes may be organized for the workers so as to achieve food and nutritional security.

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Appendices

APPENDIX I

KERALA AGRICULTURAL UNIVERSITY

FACULTY OF AGRICULTURE

COLLEGE OF HORTICULTURE, VELLANIKKARA, THRISSUR

DEPT. OF HOME SCIENCE

Interview schedule to elicit information regarding the socio-economic conditions of the families:

1. Name of the respondent :
2. Address :
3. Place of Survey :
4. Taluk, House No. :
   Ward
5. Age of the respondent :
6. Type of the family : Joint / Nuclear
7. Women headed family : Yes/No
8. Religion / Caste :
9. Family size :

   No. of adults :

   No. of children :
10. Marital status : a) Married (b) Unmarried
    c) Divorced/separated (e) Widowed

11. Composition, education and occupation of family members

Sl. No.	Name	Relation-ship with the head	Age	Sex	Occup ation	Educational status				Income per month
						Illite-rate	Primary school Lp Up	H.S.	College	

12. Total family income: Rs permonth

13. Do you have any other source of income:

a) If yes, specify :
b) Amount :

14. Does your family have own land : Yes / No
If yes, specify

Total area	Area under cultivation	Specify how you got this land
		a) Purchased b) Inherited from parents c) Received from Government d) Others (specify)

15. Details regarding the cultivation of crops

Sl. No.	Name of crop	Area cultivated	Total produce per year	Quantity used at home	Quantity sold	Income

15 a) who runs the land on your family? Male alone/female alone
b) Do you have land area on your name? Yes/No

16. Do you have any domestic animals: Yes / No
If yes, details regarding domestic animals

Domestic animals	How many	Source of domestic animals			
		Purchased	Gift	Government	Inherited
1. Cattle a) Cow	1 2 3 4				
b) Buffalo	1 2 3 4				
c) Goat	1				

	2 3 4				
d) Pork	1 2 3 4				
2. Poultry a) Hen	1 2 3 4				
b) Duck	1 2 3 4				

17. Do you have a kitchen garden: Yes / No
If yes, specify

Item of cultivation	Use of produce		
	By family	Gift	Sale

18. Have you taken any loan? : Yes / No
If yes, specify

Sl. No.	Source of Loan	Amount of loan taken	Purpose

19. Monthly expenditure pattern

Sl. No.	Items	Amount spent per month	Percentage of total income
1	Food		
2	Clothing		

3	Shelter		
4	Transport		
5	Recreation		
6	Education		
7	Electricity		
8	Health		
9	Fuel		
10	Luxury and personal		
11	Remittance		
12	Savings		
13	Others		

20. Details of housing conditions
    i) Type of house
        a) Own house / rented house
        b) Mud built / Brick built
        c) Thatched / Tiled / Terraced
        d) Single storeyed / Double storeyed
        e) No of rooms: 1 / 2 / 3 / 4 / 5 / more
        f) Floor: Mud/Cement/Floor tiles
    ii) Other characteristics
        a) Separate kitchen: Yes / No
        b) Usage of different rooms in the house
            1. Multipurpose room
            2. Drawing room
            3. Bed room
            4. Study room
            5. Store room
        c) Source of drinking water: Own well/ Public tap/ Public well/ Tank/ River
        d) Lavatory facilities: Own latrine/ Public latrine/ Open field
        e) Drainage facilities: Yes / No
        f) Electricity facilities: Yes / No
        g) Recreational facilities: Yes / No
            If yes, specify: Radio / Transistor/ Television/ VCR
        h) Transport facilities: Bus/ Bicycle/ Motor bike/ Jeep

21. Details regarding use of fuel
    i) Type of fuel
        a) Wood

b) Agricultural waste
c) Cow dung
d) Saw dust
e) Kerosene
f) LPG
g) Waste from coir industry
h) Electricity
g) Others

ii) Source of fuel
a) Collected from surroundings
b) Purchased

22. i) From where did you buy the food items?
a) PDS
b) Nearby shop
c) Wholesale shop
d) Suppplyco margin free market
e) Others (specify)

ii) What are the items you buy from PDS?
a) Rice
b) Wheat
c) Sugar
d) Kerosene
e) Others (specify)

23. Do you have any health facilities in your locality? Yes/No
If yes, specify
a) Primary Health Centre
b) Private Hospital
c) Medical College
d) Maternal and Child Health Centre
e) Ayurvedic Hospital/ Clinic
f) Homoeopathic Hospital/ Clinic
g) District Hospital
g) Others

24. When anybody is ill do you make use of the facilities available? Yes/No

25. Epidemics prevalent in the locality (house) in the past one year
a) Measles
b) Chicken pox
c) Whooping Cough
d) Typhoid
e) Chikungunia
f) Mumps
g) Others

ii) Was any member of the family affected by the above disease?
Yes/No
If yes, specify:

Name of Disease	Name of person affected	Treatment adopted	Any after effects due to the disease

26. Do you have any savings? Yes/No
    If yes, what is the nature of your savings?
    a) Bank:
    b) Land:
    c) Ornaments:
    d) Other investments (specify):
27. Are you a member of any social organization: Yes/No
    a) Mahila Samajam
    b) Youth Club
    c) Ayalkootam
    d) Kudumbasree
    e) Others
28. Do you attend the meeting organized by the organization: Yes/No

29. Details of time expenditure pattern
    a) Number of working hours per day:
    b) Hours spent for household activities:
    c) Sleeping time and leisure time
    d) Community management activities

30. Details of working pattern of the respondent
    a) Name and address of the industry in which employed:
    b) Place of employment: Home
    Society
    Industry (company)
    c) Are you a permanent employee of the industry: Yes/No.
    If yes, when did you join for work?

    d) How many days you get work in a week:
    e) Will it vary during different season?
    If yes, Specify
    f) How much time/hours did you work in a day:
    g) Tenure of payment: Monthly
    Weekly
    Daily
    h) Do you have any off day in a week: Yes/No.

i) How frequently you go for work: Daily/Weekly once/Weekly twice/Occasionally

j) If it is not daily, Give reasons

a) No work
b) Seasonal work
c) Health problems
d) No body to look after children
e) Low wage
f) Tedious
g) Others

k) Did you get leave: Yes/No.

If yes, give details

1. Medical Leave
2. Casual Leave
3. Other Leave

L) Do you receive any medical aid or medical benefit from the organization: Yes/No

m) At what time you go for work :

n) How many hours you get interval: Morning/Lunch/Evening

o) At what time you return from work:

p) Do you go for any other work during off days: Yes/No.

If yes, specify

Details of work	Days	Wage

31. Are you given festival allowances: Yes/No
32. Do you face any discrimination in terms of wage: Yes/No

If yes, specify the wage of Men: Women:

33. Type of work undertaken:

Retting of husk (extraction of coir fibre)
Defibering (beating and cleaning)
Coir yarn spinning
Coir weaving
Rope making
Mat tailoring
Mat stenciling
Coloring of rope
Loading
Making of different items
Others (specify)

34. Do you have any specific health problems due to your work: Yes/No
If yes, Specify
a) Asthma
b) Allergy
c) Skin Diseases
d) Others

35. Describe the work environment
a) Work is going on open place/indoor
1. Shed
2. Sheet
3. Others (specify)

b) Do you like your working environment? Yes/No
If no, Give reasons
1.
2.
3.

c) Do you receive adequate facilities in the work place? Yes/No
1. Resting place
2. Toilet facilities
3. Others (specify)

d) Sanitary conditions of the work place: Good
Fair
Poor

36. Do you face any problems in your working unit: Yes/No
If yes, specify

37. Do you use any implement / equipment for doing your work in coir industry: Yes/No
If yes, specify the name of implement / equipment

38. Describe the tools/inputs used and the problems faced in the activities

Work	Tools	Problems
Peeling	Iron stick	Pain in hands/Skin problems
Coir yarn spinning	Spinning wheels/charka	
Coir weaving	Coir matting loom	
Mat tailoring	Tailoring machine	
Cleaning/shaping the mat	Scissors	
Others (specify)		

39. Do you rest in between work? Yes/No
If yes, how much time:

APPENDIX II

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

1. Name of the respondent :
2. Age :
3. Sex :
4. Address :
5. Place of survey :
6. Taluk :
7. Block :
8. Food habit : Vegetarian/Non-vegetarian
9. Name of staple food :
10. Details of food expenditure :

Sl. No.	Food items	Quantity purchased	Total cost	Percentage of total expenditure
1	Cereals			
2	Pulses			
3	Vegetables, roots and tubers			
4	Oils and fats			
5	Milk and milk products			
6	Fruits			
7	Meat			
8	Fish			
9	Egg			
10	Spices and condiments			
11	Sugar			
12	Salt			
13	Others			

11. Details of frequency of purchase and use of various food items

Sl. No.	Food items	Purchase and frequency of use in a week				Monthly	Occasionally	Never
		Daily	Thrice	Twice	Once			
1	Cereals							
2	Pulses							
3	Green leafy vegetables							
4	Other vegetables							
5	Roots and tubers							
6	Fruits							
7	Oils and fats							
8	Spices and condiments							
9	Milk and milk products							
10	Meat							
11	Fish							
12	Egg							
13	Salt							
14	Sugar							

12. Details about frequency of meals per day
Once/Twice/Thrice/More than three

13. Details about meal planning
Do you plan your meals in advance? Yes/No

If yes, what is the basis of planning?
a) Total family requirement
b) Food stuffs available
c) Likes and dislikes of family members
d) Foods available

14. Details of consumption of raw food items
    i) Do you consume any raw food items? Yes/No
       If yes, specify
    ii) Do you find any advantage or disadvantage of eating raw food? Yes/No
       If yes, specify

15. Do you use left over food items? Yes/No
    If yes, specify

16. Do you use boiled water for drinking? Yes/No

17. Do you use specific time schedule for meal intake? Yes/No

    If no, what is the basis of intake of meals

    a) Take food when hungry
    b) Take food according to convenience

18. Do you take food from outside: Yes/No

19. How many time you cook meals in a day.
    Once/Twice/Thrice/More than three

20. Details about food preservation

    i) Do you preserve any food items in your home? Yes/No
       If yes, specify

    ii) Do you buy any preserved food items from outside? Yes/No
    iii) Preservation of food items

Sl.No.	Food items	Methods used	Period over which preserved
1	Cereals		
2	Pulses		
3	Fruits		
4	Milk		
5	Meat		

6	Vegetables		
7	Fish		
8	Others		

21. Details of storage of food items

i) Do you store any food items in your home? Yes/No
If yes, specify

Sl.No.	Food items	Method of storage	Period of storage
1	Cereals		
2	Pulses		
3	Fruits		
4	Milk		
5	Meat		
6	Fish		
7	Vegetables		
8	Egg		
9	Others		

ii) Do you employ any specific treatment before storing of food items? Yes/No
If yes, specify

22. Do you give equal importance to all family members in serving food items? Yes/No

If yes, give the order of importance

Order	Reasons
1 2 3	

24. Do you take packed foods to the work site: Yes/No

25. Foods taken /avoided by you during special conditions:

Sl no	Conditions	Foods taken	Reasons	Foods avoided	Reasons
1 2 3 4 5	Pregnancy Lactating period Adolescent age Old age Diseased conditions 1.Fever 2.Diarrhoea 3.Parasite infection 4.others specify				

APPENDIX III
SCHEDULE FOR INDIVIDUAL FOOD WEIGHMENT SURVEY
(ONE DAY WEIGHMENT METHOD)

1. Name of the respondent :
2. Age of the respondent :
3. Place of survey :
4. Details of food consumption :

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

APPENDIX IV
Schedule for Clinical Assessment
(N.A.C.I.C.M.R.)

1. Sex:
2. Age:
3. Height:
4. Weight:
5. General appearance:
   1. Good
   2. Fair
   3. Poor
   4. Very poor
6. Eyes
   a) i) Xerosis :
      1. Absent, glistening and moist
      2. Slightly dry on exposure for a minute /lack of luster
      3. Conjunctiva dry and wrinkled
      4. Conjunctiva very dry and bitot's spots present
   ii) Pigmentation:
      1. Normal colour
      2. Slight discolouration
      3. Moderate browning in patches
      4. Severe earthy discolouration
   iii) Discharge:
      1. Absent
      2. Watery, excessive larchymation
   b) i) Xerosis:
      1. Absent
      2. Slight dryness and diminished sensibility
      3. Haziness and diminished transparency
      4. Ulceration
   ii) Vascularisation:
      1. Absent
      2. Circumcorneal infection
      3. Vascularization of cornea
   c) i) Excoriation:
      1. Absent
      2. Slight excoriation
   ii) Folliculosis:
      1. Absent
      2. A few granules
      3. Lids covered with extensive granules
      4. Hypertrophy
   d) i) Functional Night blindness:
      1. Absent
      2. Present

7. Mouth

a) Lips

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

b) Tongue

i) Colour:
1. Normal
2. Pale but coated
3. Red
4. Red and raw

ii) Surface:
1. Normal
2.Fissured
3. Ulcered
4. Glazed and atropic

c) Buccal mucosa

i) Condition:
1. Normal
2. Bleeding
3. Pyorrhoea
4. Retracted

d) Gums

i) Condition:
1. Normal

e) Teeth

i) Flourosis:
1. Absent
2. Chalky teeth
3. Pitting of teeth
4. Mottled and discoloured teeth

ii) Carries:
1. Absent
2. Slight
3. Marked

8. Hair

i) Condition:
1. Normal
2. Loss of luster
3. Discoloured and dry
4. Spares and brittle

9. Skin

a) General appearance:
1. Normal
2. Loss of luster
3. Dry and rough or Crazy pavement
4. Hyperkeratosis, phrynoderma

b) Elasticity:
1. Normal
2. Diminished
3. Wrinkled skin

c) Regional:

i) Trunk:
1. Normal

2. Collar like pigmentation and dermatitis around the neck

ii) Face:
1. Normal
2. Nasolabial seborrhea
3. Symmetrical sub orbit pigmentation
4. Moon face

iii) Pigmentation:
1. Normal

b) Oedema

i) Dstribution:
1. Absent
2. Oedema on dependent parts
3. Oedema on face and dependent parts

11. Bones

i) Condition:
1. Normal
2. Stigmata of past rickets

12. Heart

i) size:
1. Normal
2. Appex outside the nipple line
3. Enlarged

13. Nervous system

i) Calcification:
1. Absent
2. Present

ii) Paresis:
1. Absent
2. Present

14. Alimentary

i) Appetite:
1. Normal
2. Anorexia

ii) Liver:
1. Not palpable
2. Palpable

iii) Spleen:
1. Not palpable
2. Palpable

15. Occupational diseases

1) Asthma
2) Allergy
3) Skin diseases
4) Pain in hands and legs and back pain
5) Others (specify)

NUTRITIONAL PROFILE OF WOMEN LABOUR IN COIR SECTOR

By

DEEPA, R

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)

Faculty of Agriculture

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ABSTRACT

A study on "Nutritional profile of women labour in coir sector" was conducted during 2007-2008 among women coir workers of organized and unorganized sectors in Alappuzha district. A total of 60 women coir workers were selected from organized sector and 60 women from unorganized sector constituting 120 women coir workers as the sample for the study.

The details on socio-economic status and food consumption pattern of the family and working pattern, nutritional status, energy balance and occupational hazards of respondents were collected from the respondents.

Information regarding socio-economic condition of the families revealed that most of the families in organized and unorganized sectors were Hindus and belonged to backward caste with a family size of 4 to 6 members.

Majority of the family members in organized and unorganized sectors were literates. The monthly income of the families varied from Rs.1000 to 5000.

Majority of the families in both organized (58.33%) and unorganized sectors (63.33%) owned upto 10 cents of land.

All the families in both sectors borrowed money from different sources. Majority of the families in both sectors did not have the habit of saving money for future purpose.

All the families in organized sector had their own houses with brick as the wall material and tiles as the roofing material with three to four rooms. Drinking water, electricity, recreational and lavatory facilities were found to be satisfactory.

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All the families in both groups were non vegetarians and consumed rice as their staple food. Food expenditure pattern of the families revealed that in both sectors maximum amount of the income was spent on cereals. Majority of the families purchased food items from PDS and nearby shops on a weekly basis. The most frequently used food items were cereals, other vegetables, fats and oils, spices and condiments, sugar and fish in both the sectors.

Advance meal planning was popular in both groups with three major meals a day pattern.

Age of the respondents varied from 23 to 55 years and majority of the respondents in both sectors were married. All the respondents in organized sector and 81.67 per cent respondents in unorganized sector were found to be literate.

All the respondents in organized sector worked for 6 days in a week for 7 to 8 hours in a day from 8.30 am to 5.30 pm with specific time for interval in the morning, noon and evening. In unorganized sector the respondents worked for 3 to 6 days in a week with out any specific time schedule.

All respondents in both sectors used to get their wages on weekly basis. In organized sector the wage of most of the respondents varied from Rs 300 to Rs 400 week and in unorganized sector it varied from Rs 200 to 300 in a week.

Details of morbidity pattern among the respondents for the past one year revealed chikungunia as the most important epidemic and 53 per cent of the respondents in organized and 65 per cent in unorganized sectors suffered from chikungunia during 2006-2007.

Asthma, allergy, skin lesions and pain in the hands and legs as well as back pain were the prominent occupation related problems noted among the respondents of both organized and unorganized sectors.

Body mass index showed that about 58.33 per cent in organized and 51.67 per cent of respondents in unorganized sector had normal BMI in the range of 18.5 to 22.9. Among the respondents who were undernourished 85.72 per cent in organized sector and 80 per cent in unorganized sector were found to be having mild malnutrition.

The food and nutrient intake of the respondents indicated that the intake of most of the food groups were lower than the RDA. The intake of other vegetables, roots and tubers and flesh foods were found to be higher than the recommended allowances in both sectors. The intake of most of the nutrients were also lower than the RDA.

Clinical examination showed symptoms like xerosis, pigmentation, angular stomatitis, chalky teeth, dental carries, loss of luster in hair and pale but coated tongue among both sectors of respondents.

Biochemical estimation of blood for haemoglobin showed that 70 per cent of respondents in organized sector and 85 per cent in unorganized sector had anaemia.

All the women coir workers were observed to have negative energy balance when their daily energy intake and daily energy expenditure were compared.