FOOD CONSUMPTION PATTERN AND NUTRITIONAL STATUS OF WOMEN AGRICULTURAL LABOURERS OF OLLUKKARA BLOCK, THRISSUR DISTRICT

By

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THESIS

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DECLARATION

I hereby declare that the thesis entitled **'Food consumption pattern and nutritional status of women agricultural labourers of Ollukkara Block, Thrissur District'** is a bonafide record of research work done by me during the course of research and that the thesis has not previously formed the basis for the award to me of any degree, diploma, fellowship or other similar title of any other University or Society.

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DEDICATED TO
MY LOVING PARENTS

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Introduction

INTRODUCTION

Agricultural sector is the main component of Indian economy. In India, 75 per cent of the population are engaged in agricultural related operations and in Kerala 42 per cent of the population depends upon agriculture for their livelihood (Government of India, 1990).

An agricultural labourer can be defined as a person who is in consideration of the wages payable to him by a land owner, works or does any other agricultural operation in relation to the agricultural land of such land owner (Government of Kerala, 1976). Agricultural laboures are considered as a group of underclass people in peasant society. In India, they account for about 25.20 per cent of the total work force and the proportion of the agricultural labourers to the total work force is constantly increasing. Though they form the largest group, they have the lowest social and economic status.

An improper food purchasing pattern was observed among agricultural labourers due to the seasonal work fluctuations. Sentilnathan (1991) opined that seasonal unemployment and underemployment was the biggest problem faced by the agricultural labourers.

In India, one fifth of the total labour of a family comes from women and one third of the women labour of the family was engaged in agriculture (Saikea and Gogoi, 1981). According to the census of India, 1991 women constituted 48.16 per

cent of India's total population and 83.00 per cent women were engaged in agriculture as cultivators and labourers.

It is important to recognise women's health needs as an integral part of both productive and reproductive functions by taking into account women's roles as a economic producers incorporating political, economic, behavioural, agricultural and health issues (Turshen and Mebrahtu, 1991). Women's daily activities which are mainly perennial use up more calories than even the peak period activities of men, even if women's additional calorie requirements during pregnancy and lactation are omitted (Batliwala *et al.*, 1985).

In our country, women have an important role in crop production and it is estimated to be about 50 to 60 per cent. The status of women agricultural labourers in general much lower than that of their male counterparts, largely because of their customary male dominance in the society, lack of opportunities, very poor accessibility to modern technologies . Thus they often face the double drudgery of being both the major contributors to family income, in addition to being responsible for household and family maintenance. Women agricultural labourers undergo nutritional stress because of low dietary intake and high energy output for wage earning , child bearing and child rearing. The extremely high workload of women and the inadequate intake of the nutritional foods has deleterious effects on her own health and nutritional status. Very few research studies relating to the nutritional status and food consumption pattern of women agricultural labourers have been attempted in Kerala and hence the present study entitled "Food consumption pattern

and nutritional status of women agricultural labourers of Ollukkara block, Thrissur District" was carried out with the following objectives:

1. To assess the socio economic status of the agricultural labourer families
2. To assess the food consumption pattern of the agricultural labourer families
3. To assess the nutritional status of the women agricultural labourers

Review of Literature

REVIEW OF LITERATURE

The review of literature relevant to the study on "Food consumption pattern and nutritional status of women agricultural labourers of Ollukkara Block, Thrissur District" is listed under the following heads.

2.1 Socio economic status of the agricultural labourer households

2.2 Food consumption pattern of the agricultural labourer households

2.3 Factors influencing nutritional status of the agricultural labourer families

2.4 Prevalence of nutritional defeciencies among agricultural labourer families

2.5 Role of women in agriculture

2.6 Infant feeding practices existing among the agricultural labourer households

2.7 Knowledge, Attitude and Practice (KAP) of the agricultural labourers

2.1 Socio economic status of the agricultural labourer households

Largest percentage of poverty among agricultural labourers was observed in four states, viz., Tamil Nadu, Orissa, Madhya Pradesh and Kerala (Natarajan, 1978). He also noted that agricultural labourers in Punjab and Himachal Pradesh were in better economic status. In Kerala, the per capita income among the agricultural labourer households was less than half of the per capita income for the state as a whole (Panikar, 1979). Venkataswamy (1975) observed that in Tamil Nadu, agricultural labourers were living under conditions of abject poverty and disguised unemployment.

Acharya (1982) pointed out that marginal farmers in Maharashtra had varying levels of income, depending on the nature of the land. The income of the

agricultural labourers in rural Srilanka had either been stagnated or declined and the living conditions of estate workers remained below acceptable levels (Gooneratne and Gunawardena, 1984).

According to Mellor (1984) health, nutrition and family planning programmes directly increase human welfare, and enhance the effectiveness of the labour force thereby facilitating accelerated growth in income of the poor. Thomas (1989) reported that majority of the agricultural labourer families in Trivandrum District had a monthly income below Rs. 1000/-.

Singh and Singh (1991) observed a higher inequality in the distribution of income in relation to the farm size and employment. According to Rief and Cochrame (1991), off farm employment played an important role in expanding income for households constrained by limited land and water and with larger number of residents.

Slesinger (1979) reported that migrant workers formed a unique and essential part of the agricultural labour force in Wisconsin and their low family income placed them in conditions of poverty and they had to travel thousands of miles each year in search of work. Swamy *et al.* (1980) reported that if the present trends in income growth and distribution continue, even a moderate increase in food prices will imply a large nutritional sacrifice for the poor. According to Marimuthu and Subbarayalu (1986) sheep farming and its associated industry generated self employment opportunities and improved the rural economy.

Uno *et al.* (1991) reported that in Japan and other Asian countries actual agricultural labour evaluation and farmer's income had been declining in the economic structure where manufacturing sector wages exceeded the earnings of cultivators. Labour productivity as measured by wages for agricultural labourers had a positive implication in the expenditures for improved health and nutrition and in investment (Haddad and Bouis, 1991).

Low levels of income resulted from low labour productivity was closely related to increased land scarcity, slow compensating growth in human capital, absence of productivity enhancing technology and deficiency in employment expanding infrastructure (Bigsten *et al.* 1992). The more the labourers' households were tied to the land of the farm owner for both income and own food production, the more difficulties they faced in satisfying even their basic needs (Foeken and Tellegen, 1994).

According to Asayehgn (1979), in Tanzania, females constituted slightly more than 50 per cent of the population and they were underrepresented in higher education and in positions of authority, in the labour force. Slesinger (1979) reported that the migrant agricultural workers in Wisconsin were not fluent in English and their educational attainment was poor.

Literacy rate of agricultural labourers in Kerala was found to be 72 per cent (Panikar, 1979). In Trivandrum District about 16 per cent of the female agricultural labourers were illiterate when compared to men (Usha *et al.*, 1990). They also

observed that about 60 per cent of women had Upper Primary and High School education. According to Alderman and Garcia, (1992) educating mothers to at least primary level reduces the level of child stunting, far more than increasing the per capita income.

Female literacy level in rural areas of Karnataka and Tamil Nadu was lower than in the urban areas (Mathew, 1994). Vaidehi and Joshi (1995) reported that 54.10 per cent of poultry farm women of Bangalore and Salem Districts were literate and 11.40 per cent of large and small farmers attained secondary school education.

Saxena (1986) observed that nuclear families were better than joint families in health and development. Majority of the labourer families in Trivandrum District were large sized consisting of five to ten members and majority of them were Hindus belonged to scheduled castes (Thomas, 1989). Cherian (1992) observed that majority of the agricultural labourers surveyed in Trivandrum District were from the under privileged communities and nuclear type families with patriarchal family system.

2.2 Food consumption pattern of the agricultural labourer households

Adverse circumstances such as unemployment, economic distress and natural calamities affect the level of food intake (Panikar, 1979). Thimmayamma (1983) observed that larger family size resulted in improper food distribution among family members of agricultural labourers mainly due to low purchasing power and

faulty food habits. According to Wong *et al.* (1985) protein intake increases as the family income rises.

Changes in the level and distribution of household income and in household size and composition had important effects on aggregate food consumption and expenditure patterns (Nyankori and Senauer, 1986). Gawn *et al.* (1989) reported that income and wage earnings extent a small, but significant impact on the level of consumption of most nutrients and life style and education are also found to be important determinants of food choices.

Food habits in rural East Africa depended mainly on the subsistence cropping system and the seasonality and perishability of certain foods and food products affected the dietary patterns of subsistence farmers (Haillu, 1990).

Rapid population growth has important implications for the region's food security in that it challenges the agricultural sector to increase food availability and to generate income for purchasing food (Shapouri and Scott, 1994).

Krechniak (1983) reported that in Poland average proportion of women taking four or more meals daily was relatively high and women taking three or two meals daily was 45 and 8 per cent respectively. Batliwala *et al.* (1985) reported that allocation of food to women was on average 25 per cent below to that of men.

Gooneratne and Gunawardene (1984) reported that among rural Srilankan workers, even though there was greater per capita availability of food, food consumption and nutrition appeared to have declined. According to Kaur (1985) Malaysian food production has seriously deteriorated as a result of that there has been a steady fall in the availability for local consumption of main food products like rice, fish, fruits, vegetables and meat. African women farmers produced their own crops, garden vegetables, live stock and poultry and the minor food crops provided up to 15 to 20 per cent of the family's total energy intake (Gittinger *et al.*, 1987).

There was many food taboos among the migrant agricultural workers of a rural slum in Brazil, but only a few taboos had potentially negative nutritional consequences (Desai *et al.*, 1989). Sahn *et al.* (1989) reported that in India, among labourers, food consumption has an immediate labour productivity impact and health status has a longer run productivity impact.

Benito (1979) observed that the major foods of the typical diet and crop pattern of Puebla in Mexico were maize (an energy food) and beans (a protein food). According to Smith *et al.* (1981) in rural Sierra Leone, rice was the staple food but palm oil, dried fish, cassava and ground nuts were also important followed by sorghum and other cereals and a wide variety of vegetables and fruits. In Nepal, lactating mothers having infants under one year of age showed diet variation according to duration of lactation and consumption of milk and flesh foods were

quite generous until two months after delivery and thereafter the intake of these foods were curtailed (Gujral and Rajbhandari, 1981)

Prema *et al.* (1982) reported that in Kerala, rice was the preferred cereal among tribal people, but it was often replaced partly or wholly by roots and tubers. It was observed that pulses and vegetables were used only occasionally.

Kondaiah (1984) reported that 62 per cent of the individuals and 73.4 per cent of the families in rural area of Uttar Pradesh were non vegetarians and the average consumption of meat and eggs were about 4.3 g. per consumption unit per day which was far below the requirement.

Sidhu and Singh (1987) indicated that among men and women workers near Ludhiana, intake of cereals, pulses, leafy vegetables, roots and tubers, fats and oils, sugar and jaggery and milk and milk products were greater than recommended allowances. The consumption of sugar, jaggery, oil seeds, and vegetables were low in the diets of rural areas of Uttar Pradesh. (Sharma, 1989).

According to Devadas and Easwaran (1986) nearly 84 per cent and 90 per cent of the monthly income was spent on food by the rural households in Hyderabad and Tamil Nadu respectively. Mathai (1988) found that with higher and more regular income the consumption pattern of the families changed in quality and quantity without any consequent modification in the variety of dishes.

People in desert areas of Rajasthan consumed diet which were cereal based with small amounts of milk, pulses, roots, tubers, other vegetables, and green leafy vegetables where as fruits, eggs and meats were completely absent (Rawtani and Varma, 1989). Among the farm families in Trivandrum District, all the families surveyed were non vegetarians and fish was the important non vegetarian food in their daily diet (Usha *et al.* 1990). According to Cherian (1992) the main items included in the daily diets of agricultural labourers in Trivandrum District were rice, tapioca, fish, coconut, locally cultivated vegetables, milk, cooking oils and sugar. Adams *et al.* (1993) observed a relative high frequent consumption of beef, fish, eggs, whole milk and palm oil among Nigerian women.

Murugesan and Ananthalakshmi (1991) observed that the diet of the Paliyar tribal people was peculiar with inclusion of unconventional plant foods which were available in seasons. Their meal pattern was unplanned and monotonous and the diet was cereal based. According to Sar *et al.* (1991) in Maharashtra, the intake of almost all food stuffs were inadequate among landless labourers, marginal farmers and small farmers.

Shrinivasan *et al.* (1991) reported that the diets of low income groups of Tamil Nadu were mainly constituted by cereals (495 to 564 g / day) and some vegetables (84 to 124 g / day), where as the diets of higher income groups were composed of less cereals, more vegetables, pulses, milk products and fats and oils. Huss-Ashmore and Curry (1994) reported that rural Swaziland women had high

reliance on maize and other starches and a high seasonality to the consumption of fruits, vegetables, milk and meat.

Singh (1989) observed that among tribal and non tribal households in Bihar cereals and to some extent pulses constituted the main sources of protein and calories. Consumption of fish, milk and milk products were low and non tribal households had a much higher protein intake than tribal families.

Among Indian industrial workers, intake of cereals, leafy vegetables, other vegetables and milk were inadequate where as consumption of pulses and roots and tubers were more than adequate and that of oils, fats, sugar and jaggery were adequate when compared with Recommended Dietary Intake (RDI) (Singh and Chawla, 1991). Hirai *et al.* (1994) reported that in South Eastern Nepal, cereals especially rice contributed greatly to the nutrient intake and the proportion of protein of animal origin was low while milk and milk products were the only source of protein and vitamin A of animal origin. They also observed that green leafy vegetables were often consumed as seasonal produce only as a source of beta carotene.

Huss-Ashmore and Curry (1994) indicated that production factors were more closely linked to food consumption than to nutritional status of either women or children. Aziz (1995) reported that an increase in calorie consumption increased the female labour productivity, but health as measured by weight for height of the female workers were not significant due to increased calorie intake.

2.3 Factors influencing nutritional status of the agricultural labourer families

Nutritional status is the condition of health as it is related to the use of food by the body (Robinson, 1975). Malnutrition is a condition when one or two nutrients are less or are in excess in the body (Robinson, 1990 and Begum, 1991). Malnutrition has been described as a biological state resulting from a relative or absolute deficiency or excess of one or more essential nutrients (WHO, 1993).

The main factors responsible for malnutrition are poor socioeconomic condition, large families, ignorance of parents about the nutritional requirements of children and prejudices against certain foods (Ghosh, 1977). Kumar (1978), reported that nutritional status of women and children of agricultural labourer households was closely associated with the earning capacity of mothers. Kazmini and Kazmini (1979) had found that the prevalence of malnutrition among low income groups was due to large number of children in the family, unhygienic environment, early introduction to supplementary foods and insanitary conditions. In developing countries, even a moderate increase in food prices implied a large nutritional sacrifice for the poor (Swamy *et al.*, 1980). Desai *et al.* (1981) reported that poor socioeconomic status and dietary habits prevalent among the migrant farm workers and periurban population of Brazil lead to significantly poorer growth, development and performance among the children. According to Nazmul and Ahmed (1986) socio economic factors such as land holdings, income and expenditure of food had a positive influence on healthy living of farmers. Swaminathan (1986) reported that one of the important causes of malnutrition among agricultural workers was low purchasing power due to inadequate income. A

relationship between nutritional status and land ownership was observed by Zuniga *et al.* (1986) in North Eastern Brazil. Tanner (1987) also reported that in North East Braiyin, there was a relationship between land holdings and prevalence of malnutrition.

Poverty, lack of food availability, climatic conditions, water scarcity and continuous years of drought played an important role in the food consumption pattern and nutritional status of people in desert areas of Rajasthan (Rawtani and Varma, (1989). Nutritional problems of agricultural labourer households in Peru were mainly associated with insufficient income, inadequate diet, low levels of schooling , inadequate access to safe water and insanitary conditions (Harrel *et al.*, 1989). Bernado *et al.* (1989) reported that socioeconomic manifestations of malnutrition among agricultural labourers was due to low productivity, low capacity and lack of interest. Bigsten *et al.* (1992) indicated that the food and nutritional problems of the absolute poor were rooted in low and unstable incomes and highly deficient health and sanitation services. De Walt (1993) reported that nature of the crop, the control of production and income, the allocation of household labour, the maintenance of subsistence production, land tenure and pricing policies for both cash crop and food stuffs appeared to be the most crucial in the nutritional status of rural people.

Nutritional status of an individual was influenced by factors such as physiological influences and also by thought, beliefs and emotions (Suiter and Hunter, 1980).

The highest incidence of nutrient deficiency was found among rural households in Florida and rural black households registered highest incidence of poverty (Moussie *et al.* 1983). Wijga *et al.* (1983) reported that children whose parents were labourers gained less weight between three and six months and had a higher prevalence of malnutrition and more reports of illness than those from other households.

Gencaga (1986) reported that educational level of parents and their knowledge of sound dietary practices was the most important determinant of nutritional status. Alderman and Garcia (1992) reported that raising of the household food consumption had less impact on nutritional status than increasing the educational level of mothers. Guarnaccia *et al.* (1992) reported that in USA long term consequences of the severe occupational and environmental exposures associated with agricultural labour lead to specific health problems. According to Chen *et al.* (1992) to improve the nutritional state nutrition education should be improved and a national nutrition surveillance system should be established.

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

Behrman and Deolalikar (1986) found that seasonal variation in environmental conditions, food availability, food prices and labour demands have

considerable impact on nutrition and health status of women. Food intake as well as the nutritional status of vulnerable household members in Kenya were all affected by seasonal changes in household food availability, leading to weight loss in adults and poor growth in children (Kigutha, 1995). Agrochemicals and lack of insufficient land for agriculture exerted a major negative influence on health and nutritional status of agricultural workers in Portugal (Hespanhol and Lesaffre, 1996)

Spurr *et al.* (1979) observed that better nourished Guatemalan peasants were able to complete their assigned work in about half the time as compared to poorly nourished peasants. In southern Ghana although virtually everyone in the community was a farmer, indicators of agricultural resources correlated only weakly with the nutritional status (Tripp, 1979). He also noted that a high proportion of children were under nourished and the children of traders were significantly better nourished.

2.4 Prevalence of nutritional deficiencies among agricultural labourer families

Panikar (1979) reported that among agricultural labourer households the average intake of energy was 2,200 calories and the average intake of protein was above the minimum recommended which was derived from animal products especially fish. Swietochowska (1981) reported that 20 to 30 per cent of population in Poland consumed less than adequate number of calories and the intake of vitamins, minerals and protein were inadequate. Studies (Tchai and Ju, 1987) on the nutritional status of Koreans had showed that cereals especially rice provided more than 80 per cent of the total energy and more than 50 per cent of total protein. The

average intake of protein was 63 to 70 g that is 27.8 to 43.8 g from cereals, 3.8 to 5.6 g from legumes, 3.8 to 18.4 g from fish, and 1.5 to 5.8 g from meat. The migrant women agricultural workers in a rural slum in Sao Paulo state of Brazil seemed to be at a relatively high risk for deficiency of vitamin A, iron, calcium, ascorbic acid and riboflavin and children under five years of age were deficient for vitamin A, iron and ascorbic acid (Desai *et al.*, 1989). Butt *et al.* (1989) reported that in Pakistan diet of low income groups were deficient in energy, Calcium, vitamin A and riboflavin. According to Singh and Bhattacharya (1990) the farm women performing agricultural operations which involved drudgery and physical labour seems to be overburdened and undernourished.

Among farm workers near Ludhiana mean daily intake of all nutrients were found to be greater than ICMR recommended allowances with the exception of intake of iron by women (Sidhu and Singh, 1987).

Nutritional anaemia was widespread among women of child bearing age and contributed significantly to maternal morbidity and mortality (Kishwar, 1988). Usha *et al.* (1990) reported an inadequate nutrient intake and clinical symptoms like anaemia and emaciation among the farm women of instructional farm, Vellayani. They also realised that anaemia is one of the main causes of maternal mortality. Seralathan (1993) observed that among the farm women in Coimbatore District 16 per cent suffered from severe anaemia and vitamin A and iron deficiency diseases were rampant.

Energy intake of rural Swaziland women varied seasonally and it was less than estimated requirements among 84 per cent of women (Huss - Ashmore and Curry, 1991). Singh and Chawla (1991) reported that among Indian industrial workers, intake of energy and protein was adequate, that of calcium and thiamine was more than RDA and that of iron, vitamin A, riboflavin and vitamin C were lower than RDA. According to Karuna and Prema (1993) 33.33 per cent of the women who were engaged in fish vending in Thiruvanthapuram District showed different grades of deficiency.

Among the farm women of Tamil Nadu Agricultural University orchard the intake of all food groups and nutrients were lower than the RDA (Seralathan *et al.* 1993).

Josserand (1985) reported that protein intake was adequate among the West African rural households, but there was serious calorie deficiencies following the very uneven income distribution pattern. Sar *et al.* (1991) observed that 53 per cent of the rural households in Maharashtra had calorie deficiency and 30 per cent of the households had protein deficiency indicating that calorie deficiency was more serious than protein deficiency. Shrinivasan *et al.* (1991) found that the diets of the low income group in Tamil Nadu were deficient in energy, carotene, riboflavin and vitamin C.

Thirumaran *et al.* (1993) revealed that the food and nutrient intakes of the farm women of Coimbatore were lower than the recommended allowances with the first priority of food intake were given to male members.

In China, the adequacy of nutrient intake expressed as per cents of RDA was higher for urban populations than for rural and higher for high income groups than for low income groups (Keyou - Ge, 1995).

Among the farm workers in Ludhiana the anthropometric measurements were found to be greater for men than for women with the exception of triceps skin fold thickness (Sidhu and Singh, 1987). Weight for height values of migrant women agricultural workers of a rural slum in Brazil were at or below the fifth per centile for 28 per cent of the women, and 46.2 per cent of boys and 31,6 per cent of girls had height for age values below the fifth per centile (Desai *et al.* 1989).

According to Singh and Chawla (1991) height and weight of the Indian industrial workers compared well with the standard whereas mid upper arm circumference and triceps skin fold thickness were positively and significantly correlated.

Benefice and Simondon (1993) reported that among 37 families of a village community in Senegal the prevalence of malnutrition was high with 16 per cent stunting, 13 per cent wasting among children aged zero to ten years and 33 per cent of the older children and 20 per cent of the adults presented an emaciated appearance.

Sidhu and Singh (1987) reported that among farm workers near Ludhiana, mean haemoglobin value was 13.5 and 10.5 g/100 ml for men and women

respectively. Singh and Chawla (1991) reported that average haemoglobin level of the Indian industrial workers was below the standard.

Guarnaccia *et al.* (1992) reported that the impoverished health status among the agricultural workers in USA was synergistic effect of age, low socioeconomic status and participation in farm work.

In China, rural children had a higher incidence of chronic energy deficiency than their urban counterparts and the improvement in children's growth and the increase of over weight adults were in line with the country's overall food production and the average food consumption of the population (Keyou-Ge, 1995).

Mellor *et al.* (1987) reported that reduction of malnutrition among poor requires a set of interacting forces like nutrition needs, generation of effective demand for food by the poor, increased employment, a development strategy that structures demand towards labour intensive goods and services, production of wage goods and emphasis on growth in agriculture.

2.5 Role of Women in agriculture

Prosperity and growth of the nation depend on the status and development of its women as half of India's population consists of women (Srivastava, 1992; Malaviaya and Rani, 1990). Gittinger *et al.* (1987) observed that activities of women in support of their families usually determine how much food is available for family consumption and hence the nutritional status of family members. They also

reported that women's time constraints and other constraints on their productive activities have major implication for food production and family nutritional status.

Huffman and Hoisington (1987) reported that women in developing countries spend their time on home production (including child care, food processing, food preparation and maintaining water and fuel supplies) market production and other income producing activities. In the hills of Uttar Pradesh the women were employed in different activities in crop and live stock enterprises such as sowing paddy, transplanting, threshing, and winnowing, grass cutting, feeding and milking of animals (Singh *et al.* 1988).

There is little evidence of a negative effect of maternal employment on child nutrition and therefore no justification for limiting women's labour force participation on the grounds of promoting child welfare (Leslie, 1988).

Thomas (1989) observed that among the families of Trivandrum District 62 per cent of women were not engaged in any occupation and only 2.67 per cent of the housewives were earning members. According to Garcia (1991) earnings from women affected the household consumption patterns by reflecting their own preferences and influenced their ability to control the disposal of such earnings autonomously.

Verma (1995) opined that although women's role in agriculture is significant they remain inactive and dependent. According to Singh and Bhattacharya (1990), women agricultural labourers are considered to be submissive,

illiterate, ignorant and assetless females who have been trapped in the webs of tradition and customs.

Sultana *et al.* (1991) reported that the female labour force in Pakistan has so far not been fully utilised mainly because of unorganised supply, inadequate economic incentives, and other socio cultural constraints and inhibitions. Rabiee and Geissler (1992) reported that by participating in agricultural production women of rural Iran played a more important role in the economy of the household. Grover and Verma (1993) reported that 47 per cent of rural women of Hissar District in Haryana were classified as agricultural laboureres and 34 per cent as cultivators.

At lower income levels in the Dominican republic, children from female headed households were at least well nourished than children living in male headed households of the same income class and this may be explained in part by female generated income (Johnson and Rogers, 1993). According to Grover and Verma (1993) in agriculture the activities of women were seasonal and their maximum involvement was in harvesting, threshing and storage activities.

2.6 Infant feeding practices

Panter - Brick (1991) reported that there exists a strong relationship between fertility, nursing behaviour and life style of rural women. Hossain *et al.* (1992) reported that in rural Bilbeis of Egypt 60 per cent of the infants were prelacteally fed with sugar water, tea or both. Lack of milk in the mother's breast (74 %) and maternal exhaustion following labour (29 %) were the two most commonly stated reasons for prelacteal feeding. The authors also reported that

diarrhoea incidence was higher among prelacteally fed infants in the age groups of 0 to11, 11 to 23 and 36 to 47 weeks. According to Rabiee and Geissler (1992) women agricultural workers of rural Iran were not able to breast feed for as long as their urban counterparts.

2.7 Knowledge, Attitude and Practice (KAP) of agricultural labourers

According to the nutritional awareness survey of Patel (1982) among Kondhs of Phulbani District of Orissa, there is a belief in possible relationship between the diet and illhealth and supernatural poweres causing disease. He also reported that women and girls in the community were strictly prohibted from drinking milk due to certain pre existing beliefs.

Rao (1986) reported that nutrition knowledge among pregnant women in Karnataka was limited to familiar practices in the daily diet and attitudes towards complications of pregnancy and illness tended to be fatalastic. They were aware about the importance of maternal nutrition and the harmful effects of insanitary living conditions. His studies also showed that the beliefs regarding protein energy malnutrition in infants were based on superstitions.

Gopaldas (1987) reported that women of Rathwas of Gujarat avoided salt, chilli and new rice during pregnancy while black pepper, rotla and jaggery were considered suitable. She also observed that mahua liquor was consumed by the women after delivery in the belief that it helps in stopping the post partum bleeding and it has cleansing effect on the gastro intestinal tract.

According to the attitude survey done among tribals and non tribals of Madhya Pradesh, Gopaldas *et al.* (1974) reported that people considered wheat, roots and tubers, milk, flesh foods, egg, jaggery, ghee, ginger, herbs and mahua alcohol as hot foods and rice, maize, sorghum, curds, oil, sugar and ground nuts were considered as cold foods.

Materials and Methods

MATERIALS AND METHODS

The procedures and techniques followed during the study entitled "Food consumption pattern and nutritional status of women agricultural labourers of Ollukkara Block, Thrissur District"are explained under the following headings .

3.1. Location of the area

3.2. Selection of the sample

3.3. Plan of research work

3.4. Selection of suitable tools and techniques

3.5. Conducting the study

3.6. Statistical analysis

3.1 Location of the area

The locality selected for the study was Ollukkara block of Thrissur District.

3.2 Selection of the sample

Three panchayats were selected from the block where there was maximum agricultural operations. They were Madakkathara, Ollukkara and Panancheri. From each panchayat one ward was selected randomly. From each selected ward 50 women agricultural labourers within the age group of 18 to 45 years were randomly selected from the list of agricultural labourers available in the block office. Thus a total of 150 women agricultural labourers were selected for the study. Ten women

agricultural labourers were selected at random from the 50 selected women in each ward and a detailed study was conducted among the 30 women agricultural labourers.

3.3 Plan of research work

3.3.1. A base line survey to monitor the socioeconomic and cultural background of the selected 150 families with the help of a structured and pre tested schedule.

3.3.2 A dietary survey of the selected 150 families to assess the food consumption pattern and the dietary habits of the family members through a pre tested schedule.

3.3.3 Work pattern and energy expenditure of sub sample (30 women agricultural labourers).

3.3.4 Knowledge, Attitude and Practice (KAP) of the sub sample with respect to health and nutrition.

3.3.5 Assessment of the nutritional status of the women labourers by conducting

a) Anthropometric measurements of the sample to monitor height and weight

b) Clinical examinations of the sub sample

c) Haemoglobin estimation of the sub sample

d) One day food weighment survey of the sub sample

3.4. Selection of suitable tools and techniques

Determination of suitable methods and procedures are most important to get accurate and reliable data. Interview method is a systematic approach by which

a person enters more or less imaginatively into an inner life of a comparative stranger (Devadas and Kulandaivel, 1975). According to Bass *et al.* (1979) interview method is the most suitable way since it proceeds systematically and record the collected information quickly. Hence in the present study direct interview method was used with the help of structured and pre tested schedules.

According to Aebi (1983) anthropometric indices, presence of clinical deficiency signs, dietary assessment, actual food intake and bio chemical estimation were widely used as direct parameters of nutritional status.

Anthropometric measurements had been accepted as an important tool for assessment of nutritional status (Vijayalakshmi *et al.*, 1987 and Sharma and Kalia, 1990). Gopaladas and Seshadri (1987) reported that the extent of height deficit in relation to age as compared to regional standards could be regarded as a measure of the limitations of malnutrition and comparison of weight for age values with regional standards at corresponding ages would help to determine the degrees of under weight in a community. Hence in the present study anthropometric measurements were taken to assess nutritional status.

According to Swaminathan (1986) clinical examination is very important to assess the nutritional status since it provides direct information of signs and symptoms of dietary deficiency as prevalent among the people. Hence, in the present study the clinical examination was carried out among the subsample to assess the nutritional status.

Sausberlich *et al.* (1977) reported that biochemical estimation represented the most objective assessment of the nutritional status of an individual providing pre or sub clinical information. According to Daphna (1979) biochemical tests are

of utmost important in the assessment of individual nutriture. Hence in the present study biochemical estimation of blood was carried out among the subsample.

Swaminathan *et al.* (1967) and Rao (1975) reported that among the diet survey methods the conventional seven day weighment method had been considered as the most reliable. Rao (1975) also reported that any single day or two days weighment method would be as efficient as that of seven days. Hence in the present study one day food weighment survey was done among the subsample to assess actual daily food intake and to assess the deficiency of specific nutrients in the diet.

Knowledge, Attitude and Practice (KAP) of women agricultural labourers towards health and nutrition was assessed with the help of pre tested schedules.

Knowledge

A group of nutrition and health related questions (items) were prepared as a primary stage for the knowledge test. The questions were prepared by reviewing the literature and by discussion with subject matter specialists. The items should have the following properties

1. It should create interest and promote thinking
2. It should discriminate the knowledge of well informed labourers from the poor informed
3. It should have a difficulty index.

To develop an effective and standardised knowledge test, 30 questions or items which were related to health and nutrition and relevant to the study were formulated (Appendix I). Item difficulty and item discrimination indices were computed. Item difficulty index tells about the difficulty of an item and item discrimination index discriminates the well informed labourers from the poorly informed labourers.

Thirty six women respondents were selected, who were different from the sample selected for the main research but had identical characteristics of the main sample. The questions which were prepared earlier were asked to them. A score of one was given to the correct answer and zero was given to the incorrect one. There was a possibility of scoring 30 for the very well informed respondent and a score of zero for the poorly informed one. The scores obtained by 36 respondents were arranged in descending order. The respondents were then divided into three equal groups G_1, G_2 and G_3 with 12 respondents in each group. For the item analysis the middle group was eliminated and group G_1 and G_3 were retained which includes the respondents who have got high and low scores respectively.

Calculation of item difficulty index (P)

The item difficulty index refers to the percentage of respondents answering an item correctly. Coombs (1950) opined that the difficulty of an item varied for different individuals. Items with high P value were considered for the knowledge test among the subsample.

Calculation of discrimination index

Discrimination index is the next criterion for the final selection of items for knowledge test. Discrimination index (E 1/3) was calculated using the following formula.

$E\ 1/3 = (S_1-S_3) / (N/3)$

Where S_1 = Number of correct answers in the group G_1

S_3 = Number of correct answers in the group G_3

N = Total number of respondents.

According to Mehta (1958) E 1/3 method to find out item discrimination values was some what analogous to and a convenient substitute for the phi coefficient as formulated by Perry and Michael (1951).

In this study the items with E 1/3 values above 0.4 were selected for the knowledge test among the subsample. Thus ten items were finally selected (Appendix I).

The sub sample constituting 30 women agricultural labourers were asked the selected questions (items) • Scores of one and zero were given to the correct and incorrect answers respectively. Then the total score of each sample was computed.

Attitude

Thirty statements which were related to health and nutrition were formulated to do the attitude test among the 36 selected women who were not being the sub sample, but had identical characterisitcs of the subsample. The

statements were prepared by reviewing the literature and through discussion with the subject matter specialists. The statements were both positive and negative type. The statements were asked in a five point Likert's scale i.e., strongly agree (SA), agree (A) undecided (UD), disagree (DA) and strongly disagree (SDA). Item analysis of the statements was worked out to examine to which extent each statement differentiate among the respondents.

Item analysis

The attitudes like SA, A, UD, DA and SDA were scored as 5, 4, 3, 2 and 1 respectively for the positive statements and reversing the order of scoring for the negative statements. Then the total score of each respondent was calculated. The respondents were arranged in descending order of the total scores and then divided into four equal groups. For the item analysis the groups with highest and lowest scores were selected and the middle two groups were eliminated.

As suggested by Edwards (1957) 't' value was calculated to differentiate the attitudes of high and low groups to each statement (Appendix - II).

t value is calculated using the following formula

$$t = \frac{X_H - X_L}{\frac{\sqrt{S_H^2}}{\sqrt{n_H}} + \frac{\sqrt{S_L^2}}{\sqrt{n_L}}}$$ where,

X_H = the mean score on a given statement for the high group

X_L = the mean score on a given statement for the low group

S_H^2 = the variance of the distribution of responses of the high group to the statement

S_L^2 = the variance of the distribution of responses of the low group to the statement.

n_H = the number of subjects in the high group

n_L = the number of subjects in the low group

The 't' value gives an idea about the extent to which the given statement differentiate between high and low scored groups. The statements with 't' value greater than 1.75 were considered. The selected statements were then arranged in ascending order of 't' value. Ten statements (five positive and five negative) with maximum 't' value were finally selected for the attitude test among the sub sample (Appendix II).

Practice

To know the practices related to health and nutrition, ten questions were formulated and directly asked to the sub sample. Scores of 1 and 0 were given to correct and incorrect practices respectively. Then the total score of each respondent was summed up (Appendix III).

3.5 Conducting the study

3.5.1 Survey to collect information on socio economic status

Using the pre tested schedule, survey was done among the sample. The details regarding religion, caste, family system, total family income, total land holding, crop cultivation, domestication of animals, monthly expenditure pattern, savings, loans taken, living conditions, use and source of drinking water, lavatory facilities, drainage facilities, use and source of fuels, use of health care facilities, time expenditure pattern etc. were collected. More specific questions were asked to collect genuine data. The pre tested schedule is shown in Appendix -IV.

3.5.2 Survey to collect information regarding food consumption pattern and dietary habits

Using the pre tested schedule survey was done among the selected sample. Details regarding food habit (vegetarian / non vegetarian), food expenditure pattern, frequency of use of various food items, number of meals per day, planning of meals, use of left over foods, diets during different stages of life, (infancy, preschool age, school age, adolescence, pregnancy, lactation and old age), diet during special occasions, diet during diseases, washing, cutting and cooking of various food items, cooking vessels used, cooking methods followed, infant feeding practices etc. were asked by direct interview method. More specific questions were asked to collect genuine data. The schedule is shown in Appendix V.

3.5.3 Assessment of nutritional status

3.5.3.1 Recording of Height and Weight measurements

Height was taken using a measuring tape. The subject was asked to stand close to the wall without shoes. The head was pressed lightly with a measuring scale to reduce the thickness of the hair. Then the apex of the head was marked on the wall and height of the respondent was measured.

Weight of the respondent was measured using the bathroom weighing balance. The subject was asked to stand on the weighing balance without shoes and with minimum clothing. The subject was asked to hang the hands freely and to hold the head erect. Before taking the body weight the weighing balance was adjusted to zero level.

The weight and height of 150 respondents were measured and Body Mass Index (BMI) was calculated using the following formula.

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

3.5.3.2 Clinical examination of the sub sample

Using the pre tested schedule, clinical deficiency symptoms of the sub sample were assessed by an expert physician. The schedule for clinical examination is shown in Appendix VI.

3.5.3.3 Haemoglobin estimation

Blood haemoglobin level was estimated among the sub sample. This was done using cyanmethaemoglobin method suggested by NIN (1983) and haemoglobin levels were recorded. The procedure for haemoglobin estimation is shown in Appendix VII.

3.5.3.4 One day food weighment survey

One day food weighment survey was done among the sub sample. Pre tested schedule is shown in Appendix VIII.

3.5.3.5 Energy expenditure pattern

Energy requirement can be assessed in a better way in terms of energy expenditure rather than energy intake. Energy expenditure studies were carried out among the sub sample. Using the prediction equation proposed by ICMR Expert Group for Indians, the value of one Basal Metabolic Rate (BMR) unit in

terms of kilo calories was computed for each individual. The prediction equation for the age group of 30 to 60 years is 8.3 x body weight (kg) + 788. By substituting body weight of each individual in the prediction equation, the value of one BMR unit in terms of kilo calories were calculated. There are suggested BMR units for sedentary, moderate and heavy workers for sleep, occupational and non occupational activities. Agricultural labourers are grouped in the category of moderate workers. For a moderate worker, the energy expenditure in terms of BMR units for 24 hours is 1.0 for sleep, 2.8 for occupational activity and 2.0 for non occupational activity. The BMR units for a whole day was calculated by activity breakup methods i.e., hours spent for sleep, occupational activity and non occupational activity were multiplied with the respective BMR units suggested for a whole day divided by 24. The three computed BMR units (sleep, occupational activity and non occupational activity) were summed. The computed BMR unit was then multiplied with the kilo calories obtained for one BMR unit for each individual. Thus the total energy expenditure for a whole day was calculated. The total energy expenditure was compared with the energy intake for one day obtained from one day food weighment survey.

3.6 Statistical analysis

Before doing the statistical analysis, all the data gathered through the survey were tabulated. Then the data were statistically analysed using correlation and analysis of variance. The statistical analysis helped to interpret the data and to arrive at the results.

Results

RESULTS

The results of the study are grouped under the following headings.

4.1 Socio economic and cultural background of the agricultural labourer families

4.2 Food consumption pattern of the agricultural labourer families

4.3 Nutritional status of the women agricultural labourers

4.4 Energy expenditure pattern of the women agricultural labourers

4.5 Knowledge, Attitude and Practice (KAP) of the women agricultural labourers

4.1 Socio economic and cultural background of the agricultural labourer households

In this subdivision the details about religion, caste, family system, age, sex distribution, educational status, occupational status, total family income, income derived from agriculture and domestic animals, monthly expenditure pattern, details about loans, health care services etc. are presented.

4.1.1 Religion and caste

Table 1 presents the details about religion and caste subdivisions. About 16 and 10 per cent of the families came under Muslim and Christian caste subdivisions. Majority (74 %) of the families were Hindus and out of this 10 per cent belonged to forward caste, 50.67 per cent belonged to other backward classes and the remaining 13.33 per cent belonged to scheduled castes.

Table 1. Distribution of families by religion and caste

Religion and caste subdivision	Number of families	Percentage
Hindu	111	74
Forward	15	10
Other back ward	76	50.67
Scheduled caste	20	13.33
Muslim	24	16
Christian	15	10
Total	150	100

Table 2. Distribution of families by family system

Joint/Nuclear	Number of families	Percentage	Patriarchal/ Matriarchal	Number of families	Percentage
Joint	12	8	Patriarchal	119	79.30
Nuclear	138	92	Matriarchal	31	20.70
Total	150	100	Total	150	100

4.1.2 Family system

Majority (92 %) of the families were nuclear and eight per cent of the families were joint type. Patriarchal (79.30 %) family system was more common when compared to matriarchal (20.70 %) family system (Table 2).

4.1.3 Composition of families

Regarding the composition of families, among male adults, 39.29 per cent were within the age group of 20 to 30 years and 36.60 per cent came under the age group of 40 to 50 years. There was 16.07 per cent within the age group of 30 to 40 years and 7.14 per cent with in 50 to 60 years. Among the female adults, 41.67 per cent were within the age group of 20 to 30 years, 35.32 per cent within 40 to 50 years and 20.63 per cent within the age group of 30 to 40 years (Table 3a and Table 3b).

Regarding the literacy rate, about 8.93 per cent of males and 13.49 per cent of females were illiterate. Lower primary level education was attained by 25.89 per cent of males and 31.35 per cent of females. Education upto upper primary level was present among 32.59 per cent of males and 22.62 per cent of females. About 28.13 per cent of males and 23.81 per cent of females had high school level education. Only about 4.46 per cent of males and 8.73 per cent of females had college level education (Table 3a and Table 3b).

4.1.4 Distribution of young age group by age and education

In the young age group (0 to 20 years), 28.08 per cent were in 0 to 10 age group and 20.05 per cent of them had not started their studies. The rest (71.92 %)

Table 3a. Composition of families

Age group	Number of male adults	Number of female adults
20 – 30	88 (39.29)	105 (41.67)
30 – 40	36 (16.07)	52 (20.63)
40 – 50	82 (36.60)	89 (35.32)
50 – 60	16 (7.14)	3 (1.19)
> 60	2 (0.90)	3 (1.19)
Total	224 (100)	252 (100)

Numbers in parentheses are percentages

Table 3b. Distribution of male and female adults by education

Educational status	Number of male adults	Number of female adults
Illiterate	20 (8.93)	34 (13.49)
Lower primary	58 (25.89)	79 (31.35)
Upper primary	73 (32.59)	57 (22.62)
High school	63 (28.13)	60 (23.81)
College	10 (4.46)	22 (8.73)
Total	224 (100)	252 (100)

Numbers in parentheses are percentages

came under the 10 to 20 age group and in this group 38.36 per cent had stopped their studies and the remaining (61.64 %) were students (Table 4).

4.1.5 Family size

More than three fourths (78 %) of the total families had 4 to 6 members and 14 per cent had 1 to 3 members. It was observed that 6.67 per cent of the families had 7 to 9 members and only 1.33 per cent of families had members within 10 to 12 (Table 5).

4.1.6 Occupational status of husband

All the labourers surveyed were married and 98.66 per cent of husbands were working as coolies. Only 1.34 per cent had occupation under government or private agencies (Table 6).

4.1.7 Monthly income distribution

Thirty four per cent of the families had monthly income within the range of Rs. 2001 to 2500 followed by Rs. 1001 to 1500 (26.67 %) (Table 7). Another 26.67 per cent of families had an income of Rs. 1501 to 2000. Some (4.67 %) were grouped under Rs. 3001 to 5000 and only 0.67 per cent were within the range of Rs. 5001 to 7000. The remaining 2.66 per cent of the families were equally distributed in the income ranges of Rs. 501 to 1000 and Rs. 2501 to 3000.

4.1.8 Possession of land area

It is observed that 45.35 % of the families owned less than 5 cents of land, while 27.30 per cent owned 5 to 10 cents. Some families (14.67 %) owned 10 to 20

Table 4. Distribution of young age group by age and education

	Number of respondents		
Educational level	0-10 years	10-20 years	Total
Not started studies	12(5.91)	-	12(5.91)
Students	45(22.17)	90(44.33)	135(66.5)
Stopped studies	-	56(27.59)	56(27.59)
Total	57(28.08)	146(71.92)	203(100)

Numbers in parentheses are percentages

Table 5. Distribution by family size

Total family members	Number of families	Percentage
1 – 3	21	14
4 – 6	117	78
7 – 9	10	6.67
10 - 12	2	1.33
Total	150	100

Table 6. Occupational status of husband

Occupation of husband	Number of respondents	Percentage
Government Job	1	0.67
Private job	1	0.67
Coolie	148	98.66
Total	150	100

Table 7. Monthly income distribution

Income level (Rs.)	Number of families	Percentage
501-1000	2	1.33
1001 – 1500	47	31.33
1501 – 2000	40	26.67
2001 - 2500	51	34
2501 –3000	2	1.33
3001-5000	7	4.67
5001-7000	1	0.67
Total	150	100

cents of land. Land area of about 20 to 50 cents were owned by 7.34 per cent of the total families. Only two per cent owned more than 100 cents of land and 50 to 100 cents of land was owned by 3.34 per cent of the families (Table 8).

Fourty six per cent of the families purchased the land and 35.30 per cent of the families inherited the land from parents. Among the families, 13.31 per cent received the land from government. Land was owned through both purchase and inheritance by only 5.34 per cent of the families and among them, 3.34 per cent owned 50 to 100 cents of land and two per cent owned more than 100 cents of land (Table 8).

4.1.9 Cultivation of crops

Out of the 150 families, only 26 families cultivated various types of food crops and among them only eleven families (42.31 %) derived income from crop production. Coconut alone was cultivated by 26.92 per cent of the families, 15.38 per cent of the families cultivated coconut and banana, 11.54 per cent of the families cultivated coconut, arecanut and banana. Rest of the families cultivated other crops like paddy, pepper, cashew, papaya etc. (Table 9).

4.1.10 Domestication of animals

It was observed that only 31 families domesticated animals and among them only 51.61 per cent generated income from domestic animals. Among the 31 families, 35.48 per cent reared hens, 25.81 per cent domesticated cows, 22.58 per cent domesticated goats and 12.90 per cent reared goat and hen. Only one family (3.23 %) domesticated buffaloes (Table 10).

Table 8. Details about land holdings

Land area	Number of families				
	Purchased	Inherited	Received from govt.	Inherited and purchased	Total
less than 5 cent	22(14.67)	26(17.31)	20(13.31)	-	68(45.35)
5-10 cent	30(20)	11(7.3)	-	-	41(27.3)
10-20 cent	12(8)	10(6.67)	-	-	22(14.67)
20-50 cent	5(3.34)	6(4)	-	-	11(7.34)
50-100	-	-	-	5(3.34)	5(3.34)
greater than 100	-	-	-	3(2)	3(2)
Total	69(46.03)	53(35.32)	20(13.31)	8(5.34)	150(100)

Numbers in parentheses are percentages

Table 9. Details about cultivation of crops

	Crops cultivated	Number of families	Percentage
1	Coconut	7	26.92
2	Banana	2	7.68
3	Coconut, Jack, Mango, Papaya, Cereals	1	3.85
4	Coconut, Arecanut, Banana, Paddy	1	3.85
5	Coconut, Pepper, Cashew	1	3.85
6	Coconut, Pappaya, Mango	1	3.85
7	Coconut, Banana	4	15.38
8	Cococnut, Arecanut, Banana	3	11.54
9	Mango	1	3.85
10	Banana, Paddy	1	3.85
11	Paddy	2	7.68
12	Cococut, Cashew	1	3.85
13	Coconut, Paddy	1	3.85
	Total	26	100
	Getting income from crop cultivation	11	42.31

Table 10. Details about domestication of animals

Domestic animals	Nnumber of families	Percentage
Goat	7	22.58
Hen	11	35.48
Cows	8	25.81
Goat and hen	4	12.90
Buffalo	1	3.23
Total	31	100
Receiving income from domestic animals	16	51.61

Table 11. Details about kitchen garden

Kitchen garden	Number of families	percentage
1. Absent	135	90
2. Present	15	10
Total	150	100

4.1.11 Details about kitchen garden

Most of the families (90 %) did not have kitchen garden in their house. Only 10 per cent of families had a kitchen garden and these families used the produce from it for their own consumption (Table 11).

4.1.12 Details about the use and sources of loans

Among the families surveyed, 47.30 per cent had taken loans from different sources for various purposes. Majority (69.01 %) of the loans were taken from Co-operative societies followed by from bank (15.49 %). The other sources of loans were provident fund (5.64 %), housing board (5.64%) and IRDP (4.22 %) (Table 12).

4.1.12.1 Loans from Co-operative society

The loans from co-operative societies were used for housing (83.67 %), marriage (10.21 %), business (2.04 %), buying domestic animals (2.04 %) and education (2.04 %). Among the loans which were used for housing 36.73 per cent were within the range of Rs 20,000 to 40,000. For housing, 18.37 per cent and 14.29 per cent used amounts within the range of Rs. 40,000 to 60,000 and Rs. 10,000 to 20,000 respectively (Table 13).

4.1.12.2 Loans from provident fund

Three fourth (75 %) of the provident fund loans were utilised for repayment of debt and among these 50 per cent were within the range of Rs. 5,000 to 10,000.

Table 12. Source of loans

Source of loans	Number of families	Percentage
Co-operative society	49	69.01
Provident fund	4	5.64
Bank	11	15.49
Housing board	4	5.64
IRDP	3	4.22
Total	71	100

Table 13. Utilisation of loans from co-operative society

Amount of loan (Rs.)	Number of families						
	Housing	Marriage	Business	For buying land	For buying dosmestic animals	Education	Total
1,000 - 5,000	-	-	1(2.04)	-	-	-	1(2.04)
5,000 - 10,000	-	1(2.04)	-	-	1(2.04)	-	2(4.08)
10,000 -20,000	7(14.29)	1(2.04)	-	-	-	-	8(16.33)
20,000 - 40,000	18(36.73)	2(4.08)	-	-	-	1(2.04)	21(42.86)
40,000 - 60,000	9(18.37)	1(2.04)	-	-	-	-	10(20.41)
60,000 - 80,000	6(12.24)	-	-	-	-	-	6(12.24)
80,000 - 1,00,000	1(2.04)	-	-	-	-	-	1(2.04)
Total	41(83.67)	5(10.21)	1(2.04)	-	1(2.04)	1(2.04)	49(100)

Numbers in parentheses are percentages

The remaining 25 per cent of the provident fund loans were utilised for marriage purpose (Table 14).

4.1.12.3 Loans from Bank

Bank loans were utilised for housing (63.63 %), marriage (27.27 %) and repayment of debt (9.10) (Table 15).

4.1.12.4 Loans from housing board

All the loans from housing board were utilised for house construction and among them 50 per cent were with in the range of Rs. 40,000 to 60,000 (Table 16).

4.1.12.5 Loans from IRDP

The loans taken from IRDP were utilised for housing (66.67%) and for buying domestic animals (33.33 %). Most of the loans (66.66 %) were within the range of Rs. 10,000 to 20,000 (Table 17).

4.1.13 Monthly expenditure pattern

Families spent 25 to 80 per cent of their monthly income on food items. Twenty four per cent of the families spent 45 to 50 per cent of their income on food while 20 per cent spent 60 to 65 per cent of their income and 20.67 per cent spent 65 to 70 per cent of their income on food (Table 18).

Majority (66 %) of the families spent upto 5 per cent of their income on clothing and the remaining 34 per cent spent 5 to 10 per cent. All the families spent upto five per cent of their monthly income on shelter, recreation, electricity and to purchase luxury and personal items.

About 40.67 % of the families spent only upto 5 per cent of their monthly income on transport facilities. For the education of children, 86.7 % of the families spent upto 5 per cent of their income. More than half (57.33 %) of the families spent

Table 14. Utilisation of loans from provident fund

Amount of loan (Rs.)	Number of families		Total
	For debt repayment	Marriage	
1,000 -5,000	1(25)	-	1(25)
5,000 - 10,000	2(50)	-	2(50)
20,000 - 40,000	-	1(25)	1(25)
Total	3(75)	1(25)	4(100)

Numbers in parentheses are percentages

Table 15. Utilisation of loans from bank

Amount of loan (Rs.)	Number of families			Total
	Housing	Marriage	For debt repayment	
1,000 -5,000	1(9.10)	2(18.18)	1(9.10)	4(36.35)
10,000 - 20,000	1(9.10)	-	-	1(9.10)
20,000 - 40,000	4(36.35)	-	-	4(36.35)
40,000 - 60,000	-	1(9.10)	-	1(9.10)
80,000 - 1,00,000	1(9.10)	-	-	1(9.10)
Total	7(63.63)	3(27.27)	1(9.10)	11(100)

Numbers in parentheses are percentages

Table 16. Utilisation of loans from housing board

Amount of loan (Rs.)	Number of families Housing
5,000 - 10,000	1(25)
20,000 - 40,000	1(25)
40,000 - 60,000	2(50)
Total	4(100)

Numbers in parentheses are percentages

Table 17. Utilisation of IRDP loans

Amount of loan (Rs.)	Number of families For buying domestic animals	Housing	Total
10,000 - 20,000	1(33.33)	1(33.33)	2(66.66)
20,000 - 40,000	-	1(33.34)	1(33.34)
Total	1(33.33)	2(66.67)	3(100)

Numbers in parentheses are percentages

Table 18. Monthly expenditure pattern

Percentage expenditure	Number of families											
	Food	Clothing	Shelter	Transport	Recreation	Education	Electricity	Health	Fuel	Luxuary and personal	Remittance	Savings
0 - 5	-	99(66)	150(100)	61(40.67)	150(100)	130(86.7)	150(100)	86(57.33)	47(31.33)	150(100)	54(36)	113(75.33)
5 - 10	-	51(34)	-	39(26)	-	14(9.30)	-	38(25.33)	95(63.33)	-	35(23.33)	34(22.67)
10 - 15	-	-	-	35(23.33)	-	6(4)	-	21(14)	7(4.67)	-	15(10)	2(1.33)
15 - 20	-	-	-	4(2.67)	-	-	-	4(2.67)	-	-	19(12.67)	1(0.67)
20 - 25	-	-	-	8(5.33)	-	-	-	1(0.67)	1(0.67)	-	8(5.33)	-
25 - 30	1(0.67)	-	-	3(2)	-	-	-	-	-	-	7(4.67)	-
30 - 35	4(2.67)	-	-	-	-	-	-	-	-	-	5(3.33)	-
35 - 40	8(5.32)	-	-	-	-	-	-	-	-	-	2(1.33)	-
40 -45	5(3.33)	-	-	-	-	-	-	-	-	-	3(2)	-
45 - 50	36(24)	-	-	-	-	-	-	-	-	-	-	-
50 - 55	19(12.67)	-	-	-	-	-	-	-	-	-	1(0.67)	-
55 - 60	4(2.67)	-	-	-	-	-	-	-	-	-	1(0.67)	-
60 - 65	30(20)	-	-	-	-	-	-	-	-	-	-	-
65 - 70	31(20.67)	-	-	-	-	-	-	-	-	-	-	-
70 - 75	7(4.67)	-	-	-	-	-	-	-	-	-	-	-
75 - 80	5(3.33)	-	-	-	-	-	-	-	-	-	-	-
Total	150(100)	150(100)	150(100)	150(100)	150(100)	150(100)	150(100)	150(100)	150(100)	150(100)	150(100)	150(100)

Number in parentheses are percentages

upto 5 per cent of their income on health care followed by 5 to10 per cent (25.33 %) and 10 to 15 per cent (14 %). Among the families, 63.33 per cent spent 5 to 10 per cent of their income for purchase of fuel.

Thirty six per cent of the families had remittance upto 5 per cent of their monthly income followed 23.33 per cent, 12.67 per cent and 10 per cent of the families had remittance of 5 to 10 per cent, 15 to 20 per cent and 10 to 15 per cent respectively.

Upto 5 per cent of the monthly income was saved by 75.33 percent of the families and 22.67 per cent saved 5 to 10 per cent.

4.1.14 Housing conditions

All the families surveyed had own houses. Among them 80 per cent were mud built and the remaining 20 per cent were made with bricks. Most of the houses (59.33 per cent) were tiled and 25.34 per cent of the houses were thatched. There was only 10 per cent of terraced houses. All the houses were single storeyed (Table 19).

Among the houses, 29.33 per cent had 4 rooms, 28 per cent had 3 rooms, 22.67 per cent had 5 rooms and 8.67 per cent had 2 rooms. Most of the houses (96 %) had a separate kitchen.

Drawing room was present in 73.40 per cent of the houses and 14.60 per cent of the houses had a hall in addition to the drawing room. Drawing room was absent in 12 per cent of the houses. Study room was not present in any of the houses and 10.67 per cent of houses had not even a single bed room. Among the houses, 34.67 per cent had one bed room, 34 per cent had 2 bed rooms and the remaining 20.67 per cent of the houses had 3 bed rooms. Store room was absent in more than

Table 19. Housing conditions

Housing conditions	Number of families	Percentage
Own house	150	100.00
Rental house	0	0.00
Total	150	100.00
Mud built	120	80.00
Brick made	30	20.00
Total	150	100.00
Thatched	38	25.34
Tiled	89	59.33
Terraced	15	10.00
Thatched and tiled	8	5.33
Total	150	100.00
Single storeyed	150	100.00
Double storeyed	0	0.00
Total	150	100.00
Number of roomes		
1	2	1.33
2	13	8.67
3	42	28.00
4	44	29.33
5	34	22.67
>5	15	10.00
Total	150	100.00
Separate kitchen		
present	144	96.00
absent	6	4.00
Total	150	100.00
Drawing room present	110	73.40
Drawing room absent	18	12.00
Drawing room and hall present	22	14.60
Total	150	100.00
Study room		
present	0	0.00
absent	150	100.00
Total	150	100.00
Bed rooms		
absent	16	10.67
1	52	34.67
2	51	34.00
3	31	20.67
Total	150	100.00
Store room		
present	34	22.67
absent	116	77.33
Total	150	100.00

three fourth of the houses (77.33 %) and 22.67 per cent of the houses had a store room.

4.1.15 Living conditions

More than three fourths (76 per cent) of the families had their own well, 12 per cent of the families depended on public tap, and the remaining 12 per cent of the families depended on public well for drinking water.

Most of the families (78.67 %) had their own latrine and 20.66 per cent used open field for defecation. Only 0.67 per cent of the families used public latrine.

Drainage facility was present only in 10 per cent of the houses, and 68 per cent of the houses had electrical facilities.

Even though, expenditure on recreation was negligible, 72.66 per cent of the families owned recreational aids (Table 20).

About 61.33 per cent of the families depended on bus for transport. About 36.67 per cent of the families owned a bicycle and 2 per cent of the families owned a motor bike.

4.1.16 Use and source of fuel

Table 21 gives the details about the use and sources of fuel. About 53.33 per cent of the families used only wood as fuel. Some families (19.33 %) used wood and sawdust, and 18.67 per cent used wood and kerosene, 8 per cent of the families used wood, kerosene and sawdust as fuels. Only a very small number (0.67 %) of the families used cooking gas for cooking purposes.

About 49.33 per cent of the families got fuel both through collection from surroundings and purchase and 42.67 per cent got it only through purchase

Table 20. Living conditions

Living conditions	Number of families	Percentage
Source of drinking water		
1. Own well	114	76.00
2. Public tap	18	12.00
3. Public well	18	12.00
Total	150	100.00
Lavatory facility		
Own latrine	118	78.67
Public latrine	1	0.67
Open field	31	20.66
Total	150	100.00
Drainage facility		
Present	15	10.00
Absent	135	90.00
Total	150	100.00
Electrical facility		
Present	102	68.00
Absent	48	32.00
Total	150	100.00
Recreational facility		
No recreational aids	41	27.34
Own radio	59	39.33
Own radio and transister or televison	34	22.67
Own radio, transister and teleyison	14	9.33
Own radio, transister televison and VCR	2	1.33
Total	150	100.00
Transport facility		
Bus	92	61.33
Bus and bicycle	55	36.67
Bus and motorbike	3	2.00
Total	150	100.00

4.1.17 Health care services

More than half (56 %) of the families depended on Primary Health Centre (PHC) for treatment of diseases. About 15.33 per cent of the families depended on PHC, private hospitals and ayurvedic hospitals for the treatment of diseases. About 14 per cent of the families depended on PHC and private hospitals. Among the families surveyed, 8 per cent depended on PHC, private hospitals and medical college. For the treatment of diseases homeopathic medicines were used by 4 per cent of the families in addition to the help from PHC. Allopathy, ayurvedic and homeopathic medicines were used by about 2.67 per cent of the families.

4.1.18 Epidemics prevalent in the locality

Prevalence of any type of epidemics was not reported in the locality for the past one year.

4.1.19 General Information Source

Table 23 gives the details about the general information sources. About 82 per cent of the respondents gained general information from friends and neighbours. Information was acquired through conversation with family members and relatives by 74.67 per cent of the labourers. About 38.67 per cent of the families used radio as an information source. Television was used by about 48 per cent of the families and general information was gathered through cinema and exhibition by about 21.33 per cent and 6 per cent of the families respectively. Information were gathered through the meetings by about 8 per cent of the labourers and 9.33 per cent obtained the general information through contacts with the officers like agricultural officers and Block Development Officer etc.

Table 21. Use and source of fuels

Use and source of fuel	Number of families	Percentage
Type of fuel		
wood	80	53.33
wood and sawdust	29	19.33
wood, sawdust and kerosene	12	8.00
wood and kerosene	28	18.67
cooking gas	1	0.67
Total	150	100.00
Source of fuel		
collected from surroundings	12	8.00
purchased	64	42.67
collected from surroundings and purchased	74	49.33
Total	150	100.00

Table 22. Health care services

Medical services	Number of families	Percentage
Primary Health Centre (PHC)	84	56.00
PHC and private hospital	21	14.00
PHC, private hospital and ayurvedic medicines	23	15.33
PHC, private hospital and medical college	12	8.00
PHC and homeopathic medicines	6	4.00
PHC, ayurvedic and homeopathic medicines	4	2.67
Total	150	100.00

About 22.67 per cent of the sample got general information through newspapers and 17.33 per cent through magazines and booklets.

4.1.20 Time expenditure pattern

Table 24 gives the details about the expenditure of time. Most of the labourers (97.33 %) spent 8 to 10 hours a day for working in the field. Nearly three fourth of the sample (74.67 per cent) spent 3 to 5 hours for household activities. About 17.33 per cent spent 1 to 3 hours and 8 per cent spent 5 to 7 hours of the day for doing the household activities.

Sleeping time of the 65.33 per cent of the labourers ranged from 6 to 8 hours in a day. Twenty eight per cent of the labourers spent 4 to 6 hours and the rest (6.67 %) spent 8 to 10 hours for sleep.

Correlation (0.170*) of total family members with monthly food expenditure showed significant results.

Analysis of variance revealed (Table 25) that the family system (Joint/Nuclear) did not exert any significant influence on the monthly food expenditure pattern. Educational status of the sample also exerted no significant influence on food expenditure.

The correlation of independent variables like land area, food expenditure, clothing, shelter, transport etc. with monthly income has shown in the Table 26. Land area showed no significant correlation with monthly income. The food expenditure, expenditure for clothing, fuel expenditure, remittance and savings showed significant correlation with monthly income. The expenditures for shelter, transport, recreation, education, health and luxury and personal matters had no significant correlation with monthly income (Table 26).

Table 23. General Information Sources

Information source	Number of respondents	percentage
Friends and neighboures	123	82.00
Family members and relatives	112	74.67
Newspaper	34	22.67
Magazines and booklets	26	17.33
Radio	58	38.67
Televison	72	48.00
Meetings	12	8.00
Cinema	32	21.33
Exhibition	9	6.00
Officers like agricultural officer, block development officer etc.	14	9.33

Table 24. Time expenditure pattern

Time expenditure	Number of respondents	Percentage
working time		
6 - 8 hours	4	2.67
8 - 10 hours	146	97.33
Total	150	100.00
Time spent at household activities		
1 - 3 hours	26	17.33
3 - 5 hours	112	74.67
5 - 7 hours	12	8.00
Total	150	100.00
Sleeping time		
4 - 6 hours	42	28.00
6 - 8 hours	98	65.33
8 - 10 hours	10	6.67
Total	150	100.00

Table 25. F value of analysis of variance on food expenditure

	F value
Joint/Nuclear family system	$.080^{NS}$
Educational status of the sample	1.277^{NS}

NS: Not significant

Table 26. Correlation with total income

Independent variables	Correlation
Land area	0.111^{NS}
Food expenditure	0.587**
Clothing	0.539**
Shelter	0.133^{NS}
Transport	0.043^{NS}
Recreation	0.045^{NS}
Education	0.008^{NS}
Health	0.015^{NS}
Fuel	0.237**
Luxury & Personal	0.037^{NS}
Remittance	0.638**
Savings	0.204**

NS: Not significant

* Significant at 5% level

** Significant at 1% level

4.2 Food consumption pattern of the agricultural labourer families

4.2.1 Food expenditure pattern

The survey showed that all the families were non vegeterians. Table 27 gives the details about the food expenditure pattern.

All the families used more food expenditure on cereals. Most of the families spent 45 to 50 (42 %), 50 to 55 (39.33 %) and 55 to 60 (10 %) per cent of their food expenditure on cereals.

Almost all the families (99.33 %) used only upto five per cent of their food expenditure to purchase pulses.

For the purchase of roots and tubers, green leafy vegetables and other vegetables 76 per cent and 23.33 per cent of the families spent respectively 10 to 15 and 15 to 20 per cent of their food expenditure.

Most of the families (96 %) spent upto five percent of their food expenditure for the purchase of oils and fats.

Families spent 5 to 10 (87.33 %) and 10 to 15 (12.67 %) of their food expenditure on the purchase of sugars.

There was no expenditure on the purchase of milk and milk products by 63.34 per cent of the families. While 31.33 per cent spent upto five per cent of their food expenditure for the same.

Regarding the expenditure on fruits, upto 5 per cent of their food expenditure was spent for it by 71.33 per cent and 28 per cent spent nothing for it.

Majority of the families (97.34 %) spent only upto 5 per cent of their food expenditure for the purchase of meat.

Table 27. Food expenditure pattern

Percentage expenditure	Number of families										
	Cereals	Pulses	Roots and tubers, GLV and other vegetables	Oils and fats	Sugars	Milk and milk products	Fruits	Meat	Fish	Egg	Spices and condiments
No expenditure	-	-	-	-	-	95(63.34)	42(28)	2(1.33)	-	79(52.66)	-
0 - 5	-	-	-	144(96)	-	47(31.33)	107(71.33)	146(97.34)	42(28)	70(46.67)	150(100)
5 - 10	-	149(99.33)	1(0.67)	6(4)	131(87.33)	8(5.33)	1(0.67)	2(1.33)	103(68.7)	1(0.67)	-
10 - 15	-	1(0.67)	114(76)	-	19(12.67)	-	-	-	5(3.3)	-	-
15 - 20	-	-	35(23.33)	-	-	-	-	-	-	-	-
20 - 25	-	-	-	-	-	-	-	-	-	-	-
25 - 30	-	-	-	-	-	-	-	-	-	-	-
30 - 35	-	-	-	-	-	-	-	-	-	-	-
35 - 40	2(1.33)	-	-	-	-	-	-	-	-	-	-
40 -45	10(6.67)	-	-	-	-	-	-	-	-	-	-
45 - 50	63(42)	-	-	-	-	-	-	-	-	-	-
50 - 55	59(39.33)	-	-	-	-	-	-	-	-	-	-
55 - 60	15(10)	-	-	-	-	-	-	-	-	-	-
60 - 65	1(0.67)	-	-	-	-	-	-	-	-	-	-
Total	150(100)	150(100)	150(100)	150(100)	150(100)	150(100)	150(100)	150(100)	150(100)	150(100)	150(100)

Numbers in parentheses are percentages

More than half of the families (52.66 %) spent no money for the purchase of egg and 46.67 per cent spent below 5 per cent of their food expenditure for the same.

All the family spent less than 5 per cent of their food expenditure on food items like spices and condiments.

4.2.2 Frequency of use of various food items

All the families used cereals, other vegetables, oils and fats, spices and condiments and sugars daily.

On four days in a week, 4.67 per cent used pulses, 2.67 per cent used roots and tubers and 2.67 per cent used fish.

Roots and tubers and fish were used by 19.30 and 15.33 per cent of the families respectively on three days in a week.

On two days in a week, food items like pulses, roots and tubers and fish were used by 55.33, 26.70 and 20.67 per cent of the families respectively.

Once in a week, roots and tubers, fish and egg were used by 18, 35.33 and 19.34 per cent of the families respectively.

Once in two weeks, green leafy vegetables, pulses, roots and tubers, fish and egg were used by 15.33, 12.67, 12,10 and 10 per cent of the families respectively.

Once in a month, 30 per cent of the families used meat, 18 per cent used green leafy vegetables, 12.67 per cent used fruits and 10.66 per cent used roots and tubers.

Once in two months, 25.34 per cent used green leafy vegetables and 10.67 per cent used milk and milk products.

Table 28. Frequency of use of various food items

Food items	Number of families										
	Daily	4 days in a week	3 days in a week	2 days in a week	Once in a week	Once in two weeks	Once in a month	Once in two months	Occasionally	Never	Total
Cereals	150(100)	-	-	-	-	-	-	-	-	-	150(100)
Pulses	2(1.33)	7(4.67)	9(6)	83(55.33)	12(8)	19(12.67)	12(8)	-	6(4)	-	150(100)
Green leafy vegetables	-	-	3(2)	2(1.33)	18(12)	23(15.33)	27(18)	38(25.34)	39(26)	-	150(100)
Other vegetables	150(100)	-	-	-	-	-	-	-	-	-	150(100)
Roots and tubers	13(8.67)	4(2.67)	29(19.30)	40(26.7)	27(18)	18(12)	16(10.66)	-	3(2)	-	150(100)
Fruits	-	-	-	2(1.33)	17(11.33)	13(8.67)	19(12.67)	14(9.33)	80(53.34)	5(3.33)	150(100)
Oils and fats	150(100)	-	-	-	-	-	-	-	-	-	150(100)
Spices and condiments	150(100)	-	-	-	-	-	-	-	-	-	150(100)
Sugar and jaggery	150(100)	-	-	-	-	-	-	-	-	-	150(100)
Milk and milk products	52(34.67)	-	-	-	2(1.33)	3(2)	5(3.33)	16(10.67)	50(33.33)	22(14.67)	150(100)
Meat	-	-	-	-	15(10)	13(8.66)	45(30)	7(4.67)	70(46.67)	-	150(100)
Fish	5(3.33)	4(2.67)	23(15.33)	31(20.67)	53(35.33)	15(10)	5(3.33)	3(2)	11(7.34)	-	150(100)
Egg	-	-	2(1.33)	6(4)	29(19.34)	15(10)	12(8)	3(2)	65(43.33)	18(12)	150(100)

Numbers in parentheses are percentages

Table 29a. Frequency scores obtained for various food items

Food items	Score
Cereal	100.00
Pulses	60.22
Green leafy vegetables	30.44
Other vegetables	100.00
Roots and tubers	62.99
Fruits	23.26
Oils and fats	100.00
Spices and condiments	100.00
Sugar	100.00
Milk and milk products	43.48
Meat	25.72
Fish	57.85
Egg	26.82

Table 29b. Classification of food items based on frequency of use

Frequency of use	Food items
Most frequenctly used food items (scores of 75 to 100)	Cereals, other vegetables, oils and fats, spices and condiments and sugar, (All obtained score of 100)
Medium frequently used food items (scores of 50 to 75)	Pulses, roots and tubers and fish
Less frequently used food items (scores less than 50)	Green leafy vegetables, milk and milk products, meat, egg and fruits

Fruits, meat, egg, milk and milk products and green leafy vegetables were used only occasionally by 55.34, 46.67, 43.33, 33.33 and 26 per cent of the families respectively.

Milk and milk products, egg and fruits were never included in the dietary pattern of 14.67, 12 and 3.33 per cent of the families respectively.

Tables 29a and 29b show that cereals, other vegetables, oils and fats, spices and condiments and sugar were the most frequently used food items. All the food items in this group obtained a score value of 100. Pulses, roots and tubers and fish were included in the list of medium frequently used food items. Green leafy vegetables, milk and milk products, meat, egg and fruits were included in the group of less frequently used food items. Frequency scores were calculated by using the equation suggested by Reaburn *et al.* (1977) (Appendix IX).

4.2.3 Diet during different stages

All the schoolers, adolescents and old people consumed ordinary diets without any special inclusion of nutritious foods. Ordinary diets were also consumed by 62 per cent of pre schoolers, 80.67 per cent of pregnant women and 86.67 per cent of lactating women. Some pre schoolers from the surveyed families (16%) consumed extra vegetarian food items like biscuits, bread and fruits and 14 per cent of the pre schoolers consumed extra vegetarian and non vegetarian food items (Table 30).

Table 30. Diet during different stages of life

Different stages	Number of families							
	Ordinary diet	Extra vegetarian food (Biscuit, bread, fruits etc.)	Extra non vegetarian foods (meat, fish, egg, milk etc.)	Extra vegetarian and non vegetarian foods	Extra green leafy vegetables and other vegetarian foods	Extra green leafy vegetables and non vegetarian foods	Extra green leafy vegetables, vegetarain and non vegetarian foods	Total
Pre-schoolers	93(62)	24(16)	12(8)	21(14)	-	-	-	150(100)
School age	150(100)	-	-	-	-	-	-	150(100)
Adolescents	150(100)	-	-	-	-	-	-	150(100)
Pregnancy	121(80.67)	3(2)	3(2)	14(9.33)	6(4)	1(0.67)	2(1.33)	150(100)
Lactation	130(86.67)	4(2.67)	1(0.67)	5(3.33)	5(3.33)	-	5(3.33)	150(100)
Old age	150(100)	-	-	-	-	-	-	150(100)

Numbers in parentheses are percentages

4.2.4 Diet during special occasions

Regarding the diet during festive occasions, 44.67 per cent prepared 'sadya and payasam', 26.66 prepared 'sadya' and 18 per cent of the families prepared 'rice and meat'(Table 31).

4.2.5 Number of washing of food items

Before cooking, food articles (dry and perishable) were washed twice by 59.33 per cent of the families. Food articles were washed once and thrice by 21.33 and 12 per cent of the families respectively (Table 32).

4.2.6 Mode of washing of food items

Regarding the type of washing of food items, green leafy vegetables and other vegetables were washed before and after cutting by 55.33 per cent. About 25.33 per cent washed it after cutting and the rest (19.33 %) washed it before cutting. Roots and tubers were washed after cutting by 84 per cent of the families. Fruits were washed before cutting by all the families where as all the families washed meat and fish after cutting (Table 33)

4.2.7 Details about the cooking methods followed

For cereals, 74.67 per cent of the families followed the boiling method ('kanji') and all the families followed the method of boiling with straining. For cereal flour and cereal dough preparations, 30 per cent of the families followed the steaming method, 32.67 per cent followed shallow fat frying, 19.33 per cent followed frying without fat and 10 per cent followed deep fat frying method. (Table 34).

Table 31. Diet during special occasions

Diet during special occasions	Number of families	Percentage
Sadya	40	26.66
Sadya and payasam	67	44.67
Sadya, payasam and snacks	4	2.67
Biriyani	5	3.33
Gheerice, meat	4	2.67
Rice, meat	27	18.00
Gheerice. meat and snacks	3	2.00
Total	150	100

Table 32. Frequency of washing of food articles (dry and perishable)

Number of washing	Number of families	Percentage
Once	32	21.33
Twice	89	59.33
Thrice	18	12.00
more than 3 times	11	7.34
Total	150	100

Table 33. Mode of washing of perishable food articles

Food items	Number of families			
	Washing before cutting	Washing after cutting	Washing both before and after cutting	Total
Green leafy vegetables and other vegetables	29(19.33)	38(25.33)	83(55.33)	150(100)
Roots and tubers	-	126(84)	24(16)	150(100)
Fruits	150(100)	-	-	150(100)
Meat	-	150(100)	-	150(100)
Fish	-	150(100)	-	150(100)

Numbers in parentheses are percentages

Table 34. Cooking methods followed

Cooking methods used	Number of families									
	Cereals	Cereal flour and cereal dough preparations	Pulses	Green leafy vegetables and other vegetables	Roots and tubers	Fruits (Banana)	Meat	Fish	Egg	Milk
Boiling	112(74.67)	-	132(88)	150(100)	128(85.33)	-	139(92.67)	148(98.67)	78(52)	150(100)
Boiling and straining	150(100)	-	-	-	150(100)	-	-	-	-	-
Boiling and absorption	-	-	93(62)	92(61.33)	68(45.33)	-	68(45.33)	-	-	-
Steaming	-	45(30)	-	-	-	38(25.33)	-	-	-	-
Boiling and absorption with shallow fat frying	-	-	68(45.33)	72(48)	43(28.67)	-	56(37.33)	-	-	-
Shallow fat frying	-	49(32.67)	-	-	-	-	-	72(48)	60(40)	-
Deep fat frying	-	15(10)	-	-	-	12(8)	12(8)	-	-	-
Frying without fat	-	29(19.33)	-	-	-	-	-	-	-	-

Numbers in parentheses are percentages

For pulses 88 per cent of the families followed the boiling method and 62 per cent followed boiling and absorption method. Boiling and absorption with shallow fat frying was followed by 45.33 per cent of the families.

To prepare green leafy vegetable items, all the families followed the boiling method and 61.33 per cent followed boiling and absorption. Boiling and absorption with shallow fat frying was followed by 48 per cent.

For cooking roots and tubers other than tapioca 85.33 per cent followed the boiling method, 45.33 per cent followed the boiling and absorption and 28.67 per cent followed boiling and absorption with shallow fat frying. For tapioca all the families followed the method of boiling with straining.

For banana 25.33 per cent of families followed the steaming method and only 8 per cent of the families followed the deep fat frying method.

For meat preparations, 92.67 per cent followed the boiling method, 45.33 per cent followed the boiling and absorption method and 37.33 per cent followed the boiling and absorption with shallow fat frying. For meat, only 8 per cent followed the deep fat frying.

For fish preparations, 98.67 per cent followed the boiling method and 48 per cent followed shallow fat frying.

In the case of egg, boiling method was adopted by 52 per cent and 40 per cent followed shallow fat frying (Table 34).

4.2.8 Cooking vessels

For cooking cereals 82 per cent used aluminium vessels, 13.33 per cent used clay vessels and 4.67 per cent used steel vessels(Table 35).

Table 35. Details about use of various cooking vessels

Food items and cooking vessels used	Number of families	Percentage
Cereals		
Aluminum vessel	123	82.00
Clay vessel	20	13.33
Steel vessel	7	4.67
Total	150	100.00
Pulses		
Pressure cooker	24	16.00
Aluminium and clay vessel	12	8.00
Clay vessel	107	71.33
Aluminium vessel	5	3.34
Pressure cooker and Aluminium vessel	2	1.33
Total	150	100.00
Vegetables		
Pressure cooker	3	2.00
Aluminium vessel	9	6.00
Aluminium and clay vessel	22	14.67
Pressure cooker and Aluminium vessel	2	1.33
Clay vessel	114	76.00
Total	150	100.00
Roots and tubers		
Aluminium vessel	17	11.33
Aluminium and clay vessel	16	10.67
Clay vessel	117	78.00
Total	150	100.00
Fish		
Clay vessel	150	100.00
Total	150	100.00
Meat		
Pressure cooker	2	1.33
Pressure cooker and Aluminium vessel	1	0.67
Pressure cooker and clay vessel	2	1.33
Aluminium vessel	5	3.33
Aluminium and clay vessel	4	2.67
Clay vessel	136	90.67
Total	150	100.00
Egg		
Aluminum vessel	97	64.66
Clay vessel	37	24.67
Aluminium and steel vessel	1	0.67
Aluminium and clay vessel	15	10.00
Total	150	100.00
Milk		
Steel vessel	30	20.00
Aluminium vessel	94	62.67
Clay vessel	26	17.33
Total	150	100.00

For pulses, 71.33 per cent used clay vessels and 16 per cent used pressure cooker.

To cook green leafy vegetables and other vegetables, 76 per cent used clay vessels and 14.67 per cent used both aluminium and clay vessels.

To cook roots and tubers, 78 per cent used clay vessels, 11.33 per cent used aluminium vessels and 10.67 per cent used both aluminium and clay vessels.

All the families cooked fish in clay vessels and for meat also 90.67 per cent used clay vessels.

For cooking milk, 62.67 per cent used aluminium vessels and 17.33 per cent used clay vessels.

Among the families, 64.66 per cent cooked egg in aluminium vessels and 24.67 per cent cooked it in clay vessels (Table 35).

4.2.9 Number of meals per day

About 62.67 per cent of the families consumed 3 meals a day and the rest (37.33 %) consumed 2 meals daily (Table 36 a).

4.2.10 Details of meal planning

Table 36b gives the details about the meal planning. Out of the 150 families, 76 per cent planned their meals in advance and among them, 75.44 per cent planned the meals according to the availability of foods stuffs and money, 15.79 per cent planned the meals according to the total family requirement. Both the total family requirement and the availability of food stuffs and money were the basis of meal planning for 8.77 per cent of the families. The survey showed that 24 per cent of the families did not plan the meals in advance.

Table 36a. Number of meals per day

Number of meals per day	Number of families	Percentage
One	-	-
Two	56	37.33
Three	94	62.67
Four	-	-
Total	150	100

Table 36b. Details about meal planning

Meal planning	Number of families	Percentage
Plan meals	114	76
Do not plan	36	24
Total	150	100
Basis of meal planning		
Total family requirement	18	15.79
Food stuffs available and money available	86	75.44
Both total family requirement and food stuffs and money available	10	8.77
Total	114	100

4.2.11 Food distribution pattern

In food distribution, equal importance to all family members were given by 78.67 per cent of the families where as 21.33 per cent gave more preference to male members.

4.2.12 Consumption of raw food items

Most of the families (88.67 %) did not have the habit of eating raw vegetables where as 11.33 per cent had the habit.. Among the families, 92.67 per cent was not aware about the importance of intake of raw vegetables and fruits (Table 38).

4.2.13 Use of left over foods

Among the 150 families, 149 (99.33 %) had the habit of reusing left over foods (Table 39).

4.2.14 Details about drinking water

The habit of drinking water without boiling was practised by 65.33 per cent of the families (Table 40).

4.2.15 Details about the intake of meals

Table 41 gives the details about the intake of meals. Most of the families (84 %) did not keep specific schedule for the intake of meals and only 16 per cent kept specific time schedule for the meal intake. Among the families, who were not keeping specific schedule for meal intake, 65.08 per cent consumed food according to the convenience and the others (34.92 %) consumed food according to hunger signs.

4.2.16 Diet during diseases

Table 42 gives the details about the diet given during illness.

Table 37. Details about food distribution

Food distribution pattern	Number of families	Percentage
Equal importance to all family members in food distribution	118	78.67
Males give preference	32	21.33
Total	150	100

Table 38. Details about consumption of raw food items

Consumption of raw vegetables	Number of families	Percentage
Eat raw vegetables	17	11.33
Do not eat raw vegetables	133	88.67
Total	150	100
Opinion about raw food items		
Importance of raw vegetables and fruits are not known	139	92.67
Raw fruits and vegetables are good for health	11	7.33
Total	150	100

Table 39. Details about use of left over foods

Details about use of left over foods	Number of families	Percentage
Reusing left over foods	149	99.33
Not reusing	1	0.67
Total	150	100

Table 40. Details about drinking water

Details about drinking water	Number of families	Percentage
Drink boiled and cooled water	52	34.67
Drink water without boiling	98	65.33
Total	150	100.00

Table 41. Details about intake of meals

Details about time schedule for intake of meals	Number of families	Percentage
Keep specific time schedule for intake of meals	24	16.00
Do not keep specific time schedule for intake of meals	126	84.00
Total	150	100.00
Basis of intake of meals		
Take food when hunger occurs	44	34.92
Take food according to convenience	82	65.08
Total	126	100.00

4.2.16.1 Diet during fever

About 33.33 per cent of the families gave 'kanji' alone during fever. Kanji and pickle were given by 23.34 per cent and 22 per cent gave kanji along with fat free pappad. Only 21.33 per cent of the families gave kanji along with fat free pappad and pickles.

4.2.16.2 Diet during diarrhoea

Kanji water and boiled and cooled water were given by 39.33 per cent of the families during diarrhoea. About 26 per cent of the families gave salted kanji water for the diarrhoea patient. About 17.33 per cent of the families gave kanji water and tender coconut water during diarrhoea.

4.2.16.3 Diet during measles

Salt free kanji and fat free pappads were given by about 25.33 per cent of the families during measles. Tender coconut water was also given along with the salt free kanji and fat free pappad by 15.33 per cent and 10.67 per cent gave fruits and cold foods.

4.2.16.4 Diet during chicken pox

About 30 per cent of the families gave salt free kanji and fat free pappad during chicken pox. Tender coconut water along with the salt free kanji and fat free pappad were given by about 21.33 per cent of the families. About 18.67 per cent of the families gave corriander water along with salt free kanji. Fruits and cold foods were given by 6.67 per cent.

Table 42. Diet during diseases

Diseases	Number families									
	Kanji	Kanji, pappad (fat free) and pickle	Kanji and pappad (fat free)	Kanji and pickle	Salted kanji water	Tender coconut water	Boiled and cooled water	Kanji water and tender coconut water	Kanji water and boiled and cooled water	Kanji water, tender coconut water and boiled and cooled water
Fever	50(33.33)	32(21.33)	33(22)	35(23.34)	-	-	-	-	-	-
Diorrhoea	-	-	-	-	39(26)	-	7(4.67)	26(17.33)	59(39.33)	19(12.67)
Measles	-	-	-	-	-	-	-	-	-	-
Chicken pox	-	-	-	-	-	-	-	-	-	-
Whooping cough	18(12)	-	-	-	-	-	-	-	-	-
Hyper tension	-	-	-	-	-	-	-	-	-	-
Diabetes	-	-	-	-	-	-	-	-	-	-

Numbers in parentheses are percentages

(Continued .....)

Table 42. Continued

Number of families										
Kanji (salt free) and pappad (fat free)	Fruits and cold foods	Coriander water and kanji(salt free)	Tender coconut water, kanji (salt free) and pappad(fat free)	Salt free foods, pappads and pickles avoided	Salt free foods, pappad and pickles included	Salt free foods and green leafy vegetables included	Sugar free diets, pappads and pickels avoided	Sugar free diets	Not known about diets	Total
-	-	-	-	-	-	-	-	-	-	150(100)
-	-	-	-	-	-	-	-	-	-	150(100)
38(25.33)	16(10.67)	17(11.33)	23(15.33)	-	-	-	-	-	56(37.34)	150(100)
45(30)	10(6.67)	28(18.67)	32(21.33)	-	-	-	-	-	35(23.33)	150(100)
-	-	-	-	-	-	-	-	-	132(88)	150(100)
-	-	-	-	32(21.33)	48(32)	16(10.67)	-	-	54(36)	150(100)
-	-	-	-	-	-	-	21(14)	47(31.33)	82(54.67)	150(100)

Numbers in parentheses are percentages

4.2.16.5 Diet during whooping cough

Majority of the labourers (88 %) were not knowing about the diet to be given during the attack of whooping cough while the remaining 12 per cent of the families gave kanji to the patient.

4.2.16.6 Diet during Hypertension

About 36 per cent of the labourers were not knowing about the diet to be given during hypertension. About 32 per cent of the labourers suggested salt free foods with the inclusion of pappad and pickle. While about 21.33 per cent of the labourers suggested salt free foods with the exclusion of pappad and pickles. The remaining 10.67 per cent suggested salt free foods with the inclusion of green leafy vegetables.

4.2.16.7 Diet during diabetes

More than half of the surveyed labourers (54.67 %) were not aware about the diabetic diet. About 31.33 per cent of the labourers suggested that sugar free diet should be given and 14 per cent suggested sugar free diet with the exclusion of pappad and pickle.

4.2.17 Details about the preserved food items

About 30 per cent of the families bought preserved food items like pickles, jam and squash from outside. Out of them, 71.10 per cent bought pickles and 20 per cent bought jam and the remaining 8.90 per cent bought squash from outside. Preserved food items at home were prepared by 18 per cent of the families. Among these families, 96.3 per cent prepared pickles and 3.70 per cent prepared jam (Table 43).

Table 43. Details about preserved food items

Details about preserved food items	Number of families	Percentage
Preserved foods bought from outside		
Pickles	32	71.10
Jam	9	20.00
Squash	4	8.90
Total	45	100.00
Preserved foods prepared at home		
Pickles	26	96.30
Jam	1	3.70
Squash	-	-
Total	27	100.00

Table 44. Details about preparation cereal flours

Details about preparation of cereal flours	Number of families	Percentage
Preparing cereal flours at home	111	74
Not preparing cereal flours	39	26
Total	150	100
Keep cereal flours for 2 weeks	21	18.92
Keep cereal flours for 1-2 months	42	37.84
Preparing cereal flours on special occasions only	48	43.24
Total	111	100

4.2.18 Details about the storage facilities

All the families stored dry food articles especially cereals (rice, wheat), pulses (green gram, red gram, bengal gram, green peas etc.), spices and condiments (pepper, chilly powder, turmeric powder etc.) and sugars (sugar and jaggery) in moist free air tight cans.

For the storage of perishable food articles like vegetables, fruits, meat and fish etc. refrigeration storage facility was not available in any family.

4.2.19 Details about the preparation of cereal flours

Table 44 gives the details about the preparation and storage of cereal flours. About 74 per cent of the families had the habit of preparing cereal flours for various meal preparations.

Out of the 111 families, 43.24 per cent prepared cereal flours on special occasions only. About 37.84 per cent prepared and kept the cereal flours for one to two months and 18.92 per cent prepared it and stored for two weeks. The remaining 26 per cent did not prepare cereal flours at home.

4.2.20. Infant feeding practices

Table 45 presents details about breast feeding practices.. About 86 per cent of the labourers provided breast milk to the infant soon after birth and 12.67 per cent provided it for the infant after the second day of delivery. Most of the women (86 %) supplied colostrum to the infant and the remaining 14 per cent had not given colostrum to the infant.

Table 45. Details about breast feeding

Details about breast feeding	Number of respondents	Percentage
Introduction of breast milk		
Soon after birth	129	86.00
After 2nd day	19	12.67
After 3rd day	2	1.33
Total	150	100.00
Supply of colostrum		
Gave colostrum	129	86.00
Had not given colostrum	21	14.00
Total	150	100.00
Opinion about colostrum		
Colostrum is good	31	20.67
Colostrum is not good	16	10.67
Importance of colostrum was unknown	103	68.66
Total	150	100.00
Duration of breast feeding		
Less than 1 year	5	3.33
1-3 years	119	79.33
3-5 years	25	16.67
Greater than 5 years	1	0.67
Total	150	100.00

Table 46a. Details about weaning of infants

Details about weaning	Number of respondents	percentage
Age of weaning		
28-90 days	21	14
90days- 2months	0	-
2-5 months	106	70.67
5-7 months	23	15.33
Total	150	100
Weaning foods included		
Cow's milk	73	48.66
Suji	71	47.33
Ragi	41	27.33
Banana	109	72.67
Rava	20	13.33
Banana powder	18	12.00
Commercial weaning foods	9	6.00
Bun and bread	6	4.00
Biscuit	11	7.33
Mashed rice	10	6.67
Tapioca	8	5.33
Maida	2	1.33

Table 46b. Time schedule of infant feeding

Infant feeding time schedule	Number of families	Percentage
Keep specific time schedule for infant feeding	24	16
Do not keep specific time schedule	126	84
Total	150	100

About 68.66 per cent of the women were ignorant about the importance of colostrum and only 20.67 per cent of the women opined that colostrum is good for an infant (Table 45).

4.2.20.1 Duration of breast feeding

Most of the women (79.33 %) breast fed their infants for a period of 1 to 3 years and 16.67 per cent breast fed their infants for 3 to 5 years (Table 45).

4.2.20.2 Details about the weaning of the infant

Table 46a gives the details about the weaning of the infant. About 70.67 per cent of the mothers had started weaning of the infant in the period of two to five months and 15.33 per cent had started weaning of the infant in the period of 5 to 7 months. Weaning was started from 28 to 90 days after birth of the infant by 14 per cent of the mothers.

The commonly given weaning food was banana (72.67 per cent). About 48.66 per cent of mothers gave cows milk, 47.33 per cent gave suji, 27.33 per cent gave ragi, 13.33 per cent gave rava and 12 per cent gave banana powder.

Most of the families (84 %) did not keep specific time schedule for infant feeding while only 24 % kept specific time schedule (Table 46b).

4.3 Nutritional status of the women agricultural labourers

4.3.1 Anthropometric measurements

The mean height and weight of the whole sample was 151.60 cm and 46.71 kg respectively. The mean weight was compared with the standard weight (50 kg) suggested by ICMR (1989) and the 't' value (3.13**) indicated that the mean weight was significantly lower than the standard weight.

Table 47 Classification according to Body mass index (BMI)

Classification	BMI	Number of respondents	Percentage
Grade II CED(Moderate)	16-17	5	3.33
Grade I CED(Mild)	17-18.5	27	18
Low weight (Normal)	18.5-20.0	38	25.33
Normal	20-25	76	50.67
Grade I obesity	25-30	4	2.67
Total		150	100

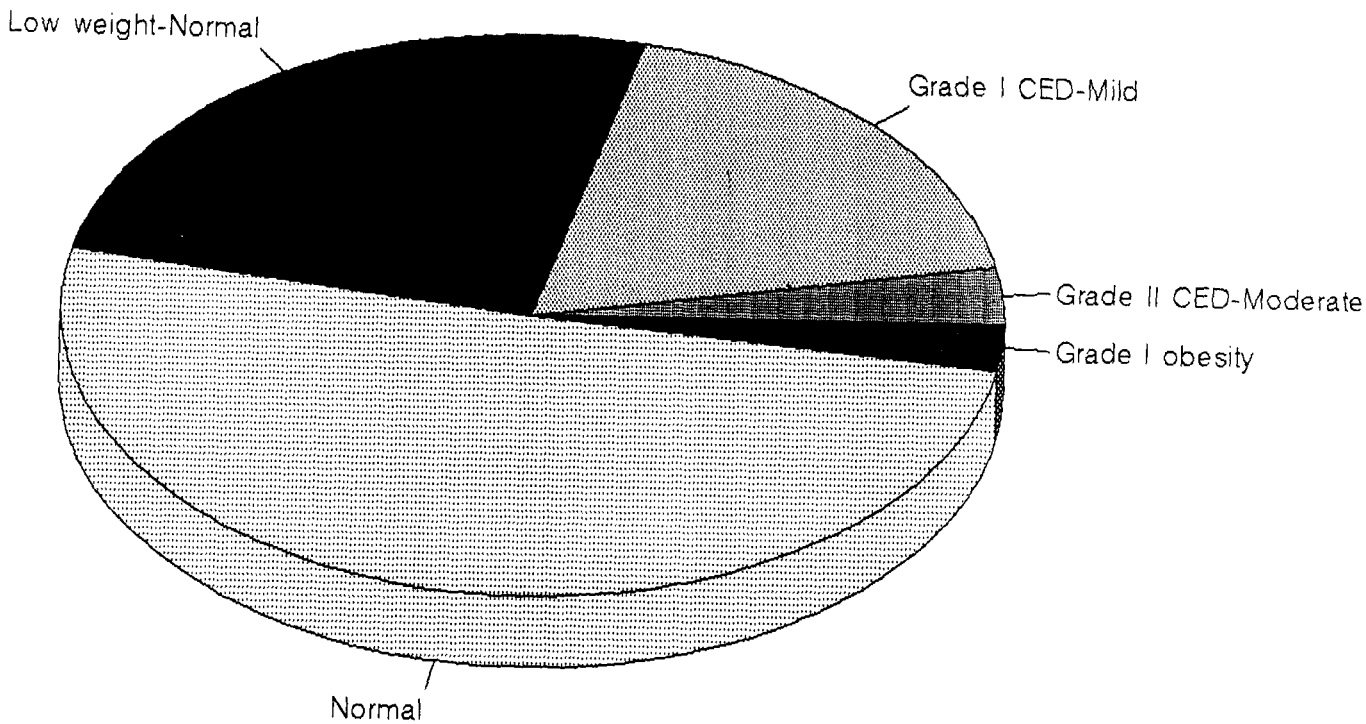

Fig.1. Classification according to Body Mass Index (BMI)

Table 47 gives the details of the classification of the women based on Body Mass Index (BMI). About 50.67 per cent of the women were normal with the BMI ranging between 20 and 25. There was 25.33 per cent of normal women with low weight and their BMI ranged between 18.5 and 20.0. About 18 per cent of the women had Grade I (mild) Chronic Energy Deficiency and their BMI ranged from 17 to 18.5. About 3.33 per cent of the women had Grade II (moderate) Chronic Energy Deficiency and their BMI ranged from 16 to 17. Grade I obesity was prevalent among 2.67 per cent of the women and their BMI ranged from 25 to 30 (Fig. 1). To find out the influence of independent variables like income and food expenditure on Body Mass Index (BMI) correlations were worked out. Both the variables, income(0.025^{NS}) and food expenditure (0.085^{NS}) did not have significant correlation with BMI . Analysis of variance was done to test the influence of educational status of the sample on BMI. It was revealed that it did not influence the BMI (F value - 0.664^{NS})

4.3.2 Clinical examination

Dental caries was the most prominent disorder. About 36.67 per cent of the women had mild dental caries and 26.66 per cent exhibited severe dental caries. Regarding the health of the eye, only 6.67 per cent showed symptoms of early cataract. Only one woman (3.33 %) showed symptoms of mild angular stomatitis and another 3.33 per cent showed symptoms of bleeding gums (Table 48).

4.3.3 Biochemical estimation of blood

Table 49 gives classification of the women based on haemoglobin status. Among the 30 women in the sub sample, 40 per cent had haemoglobin level greater

Table 48. Details about clinical examination

Clinical deficiency symptoms	Number of respondents	Percentage
Dental caries		
Absent	11	36.67
Mild	11	36.67
Severe	8	26.66
Total	30	100
Cataract		
Absent	28	93.33
Early	2	6.67
Total	30	100
Angular stomatitis		
Absent	29	96.67
Mild	1	3.33
Total	30	100
Bleeding gums		
Absent	29	96.67
Mild	1	3.33
Total	30	100

Table 49. Classification according to Haemoglobin levels

Haemoglobin level	Number of respondents	Percentage
less than 10g/100 ml (Deficient)	1	3.33
10 - 11.9 g/100 ml (Low)	17	56.67
greater than 12.0 g/100 ml	12	40
Total	30	100

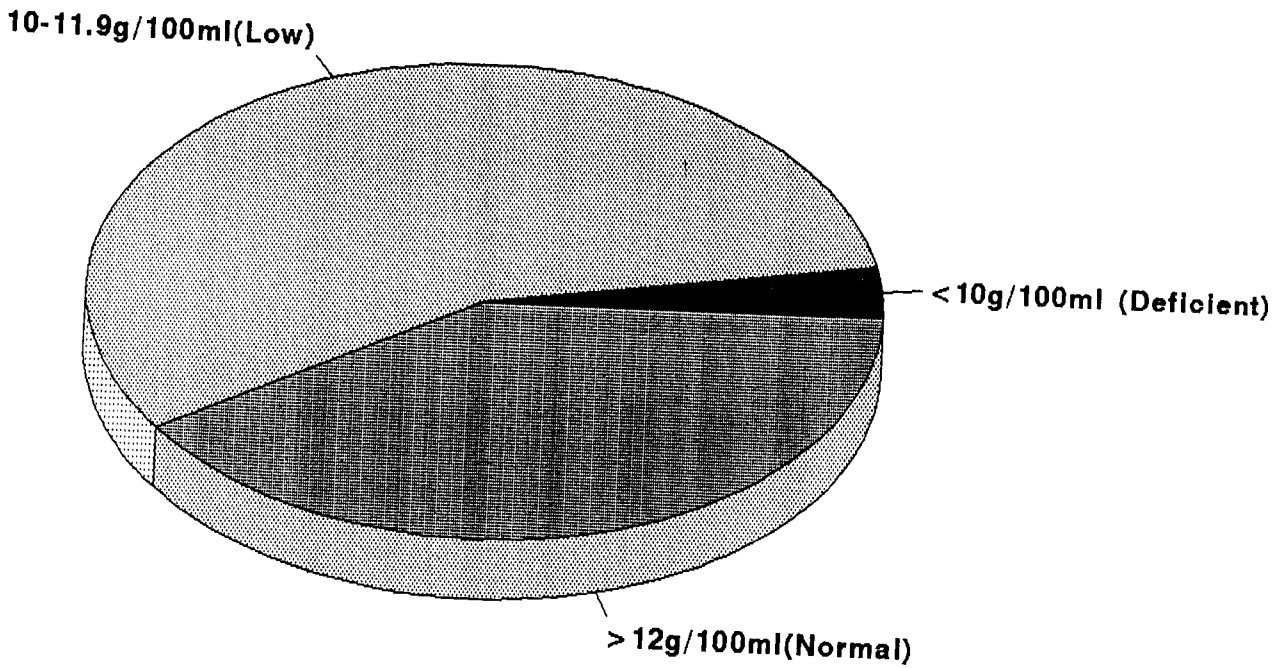

Fig.2. Classification according to Haemoglobin levels

than 12 g per 100ml. About 56.67 per cent of the women had low haemoglobin levels which ranged from 10 to 11.9 g per 100 ml. There was only one woman (3.33 %) with deficient haemoglobin status which was less than 10 g per 100 ml (Fig. 2).

4.3.4 Individual food weighment survey

4.3.4.1 Comparison of mean food intake with Recommended Dietary Allowances (RDA)

Intake of various food items were estimated using one day food weighment survey (among sub sample). These raw equivalents of food items were then compared with the balanced diet suggested by ICMR (1984).

Table 50 shows that the intake of pulses, green leafy vegetables, fruits, milk, fish, egg, fats and oils, sugar and roots and tubers were significantly lower than the balanced diet suggested by ICMR (1984). The intake of other vegetables were not significantly different from the balanced diet. While the cereal intake of cereals was significantly higher than the balanced diet suggested by ICMR(1984) (Fig. 3).

4.3.4.2 Comparison of mean nutrient intake with RDA

Individual food weighment survey was done to assess the daily food intake. From the amounts of weighed raw food ingredients nutritive value for the whole day was calculated using the nutritive value tables (Gopalan *et al.*, 1995) . These calculated amounts of nutrients were compared with the RDA. proposed by ICMR (1984) (Table 51).

Table 50. Comparison of mean food intake with RDA

Food items	Mean ± SE	RDA	Percentage of RDA	t value
Cereals (g)	481.3 ± 6.902	440	109.39	5.9877**
Pulses (g)	15.50 ± 2.86	25	62.00	3.3205**
Green leafy vegetables (g)	10.33 ± 3.579	100	10.33	25.05**
Other vegetables (g)	41.667 ± 3.493	40	104.17	0.4772^{NS}
Roots and tubers (g)	26.167 ± 8.807	50	52.33	2.7056*
Fruits (g)	3.33 ± 2.507	30	11.10	10.639**
Milk (ml)	9.167 ± 3.491	150	6.11	40.341**
Fish (g)	11.833 ± 3.265	30	39.44	5.565**
Egg (g)	0.667 ± 0.667	30	2.22	43.73**
Fats and oils (g)	8.167 ± 0.610	30	27.22	35.787**
Sugar (g)	16.43 ± 0.554	20	82.15	6.44**

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

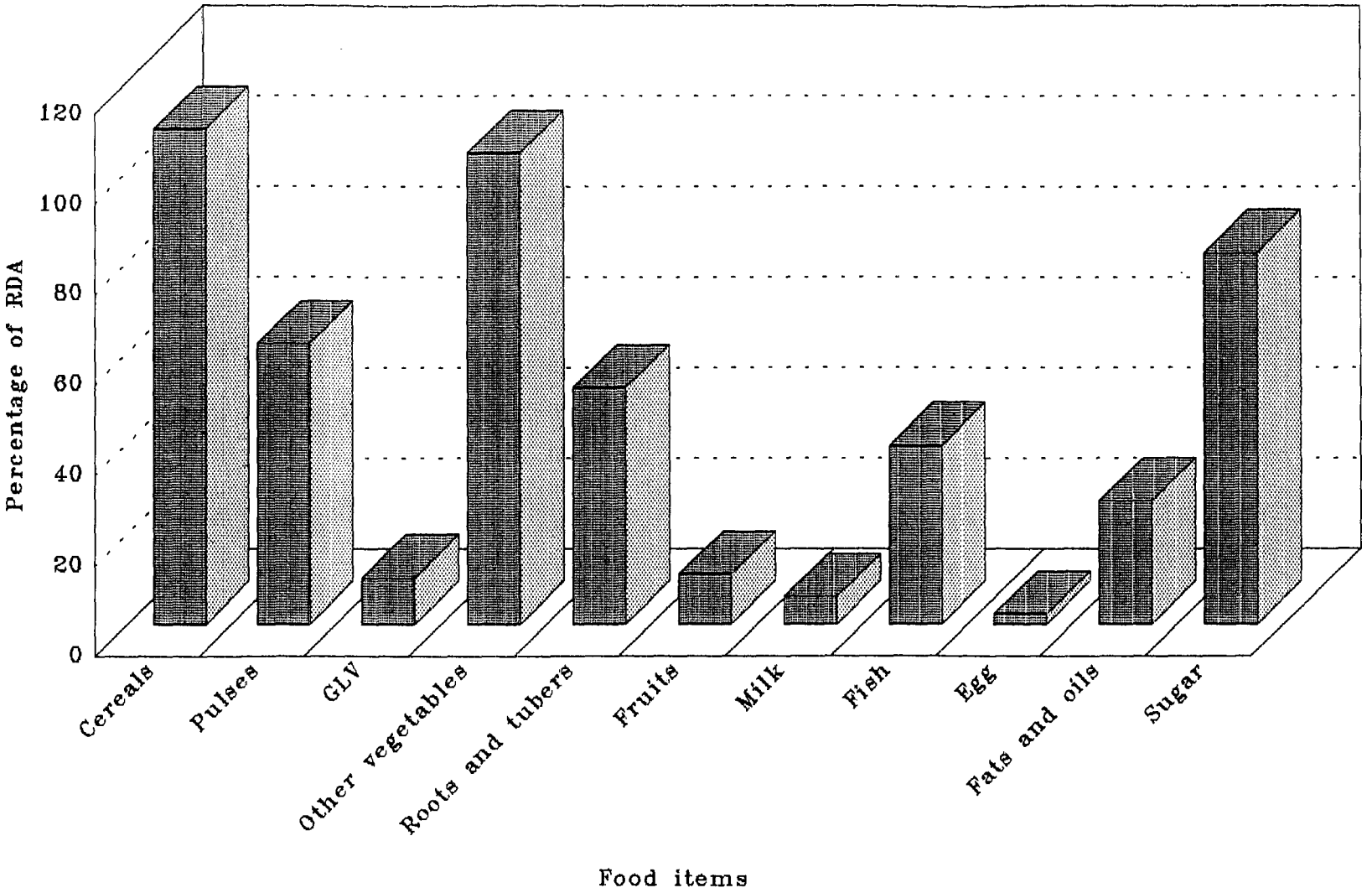

Fig.3. Mean daily food intake as percentage of RDA

Table 51. Comparison of mean nutrient intake with RDA

Nutrient	Mean ± SE	RDA	Percentage of RDA	t value
Fat (g)	12.00 ± 0.52	15	80.00	15.63**
Protein (g)	41.245 ± 1.079	50	82.49	8.119**
Calories (kcal)	1911.51 ± 18.012	225	85.91	17.40**
Calcium (mg)	183.335 ± 15.66	400	45.83	13.835**
Iron (mg)	25.968 ± 1.528	30	86.56	2.639*
Retinol (μg)	136.898 ± 55.71	600	22.82	8.31**
Thiamine(mg)	1.25 ± 0.087	1.1	113.64	1.726^{NS}
Riboflavin (mg)	0.428 ± 0.039	1.3	32.92	22.36**
Nicotianic acid (mg)	18.414 ± 0.336	1.4	131.53	13.137**
Vitamin C (mg)	29.62 ± 7.123	14	74.05	1.457^{NS}

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

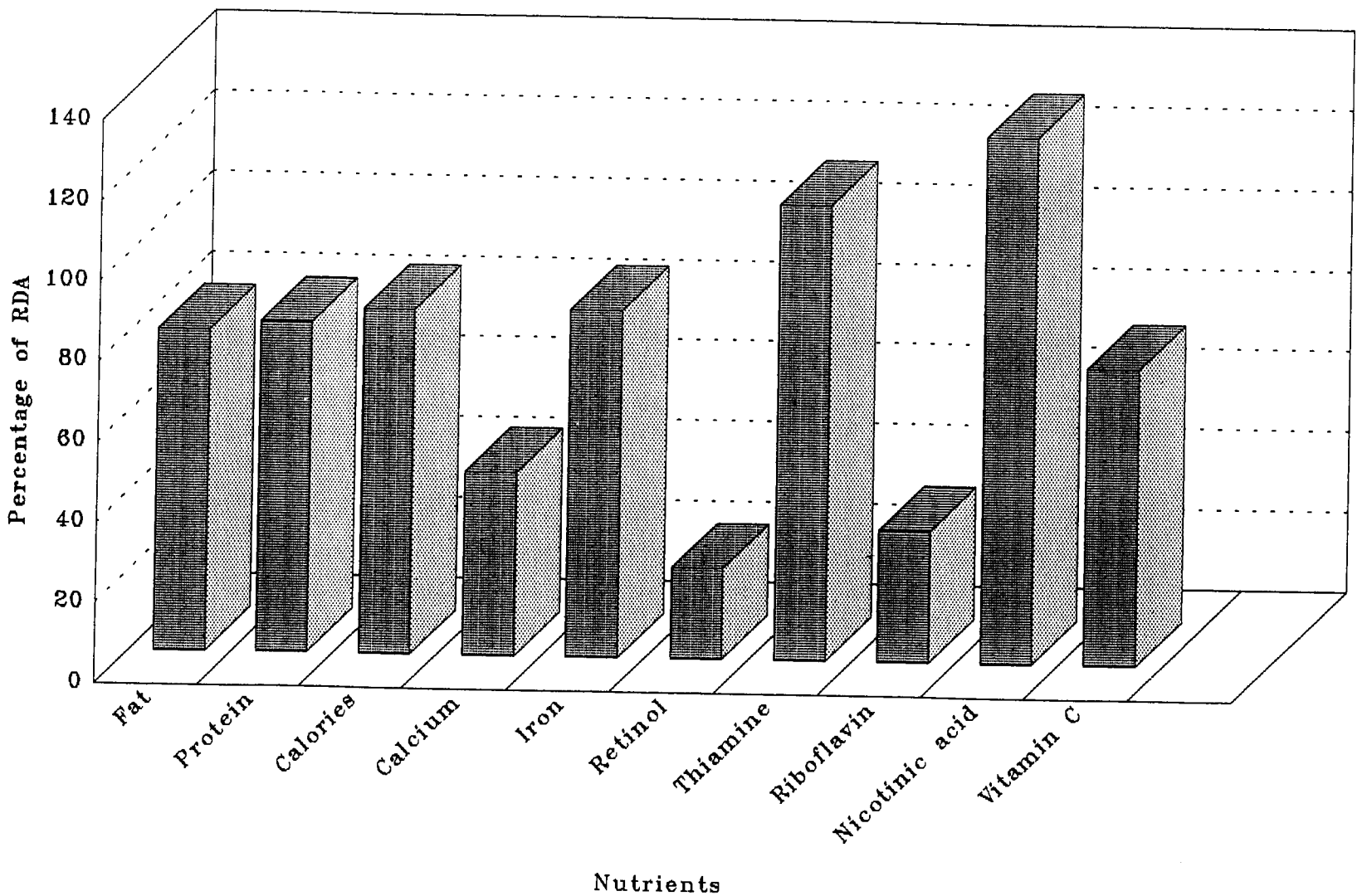

Fig.4. Mean daily nutrient intake as percentage of RDA

The intake of fat, protein, calories, calcium, iron, retinol and riboflavin were lower than the RDA. The intake of thiamine was almost same as the RDA. While the intake of nicotinic acid was higher than the RDA (Fig. 4).

4.4 Energy expenditure pattern of women agricultural labourers

Details about the daily energy expenditure pattern are presented in Table 52a and 52b. Energy expenditure studies among the subsample indicated that all the women labourers were deficient in energy intake when compared with the total energy expenditure for different activities. The mean energy expenditure (2341.79 kcal) was found to be lower than the mean energy intake (1958.99 kcal). The difference between energy intake and energy expenditure also indicated that the mean difference (-429.63) was very low.

The women labourers were classified based upon the differences between energy intake and energy expenditure. The maximum difference of -700 to -800 was observed among 3.33 per cent. Difference of -500 to -600 was observed among 30.00 per cent and difference of -300 to -500 was observed among 40.00 per cent (Table 52b).

4.5 Knowledge, Attitude and practice (KAP)

KAP test was carried out among the subsample. Table 53a and 53b give details about the knowledge, attitude and practice scores obtained by the subsample.

Table 52a. Comparison between daily energy intake and daily energy expenditure pattern of 30 women agricultural labourers

Sl.No.	Age (years)	Weight (kg)	Daily energy intake (kcal)	Daily energy expenditure (kcal)	Difference
1	42	50	2230.60	2292.91	-62.31
2	43	47	1954.90	2173.59	-218.69
3	41	49	1888.20	2280.68	-392.48
4	38	51	1819.35	2209.84	-390.49
5	40	51	1829.80	2259.86	-430.06
6	39	56	1756.30	2417.90	-661.60
7	35	50	1720.05	2294.12	-574.07
8	41	55	1809.60	2347.50	-537.90
9	42	49	1785.25	2278.29	-493.04
10	43	66	1859.50	2627.25	-767.75
11	39	49	1973.00	2327.63	-354.63
12	36	42	1891.70	2167.50	-275.80
13	43	40	1909.45	2182.10	-272.65
14	41	55	1901.20	2504.62	-603.42
15	38	53	1983.00	2417.61	-434.61
16	39	60	1940.10	2508.47	-568.37
17	40	64	1938.50	2460.97	-522.47
18	42	53	1922.40	2344.43	-422.03
19	43	55	1826.60	2347.50	-520.90
20	41	46	1902.20	2259.47	-357.90
21	38	45	1890.70	2214.98	-351.27
22	39	63	2038.50	2606.46	-324.28
23	37	57	2047.10	2457.00	-567.96
24	40	50	1857.20	2393.49	-409.90
25	42	55	1972.85	2501.69	-528.84
26	40	41	2008.95	2248.02	-239.07
27	41	33	1918.80	1958.99	-40.19
28	38	53	1878.60	2344.43	-465.83
29	40	57	1953.30	2482.98	-529.68
30	43	58	1937.65	2342.04	-386.39

Table 52b. Classification according to difference of daily energy intake from daily energy expenditure

Difference of energy intake from energy expenditure	Number of respondents	Percentage
0 to -100	2	6.67
-100 to -200	0	0
-200 to -300	4	13.33
-300 to -400	6	20
-400 to -500	6	20
-500 to -600	9	30
-600 to -700	2	6.67
-700 to -800	1	3.33
Total	30	100

4.5.1 Knowledge

The mean knowledge score of 6.03 indicated that to some extent the women labourers were aware about the nutrition and health related aspects. The maximum score value is 10. The classification based on knowledge score indicated that most of the labourers (86.66 %) included in the score range of 5 to 10. Most of the labourers (86.66 %) were included in the score range of 5 to 10.

4.5.2 Attitude

The attitude mean score (22.77) also indicated that to some extent the women labourers had healthy and positive attitudes regarding nutrition and health. The maximum score is 50. Classification indicated that 50 per cent of the labourers were included in the attitude score interval of 20 to 30 and 13.34 per cent were included in the score interval of 30 to 40.

4.5.3 Practice

The mean score of practice (3.00) indicated that the nutrition and health related practices existing among the women agricultural labourers were not satisfactory. The maximum score is that can be secured by an individual was 10. Classification based on scores indicated that 86.66 per cent were included in the score range of 0 to 5 and the rest (13.34 %) included in the score range of 5 to 10.

Table 53 a. Mean scores of Knowledge, Attitude and Practice (KAP)

KAP	Mean ± SE
Knowledge	6.033 ± 0.265
Attitude	22.77 ± 1.268
practice	3.0 ± 0.292

Table 53 b. Classification of women labourers based on scores obtained in KAP

KAP Score intervals	Number of respondents	Percentage
Knowledge		
0 - 5	4	13.34
5 - 10	26	86.66
Total	30	100.00
Attitude		
0 - 10	1	3.33
10 - 20	10	33.33
20 - 30	15	50.00
30 - 40	4	13.34
Total	30	100.00
Practice		
0 - 5	26	86.66
.5 - 10	4	13.34
Total	30	100.00

Discussion

DISCUSSION

This chapter includes a critical and brief discussion of the results on various aspects of the study. The discussion is mainly categorised into five groups.

5.1 Socio economic status of the agricultural labourer families

5.2 Food consumption pattern of the agricultural labourer families

5.3 Nutritional status of women agricultural labourers

5.4 Energy expenditure pattern of women agricultural labourers

5.5 Knowledge, attitude and practice (KAP) of women agricultural labourers

5.1 Socio economic status of the agricultural labourer families

Today's family system is mainly comprised of nuclear families. The study revealed that majority of the families were nuclear type (92 %) with patriarchal family system (79.3 %). Cherian (1992) also observed similar type of families among the agricultural labourer households of Trivandrum District. Similar findings were also reported by Thomas (1989), Nagammal (1989) and Seshadrinath (1993) among agricultural labourer families.

The study revealed that majority of the males and females were literate. In support to this Census of India (1991) has ranked Kerala as the most literate state.

In India, even though literacy level was very high, men have better education than women probably because of social discrimination against women (Ingle and

Khai, 1987 and Joseph, 1991). Choudhary (1990) reported that in rural areas of Hydrabad the female literacy rate was only about 1/3rd of the males. In this study also, the female literacy rate (86.51%) was lower than male literacy level (91.07%).

Nutritional status of a family is very much influenced by its family size. The present study showed that the number of total family members exerted significant correlation with monthly food expenditure. Majority (78 %) of the families were with the size of 4 to 6 members. This type of medium sized families were also observed among agricultural labourer families of Trivandrum District (Nagammal, 1989; Cherian, 1992). While contradictory result was reported by Usha *et al.* (1990) who observed that majority of the farm families were large sized with 5 to 9 members.

The economic status of a family is reflected by land holdings, family income, number of earning members in the family and monthly expenditure pattern (Wood and Blaylock, 1982). Majority of the families (92 %) had monthly income within the range of Rs. 1000 to 2500. Concordant finding was also reported by Shyna (1996) who observed that 79.17 per cent of the agricultural labourer families in Thrissur District had a monthly income within the same range.

Majority (87.32 %) of the families owned less than 20 cents of land. Cherian (1992) and Seshadrinath (1993) also observed similar findings among the agricultural labourer families of Trivandrum District

Out of the families who had cultivation various crops, only 7.68 per cent of the families cultivated paddy. This was in accordance to the findings of Jayanthakumari (1993) who found that only families with larger land holdings cultivated paddy. The present study also showed that only 17.30 per cent of the families cultivated various types of crops like coconut, banana, arecanut, cashew, pepper, papaya etc. Majority (90 %) of the families did not have kitchen garden and the very few families who had kitchen garden used up the products completely at the home.

Among the surveyed families, only 20.67 per cent reared domestic animals like goat, cow, hen or buffalo and out of them 51.61 per cent obtained income from domestic animals. Some families who had very small yield from domestic animals, used the products fully at home.

About 47.33 per cent of the families had taken loans from various sources like co-operative society, provident fund, bank, housing board, IRDP etc. Most of the loans were for house construction followed by marriage, debt repayment, for buying domestic animals, business and education. In accordance to this Udaya (1996) also reported that about 29.15 per cent of the families had taken loans from cooperative society and bank and the loans were for the purposes of agriculture, house construction and for buying cattle.

By analysing the monthly expenditure pattern it was revealed that majority of the families spent 45 to70 per cent of their monthly income on food items. In

support to this Puhazhendi (1980) observed that the agricultural labourers in Nilgiri's District spent 67.45 per cent of their monthly income on food followed by clothing. Majority of the farm families in Trivandrum (Usha *et al.*, 1990) and Thrissur Districts (Udaya, 1996) spent respectively 51 to 70 and 30 to 80 per cent of their monthly income on food. Devadas and Easwaran (1986) also observed that rural households in Tamil Nadu spent about 90 per cent of their monthly income on food . Shyna (1996) also reported similar monthly expenditure pattern among the agricultural labourer families.

The expenditure on clothing, electricity, personal need and education were comparatively low. Concordant findings were also reported by Usha *et al.* (1990) and Jayanthikumari (1993) in Trivandrum District.

Majority of the labourer families spent up to 15 per cent of their monthly income on recreation, health care and fuel. In contrast to this Udaya (1996) reported that majority of the families did not spend money for recreation, health and fuel.

Majority of the families (98 %) saved small amounts of their monthly income (0 to 10 %). Cherian (1992) and Shyna (1996) also observed similar findings among the agricultural labourer families of Trivandrum and Thrissur Districts respectively.

All the families owned a house and majority of them were tiled (59.33 %), had separate kitchen (96 %), drawing room (73.40 %), had good living conditions like lavatory facilities (78.67 %), electricity (68 %) and recreational aids (72.66 %). This

was in accordance to the findings of Shyna (1996) among the agricultrual labourer families of Thrissur District and was partly in contrast to the findings of Usha *et al.* (1990) among the farm families of Trivandrum.

The survey showed that no epidemic was prevalent in the locality for the past one year.

Majority of the families got general information through friends and neighbours, family members and relatives, radio and television. This finding was in accordance with the findings of Jayanthakumari (1993) and Udaya (1996) among the farm families and Shyna (1996) among the agricultural labourer families.

Time expenditure pattern showed that, 97.33 per cent of the women worked for about 8 to 10 hours in the field, most of them (74.67 %) spent 3 to 5 hours in household work and 65.33 per cent of them spent 6 to 8 hours for sleep. In accordance to this Pandey *et al.* (1988) observed that the working hours of rural women was about 9 to 14 hours including the domestic chores also. Cherian (1992) also reported that the working hours of agricultural labourers of Trivandrum was about 9 hours per day.

5.2 Food consumption pattern of the labourer households

All the families surveyed were non vegetarians. Cherian (1992) and Shyna (1996) also observed similar type of food habit among labourer families. The staple food consumed was rice Cherian (1992) also observed a similar trend of using

comparative cheap food articles like cereals, roots and tubers and fish among the labourer families.

Family size influenced the food expenditure pattern of the families. This finding was in agreement with the findings of Ghosh (1977), Chandrasekharan and Neeraja (1982), Thimmayamma (1983) and Seshadrinath (1993). The monthly food expenditure pattern showed that all the families spent 35 to 65 per cent of their food expenditure on cereals. Studies on dietary pattern of Kerala (Gopalan, 1979) and among Kuttanad agricultural labourers (Panikar,1979) also supported this finding. In contrast to this Udaya (1996) reported that the farm families of Thrissur District spent no money for cereals. In this study majority of the labourers were daily wage earners in the farms of a landowner or in the farms of Kerala Agricultural University. They did not have their own farms and crop yield. This may be the reason for spending high proportion of their monthly income for cereals.

Majority of the families (79.33 %) did not have domestic animals. So the consumption of milk, egg etc. was very low. About 63.34 per cent of the families did not spend any amount for the purchase of milk. While in difference to this, Udaya (1996) reported that majority of the farm families in Thrissur District domesticated animals and used a part of the products for their own use. About 28 per cent of the families did not spend money for fruits and only up to 5 per cent of monthly income was spent for fruits by 71.33 per cent of the families. This may be due to the scarcity of money for the purchase and may be due to the ignorance about the nutritive value of the fruits. Most of the families (97.34 %) spent only up to 5 per cent of their

monthly income for meat and 52.66 per cent did not spend any amount for egg. These may be also due to the scarcity of money.

The frequency of use of food items revealed that the most frequently used items were cereals, other vegetables, oils and fats, spices and condiments and sugar. Similar dietary pattern was also observed among the women of non organised sector (Augustine, 1993) and among the agricultural labourer families (Seshadrinath, 1993) of Trivandrum District. The frequency of use of pulses, roots and tubers and fish were deficient, but they were the medium frequently used food items. To some extent contrast findings were reported by Gopalan (1979) and Lina and Reddy (1989) who reported about the excess consumption of fish and tapioca in the dietary pattern of Keralites.

During the preschool age, 62 per cent of the children were given normal adult diets. Bhat and Dahiya (1985) reported that majority of the pre school children in India consumed an ordinary home diet which was deficient in many nutrients especially vitamin C and iron. Usha *et al.* (1990), Cherian(1992) and Jayanthikumari (1993) also observed similar type of pre school dietary pattern in Trivandrum. During school age and adolescence diet supplements were not included. This was in accordance to the findings of Cherian (1992) and Udaya (1996).

The food consumption pattern during pregnancy showed that majority of the families (80.67 %) gave normal adult diet to pregnant women. Devadas and Easwaran (1986) reported that the food intake of pregnant mothers in our country is

deficient in terms of energy and other nutrients. Easwaran and Goswami (1989) also observed a similar condition of not receiving any special attention during pregnancy and lactation. Usha *et al.*(1990) and Cherian (1992) also observed a similar type of practice of giving a normal adult diet to the pregnant and lactating women. In contrast to these findings Udaya (1996) observed an increased intake of normal adult food with the special inclusion of milk among the pregnant and lactating farm women of Thrissur.

During festive occasions, sadya (26.66 %), sadya and payasam (44.67 %), rice and meat (18 %) etc. were prepared.

More than half of the families (59.33 %) washed the food articles only two times. While certain families washed it 3 (12 %) and more than 3 times (7.34 %). Certain families followed the practice of washing the green leafy vegetables and other vegetables after cutting (25.33 %). Similar findings were also reported by Cherian (1992) who observed that the dry food articles like rice being washed several times before cooking and vegetables being washed after cutting.

Majority of the families (69.13 %) adopted boiling method for cooking of different food items. Similar type of cooking method was also reported by Thomas (1989), Cherian (1992), Jayanthakumari (1993) and Udaya (1996).

Majority of the families (62.67 %) consumed three meals a day. Similar finding was observed among the rural families of Trivandrum District (George, 1987

and Jayasree, 1987). Three meal pattern was also observed among majority of the rural Keralites by Usha *et al.*(1990), Cherian (1992), Jayanthakumari (1993), Augustine (1993) and Shyna (1996).

Majority of the families (78.67 %) gave equal importance to all family members in food distribution. While Seshadrinath (1993) found out that among the agricultural labourer families of Trivandrum male members, children, head of the family and employed members were given priority in food distribution. This type of dissimiliar practice was also reported by Schofield (1972), Devadas and Easwaran (1986), Sen (1988), and Usha *et al.* (1990).

This study showed that majority of the families (88.67 %) did not have the habit of eating raw vegetables and among them 92.67 per cent were not knowing about the importance of raw vegetables and fruits. In accordance to this Udaya (1996) also reported that majority (67.5 %) of the farm families did not eat any raw vegetables.

Regarding the use of left over foods, the study showed that almost all (99.33%) the families showed the habit of reusing the left over foods. Udaya (1996) also reported that 53.3 per cent of the families used the left over foods.

The habit of drinking water indicated that majority of the families (65.33 %) drank water without boiling. Udaya (1996) also reported that about 61.7 per cent of the families had the habit of drinking water without boiling.

Diet modification was observed during the disease conditions. Kanji, fat free pappad and pickles were given during fever. Kanji water, tender coconut water, boiled and cooled water etc. were given during diarrhoea. About 64 per cent of the women were aware about the provision of salt free foods during hypertension and some (45.33 %) also known about the provision of sugar free diet to the diabetic patients. Similar to this Easwaran and Goswami (1989) reported that majority of the families provided bland diets during fever, diarrhoea and chicken pox. Cherian (1992)also observed that majority of the agricultural labourer families in Trivandrum District provided gruel and bread during illness.

Details about the preserved food items revealed that only 18 per cent of families prepared the preserved food item like pickles at the home and 30 per cent of families bought it from outside.

Proper storage facilities of food items were not available among the households. The cereals (rice, wheat) and pulses (green gram, red gram, bengal gram) were kept in moist free air tight cans. This type of storage method was also reported by Cherian (1992) among the rural labourer households. The perishable foods like vegetables and fruits were purchased daily and the refrigeration storage method was not practised by any one of the families. Thomas (1989) and Cherian (1992) supported this finding.

The study also revealed that majority of the families (74 %) prepared cereal flours at home and out of them 43.24 per cent prepared it only on special occasions.

Regarding the infant feeding practices, majority of women (86 %) started breast feeding of the baby soon after birth itself and they gave colostrum to the baby which is highly nutritious. Similar practice was also observed among the farm women of Thrissur District (Udaya, 1996).

Some labourers (14 %) did not give colostrum to the baby due to the unawareness of its nutritive value. About 70.67 per cent of the mothers started weaning of infants in a period of two to five months. This good practice gives an idea about the awareness of the mothers about supplementation.

During infancy, cow's milk, suji, ragi, banana, banana powder, rava etc. were given. Thomas (1989), Cherian (1992), Jayanthakumari (1993) and Udaya (1996) also reported similar infant feeding practices among the rural families.

Scientific schedule for infant feeding practices insist specific time for feeding of the infant and regular intervals of feeding. The present study showed that there did not exist any strict time schedule for infant feeding. George (1987) also reported similar finding among the low income strata of Kerala.

5.3 Nutritional status of women agricultural labourers

To assess the nutritional status of the women labourers anthropometric measurements like height and weight, one day food weighment survey, clinical examination and biochemical estimation of haemoglobin level of blood were carried out. The mean height and weight were 151.60 cm and 46.71 kg respectively. This is

similar to the values reported by Bimla (1995) who found that the mean height and weight of farm women in the age group of 25 to 50 years in Hissar District of Haryana was 154.76 cm and 48.31 kg respectively.

Mean value of weight observed in this study was below the reference standards suggested by ICMR (1989). Cherian (1992) and Udaya (1996) also reported that the women were under nourished when compared with the standard weight for age values. In difference to this Jayanthakumari (1993) reported that the weight for age values were higher than the standards. Body mass Index values suggested that 50.67 per cent showed normal BMI, 25.33 per cent came under the low weight group with normal BMI, and18 per cent showed mild Chronic Energy Deficiency. These values were similar to the values reported by Cherian (1992). Similar to this Udaya (1996) also reported that 38.33 per cent of farm women were normal group, 40 per cent were in the low weight group and 19.17 per cent showed severe Chronic Energy Deficiency.

Clinical examination is the most essential part of all nutritional surveys and it is also the simplest, the most practical and the soundest means of ascertaining the nutritional status of a group of individuals (Park and Park, 1981).

The clinical examination showed that mild angular stomatitus, mild bleeding of gums and early cataract were prevalent to a very small extent, while majority of the sample (63.33 %) showed the symptoms of mild and severe dental caries . Udaya (1996) also observed very mild angular stomatitus, bad gums and caries in the teeth

(8.33 % each) among the farm women. Cherian (1992) also observed many nutritional disorders due to the deficiency of minerals and vitamins among the agricultural labourers. In contrast to this Jayanthikumari (1993) reported about the absence of clinical manifestation among the farm woman of Trivandrum District, but prevalence of anaemia was observed.

To determine the prevalence of nutritional anaemia biochemical estimation of haemoglobin levels of blood was carried out. WHO (1979) defined nutritional anaemia as a condition in which the haemoglobin content of the blood is lower than the normal as a result of a deficiency of one or more essential nutrients. Biochemical estimation of blood showed that about 56.67 per cent of the labourers were with lower haemoglobin levels. This finding was in accordance with the finding of Udaya (1996) who reported that majority of the farm women in Thrissur District were with lower haemoglobin levels. Lower intake of iron rich foods (green leafy vegetables, liver, egg yolk) and rich source of folic acid and B_{12} may be the reason for the deficient haemoglobin status of blood.

The one day food weighment survey revealed the low food intake of pulses, green leafy vegetables, fruit, milk, meat, fish, egg, oils and fats, sugars and roots and tubers. Cereal intake was more than the recommended amounts where as the intake of other vegetables was as per the RDA.. Even though green leafy vegetables are inexpensive source of many nutrients essential for growth and maintenance of normal health (ICMR, 1987) deficient intake was observed among the sub sample. Rao, *et al.* (1976), Pushpamma *et al.* (1982) and the surveys conducted by NNMB (1989)

also reported about the deficient intake of pulses and green leafy vegetables among the rural Indian house holds. Shyna (1996) also reported similar findings

In accordance to the results of this study Seshadrinath (1993) reported that the diets of male and female agricultural labourers were deficient in all food item recommended for a balanced diet. Agarwal (1980) also reported that the food consumption of rural population was lower than the minimum requirements of physical sustenance of healthy living. Usha *et al.* (1990) reported a low intake of all food groups except roots and tubers among the farm families. Similar findings were also reported by Jayanthakumari (1993) who reported that the intake of green leafy vegetables, flesh foods and egg were very low and the intake of pulses was low. But in contrast to the findings of this study she also reported that the intakes of other vegetables, milk and milk products, fruits and oils and fats were in higher amounts. This study revealed that the intakes of fat, protein, calories, calcium, iron, retinol and riboflavin were lower than the RDA. The intake of thiamine and vitamin C were as per the RDA.. While the intake of nicotinic acid was higher than the RDA. Similar to these findings Aujila *et al.* (1983), Wadker *et al.* (1988), Pinstrup-Anderson and Jaramillo (1991) and ICMR (1994) reported about a reduced energy intake among the households of Southern and Northern India. The deficient intake of iron, vitamin A and vitamin B_2 were also observed in the diets of female agricultural labourers of Trivandrum District (Cherian, 1992). Similar findings were also reported by Seshadrinath (1993) who observed the deficiencies of protein, fats, calcium, iron, niacin and carotene in higher amounts among adult females when compared to adult males. Deficient intake of vitamin especially vitamin A through Indian home diets

was also reported by many findings (Aujila *et al.* (1983), Bhat and Dahiya (1985), Kaur and Sood (1988) and Agarwal (1991).

5.4 Energy expenditure pattern of women agricultural labourers

The energy expenditure pattern studies revealed that all the energy intake values showed negative differences with energy expenditure. Cherian (1992) also reported similar finding among the agricultural labourer families of Trivandrum District.

5.5 Knowledge, attitude and practice of women agricultural labourers

Knowledge attitude and practice regarding health and nutrition among the women agricultural labourers indicated that the mean knowledge score (6.03/10) was satisfactory to some extent and attitude score (22.77/50)was also satisfactory to some extent. While the mean practice score (3.04/10) obtained by the women was a poor one.

Summary

SUMMARY

The present study was carried out among the women agricultural labourers of Ollukkara Block, Thrissur District. The sample for the study was selected from three panchayats of Ollukkara Block where there was maximum agricultural operations. The selected panchayats were Madakkathara, Ollukkara and Panancheri. One ward from each panchayat was randomly selected. From each ward 50 women agricultural labourers within the age group 18 to 45 years were randomly selected and thus comprised a sample of 150 women agricultural labourers. For detailed study 10 women agricultural labourers were randomly selected from each ward and thus subsample comprised of 30 women agricultural labourers.

The study was done with the following objectives

1. To assess the socio economic status of the agricultural labourer families.
2. To assess the food consumption pattern of the agricultural labourer families.
3. To assess the nutritional status of the women agricultural labourers.

The major findings of the study is summarised as follows

1. Socio economic status

The study showed that majority of the families were nuclear type with patriarchal family system. The literacy level indicated that there was only 8.93 per cent of males and 13.49 per cent of females with illiteracy.

The family size revealed that majority of the families were with 4 to 6 members. Regarding the income distribution pattern, 92 percent of the families were with income within the range of Rs.1001 to 2500. About 45.35 per cent of the labourer families owned less than 5 cents of land and 27.30 per cent owned 5 to 10 cents. About 46.03 per cent of them owned the land through purchasing.

The crop cultivation details indicated that only a small per cent of the families cultivated various types of crops and out of them only a few received income from it. Similar trend was observed in the domestication of animals also. The kitchen garden details indicated that only 10 per cent of the families had kitchen garden and the produce got from it was completely used at the home itself.

Use and source of loans indicated that about 47.33 per cent of the families had taken loans from different sources like co-operative society, provident fund, bank, housing board and IRDP. Loans were taken for house construction, marriage, debt repayment, buying domestic animals, business, education of children etc.

Regarding monthly income expenditure pattern, majority of the families spent maximum proportion of their income on food items. The expenditure on clothing, shelter, transport, electricity, education, recreation and luxury and personal items were low. The fuel and health expenditures were within the range of 0 to 10 and 0 to 15 per cent respectively. Majority of the families (75.33 %) saved upto 5 per cent of their monthly income followed by 5 to 10 per cent (22.67 %).

All the families owned a house and most of them were mud built. Majority (59.33 %) of the houses were tiled and 25.34 per cent was thatched. Most of the houses had 3 to 5 rooms. Majority of them were with separate kitchen. Majority of the families had drinking water facilities, lavatory facilities, electricity, recreational aids etc. The use and source of fuels indicated that majority of the families used wood as fuel.

Health care facilities revealed that majority of the labourer families depended on Primary Health Centre (PHC) for the treatment of diseases. Ayurvedic medicines

and homeopathic medicines were also used. Some of them depended on private hospitals.

Most of the labourers got general information through friends, neighbours, family members, relatives, radio, television, newspapers, magazines, booklets, cinema etc.

Most of the labourers spent 8 to 10 hours in a day for working in the field and about 74.67 per cent spent 3 to 5 hours for doing the household activities.

2. Food consumption pattern

All the families surveyed were non vegetarians. Majority of the families spent 45 to 55 per cent of their food expenditure for cereals, 5 to 10 per cent for pulses, 10 to 15 per cent for roots and tubers, green leafy vegetables and other vegetables, 0 to 5 per cent for oils and fats, 5 to 10 per cent for sugars, 0 to 5 per cent for fruits, 0 to 5 per cent for meat and 5 to 10 per cent for fish. Majority of the families spent no amount for milk and milk products (63.34 %) and egg (52.66 %).

Cereals, other vegetables, oils and fats, spices and condiments and sugar were the most frequently used food items. Pulses, roots and tubers and fish were medium frequently used and green leafy vegetables, milk and milk products, egg, meat and fruits were the less frequently used food items.

The diet during different stages indicated that all the schoolers, adolescents and aged people consumed ordinary diets without any special inclusions. Majority of the pre schoolers (62 %) pregnant (80.67 %) and lactating women (86.67 %) also consumed ordinary diets.

Food items were washed two times before cooking by majority of the families (59.33 %) and only 19.34 per cent washed it three times and more than three times. Green leafy vegetables and other vegetables were washed both before and after cutting by 55.33 per cent and 84 per cent washed the roots and tubers after cutting.

Boiling was the commonly practised cooking method with variation of it like boiling with straining, boiling and absorption and boiling and absorption with shallow fat frying.

Clay vessels (58.92 %), aluminium vessels (29.17 %) and steel vessels (8.33 %) were the commonly used cooking vessels.

Majority of the families (62.67 %) consumed three meals a day while the rest (37.33 %) had two meals daily. Majority of the families (76 %) planed the meals in advance and most of them planned it according to the availability of food stuffs and money. Most of the families (84 %) did not keep specific home schedule for meal intake.

The food distribution pattern indicated that most (78.67%) of families gave equal importance to all the family members in food distribution. Most of the families (88.67%) did not have the habit of eating raw vegetables and 92.67 per cent was ignorant about its importance. Almost all the families reused the left over foods and majority of them (65.33%) showed the habit of drinking water without boiling.

Diet modification during the disease conditions was observed. Kanji during fever, kanji water, tender coconut water, boiled and cooled water during diarrhoea, salt free foods during hyper tension, sugar free diets during diabetes etc. were the modifications.

The use of preserved food items indicated that 30 per cent of the families bought preserved food items like pickles, jam and squash from out side. About 18 per cent of the families prepared preserved food items like pickles in the home. The use of cereal flours indicated that 74 per cent of the families had the habit of making it at home and out of them 43.24 per cent prepared it only on special occasions.

3. Infant feeding practices

Majority of the mothers had the habit of providing breast milk to the infant soon after birth. Even if the mothers provided colostrum to their infants they were not known about the nutritional benefit of it. Majority of the mothers (79.33%) breast fed their infants for a period of 1 to 3 years.

The weaning practices indicated that majority of the mothers started weaning of the infant between the age of 2 and 5 months. The most commonly given weaning foods were banana(72.67 %), suji (47.33 %) and ragi (27.33 %).

4. Nutritional status

Anthropometric measurements indicated that the mean body weight (46.71 kg) was significantly lower than the standard weight suggested by ICMR (1989) and the mean height was 151.60 cm. Body Mass Indices (BMI) showed that about 50.67 per cent of the labourers were with normal BMI. There was 25.33 per cent women with low weight and normal BMI. Grade I and Grade II Chronic Energy Deficiencies (CED) were observed among 18 per cent and 3.33 per cent

respectively. Clinical examinations showed that mild (36.67 %) and severe (26.66 %) dental caries were the most prominent clinical deficiency symptoms. Symptoms of early cataract was also observed (6.67 %). There were about 56.67 per cent of women with low haemoglobin levels (10 to 11.9 g/100ml) and 3.33 per cent exhibited deficient (< 10 g/100ml) haemoglobin status.

Individual food weighment survey indicated that the mean intake of pulses, green leafy vegetables, fruits, milk, fish, egg, fats and oils, sugar and roots and tubers were lower than the RDA. The cereal intake was more than the RDA. The comparison of mean nutrient intake with the RDA indicated that the intake of fat, protein, calories, calcium, iron, retinol and riboflavin were lower than the RDA while nicotinic acid intake was more than the RDA.

5. Energy expenditure pattern

Daily energy expenditure pattern of the labourers indicated that all of them showed negative energy balance when compared the daily energy intake with daily energy expenditure.

6. Knowledge, Attitude and Practice (KAP)

Knowledge, Attitude and Practice (KAP) survey related to health and nutrition aspects indicated that the mean score of knowledge (6.03) and attitude (22.77) tests were satisfactory to some extent, while the mean practice score (3.00) was not a satisfactory one.

Conclusion

Most of the families were nuclear type with patriarchal family system. The family size ranged from 4 to 6 and majority of the families had monthly income within the range of 1001 to 2500. All the families spent maximum percent of their monthly income on food. All the families owned a house and most of the houses were mud built and tiled. Most of the women spent 8 to 10 hours in the field and 3 to 5 hours for household works.

All the families were non vegetarians. Cereals, other vegetables, oils and fats, spices and condiments and sugars were the most frequently used food items. Pulses, roots and tubers and fish were the medium frequently used food items. Milk and milk products, green leafy vegetables, egg, meat and fruits were less frequently used food items. Boiling was the commonly practised cooking method. Three meal pattern was more common.

Normal BMI values were observed among more than half of the sample. Low weight with normal BMI and Grade I Chronic Energy Deficiency were also observed. Dental caries were the most prominent clinical deficiency symptom and low haemoglobin status was commonly observed. All the labourers showed negative energy balance when compared the daily energy intake with daily energy expenditure. Knowledge, Attitude and Practice (KAP) regarding health and nutrition indicated that mean knowledge and attitude scores were satisfactory while the mean practice score was a poor indicator.

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Appendices

APPENDIX I

Interview schedule for knowledge test

			P value	E 1/3 value
1	*Are green leafy vegetalesgood in vitamin A when compared to milk ?	Yes / No	80	0.417
2	*Whether amla or apple is good source of vitamin C ?	Amla / Apple	76.67	0.5
3	*Does sprouting improve the quality of pulses ?	Yes / No	80	0.583
4	Vegetables should be washed before cutting	True / False	60	0.33
5	Are animal foods the only sources of protein ? If not, what is the protein rich plant food ?	Yes / No	63.3	0.33
6	*The red colour of beetroot helps in the production of blood.	True / False	70	0.417
7	Eggs can be consumed in large number without any restriction	True / False	56.67	0.25
8	*Gurva is very low in vitamin C when compared to apple, grapes etc.	True / False	76.67	0.5
9	Is breast milk better than cow's milk?	Yes / No	63.33	0.33
10	*First milk is not good for the infant	True / False	83.33	0.66
11	Are commercial weaning foods better than home made weaning foods ?	Yes / No	56.67	0.25
12	Should water boil before drinking?	Yes / No	63.33	0.33
13	Proper birth spacing is good for mother's health	True / False	66.67	0.167
14	Which vitamins is essential for vision?		50	0.33
15	Which mineral causes anaemia ?		46.67	0.083
16	Costly foods are better than cheap locally available foods	True / False	50	0.33

17	Worm trouble can be prevented if the nails are kept clean and short	True / False	43.33	0.416
18	Papaya is not good for pregnant ladies	True / False	40	0.167
19	* Raw egg is better than boiled egg	True / False	76.67	0.75
20	What is an important source of vitamin D?		30	0.167
21	*The height and weight of the children are indicators of their nutritional status.	True / False	86.67	0.67
22	Supplementary foods can be prepared at home using cereals and pulses	True / False	50	0.33
23	*Sugar and ---- are added to water and is given to a child with diarrhoeas		73.33	0.583
24	Tetanus toxoid injection should not be giiven to pregnant ladieis	True / False	30	0.083
25	*Should a child continue to breast feed even during illness like diarrhoea?	Yes / No	80	0.83
26	Curry leaves contain no nutrients	True / False	40	0.167
27	Low intake of nutritious foods in pregnant ladies affect the health of the baby	True / False	50	0.33
28	Prolonged breast feeding will affect the health of the mother	True / False	33.3	0.083
29	Deficiency of which mineral causes goitre?		26.67	0
30	Which mineral is rich in Jaggery?		30	0

* Questions finally selected for knowledge test

APPENDIX II

Interview schedule for attitude test

Against each question write any one of the following options:

Strongly agree (SA) / Agree(A) Undecided (UD) / Disagree (D) / Strongly disagree (SD)

		t value
1	Boiling of the drinking water kills the germs which cause diseases	1.034
2	Males should be given greater importance in food distribution	1.54
3	Milk should be given daily to infants	1.37
4	*Sugar and oils are rich sources of vitamins and minerals	3.32
5	*Green leafy vegetables are good sources of vitamins and minerals	3.58
6	Food and water kept at unhygienic conditions lead to diarrhoea	1.89
7	*Absorption method of cooking rice is good to retain nutrients	3.88
8	Protein is essential for growth. So grown ups do not require protein	1.265
9	Immunisation is not necessary for children	1.61
10	Raw vegetables are good sources of vitamins when compared to cooked vegetables	1.86
11	*Drumstick leaf is not as good as bittergourd as a vitamin A source	2.82
12	*Calcium is essential for the formation of bones and teeth	2.38
13	Iron rich foods are necessary for blood formation	1.51
14	Fruit juices supplement vitamin C in the weaning food	1.19
15	*Germination of pulses improve its nutritive value	3.2
16	*Parboiled rice is better than raw rice	3.78
17	Cleanliness in the house and surroundings keep away many diseases	1.312
18	Vegetables and fruits are rich sources of proteins	0.99

19	Deworming is necessary for the child	1.09
20	*Commercial weaning foods are more nutritious than home made weaning foods	3.92
21	Animal foods are rich in vitamin C when compared to green leafy vegetables	1.83
22	*During diarrhoea breast feeding should be stopped	3.5
23	*Amla is not as nutritious as fruits like grapes, oranges etc.	2.37
24	Iron rich foods are necessary for vision	1.09
25	Guava is a poor source of vitamin C	1.99
26	Repeated pregnancies will affect health of mother	1.23
27	BCG Vaccination is a preventive measure against T.B.	0.886
28	Meat and fish are giving more energy when compared to rice	1.934
29	Prolonged cooking destroys the nutrients of the food	1.632
30	DPT Vaccination is given for preventing Diphtheria, Polio and Tetanus	1.03

* Questions finally selected for attitude test

APPENDIX III

Interview schedule for practice test

1. Do you use green leafy vegetables more frequently in the dietary pattern ? Yes / No
2. Do you use fruits in the dietary pattern? Yes / No
3. Do you use boiled water for drinking ? Yes /No
4. Do you keep house and surroundings always tidy ? Yes / No
5. Do you ever consume raw vegetables through your diets ? Yes / No
6. Do you regularly include protein rich foods like egg, milk, fish etc. in the diets of growing children ? Yes / No
7. Do you adopt absorption method for cooking rice? Yes / No
8. Do you include germinated pulse items in your diet? Yes / No
9. Do you include more nutritious foods in the diet of pregnant and lactating women? Yes / No
10. Do you wash vegetables before cutting ? Yes / No

APPENDIX IV

Interview Schedule to collect information on socio-economic status of selected families

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

4. Place of survey :
5. Panchayat :
6. Block :
7. Religion :
8. Caste :
9. Type of family :
10. Family system : Matriarchal / Patriarchal
11. Details regarding family members

Distribution of family members	Age	Educational level	Occupation	Marital status
1				
2				
3				
4				

12. Source of income of family
    a) Government job
    b) Private job
    c) Coolie
13. Side business
    a) Agricutlture
    b) Poultry
    c) Others : specify
14. Total income of family

15. Do you own land

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)

16. Details regarding the cultivation of crops

Sl. No.	Name of crop	Area cultivated	Total produce per year	Quantitiy used at home	Quantity sold	Income
1						
2						
3						
4						

17. Do you have any domestic animals? : Yes / No

If Yes, details regarding domestic animals

		Source of domestic animals			
Domestic animals	How many	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

---

18. Details of produce from domesitc animals

Sl. No.	Name of product	Quantity produced per year	Use of produce			Income
			By family	Gift	Sale	
1.						
2.						
3.						
4.						

19. Do you have a kitchen garden ? : Yes / No

If Yes, specify

Items of cultivation and use of produce

Item	Use of produce		
	By family	Gift	Sale
1			
2			
3			
4			

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

If Yes, specify

Sl. No.	Source of debt	Amount of debt	Purpose
1			
2			
3			
4			

21. 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		

22. Details of housing conditions

i) Type of house

a) Own house / Rented house

b) Mud built / Brick built

c) Thatched / Tiled / Terraced

d) Single storeyed / Double storeyed

e) No. of rooms : 1 / 2 / 3 / 4 / 5 / more

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

23. Details regarding use of fuels

i) Type of fuel

a) Wood

b) Agricultural waste

c) Cow dung

d) Saw dust

e) Kerosene

f) Others

ii) Source of fuel

a)Collected from surroundings

b)Purchased

24. When any body is ill do you make use of health centre ? : Yes / No

If Yes, specify

a) Primary Health Centre

b) Private Hospital

c) Medical College

d) Maternal and Child Health Centre

e) Ayurvedic

f) Homeopathic

g) Others

25. Epidemics prevalent in the locality in the past one year

i) a) Measles

b) Chicken pox

c) Whooping cough

d) Typhoid

e) Others

ii) Was any member of the family affected ? : Yes / No

If Yes, specify: Name of disease

26. General information source

i) General : Friends / Neighbours / Family members / Relatives

ii) Media : News paper / Magazine / Book lets / Television / Radio / Meetings Cinema / Exhibition

iii) Official : Agricultural Officer / Block Development Officer / Bank Officer / Village Extension Officer / Panchayat members

27. Details of time expenditure pattern

a) Number of working hours per day :

b) Hours spent for house hold activities :

c) Sleeping time

1. Wakes up at :
2. Goes bed at :

APPENDIX V

Interview Schedule to collect information on food consumption pattern of selected families

1. Name of the respondent

2. Name of the head of the family

3. Address

4. Place of survey

5. Panchyat

6. Block

7. Food habit : Vegetarian / Non vegetarian

8. Details of food expenditure

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

9. Details of frequency of use of vaious food items

Sl. No.	Food items	Frequency of use in a week						
		Daily	Thrice	Twice	Once	Monthly	Occasionally	Never
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.	Sugar							
10	Milk and milk products							
11	Meat							
12	Fish							
13	Egg							

10. Diet during different stages of life

Sl. No.	Condition	Foods given	Foods avoided	Reasons
1	Infancy			
2	Pre school age			
3	School age			
4	Adolescence			
5	Pregnancy			
6	Lactation			
7	Old age			

11. Diets during special occasion

Sl. No.	Occasion	Foods prepared	Reasons
1			
2			
3			
4			

12. Frequency of washing of food items (dry and perishable)

Once / Twice / Thrice / More than thrice / Until water is clear

13. Mode of washing of perishable food items

Sl. No.	Food items	Washing before cutting	Washing after cutting
1	Vegetables		
2	Roots and tubers		
3	Fruits		
4	Meat fish		

14. Cooking methods followed for various food items

Sl. No	Food items	Boiling	Straining	Absorption	Steaming	Frying		Others
						Deep fat	Shallow fat	
1	Cereals							
2	Pulses							
3	Vegetables							
4	Roots and tubers							
5	Fruits							
6	Meat							
7	Fish							
8	Egg							
9	Milk							

15. Cooking vessels used for various food items

Sl. No.	Food items	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. Details about frequency of meals per day

One / Two / Three / More than three

17. Details about meal planning

Do you plan your meals in advance? Yes / No

If Yes, what is the basis of planning?

a) Total family requirement

b) Food stuffs available

c) Money available

18. Do you give equal importance to all family members in food distribution?

Yes / No

If Yes, what is the order of importance ?

Order	Reasons
1	
2	
3	

19. Details of consumption of raw food items

i) Do you consume any raw food items? Yes / No

If Yes, specify

ii) Do you find any advantage or disadvantage of eating raw food? Yes / No

If Yes, specify

20. Do you use left over food items ? Yes / No

If Yes, specify

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

22. Do you use specific time schedule for meal in take? Yes / No

If not, what is the basis of intake of meals

a) Take food when hunger occurs

b) Take food according to convenience

23. Details about diet during diseases

Sl. No.	Disease	Foods given	Reasons	Foods avoided	Reasons
1	Fever				
2	Diarrohoea				
3	Measles				
4	Chicken pox				
5	Whooping cough				
6	Hyper tension				
7	Diabeties				
8	Others				

24. Details about food preservation

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

ii) Preservation of food items

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

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

If Yes, specify

25. Details of storage of food items

i) Do you store any food items in your home ? Yes / No

If Yes, specify

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

ii) Do you employ any specific treatment before storing of food items ? Yes / no

If Yes, specify

Details about infant feeding practices

26. i) When do you start breast feeding the infant ?

a) First day – Soon after birth / After 6 hours / After 7-12 hours / After 12 hours
b) Second day
c) Third day
d) After third day

ii) Give reasons

27. Do you give colostrum to your baby? Yes / No
If Yes, what is the importance of it ?

28. What is the first food item given to baby ? When is it given ? Give reasons.

29. How long you breast feed the infant?

Less than 6 months / 1 year / 1 – 2 years / more than 2 years

30. What is the interval between breast feeding ?

Every 2 hours / when ever possible / on demand feeds

31. i) What is the age of weaning of the infant ?

ii) What are the foods given during weaning ?

Sl. No.	Weaning foods	Quantity
1		
2		
3		

iii) Do you keep specific time schedule for infant feeding ? Yes / No

If not, what is the basis of feeding ?

a) On demand feeding
b) When ever possible
c) Others

APPENDIX VI

Schedule For Clinical Assessment

(N.A.C.I.C.M.R.)

1. Sex :
2. Age :
3. Height :
4. Weight :
5. General appearance
    0. Good
    1. Fair
    2. Poor
    3. Very poor
6. Eyes
    a) Conjunctiva
        i) Xerosis
            0. Absent, glistening and moist
            1. Slightly dry on exposure for a minute, lack of lustre
            2. Conjunctiva dry and wrinkled
            3. Conjunctiva very dry and Bitot's spot present
        ii) Pigmentation
            0. Normal colour
            1. Slight discolouration
            2. Moderate browning in patches
            3. Severe earthy discolouration
        iii) Discharge
            0. Absent
            1. Watery, excessive, lachrymation
            2. Mucopurulent
            3. Purulent
    b) Cornea
        i) Xerosis
            0. Absent
            1. Slight dryness and diminished sensibility

2. Haziness and diminished transparency
3. Ulceration

ii) Vascularization
0. Absent
1. Circumcorneal infection
2. Vascularization of cornea

c) Lids
i) Excoriation
0. Absent
1. Slight excoriation
2. Blepharitis

ii) Foliculosis
0. Absent
1. A few granules
2. Lids covered with extensive granules
3. Hypertrophy

iii) Angular conjunctivitis
0. Absent
1. Present

d) Functional
i) Night blindness
0. Absent
1. Present

NB: Exclude other eye diseases not associated with nutritional defects

7. Mouth

a) Lips
i) Condition
0. Normal
1. Angular stomatitis, mild.
2. Angular stomatitis, marked.

b) Tongue
i) Colour
0. Normal

1. Pale but coated
2. Red
3. Red and raw

ii) Surface

0. Normal
1. Fissured
2. Ulcered
3. Glazed and atrophic

c) Buccal mucosa

i) Condition

0. Normal
1. Bleeding and/or gingivitis
2. Pyorrhoea
3. Retracted

d) Gums

i) Condition

0. Normal

e) Teeth

i) Fluorosis

0. Absent
1. Chalky teeth
2. Pitting of teeth
3. Mottled and discoloured teeth

ii) Carries

0. Absent
1. Slight
2. Marked

8. Hair

i) Condition

0. Normal
1. Loss of lustre
2. Discoloured and dry
3. Sparse and brittle

9. Skin

a) General

i) Appearance

0. Normal
1. Loss of lustre
2. Dry and rough or crazy pavements
3. Hyperkeratosis, phrynoderma

ii) Elasticity

0. Normal
1. Diminished
2. Wrinkled skin

b) Regional

i) Trunk

0. Normal
1. Collar-like pigmentation and dermatitis around the neck
2. Moon face

ii) Face

0. Normal
1. Nasolabial seborrhoea
2. Symmetrical suborbit pigmentation
3. Moon face

iii) Perineum

0. Normal
1. Scrotal or pudendal dermatitis

iv) Extremities

0. Normal
1. Symmetrical dermatitis with pigmentation of glove or stocking type

10. Adipose tissue (to be judged by the examination of the arm over the biceps)

i) Quantity

0. Normal
1. Deficient

11. Oedema

i) Distribution

0. Absent

1. Oedema on dependent parts
2. Oedema on face and dependent parts
3. General anasarca

12. Bones

i) Condition

0. Normal
1. Stigmata of past rickets

13. Heart

i) Size

0. Normal
1. Apex outside the nippleline
2. Enlarged

14 Alimentary system

i) Appetite

0. Normal
1. Anorexia

ii) Stools

0. Normal evacuation
1. Diarrhoea

iii) Lever

0. Not palpable
1. Palpable

iv) Spleen

0. Not palpable
1. Palpable

15. Nervous system

i) Calf tenderness

0. Absent
1. Present

ii) Paresis

0. Absent
1. Present

APPENDIX VII

Procedure adopted for bio-chemical estimation of haemoglobin
(Cyanmethaemoglobin method)

Principle

Haemoglobin is converted into cyanmethaemoglobin by the addition of KCN and ferricyanide. The colour of cyanmethaemoglobin is read in a photoelectric colorimeter at 540 nm against a standard solution. Since cyanides has the maximum affinity for haemoglobin, this method estimates the total haemoglobin.

Reagent

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

Procedure

20 ml of blood is transferred with the help of a haemoglobin pipette and delivered on to a Whatman No.1 filter paper disc. The filter paper is air dried, labeled and can be stored upto one week. The portion of filter paper containing the blood is cut and dipped in 5 ml of Drabkin's solution taken in a test tube. Wait for 30 minutes and mix the contents in the tubes, take the reading in a photoelectric colorimeter. The reagent blank (Drabkin's diluent) is adjusted to zero.

Construction of standard curve

If the blood drawn from the subject contains haemoglobin 15 g / dl after estimation then the three reference standards prepared are as follows:

1.Referencnne standard A

4 ml of blood in 1000 ml Drabkin's reagent contains haemoglobin 15 g / dl.

2. Referencne standard B

300 ml of reference standard A+200 ml Drabkin's reagent contains haemoglobin concentration of 10 g / dl.

3. Reference standard C

200 ml of reference standard A+300 ml Drabkin's reagent contains haemoglobin concentration of 7.5 g / dl.

Thus we have three reference standards at three levels of haemoglobin concentration. Use 5 ml from each standard whenever haemoglobin estimations are done.

APPENDIX VIII

Schedule for individual food consumption survey
(One day weighment method)

1 Name of the respondent

2. Age of the respondent

3. Name of the head of the family

4. Address

5. Place of survey

6. Panchayat

7. Block

8. Details of food consumption

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

APPENDIX IX

The formula for the calculation of food frequency scores as suggested by Reaburn *et al.* (1979)

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

S_n = Scale of rating

R_n=Percentage of respondents selecting a rating

n= Maximum scale of rating

FOOD CONSUMPTION PATTERN AND NUTRITIONAL STATUS OF WOMEN AGRICULTURAL LABOURERS OF OLLUKKARA BLOCK, THRISSUR DISTRICT

By

M. E. SMITHA

ABSTRACT OF THE THESIS

Submitted in partial fulfilment of the requirement for the degree

Master of Science in Home Science

(FOOD SCIENCE AND NUTRITION)

Faculty of Agriculture

Kerala Agricultural University

DEPARTMENT OF HOMESCIENCE

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1999

ABSTRACT

The present study on "Food consumption pattern and nutritional status of women agricultural labourers of Ollukkara Block, Thrissur District" was carried out to asses the socio economic status, food consumption pattern and nutritional status of women agricultural labourers within the age group of 18 to 45 years. The study was carried out in 3 panchayats of Ollukkara Block where there was maximum agricultural operations. The selected panchayats were Madakkathara, Ollukkara and Panancheri. From each panchayat one ward was randomly selected. Women agricultural labourers within the age group of 18 to 45 years were randomly selected from the selected wards. The findings of the present study are given as follows

Majority of the labourer families surveyed were nuclear type with patriarchal family system. Less than 30 age group was more common and their literacy rate was satisfactory to some extent. The family size ranged between 4 to 6 and majority of the income levels were with in Rs. 1001 to 2500. Land possession was meagre and majority of the labourer families owned the land through purchase and some of them inherited the land from parents.

Maximum proportion of income was spent on food items and small per cent of their income was saved by majority of the families.

All the families owned a house and most of them were mud built and tiled. The houses were occupied with separate kitchen and 3 to 5 rooms were present in most of them. Drinking water, lavatory and electrical facilities were satisfactory. Most of the families used wood as fuel and some of them used saw dust and kerosene

also. Expenditure for fuel purchase was significant even if fuels were collected from surroundings.

As a medical aid majority of the families depended on Primary Health Centres (PHC). Some families spent significant portion of their income for medical services. The attainment of general information through various media was satisfactory to some extent. Most of the women worked for 8 to 10 hours in the field and 3 to 5 hours in the home.

All the families surveyed were non vegetarians. Maximum of the food expenditure was for cereals followed by roots and tubers, other vegetables, pulses, fish, sugar, oils and fats etc. Frequency score of 100 was got for cereals, other vegetables, oils and fats, spices and condiments and sugars. Medium frequently used foods were comprised of pulses, roots and tubers and fish. Milk and milk products, green leafy vegetables, egg, meat and fruits were included in the list of less frequently used food items.

All the schoolers, adolescents and old people and majority of the pre schoolers, pregnant and lactating women consumed ordinary home diets without any special inclusion of nutritious foods.

Before cooking, the food items were washed only two times by majority and a minor group washed it three or more times. Boiling was the commonly practised cooking method for various food items. Three meal pattern was more common and based on the accessibility of food stuffs and money most of them planned the meals. Equal importance to all the family members in food distribution was observed.

Consumption of raw vegetables was meagre and majority of the families reused the left over foods. Practice of drinking water without boiling was more common.

Diet modification during disease conditions were observed. Kanji (rice gruel), kanji water, tender coconut water, fat free pappads etc. were the modifications for different types of diseases.

The mothers had started breast feeding of the baby soon after birth and they continued it for 1 to 3 years. Weaning between the age of 2 to 5 months was more common and the weaning foods included were banana, suji, ragi etc.

The mean body weight of the sample was lower than the standard body weight suggested by ICMR (1989) and the observed mean height was 151.6 cm. Normal BMI values were observed among more than half of the sample. Low weight with normal BMI and Grade I Chronic Energy Deficiency (CED) were also observed among some women. Mild and severe dental caries were the most prominent clinical deficiency symptom. Low haemoglobin status was more common.

The deficient intake of fruits, egg, green leafy vegetables, milk and milk products and all the other food items except cereals and other vegetables were observed. The deficient intake of fat, protein, calories, calcium, iron, retinol and riboflavin were observed and only the intake of nicotinic acid and thiamine were adequate.

All the labourers showed negative energy balance when compared the daily energy intake with the daily energy expenditure.

Knowledge and attitude regarding health and nutrition was satisfactory to some extent, while the practice score was a poor indicator.