NUTRITIONAL PROFILE OF WOMEN PARTICIPATING IN KUDUMBASREE PROGRAMMES

By

SHIJI.N

(2006-16-101)

Department of Home Science
COLLEGE OF HORTICULTURE
VELLANIKKARA, THRISSUR - 680 656
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THESIS

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DECLARATION

I, hereby declare that this thesis entitled **"Nutritional profile of women participating in Kudumbasree programmes"** 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.

Vellanikkara **Shiji, N**
14-10-2008

CERTIFICATE

Certified that this thesis entitled **"Nutritional profile of women participating in Kudumbasree programmes"** is a bonafide record of research work done independently by **Ms. Shiji** 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.

Vellanikkara
14-10-2008

Dr.V. Usha
(Major Advisor)
Professor & Head
Department of Home science
College of Horticulture
Vellanikkara
Thrissur

CERTIFICATE

We, the undersigned members of the Advisory Committee of **Ms. Shiji, N** a candidate for the degree of **Master of Science in Home Science**, with major field in **Food Science and Nutrition**, agree that the thesis entitled **"Nutritional profile of women participating in Kudumbasree programmes"** may be submitted by Ms. Shiji in partial fulfillment of the requirements for the degree.

Dr. V. Usha
(Major Advisor, Advisory committee)
Professor& Head
Department of Home Science
College of Horticulture
Vellanikkara
Thrissur

Dr. V. Indira
Professor
Department of Home Science
of Horticulture
Vellanikkara
(Member)

Dr. Jayasree Krishnankutty
Associate Professor
Department of Agricultural Extension College
College of Horticulture Vellanikkara
(Member)

Sri. S. Krishnan
Assistant Professor (Sr. Scale)
Department of Agricultural Statistics
College of Horticulture
Vellanikkara.
(Member)

(External Examiner)
Dr. K.S. Kumari
Principal and Head of the Department
Food Science and Nutrition
Pondichery University College

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Shiji, N


Dedicated to
My Loving
Family members

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ABBREVIATIONS

ADS	Area Development Societies
BMI	Body Mass Index
BPL	Below Poverty Line
CDS	Community Development Societies
CED	Chronic Energy Deficiency
ICMR	Indian Council of Medical Research
NABARD	National Bank for Agriculture and Rural Development
NGO	Non Governmental Organization
NHG	Neighborhood Groups
NNMB	National Nutrition Monitoring Bureau
NS	Not Significant
RDA	Recommended Dietary Allowances
SHG	Self Help Groups
WHO	World Health Organization

Introduction

1. INTRODUCTION

Women, along with men from times immemorial have formed an integral part of social structure throughout the world. She plays manifold role in the society: as a mother, as a sister and as a wife. Thus, she is the foundation stone of the family in particular and the society in general.

Women constitute almost half of the country's population, which has been deprived of self respect and subjugated into existence at the whim and mercy of the male. Society views men and women in terms of their certain specific roles in family and community. Thus, we found that the dominant presumption in development programmes for women is that women are first and foremost home-maker, and they are only secondary productive workers (Ravishankar and Pargunan, 2002).

Seventy-four per cent of the Indian population lives in villages and majority of them are poor, mainly constituting women belonging to below poverty line (BPL). Poverty is frequently given the face of a woman, making it fashionable to evolve gender sensitive development schemes based on women empowerment, which are supposed to challenge the victimization of poor women (Lindwall and Bergquist, 2006).

The relationship between poverty and health has gained the attention of public health researchers and activists throughout the history (Waitzkin, 1981; Rosen, 1993). Poverty is widely accepted as a root cause of ill-health. Poor suffer from ill-health and have lower health productivity (Gwatkins *et al*., 2000). Poverty continues to be of primordial importance throughout the world, particularly in the developing world (Wagstaff, 2001).

As per poverty estimates, in India 244 million people are below poverty line in rural areas in 1993-1994. This gives an indication about the magnitude, size and the problems of the rural poverty and deprivation (Chouhan,1998). In many low-income countries, over half of the population lives in poverty (Leon *et al*., 2001). Due to the existence of a strong linkage between poverty and health, poverty alleviation schemes are a particularly attractive option to explore (Mohindra, 2003). The challenge set before us is to break the cycle of ill-health and poverty. The increased income helps to reduce the level of poverty to a great extent in several families. The formation of self–help groups (SHGs) is "not ultimately a micro credit project but an empowerment process". The concept aims at empowering women and thus uplifting their families above the poverty line.

The status of women is ultimately connected with their economic position, which in turn depends on opportunities for women for participating in economic activities. These groups were designed not only as a strategy for poverty alleviation, but also to increase women's access to resources and their power in household decision making. One form of micro-credit popular in India is the self-help groups promoted by national and state government and non-governmental organizations (NGOs). The 1990s saw a proliferation of women SHGs across India, particularly in the south (Narayana, 2002).

Kerala - one of the south Indian state - is different from other states in many spheres like health, educational status, standard of living etc. With regard to the standard of living and status of women, Kerala is far above low - income countries and reaches a level comparable with some of the western countries (Oommen,1999).Kerala is home to 32 million people. Kerala is considered as economically poor but Kerala has achieved success in poverty reduction over the past thirty years. This reduction in poverty can be attributed to various factors, centered on public acts, state intervention and an educated population (Kannan, 1999).

The only factor that based for determining poverty was income. Income generating programmes as anti-poverty programmes were aimed mainly to reduce poverty and help poor families to improve their level of living (Ravishankar and Pargunan, 2002). Kudumbasree is a poverty eradication project officially launched by the Government of Kerala with the active support of the Central Government and National Bank for Agriculture and Rural Development (NABARD) for wiping out absolute poverty from the state within 10 years. The project was inaugurated by the then Prime Minister Shri Atal Bihari Vajpayee on May 17th 1998 at Malappuram and its action started on 1st April 1999 at Alapuzha district.

For effective implementation of Kudumbasree a three-tier community based organization is in action, - Neighborhood groups (NHGs) at the cutting edge level, Area Development Societies (ADS) at the ward level and Community Development Societies (CDS) at the local body level. Women are organized in these and give support to take different kinds of loans for starting up their own business - a form of micro enterprise.

The provision of loans to women may then serve the dual goals of increasing household wealth and empowering women (Amin *et al*.,1998; Kabeer,2000). The potential of micro credit helps in poverty alleviation (Mosley and Halmer, 1998; Matin *et al*., 2002).

One of the measures to alleviate poverty is providing credit on 'reasonable' rate of interest. Many scholars argue that credit linked self-employment schemes are the only most effective way to alleviate poverty on sustained basis (Dantwala, 1985; Bagachee, 1987; Dreeze,1990).

Self-help groups (SHGs) movement strives to empower the rural women and to contribute towards the socio-economic progress of the country. SHGs have emerged as an alternative credit support to rural poor in their effort to

become economically independent. This improves their quality of life by way of increase in family income, which leads to better quality of food, clothing and education of children, thereby improving the socio-economic status in general.

Hence the present study entitled "Nutritional profile of women participating in Kudumbasree programmes" was carried out with the following objectives:-

1. To assess the socio-economic status of women participating in Kudumbasree programmes and

2. To assess the food consumption pattern and nutritional status of these women.

Review of Literature

2. REVIEW OF LITERATURE

The review of literature relevant to the study entitled "Nutritional profile of women participating in Kudumbasree programmes" is listed under the following headings.

2.1 Women empowerment programmes

2.2 Demographic profile of women participating in Kudumbasree

2.3 Socio-economic conditions of women participating in Kudumbasree

2.4 Food consumption pattern of women

2.5 Nutrient intake and prevalence of malnutrition among women

2.6 Factors influencing the nutritional status of women

2.7 Income generating activities of rural women participating in Kudumbasree

2.1 WOMEN EMPOWERMENT PROGRAMMES

Empowerment is a process of awareness and capacity building leading to greater participation, greater decision-making power and control, and transformative action (Griffer,1987).Women empowerment is a process with women in focus, placing men in the periphery (Batiwala,1997). Since women's empowerment is the key to the socio-economic development of the community, bringing women into the mainstream of national development has been a major concern of the government (Singh, 2004).

Women constitute half of our population and play a vital role in the development of the family, the community and the nation (Afshar, 1992). It has been widely recognized that unless women's potential is properly developed, no transformation and economic development is possible (Pillai and Harikumar,2006). Jyothi and Dileep (2007) observed that the non participation of women in technological aspects resulted in partial failure of every development programme launched in India. Therefore, to accelerate the growth and prosperity

of the nation, it is very important to create opportunities for socio-economic development of women in rural India.

India is primarily rural in character where about 74 per cent of the population live in villages (Choudhary, 1998). Majority of rural population constitutes the poor in India. They are small marginal farmers, landless agricultural labourers, scheduled casts, scheduled tribes and women (Sahota, 2002).

Das and Pankaj (1976) observed that rural Indian women are extensively involved in agricultural activities. The contribution of women farmers to Indian agriculture is enormous (World Bank,1984; Arun,1999). Much of women's work never appear in the national statistics because it is seen as an extension of their caring and nurture (Sarmishta, 2004).

Throughout the world, women are over worked and under evaluated (WHO, 1993). Recognizing the family as an important basic social unit, there is a need for strengthening the family. Empowering women in the family will involve reorganization of career path and greater economic empowerment (Sathyavathi, 1995).

According to Narayanaswamy (1998), Government is providing several opportunities to women led SHGs (Self Help Groups) to improve their professional skills, promote marketing technologies and increase entrepreneurship amongst the rural entrepreneurs. Some of the successful group-based participatory programmes have made significant improvement in the living conditions of poor women (Oommen, 1999).

SHGs are small informal association created for the purpose of enabling members to reap economic benefit out of natural help, solidarity and joint responsibility (Anand, 2002). Women have been identified as carrying the burden of poverty (Bablu, 2002). Renewed economist Jeffrey (2005) has

suggested that reliable and appropriate intervention in the area of housing, food, education, basic health, agricultural inputs, safe drinking water, transportation and communications can help to eradicate poverty globally.

In India about one third of the rural population is covered by one million SHGs (Sivaramakrishna and Panigrahi,2001). In India's developmental planning, poverty eradication has been a major concern since 1970's and various poverty reduction schemes were launched to help the poor (Lindwall and Bergiquist, 2006). Moyle *et al.*(2006) reported that the self help group approach promotes conditions to improve the status of women, by helping women to understand their situations and to educate them regarding income generation activities through mobilization of their own resources. The Kudumbasree programmes, developed to eradicate poverty, is a successful model of women empowerment in Kerala state.

Kudumbasree is a multi sectional, women central participatory poverty eradication movement which simultaneously aims for the economic empowerment of poor through the development and nurture of thrift and credit societies and micro enterprises (Anderson and Kotler,1996; Devika and Thampi,2007).The Kudumbasree programme of Kerala is a globally acknowledged model of poverty eradication and women empowerment at grass root level (Ramesh, 1998). According to Oommen (1999) it is Asia's largest women self grouping at grass root level.The principal objective of Kudumbasree is the eradication of absolute poverty from the state and the strategy slogan of the Mission is "*reaching families through women and reaching the community through families*".

According to Anand (2002), Kudumbasree is an organizational innovation overcoming the barriers if government bureaucracy to reach the benefits of various government programmes and resources to the poor.

Kudumbasree is the name of the State Poverty Eradication Mission, launched by Government of Kerala for wiping out absolute poverty from the state within a period of 10 years (Edward and Zakkariya, 2007).

On 17th May 1998, the state of Kerala witnessed a historical event, the inauguration of Kudumbasree, the prestigious project of the Government of Kerala by Hon'ble Prime Minister Shri. Atal Bihari Vajpayee at Malappuram (Kudumbasree, 2002; Issac, 2002). Government of Kerala launched the State Poverty Eradication Mission, on 1st April 1999 as a partnership of the Sate Government, Central Government, Local Government and the National Bank for Agriculture and Rural Development (NABARD).

Kudumbasree started its operation on 1st April 1999 is functioning as State Urban Development Agency (SUDA) in Kerala and is responsible for the implementation of Swarna Jayanti Shahari Rozgar Yojna (SJSRY), a centrally sponsored Urban Poverty Alleviation Programme (Kudumbasree, 2005).

The unique three tier structure linking NHG (Neighborhood groups), ADS (Area Development Societies) and CDS (Community Development Societies) are identified as the real strength of the Kudumbasree programme (Anand, 2002). The women from below poverty line (BPL) families are organized into Neighbourhood Groups representing 15-40 families. A five-member women volunteer team elected from the NHGs will be the cutting edge level of the programme. NHGs are federated democratically into Area Development Society (ADS) at the ward level and then into Community Development Societies (CDS) at the Local Body level. These organizational structures provide opportunities for collective public actions (State Planning Board, 2004).

In many NHGs, the active participation of women has resulted in increased feeling of solidarity among them. Nair (2006) observed that NHGs are attaining high levels of active participation in social empowerment and are acting

collectively against social problems, such as illicit alcohol brewing, promoting marital counseling and other initiative against domestic violence. According to Anand (2002), involvement in NHGs increases the social awareness of women. Suneetha (2004) observed that the multidimentional nature of SHGs increase the social and political interactions of women like participation in grama sabhas, and initiate social movement such as the anti arrack movement in Alleppey. She also revealed that micro-credit programmes of Kudumbasree is overshadowing other vital issues of health, education, nutrition and sanitation.

2.2 DEMOGRAPHIC PROFILE OF WOMEN PARTICIAPTING IN KUDUMBASREE

In Indian society, women has played and continues to play an important role (Rekha and Sarada, 1983). It is true that the progress of a country can be judged to a great extent by the status of her women (Maria, 1986; Eapen and Kodoth, 2002). Thus woman is the foundation stone of the family in particular and the society in general.

While women represent 50 per cent of the adult population and one third of labour forces, they perform nearly two-third of all working hours and receive only one-tenth of the world income (Andey, 1981).According to Sankar (2004), India has 406 million women out of a population of 844 million. Most of the Indian women are working in unorganized sectors (Sharma, 2004). According to Vimala (2004), there is no exaggeration in saying that the backbone of Indian work force is the unorganized sector. According to 1991 census, the total women work force was 87.77 million, their share in the organized sector was only 4.2 per cent while the rest of 95.8 per cent were in the unorganized sector.

Sundaram (2001) observed that the large sector of employed women in the unorganized sector which included the landless agricultural labourers, workers

in traditional crafts, village and cottage industries and migrants to the cities were employed as domestic workers and vendors.

The initiation of Kudumbasree increased the social participation of women in Kerala. Kerala has high level of literacy. Although Kerala tops in women's literacy rate and education, when it comes to work participation, sex ratio shows great deviation. According to 1991 census there were only 345 female workers per 1000 males and the ratio is lower than the national average. This in turn gives the indication that the women's share of earned income in the state is only 12 per cent. Kudumbasree enlighten the poor women of Kerala to realize their potentials and strengthen them to contribute to the development of their family. By June 2000, Kudumbasree programme was launched in 262 villages covering the entire rural area. By November 2001, it was extended to 1338 local governing bodies and by 2002, it was implemented in the remaining 291 local bodies thus covering the entire state (Murugaish, 2002).

During the years of 2002-03, 43270 NHGs were formed and 8,48,247 families were brought under the neighbourhood groups .In the urban area, 2,47,165 women from poor families have been organized into 7863 NHGs (Senguptha, 2000).

Today 3.1 million poor women participate in the Kudumbasree (Anand, 2002). At present, there are about 1,77,520 NHGs covering urban, rural and tribal areas of Kerala with 1049 CDSs at the local government body level (Kudumbasree, 2007).

According to Kudumbasree report (2005) about 14,524 NHGs are found in Thrissur district and it covered about 2,61,447 families and in Malapuram about 10,662 NHGs with the involvement of 2,51,853 families. In Urban areas of Kerala, the total number of NHGs in 2005 is about 10,687

covering 2,92,207 families and in tribal (5 districts) 2033 NHGs were found with the participation of 32,728 families.

2.3 SOCIO-ECONOMIC CONDITIONS OF WOMEN PARTICIPATING IN KUDUMBASREE

Kerala, the state where the first democratically elected communist government came into power in the world, women's participation in the political sphere is also very low (Kudumbasree, 2001). The proportion of women contesting for elections and getting elected is very small. At national level in 2004 elections the number of women representatives were only two. According to Menon *et al.* (2006) most of the families in rural area are women centered either unwed mother or abandoned wife.

Implementation of Kudumbasree programme has been found very effective, since the women got involved with the activities who were home bound earlier and were not able to interact with outside, are found to be more confident, articulate and decision makers (Gopalan and Bhupathy, 2000). The Kudumbasree women has become socially empowered that they now control the price line in the market of Kothamangalam belt (Ernakulam Dist.) and even could successfully ban arrack brewing and consumption in that area. In this area the women have effectively managed the ban of plastic bags by introducing cloth bags (Menon *et al.*, 2006).

The link of NHGs with banks helped the local economic empowerment along with the social and economic empowerment of women. Through Kudumbasree mission activities, state is experiencing far reaching changes in the economic and social empowerment of poor women (Hafkin and Taggart, 2001).

The economic strength of women in different districts increased by various activities like government farming (Vazathoppu panchayat), rabbit rearing (Kamakshi panchayat), and new innovative ventures like tapioca farming, plantain farming, jasmine farming, paddy cultivation (in Alappuzha district) etc. In Fort Kochi, the beach is cleaned and maintained by women in collaboration with the Tourism Department. Milk product unit in Nedumkandam panchayat expanded their activities by distribution of other milk and milk products through various outlets. Sowkundam Shawl Making unit in Kozhikode is a project which changed the lives of 10 poor women in a fishing neighbourhood. Women can work from home, is a great advantage. Training in nursing was given to women sponsored by Kudumbasree units of Idukki district which is relatively backward in education facilities due to its terrain (State Planning Board, 2001). Kudumbasree is based on participation of women below poverty line. Their monthly income was found to be below Rs.3000 (Isacc *et al.*, 2002).

According to Menon *et al.* (2006), this silent revolution, gave women not only economic independence but also new found self confidence. Many women who were limited to the four walls of the house have found new avenues to step out and new horizons to dream.

Neighbourhood groups are formed among the five primitive tribal groups of Kerala Koragas (Kasargod), Paniyas and Kattunaikans (Wynad and Malappuram), Kadar (Trichur) and Kurumba (Attappadi-Palakkad) (Menon *et al.*, 2006).

2.4 FOOD CONSUMPTION PATTERN OF WOMEN

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

Fifty years of independence has brought about many significant changes in the pattern of food intake and undernutrition in India (Devadas, 2000).

Women, in rural subsistence economics, are the providers of food, fuel and water and the primary caretakers of their families (Rishi, 2001). As major buyers of family food and meal makers, women ensure adequate food security (Singh, 2004).

Women in India are extensively involved in activities related to production, processing, preparation, marketing and selling of different food products. (Deshpande and Ali, 2004). According to Singh (2004) as primary providers of nutrition to the young children, women are the major decision-makers in ensuring nutrition to the next generation.

Cheriyan (1992) and Jayanthakumari (1993) observed deficient intake of pulses and green leafy vegetables among women in the rural households. Chadha *et al.* (1995) observed a lower intake of almost all food groups except cereals in the rural community. Among the food groups the pronounced deficit was observed in the intake of fruits and green leafy vegetable among men and women and least for pulses and cereals (Adhiguru and Ramaswamy, 2003).

FAO and World Bank (1993) reported that in other Asian countries, the intake of flesh foods varied from about 26 g in Myanmar to 44 g in Bangladesh, as compared to about 12 g in Indian dietaries. The study of Khadka (2001) among the rural households of Nepal revealed that majority of the villagers consumed vegetable and fruits on the basis of seasonal availability.

In India the diets are mostly based on plant foods. Gogoi and Bhattacharya (2000) reported inadequate intake of cereals, roots and tubers and other vegetables, milk, sugar and fat and oils among the households of India and

variation in the meal pattern on the basis of occupation was also observed by others.

Meena *et al.* (2000) observed adequate intake of other vegetables, milk and milk products and fats and oils by the women in the rural areas of Parbhani district. Rajkumar and Premakumari (2000) in their studies among women labourers of Coimbatore indicated decreased intake of protective foods in their diet. But in contrast, Agarwal (2001) in his study among the rural households of Delhi observed that intake of cereals and pulses were above the recommended dietary allowances in women whereas the intake of fruits and milk & milk products were much below the RDA. A lower intake of cereals and millets among the adults of Andhra Pradesh was observed by Rahman and Rao (2001). Rajuladevi (2001) in a study among the landless labour households of Tamil Nadu, indicated that majority of the households survived on cereals and the intake of most of the other food groups were low in women when compared with RDA.

Prema *et al.* (1982) reported that in Kerala, rice was the preferred cereal among the labourers but it was often replaced partly or wholly by roots and tubers. A higher intake of roots and tubers was reported by Augustine (1993) among the women engaged in stone breaking in Kerala. Jyothi (2003) observed pulses as a medium frequently consumed food item in the low income groups of rural Kerala and green leafy vegetables were consumed only occasionally by all the families.

Karuna (1993) reported that consumption of vegetables, pulses, eggs and green leafy vegetables were less in fisher women in Thiruvananthapuram district due to lack of knowledge about nutritious foods. Aneena (2003) observed rice and roots and tubers as the staple food among the fisherman households of Thrissur district.

2.5 NUTRIENT INTAKE AND PREVALENCE OF MALNUTRITION AMONG WOMEN

Malnutrition is a condition in which one or two nutrients are less or are in excess in the body (Robinson, 1990; Begum,1991). Malnutrition has been described as a biological state resulting from a relative or absolute deficiency or excess of one or more nutrients (WHO,1993). Malnutrition refers to any disorder of nutrition – whether it is due to dietary deficiency, called undernutrition, or due to excess diet, called overnutrition (Britanica Student Encyclopeadia,2005).

Undernutrition is the result of an in sufficient diet or of a disease state that increases nutrient needs or interferes with the ability to consume and utilize nutrients. Undernutrition is the major form of malnutrition in developing nations, where 840 million people are chronically under nourished (Radhakrishna and Ravi, 2004).

The cycle of malnutrition begins when women consume a deficient diet during pregnancy. These women are more likely to give birth to low birth weight infants (WHO,1997). This is particularly true in developing countries like India.

Malnutrition world wide includes a spectrum of nutrient related disorders, deficiencies and conditions such as intrauterine growth retardation, protein – energy malnutrition, iodine deficiency disorders, vitamin A deficiency and over weight / obesity and other diet related non communicable diseases (Ratzan *et al.*, 2000). Micronutrient deficiencies are a significant cause of malnutrition and associated ill health throughout the world (Manner, 2007).

For social and biological reasons, women of the reproductive age are the most vulnerable to malnutrition (Merchant and Kurtz, 1993; Devasconcellos,1994; Shetty and Jaimes, 1994; Tinker, 1995; Stunkard, 1996; Rotmi *et al.*, 1999).The World Health Organization (1997) estimates that in 1995,

about one million adult deaths resulted from health problems exerbated by malnutrition, while half of it were associated with undernutrition. Many factors have been associated with both forms of malnutrition of women in the literature including socioeconomic, cultural, demographic and dietary characteristics (Griffiths and Bentaley, 2001; Monterio *et al.*,2002, Sukla *et al.*,2002;Radhakrishna and Ravi, 2004; Radhakrishna *et al.*, 2004 and Roy *et al.*, 2004).

In India, which is typically known for large proportions of over weight / obesity, is also existed with the undernourished (IIPS, 2000) and there is some evidence of even emerging nutrition transition also (Shetty, 2002; Shukla *et al.*, 2002; Arnold, 2004). According to WHO (2003), the major cause of malnutrition are increasing urbanization and changes in diet and life style, in particular the "nutrition transition" away from fruits, vegetables and greater consumption of more 'energy-dense, nutrient-poor' diets, dependence on television for leisure along with reduced levels of physical activities.

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

Prevalence of anaemia is higher in rural areas than in urban areas (Whitehead, 1990). Elson (1993) observed that world wide, over 2 billion people suffer from iron deficiency and more than half of them are anaemic. According to studies carried out by the Food and Nutrition Board and NIN (1993) the prevalence of anaemia was noted to be 65 per cent in adult women and 54 per cent in adult men from poor rural communities. Anaemia is the major contributory cause in 20-40 per cent of meternal death. Barbin *et al.* (1998) reported anaemia among women of different weight categories which was found to be 52 per cent for thin women, 50 per cent for normal weight women and 41 per cent for overweight women. The study conducted by Kumar (2000) revealed that anaemia

was observed among 40 per cent of women in the highest socio economic group while among urban poor and rural poor women, the prevalence was found to be 62 per cent and 54 per cent respectively. Singh *et al*. (2001) observed that iron deficiency anaemia is a major health problem resulting in considerable mortality and morbidity in an early age. For severe anaemia the highest and lowest prevalences were observed in rural areas, with the rural high standard of living group exhibiting the lowest (1%) and the rural low standard of living group the highest (3%) prevalence (Bentley and Griffiths, 2003).

Iron deficiency anaemia is the most common nutritional problem in both developed and developing nations (Agarwal, 1991). Iron deficiency anaemia was also observed among the rural women of child bearing age in China (Liu *et al*., 1992) and Costa Rica (Rodeguize *et al*., 2000). A study conducted by Sucharna *et al*. (1992) observed iron deficiency anaemia among 43.5 per cent pregnant women in West Java. Sanchez *et al*. (2000) observed anaemia among 3 per cent of women above 18 years in the Canary island population.

Iron deficiency anaemia among the rural pregnant women in North West Eucador, Ethiopia, Tanzania, Burkina and Mexico was reported by Weigt *et al*. (1992), Haider *et al*. (1999), Antelman *et al*. (2000) and Perez and Alamagnia (2002) respectively. Ansary *et al*. (1999) observed iron deficiency anaemia among mothers in the rural areas of Kohran Abad city. The authors also reported deficient ferritin levels among 25 per cent of women. According to Okafor *et al*. (2001) about half of the women in Yewa South Local Government Area of Ogun State suffered from iron deficiency, and that the deficiency was more pronounced in the first trimester of pregnancy.

Nutritional anaemia is common in 50-70 per cent women who took cereal based vegetarian diet because of excessive body needs of iron (NIN, 1984). According to the studies carried out by Food and Nutrition Board and NIN (1993) the prevalence of anaemia among pregnant women was 75 per cent in India.

Studies conducted at NIN (1993) indicate that a low plasma vitamin A level in pregnant women is associated with lowered maternal Hb concentration. Mukherjee (1994) observed that iron deficiency anaemia is a significant cause of risk for pregnant women and their infants. According to Negi (1999), anaemia is an indirect cause of 1/5th of maternal death (19.3%) in rural India. UNDP (1999) also found anaemia as one of the main causes of maternal death. At the national level more than 50 per cent of the women are anaemic,state wise highest in Assam and lowest in Kerala, Punjab and Maharashtra (Mahipal,2000). Nutritional and regional survey indicated that the prevalence of anaemia could be as high as 74 per cent in children below three years of age, and 85 per cent in expectant mothers in some population group (ICMR, 2001).

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. Seralathan *et al.* (1993) observed that 16 per cent of farm women in Coimbatore district suffered from severe anaemia. A study conducted by Kupputhai and Mallika (1993) among women belonging to Khond, Gadaba and Paija tribes of Andra Pradesh observed anaemia in the form of pallar of conjunctiva and koilonychia. Rajkumar and Premakumari (2000) in their studies among women workers of different occupational sectors in Coimbatore also observed under weight and anaemia. The main cause of this was lack of awareness among people. Remya and Devaki (2000) in their study among women construction workers in Thirupathi observed increased degrees of anaemia associated with deficient intake of iron, vitamin C, protein and energy.

Farzana and Manay (2000) and Singh and Baghe (2001) observed nutritional anaemia among women in rural areas of Karnataka. Dietary intake showed that 8 to 85 per cent of women in Delhi were consuming less than 50 per cent of energy, protein, iron and β-carotene as compared to their RDA. Latafat *et*

al. (2000) found iron deficiency anaemia among dairy and non-dairy families of coastal Andhra. 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.

Udaya (1996) and Smitha (1999) reported anaemia among 60 per cent of farm women and women agricultural labourers respectively of Thrissur district on the basis of haemoglobin status. Jyothi (2003) revealed prevalence of anaemia among 63.33 per cent of women labourers involved in rice cultivation in Palakkad district of Kerala.

Saxena and Taneja (1999) in their studies among pregnant and lactating women at Jhabua district of Madhya Pradesh observed higher rate of morbidity and mortality among women during child bearing age. Kapil *et al*. (1999) indicated that 4.8 per cent of pregnant women in three urban slum communities of Delhi had iron deficiency anaemia. Gopalan (2001) reported 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.

In India, 2000 million people are estimated to be at risk of IDD (Gopalan, 1991). A study conducted by Kapil *et al*. (1999) 22.9 per cent of pregnant women had iodine deficiency disorder. Despite the universalisation of salt since 1984, 70 million Indians suffer from unsightly swelling of the neck caused by over worked thyroid gland (Devaraj *et al*.,1999). The prevalence of goiter is higher among females (Griffiths and Bentley, 2001).

Sucharno *et al*. (1992) reported vitamin A deficiency among 2.5 per cent of pregnant women in Indonesia. Christian *et al*. (1995) reported clinical symptoms of vitamin A deficiency among pregnant women in rural Nepal. Kapil *et al*. (1999) observed retinal deficiency among 4.8 per cent of pregnant women.

Inadequate levels of serum retinol was also observed among mothers in Brazil (Ramalho *et al*., 2001).

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

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

Chronic energy deficiency is associated with increased mortality, impaired physical capacity, poorer reproductive outcomes, reduced economic productivity (NIN,1991; Durnin,1994; Kennedy,1994; WHO,1995; Untoro,1998; Schieve *et al*., 2000). Gupta (1999) reported that greater proportion of female suffer from CED than male and are associated with progressive impairment in morbidity and function.

In China rural women had a higher incidence of CED than their urban counter parts (Ge, 1995). Alam (2001) observed that about 50 per cent of women in rural Bangladesh had CED.

The results of assessment of individual intakes by 24 hour recall reveals that in India the energy intake are about 75-85 per cent of the RDA in different age groups (Thimmayamma and Rau, 1996). The consumption of energy per CU of an Indian is about 8 per cent less than the RDA (ICMR, 1990). Studies

carried out by NNMB in India indicated chronic energy deficiency among 39 per cent of women (NIN, 2002).

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. Among the rural households of Maharashtra, Hyderabad and Delhi a deficient calorie intake was observed by Sar *et al*. (1991), Rahman and Rao (2000) and Singh and Agarwal (2001) respectively. Kupputhai and Mallika (1993) conducted a study among Khond, Gadaba and Preja tribes of Andra Pradesh and reported that 82 to 92 per cent of the tribes had chronic energy deficiency of grade I type. Among the Indian states the level of CED is high in Orrissa (Shetty and James, 1994; Ferro, 1992). Both CED and over weight / obesity are widespread in Kerala and there is a need for public health programmes that are able to address both simultaneously (Gopalan, 1998; Popkin, 2001; Ramesh, 2006). Farzana and Manay (2000) observed optimum energy consumption in the rural households of Karnataka. A study conducted by NIN (2002) in West Bengal indicated different grades of CED among 49 per cent of the women.

Karuna (1993) observed that 33.33 per cent of women engaged in fish vending in Thiruvananthapuram had different grades of energy deficiency. Udaya (1996) also observed different grades of energy deficiency among farm women in Thrissur district. Smitha (1999) observed grade I and grade II chronic energy deficiencies (CED) among 18 per cent and 3.33 per cent respectively among women agricultural labourers of Thrissur district. Jyothi (2003) reported various grades of CED among 43.33 per cent of women agricultural labourers in Palakkad district.

2.6 FACTORS INFLUENCING THE NUTRITIONAL STATUS OF WOMEN

The average diet of the working women in all less developed countries is almost invariably inadequate in calories, animal proteins, vitamins and minerals necessary for proper health and optimum work efficiency (ICMR, 1990).Sundari (1990) pointed out that for women employed as casual laborers, their job, inspite of providing greater economic freedom, result in greater drudgery and consequently poor nutritional status. Employment and economic improvement of women combined with education, health social inputs would definitely serve as a motivation for consuming nutritious food (Vijayalakshmi,1991).

Among rural households, women's time use and opportunities for off employment might be the important variables mediating nutritional status of women (Ashmar and Curry,1994). The maternal knowledge on nutrition is an important factor in influencing nutritional intake of household members (Brahmam,1995). Household income, educational level and occupation of the head of the household and size of household affect the nutritional status (WHO,1997). According to King *et al*. (1997) an individual's occupation has been shown to have a significant effect on the type of food consumed and their nutritional status and physical activity. Poverty is the first source of limitation on the consumption of food by large sections of the population (Swaminathan,1996 and Sing, 1998).

Socio-economic factors such as income, occupation and migration have a profound influence on nutrient intake, while among the biological factors, sex and physiological status of women emerge as strong variables in influencing nutrient intake (Busi and Saileela,1999). Venkitalakshmi and Peramma (2000) in their study observed that women's poor health status, was mainly due to unequal intrafamilial distribution of food and unequal provision of health care. Women have been the focal point for family health and have been referred to as the

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

According to Rajkumar and Premkumari (2000), women's health and nutritional status are affected by socio- economic conditions like poverty, illiteracy, over work, repeated pregnancies, high infant and maternal mortality rates, defective health care services, faulty food habits hazardous work environment, infection and infestations. Nation wide surveys have indicated that nutritional status and the psychological needs of women received low priority in the family (Despande *et al.*, 2001).

The most important social, economic and cultural dimensions which affect women's provision of nutrition are, women's employment, women's decision making power, the way of disposal of their income and their ability to cook and serve adequate quantities of food to individual household members (Khetarpaul and Grover,2001).Women's access to and control over assets is an important determinant of their ability to lead a healthy life (Despande *et al.*,2001).According to Yongok (2001) income and education are the most important variables influencing the food and nutrient consumption.

2.7 INCOME GENERATING ACTIVITIES OF RURAL WOMEN PARTICIPATING IN KUDUMBASREE

Kudumbasree aims at promotion of income generation activities for poor women, which will help them to earn more income that will help to achieve economic self-sufficiency (Singh, 2004).

According to Anand (2002), it is widely accepted that the returns from the economic activity are used not only for women's welfare but also for the welfare of their children and the family and the community at large. To facilitate the savings of the poor, 7863 NHGs in Urban area act as thrift and credit societies also. Savings collected in the urban area during 2002-2003 year come to the tune of Rs.423.17 lakhs and the cumulative savings crossed Rs.1990 lakhs (Kudumbasree Annual Report, 2003).

Irrespective of the voluntary agency, majority of the members had gone in for poultry and cow and goat-rearing Anand (2002). Of the total, 27 per cent belonged to this category. As in other rural areas, this activity has proved to be low risk, low cost economic activity for supplementing family income without much effort (Heeks, 2004).In the case of Kudumbasree, income generation and saving activities are used as a route to empowerment of poor women, making them independent and come out of the vicious cycle of poverty. This way, even nutritional status, maternal and child care issues can also be improved (Kudumbasree, 2007).

The basic assumption underlying the provision of micro credit is that the investment made with that credit would generate income, adequate to contribute significantly to family earnings (Varghese, 1993). The increased income have helped to supplement the family income, and to reduce the levels of poverty to a great extent in several families (Kanbur, 2001).The contribution of micro enterprise to total family income is found to be significant indicating the positive impact of strategy (Anand, 2002).

Agriculture, vegetable cultivation including cultivation of banana and tapioca proved to be viable ventures (Persen, 1999). Shakthi Hollow-Bricks unit in Iddinjangode, a hilly village in Palakkad district, is another example of success of self help groups in rural areas (Vimala, 2004).

In Chunguthara, goat-keeping is an ideal activity as gazing is possible in the nearby forest (Anand, 2002). In spite of the tendency among beneficiaries to under report income, most of them stated to have generated a monthly income ranging from Rs.50 to Rs.3000. Most of them also had availed repeat loans. The main source of credit included thrift and loans from bank.

Some members of CDS who started papad-making, curry powder etc., had to stop the venture due to low demand for the product. However, in *Shreyas* in Chungathara one of the members could carry on the activity of papad-making successfully as she was a traditional papad-maker and had regular clients. From this it was evident that those who had some business experience earlier were able to make use of micro-credit more effectively (Anand,2002).

Four Kudumbasree members had taken loan for tailoring and purchase of sewing machines at Malapuram. The innovative group activity of direct marketing of Sabari tea and Supplyco's other products on commission basis taken up by some members are also found to be very remunerative, yielding an average of Rs.1500 per month per member (Anand, 2002). The soda-making unit, which had been a viable one earlier, is now facing tough competition from branded soft-drink products.

Study of Anand (2002) revealed that umbrella making group of Chungathara panchayat (Malappuram district) has availed loan from NABARD and two other voluntary agencies and their average gross monthly income from this enterprise ranged from Rs.700 to Rs.1500.

According to the Report of Kudumbasree (2003) in setting up of micro enterprises for the poor and enabling to take up livelihood activities, Kudumbasree has developed its own methodology. So far 27,477 women from urban area and 2.07 lakh women from rural areas were given the sustainable self employment opportunities with reasonable income. The activities taken up include

those of sun rise sector such as, IT, agri business, tourism related activities, food processing, dairy products, solar cookers, integrated coconut processing (Kerashree), tissue culture, yathrashree (Chain Hotels), solar dried vegetables and fruits, hotels and restaurants, surgical kit and sanitary napkin, ayurvedic tooth powder and allied products. Agri-horti-herbal nurseries, exclusive vanilla nurseries, solid waste management units, bio fertilizer manufacturing units, multi purpose job clubs, courier service and several other activities in service, business and industry sectors are also run by women from poor families.

The poverty Eradication Mission of Kerala trained the poor women of Neelivayal (Idukki district) to initiate rabbit rearing in a micro enterprise in the panchayath. The success stories of these women become glorious as the Idukki district constitute highest number of suicides among the agrarian families (Kudumbasree Annual Report, 2003).

In 80 per cent of the members with economic activities, their income from micro enterprises contributed considerably to the family income directly or indirectly (Kudumbasree, 2005).

New Info IT established in Kattappana, an urban village in Idukki district of Kerala, has become an icon of women empowerment in the high range. They have initiated their IT intervention with a loan amount of Rs.2,50,000 and offering various courses in IT at an affordable fee (Kudumbasree, 2005).

The experience of a woman in CDS who took a loan for cultivating banana and betel in 1.25 acres in Malappuram district is an excellent example of an activity with high returns. Sericulture done as a group activity by members of Kudumbasree seems to have generated on an average Rs.2000 per month (Menon *et al.*, 2006). Seed nursery set up by a group with the support from Krishi Bhavan is a welcome step (Kudumbasree, 2006).

Micro finance is being used by Kudumbasree as a major tool for poverty eradication. It is only finance at their door step but they themselves manage it. Put together they have mobilized Rs.432.34 crores and lent Rs. 874.78 crores (Menon *et al.*, 2006).

Materials and Methods

3. MATERIALS AND METHODS

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

3.1 Selection of the study area

3.2 Selection of sample

3.3 Plan of study

3.4 Methods adopted for the study

3.5 Development of tools

3.6 Conduct of the study and

3.7 Interpretation of data

3.1 SELECTION OF STUDY AREA

The study was conducted in Thrissur district. A list of panchayats with 'A'grade Kudumbasree units in the district was prepared, from which one panchayat was selected randomly for the study. Thus Nadathara panchayat formed the study area.

3.2 SELECTION OF SAMPLE

From the list of Ayalkootams in Nadathra panchayat, 20 Ayalkootams were selected randomly and from each Ayalkootam, 5 women in the age group of 20-40 years were selected at random. A control group consisting of 20 women in the same socio-economic and age group who were not participating in Kudumbasree activities were also selected from the same panchayat. Thus a total of 120 women (20-40years) formed the sample for the study.

From the selected 20 Ayalkootams, 3 Ayalkootams were randomly selected and all the 15 women in the selected 3 Ayalkootams and 10 women in the control group were subjected to a detailed study.

3.3 PLAN OF STUDY

Based on the objectives of the study, the plan of the study was designed, which included

3.3.1 A base line survey to collect the socio economic status of the families and details regarding the involvement in Kudumbasree activities using a structured and pre tested interview schedule.

3.3.2 A dietary survey to assess the food consumption pattern of the families

3.3.3 Assessment of nutritional status of selected women by conducting

a) An anthropometric survey to record the height and weight of the selected women.

b) Clinical examination of a sub sample (25 women subjects) to identify the manifestations of symptoms related to malnutrition.

c) A one-day food weighment survey in a sub sample of 25 women to determine the actual food and nutrient intake.

d) Haemoglobin estimation in blood in a sub sample of 25 women.

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

3.4 METHODS ADOPTED FOR THE STUDY

Determination of suitable methods and procedures are very important to get accurate and reliable data. According to Wilkinson and Bhandharkar (1979) interview method yield an almost perfect sample of the general population and the

information secured is likely to be more correct compared to that secured through other techniques. In this study, interview method was used with the help of structured and pre tested schedules to collect the required information about the socio economic background, personal information and food consumption pattern of the selected families.

According to Bass *et al.* (1979), interview method is the most suitable way to collect data since it proceeds systematically and enables quick recording. The information received from an interview schedule is more reliable as the accuracy of the statements can be checked by supplementary questions (Gupta,1987).

According to Thimmayamma and Rau (1996), the dietary habits of individuals or families or communities vary according to different factors. Precise information on food consumption patterns of people, through the application of appropriate methodology is often needed not only for assessing the nutritional status of the people but also for elucidating the relationship of nutrient intakes with deficiency as well as degenerative diseases.

Anthropometric indices, presence of clinical deficiency signs, dietary assessment and actual food intake were widely used as direct parameters of nutritional status (Aebi, 1983). According to Rao and Vijayaraghavan (1996), anthropometry can help in the assessment of sub clinical stages of malnutrition and it has been recognized as a reliable tool to identify nutritionally vulnerable groups.

Nutritional anthropometry is the measurement of human body at various ages and levels of nutritional status (Rao and vijayaraghavan, 1996). Anthropometry has been accepted as an important method for assessment of nutritional status and it is a simple and practical index (Jelliffee, 1966; Cooper

and William, 1982; Mc Laren *et al.*, 1984; Vijayaraghavan, 1987; Sharma and Kalia, 1990; Reddy *et al.*, 1993; and Rao and Vijayaraghavan, 1996).

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

Body weight is the most widely used and simplest anthropometric measurement for the evaluation of nutritional status (Swaminathan, 1987). It is sensitive even to small change in nutritional status (Rao and Vijayaraghavan, 1996). Body weight is a sensitive indicator of nutritional status (Venkitalakshmi and Peramma, 2000).

Crown-heel length or height deficit is an indicator of long term malnutrition. According to Gopaldas and Sheshadry (1987), the extent of height deficit in relation to age as compared to regional standards can be regarded as a measure of malnutrition.

Body Mass Index (BMI) is used as an indicator of nutritional status of adults (Brahmam,1995). In order to assess the Chronic Energy Deficiency (CED) of women, BMI was calculated by the formula,

$$BMI = Weight(Kg) / Height(m^2)$$

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

Clinical examination is an important and sound method of assessing the nutritional status of a community (Jelliffee, 1966; Kamath, 1986). Clinical examination provides direct information of signs and symptoms of dietary

deficiencies prevalent among people (Swaminathan, 1986). According to Rao and Vijayaraghavan (1987) clinical examination reveals the anatomical changes due to malnutrition that can be diagnosed by naked eye. In the present study clinical examination was conducted in a sub sample of 25 women by the help of a qualified physician.

Food weighment method can give accurate values of dietary intake. Food consumption surveys provide data on the type and amount of food consumed by a representative sample of the survey population. Food weighment method is the most reliable method to assess the actual food intake of an individual (Devadas and Easwaran, 1986).

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

In one day food weighment method, foods are actually weighed using an accurate balance with standard weights and measures. This forms the main equipment and a structured diet survey schedule is the study instrument. Any single day or two day weighment method could be as efficient as tool as seven days (Rao, 1974). Since the present study was in a panchayat area, a one day food weighment survey was conducted among the sub sample.

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

haemoglobin. Hence, in the present study biochemical estimation of blood was conducted in 25 women to assesss their haemoglobin level using cyanmethemoglobin method.

3.5 DEVELOPMENT OF TOOLS

Tools are certain instruments, which are used in research for gathering new facts. To collect information regarding the socio economic and dietary pattern of the families, interview method was used. A pilot study was conducted on non sample respondents and the interview schedule was finalized based on this. The schedule was structured to include data on the type of the family, family size, distribution of family members according to age and sex, educational and occupational status of family members, income from Kudumbasree activities, total income, domestication of animals, details of land holdings, indebtedness, source of loan, savings, monthly expenditure pattern, living conditions, health facilities utilized, morbidity pattern, nature of activities involved in Kudumbasree programmes, training programmes attended and attitude towards the development programmes. The pre-tested questionnaire is presented in Appendix I.

A dietary survey questionnaire was also constructed to collect details regarding the dietary habits of the families mainly food expenditure pattern, food habits, food beliefs, frequency of use of various foods, foods during special conditions, cooking methods and hygienic practices followed. The pre tested questionnaire is presented in Appendix II.

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

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

Haemoglobin was estimated by cyanmetheamoglobin method as suggested by NIN (1983). The procedure is given in Appendix V.

3.6 CONDUCT OF THE STUDY

3.6.1 Socio economic and dietary pattern of the families

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

3.6.2 Assessment of nutritional status

3.6.2.1 *Anthropometric measurements*

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

Height was measured using a fiberglass tape. The subject was asked to stand without slippers, with the heels buttocks, shoulder and occipit against the wall. The height was recorded in centimeters. The procedure of measuring height is presented in plate no.2.

3.6.2.2 *Clinical examination*

Clinical examination was conducted with the help of a qualified physician. In the present study clinical examination was conducted in a sub sample of 25 women (Plate no. 3).

3.6.2.3 *Food weighment survey*

To assess the actual food and nutrient intake of women, a one day food weighment survey was conducted in a sub sample of 25 women. The weight of raw ingredients included in the meal for a day and the weight of cooked foods prepared by the family were recorded. Actual foods consumed by the women were weighed and any other extra food taken by the women outside the house was also recorded. All these weights were taken with standard measuring cups and spoons and also by means of a food weighing balance (Plate no.4). The amount of cooked food consumed by the women was then converted to its raw equivalents. This study was conducted for one day and the nutritive value of the foods consumed was computed using food composition tables (Gopalan *et al.*, 1991).

3.6.2.4 *Estimation of blood haemoglobin level*

Blood haemoglobin level in a sub sample of 25 women was estimated using cyanmetheamoglobin method suggested by NIN (1983).

3.7 INTERPRETATION OF DATA

To interpret the results, the data was analysed using percentage analysis, t – test, χ^2 - test and correlation analysis.

Plate no. 1 Procedure of measuring weight

Plate no. 2 Procedure of measuring height

Plate no.3 Clinical examination of women

Plate no. 4 Method of food weighment

Results

4. RESULTS

The results of the study on "Nutritional profile of women participating in Kudumbasree programmes" are presented under the following headings.

4.1 Socio-economic profile of the families

4.2 Food consumption pattern of the families

4.3 Nutritional status of the respondents assessed by

a) Anthropometric measurements

b) Clinical examination

c) Food weighment survey

d) Biochemical estimation of blood

4.1 SOCIO-ECONOMIC PROFILE OF THE FAMILIES

The socio-economic profile of the families was studied with special reference to their religion, caste, type of the family, family size, age, sex, educational status and occupational status of family members, income from Kudumbasree activities, total income, domestication of animals, details of land holdings, indebtedness, source of loan, savings, monthly expenditure pattern, living conditions, health facilities utilized, morbidity pattern, nature of activities involved in Kudumbasree programmes, training programmes attended and attitude towards the programme.

Religion, caste, type of family and family size

Distribution of families according to religion, caste, type of family and family size are presented in Table 1. As revealed, most of the Kudumbasree member families (KM families) (62%) and Non member families (NM families) (65%) were Hindus and the remaining belonged to Christian Community.

Regarding their caste, among KM families 38 per cent were Roman Catholics, 21 per cent were Kumbarans, 18 per cent were Viswakarmas, 16 per cent were Ezhavas, 4 per cent were Velans and 3 per cent were Ezhuthachans. Among NM families, 35 per cent were Roman Catholics, 25 per cent were Kumbarans, 20 per cent were Ezhavas, 15 per cent were Viswakarmas and 5 per cent were Ezhuthachans.

Regarding the type of families, majority of the KM families (68%) and NM families (55%) followed a nuclear family system.

Regarding the family size, 45 per cent of KM families and 35 per cent of NM families had 4 members. About 20 per cent of KM families had 5 members whereas it was 30 per cent in NM families. Six and more than 6 members were found in 19 per cent of KM families and in 20 per cent of NM families. In KM families, 12 per cent were having 3 members and the remaining 4 percent families showed a family size of 2 members. But in NM families, the remaining 15 per cent were having 3 members.

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

Sl No.	Category	Number of families	
		KM (n =100)	NM (n = 20)
1	Religion		
	Hindu	62(62)	13(65)
	Christian	38(38)	7 (35)
2	Caste		
	Ezhuthachan	3(3)	1(5)
	Velan	4(4)	-
	Ezhava	16(16)	4(20)
	Viswakarma	18(18)	3(15)
	Kumbaran	21(21)	5(25)
	Roman catholic	38(38)	7(35)
3	Type of family		
	Nuclear	68(68)	11(55)
	Joint	32(32)	9(45)
4	Family size		
	2	4(4)	-
	3	12(12)	3(15)
	4	45(45)	7(35)
	5	20(20)	6(30)
	6	9(9)	2(10)
	> 6	10(10)	2(10)

Figures in parenthesis indicate percentage
KM - Kudumbasree member families
NM - Non member families

Age and sex wise distribution of family members

Distribution of family members based on age and sex is presented in Table 2. In 100 KM families there were a total of 454 members, out of which 223 were male members (49.1%) and 231 female members (50.9%).Among 454 members,17.4 per cent were children in the age group of 0-10 (both boys and girls) and 18.1 per cent were in the age group of 11-20 . About 37.3 per cent of members were in the age group of 21-40, 19.12 per cent in the age group of 41- 60 and 7.92 per cent above the age of 60.

Age wise distribution of total male members (223) in KM families revealed that, about 45.2 per cent were children (0-10) and adolescents in the age group 11-20 years. About 21.1 per cent of male members were in the age group of 21-40 years and 28.2 per cent between 41-60 years. About 5.4 per cent male members were above the age of 60.

Age wise distribution of the total female members (231) in the KM families revealed that, 10.4 per cent were children in the age group of 0-10 years and 15.6 per cent were adolescents in the age group of 11-20 years. About 53.2 per cent of female members were in the age group of 21-40 years and 10.4 per cent between 41-60 years. About 10.4 per cent female members were above the age of 60.

In 20 NM families there were a total of 87 members. Out of which 42 were male members (48.3%) and 45 female members (51.7%). Among 87 members, 18.4 per cent were children in the age group of 0-10 years (both boys and girls) and 17.3 per cent were in the age group of 11- 20 years. About 43.7 per cent of members were in the age group of 21-40 years, 17.23 per cent in the age group of 41-60 years and 3.44 per cent above the age of 60.

Age wise distribution of total male members (42) in NM families revealed that 45.2 per cent belonged to children and adolescent group. About 33.2 per cent of male members were in the age group of 21-40 years and 16.6 per cent between 41-60 years. About 4.8 per cent male members were above the age of 60.

Age wise distribution of the total female members (45) in the NM families revealed that 26.6 per cent were children and adolescents. About 53.3 per cent of female members were in the age group of 21-40 years and 17.8 per cent between 41-60 years. About 2.2 per cent female members were above the age of 60.

Table 2. Age and sex wise distribution of family members

Age	Number of Males		Number of Females		Total	
	KM	NM	KM	NM	KM	NM
>60	12(5.4)	2(4.8)	24(10.4)	1(2.2)	36(7.9)	3(3.4)
51 - 60	13(5.8)	3(7.1)	8(3.5)	7(15.5)	21(4.6)	10(11.4)
41 - 50	50(22.4)	4(9.5)	16(6.9)	1(2.3)	66(14.5)	5(5.74)
31 - 40	31(13.9)	13(30.9)	77(33.3)	18(40)	108(23.7)	31(35.6)
21 - 30	16(7.2)	1(2.3)	46(19.9)	6(13.3)	62(13.6)	7(8.04)
11 - 20	46(20.6)	9(21.4)	36(15.6)	6(13.3)	82(18.1)	15(17.2)
0 - 10	55(24.6)	10(23.8)	24(10.4)	6(13.3)	79(17.4)	16(18.4)
Total	223(100)	42(100)	231(100)	45(100)	454(100)	87(100)

Figures in parenthesis indicate percentage
KM - Kudumbasree member families
NM - Non member families

Educational status of family members (>18 years)

The educational status of family members above 18 years of age is presented in Table 3. Among 131 male and 184 female members above 18 years of age in the KM families, 40.5 per cent male and 47.8 per cent of female members had studied upto high school level. In NM families, out of 32 male and 37 female members above 18 years of age, 28.2 per cent male and 45.9 per cent female members had studied up to this level. About 5.3 per cent of male and 7.06 per cent of female in the KM families and 15.62 per cent of male and 8.1 per cent of female in the NM families were found to be illiterates. Only 6.9 per cent of male and 13.04 per cent of female in the KM families had college level of education while it was found to be about 3.12 per cent and 13.5 per cent respectively in NM families. Three point eight per cent of male members above

Table 3. Distribution family members on the basis of educational status

Educational status	Age in years															
	18 - 45				45 - 55				> 55				Total			
	Male		Female		Male		Female		Male		Female		Male		Female	
	KM	NM	KM	NM	KM	NM	KM	NM	KM	NM	KM	NM	KM	NM	KM	NM
Lower primary	7 (7.69)	2 (7.7)	1 (0.7)	1 (3.6)	14 (53.8)	-	10 (45.4)	2 (100)	7 (50)	1 (25)	12 (46.1)	3 (42.9)	28 (21.4)	3 (9.3)	23 (12.5)	6 (16.2)
Upper primary	26 (28.6)	11 (42.3)	28 (20.6)	5 (17.9)	7 (26.9)	1 (50)	7 (31.8)	-	1 (7.1)	-	1 (3.8)	1 (14.2)	34 (25.9)	12 (37.5)	36 (19.6)	6 (16.2)
High school	50 (54.9)	8 (30.8)	83 (63.0)	17 (60.7)	3 (11.5)	1 (50)	5 (22.7)	-	-	-	-	-	53 (40.5)	9 (28.1)	88 (47.8)	17 (45.9)
College	8 (8.8)	1 (3.8)	24 (17.6)	5 (17.9)	1 (3.8)	-	-	-	-	-	-	-	9 (6.9)	1 (3.1)	24 (13.04)	5 (13.5)
Illiterate	-	2 (7.7)	-	-	1 (3.8)	-	-	-	6 (42.8)	3 (75)	13 (50)	3 (42.9)	7 (5.3)	5 (15.6)	13 (7.06)	3 (8.1)
Total	91 (100)	26 (100)	136 (100)	28 (100)	26 (100)	2 (100)	22 (100)	2 (100)	14 (100)	4 (100)	26 (100)	7 (100)	131 (100)	32 (100)	184 (100)	37 (100)

Figures in parenthesis indicate percentage, KM - Kudumbasree member families , NM - Non member families

45 years of age in the KM families had college level education. But none of the female members in the KM families and both male and female members in the NM families above 45 years of age had college level education.

Educational status of respondents

Details regarding the educational status of the respondents are presented in Table 4. Among KM respondents, 63 per cent had high school level education. About 13 per cent of respondents had attained college level education. About 23 per cent of the respondents had received upper primary level of education while lower primary level was observed in one per cent. Among NM respondents, 10 per cent and 5 per cent of the respondents had attained upper primary and lower primary level of education respectively. About 70 per cent had high school level of education and 15 per cent had college level education. There were no illiterates among KM and NM respondents.

Table 4.Educational status of respondents

Sl No.	Educational status	Number of respondents	
		KM(n=100)	NM(n=20)
1	Illiterate	-	-
2	Lower primary	1(1)	1(5)
3	Upper primary	23(23)	2(10)
4	High school	63(63)	14(70)
5	College	13(13)	3(15)

Figures in parenthesis indicate percentage
KM - Kudumbasree member
NM - Non member

Table 5a. Educational status of children and adolescents of KM families

Sl No.	Educational status	0 – 4years		5-9 years		10-12 years		13-15 years		16-17 years		Total	
		B	G	B	G	B	G	B	G	B	G	B	G
1	Not started studies	9 (52.9)	6 (75)	-	-	-	-	-	-	-	-	9 (9.8)	6 (13.0)
2	Anganwadi	8 (47.0)	2 (25)	-	-	-	-	-	-	-	-	8 (8.6)	2 (4.3)
3	Lower primary	-	-	27 (100)	8 (100)	1 (4.2)	-	-	-	-	-	28 (30.4)	8 (17.3)
4	Upper primary	-	-	-	-	23 (95.8)	9 (100)	5 (33.3)	-	-	-	28 (30.4)	9 (19.5)
5	High school	-	-	-	-	-	-	10 (66.7)	12 (100)	4 (44.4)	3 (33.3)	14 (15.2)	15 (32.6)
6	College	-	-	-	-	-	-	-	-	5 (55.6)	6 (66.7)	5 (5.4)	6 (13.0)
7	Illiterate	-	-	-	-	-	-	-	-	-	-	-	-
Total		17 (100)	8 (100)	27 (100)	8 (100)	24 (100)	9 (100)	15 (100)	12 (100)	9 (100)	9 (100)	92 (100)	46 (100)

Figures in parenthesis indicate percentage, KM - Kudumbasree member, B – Boys, G - Girls

5b. Educational status of children and adolescents of NM families

Sl No.	Educational status	0 – 4years		5-9 years		10-12 years		13-15 years		16-17 years		Total	
		B	G	B	G	B	G	B	G	B	G	B	G
1	Not started studies	1 (25)	-	-	-	-	-	-	-	-	-	1 (5.2)	-
2	Anganwadi	3 (75)	2 (100)	-	-	-	-	-	-	-	-	3 (15.8)	2 (15.3)
3	Lower primary	-	-	7 (100)	4 (100)	3 (100)	1 (100)	-	-	-	-	10 (52.6)	5 (38.5)
4	Upper primary	-	-	-	-	-	-	-	-	-	-	-	-
5	High school	-	-	-	-	-	-	1 (100)	2 (100)	4 (100)	2 (50)	5 (26.3)	4 (30.7)
6	College	-	-	-	-	-	-	-	-	-	2 (50)	-	2 (15.3)
7	Illiterate	-	-	-	-	-	-	-	-	-	-	-	-
Total		4 (100)	2 (100)	7 (100)	4 (100)	3 (100)	1 (100)	1 (100)	2 (100)	4 (100)	4 (100)	9 (100)	46 (100)

Figures in parenthesis indicate percentage, NM - Non member, B – Boys,G - Girls

Educational status of children and adolescents

Educational status of children and adolescents in KM and NM families are presented in Table 5a and 5b.As revealed in KM families, in the age group of 0-4 years 52.9 per cent of boys and 75 per cent of girls had not started their formal education, and the remaining boys (47.1%) and girls (25%) were attending non formal preschool education like in anganwadi. In NM families among this age group, 25 per cent boys have not started formal education while 75 per cent boys and 100 per cent girls were attending anganwadi. All the children in the age group of 5-9 years in both KM and NM families were going to lower primary schools. Ninety five point five per cent of boys in the age group of 10-12 in KM families were studying in upper primary classes whereas it was 100 per cent among girls. About 33.3 per cent of boys in the age group of 13-15 were studying in upper primary classes. In NM families there were no children studying in upper primary classes.

Among 13-15 years, high school boys were 66.7 per cent whereas 100 per cent girls in this age group were studying in high schools in KM families. In NM families all the children in this age group were in high school. In KM families among 16-17 years, 44.4 per cent of boys were in high school and 55.6 per cent were in college. Among girls it was 33.3 per cent and 66.7 per cent respectively. In NM families among this age group, 100 per cent of boys and 50 per cent of girls were in high school whereas 50 per cent girls were in college.

Occupational status of family members

Details on the occupational status of the family members are given in the Table 6. Out of the total male population (130) above 18 years, in KM families, 46.2 per cent were working as coolies and 14.6 per cent were not engaged in any work. About 54.34 per cent female members in KM families were engaged in Kudumbasree activities while 38.6 per cent were not engaged in any work. In NM families 13.3 per cent of male and 97.3 per cent of female members were not engaged in any work. Other major types of occupations of the male

members in KM and NM families were driver (17.7 and 6.7%), carpenter (6.2 and 16.7%) and business (8.5 and 13.3%). About 3.8 per cent of male members in KM families were tailors. In NM families 46.7 per cent of the male members and 2.7 per cent of female members worked as coolies.

Table 6. Occupational status of family members (>18 years)

Occupation	Male		Female	
	KM	NM	KM	NM
Govt. employee	1(0.8)	-	-	-
Coolie	60(46.2)	14(46.7)	11(5.97)	1(2.70)
Driver	23(17.7)	2(6.7)	-	-
Carpenter	8(6.2)	5(16.7)	-	-
Business	11(8.5)	4(13.3)	-	-
Mechanic	3(2.3)	1(3.3)	-	-
Tailor	5(3.8)	-	2(1.1)	-
Kudumbasree activities	-	-	100(54.34)	-
No work	19(14.6)	4(13.3)	71(38.6)	36(97.3)
Total	130(100)	30(100)	184(100)	37 (100)

Figures in parenthesis indicate percentage
KM - Kudumbasree member families
NM - Non member families

Marital status of the respondents

Marital status of the respondents is presented in Table 7. It was observed that 78 percent of the KM respondents and 80 per cent of the NM respondents were married and 5 per cent in each group were divorced. Ten per cent of KM respondents were unmarried. Seven per cent and 10 per cent of KM respondents and NM respondents respectively were widowed.

Table 7. Marital status of respondents

Sl. No.	Category	Number of families	
		KM (n = 100)	NM (n = 20)
1	Married	78 (78)	16(80)
2	Unmarried	10(10)	1(5)
3	Divorced/Separated	5(5)	1(5)
4	Widowed	7(7)	2(10)

Figures in parenthesis indicate percentage

KM - Kudumbasree member

NM - Non member

Nature of Kudumbasree activities and income of the respondents

As revealed in Table 8, in the selected 20 units, there are mainly 7 types of income generating activities viz chocolate making, biofertilizer making, banana products making, convenient food making, papad making, garment making and clay work (Plate no.5 to 8).

Clay work was the activity adopted by 7 units followed by garment making (6 units). Three units were engaged in papad making, and one unit each for chocolate making, biofertilizer making, banana products and convenient food making. Ten units were having 6 members per unit, 7 units with 5 members, 2 units with 7 members and one unit with 8 members.

The unit with convenient food making generated maximum income among the selected 20 units and each member of the unit got a maximum return of Rs. 1666 per month.

The monthly income of clay work units (7 units), ranged between Rs. 4500-7000 involving 35 respondents and majority of the respondents in this unit (20 respondents) got more than Rs.1000 per month.

The monthly income of garment making units (6 units), ranged between Rs. 6000-9000 involving 30 respondents and all the respondents got more than Rs. 1000 per month.

The monthly income of papad making units (3 units), ranged between Rs. 3000-5000 involving 15 respondents and only 5 respondents got Rs.1000 per month.

The other 3 units viz chocolate making, biofertilizer making and banana products making, each having 5 respondents per unit, the income ranged from Rs.3000-3500 and each respondent got Rs.600 and below. The respondents in biofertilizer making unit got the least monthly income of less than Rs.500 per respondent.

Table 8. Nature of Kudumbasree activities and income earned by the respondents

Sl. No.	Nature of activities in the selected units	No.of members in a unit	Income/month /unit (Rs.)	No. of respondents	Income of each respondent/month
1	Chocolate making	5	3000	5	600
2	Biofertilizer making	8	3500	5	437
3	Banana products making	5	3000	5	600
4	Convenient food making	6	10,000	5	1666
5	Papad making	6	3000	5	500
6	Papad making	5	4000	5	800
7	Papad making	5	5000	5	1000
8	Garment making	5	6000	5	1200
9	Garment making	5	6500	5	1300
10	Garment making	5	7000	5	1400
11	Garment making	6	9000	5	1500
12	Garment making	7	8000	5	1143
13	Garment making	6	8500	5	1417
14	Clay work	6	4500	5	750
15	Clay work	6	7000	5	1167
16	Clay work	6	7000	5	1167
17	Clay work	6	4500	5	750
18	Clay work	6	6500	5	1083
19	Clay work	6	6500	5	1083
20	Clay work	7	5000	5	714

Monthly income of KM respondents

Details regarding the monthly income earned by KM respondents from Kudumbasree activities are given in Table 9. Majority of the families (55%) received more than Rs.1000 per month from their activities in Kudumbasree. Five per cent of the members received less than Rs.500 and 40 per cent of the remaining members received an income between Rs.500- 1000 per month.

Table 9. Average monthly income of KM respondents from kudumbasree activities

Sl. No.	Income(Rs.)	KM respondents (n=100)
1	< 500	5
2	500 - 1000	40
3	>1000	55

KM - Kudumbasree members

Activities and monthly income of Kudumbasree units

As revealed, maximum income in the range of Rs. 9001-10,000 was for the unit preparing convenient foods. Two units involved in garment making obtained an income of Rs. 8001-9000. One of the garment making unit got an income ranging from Rs.7001-8000. An income ranging from Rs.6001-7000 was obtained by 6 units consisting of 2 garment making and 4 clay work units. A monthly income Rs. 5001-6000 was earned by one garment making unit. Income ranging from Rs. 4001-5000 was observed for 4 units consisting of 1 papad unit and 3 clay work units. Monthly income below Rs.4000 was observed for 5 units like chocolate making, banana product making, biofertilizer making and 2 units of papad making.

Plate no.5 Products of chocolate making unit

Plate no. 6 Tailoring unit

Plate no.7 Bio fertilizer making unit

Plate no.8 Clay work unit

Table 10. Activities and monthly income of Kudumbasree units

Sl. No.	Monthly income of units	No.of units(n=20)	No.of respondents (n=100)	Activity of the units
1	2001-3000	3	15	Chocolatemaking,papad making banana products making
2	3001-4000	2	10	Biofertilizer making, papad making
3	4001-5000	4	20	Papad making, clay work, clay work, clay work
4	5001-6000	1	5	Garment making
5	6001-7000	6	30	Garment making, garment making, clay work, clay work, clay work,
6	7001-8000	1	5	clay work
7	8001-9000	2	10	Garment making
8	9001-10,000	1	5	Garment making, Garment making Convenient foods preparation
Total		20	100	

Monthly income of the families

Distribution of families according to monthly income is given in Table 11. Seventy nine per cent of the KM families had monthly income ranging in between Rs.2001 - 3000 while among NM families it was only 35 per cent. Most of the NM families (50%) had monthly income between Rs.1001 - 2000. In

KM families about 14 per cent were having an income ranging from Rs.3001 - 4000 whereas it was only 10 per cent in NM families. One per cent of KM families had monthly income above Rs.4001 whereas none of the NM families had this level of monthly income. The comparison of monthly income of KM and NM families are given in Figure 1.

Table 11. Monthly income of the families

Sl. No.	Income(Rs.)	Number of families	
		KM (n = 100)	NM (n = 20)
1	500 - 1000	1(1)	1(5)
2	1001 - 2000	5(5)	10(50)
3	2001 - 3000	79(79)	7(35)
4	3001 - 4000	14(14)	2(10)
5	>4001	1(1)	-

Figures in parenthesis indicate percentage
KM - Kudumbasree member families
NM - Non member families

Contribution to monthly income by the KM respondents

As revealed in Table 12, thirty one to forty per cent of monthly income of family was contributed by 34 per cent of KM respondents. About 41-50 per cent of the family income was contributed by 31 per cent the KM respondents. Fourteen per cent of women contributed 51-60 per cent of the monthly income of their family and 61-70 per cent of monthly income was contributed by one respondent. About 20 per cent of women showed a contribution of 10–30 per cent to the family income. Contributions to family income by the KM respondents are given in Figure 2.

Figure 1. Comparison of monthly income of KM and NM families

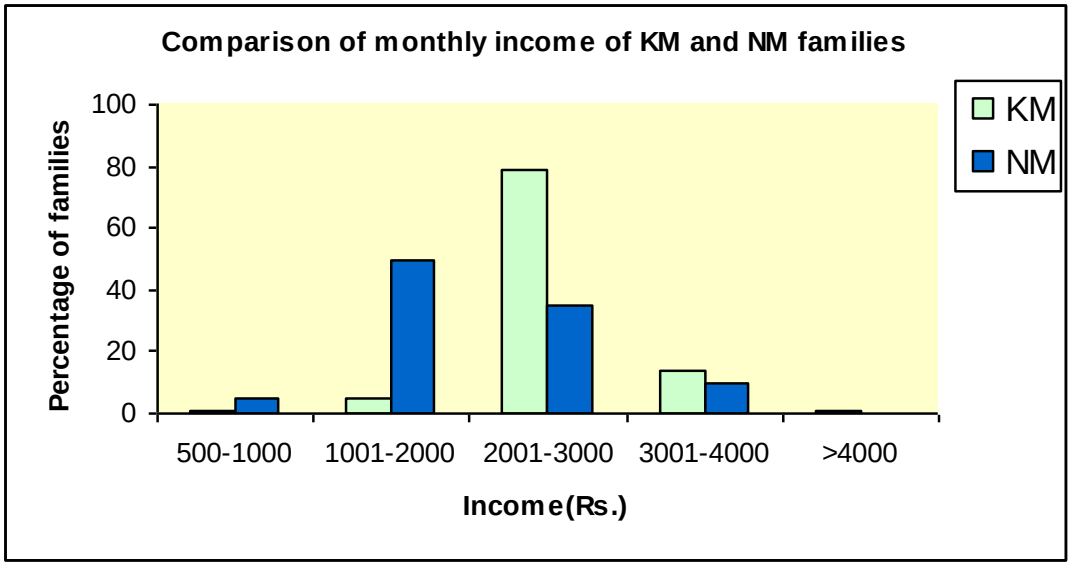


Figure 2. Contribution to monthly income by the KM respondents

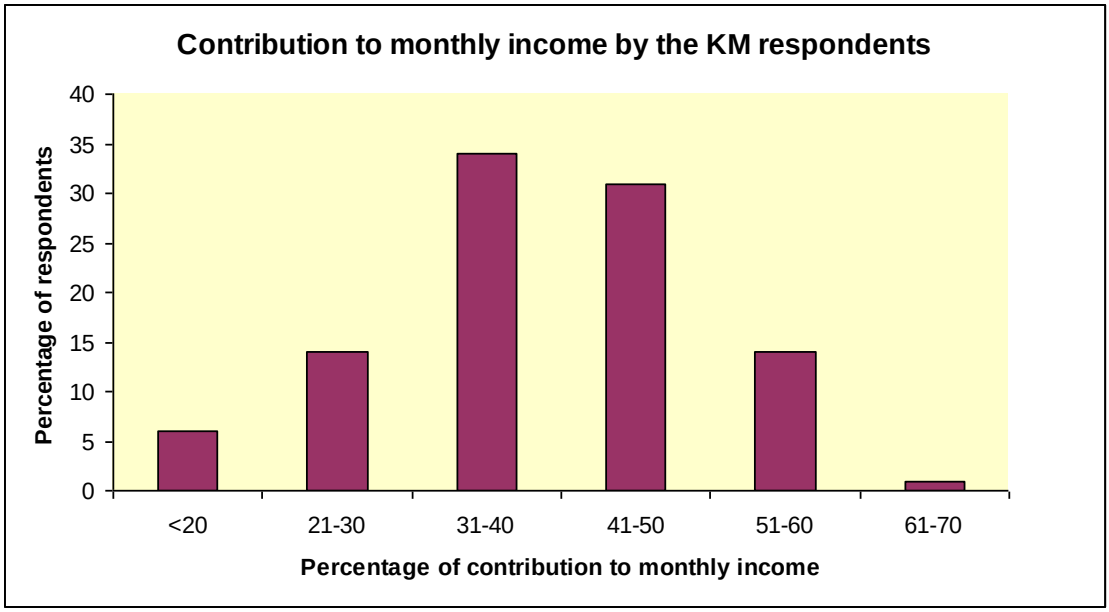


Table12.Contribution to monthly income by the KM respondents

Percentage of contribution to monthly income	Number of respondents (n=100)
10-20	6(6)
21-30	14(14)
31-40	34(34)
41-50	31(31)
51-60	14(14)
61-70	1(1)

Figures in parenthesis indicate percentage

Domestication of animals

The details of domestication of animals by the families are given in Table13. Among KM families only 4 per cent had domestic animals whereas in NM families 10 per cent had domestic animals. But 95 per cent of NM families were not getting any income from domestic animals.

Table 13. Details of domestication of animals

Sl. No.	Category	Number of families	
		KM (n = 100)	NM (n = 20)
1	Domestic animals present	4 (4)	2 (10)
2	Domestic animals absent	96 (96)	18 (90)
3	Receiving income	0 (0)	1(5)
4	Not receiving income	100 (100)	1(95)

Figures in parenthesis indicate percentage
KM - Kudumbasree member families
NM - Non member families

Details of land holdings

Details regarding the land holdings of the families are given in Table14. All the KM families and NM families owned land. Most of the KM families (97%) owned 5-15 cents and rest of the families owned more than 15 cents of land. Among the NM families 50 per cent had 5- 10 cents and 30 per cent

had 11- 15 cents. None of the NM families had more than 15 cents of land. Twenty per cent of the NM families owned less than 5 cents of land.

Majority of the families (98%) of both groups had no specific cultivation in their land.

Table14. Details of land holding by the families

Sl. No.	Area(cent)	Number of families	
		KM (n = 100)	NM (n = 20)
1	< 5	0(0)	4 (20)
2	5 -10	62(62)	10 (50)
3	11 – 15	35(35)	6 (30)
4	>15	3(3)	0 (0)

Figures in parenthesis indicate percentage
KM - Kudumbasree member families
NM - Non member families

Indebtedness

The details of loan taken by the families are given in Table 15a,15b and 15c. It was observed that majority of the KM families (88%) borrowed money from the Kudumbasree fund and also from Kudumbasree and banks (22%) whereas in the case of NM families 80 per cent took loan from kuris and the remaining families (20%) from banks. Regarding the purpose of loan (Table 15b), 60 percent KM families took loan only for house construction whereas it was only 20 per cent among NM families. Among this group 40 per cent took loan only for marriage of the family members whereas it was only 7 per cent among KM families. Both house construction and marriage was the purpose of loan for 35 per cent of NM families but loan for this purpose was 22 per cent among KM families. Business was the purpose of loan for 6 per cent and 5 per

cent of KM families and NM families respectively. Besides this, KM families (2%) took loan for repaying loans, treatment of family members (1%) and for educational purposes (2%).

Table 15 c revealed the amount of loan taken by the families for various purposes. Among KM families, 40 per cent took a loan ranging from Rs.20,000-30,000 and 32 per cent took loan ranging from Rs.10,000 – 20,000. Among NM families most of the families (50%) took a loan ranging from Rs.40,000-50,000 and 35 per cent took a loan ranging from Rs.70,000-80,000. In both groups, 5 percent took loan ranging from Rs.90,000 to 1lakh.

Table 15 a Source of loan taken by the families

Sl. No.	Source of loan	Number of families	
		KM (n = 100)	NM (n = 20)
1	Kudumbasree	88 (88)	-
2	Kudumbasree and Bank	22 (22)	-
3	Bank	-	4 (20)
4	Kuri	-	16(80)

Figures in parenthesis indicate percentage
KM - Kudumbasree member families
NM - Non member families

Table 15b. Purpose of loan taken by the families

Sl. No.	Purpose	Number of families	
		KM (n=100)	NM (n=20)
1	House construction	60(60)	4(20)
2	Marriage	7(7)	8(40)
3	House construction and Marriage	22(22)	7(35)
4	Debt clearance	2(2)	-
5	Business	6(6)	1(5)
6	Treatment	1(1)	-
7	Education	2(2)	-

Figures in parenthesis indicate percentage
KM - Kudumbasree member families
NM - Non member families

Table 15c. Details of amount of loan taken by the families

Sl. No.	Amount of loan(Rs.)	Number of families	
		KM (n=100)	NM (n=20)
1	10,000 – 20,000	32(32)	2(10)
2	20,000 – 30,000	40(40)	-
3	30,000 – 40,000	-	-
4	40,000 – 50,000	5(5)	10(50)
5	50,000 – 60,000	-	-
6	60,000 - 70,000	-	-
7	70,000 – 80,000	18(18)	7(35)
8	80,000 – 90,000	-	-
9	90,000 – 1 lakh	5(5)	1(5)

Figures in parenthesis indicate percentage
KM - Kudumbasree member families
NM - Non member families

Savings

Details regarding the savings are given in Table 16a and 16b. From the tables it was observed that all the KM families (100%) saved money whereas savings was found only in 45 per cent of NM families .Fifty five per cent of NM families had no monthly savings. Among KM families with savings, majority (53%) invested in Life Insurance Schemes and Kudumbasree whereas among NM families with savings, 44.4 per cent saved in Life Insurance Schemes. Forty four per cent of KM families invested in Kudumbasree itself as the revolving fund and 3 per cent invested in kuris. About 55.6 per cent of families with savings in NM families invested in kuris.

Table16a. Details regarding the savings by the families

Sl. No.	Details	Number of families	
		KM (n = 100)	NM (n = 20)
1	Saved money	100(100)	9(45)
2	No saving	-	11(55)

Figures in parenthesis indicate percentage
KM - Kudumbasree member families
NM - Non member families

Table 16b Details regarding the mode of saving by the families

Sl. No.	Details	Number of families	
		KM	NM
1	Life Insurance Scheme and Kudumbasree	53(53)	-
2	Life Insurance Scheme	-	4(44.4)
3	Kudumbasree and Chitty/ Kuri	3(3)	-
4	Kudumbasree	44(44)	-
5	Chitty/ Kuri	-	5(55.6)
Total		100(100)	9(100)

Figures in parenthesis indicate percentage
KM - Kudumbasree member families, NM - Non member families

Monthly expenditure pattern of the families

Table 17a and 17b presents the percentage of income spent on food, clothing, shelter, education, transport, recreation, electricity, health, fuel, remittance, savings, and others by the families.

It is seen that 59 per cent of KM families spent between 46-50 percent of their income for food while this was in 85 per cent in NM families (Figure 3). Majority of KM families (60%) and NM families (85%) spent 5-10 per cent of their monthly income on clothing. Thirty eight per cent of KM families spent 11-15 per cent on clothing (Figure 4). About 90 per cent of the KM families spent 5 - 15 per cent of their monthly income for shelter. In NM families majority (85%) spent less than 5 per cent for shelter (Figure 5). It was observed that 61 per cent of the KM families spent 5-10 percent of their monthly income for different modes of transportation facilities utilized by family members and it was less than 5 per cent in 95 per cent of NM families. Fifty per cent of the KM families spent less than 5 per cent of income for recreation purposes and all the NM families spent less than 5 per cent. About 47 per cent of KM families spent 5-10 per cent of their income for recreation purposes. Five to Ten per cent expenditure was observed for electricity for majority of KM families (95%) and it was 60 per cent for NM families.

About 73 per cent of the KM families spent 5 –20 per cent of their monthly income for education while 70 per cent of NM families spent less than 5 per cent for education (Figure 6). Among KM families 86 per cent spent 5-10 per cent of their income for health aspects whereas 55 per cent of NM families spent less than 5 per cent for this purpose. About 40 per cent of NM families were found to spend 5-15 per cent for health aspects. In 70 per cent of KM families expenditure for fuel was 5-10 per cent whereas all the NM families showed an expenditure below 5 per cent in this aspect. About 29 per cent of KM families never spent anything on fuel. Personal expenditure as well as for luxury items, 85

per cent of KM families spent 5-10 per cent while 85 per cent of NM families spent less than 5 per cent. About 15 per cent of NM families showed no expenditure in this regard.

Most of the KM families (76%) saved less than 5 per cent of their monthly income whereas only 45 per cent of NM families showed a saving of less than 5 per cent. About 23 per cent of KM families saved 5-10 per cent. In NM families 55 per cent had no saving at all(Figure 7).

In KM families about 62 per cent used 5-15 per cent of their income for various types of remittance whereas in NM families 90 per cent used 5-15 per cent for remittance. Thirty eight per cent of KM families used only less than 5 per cent of their income for remittance. But in NM families 5 per cent used 16-20 per cent of their income for remittance(Figure 8).

Total income and monthly expenditure pattern of KM and NM families were compared applying t-test and are presented in Table 18.The results revealed that in KM families the expenditure for various items were significantly high than in NM families except in the expenditure for health, fuel and remittance. There was no significant difference in the expenditure pattern for health and fuel between KM and NM families. The expenditure of KM families on remittance was found to be significantly low compared to NM families.

Table 17a. Percentage distribution of KM families on the basis of monthly expenditure pattern

Percentage of income	Number of families (n = 100)											
	Food	Clothing	Shelter	Transport	Recreation	Education	Electricity	Health	Fuel	Luxuery & Personal	Remittance	savings
<□5	-	-	9	39	50	1	1	12	1	15	38	76
5-10	-	60	71	61	47	22	95	86	70	85	49	23
11-15	-	38	19	-	3	34	1	1	-	-	13	1
16-20	-	2	1	-	-	17	-	-	-	-	-	-
21-25	-	-	-	-	-	-	-	-	-	-	-	-
26-30	-	-	-	-	-	-	-	-	-	-	-	-
31-35	-	-	-	-	-	-	-	-	-	-	-	-
36-40	22	-	-	-	-	-	-	-	-	-	-	-
41-45	18	-	-	-	-	-	-	-	-	-	-	-
46-50	59	-	-	-	-	-	-	-	-	-	-	-
>50	1	-	-	-	-	-	-	-	-	-	-	-
Nil	-	-	-	-	-	26	3	1	29	-	-	-

KM - Kudumbasree member families

Table 17b. Percentage distribution of NM families on the basis of monthly expenditure pattern

Percentage of income	Number of families (n = 20)											
	Food	Clothing	Shelter	Transport	Recreation	Education	Electricity	Health	Fuel	Luxuery & Personal	Remittance	savings
<□5	-	10	85	95	100	70	60	55	100	85	5	45
5-10	-	85	15	5	-	20	25	20	-	-	25	-
11-15	-	5	-	-	-	-	-	20	-	-	65	-
16-20	-	-	-	-	-	-	-	-	-	-	5	-
21-25	-	-	-	-	-	-	-	-	-	-	-	-
26-30	-	-	-	-	-	-	-	-	-	-	-	-
31-35	-	-	-	-	-	-	-	-	-	-	-	-
36-40	5	-	-	-	-	-	-	-	-	-	-	-
41-45	10	-	-	-	-	-	-	-	-	-	-	-
46-50	85	-	-	-	-	-	-	-	-	-	-	-
>50	-	-	-	-	-	-	-	-	-	-	-	-
Nil	-	-	-	-	-	10	15	5	-	15	-	55

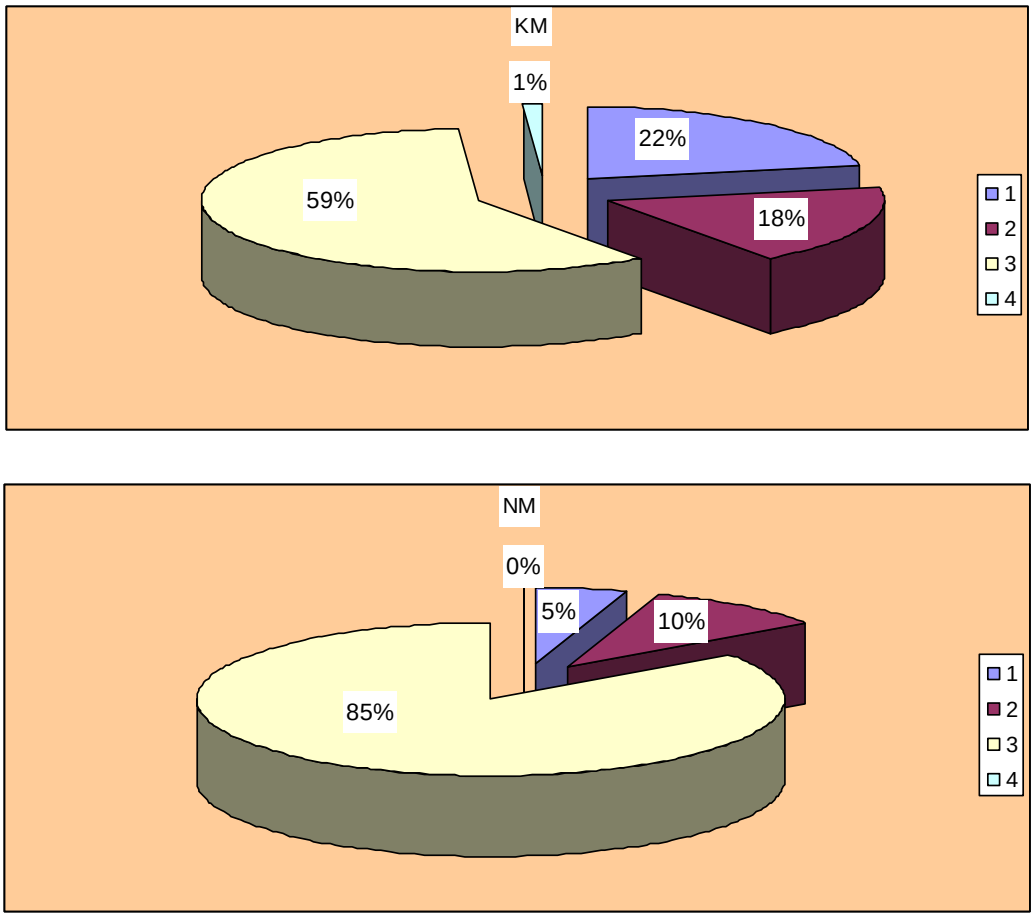
NM - Non member families

Table 18. Comparison of income and monthly expenditure pattern of KM and NM families

Items of expenditure	Average expenditure(Rs.) Mean ± SE		t value between the groups
	KM (n=100)	NM (n=20)	
Food	1223.89±30.7	1008.5±80.5	2.77**
Clothing	276.81±8.1	177.85±16.1	5.02**
Shelter	222.9±15.6	93.89±10.5	3.63**
Transport	124.0±4.0	81.20±8.81	4.34**
Recreation	133.14±8.81	46.63±6.4	4.36**
Education	275.61±21.2	94.05±17.5	3.76**
Electricity	171.74±6.17	101.8±12.2	4.71**
Health	140.35±5.13	135.0±17.6	0.383^{NS}
Fuel	113.37±8.22	84.67±9.28	1.518^{NS}
Luxury & Personal	129.15±3.84	51.48±7.9	8.34**
Remittance	175.05±10.6	238.8±18.3	-2.53**
Savings	224.06±10.02	.000±.000	9.96**

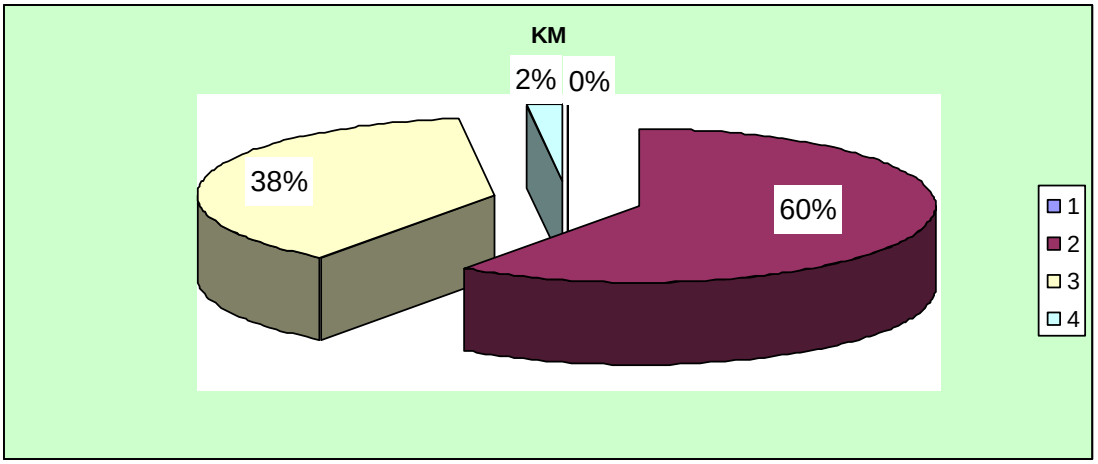
KM - Kudumbasree member families, NM - Non member families
** - Significant at 5% level, NS – Non significant

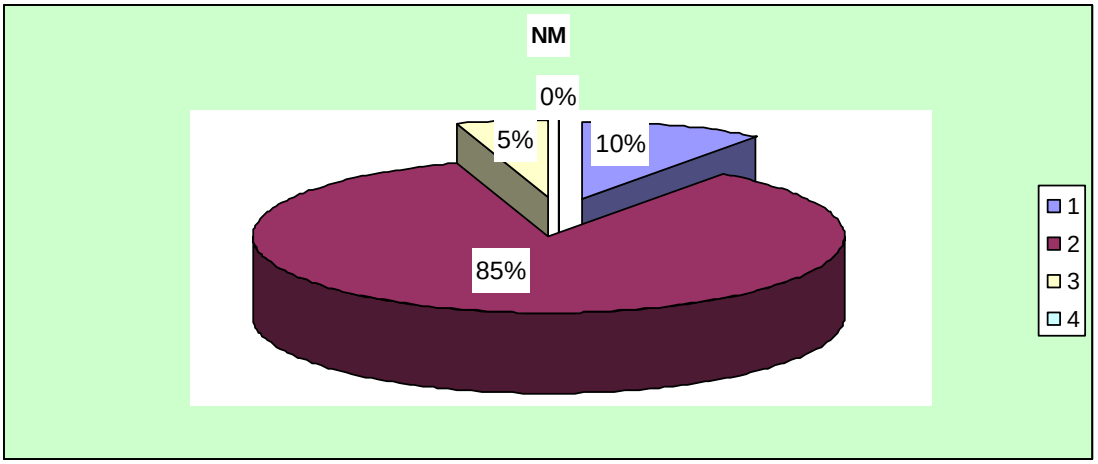
Figure 3. Monthly expenditure of income for food by KM and NM families



1. 36-40% of monthly income
2. 41-45% of monthly income
3. 46-50% of monthly income
4. >50% of monthly income

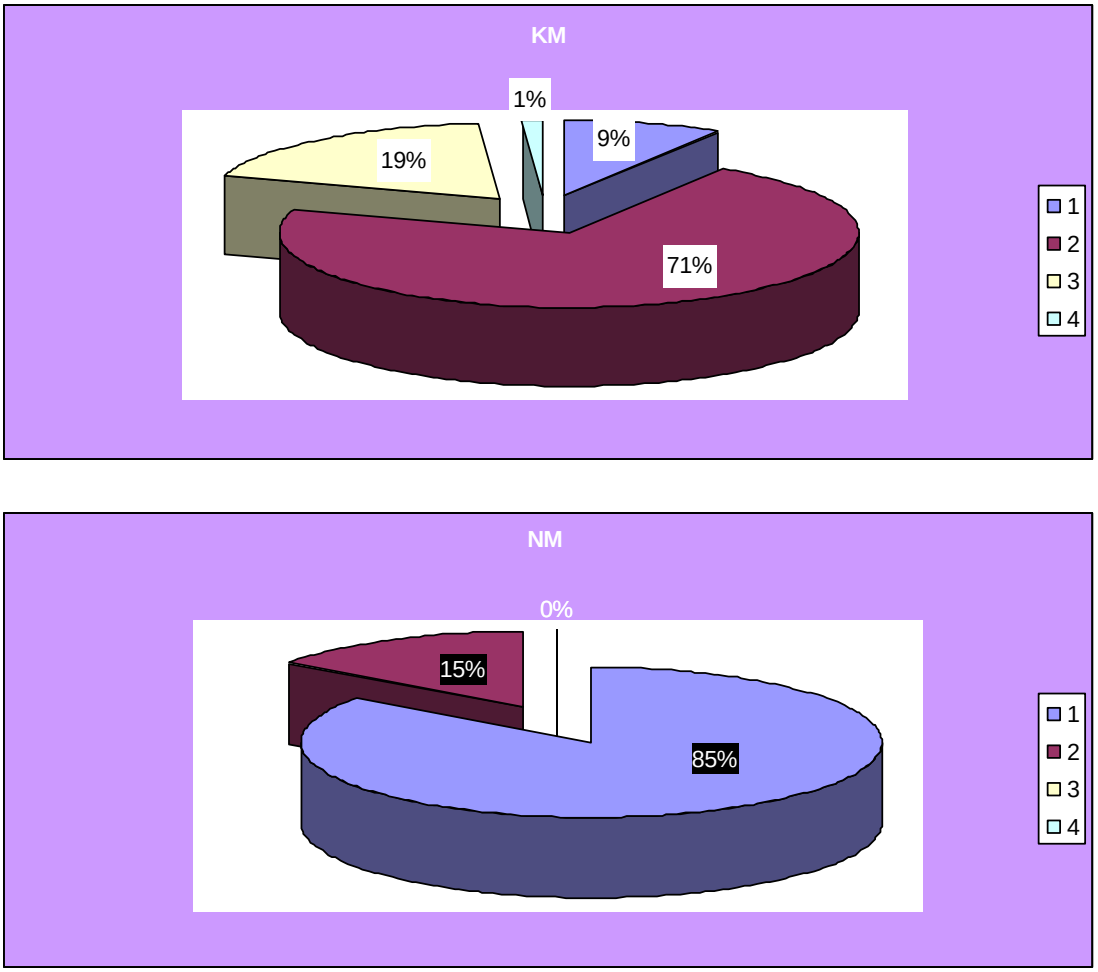
Figure 4. Monthly expenditure of income for clothing by KM and NM families





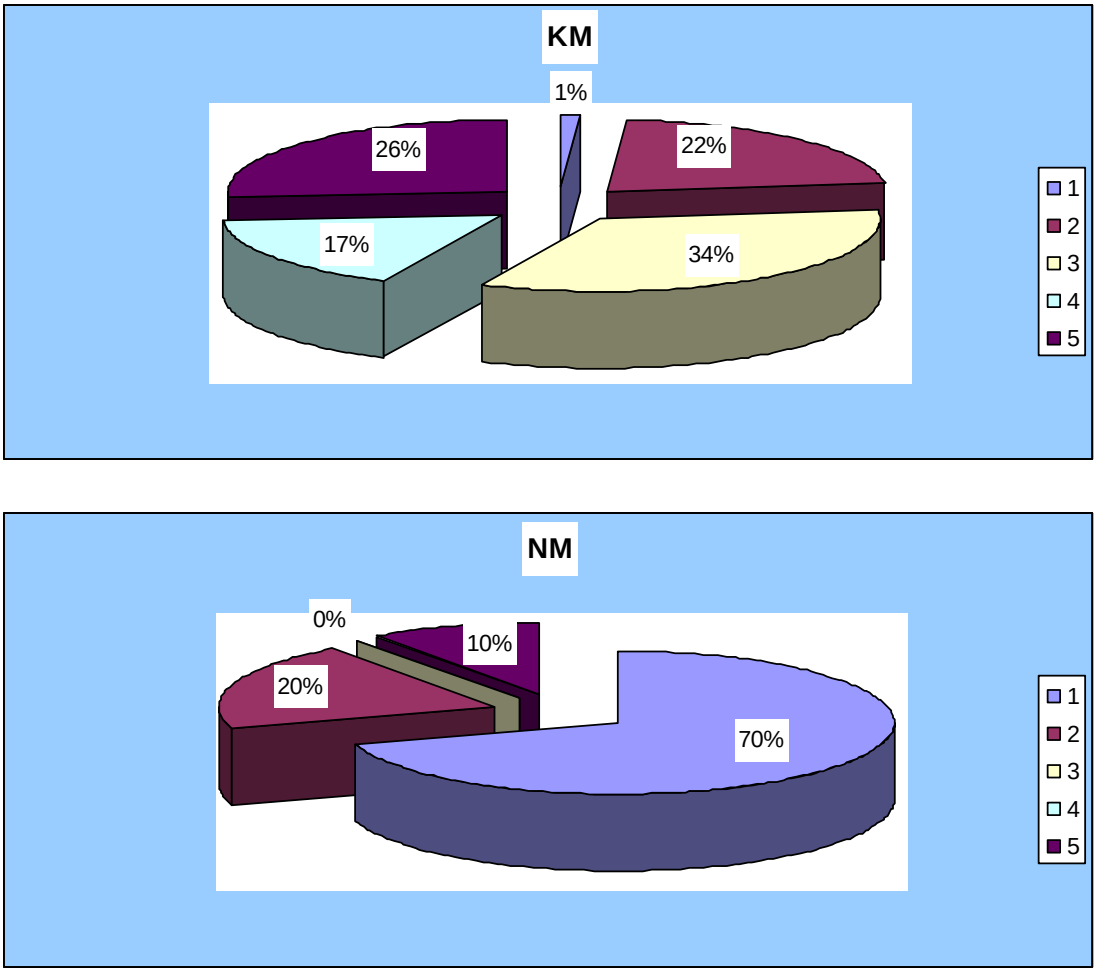
1. <5% of monthly income
2. 5-10% of monthly income
3. 11-15% of monthly income
4. 16-20% of monthly income

Figure 5. Monthly expenditure of income for shelter by KM and NM families



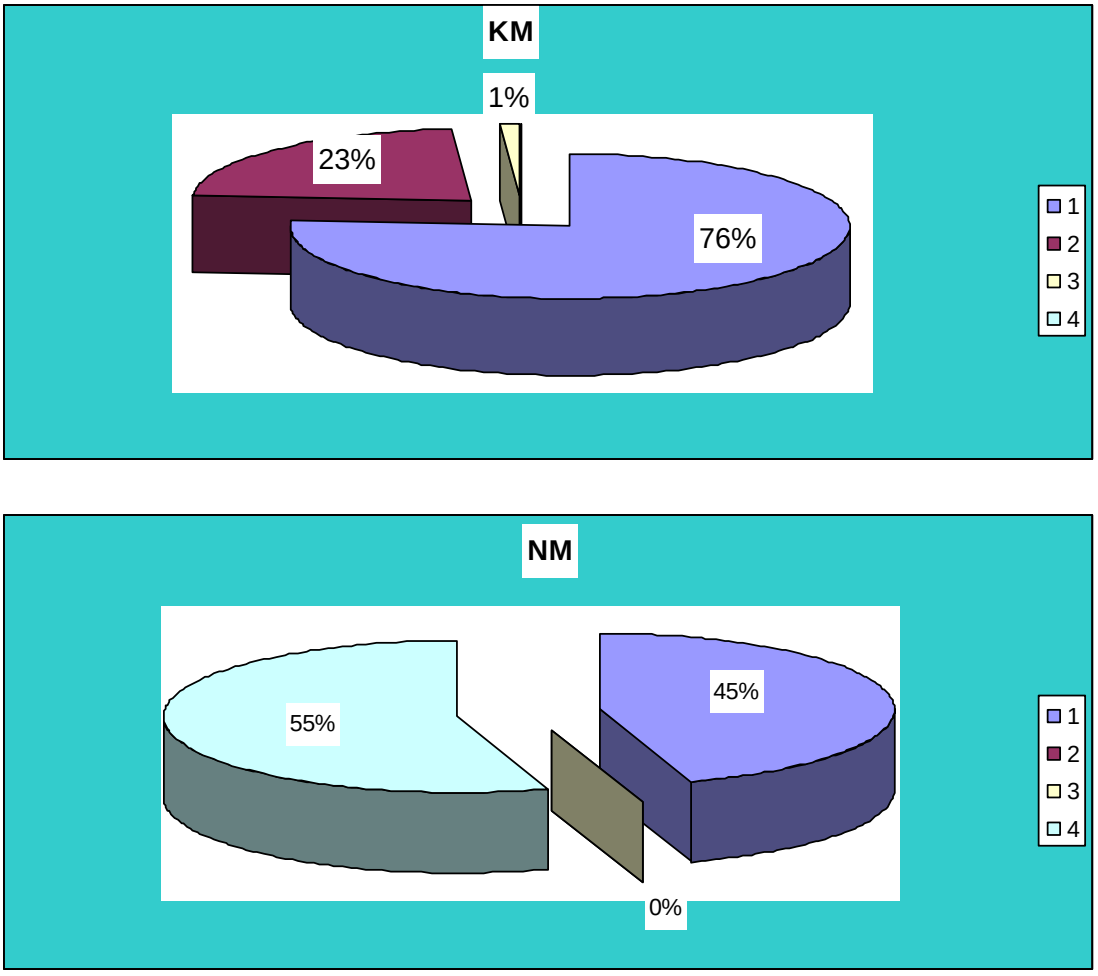
1. <5% of monthly income
2. 5-10% of monthly income
3. 11-15% of monthly income
4. 16-20% of monthly income

Figure 6. Monthly expenditure of income for education by KM and NM families



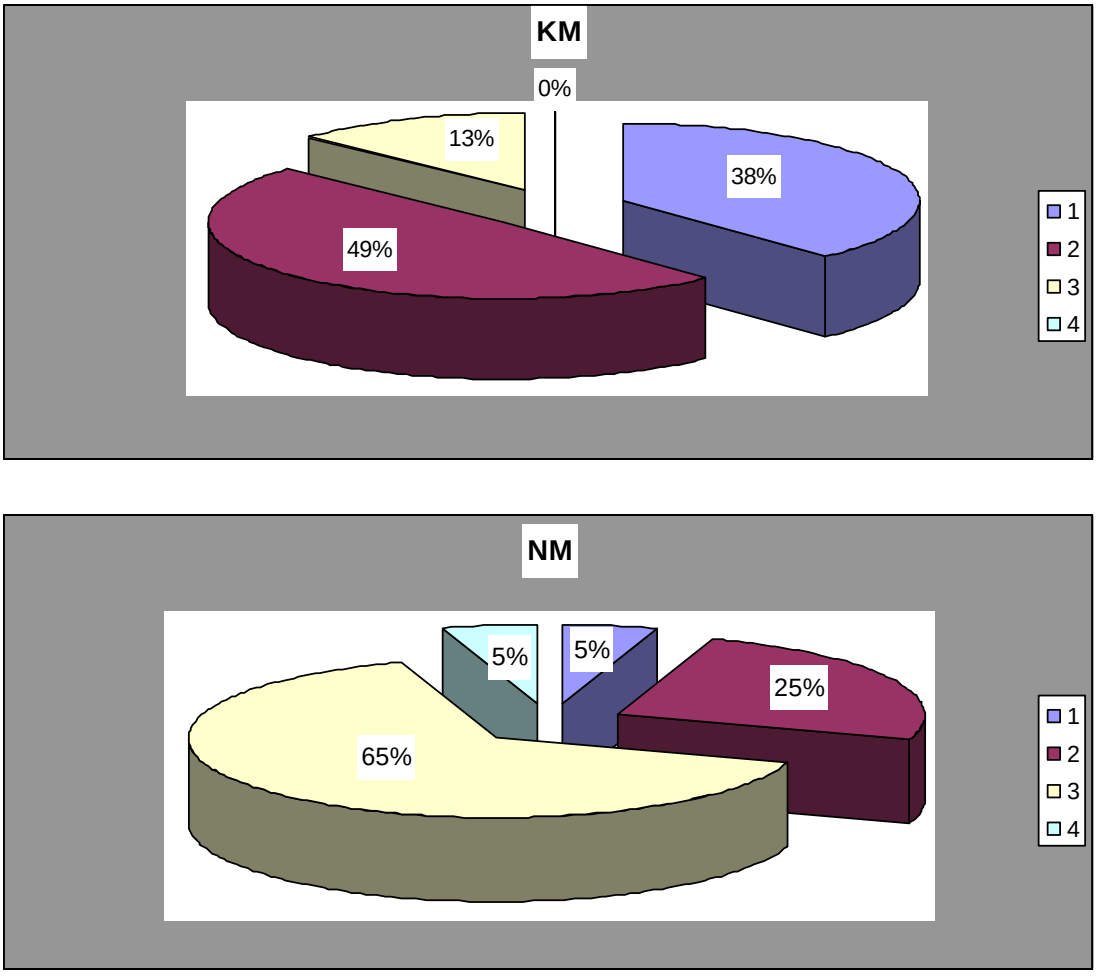
1. <5% of monthly income
2. 5-10% of monthly income
3. 11-15% of monthly income
4. 16-20% of monthly income
5. Nil

Figure 7. Monthly expenditure of income for savings by KM and NM families



1. <5% of monthly income
2. 5-10% of monthly income
3. 11-15% of monthly income
4. Nil

Figure 8. Monthly expenditure of income for remittance by KM and NM families



1. <5% of monthly income
2. 5-10% of monthly income
3. 11-15% of monthly income
4. 16-20% of monthly income

Living conditions of the families

Details regarding the living conditions of the families are presented as housing conditions and other living facilities in Table 19a and 19b. Majority of the KM families (99%) and NM families (90%) were living in their own houses. Most of the KM families (82%) had houses with 3-5 rooms with brick wall and tiled roof. Two to three rooms were observed in houses of 75 per cent of NM families and most of them had tiled roof (95%). Five percent of NM families had thatched roof and 15 per cent had mud wall for their houses. Five per cent of KM families had concrete roof and 3 per cent had double storeyed house.

Regarding other living facilities of the families (Table19b), majority of the KM (97%) and NM (95%) families had their own well. All the families in both groups had lavatory facilities. Majority of the KM (85%) and NM families (75%) had proper drainage facilities in their surroundings. In NM families 25 per cent houses were without drainage facilities whereas in KM families it was 15 per cent. Except for 3 per cent, all the households had electricity facilities in KM families, while in NM families 15 per cent had no electric connection.

Majority of the KM families (75%) had TV while this was found only in 45 per cent of NM families. About 94 per cent of KM families possessed either a TV or both TV and radio but in NM families it was only in 70 per cent. Majority of KM and NM families had proper public transport facilities in their locality.

In KM families 71 per cent used wood as well as LPG as fuel for cooking, whereas this was only 10 per cent in NM families. About 90 per cent of the NM families used only fire wood for cooking and this was only in 29 per cent among KM families. Regarding the source of fuel, 71 per cent of KM families collected fire wood as well as purchased, whereas in 75 per cent of NM families fuel was mainly purchased.

Table 19a. Details of living conditions of households

Sl. No.	Housing conditions	Number of families	
		KM (n=100)	NM (n=20)
1	**Ownership**		
	Own house	99(99)	18(90)
	Rented house	1(1)	2(10)
2	**Type of wall**		
	Mud	2(2)	3(15)
	Brick	98(98)	17(85)
3	**Type of roof**		
	Thatched	-	1(5)
	Tiled	95(95)	19(95)
	Concrete	5(5)	-
4	**Type of house**		
	Single storeyed	97(97)	20(100)
	Double storeyed	3(3)	-
5	**Total No. of rooms including kitchen**		
	1 room	-	1(5)
	2 room	-	6(30)
	3 room	2(2)	9(45)
	4 room	10(10)	3(15)
	5 room	72(72)	1(5)
	>5 room	16(16)	-

Figures in parenthesis indicate percentage,KM - Kudumbasree member families, NM - Non member families

Table 19b. Other living facilities of the families

Living facilities	Number of families	
	KM (n=100)	NM (n=20)
Electricity		
Present	97(97)	17(85)
Absent	3(3)	3(15)
Drainage		
Present	85(85)	15(75)
Absent	15(15)	5(25)
Lavatory facilities		
Own latrine	100(100)	20(100)
Open field	-	-
Drinking water		
Own well	97(97)	19(95)
Nearby well	3(3)	1(5)
Transport facilities		
Bus	100(100)	18(90)
Cycle	-	1(5)
Motor bike	-	1(5)
Nil	-	-
Type of fuel		
Wood	29(29)	18(90)
LPG	-	-
Wood and LPG	71(71)	2(10)
Source of fuel		
collected from surroundings	29(29)	-
Purchased	-	15(75)
Collected and Purchased	71(71)	5(25)
Recreational facilities		
Radio	5(5)	5(25)
Television	75(75)	9(45)
Radio& Television	19(19)	5(25)
Absent	1(1)	1(5)

Figures in parenthesis indicate percentage,KM - Kudumbasree member families
NM - Non member families

Health care facilities utilized by the families

Details of health care facilities utilized by the families are given in Table 20. Majority of KM families (73%) and NM families (75%) depended on primary health centers for medical care. About 5 per cent of KM and NM families depended on private hospitals. The remaining families in both groups depended on primary health centers, medical college and private hospitals for medical services.

Table 20. Health care facilities utilized

Sl. No.	Health care facilities	Number of families	
		KM (n=100)	NM (n=20)
1	Primary health center(PHC)	73(73)	15(75)
2	PHC, Medical college, Private hospital	21(21)	4(20)
3	Private hospital	5(5)	1(5)
4	Ayurvedic hospital	1(1)	-

Figures in parenthesis indicate percentage
KM - Kudumbasree member families,
NM - Non member families

Morbidity pattern in the families

Details of morbidity pattern in the families for the past one year as reported by the respondents are presented in Table 21. Majority of KM families (68%) and NM families (70%) reported only the incidence of fever in their families.

Table 21. Morbidity pattern of families during the past one year

Sl. No.	Disease	Number of families	
		KM (n=100)	NM (n=20)
1	Diarrhoea	2(2)	-
2	Fever	68(68)	14(70)
3	Jaundice	1(1)	-
4	Other communicable diseases	-	-
5	No other diseases	29(29)	6(30)

Figures in parenthesis indicate percentage
KM - Kudumbasree member families
NM - Non member families

Training programmes attended by the KM respondents

Details of training programmes attended by the KM respondents are given in Table 22. It was found that 95 per cent of the respondents had attended training programmes related to their activity and also in other areas. Fifteen per cent KM respondents attended 1 year training in tailoring practice. No other training programmes were attended by women of such duration. About 40 per cent women attended training in clay accessories making, 25 per cent attended tender coconut products preparation, and 5 per cent each attended cocoa products preparation and chocolate making of one month duration. About 10 per cent attended convenient foods preparation training for a duration of 15 days. One week training was mainly for tailoring practices (35%), clay accessories making practices (30%) and biofertilizer preparation (10%). Training programmes attended by the KM respondents are given in Figure 9.

Table 22. Percentage of KM respondents attended the training programmes

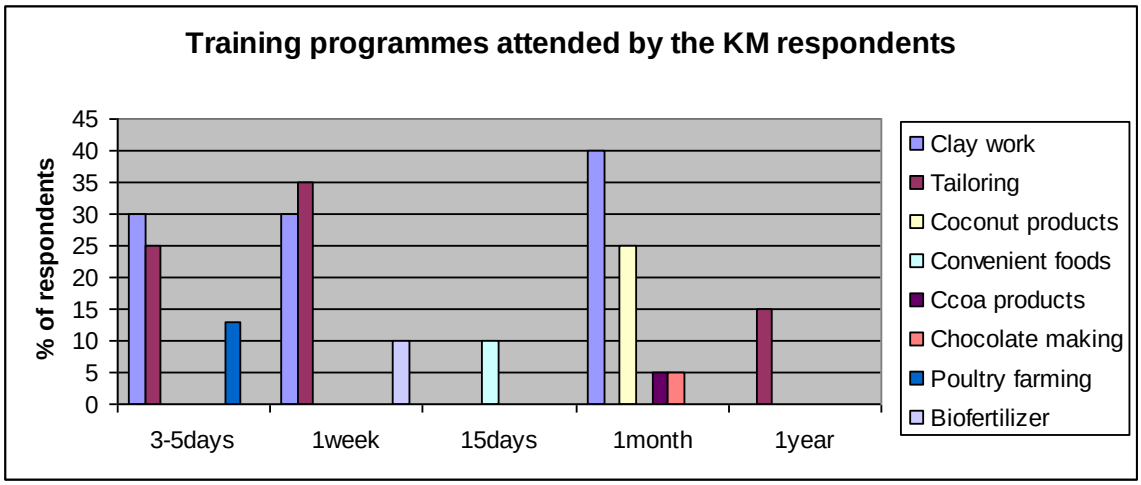
Training programmes	Duration of training				
	3-5days	1 week	15days	1month	1year
Clay accessories making practice	30	30	-	40	-
Tailoring practice	25	35	-	-	15
Tender coconut products preparation	-	-	-	25	-
Convenient foods preparation	-	-	10	-	-
Cocoa products preparation	-	-	-	5	-
Chocolate making	-	-	-	5	-
Poultry farming	13	-	-	-	-
Azola biofertilizer preparation	-	10	-	-	-

Forty per cent of the respondents had a common site for working and the remaining did their activities at home itself. All the units conducted meeting 3-4 times in a month.

Attitude of KM respondents towards the programme

Details of attitude of KM respondents towards the programme are given in Table 23. It was found that majority of the members strongly agreed to the positive statements and strongly disagreed to the negative statements about the programme. About 99 per cent of KM respondents agreed that their activities

Figure 9. Training programmes attended by KM respondents



significantly added income to their family income and 96 per cent of the respondents liked the income generating activities of Kudumbasree. Ninety five per cent women strongly agreed that these income generating activities had increased their self confidence and 94 per cent women felt that they were getting more recognition in the family as well as in the society. About 69 per cent strongly agreed that they are feeling proud of being a member in a Kudumbasree group.

All the respondents strongly disagreed to the statement that members are not getting equal benefits. About 99 per cent strongly disagreed to the staement that the leaders are coming to the front and others are not getting recognition. Most of the respondents (96%) had a positive attitude towards the viability of this programmes in the long run. About 82 per cent of women strongly disagreed to the statement that this is a time consuming activity and also disagreed that (93%) since they have other household works, there is no time for such activities.

4.2 FOOD CONSUMPTION PATTERN OF FAMILIES

Food consumption pattern of the families were studied with special reference to the frequency of use of various foods, meal pattern, preservation of foods, food believes, foods during special conditions, cooking methods and hygienic practices followed.

Food habits of the families

All the KM families were found to be non vegetarians while 5 per cent among the NM families were found to be vegetarians.

Table 23. Distribution of KM respondents according to their attitudes towards Kudumbasree programme

Sl. No.	Statements	Number of respondents(n=100)				
		SA	A	UD	DA	SDA
1	I like doing kudumbasree activities	96	4	-	-	-
2	I am proud of being a member in the kudumbasree group	69	30	1	-	-
3	I started to get more recognition from my family & neighberhood since I become a member of kudumbasree group	94	1	5	-	-
4	The group activities have significantly increased my self confidence	95	5	-	-	-
5	Kudumbasree activities significantly add income to the family	99	1	-	-	-
6	Kudumbasree activities unnecessarily take up a lot of my time	-	-	8	10	82
7	I have enough work to do, so I am not interested in it	-	-	5	2	93
8	Mostly leaders come up front, others get less recognition	-	-	-	1	99
9	Members are not getting equal benefits	-	-	-	-	100
10	In long term, this is not going to be a viable idea	-	-	-	4	96

SA – Strongly agree, A – Agree, UD – Undecided, DA – Disagree, SDA – Strongly disagree

Frequency of use of various food items

Percentage distribution of the families according to the frequency of use of various food items as reported by the respondents are given in Table 24a and 24b.

Table 24a gives the above details of the KM families. It was found that all the families included cereals, fats and oils, sugars, spices and condiments in their daily diet. Daily consumption of pulses was found only in 1 per cent of the families whereas 36 per cent of the families consumed it only once in a week . About 55 per cent of the families used pulses twice or thrice in a week. Pulse consumption was limited to once in a month by 7 per cent of the families.

Majority of the families (52%) consumed green leafy vegetables only once in a week. Consumption twice or thrice in a week was reported in about 26 per cent families. Seventeen per cent of the families consumed GLV once in a month and occasional consumption was seen in 4 per cent. One percent of the families never consumed GLV.

Daily consumption of other vegetables was found in 35 per cent of the families where as 36 percent consumed vegetables thrice in a week. Roots and tubers was consumed daily by 32 per cent families where as 38 per cent consumed this, thrice in a week.

About 37 per cent of the families consumed fruits only occasionally where as 8 per cent never consumed fruits.

About 45 per cent consumed milk and milk products only occasionally and 13 per cent never included this food group in their diet.

Occasional meat consumption was seen in 50 per cent of the families but 30 per cent included meat once in a month. Daily consumption of fish was seen in 37 per cent families while 43 per cent included this food thrice in a week. Thirty nine per cent used egg occasionally while 26 per cent never included this in the diet. Daily consumption of egg was limited to only 2 per cent of the families. Frequency of bakery items was found to be once in a week (24%), once in a month (28%) and occasionally (27 %) in the families. Five per cent families never purchased bakery items.

Table 24b gives the details of frequency of use of various foods by NM families. It was found that all the families included cereals, fats and oils, sugars, spices and condiments in their daily diet. Daily consumption of pulses was found in 5 per cent of the families where as 50 per cent of the families consumed it only once in a week. About 45 per cent of the families used pulses twice or thrice in a week.

Most of the families (40%) consumed green leafy vegetables only once in a week. Consumption twice or thrice in a week was reported in about 20 per cent families. Twenty per cent of the families consumed GLV once in a month and occasional consumption was seen in 5 per cent.

Daily consumption of other vegetables was found only in 10 per cent of the families whereas 45 percent consumed vegetables thrice in a week. Once or twice consumption in a week was reported in about 45 per cent families. Roots and tubers were consumed daily by only 5 per cent families where as 95per cent consumed this once or twice in a week.

About 65 per cent of the families consumed fruits only occasionally where as 5 percentage never consumed fruits.

About 50 per cent consumed milk and milk products only occasionally and 5 per cent included this food group daily in their diet.

Occasional meat consumption was seen in 45 per cent of the families but 35 per cent included meat once in a month. Daily consumption of fish was seen in 35 per cent families while 40 per cent included this food thrice in a week. Twenty five per cent used egg occasionally while 50 per cent included twice or thrice in a week. Frequency of bakery items was found to be once in a week (10%), once in a month (30%) and occasionally (55%) in the families.

The frequency of use of different food items among the families was assessed by the formula suggested by Reaburn *et al*. (1979) (Appendix VI) and percentage score was worked out. Based on the percentage frequency scores obtained for different food items, the foods were classified into 3 groups viz. most frequently used foods (percentage frequency score above 70%), medium frequently used foods (percentage frequency score 40-70%), and less frequently used foods (percentage frequency score below 40%).The results are presented in Table 25a and 25b.

As revealed in Table 25a, in KM families cereals, roots & tubers, other vegetables, fish, oils & fats, spices & condiments and sugar was the most frequently used foods. Pulses and green leafy vegetables were medium frequently used foods whereas foods like fruits, meat, milk & milk products, egg and bakery items were less frequently consumed foods.

In NM families (Table 25b) foods like cereals, other vegetables, oils & fats, sugar, spices & condiments and fish were the most frequently consumed foods. Roots & tubers and green leafy vegetables were medium frequently consumed foods whereas foods like pulses, fruits, milk & milk products, meat, egg and bakery items were less frequently consumed foods.

Table 24a. Frequency of use of various food items by the KM families

Food items	Number of families(n=100)						
	Daily	Thrice in a week	Twice in a week	Once in a week	Once in a month	Occasionally	Never
Cereals	100	-	-	-	-	-	-
Pulses	1	28	27	36	7	-	-
Green leafy vegetables	-	9	17	52	17	4	1
Other vegetables	35	36	18	11	-	-	-
Roots and tubers	32	38	16	14	-	-	-
Fruits	1	2	15	19	18	37	8
Oils and Fats	100	-	-	-	-	-	-
Spices and condiments	100	-	-	-	-	-	-
Milk& Milk products	10	4	1	9	18	45	13
Meat	-	-	1	18	30	50	1
Fish	37	43	10	4	6	-	-
Egg	2	1	2	16	14	39	26
Sugar	100	-	-	-	-	-	-
Bakery items	-	1	15	24	28	27	5

KM - Kudumbasree member families

Table24b. Frequency of use of various food items by the NM families

Food items	Number of families(n=20)						
	Daily	Thrice in a week	Twice in a week	Once in a week	Once in a month	Occasionally	Never
Cereals	20 (100)	-	-	-	-	-	-
Pulses	1 (5)	1 (5)	8 (40)	10 (50)	-	-	-
Green leafy vegetables	2 (10)	1 (5)	3 (15)	8 (40)	5 (20)	1 (5)	-
Other vegetables	2 (10)	9 (45)	7 (35)	2 (10)	-	-	-
R&T	1 (5)	-	10 (50)	9 (45)	-	-	-
Fruits	-	-	1 (5)	1 (5)	4 (20)	13 (65)	1 (5)
Oils&fats	20 (100)	-	-	-	-	-	-
Spices&condiments	20 (100)	-	-	-	-	-	-
Milk&milk products	1 (5)	1 (5)	2 (10)	3 (15)	3 (15)	10 (50)	-
Meat	-	-	1 (5)	2 (10)	7 (35)	9 (45)	-
Fish	7 (35)	8 (40)	4 (20)	-	-	-	-
Egg	-	-	5 (25)	5 (25)	5 (25)	5 (25)	-
Sugar	20 (100)	-	-	-	-	-	-
Bakery items	-	-	1 (5)	2 (10)	6 (30)	11 (55)	-

Figures in parenthesis indicate percentage, NM - Non member families

Table 25 a. Use of foods based on percentage frequency score by KM families

Most frequently used foods (>70%)	Medium frequently used foods (40-70%)	Less frequently used foods (<40%)
Cereals Other vegetables Roots and Tubers Oils and Fats Spices and condiments Fish Sugar	Pulses Green leafy vegetables	Fruits Milk and milk products Meat Egg Bakery items

KM- Kudumbasree member families

Table25b. Use of foods based on percentage frequency score by NM families

Most frequently used foods (>70%)	Medium frequently used foods (40-70%)	Less frequently used foods (<40%)
Cereals Other vegetables Oils and Fats Spices and condiments Fish Sugar	Green leafy vegetables Roots and Tubers	Pulses Fruits Milk and milk products Meat Egg Bakery items

NM- Non member families

Meal pattern of the families

Details regarding the meal pattern of the families are given in Table 26a, 26b, and 26c. Table 26a shows that 98 per cent of the KM families and 95 per cent of the NM families followed a pattern of 3 major meals a day.

Lunch pattern of Kudumbasree respondents as revealed in Table 26b, 40 per cent took packed lunch with them while going for work, 25 percent of women cooked lunch at working unit while 15 per cent never had lunch on working site. Twenty per cent women had lunch only after reaching home from work site.

Regarding food preparation for lunch, at work site or packed lunch (Table 26c), 33.8 per cent women prepared lunch with rice and pulses, whereas 27.7 per cent consumed rice along with chutney and egg. Rice with fish curry (7.6%), rice with vegetable curry (23.1%) and also tapioca with fish (7.7%) were also found to be their usual preparation for lunch during their working days either packed or prepared at work site.

Table 26a. Meal pattern of the families

Meal pattern	Number of families	
	KM (n=100)	NM (n=20)
Two major meals	2(2)	1(5)
Three major meals	98(98)	19(95)

Figures in parenthesis indicate percentage
KM - Kudumbasree member families
NM - Non member families

Table 26b. Lunch pattern of KM respondents on working days

Lunch pattern	Number of respondents (n=100)
Packed lunch	40
Cooking at working unit	25
Not taking lunch	15
Taking lunch after reaching home	20

Table 26 c. Dishes prepared for lunch by KM respondents

Sl. No.	Dishes	Number of respondents (n=65)
1	Rice, pulses	22(33.8)
2	Rice, egg, chutney	18(27.7)
3	Rice, fish curry	5(7.7)
4	Rice, vegetable curry	15(23.1)
5	Tapioca, fish curry	5(7.7)

Figures in parenthesis indicate percentage

Preservation of foods by the families

Distribution of families according to the methods adopted for the preservation of foods are given in Table 27. It was revealed that 52 per cent of the KM and 45 per cent of NM families adopted pickling as a method of preserving fruits and vegetables and they used to store them for more than 2 months. Majority of the NM families (55%) never adopted any of the food preservation methods.

Table 27. Preservation of foods by families

Sl. No.	Details	Number of families	
		KM (n=100)	NM (N=20)
1	Pickling	52(52)	9(45)
2	Never processed foods	48(48)	11(55)

Figures in parenthesis indicate percentage
KM - Kudumbasree member families
NM - Non member families

Foods given during special conditions in the family

Foods given to family members during various physiological conditions and during various disease conditions are presented in Table28 and 29.

From Table 28, it was observed that in majority of KM families, no special foods were given during adolescent and old age. But in NM families (95%) they gave milk as special food for old age family members. During pregnancy, cereal preparations and non vegetarian items were given as special foods by 46 per cent of KM families whereas this was seen only in 35 per cent of the NM families. Milk and fruits formed special foods during pregnancy in 24 per cent of KM families and this was only 5 per cent in NM families. Majority of NM families (60%) never used any special foods during pregnancy.

Cereal preparations and non vegetarian foods formed the special foods during lactation in 53 per cent of KM families and 40 per cent of NM families. Seventeen per cent of KM families provided pulses, GLV and eggs for lactating women in the family compared to 5 per cent in NM families. Majority of NM families (55%) never gave any type of special foods during lactation and it was 30 per cent in KM families.

Majority of KM families (92%) and NM families (90%) gave ragi for infants. Along with ragi, commercial infant foods were also given by 10 per cent NM families and this was 8 per cent in KM families.

Special foods given during various disease conditions are presented in Table 29. As revealed, majority of KM families (55%) and NM families (60%) did not give any special foods during conditions like fever. Special foods like rice porridge, bread and biscuits were given to family members during fever in 30 per cent of KM families but only 5 per cent NM families gave such special foods during fever. NM families (35%) gave only rice porridge during fever. During diarrhoea, 92 per cent and 95 per cent of KM and NM families respectively gave nothing as special foods. One per cent of KM families gave tender coconut water to diarrhoea patients in the family. In the case of other infectious diseases, 92 per cent of KM families and all the NM families did not give any special foods but 8 per cent of KM families gave rice porridge to family members.

Table 28. Foods given during physiological conditions

Sl. No.	Physiological condition	Foods given	Number of families	
			KM (n=100)	NM(n=20)
1	Pregnancy	Cereals, Non veg.	46(46)	7(35)
		Milk, Fruits	22(22)	1(5)
		No special foods	32(32)	12(60)
2	Lactation	Cereals, Non veg.	53(53)	8(40)
		Pulses,GLV,egg	17(17)	1(5)
		No special foods	30(30)	11(55)
3	Infancy	Ragi	92(92)	18(90)
		Ragi, commercial infant foods	8(8)	2(10)
4	Adolescence	Milk, egg	2(2)	1(5)
		No special foods	98(98)	19(95)
5	Old age	Milk	4(4)	19(95)
		No special foods	96(96)	1(5)

Figures in parenthesis indicate percentage
KM - Kudumbasree member families
NM - Non member families

Table 29. Diet during disease conditions

Sl. No.	Disease	Foods	Number of families	
			KM(n=100)	NM(n=20)
1	Fever	Rice porridge	15(15)	79(35)
		Porridge, bread, biscuit	30(30)	1(5)
		No special foods	55(55)	12(60)
2	Diarrhoea	Rice porridge	7(7)	1(5)
		Tender coconut water	1(1)	-
		No special foods	92(92)	19(95)
3	Other infectious diseases	Rice porridge	8(8)	-
		No special foods	92(92)	20(100)

Figures in parenthesis indicate percentage
KM - Kudumbasree member families
NM - Non member families

Cooking methods adopted in the family

Percentage distribution of families according to different cooking methods adopted and cooking vessels used is presented in Table 30.

It was found that 80 to 100 per cent of the families in both groups followed boiling method for cooking of cereals, pulses, vegetables, fish, meat and milk. Frying of fish was limited to 7 per cent in KM families but it was 10 per cent in NM families. Egg was fried in 42 and 50 per cent of KM and NM families respectively.

Majority of the KM and NM families used aluminium vessels for cooking. Thirty per cent of KM families used pressure cooker for cooking cereals while only 10 per cent of the NM families used pressure cooker for cooking cereals. Meat was also cooked in pressure cooker in 28 per cent of KM families. Clay vessels were also used by ten to twenty two per cent of KM families for cooking

various food items while 5 to 15 per cent of NM families used clay vessels. Twenty five per cent of KM families used steel vessels for cooking fish, while this was 10 per cent in NM families. Fish (10%) and meat (22%) was prepared in clay vessels in KM families whereas this was only 5 per cent in NM families.

Hygienic practices followed by families

Details of hygienic practices followed by the families are given in Table 31. It was observed that 100 per cent of the families of both groups used water from protected sources. More than 90 per cent of the families used boiled water for drinking purposes and kept the water pots covered while not in use. Washing vegetables before cutting was observed in 63 per cent of KM families and 60 per cent of NM families. Washing vessels before using was observed in more than 70 per cent of all the families. Hygienic practices like washing hands before food preparation was observed in 82 per cent of KM families and it was 75 per cent in NM families. Practices like keeping the cooked foods covered and keeping the utensils off the floor was observed in 90 per cent of NM families and 86 per cent of KM families. In 42 per cent of KM families and 45 per cent of NM families toilets were found to be near the wells. But in majority of the families, domestic animals were kept away from the wells.

Food beliefs of the respondents

Details of food beliefs of the respondents are given in Table 32.
It was found that majority of the KM respondents (57%) did not believe that garlic increased milk production in lactating mothers while 55 per cent of NM respondents had this belief. Majority of the KM respondents (98%) and NM respondents (95%) believed that beetroot helps in blood formation. Ninety-nine per cent of KM respondents and all the NM respondents believed that papaya fruits caused abortion in pregnant women. Majority of KM respondents (88%) and NM respondents (75%) believed that oils and fats are not fattening.

Table 30. Different cooking methods and vessels used by the families (in percentage)

Food items	Method of cooking						Cooking vessels									
	Boiling		Straining		Frying		Pressure cooker		Aluminium		Steel		Clay		Indalium	
	KM	NM	KM	NM	KM	NM	KM	NM	KM	NM	KM	NM	KM	NM	KM	NM
Cereals	100	100	-	-	-	-	30	10	60	75	-	-	10	15	-	-
Pulses	100	100	-	-	-	-	-	-	78	80	2	10	20	10	-	-
Vegetables	82	85	-	-	18	15	-	-	98	90	2	10	-	-	-	-
R& T	100	60	-	-	-	40	-	-	100	100	-	-	-	-	-	-
Fruits	7	20	93	80	-	-	-	-	98	80	2	20	-	-	-	-
Fish	93	90	-	-	7	10	-	-	64	85	25	10	10	5	1	-
Meat	98	95	-	-	2	5	28	-	50	90	-	5	22	5	-	-
Egg	58	50	-	-	42	50	-	-	100	100	-	-	-	-	-	-
Milk	100	100	-	-	-	-	-	-	82	90	3	5	15	5	-	-

R &T – Roots & Tubers, KM - Kudumbasree member families (n=100),
NM - Non member families(n=20)

Table31. Hygienic practices followed in the families

Sl. No.	Practices	Percentage of families			
		KM (n=100)		NM(n=20)	
		Yes	No	Yes	No
1	Washing the vegetables before cutting	63	37	60	40
2	Washing the cooking vessels before using	72	28	70	30
3	Separate utensils used for raw and cooked foods	58	42	65	35
4	Cleaning hands before food preparation	82	18	75	25
5	Drinking boiled cooled water	90	10	95	5
6	Keeping cooked food covered and utensils off the ground	86	14	90	10
7	Taking drinking water from protected sources	100	-	100	-
8	Keeping water pots covered when they are not in use	97	3	90	10
9	Toilet is at a safe distance from water sources	58	42	55	45
10	Animals are kept away from water sources and home	77	23	90	10

KM - Kudumbasree member families, NM - Non member families

Table 32. Food beliefs of the respondents

Sl. No.	Beliefs	Percentage of families			
		KM (n=100)		NM(N=20)	
		Yes	No	Yes	No
1	Garlic increase milk production in lactating women	43	57	55	45
2	Beetroot helps in blood production	98	2	95	5
3	Adult need no milk	67	33	75	25
4	Drinking too much water is fattening	7	93	15	85
5	Foods cooked in aluminum vessels cause cancer	13	87	10	90
6	Papaya fruit induces abortion in pregnant women	99	1	100	-
7	Eating clay helps in the normal development of fetus	69	31	75	25
8	Oils and fats are not fattening	88	12	75	25

KM - Kudumbasree member families, NM - Non member families

Majority of the KM (69%) and NM (75%) respondents had the belief that eating clay/ mud during pregnancy is helpful in the normal development of the foetus. Thirteen per cent of KM respondents believed that cooking in aluminium vessels can cause cancer and 10 per cent of NM respondents agreed to this. Fifteen per cent of NM respondents believed that drinking too much water is fattening whereas only 7 per cent of KM respondents had this belief. Majority of KM respondents (67%) and NM respondents (75%) believed that adults need no milk in their diet.

4.3 NUTRITIONAL STATUS OF THE RESPONDENTS

Nutritional status of the respondents were assessed through anthropometric measurements, clinical examination, food weighment and heamoglobin estimation in blood.

4. 3. 1. Anthropometric measurements

Distribution of respondents on the basis of height and weight are presented in Table 33.It was found that height of KM respondents varied from 140cm to 170cm with a mean height of 162.8cm and weight varied from 40Kg to 68Kg with a mean weight of 51.34Kg. In NM respondents, the height varied from 150cm to 160cm with a mean height of 155.9cm and the weight varied from 41Kg to 61Kg with a mean weight of 52.35Kg.

The prevalence of Chronic Energy Deficiency (CED) among respondents on the basis of BMI are presented in Table 34. It was found that 4 per cent of the KM respondents were severely malnourished while it was about 5 per cent in NM respondents. Forty three per cent of the KM respondents and 40 per cent of NM respondents were found to be normal. About 38 per cent of the KM respondents were normal with low weight and it was 35 per cent in NM respondents. Two per cent of KM respondents were obese while none of the NM

respondents were found to be obese. About 8 per cent of the KM respondents and 10 per cent of the NM respondents were moderately malnourished. Five per cent of the KM respondents and 10 per cent of the NM respondents were found to have mild malnutrition. The prevalence of CED among KM and NM respondents are given in Figure 10.

The χ^2 value for testing the distribution of the different grades of CED among KM and NM respondents worked out to be 1.3 and was not significant. This implying the distribution of the respondents in the different grades of CED was depended upon different classes namely KM and NM. The percentage of respondents in the CED group was much higher in NM respondents compared to KM respondents. Thus, the kudumbasree mission has lent a far sight even in the nutritional update of their members.

Table 33. Distribution of the respondents on the basis of height and weight

Weight (Kg)	Number of respondents		Height (cm)	Number of respondents	
	KM(n=100)	NM (n=20)		KM (n=100)	NM (n=20)
40 -45	15(15)	2(10)	140 -145	1(1)	-
46 – 50	43(43)	8(40)	145.1 -150	16(16)	1(10)
51 -55	22(22)	4(20)	150.1 -155	28(28)	6(30)
56 -60	15(15)	4(20)	155.1 -160	43(43)	13(60)
61 – 65	4(4)	2(10)	160.1- 165	10(10)	-
66 – 70	1(1)	-	165.1 -170	2(2)	-

Figures in parenthesis indicate percentage
KM - Kudumbasree member respondents
NM - Non member respondents

Table 34. Prevalence of CED among the respondents on the basis of Body Mass Index

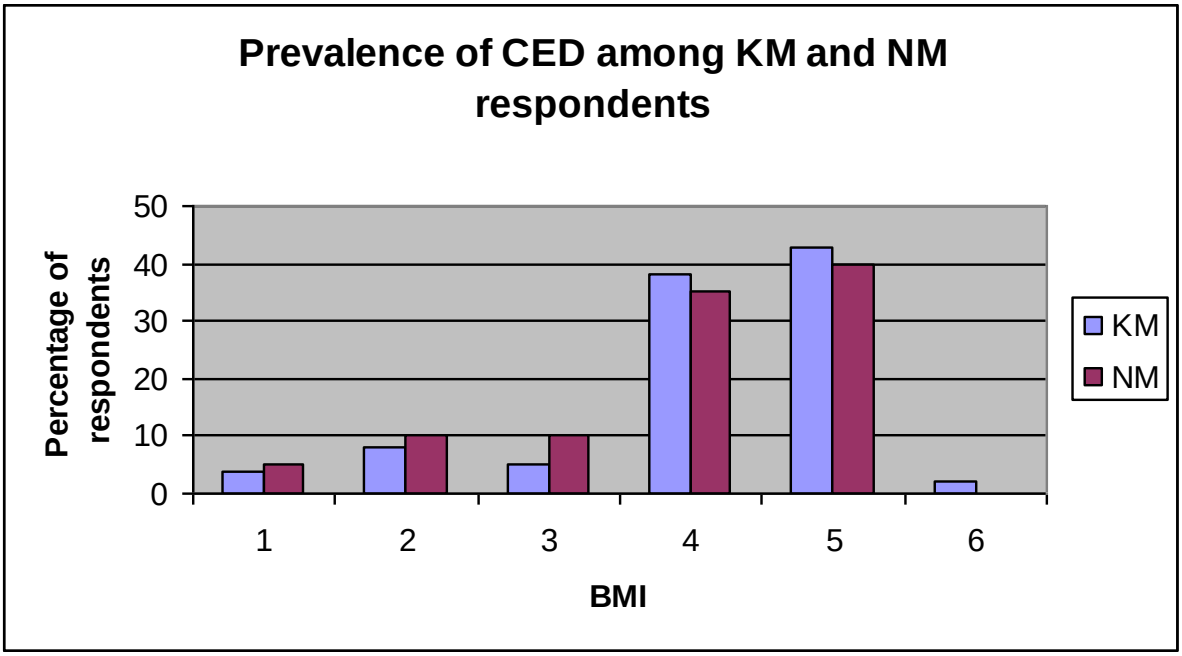
Sl. No.	Category (BMI)	Grades of malnutrition	Number of respondents	
			KM(n=100)	NM(n=20)
1	CED grade III (< 16)	Severe	4(4)	1(5)
2	CED grade II (16 – 17)	Moderate	8(8)	2(10)
3	CED grade I (17 – 18.5)	Mild	5(5)	2(10)
4	Low weight normal (18.5 – 20)	Normal with low Weight	38(38)	7(35)
5	Normal (20 – 25)	Normal	43(43)	8(40)
6	Over weight (>25)	Obese	2(2)	-

Figures in parenthesis indicate percentage
KM - Kudumbasree member families
NM - Non member families

4. 3. 2. Clinical examination

Incidence of clinical signs and symptoms observed among the respondents are presented in table 35. Different clinical symptoms related to nutritional deficiencies like xerosis (86.6%), pigmentation (73.3%), and functional night blindness (93%) were observed in the eyes and flourosis (53.3%), and carries(13.3%) in the mouth were found among KM respondents and in NM respondents, the prevalence was xerosis (90%), pigmentation (80%), functional night blindness (90%), flourosis (40%), and carries(60%). None of the KM and NM respondents showed other deficiency symptoms.

Figure 10. Prevalence of CED among KM and NM respondents



KM- Kudumbasree member respondents, NM – Non member respondents

1 – severe malnutrition, 4 – Normal with Low weight

2 – Moderate 5 – Normal

3 – Mild 6 – Obese

Table 35. Clinical manifestations observed among respondents

Sl. No.	Clinical details	Number of respondents	
		KM(n=15)	NM(n=10)
1	General appearance		
	Good	10(66.6)	8(80)
	Fair	2(13.3)	-
	Poor	3(20)	2(20)
2	Eyes		
	a)Xerosis		
	Present	13(86.6)	9(90)
	Absent	2(13.4)	1(10)
	b) Pigmentation		
	Normal	4(26.6)	2(20)
	Slight discolouration	11(73.3)	8(80)
	c) Functional night blindness		
	Absent	1(7)	1(10)
	Present	14(93)	9(90)
3	Mouth		
	a) Gums		
	i) Fluorosis		
	Absent	7(46.6)	6(60)
	Mottled and discoloured	8(53.3)	4(40)
	ii) Carries	13(86.6)	4(40)
	Absent	2(13.3)	6(60)
	Slight		

Figures in parenthesis indicate percentage
KM - Kudumbasree member respondents
NM - Non member respondents

4. 3. 3. Food weighment survey

An indepth study among 25 respondents comprising of 15 from KM group and 10 from NM group was conducted by one day food weighment method to determine the actual food and nutrient intake and to assess the quality and quantity 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 women engaged in moderate activity suggested by ICMR (1990). Both the food and nutrient intake of respondents were statistically analysed. The results are furnished in Table 36 and 37.

Actual food intake of respondents

In KM respondents, the intake of all the food groups except roots & tubers and flesh foods were significantly below the recommended allowances suggested by ICMR (1968). The high intake of roots & tubers compared to RDA (75.46±5.92g) was not significant but the intake of flesh foods (336% of RDA) was significantly high.

The same pattern was also observed in NM families but when compared to RDA, the intake of roots & tubers were low (70.30±7.63g) but the difference was not significant. The intake of flesh foods was significantly high (315.6% of RDA).

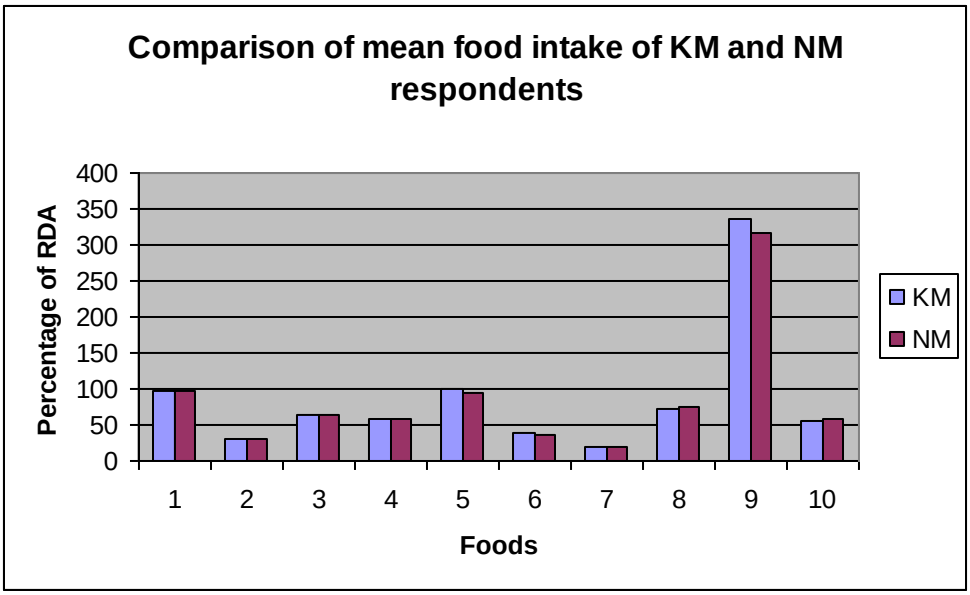
When the food intake of KM and NM respondents were compared, in KM respondents the consumption of foods like cereals (342.06 ±2.50g), roots and tubers(75.46±5.92g),fruits (11.33±6.35g), milk & milk products(20.0±1.75g) and flesh foods (100.8±3.33g) were high, but the difference with that of NM respondents was not significant. In NM respondents the intake of green leafy vegetables (81.50±6.83g), other vegetables (43.90±2.68g), oil (29.80±1.86g) and sugar (17.1±1.87g) were high when compared to KM families, but the difference was not significant. The comparison of food intake of KM and NM respondents are given in Figure 11.

Table36. Comparison of mean food intake of KM and NM respondents

Foods(g)	RDA (g)	KM respondents (n=15)			NM respondents (n=10)			t value between the groups
		Mean ±SE(g)	% of RDA	t value	Mean ±SE(g)	% of RDA	t value	
Cereals	350	342.66 ± 2.50	97.90	2.93**	339.69 ± 2.98	97.05	3.458**	0.758^{NS}
Pulses	55	17.0 ± 1.54	30.90	24.62**	17.10 ±1.53	31.09	24.642**	0.044^{NS}
GLV	125	78.33 ± 6.35	62.66	7.342**	81.50 ±6.83	65.2	6.366**	0.330^{NS}
Other vegetables	75	42.80 ± 2.11	57.06	15.23**	43.90 ±2.68	58.53	11.6**	0.325^{NS}
Roots & Tubers	75	75.46 ± 5.92	100.6	0.079^{NS}	70.30 ±7.63	93.73	0.616^{NS}	0.540^{NS}
Fruits	30	11.33 ± 1.15	37.76	16.185**	11.20 ±1.19	37.33	15.78**	0.078^{NS}
Milk & Milk products	100	20.0 ± 1.75	20	45.472**	19.0 ±2.44	19	33.06**	0.341^{NS}
Oil	40	29.26 ± 0.96	73.17	11.084**	29.80 ±1.86	74.5	5.48**	0.278^{NS}
Flesh foods	30	100.8 ± 3.33	336	21.235**	94.7 ±3.82	315.6	16.90**	1.186^{NS}
Sugar	30	16.73 ± 1.27	55.76	10.412**	17.1 ±1.87	57	6.875**	0.168^{NS}

KM- Kudumbasree member respondents, NM – Non member respondents
** - Sgnificant at 5% level
NS – Non significant

Figure11. Comparison of mean food intake of KM and NM respondents



KM- Kudumbasree member respondents, NM – Non member respondents
1-Cereals, 2- Pulses, 3- Green leafy vegetables, 4 – Other vegetables,
5- Roots and tubers,6 – Fruits, 7 – Milk, 8- Fats& Oil, 9 – Flesh foods, 10 – Sugar.

Nutrient intake of respondents

The mean intake of nutrients by the KM and NM respondents was computed from the quantity of the food consumed and compared with the RDA suggested by ICMR (1990). The details are furnished in Table 37.

The mean energy intake of KM respondents was 2157.20 ±20.82 Kcal. which was significantly lower than RDA (96.95%). In NM families, the mean energy intake was 2164±32.68 Kcal. and showed no significant difference with RDA (97.25%).There was no significant difference in the intake of total calories by KM respondents when compared to NM respondents.

Intake of protein was significantly high in KM (107.5%) and NM (104%) respondents when compared to RDA, but there was no significant difference in the intake of KM (53.73±0.878g) and NM (51.98±0.31g) respondents.

Significantly high intake of fat was observed in both KM (110.7% of RDA) and NM respondents (105.5% of RDA) and there was no significant difference in fat intake between KM and NM respondents.

Intake of calcium was significantly low in KM (98.15%) and NM (92.5%) when compared to RDA but the intake of KM respondents (392.6±2.48mg) was significantly higher than that of the NM respondents (370±7.88mg).

In KM respondents even though the intake of iron (28.02±1.01mg) was lower than RDA (93.4%) the difference was not significant. But the intake of iron in NM respondents (27.72±0.97mg) was found to be significantly low when compared to RDA (92.4%). But there was no significant difference between the intake of KM and NM respondents.

Retinol intake was significantly low in KM (96.7%) and NM (93.56%) respondents when compared to RDA but significantly high intake of retinol was observed in KM respondents when compared to NM respondents.

No significant variation was observed in thiamin intake of KM respondents (99.09%) with RDA but in NM respondents it was significantly low (92.7%).But no significant variation was observed in the intake of this nutrient between the two groups.

The intake of riboflavin was high in KM (112.3%) and NM (127%) respondents but significantly high intake was observed in NM respondents. When compared, the difference observed in the intake of riboflavin between the two groups was not significant.

Significant variation was not observed in the niacin intake of KM respondents (99.9%) with RDA but it was significantly low in NM respondents (86.5%). When compared with KM respondents the intake of NM respondents were significantly low.

Vitamin C intake did not vary significantly with RDA in KM respondents (94.85%) but significantly low intake was observed in NM respondents (86.37%).Their intake was also significantly low when compared to KM respondents. The comparison of nutrient intake of KM and NM respondents are given in Figure 12.

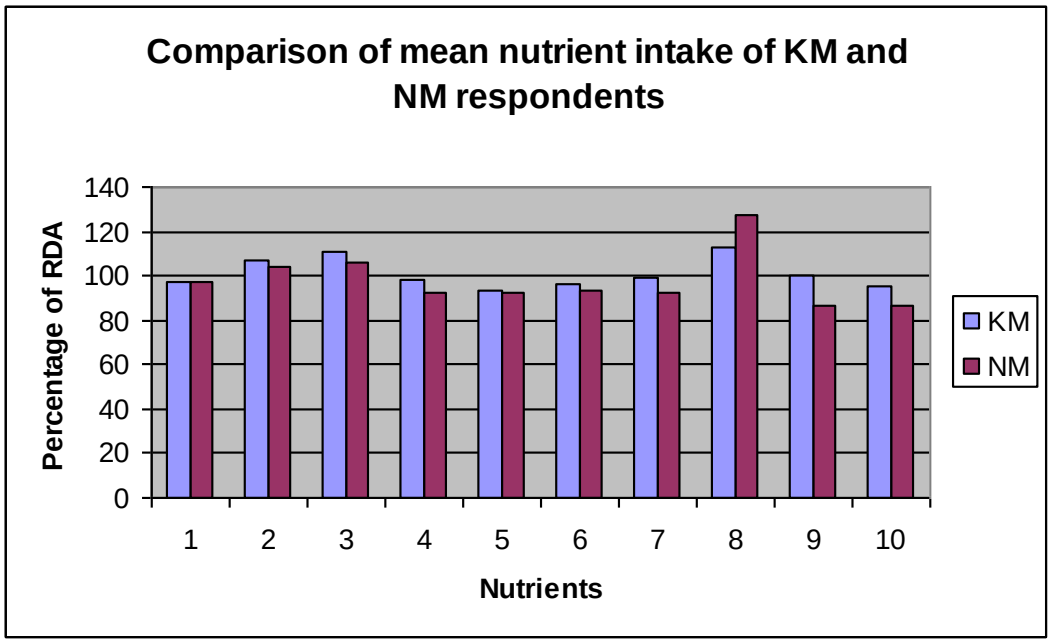
Relationship between nutrient intake especially energy, protein and fats and BMI of the respondents were statistically analyzed by correlation coefficient and the results are presented in Table 38.Energy intake and BMI indicated a significant relationship in both KM and NM respondents. There was no significant relationship between fat intake and BMI. The intake of protein and BMI indicated

Table 37. Comparison of mean nutrient intake of KM and NM respondents

Ntrients	RDA	KM respondents (n=15)			NM respondents (n=10)			t value between the groups
		Mean ±SE	% of RDA	t value	Mean ±SE	% of RDA	t value	
Energy(Kcal)	2225	2157.20±20.82	96.95	3.256**	2164.9±32.68	97.25	1.893^{NS}	0.209^{NS}
Protein(g)	50	53.73±0.87	107.5	3.716**	51.98±1.26	104	3.436**	0.715^{NS}
Fat(g)	20	22.14 ±0.46	110.7	4.597**	21.1 ±0.31	105.5	3.743**	1.569^{NS}
Calcium(mg)	400	392.6 ±2.48	98.15	2.975**	370.0 ±7.88	92.5	3.806**	3.198**
Iron(mg)	30	28.02 ±1.01	93.4	1.955^{NS}	27.72 ±0.97	92.4	2.336*	0.202^{NS}
Retinol(µg)	600	580.58 ±4.60	96.7	4.221**	561.4 ±8.17	93.56	4.721**	2.203*
Thiamin(mg)	1.1	1.09 ±0.06	99.09	0.042^{NS}	1.02 ±0.01	92.7	7.515**	0.980^{NS}
Riboflavin(mg)	1.3	1.46 ±0.10	112.3	1.512^{NS}	1.66 ±0.09	127.6	3.739**	1.305^{NS}
Niacin(mg)	14	13.99 ±0.16	99.9	0.032^{NS}	12.12 ±0.45	86.5	4.115**	4.432**
Vitamin C(mg)	40	37.94 ±1.08	94.85	1.899^{NS}	34.55 ±1.04	86.37	5.214**	2.142*

KM- Kudumbasree member respondents, NM – Non member respondents
** - Sgnificant at 5% level
NS – Non significant

Figure12. Comparison of the mean nutrient intake of the KM and NM respondents



KM- Kudumbasree member respondents, NM – Non member respondents
1-Energy(Kcal.), 2- Protein(g), 3-Fat(g), 4 –Calcium(mg), 5- Iron(mg)
6 –Retinol(µg), 7 –Thiamin(mg), 8-Riboflavin(mg), 9 –Niacin(mg),
10 –Vitamin C (mg).

a significant relationship among KM respondents whereas there was no significant relationship among NM respondents.

Table 38. Relationship between nutrient intake and BMI of respondents

Details	Number of respondents	
	KM(n=15)	NM(n=10)
Energy Vs BMI	0.85077**	0.701368**
Protein Vs BMI	0.567795**	0.477400^{NS}
Fat Vs BMI	0.23000^{NS}	-0.39032^{NS}

** -Significant at 5% level

NS-Non significant

4. 3.4. Biochemical estimation

Details regarding the heamoglobin (Hb) level of respondents compared with the normal Hb values suggested by WHO as given in Gopaldas and Seshadri (1987) are presented in Table 39. It was observed that Hb level of KM respondents varied from 10g to 12.9g/100ml with a mean value of 11.76 while in NM respondents this varied from 10g to 12g/100ml with a mean value of 11.11 g/100ml.

Table 39. Distribution of respondents on the basis of Hb level

Hb level(g/dl)	Number of respondents	
	KM (n=15)	NM (n=10)
10 - 10.9	2(13.3)	4(40)
11 - 11.9	6(40.1)	5(50)
12	3(20)	1(10)
>12	4(26.6)	-

Figures in parenthesis indicate percentage,
KM - Kudumbasree member respondents
NM - Non member respondents

The table 39 revealed that 20 per cent of the KM respondents had a normal Hb level of 12g/100ml, while it was only in 10 per cent of NM respondents. About 26.6 per cent of the KM respondents had a Hb level above the normal but none of the NM respondents had Hb level above normal. About 50 per cent of NM respondents had a Hb level in between 11 – 11.9g/100ml while it in KM respondents it was only 40.1 per cent. Forty per cent of NM respondents and 13.3 per cent of KM respondents had a Hb level in between 10 – 10.9g/100ml. The comparison of Hb level of KM and NM respondents are given in Figure 13.

To interpret the different grades of anaemia among the respondents, they were grouped according to the criteria suggested by WHO (1968) with respect to their Hb values and the details are given in Table 40.

Table 40. Prevalence of aneamia among respondents

Grades of aneamia	Hb level (g/100ml of blood)	Respondents	
		KM(n=15)	NM(n=10)
Severe	<7	0	0
Moderate	7-10	1(6.67)	3(30)
Mild	10-11.9	7(46.67)	6(60)
Normal	≥12	7(46.67)	1(10)

Figures in parenthesis indicate percentage, KM – KM respondents

NM – NM respondents

From the table it was observed that none of the respondents were severely aneamic. Among KM respondents 6.67 per cent and among NM respondents 30 per cent were having moderate aneamia. Mild aneamia was observed in 46.67 per cent of KM and 60 per cent of NM respondents. Among KM and NM respondents 46.67and10 per cent respectively were non aneamic. Prevelence of aneamia is presented in Figure 14.

Relationship of nutrient intake with Hb levels of the respondents were statistically analyzed by correlation coefficient and is given in Table 42. The intake of nutrients like energy and iron indicated a significant relationship with Hb level of respondents of both KM and NM groups. Protein and vitamin C intake of the respondents showed no significant relationship with the Hb levels.

Table 41. Relationship between nutrient intake and Hb levels of respondents

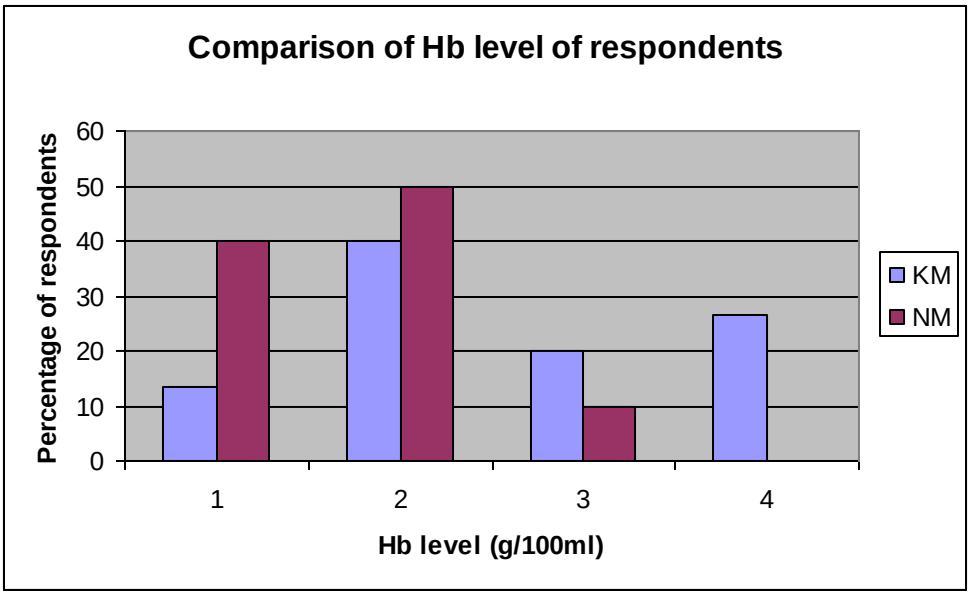
Details	Number of respondents	
	KM(n=15)	NM(n=10)
Energy Vs Hb	0.874646**	0.7383**
Protein Vs Hb	0.17215^{NS}	0.45114^{NS}
Iron Vs Hb	0.76379**	0.909367**
Vitamin C Vs Hb	0.17421^{NS}	0.00691^{NS}

** -Significant at 5% level, NS-Non significant

KM – KM respondents

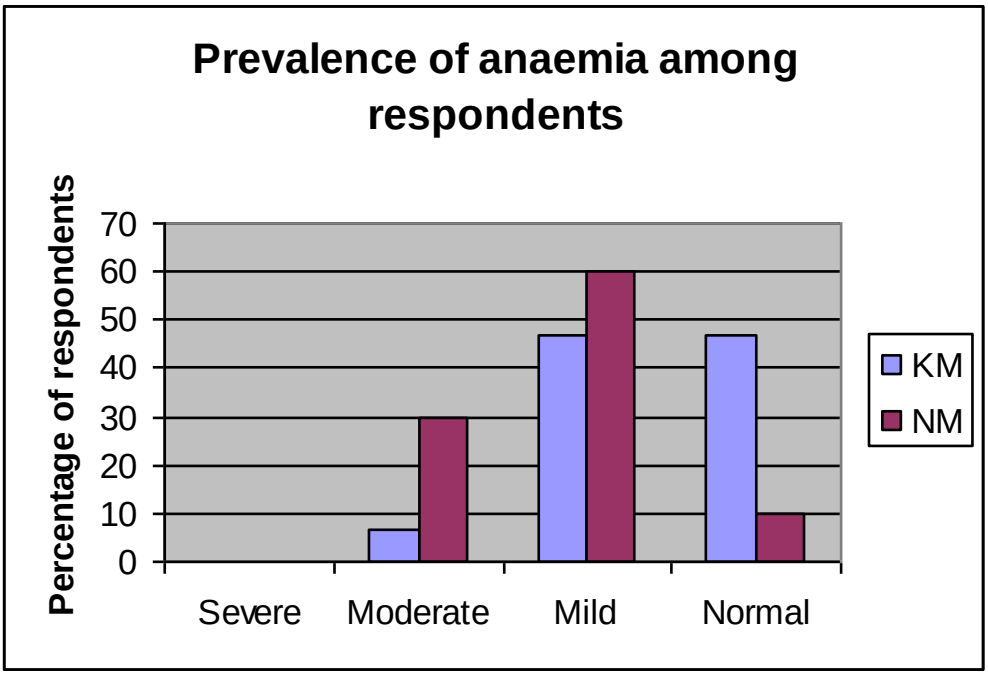
NM – NM respondents

Figure13.Comparison of Hb level of respondents



KM- Kudumbasree member respondents, NM – Non member respondents
1. 10-10.9g/100ml, 2. 11-11.9g/100ml, 3. 12g/100ml, 4. >12g/100ml

Figure 14. Prevalence of anaemia among respondents



KM- Kudumbasree member respondents,
NM – Non member respondents

Discussion

5. DISCUSSION

The discussion pertaining to the findings of the present study entitled ‘‘Nutritional profile of women participating in Kudumbasree programmes’’ is presented in this chapter under the following headings

1. Socio-economic profile of the families
2. Food consumption pattern of the families
3. Nutritional status of the respondents assessed by
    a) Anthropometric measurements
    b) Clinical examination
    c) Food weighment survey
    d) Biochemical estimation of blood

5.1 Socio-economic profile of the families

In the present study it was observed that majority of the KM families (62%) and NM families (65%) were Hindus followed by Christians. Among Hindus, all belonged to Other Backward Communities.

Due to urbanization and changes in social values, joint family system is disintegrating in different communities of Kerala. In the present study also, nuclear family system was found among majority of KM and NM families (68 and 55 per cent respectively). Saxena (1986) observed that nuclear type families are better than joint families in health and development. Women in the nuclear families get time for care and resources available for health, nutrition and education of children. The mothers also get time for earning income from economically productive work. Similar findings were observed among the different groups of Kerala by Nagammal (1989); Karuna (1993); Ranganathan (1996); Jose (1998); Smitha (1999); Jyothi (2003); Lawrence (2003) and Saleena (2004).

Family size is a major factor influencing the nutritional status of the family members. In Kerala, unlike other states, small family norm has become very popular even among the low income groups probably due to the availability of medical and educational facilities. In the present study nearly 77 per cent of KM families and 80 per cent of NM families had upto 5 members in their family. Anand (2002) also reported that majority of the members of SHGs at Malappuram district were having a family size between 3 and 5. Medium sized families were also observed by Jayanthakumari (1993); Smitha (1999) and Lawrence (2003) among different groups in Kerala.

Nineteen per cent of KM families and 20 per cent of NM families had more than 5 members in their family. Similar findings of a large family size was also observed among the members of the SHGs at Malapuram district by Anand (2002) and Shinoji (2007) in Thrissur and Kasargode district.

Kerala varies tremendously from other areas of the country in different aspects especially in the status of women like high literacy, health status, female to male ratio etc. In the present study also,there observed a Kerala pattern of sex ratio. The number of females in 100 KM families were 231 for 223 males and in 20 NM families there were 45 females for 42 males. As reported, in Kerala the female to male ratio is 1058 female per 1000 males (Economic review,2002-2003;Mohindra,2003; Menon *et al*.,2006).

One of the current demographic issues that is of serious concern in India is the declining female sex ratio. The sex ratio has been declining in India through the decades. Along with some Asian neighbours, the rate is lowest in the world. Even in Kerala evidence of continuing decline is provided by the sex ratios of the two youngest decadal cohorts 0-10 and 10-19 years. The childhood group in Kerala still has a lower and adverse sex ratio than the older cohorts. In the present study it was observed that in KM families there were 24.6 per cent boys in the age group 0-10 years whereas in the case of girls it was only 10.4. In NM families

also, there were 23.8 per cent boys while girls were only 13.3 per cent. The older cohort of 11-20 years also showed a similar declining female sex ratio. Census 2001 data clearly shows that in several parts of India the sex ratio especially in the age group 0-6 is unacceptably low. This findings agree with the report of Economic Review of Kerala Govt.(2002), which had stated that, recent years have shown a rising male child ratio in the 0-6 years population in Kerala. Kerala is gradually inching towards the national scenario where there is increased male bias. This is interesting to note in an era, where the birth rate of the girl child is quickly declining (Saradamani,1994).

The age and sex wise distribution of family members revealed that in both KM and NM families, female population was high (53.2 and 53.3 per cent respectively) in the most economically productive age of 21-40 years. This finding is in line with that of Anand (2002) who reported that 62 per cent female members of SHGs families at Malappuram district was in the reproductive age group. The study of Mohindra (2003) at Wayanad district also indicated the same result.

Even when extended upto 50 years the male population was only 43.5 per cent in KM families as against 60.1 per cent female population. In NM families also there were only 42.7 per cent male members in the age group of 21-50 years as against 55.6 per cent female population. In both KM and NM 35.5 and 35.6 per cent respectively were children and adolescents coming in the age group of 0-20 years which is considered as the dependent group.

As reported by Nair (2006) the state had been witnessing a demographic transition with elderly constituting a large portion of the population due to the decrease in birth rate and death rate and increased life expectancy. This study also shows a population of 7.9 per cent and 3.4 per cent above the age of 60 in KM and NM families respectively.

More dependent groups in the family and less male members in the economically productive age group might have made life bitter for women. In responding to the trends as outlined above, problems arising from the invisibility, underestimation and under recording of work done by women must be reckoned.

High literacy level is one of the indicator of social development of Kerala particularly striking in the case of women, and make it different from other states of India (Gopalan,1998). Education has played a large role in both reducing poverty and improving health status of the population (Kannan,1999). The present study revealed that 94.7 per cent male and 93 per cent female in KM families and 84.4 per cent male and 92 per cent female in NM families were literate. As pointed out, literacy rates are unquestionably higher among women in Kerala (88%) compared to the rest of India (Economic review, 2002-2003; Mohindra,2003; Menon *et al*.,2006). The gender gap in literacy rate is much smaller when compared to the other states. In the present study 63 per cent of respondents in KM families and 70 per cent respondents in NM families were having high school level of education .Thirteen per cent of KM respondents were having college level education whereas it was 15 per cent among NM respondents. There were no illiterate among the respondents. Anand (2002) reported that members of SHGs at Malappuram district were also educated and Shinoji (2007) also observed similar educational status among SHG members of Thrissur district.

Although Kerala tops in women's literacy rate and education, when it comes to work participation sex ratio shows great deviation. In the present study about 85.4 per cent of male members (above 18 years) in KM families and 86.7 per cent of male members in NM families were engaged in either permanent or temporary type of jobs. Fourteen point six per cent and 13.3 per cent respectively were without any jobs. Among women (above 18 years), 38.6 per cent in KM families and 97.3 per cent in NM families were not having any type of jobs with an income. This comparatively low percentage in 'no work' category in

KM families is due to the participation of 54.34 per cent women in Kudumbasree related income generating activities. Even though the family members in both groups were educated, majority of the male members were working as labourers. This findings are in support of the observations that unemployment in Kerala is considered higher than in any other Indian states especially in the high rates of educated unemployed (Ramachandran,1996).

In the present study 93 per cent of KM families had monthly income of Rs. 2001-4000 whereas in NM families 85 per cent had a monthly income of Rs. 1001-3000. In both, KM and NM families, there was not much difference in the percentage of earning male members (85.4 and 86.7 per cent respectively) and also most of them worked as casual labourers. This difference in family income in KM families gives an indication of the women's share of contribution to their family income.

Through Kudumbasree income generating activities, 55 per cent of the respondents were earning more than Rs. 1000 per month and 40 per cent earned an income ranging from Rs. 500-1000. It was also observed that 65 per cent of KM respondents contributed 31-50 per cent of the monthly family income. Fifteen per cent of KM respondents contributed more than 50 per cent of the family income. This finding has highlighted the emerging trend that rural educated women have high potentials as economic providers for their households and could act as decision makers in the familiy.

As reported by Anand (2002) a family with a monthly income above Rs. 1500 is treated as above poverty line (APL). In the present study about 50 per cent of NM families are getting an income coming in the range of Rs. 1001-2000. About 79 per cent of the KM families had an income ranging from Rs. 2001-3000 which was mainly due to the contribution of women. This shows the impact of Kudumbasree activities in changing the economic status of the families. There are similar reports that SHGs improved the economic conditions of a fairly

good number of BPL families (Oommen,1999; Nair,2006; Suneetha,2004; Devika and Thampi,2007).

The KM respondents were mainly involved in 7 different types of income generating activities like clay work (7units), garment making (6units),papad making (3 units) and one unit each for convenient food making, banana product making ,biofetilizer making and chocolate making.

About 35 respondents adopted clay work as their income generating activity because among 62 per cent Hindu KM families, 21 per cent were Kumbarans, who were traditional clay workers. So these women had their family support and also 40 per cent of them had attended training programmes on clay accessories making of one month duration. About 30 per cent of the KM respondents had attended the same training for 3-5 days and also for one week duration. These factors might have motivated more women to take up this activity.

Even among the clay work units, vide variation in the monthly income was observed and thereby in the income per respondent per month. Of the 7 units, 3 units got a monthly income ranging between Rs. 4001-5000 whereas 4 units were getting an income between Rs. 6001-7000. The monthly income of each respondent in this activity thus ranged between Rs.714-1167. This variation is due to different factors such as total number of members in a unit, availability of raw materials, skills and abilities of the women in making variety products and demand for the products in the market. The clay units with monthly income of Rs. 4001-5000, produced the same traditional mud pots whereas units with an income of Rs. 6001-7000 produced a variety of new clay products which had more demand in the market.

Garment making was the activity adopted by 30 respondents and it was observed that 15 respondents had attended training in tailoring for a duration of one year. Thirty five respondents attended the above training of one week

duration. There were 6 garment making units of which for one unit, the monthly income ranged from Rs.7001-8000 and for two units with Rs. 8001-9000. In spite of the tendency among beneficiaries to underreport income, all the respondents in garment making units agreed to have generated a monthly income ranging from Rs. 1200-1500.

There were three papad making units. One unit is getting an income of Rs.2001-3000, one unit with Rs. 3001-4000 and another unit with Rs. 4001-5000. The monthly income of the respondents in this activity ranged between Rs.500-1000.The 2 units with income ranging from Rs. 3001-5000 were traditional papad makers with regular clients and the respondents have not attended any training in papad making. But for the unit with low productivity this was a new venture. These results are in line with the studies conducted by Sundaram (2001) and Anand (2002) who observed that those who had some earlier business experience and traditional skills were able to make use of micro credit more effectively.

There was one unit for convenient food making which was found to make a monthly income of Rs. 10,000. The respondents in this unit were getting the maximum monthly income of Rs. 1666. About 10 per cent had attended training in this field of 15 days duration. The reasons as suggested by the respondents for the highly remunerative activity were, the high demand for the products like masala powders, sambar powders, chilly, turmeric and coriander powders made by them, easy availability of the raw materials from the market and the marketing experience of the respondents. Besides, like clay work and papad making this activity was not seasonal.

There were single units for chocolate making, banana products making and biofertilizer making and the monthly income of these units ranged from Rs. 3000-3500 and the monthly income of the respondents ranged from Rs. 437-600.

The reasons for the comparatively low productivity of chocolate making unit as observed, were the high cost of raw materials like cocoa powder, ghee, milk powder and packaging materials, lack of proper storage facilities which affected the shelf life of the products, lack of awareness in making variety products and also tough competition from branded chocolate products.

There was one biofertilizer unit with a monthly income of Rs. 3500 and there were 8 members in this unit. This considerably reduced the monthly income of the respondents to Rs. 437. Another important problem encountered was in the marketing of these products. They were marketing their products only through household visits.

Domestication of animals is an important source of income in rural house holds (Anand,2002) but in the present study most of the KM (96%) and NM (90%) families are not maintaining domestic animals.

Land is considered as one of the chief determinants of resource position. The present study indicated that about 62 per cent of the KM families and 50 per cent of the NM families owned 5-10 cents of land. And 35 per cent of KM families and 30 per cent of NM families owned 11-15 cents of land. Cherian (1992), Seshadrinath (1993), Smitha (1999), Jyothi (2003) and Lawrence (2003) also observed small land holdings of rural households in Kerala. Majority of the families in both groups had no specific cultivation in their land.

Indebtedness of family members indicated that all families of both groups had taken loan from different sources. Most of the KM families (88%) borrowed money from Kudumbasree and also from Kudumbasree and banks (22%). Majority of NM families took loan from chitty/kuris.

In general, women have to depend on their husbands and male relations for cash, as man control economic resources in the society. But in KM

families, it was also observed that women have access to credit from other women in the village and are less exploited. Thus these women have been improved their emotional well being through greater independence and less stress. As indicated by Devika and Thampi (2007) one of the main aims of the Kudumbasree is the economic improvement through the development and nurture of thrift and credit societies and micro enterprises.

Majority of the KM families (72%) had taken loan for an amount ranging from Rs. 10,000-30,000 whereas 50 per cent of NM families had a loan ranging from Rs. 40,000-50,000. Loan was mainly for improving the housing conditions in most of the KM families (60%) whereas for 40 per cent NM families the loan was mainly for marriage purposes. Regarding savings all the KM families saved money, either in LIC and Kudumbasree (53%) or invested in Kudumbasree itself (44%). Only 45 per cent of NM families reported savings and that also mainly in chitti/Kuris (55%).

The core structure of the Kudumbasre are neighbourhood groups (NHGs) which meet weekly. At the weekly group meeting women deposit savings and the collective savings return provide the basis for loan. The thrift and credit societies are formed with the objective of encouraging the poor women to save their meager means to widen the resource base of the NHGs. The thrift and credit societies are considered as poor women's bank. The poor women who were hitherto dependent on their men folk for every need, has managed the impossible under Kudumbasree. More than 90 per cent of the savings in the thrift societies are given away as loans. The selection of beneficiaries, the rate of interest, the amount of loan, the period of repayment etc are all decided and implemented by the women themselves. For the same reason, the NHGs are also very considerate to genuine reason of non repayments and extensions are given. It is observed that 100 per cent repayments are ensured which are more in banking history (Chavan *et al*.,2002).

Monthly expenditure pattern of the families indicated that about 59 per cent of the KM families spent 46-50 per cent of their income on food whereas it was 85 per cent in NM families. It has been observed that food expenditure will be the major expenditure in all poor families. Here in KM families with comparatively better income we can see an expenditure pattern different from that of NM families. About 38 per cent of KM families spent 11-15 per cent of income on clothing. Expenditure on housing was 5-10 per cent in 71 per cent of KM families and in NM families majority (85%) spent less than 5 per cent on shelter. Expenditure in this regard for KM families is found to be high because most of the KM families availed loan to improve their housing conditions like extension renovation or maintenance.

Better living facilities are an indication of their added income. Other facilities utilized by the families like for transportation and recreation were also high for KM families compared to NM families. Expenditure on education was 5-15 per cent in 56 per cent of KM families whereas for majority of NM families the expenditure was below 5 per cent. About 95 per cent of the KM families were found to have an expenditure of 5-10 per cent as electricity charges. The higher expenditure in this regard for KM families was mainly due to the use of labour saving devices like mixi and also pumpsets. In 15 per cent of NM families there were no electric connection. Five to ten per cent expenditure was also observed under health, fuel and luxury & personal for majority of the KM families but this expenditure was below 5 per cent in most of the NM families.

Regarding various remittances, most of the KM families used 5-10 per cent of their income for remitting and even less than 5 per cent of the income by 38 per cent of the families. In most of the NM families (65%) remittance was found to be 11-15 per cent. Most of the NM families took loan from banks and also from Kuris where the interest rate is very high. In KM families the loan was mainly from Kudumbasree itself, where the rate of interest and the period of repayment are all decided by the women themselves. Sometimes extension was

also given for repayment. Hence remittances for KM respondents were found to be low. Thus the monthly expenditure pattern of the KM families was significantly high when compared to NM families on various aspects except for health and fuel which showed no significant difference with that of NM families. Regarding remittance the monthly expenditure was significantly high in NM families.

Housing conditions would be a visible indicator of the economic status of the households. Majority of the families in both groups had their own houses. Mud walled and thatched roof houses were also observed among some NM families whereas in KM families (5%) concrete structures were also found. Majority of houses in both groups had brick walls with tiled roof. Houses with more number of rooms were also observed in KM families. Living facilities revealed that all the families had sanitary latrines and most of the families had their own well as drinking water source. Wood along with LPG was the fuel used for cooking by majority of KM families. Whereas in NM families (90%) firewood alone was the fuel used for cooking. Majority of the families in both groups had electric connection. These observations on rural households are in line with the findings of Kannan (1999), who reported that extremes of poverty and riches are relatively small in rural Kerala.

Kerala is considered to have the greatest access to health care services among the states, with a public health facility located in close approximation to urban and rural populations (Krishnan,1999). In the present study 73 per cent of KM families and 75 per cent of NM families depended on PHC for medical/health care.

While mortality rate is quite low in Kerala, the population continues to suffer from high morbidity rates (Kunhikkannan and Aravindan,2000). But in the present study most of the families in both groups reported only fever as the illness that had occurred during the past one year period. Kannan (1999) also found fever

to be the commonest illness among rural households of Kerala contributing to the high morbidity.

In the present study most of the KM respondents had attended various training programmes of different duration related to their income generating activity and also other activities. About 40 per cent of KM respondents attended training on clay accessories making for a duration of one month. About 15 per cent had undergone training on tailoring practice of one year duration. It was observed that the main organizers of these training programmes were Gramapanchayat, Khadi commission and Christian missionaries. Similar results were also observed by Oommen(1999), Anand (2002), Mohindra (2003), Suneetha (2004) and Menon *et al*.(2006) among SHGs in Kerala.

Most of the KM respondents had a positive attitude towards Kudumbasree programmes. Majority of the KM respondents strongly agreed that income generation had raised their self awareness and capabilities and brought them into touch with the outside world. It makes them feel that they are no more liabilities to the family instead as assets to the families that contribute to a substantial proportion of family income.

5.2 Food consumption pattern of families

Precise information on the food consumption pattern of the people is essential not only for assessing the nutritional status of the community but also for elucidating the food needs of population (Timmayamma and Rau,1996). The present study revealed that all KM and NM families were non vegetarian except one NM family. Smitha(1999), Jyothi(2003), Lawrence(2003) and Ramesh (2006) also observed non vegetarian food habits among rural families Kerala.

The study revealed that the diets were cereal based with vegetables and fish in almost all families. In KM families pulses were consumed frequently

but in NM families this was consumed less frequently. This is partially attributable to the soaring cost of pulses and inability of the poor to purchase adequate pulses in spite of higher expenditure on pulses. Foods like fruits, milk and milk products, meat, egg and bakery items were consumed less frequently by all the families. This is in line with the findings of National Family Health Survey-2 (2002) who reported that diet of rural women in households belonging to low socioeconomic group are mainly cereal based, lack diversity and are monotonous.

Meal pattern of the families indirectly indicate their dietary habits as well as food availability. In the present study, majority of the KM and NM families had three major meals a day pattern. Similar results was reported by Cherian (1992), Jayanthakumari (1993), Udaya (1996) and Jyothi (2003) in rural households of Kerala.

Dietary pattern is an important factor influencing the nutritional status. Skipping of meals or inadequate intake of foods results in undernutrition. About 15 per cent of KM respondents never had lunch and 20 per cent ate food only after reaching home on working days. Rice and pulses were the main items of lunch for KM respondents on working days.

Pickling of fruits and vegetables was the main method of food preservation adopted by majority of KM families (52%) and 55 per cent of NM families never adopted any food preservation techniques.

Food choices during special conditions like physiological and disease conditions indicate the nutritional awareness of the home maker. In the present study KM families were found to give some extra non vegetarian foods during physiological conditions like pregnancy and lactation but no such extra foods were given in NM families. But during infancy most of the families gave ragi as a supplementary food. In NM families (95%) milk was given to old age people. In

disease conditions majority of the families did not give any special foods except rice porridge.

People in Kerala are generally known to be more health conscious than other Indians, due to their high literacy rates and established hygienic practices (Krishnan,1999). In the present study also most of the families in both groups observed hygienic practices since they are aware of the importance of cleanliness and the sources of contamination of food.

Faulty food habits are widely prevalent among all the countries in the world. Faulty food habits are contributory factors to the wide prevalence of malnutrition among the rural households (Swaminathan,1995).Some food fads and fallacies in the community also have an important role in the contribution of malnutrition. In the present study also the families had certain food fads such as papaya and abortion, beetroot in blood formation, pica in pregnant women in the development of foetus etc.

Boiling was the main method of cooking food for majority of the families. Frying was mainly seen for eggs and that too for preparing omlette. In 40 per cent of NM families, roots and tubers were prepared by frying that is mainly for preparing chips. Regarding cooking vessels used, 30 per cent of KM respondents used pressure cooker for cooking cereals and aluminum vessels were mainly used for cooking by majority of the families.

5.3 Nutritional status of the respondents

Body mass index (BMI) is an important indicator of current nutritional status and health risk and it describes the extent of chronic energy deficiency (CED). On the basis of criteria suggested by James *et al.*(1988) and Luizz *et al.*(1992) for body mass index, about 43 per cent of KM respondents and 40 per cent NM respondents were found to be normal regarding their nutritional status.

The Second National Family Health Survey (1998-1999) showed that in Kerala about 60.3 per cent women were with normal weight for their height. BMI between 18.5-20 which indicated normal with low weight but no CED was observed in 38 per cent of KM respondents and in 35 per cent of NM respondents. Prevalence of mild and moderate malnutrition were found to be 5 and 8 per cent respectively in KM respondents whereas in NM respondents prevalence was 10 per cent in both grades of malnutrition. Thus among the KM respondents, more women came under the normal group and also observed a reduction in the mild and moderate grades of malnutrition when compared to the NM respondents. As reported by Ramesh (2006), the state of Kerala had significant advances in demographic, epidemiological and health transitions.

There are many socio economic conditions favorable to KM families which have been postulated to have made this 'health transition' possible viz high literacy rate especially female literacy (which has covered 90 per cent both in KM and NM families),occupational status especially of female members in the family (more than 60 per cent in KM families including involvement in Kudumbasree activities), comparatively high income of KM families (Rs.2000-4000), income earned by female members (>1000/month), the thrift and credit societies which encouraged the KM respondents to save their meager means, better access to loan which had improved their housing conditions and other living facilities as evidenced by their comparatively high monthly expenditure pattern and above all the self awareness, confidence and capabilities of women developed due to income generation.

There is an increasing awareness among women about the importance of nutritional status, an important index of the quality of life. Although there is an overall positive trend in nutritional outcome during the past few decades, the gain is modest and predominantly in terms of reduction of more severe forms of malnutrition. In the present study also a favourable transition appears to have been initiated in the less severe varieties of undernutrition. Mild form of malnutrition

was only among 5 per cent and moderate among 8 per cent in KM respondents as against 10 per cent in NM respondents. This improvement even amongst the poor women is an encouraging observation.

Results of the clinical examination among the respondents indicated different clinical manifestations related to nutritional deficiencies. The important symptoms observed among the KM respondents were xerosis (86.6%), pigmentation (73.3%) and functional nightblindness (93%) in the eyes and flourosis (53.3%) and carries (13.3%) in the mouth. Whereas in NM respondents the manifestations were xerosis (90%), pigmentation (80%), functional nightblindness (90%), flourosis (40%) and carries (60%). In accordance with these findings, incidence of xerosis and carries were reported by Augustine (1993) in a study among rural women of Trivandrum district. Udaya (1996) and Lawrence (2003) also observed dental carries among the farm women of rural Kerala.

The results of one-day food weighment survey indicated that the mean intake of all food items except roots and tubers and flesh foods were significantly below the recommended allowances among KM respondents. The same pattern was also observed in NM families. The intake of flesh foods were found to be significantly high in both KM (336% of RDA) and NM (315.6% of RDA) respondents. These findings are also consistent with Ramesh's (2006) perspective that more than three-fifth of Kerala women consumed chicken or meat or fish daily. Similar findings were also observed in rural areas of Kerala by Udaya (1996), Jyothi (2003) and Lawrence (2003).

Regarding the nutritional intake in KM and NM respondents, protein, fat and riboflavin intake was found to be significantly high when compared to RDA. This might be due to the high intake of flesh foods in both the groups. In KM respondents, the intake of nutrients like iron, thiamin, niacin and vitamin c were found to be satisfactory without significant difference from RDA.

The diets of both groups were found to be significantly low in the intake of nutrients like calcium and retinol. This might have contributed to the high clinical manifestations such as mottled and discoloured enamel and dental carries and also high prevalence of functional night blindness and xerosis in majority of the women in both groups.

Energy intake was found to be satisfactory in NM respondents (97.25% of RDA) but this was significantly low in KM respondents (96.95% of RDA). NNMB surveys (1979-2002) have also reported a decline in total energy intake over the 20 year period from 1975-95 while fat intake appears to have increased in both urban and rural areas. NNMB (2004) has reported that the average intake of protein, fat and energy by women was 46.5g, 21.8g and 1738 Kcals. respectively. In the present study, inspite of the low energy intake in KM respondents, there observed a significant relationship between energy intake and BMI. Women in normal group were more among KM respondents and the prevalence of mild to moderate and severe forms of CED was comparatively low in KM respondents.

As pointed out by Wasuja and Siddhu (2003), even in women from high income group, the energy intake is less than the RDA recommended by ICMR and the energy expenditure is lower than intake by about 75-100 Kcals. This positive energy balance might have lead to a progressive increase in body weight over decades.

Kerala with relatively low energy intake has undernutrition rates comparable to Punjab. Lower physical activity of women due to levels in occupational and household activities, better availability of transport, fuel and mechanization may account for the low undernutrition rates in women inspite of low energy intake. In the present study KM respondents had better access to water using pump sets from their wells, household labour saving devices like mixi and pressure cookers and access to fuel like LPG and also transportation facilities. All

these might have reduced their physical activities and resulted in a positive energy balance inspite of low energy intake. Even obesity was found among 2 KM respondents. NNMB (1979-2006) have also shown a steep increase in the expenditure on transport, better access to water and fuel which has resulted in a substantial reduction in the energy spent by rural women.

Prevalence of anaemia among respondents was interpreted on the basis of criteria suggested by WHO (1968) with respect to their Hb levels. It was observed that 46.6 per cent of KM respondents were normal with a Hb level 12g/100ml whereas this was only 10 per cent among NM respondents. The intake of iron and Hb levels were found to have a significant relationship in both groups. Iron intakes in KM respondents were found to be satisfactory but it was significantly low in NM respondents. Mild to moderate anaemia was prevalent in women of both groups but the prevalence rate was found to be higher in NM respondents. None of the respondents in both groups had severe anaemia. Reddy *et al* (1993) observed that 87.5 per cent of Indian women were anaemic and among them 33.6 per cent were moderately anaemic. Udaya (1996), Smitha (1999) and Jyothi (2003) also observed similar results among rural women in Kerala. NFHS-2 (2002) reported that 56 per cent of rural Kerala women were having Hb level >11g/dl and 24 per cent with mild and 19 percent with moderate anaemia.

The existing poverty requires not only raising income levels, but also achieving good health and poverty being the main cause of ill health, comprehensive strategies is required to improve the well being of poor communities. Improvement in women's employment and income status makes a critical difference in various aspects among low income households.

Summary

6. SUMMARY

The present study entitled "Nutritional profile of women participating in Kudumbasree programmes" was conducted in Thrissur district among 120 women in the age group of 20- 40 years. Out of these 120 women, 100 women were participating in Kudumbasree activities and 20 women were not participating in Kudumbasree activities.

Information regarding the socioeconomic conditions of the families indicated that most of the families in both groups (62% of KM and 65% of NM) were Hindus and belonged to Other Backward Communities. Nuclear family system was followed by 68 per cent of KM families and 55 per cent of NM families and nearly 77 per cent of KM families and 80 per cent of NM families had up to 5 members in their family.

Composition of families showed that 51.8 per cent of KM family members and 49.38 per cent of NM family members were in the age group of 21 to 50 years. Among adults, the numbers of female members were higher than the male members in both groups whereas among children numbers of boys were higher than the girls.

About 94.7 per cent male and 93 per cent female in KM families and 84.4 per cent male and 92 per cent female in NM families were literate. About 70 per cent of the respondents had up to high school level of education. There were no illiterates among the respondents.

Occupational status of family members revealed that about 85.4 per cent of male members in KM families and 86.7 per cent of male members in NM families were engaged in either permanent or temporary type of jobs. Fourteen point six per cent and 13.3 per cent respectively were without any jobs.

Monthly income of most of the KM families varied from Rs. 2001-4000 and in NM families it was inbetween Rs. 1001-3000.

Details of activities of KM respondents revealed that, they were engaged in 7 different types of activities in different units with a monthly income ranging from Rs.3000 to 10,000 and majority were involved in clay work (35%). The highest income was earned by convenientfoods making unit (Rs.9001-10,000) and lowest income was for chocolate making, bananaproducts making and one papad making unit (Rs.2001-3000).

Majority of KM respondents (55%) received more than Rs.1000 per month from their activities and 79 per cent of the respondents were found to contribute a major share (31-60) to their family income.

Majority of KM (96%) and NM (90%) families did not maintain any domestic animals.

Most of the KM (97%) and NM (80%) families owned 5 to 15 cents of land and had no specific cultivation in their land.

Majority of the KM families (88%) borrowed money from the Kudumbasree fund whereas in the case of NM families 80 per cent took loan from kuris. House construction was the main purpose of loan in 60 per cent of KM families whereas in NM families' majority (40%) took loan for marriage expenses of the family members. The loan amount varied from Rs.20,000-30,000 in KM families and in NM families 50 per cent took loan ranging from Rs.40,000-50,000. All the KM families saved money whereas only 45 per cent of NM families saved money.

Expenditure pattern of families indicated that 99 per cent of the KM and all the NM families spent 36-50 per cent of their income for food. The monthly

expenditure pattern of KM families was significantly higher than the NM families on various aspects except for expenditure for health and fuel. NM families showed significantly higher amount on monthly remittance.

Majority of the families in both groups had their own houses with brick walls and tiled roof but number of rooms were more in KM families (3-5 rooms). All the families in both groups had separate kitchen and proper lavatory facilities. Most of the families (97% KM and 85% NM) had adequate drainage facilities. Majority of the families in both groups had recreational facilities like TV or radio. Most of the families (97%KM and 95%NM) had water sources from their own well.

Wood and LPG was used as fuel in 71 per cent of KM families whereas in NM families 90 per cent used only wood for cooking foods.

Majority of KM and NM families (73%KM and 75% NM) used the facilities available in primary health center for health care.

Details of morbidity pattern in the families for the past one year revealed that majority had only fever during the period.

Regarding the training programme attended by the KM respondents, 95 per cent had attended training programmes related to their activity and also in other fields. Maximum duration of training (1 year) was found for tailoring practices attended by 15 per cent of women.

Regarding the attitude of the KM respondents towards the Kudumbasree programme, majority of the respondents strongly agreed to the positive statements and strongly disagreed to the negative statements about the programme.

Food consumption pattern of the families indicated that majority of the families were non vegetarians. Cereals, other vegetables, roots and tubers, oils and fats, spices and condiments, fish and sugar were consumed most frequently by the KM families while in NM families all the above food items except roots and tubers were found to be the most frequently used food items. Three major meals was the meal pattern followed by most of the families. About 40 per cent of KM respondents used packed lunch during working days and rice and pulses were the main items for lunch. Pickling was the only method of food preservation observed in the families.

In KM families some extra non vegetarian foods were given during special physiological conditions like pregnancy and lactation but this was not observed in NM families. During infancy most of the families in both groups gave ragi as the supplementary food. In disease conditions majority of the families gave rice porridge to the patients.

Majority of families in both groups followed hygienic practices and most of the respondents had different food believes.

Body mass index of the respondents showed that about 43 per cent of KM and 40 per cent of NM respondents were normal. The prevalence of mild and moderate malnutrition was found in 5 and 8 per cent respectively in KM respondents and this was 10 per cent in NM respondents.

One day food weighment survey indicated that the mean intake of all foods except flesh foods were significantly below the RDA among KM and NM respondents.

The nutritional quality of the diet revealed that the intake of nutrients like protein, fat and riboflavin were significantly high in KM and NM respondents and

the intake of iron, thiamin, niacin and vitamin C were satisfactory in KM respondents, while energy intake was significantly low.

Clinical examination showed symptoms like xerosis, pigmentation and functional night blindness in the eyes and flourosis and carries in the mouth among both groups of respondents.

Biochemical examination of haemoglobin showed that 46.6 per cent of KM respondents were normal with a heamoglobin level of 12g/100ml as against 10 per cent in NM respondents.

Improvement in women's employment and income status makes a critical difference in various aspects among low income households. The additional income will stimulate women towards better management of the resources at their disposal, to remove poverty and create happy and healthy families by improving family nutrition. Reduction of more severe forms of malnutrition was observed and also slight reduction in the less severe forms of undernutrtion even amongst the poor women was an encouraging observation. Empowering women would ultimately lead to better nutrition for the family, since women had realized the need to improve the food intake of the family members qualitatively and quantitatively. The study has highlighted the emerging trend that rural women at the subsistence level have high potentials as economic providers for their households and could act as promoters of health and nutrition of families.

There is a great scope for improving their lives through developing better skills and using better equipments, to perform their income generating activities particularly the traditional tasks more efficiently. Through adoption of newer ideas their family income and food availability can be enhanced.

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Appendices

APPENDIX I

KERALA AGRICULTURAL UNIVERSITY
FACULTY OF AGRICULTURE
COLLEGE OF HORTICULTURE, VELLANIKKARA, THRISSUR
HOME SCIENCE (FS&N)

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

1. Name of the respondent :
2. Address :
3. Place of Survey :
4. Panchayath, House No. :
   Ward
5. Age of the respondent :
6. Type of the family : Joint / Nuclear
7. Religion / Caste :
8. Family size :
   No. of adults :
   No. of children :
9. Marital status : a) Married (b) Unmarried
   c) Divorced/separated (e) Widowed
10. Composition, education and occupation of family members

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

11. Income from Kudumbasree (monthly)
    a) < 500 (Rs)
    b) 500- 1000 (Rs)
    c) > 1000 (Rs)
12. Do you have any other source of income: Yes / No

If yes, specify amount :

13. Total income :

14. 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 More than 4				
b) Buffalo	1 2 3 4 More than 4				
c) Goat	1 2 3 4 More than 4				
d) Pork	1 2 3 4 More than 4				
2. Poultry a) Hen	1 2 3 4 More than 4				
b) Duck	1 2 3 4 More than 4				

15. Details of produce from domestic animals

Sl. No.	Name of product	Quantity produced per year	Use of produce			Income
			By family	Gift	Sale	

16. Details of land holdings

Do you have your own land : Yes/ No

i) If yes, specify area under cultivation:

ii) Specify how you got this land

a) Purchased

b) Inherited from parents

c) Received from Government

d) Others (specify)

17. Details regarding the cultivation of crops

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

18. Have you taken any loan? : Yes / No

If yes, specify

Sl. No.	Source of debt	Amount of debt	Purpose

19. Details of savings

Methods of investing the savings	Approximate savings /month

1. Bank accounts a) Special money boxes b) Savings accounts c) Current accounts d) Fixed deposit account 2. Post Office Savings a) Savings account b) Cumulative time deposit c) National savings scheme 3. Life insurance scheme a) LIC b) Group insurance scheme c) Family pension scheme d) Medical insurance scheme 4. Chit funds	

20. 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		

21. Details of living 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

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) Electrical facilities: Yes / No

g) Recreational facilities: Yes / No

If yes, specify: Radio / Transistor/ Television/ VCR

h) Transport facilities: Bus/ Bicycle/ Motor bike/ Jeep

22. 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) Others

ii) Source of fuel

a) Collected from surroundings
b) Purchased

23. Details of health care facilities.

a) Primary Health Centre
b) Private Hospital
c) Medical College
d) Maternal and Child Health Centre
e) Ayurvedic
f) Homoeopathic
g) Others

24. Morbidity pattern for the past one year

1) Diarrhoea
2) Measles
3) Fever
4) Tuberculosis
5) Respiratory diseases
6) Jaundice
7) Others
8) Nil

25. Nature of activities involved in kudumbasree

1. Product making activities

Activity	Name of product	Quantity produced /month	Source of raw material	Marketing	Income
Food processing Garment making Soap making Candle making Flower making Umbrella making					

2. Agricultural activities

Name of crop	Source of raw material	Quantity produced/year	Marketing	Income
Vegetable cultivation Paddy cultivation Others				

3. Cleaning activities

Area of cleaning	Income
a) City waste disposal b) Village waste disposal c) Waste disposal activities by private agencies d) Home based cleaning activities	

4.Other home based small scale enterprises

26. Have you got any training regarding these activities ? Yes / No

If yes, details regarding training.

27. Do you have a unit for working ?

Home / Common site

28. Are you regularly attending the kudumbasree meetings ?

Yes / No

29. Frequency of meeting in a month

30. Training programmes attended

Title	Year& Month	Duration	Organized by

31. Attitudes towards the programme

SI No	Statements	SA	A	UD	DA	SDA
1	I like doing kudumbasree activities					
2	I am proud of being a member in the kudumbasree group					
3	I started to get more recognition from my family & neighberhood					
4	since I become a member of kudumbasree group					
5	The group activities have significantly increased my self confidense					
6	Kudumbasree activities significantly add income to the family					
	Kudumbasree activities unnecessarily take up a lot of my time					

7	I have enough work to do, so I am not interested in it					
8	Mostly leaders come up front, others get less recognition					
9	Members are not getting equal benefits					
10	In long term, this is not going to be a viable idea					

APPENDIX II

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

1. Name of the respondent :
2. Age :
3.. Address :
4. Place of survey :
5. Panchayath :
6. Block :
7. Food habit : Vegetarian/Non-vegetarian
8. Name of staple food :
9. Details of frequency of use of various food items

Sl. No.	Food items	Frequency of use in a week				Monthly	Occassi-onally	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	Sugar							
14	Bakery items							

10. Meal pattern

Once / Twice / Thrice / More than thrice

11. Do you take packed lunch to work site? Yes/No

12. Details of lunch

13. Preservation of foods

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		

14. Diet during special condition

SI No.	Condition	Preparations
1	Pregnancy	
2	Lactation	
3	Infancy	
4	Adolescent age	
5	Old age	
6	Disease conditions: a) Fever b) Diarrhoea c) Other diseases	

15. Cooking methods

Sl. No.	Method of cooking						Cooking vessels				
	Food items	Boiling	Straining	Absorption	Steaming	Frying	Pressure cooker	Aluminium vessel	Steel vessel	Clay vessel	Indalium vessel
1	Cereals										
2	Pulses										
3	Vegetables										
4	Roots and tubers										
5	Fruits										
6	Fish										
7	Meat										
8	Egg										
9	Milk										

16. Hygienic practices followed

a) Washing the vegetables before cutting :Yes / No

b) Washing the cooking vessels before using :Yes / No

c) Separate utensils used for raw and cooked foods :Yes / No

d) Cleaning hands before food preparation :Yes / No

e) Drinking boiled cooled water :Yes / No

f) Keeping cooked food covered and utensils off the ground :Yes / No

g) Taking drinking water from protected sources :Yes / No

h) Keeping water pots covered when they are not in use :Yes / No

i) Toilet is at a safe distance from water sources :Yes / No

J) Animals are kept away from water sources and home :Yes / No

17. Food beliefs

a) Garlic increases milk production in lactating women :Yes / No

b) Beetroot helps in the production of blood :Yes / No

c) Adult need no milk :Yes / No

d) Drinking too much water is fattening :Yes / No

e) Foods cooked in aluminum vessel cause cancer :Yes / No

f) Papaya fruit produces abortion in pregnant women :Yes / No

g) Eating clay helps in the normal development of baby in the womb :Yes / No

h) Oils and fats are not fatteni :Yes / No

i) Others

APPENDIX III
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

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

ii) Flourosis :
1. Absent
2. Chalky teeth
3. Fitting of teeth
4. Mottled and discoloured teeth

iii)Crries :
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 dermatit around the neck

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

iii) Pigmentation :
1. Normal

2. Scordal and pudental dermentation

b) Oedema

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

10. Bones

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

11. Heart

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

12. Nervous system

i) Calcification : 1. Absent
2. Present

ii) Paresis : 1. Absent
2. Present

13. Alimentary

i) Appetite : 1. Normal
2. Anorexia

ii) Liver : 1. Not palpable
2. Palpable

iii) Spleen : 1. Not palpable
2. Palpable

APPENDIX IV

SCHEDULE FOR INDIVIDUAL FOOD WEIGHMENT SURVEY (ONE-DAY WEIGHMENT METHOD)

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

ESTIMATION OF HEAMOGLOBIN (CYANMETHAEMOGLOBIN METHOD (NIN, 1983)

PRINCIPLE:

The heamoglobin (Hb) (Oxy heamoglobin, methemoglobin, carboxy heamoglobin) is converted to cyanmethaemoglobin according to the following reaction.

$$\text{Hb} \xrightarrow{K_3Fe(CN)_6} \text{Methemoglobin}$$

$$\text{Methemoglobin} \longrightarrow \text{Cyanmethaemoglobin}$$

The absorbance of cyanmethaemoglobin is proportional to the Hb concentration.

REAGENT:

Drabkin's solution: Dissolve 0.05g of KCN, 0.20g of potassium ferricyanide and 1.00g of sodium bicarbonate in 1 litter of distilled water.

PROCEDURE:

20µl of blood is transferred with the help of a Hb pipette into a test tube containing 5ml of Drabkin's solution. Mixed thoroughly and reading taken in a photoelectric colorimeter at 546nm. Optical density of standard Hb solution was also measured using a colorimeter. Heamoglobin content of the sample was found out by the formula

$$\text{Hb(gm/dl)} = \frac{\text{Optical density of sample}}{\text{Optical density of standard}} \times N \times 0.251$$

Where,

N = Concentration of standard Hb = 60mg/dl

APPENDIX VI

FORMULA FOR THE CALCULATION OF FOOD FREQUENCY SCORE

The formula for the calculation of food frequency score was suggested by Reaburn *et al*,(1979)

$$\text{Percentage of total score} = \frac{R_1S_1+R_2S_2+\ldots\ldots R_nS_n}{n}$$

Where,

S_n = Scale of rating

R_n = Percentage of respondents selecting a rating

n = Maximum scale of rating

NUTRITIONAL PROFILE OF WOMEN PARTICIPATING IN KUDUMBASREE PROGRAMMES

By

SHIJI.N

ABSTRACT OF THE THESIS

Submitted in partial fulfillment of the requirement

for the degree of

MASTER OF SCIENCE IN HOME SCIENCE

(FOOD SCIENCE AND NUTRITION)

Faculty of Agriculture

Kerala Agricultural University

Department of Home Science

COLLEGE OF HORTICULTURE

VELLANIKKARA, THRISSUR - 680 656

KERALA, INDIA

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ABSTRACT

A study on "Nutrtional profile of women participating in Kudumbasree programmes" was carried out among women in Nadathara panchayat, Thrissur district. A total of 120 women were selected randomly for the study. Out of this, 100 women from Kudumbasree members and 20 women from non members of Kudumbasree.

Information regarding the socio economic conditions of the families revealed that, most of the families in both KM and NM were Hindus and belonged to other backward communities with a family size of 3 to 5 members and majority of families were of nuclear type.

The composition of the families indicated that, among adults number of females was higher than the males and among children number of boys was higher than the girls.

Educational status of the family members showed that majority in both groups and all the respondents were literates.

Work participation of family members revealed that, majority of male members in both groups were engaged in either permanent or temporary type of jobs. And among women the percentage of 'no work' category was high in NM families than in KM families.

Monthly income of the KM families varied from Rs.2001 to 4000 whereas in NM families it was Rs.1001 to 3000.

Details of activities of KM respondents revealed that, they were engaged in 7 different types of activities in different units with a monthly income ranging from Rs.3000 to 10,000. Clay work and garment making were the two activities

with more units. Highest income was for convenient food making unit and lowest income was observed for chocolate making unit, banana products making unit and one papad making unit.

Majority of KM respondents received more than Rs.1000 per month from their income generating activities and most of them contributed to about 31-60 per cent of their family income.

About 15 cents of land was owned by most of the KM and NM families and had no specific cultivation in their land.

Most of the KM families borrowed money from the Kudumbasree fund and house construction was the main purpose of loan whereas NM families took loan from kuris mainly for marriage expenses of the family members. The loan amount varied from Rs.20,000-30,000 in KM families and in NM families ranging from Rs.40,000-50,000.All the KM families saved money whereas the per cent of families with saving was less in NM families.

Monthly expenditure of KM families were significantly higher than the NM families on various aspects except for expenditure for health and fuel. Maximum proportion of income was spent on food items in both groups.

Primary health center was utilized by majority of KM and NM families for health care. Morbidity pattern in the families for the past one year revealed that, majority had only fever.

Majority of the families in both groups had their own houses with brick walls and tiled roof but number of rooms were more in KM families (3-5 rooms). All the families in both groups had separate kitchen and proper lavatory facilities. Most of the families had adequate drainage facilities. Majority of the families in

both groups had recreational facilities like TV or radio. Most of the families had water sources from their own well.

Wood and LPG were used as fuel in most of the KM families whereas NM families used only wood for cooking foods.

Training programmes were attended by most of the KM respondents related to their activity and also in other fields and maximum duration of training (1 year) was found for tailoring practices.

Most of the KM respondents strongly agreed to the positive statements and strongly disagreed to the negative statements about the Kudumbasree programme.

Food consumption pattern of the families indicated that majority of the families were non vegetarians. Cereals, other vegetables, roots and tubers, oils and fats, spices and condiments, fish and sugar were consumed most frequently by the KM families while in NM families all the above food items except roots and tubers were found to be the most frequently used food items. Three major meals was the meal pattern followed by most of the families. About 40 per cent of KM respondents used packed lunch during working days and rice and pulses were the main items for lunch. Pickling was the only method of food preservation observed in the families.

In KM families some extra non vegetarian foods were given during special physiological conditions like pregnancy and lactation but this was not observed in NM families. During infancy most of the families in both groups gave ragi as the supplementary food. In disease conditions majority of the families gave rice porridge to the patients.

Majority of families in both groups followed hygienic practices and most of the respondents had different food believes.

Body mass index showed that 43 per cent of KM and 40 per cent of NM respondents were normal. Prevalence of mild and moderate malnutrition was found among NM respondents.

One day food weighment survey indicated that the mean intake of all foods except flesh foods were significantly below the RDA among KM and NM respondents.

The nutritional quality of the diet revealed that the intake of nutrients like protein, fat and riboflavin were significantly high in KM and NM respondents and the intake of iron, thiamin, niacin and vitamin C were satisfactory in KM respondents, while energy intake was significantly low.

Clinical examination showed symptoms like xerosis, pigmentation and functional night blindness in the eyes and flourosis and carries among both groups of respondents.

Biochemical examination of haemoglobin showed that 46.6 per cent of KM respondents were normal with a Hb level of 12g/100ml as against 10 per cent in NM respondents. There is a significant relationship was observed between the iron intake and Hb level of KM respondents.