NUTRITIONAL PROFILE OF KANIKKAR WOMEN IN AMBOORI AREA

BY

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DECLARATION

I hereby declare that this thesis entitled "Nutritional profile of Kanikkar women in Amboori Area" is a bonafied record of research and that the thesis has not formed the basis for the award to me of any degree, diploma, associateship, fellowship or other similar title of any other University or Society.

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CERTIFICATE

Certified that this thesis entitled "Nutritional profile of Kanikkar women in Amboori Area" is a record of research work done independently by Kum. Felsy Thomas under my guidance and supervision and that it has not previously formed the basis for the award of any degree, diploma, fellowship or associateship to her.

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INTRODUCTION

INTRODUCTION

Tribes constitute a group isolated from the general population, with their own physical, socio-economic and cultural environment (Swaminathan, 1982). They cover the widest range of variation in terms of race, religion and language as well as economic and political organisation (Beteille, 1980). The tribal people have remained primitive and underdeveloped technologically and economically because of their secluded habitat despite rapid progress and development in the country (Rao et al., 1983). The tribal economy is based on forests and lands (Sharma and Prasad, 1982). Chitre et al. (1983) has pointed out that due to extreme poverty the intake of various essential constituents of food is inadequate among the tribal people.

The tribal people can be broadly divided as belonging to one of the three principal territorial regions, namely North Eastern, Central or Southern region or to the small zone constituted by the Islands of Andaman and Nicobar (Rao et al., 1983).

Important tribes of India are the Gurang, Lepcha, Aka, Dafla, Abor-Miri, Mishmi, Mikir, Garo, Khasi and Naga group inhabiting the North Eastern zone which spreads over Sub-Himalayan region and the mountainous areas east of the

Testa Valley and the Jamuna-Padma portion of the River Brahmaputra, Tribes like Santhals, Munda, Oraon, Ho, Savara, Baiga, Bhil and Gonds etc. who inhabit the Central region formed by the plateaus and mountainous belts between the Indo-gangetic basin to the Krishna river in the South and the Todas, Urali, Kanikkar, Chenchus etc. inhabiting the Southern region consisting of the Peninsular India falling South of Krishna River and the Nicobarese, Onges, Jarwas and North Sentinelese inhabiting the islands of Andaman and Nicobar.

According to the 1981 census the Scheduled Tribe population in Kerala constitute about 1.03 per cent of the total population of the State (Vijayanunni, 1981). There are 38 tribal communities in Kerala. As in every other State in India, the tribals in Kerala also form a weaker section of the community, subjected to various types of exploitation for generations and their life is characterized by servitude, poverty and misery.

In recent years, there has been increased emphasis on the development of tribal areas with a focus on development of tribal communities (Ali, 1987). He has also reported that systematic studies of the health and nutritional status of different tribal groups have become necessary so that development inputs can be effectively utilised.

In tribal development, nutrition plays an important role. While some information is available on tribal diets, detailed information on food habits, nutrient content of their food, their nutritional problems and nutritional awareness in general have not been extensively studied.

Very few systematic studies are reported with focus on the tribal women population in our state. The present study is intended to evaluate the nutritional status of the Kanikkar women with the following objectives.

1. To assess the food consumption pattern and dietary habits of Kanikkar women.

2. To assess the health status of Kanikkar women through suitable anthropometric, clinical and biochemical tests.

3. To identify the nutritional problems prevalent among Kanikkar women.

4. To assess factors contributing to low nutritional status of Kanikkar women for corrective action.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

Chattopadhyay (1978) has defined a tribe as a social group, usually with a definite area, dialect, cultural homogeneity and unifying social organization. She has also reported that the families or small communities making up the tribe are linked through economic, religious, family or blood ties. According to 1981 census, tribal people constitute 7.53 per cent of the total Indian population. Rao et al. (1983) has reviewed that there are more than 400 Tribal communities in India and that they differ from each other in their social organization. A socio-economic survey of tribals in Kerala by the State Bureau of Economics and Statistics during 1976-78 has revealed that 80 per cent of the tribal population are below the poverty line. The study also revealed that among the Tribal communities of the State, the Mala Aryans, Kanikkar, Kurichians, Ulladan and Uraly are comparatively advanced. (Bureau of Economic and Statistics Report 1978). Roy Burman (1978) has described in detail the productive and social forces operating within the nation and their bearings on tribal demography. Prema et al. (1982) has reported that tribals form about 1.2 per cent of the population of Kerala, they also reported that in Kerala about 60 per cent of the tribals are farm-labourers while 40 per cent are small farmers. Sixty eight

per cent of the tribal people people are illiterates. Shashi (1978) has reported that a tribal woman occupies an important place in the socio-economic structure of her society. He has also pointed out that a tribal woman plays a dominant role in the tribes of Eastern India like Garos and Khasis, while she faces manifold hardships among various tribes of Western Himalayas, particularly the Kinnera and Gaddis. Mathur (1977) has reported that women among the tribal communities of Kerala are considered to be economic assets, but their status is definitely inferior, for they are not considered equals, for all activities including social affairs. The indices of development applied among the tribes in the State with regard to education, health, medical care, income, employment, housing and recreation substantiate the fact that tribal people continue to be the most neglected and backward section of the society.

Bodley (1982) has reported that for the amalgamation of tribals and down trodden people agricultural technology and vital inputs in agriculture, vital monetary inputs as loan and educational facilities are being provided since 1950. However, Singh (1983) has reported that the administration of the tribal areas has undergone a large change during the last 30 years because of the launching of special programmes for bridging the socio-economic disparities between the tribal and non-tribal people. The entire pattern

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of tribal life is reported to be influenced by community development programme, development of transport, communication, trade and commerce, mass scale educational development, spread of modern techniques of production and use of modern inputs, special programmes sponsored and implemented for the upliftment of weaker sections, strong institutional build up and working of a few voluntary organizations (Shah, 1985). All (1987) has reported that the Central and State Governments are committing substantial resources for the all round development of tribals including improvement in their health and nutrition. Thakur (1986) reviewed that during the last three decades several schemes have been initiated for the upliftment of the scheduled tribes in India, which aim at providing additional employment and also a source to supplement their income. Pingle (1987) stressed the need for a systematic and integrated approach to tribal development programmes while Patil (1987) feels that through self-help programmes malnutrition can be combated and the dietary habits of the tribal families improved. Gupta and Rajput (1982) reviewed that the development programmes should be such that they do not disturb the harmony of tribal life and simultaneously work for its advance, they also reported that the thrust should be towards raising the socio-economic standard of individual tribal family within their community structure,

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ensuring social justice.

The main food item or staple of the tribes depend on their location. Rice, millets and roots and tubers are the staple food among most tribal communities. Pulses are not very common in the tribal areas (Gupta, 1982). According to Ali (1987) health and nutritional status of tribal populations has an important role to play in their development. He has also reported that the study of food habit pattern of tribals reveal a wide seasonal variation in food choice and intake. Sen Gupta and Biswas (1956) reported that the Kanikkar and Urali tribes of Travancore live mainly on tapioca, yam and other tubers. Urali tribes consume in addition to the above, cereals, fruits, fish and milk. Belavady et al. (1959) reported that the food habits of the Nilgiri hill tribes resemble in general to those observed in the low socio-economic groups of South India. Sen Gupta (1961) reviewed that the Indian Tribes of North East Frontier Areas, Tripura and Travancore did not consume milk. He has also reported that the Abor hill tribes consume Goitrogenic vegetables such as those of Brassica sp. in large quantity which has resulted in endemic goitre. Sen Gupta (1980) reported that the staple food of the Andamanese is rice, wheat and sea fish, while the Nicobarese in addition have plenty of ladap, a starchy food preparation from pandanus fruit. They also collect and eat a large

insect known locally as inkat, and also have plenty of roots and tubers, fruits and meat. The Shompens who live in the interior of the forests especially in Great Nicobar have only fresh water fish, honey, fruits like banana, papaya, insect larvae, crabs and the meat of pigs, crocodiles and monkeys. The Onges of Little Andaman Islands live entirely on forests and marine products. Roy (1976) reported that the staple diet of the Khonds in Koraput district of Orissa is rice and millet, among these tribes milk is not consumed even by infants. Sashi (1978) reviewed that the Lahulis of Himachal Pradesh have a very poor staple diet, and that the Lepchas of Sikkim consume beef though they follow Buddhism. He also reported that the Lepchas dry the meat of many species and preserve it for a whole year. As observed by Ali (1987) the principal food of the Lanjia Saora is gruel prepared out of rice, ragi or janha, but during the lean months they depend on roots and tubers and seeds of mango and tamarind. Pulses are eaten by them in winter and spring soon after they are harvested. Prema (1982) reported that the Kanikkars of Pottamavu in Trivandrum district in Kerala consume rice as the major cereal and it is supplemented by locally available roots and tubers. Pulses and vegetables are only occasionally consumed. Dave (1982) has observed that among the tribes of Bastar and Chattisgarh region of Madhya Pradesh eggs are allowed

to be eaten only by male children in a family. He has also reported that in Mandala and Chattisgarh districts, fish in combination with cereals provide a balanced diet to children and mothers.

Among the various methods of cooking, only boiling method is found to be popular among the tribals, probably due to the reason that this method is simpler and cheaper. Gupta (1982) has reported that all the tribal communities cook foods by boiling in earthen pots before consumption and only on very rare occasions they roast the flesh of animals on fire. He has also reported that the tribals generally boil vegetables, meat and other food articles with salt and chillies and other spices and oil are used only if available. Prema (1982) has reported that among the Kanikkars of Pottamavu in Trivandrum district in Kerala boiling food is the common method of cooking. She has also reported that about 31 per cent of the tribal families surveyed, are aware of the method of preserving food articles like mango and cassava as and when they are available in plenty. Naik (1972) has reviewed that Bhils of Madhya Pradesh prepare dhal namely Turdhal in the same way as Hindus but with very little spices and oils. Yadav (1982) has observed that the food preparations of the Adivasis of Madhya Pradesh generally include pejgruel prepared by boiling dehusked rice.

Shashi (1978) has reported that the Lahulis of Himachal Pradesh cook chaff grinded flour, prepare tea without sugar and sometimes mix salt in tea before drinking it. Most tribals are reported to be consuming even pig meat after boiling it with rice or they sun dry the meat (Dave, 1982).

Ommen and Corden (1970) has encountered a tribal group in the New Guineas who are found to have certain nitrogen fixing flora in their intestinal tract enabling them to remain in good health on starch foods alone with negligible protein intake. However the diets of tribal communities are reported to be deficient in several studies. Ali (1980) determined the health and nutritional status of Pauri Bhuniyas and reported that their diets are found to be deficient in calories, proteins, vitamin B, Iron, Calcium and vitamin C. Copaldas (1987) has reported that among the tribes of Western and Central India, the intake of energy, iron, vitamin A and ascorbic acid are low in children, adoloscents and adults. Sarupriya and Mathew (1987) has reported that the diets of the scheduled tribes they investigated are poor in quality and quantity except in the case of cereal intake. However the diets of the Nicobarese of Great Nicobar is rich in animal protein and high in fat content (Roy and Roy, 1969). The diets of the Khonds in Koraput district of Orissa are reported to be

deficient in calories and vitamin C (Roy, 1976). Gore et al. (1977) studied the dietary pattern, nutrient intake and health status of some tribes of Orissa, Madhya Pradesh and Maharashtra and found that the tribal diets are deficient in calories but not in essential amino acids. Chitre et al. (1983) has reported that among the tribals of Bihar and Maharashtra, the intake of several essential amino acids are deficient frequently with frank signs of malnutrition. Jain (1986) has reported that among the Tharu tribals bleeding piles and gums are observed, the cause of which are attributed to the consumption of fish diets and deficiency of vitamin C. Sankhla (1986) has reported that the vitamin, mineral and protein components of the diets of the tribals of Udaipur are often drastically reduced and replaced by enormous increase in starch and carbohydrates often in the form of white flour and refined sugar.

Gupta and Rajput (1982) reviewed that health is the accumulative result of the state of nourishment compounded by several other factors like incidence and frequency of chronic, endemic or infectious diseases. Sagar and Dusane (1982) has reported that the main reasons for the backwardness of the tribal community are poverty and poor health, which in turn lead to poor nutritional and socio-economic status. Swaminathan et al. (1977) has reported that nutritional deficiency occur commonly in tribal areas.

Nutritional disorders such as undernutrition, vitamin A, B_{12}, C and D and iron deficiency are reported to be common among the Kondhs of Orissa (Ali, 1980). Sankhla (1986) has reported about a massive increase in dental problems and a variety of nutrition related disorders like incidence of clinical deficiencies with regard to vitamin D, B-complex, A and Calcium and Iron among the tribal children near Udaipur city. Rao and Satyanarayana (1987) conducted studies among different tribal groups like Gonds, Koya, Doras, Konda Reddis, Savaras and Jatapus, Yanadis and Chenchus and has reported about the prevalence of one or more signs of Protein Energy Malnutrition among the Gond and Chenchu children. Ali (1980) has reported that on clinical examination of the Pauri Bhuniyas, 39 per cent of the tribes had clinical signs of nutritional deficiency. Iron deficiency anaemia, G-6-PD deficiency and haemoglobin opathies are reported to be common among the tribal groups of Madhya Pradesh (Mathur, 1987). Gopaladas (1987) has reported that the mean heights and weights of the tribes of the Western and Central India in all the age categories are below that of the poor Indian counterparts. Rao and Satyanarayana (1987) has reported that the children of the Gond and Chenchu tribes are found to be lighter and shorter on comparison to children of other tribal groups like Koya, Doras, Konda Reddis, Savaras, Jatpus and Yanadis. Sankhla

(1986) has observed that about 90 per cent of the tribal children around Udaipur city are malnourished on the basis of weight. Mathur (1987) has reported about the prevalence of goitre among the tribes of Madhya Pradesh. He has also reported about the prevalence of clinically infective conditions like infections of the respiratory and gastro-intestinal tract and those of the eye and skin among the tribals of the State. Sarupriya and Mathew (1987) noted the prevalence of fungal infections and fluorosis among tribal children. Jain (1986) has reported that among Tharu tribals, few cases seeking medical help are for haemorroids, diverticular disease, colitis and appendicitis. Pratap (1973) reviewed that the nutritional status and dietary intake of the Chenchu women are poor. Mishra (1982) has reported about night blindness in tribal women belonging to the Gond tribe of Bhoolandabri village of Madhya Pradesh. Incidence of iron deficiency anaemia, in the form of pallor of the mucous membrane is reported among the tribal women of child bearing age of Lanjia saoras of Orissa by (Ali, 1987). Sarala and Rao (1987) noted incidences of anaemia among tribal women of Maredumilli Block due to parasitic infestations and low intake of iron, folic acid and vitamin B_{12}. Mathur (1987) has reported gynaecological problems like leucorrhoea, menorrhagia and dysmenorrhoea among the female population

of the tribes of Madhya Pradesh. However, Gopaldas (1987) observed that the nutritional status of the pregnant and lactating women of the tribes of Western and Central India are relatively good.

A cross cultural comparison on the subject of tribal drinking habits conducted by Satyanarayana et al. (1977) throw light to the fact that drinking among tribals has deeply embedded cultural meanings and motivations. Surveys conducted among some tribes from North East India, certain areas of Madhya Pradesh, Orissa, and Great Nicobar indicate that 5 to 10 per cent of their requirements of essential nutrients like calories, protein, calcium and vitamin B are derived from home fermented beers or toddies (Roy, 1978). Various tribal communities obtain distilled liquors from fermented mash often using ingenious technology, and these although having a high alcohol content, has little nutrient value (Sen Gupta, 1980). The Lanjia Saoras of Orissa, are in the habit of drinking liquor of various types such as sago palm juice, Date palm juice and Mahua liquor (Ali, 1987). He has also reported that these alcoholic beverages are taken to get relief from fatigue after a hard day's work.

Women of the Rathwas of Gujarat are reported to be aware of the increased dietary needs during pregnancy and

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lactation (Gopaldas, 1987). However studies among the Kanikkar women of Pottamavu of Trivandrum district in Kerala, indicate that no special foods are given during pregnancy and lactation (Prema, 1982). Mudgal and Kaul (1989) have reported that the women of the Gond tribe of the Mandla district of Madhya Pradesh, and Yayathi (1987) reported that among the tribes of Andhra Pradesh breast feeding is started within six hours of delivery. But Gopaldas (1987) observed that many of the tribes of Madhya Pradesh discard colostrum as they consider it to be highly indigestible for the infants. Among the Kondhs of Phulbani District of Orissa according to Patel (1982) and among the tribes of Andhra Pradesh as reported by Yayathi (1987) breast feeding is the rule until the next pregnancy. 83 per cent of the Minicoy infants and 57 per cent of the Agathy infants are entirely breast fed upto the age of six months (Bhattacharya et al., 1978) while among the Gond of Mandla district of Madhya Pradesh prolonged breast feeding is practised (Mudgal and Kaul, 1989). They have also reported that maternal illness or infant diarrhoea is no contraindication to breast feeding among them. Among the Lanjia Saoras of Orissa, traditional child-care practices result in inadequate growth of the child (Ali, 1987). Yayathi (1987) has reported that among the tribes of Andhra Pradesh no supplementary food is given to the child while it is being breast-fed. Among the Kanikkars of Pottamavu in Trivandrum district in Kerala it is reported that no

special foods are given to children during the pre-school period (Prema, 1982). Gopaldas (1987) has reported that among the tribes of Madhya Pradesh, breast milk is the major source of food for the first two years supplemented by small amounts of dilute animal milk, she also reported that the children receive small amounts of chappathis and a small amount of highly spiced dhal. However the supplementary foods of Minicoy infants are varied and high in protein content (Bhattacharya et al., 1978). Among the Koya tribes of Orissa, it is reported that supplementary feeding consisting mainly of gruels of rice and millets are started at 5 to 8 months (Roy and Roy, 1971). They also reported that the young children are not given cow's milk as these tribes associate it with stomach troubles. Solid foods are given at 12 to 18 months and alcoholic beverages except those prepared by distillation of fermented mahua flowers are given to infants and children. Bhattacharya et al. (1972) have reported that the infants of the Kharwas of Palamau district in Bihar has low growth rate in the first two years due to poor supplementary food at the weaning stage. The kharau infants are fed on gruels made from maize powder and only 40 per cent of the infants consume buffalo milk. Mudgal and Kaul (1979) has observed that among the tribes of Mandla district of Madhya Pradesh, semi-solids are introduced in the diet of the infants

between 4 to 6 months. Dal, rice, pex, kodo, samwa are preferred semi-solids, while kutki, maize, sago and dalia are considered unsuitable. Patel (1982) has reported that the Kondhs of Phulbani district in Orissa supplement breast milk from about the age of nine months with a little watery rice and redgram and some vegetables. Dave (1982) has reported that goat's milk is commonly used by certain tribes of Madhya Pradesh for feeding infants who are deprived of breast milk.

Food taboos of many kinds persist in the tribal community in respect of food, health or other aspects of life (Gupta, 1982). Among the Kondhs of Phulbani district of Orissa, there is a belief in a possible relationship between the diet and ill-health and in supernatural powers causing disease (Patel, 1982). Wheat, jaggery, meat, fish, egg, tea, ginger, spices and jackfruit are considered as hot foods while rice, curd, juicy fruits are cold. Survey conducted by Patel (1982) further revealed that according to certain prevalent beliefs women and girls in the community are strictly prohibited from drinking milk. Eating eggs by young girls are believed to make them licentious and so prohibited. Gopaldas (1987) has reported that women of the Rachwas of Gujarat avoid salt, chillie and new rice during pregnancy, while black pepper, rotla and jaggery are considered suitable. They consider bajra,

rabri, tuverdal, sua-ka-pani, coconut, jaggery, ghee, earthworm, methi etc. as specially good for lactation. She also reported that Mahua liquor is consumed by the women after delivery in the belief that it helped in stopping the post-partum bleeding and has a cleansing effect on the gastro-intestinal tract.

Gopaldas et al. (1974) has conducted an attitude survey among tribals and non-tribals of Madhya Pradesh. As per the findings of the survey hot foods include wheat, roots, tubers, milk, flesh foods, egg, jaggery, ghee, ginger herbs and mahua alcohol while cold foods include rice, maize, sorghum, curds, oil, sugar and groundnuts.

Gupta (1982) has reported that among the Gonds of Madhya Pradesh a pregnant woman is not supposed to consume milk. In the post-natal period the woman is not given any food for the first three days and then on the fourth day she is allowed to eat cooked rice along with dhal.

MATERIALS AND METHODS

MATERIALS AND METHODS

A study on the nutritional profile of Kanikkar women in Amboori area was undertaken to:-

1. Assess the food consumption pattern and dietary habits of Kanikkar women.
2. Assess the health status of Kanikkar women through suitable anthropometric, clinical and biochemical tests.
3. Identify nutritional problems prevalent among Kanikkar women.
4. Assess factors contributing to low nutritional status of Kanikkar women for corrective action.

A. Area of the study:-

The Amboori panchayat comes in the Perungadavila NES Block of Trivandrum district. The panchayat was formed during the year 1976-77 by joining two villages Amboori and Vazhichal. It has an area of about 45 sq. miles and a population of 15897 (1981 census). The panchayat has nine wards and the Kanikkar settlement comes in the Thodumala ward.

Kanikkar tribal hamlets are dispersed on the Western slopes of the famous Agasthyamudi peak, (1869 M + MSL) in

the Western Ghats of Kerala. The Tribal Area Research Centre in Amboori has identified eight of the Kanikkar hamlets in this region situated on the eastern banks of the Neyyar Dam Reservoir in the Amboori panchayat. The area is within the limits of the Neyyar Wild Life Sanctuary and the Kanikkar hamlets are separated in between by the reserve forests. The waterspread of the reservoir demarcate the fringes of the settlement enjoying a forested eco-system however showing the effects of interference due to human inhabitation.

The settlement area, forming part of the Western Ghats region in the Trivandrum district of Kerala is situated between North latitudes 76° 49' 29" and 77° 35' 21" and East longitudes 8° 4' 20" and 8° 49' 36". The area consists of a range of undulating hills of various configurations with numerous valleys. The lower slopes of the main ghats and spurs as well as the hollows and depressions are generally covered with forests. These spurs run more or less parallel to each other and divide the area into a series of valleys mostly open to the West. There is no general slope line and the topography is essentially of an undulating type. The tribal settlements are scattered on the Western slopes of the area, having a radial pattern of drainage contributing to the waterspread of the Neyyar Dam reservoir, having an extent of approximately 1430

hectares. The dam is named after the Neyyar River which has its origin in the slope of the Agasthyamudi peak.(Annual Reports TARC, Amboori 1963 - 1964)

The tribal settlements selected for the present study are located on the south east of the reservoir covering an area of approximately 25 Sq.Km The selected hamlets are Karikuzhy, Sankhinkonam, Puravimala, Kunnathumala, Themmala, Ayyavilakom, Kaipamplamoodu and Chakkappara having about 177 Kanikkar families to whom land has been assigned by the Government for their agricultural activities and living needs.

B. Selection of samples

The samples selected for the study are women in the age group of 15 to 45 of the Kanikkar families, of eight selected hamlets. Women of this age group were selected owing to the following reasons.

1. The tribal communities are the most backward of the communities in the State and the womenfolk of these communities with double disadvantages of being woman and being members of the most underprivileged community have become the most vulnerable section of the society and an assessment of their nutritional status may help us to know the deplorable condition in which they are placed at present.

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2. No previous study has been conducted on the nutritional status of the women in the reproductive age group of the Kanikkar tribes.

3. No authentic data relating to the division of labour between sexes among tribal communities and the effect of such division of labour on the child bearing function of women are available.

C. Plan of Action

The plan of action of the present study comprises

1. Assessment of the food consumption pattern of Kanikkar tribes by conducting:

   a) A socio-economic survey of all the families in the eight settlements and

   b) A food consumption survey of selected fifty households from the eight settlements.

2. Assessment of the nutritional status of Kanikkar women from selected households in a selected hamlet by conducting

   a) Food weighment survey

   b) Clinical and biochemical tests

   c) Anthropometric tests

3. Assessment of division of labour in Kanikkar houses by conducting Time and Motion Studies among selected women.

D. Formulation of Questionnaires and collection of data

1. A questionnaire to assess the ecological and socio-economic conditions of tribal families

A questionnaire to gain information of the ecological, socio-economic and cultural background of the tribals was formulated. Using the questionnaire information on the size and composition of the families, occupation, income and educational level of the family members and monthly expenditure pattern of the families was elicited. The data was collected by interview and observation methods from all the families residing in the eight hamlets. The questionnaire is presented in Appendix I.

2. A questionnaire to gain information on the food consumption pattern and dietary habits of selected tribal families

This questionnaire was used to collect information on the frequency of purchase and frequency of use of different food items, methods employed by the Kanikkar families for preparing, cooking, preserving and storing foods, types of foods avoided and used by them in special conditions

like infancy, pregnancy, lactation and illness; and on special occasions like marriage, birth, death and festivals. Questions were also included to know about their weaning methods and popular weaning foods. A total of fifty households from all the eight hamlets were selected. The questionnaire also included questions for getting information on the dietary pattern of these households. A three day recall method was used, to know about the type of foods and the different methods of food preparations employed by them. Six questions to know the attitudes and concepts of Kanikkar house-wives regarding food and nutrition were also included in the questionnaire. This survey was conducted among fifty Kanikkar families covering all the eight hamlets. The questionnaire is presented in Appendix II.

3. A questionnaire to know the actual quantity of food consumed by the Kanikkar women of the selected tribal families

A three day weighment survey was conducted by food weighment method in ten selected families of the Karikuzhy hamlet. This hamlet was chosen due to its easy accessability from the field office of the Tribal Area Research Centre. In this survey raw foods used for each meal for the whole family were weighed before cooking and the weight after cooking was also recorded. In addition to these two

FIG.1. Clinical examination

measures, the weight of the cooked food consumed by the woman of the family was also recorded. From these the raw weight of the food individually consumed by the woman was computed. From the raw equivalents the calorie, protein, fat, carbohydrate and nutrients such as calcium, iron, β carotene, thiamine, riboflavin, niacin and vitamin C were computed. These values were compared with the values of ICMR (1981). The recommended dietary allowance (R.D.A.) of the different age groups was used as a standard. The difference between the nutrients actually consumed and the recommended dietary allowance was worked out. The questionnaire used for this survey is given in Appendix III.

4. According to Swaminathan (1986) clinical examination is the most important part of nutritional assessment, as we get direct information of the signs and symptoms of dietary deficiencies prevalent among the people. The investigator with the help of a qualified physician assessed the presence or absence of malnutrition symptoms (Figure I). A schedule used for the survey is presented in Appendix IV. Ten adult women of the Karukuzhy hamlet were selected at random for the clinical survey.

5. Sauberlich et al. (1977) reported that biochemical measurements represented the most objective assessment of the

FIG.2. Collection of blood

FIG.3. Measurement of height

FIG.4. Measurement of weight

nutritional status of an individual. Blood samples were collected from the ten adult women of the Karikuzhy hamlet who were selected at random, by the finger prick method (Fig. II). The haemoglobin content was estimated by the Cyanmethaemoglobin method. Procedure followed in this method is given in Appendix V.

6. According to Ramachandran (1987), the body weight and weight for height for age is a parameter for nutritional status. The weight for height for age was found out in ten randomly selected adult women of the Karikuzhy hamlet (Fig. III) and (Fig. IV).

7. Daily time utilization pattern of tribal women in ten selected families were assessed with reference to the type, size and nature of the family. A schedule was developed for finding out the time spent on various activities performed at home and outside the homes. This time and motion study was conducted in each of the ten families for three consecutive days. The proforma used for the above study is given in Appendix VI.

From the data collected by the above methods the nutritional and health problems prevalent among the Kanikkar women were identified.

RESULTS

RESULTS

A study to assess the nutritional profile of Kanikkar women in Amboori area was conducted. The results of the study are presented as under:

1. Demographic features of the tribal population.
2. Socio-economic and ecological conditions of the families.
3. Food consumption pattern of the families.
4. Anthropometric clinical and biochemical patterns.

1. Demographic features of the tribal population

Under demographic features of the tribal population, details related to family size, age-wise distribution of the tribal family members, physiological condition of the family members and age dependency ratio are presented.

Details of family size

Details of the size of the tribal families are presented in Table 1.1.

As revealed in Table 1.1, 103 tribal families have only upto four members each, while 38, 18, 10 and 4 tribal families have 5, 6, 7 and 8 members respectively and the rest 4 houses have more than eight members. Average number of members in a tribal family was four during the period of study.

Table 1.1. Family size of the tribal population

Number of family members	Details of families	
	Number	Percentage
1	3	1.7
2	20	11.3
3	27	15.2
4	53	29.9
5	38	21.5
6	18	10.2
7	10	5.6
8	4	2.3
9	1	0.6
10	1	0.6
11	2	1.1
Total	177	100

Age-wise distribution of the tribal family members

Age-wise distribution of the tribal family members are presented in Table 1.2.

As indicated in Table 1.2, the total number of family members in the 177 families surveyed are 777. Male population constitute about 47.1 per cent and female population 52.9 of the total tribal population residing in the

Table 1.2. Age-wise distribution of family members

Age range	Total population		Male		Female	
	Number	Percentage	Number	Percentage	Number	Percentage
0-5	118	15.2	50	6.4	68	8.8
6-12	149	19.2	74	9.6	75	9.7
12-17	100	12.9	46	5.9	54	6.9
18-45	347	44.7	161	20.7	186	23.9
45-49	33	4.2	20	2.6	13	1.7
Above 50	30	3.8	15	1.9	15	1.9
	777	100	366	47.1	411	52.9

eight hamlets selected for the study. The percentage of child population is 41.7 and adult population constitute 58.3 per cent.

Physiological condition of the family members

Physiological condition of the family members are presented in Table 1.3.

Pre-school children, pregnant women and lactating mothers who are designated as "vulnerable groups" come upto 181 persons, which is 23.4 per cent of the total population.

Table 1.3. Physiological condition of the family members

Physiological condition	Number of family members coming under each category
Pregnant women	18
Nursing women	45
Pre-school children	
Male	50
Female	68
Total	181

Age dependency ratio (A.D.R.)

Age dependency ratio gives an indication of the age structure of the family (Wheeler, 1982). A.D.R. of the population is calculated using the following equation.

$$A.D.R. = \frac{\text{Number of family members below 15 or above 65}}{\text{Number of family members of age group 15 to 59}}$$

The age dependency ratio of the Kanikkar population in Amboori has been calculated using the above equation and is given below.

$$A.D.R. = \frac{328 + 5}{444} = 0.75$$

As shown above the per cent of age dependency is 0.75.

2. Ecological and socio-economic conditions of the families

Ecological and socio-economic conditions of the tribal families selected for the study include details of housing conditions, water and fuel availability, educational and occupational status of the family members, details of land held by the families, monthly income and expenditure pattern and liabilities incurred by the families.

Housing conditions of the families

Housing conditions of the families surveyed, with reference to nature of the materials used and structure of the tribal houses are presented in Tables 2.1 and 2.2.

As revealed in Tables 2.1 and 2.2 only 20 per cent of the families have pucca houses.

Drinking water availability

Drinking water is not a serious problem except in few houses because of the proximity of various sources like wells, streams and the dam canal. However safety of the drinking water is not ascertained. In summer many of the streams and rivulets get dried up.

The drinking water source of the families surveyed is presented in Table 2.3.

Table 2.1. Nature of materials used for housing

Nature of materials used	Details of housing					
	Roof		Walls		Floor	
	Number	Percentage	Number	Percentage	Number	Percentage
Tiles	33	18.6	-	-	-	-
Grass	122	68.9	-	-	-	-
Bamboo leaves	18	10.2	3	1.7	-	-
Coconut leaves	4	2.3	4	2.3	-	-
Mud	-	-	122	69.0	173	97.7
Bricks	-	-	30	16.9	-	-
Stones	-	-	17	9.6	-	-
Reeds	-	-	1	0.6	-	-
Cement	-	-	-	-	4	2.3

Table 2.2. Structure of the tribal houses

Number of rooms, doors or windows	Details of housing					
	Rooms		Doors		Windows	
	Number	Percentage	Number	Percentage	Number	Percentage
0	-	-	43	24.1	124	70.0
1	28	15.8	96	54.3	6	3.5
2	116	65.6	38	21.6	30	16.9
3	33	18.6	-	-	17	9.6

As revealed in Table 2.3, water collected from streams nearby the huts is the main source of drinking water for majority of the families, while private sources are available only for 11 per cent of the families.

Table 2.3. Drinking water source of the families

Water source	Details of houses	
	Number	Percentage
Dam	-	-
Private well	20	11.3
Streams	151	85.3
Public well	-	-
Dam canal	6	3.4
Total	177	100

Time spend for collecting water by the house-wives in the families surveyed are presented in Table 2.4.

As revealed in Table 2.4, 67.2 per cent of the house-wives spend upto one hour for collecting drinking water daily. 30 per cent of the house-wives reported that they spend 1½ to 3 hours for collecting drinking water, while 2.8 per cent of the house-wives took upto 4 hours per day for the same purpose.

Table 2.4. Time spend for collection of drinking water by the house-wives

Time spend for collection of drinking water per day by a house-wife	Details of the house-wives involved	
	Number	Percentage
20 minutes	25	14.1
½ - 1 hr	94	53.1
1½ - 2 hr	39	22.1
2½ - 3 hr	14	7.9
3½ - 4 hr	5	2.8
Total	177	100

Accessability to fuel

Accessability to fuel is another major problem faced by the tribal women.

Distance travelled for collecting fuel by the women surveyed are presented in Table 2.5.

As indicated in Table 2.5, 65 per cent of the house-wives travel about one kilometre daily for collecting fuel. 30 per cent of the house-wives surveyed, travel upto two kilometres for collecting fuel while regarding the remaining, it is reported that they cover 2½ to 5 km daily for collecting fuel.

Table 2.5. Distance travelled daily for collecting fuel by the women

Distance	Details of the women	
	Number	Percentage
½ - 1 km	115	65.0
1' - 2 km	53	29.9
2½ - 3 km	5	3.0
3½ - 4 km	3	1.5
4½ - 5 km	1	0.6
Total	177	100

Time spend for collecting fuel by the families surveyed are presented in Table 2.6.

Table 2.6. Time spend by the women for collection of fuel daily

Time spend for collection of fuel	Details of the women	
	Number	Percentage
½ - 1 hr	58	32.8
1½ - 2 hr	92	52.0
2' - 3 hr	23	12.9
3½ - 4 hr	4	2.3
Total	177	100

As revealed in Table 2.6, of the 177 families surveyed, women from 58 houses spend upto one hour for collecting fuel daily, and women from 92 houses spend about 1 to 2 hr daily, while in the rest, ie. in 27 families the women took more than 2 hr a day for collecting fuel.

Persons responsible for collecting fuel in the families surveyed are presented in Table 2.7.

Table 2.7. Persons responsible for collecting fuel

Persons responsible and frequency	Details of the families	
	Number	Percentage
Wife alone and daily	122	68.9
The whole family once or twice in a week	55	31.1
Total	177	100

From the above table, it is clear that while fuel is collected daily by the house-wives belonging to 122 households, it is a group exercise for the whole family in the remaining 55 houses.

Educational status of the family members

Data on the educational level of the members of the

Table 2.8. Educational status of the family members

e oup	Details of educational level																			
	Illiterates				Lower primary				Upper primary				High school				College			
	Male		Female		Male		Female		Male		Female		Male		Female		Male		Female	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
-5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-12	-	-	-	-	62	83.8	65	86.7	12	16.2	10	13.3	-	-	-	-	-	-	-	-
-17	2	4.3	3	5.6	17	37.0	20	37.0	23	50.0	19	35.2	5	10.9	9	16.7	1	2.2	1	1.9
-45	88	54.7	104	55.9	20	12.4	26	14.0	22	13.7	20	10.8	29	18.0	35	18.8	2	1.2	1	0.5
-49	16	80.0	11	84.6	4	20.0	-	-	-	-	1	7.7	-	-	1	7.7	-	-	-	-
ove)	13	86.7	15	100	2	13.3	-	-	-	-	-	-	-	-		-	-	-	-	-

tribal families surveyed are presented in Table 2.8.

From the table it is clear that the level of literacy among the two sexes is more or less the same. 49.6 per cent of the female population and 49.2 per cent of the male population above 15 years of age are illiterates.

Occupational status of the family members

Details related to the occupational status of the family members are presented in Table 2.9.

Table 2.9. Occupational status of the members of the family

Occupation	Details of family members			
	Male		Female	
	Number	Percentage	Number	Percentage
Government job	2	0.5	4	1.0
Temporarily employed	2	0.5	3	0.7
Self-employed	52	14.2	50	12.2
Agriculture labourers	91	24.9	102	24.8
Total	147	40.1	159	38.7

As revealed in Table 2.9, of the total population only 306 people are employed, which is 39 per cent of the total population.

Economic Dependency Ratio of the population surveyed (E.D.R.)

E.D.R. is an indicator of the proportion of the household members who are supporting the rest of the members by their work (Wheeler, 1932).

The E.D.R. of a population is calculated using the following equation.

$$E.D.R. = \frac{\text{Number of persons not in labour force}}{\text{Number of persons in labour force}}$$

The E.D.R. of the population surveyed has been calculated using the above equation and is given below.

$$E.D.R. = \frac{471}{306} = 1.53$$

Details of land held by the families

Number of acres of land held by the tribal families during the period of survey are presented in Table 2.10.

Table 2.10. Land held by the tribal families

Acres of land	Number of families included in the group	Percentage
Below one acre	1	0.6
1 - 3	63	35.6
4 - 6	80	45.1
7 - 9	15	8.5
10 - 12	12	6.8
13 - 15	5	2.8
16 - 18	1	0.6
	177	100

As revealed in Table 2.10, 54 of the total 177 families surveyed possess 1-3 acres of land, while 90 families have 4 to 6 acres and 15 families have 7 to 9 acres. The rest 18 families possess more than 10 acres of land.

Economic status of the families

Average per capita income of the families are presented under economic status of the families in Table 2.11.

Table 2.11. Economic status of the tribal families

Monthly income	Number of families coming under the category	Percentage
Rs. 150 - 200	48	27.1
Rs. 200 - 400	67	37.9
Rs. 400 - 600	30	16.9
Rs. 600 - 800	17	9.6
Rs. 800 - 1000	12	6.8
Above Rs. 1000	3	1.7
Total	177	100

As depicted in Table 2.11, 145 of the 177 families surveyed earn a monthly income below Rs.600, and 29 families earn Rs.600 to 1000 per month while only 3 of the total

Table 2.12. Monthly expenditure pattern of the families

Percentage of the total monthly expenditure	Details of families																	
	Food		Clothing		Housing		Health		Education		Travel		Recreation		Gifts		Ceremonies	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
0	-	-	6	3.4	-	-	-	-	18	10.1	11	6.2	91	51.4	154	87	122	68.9
1 - 5	-	-	103	58.2	144	81.2	107	60.5	140	79.0	138	78	71	40.1	23	13	53	30.0
6 - 10	-	-	63	35.6	30	17.0	52	29.4	18	10.1	21	11.9	15	8.5	-	-	-	-
11 - 15	-	-	4	2.2	1	0.6	11	6.1	1	0.6	4	2.2	-	-	-	-	2	1.1
16 - 20	-	-	1	0.6	1	0.6	3	1.7	-	-	2	1.1	-	-	-	-	-	-
21 - 25	-	-	-	-	1	0.6	2	1.1	-	-	-	-	-	-	-	-	-	-
26 - 30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31 - 35	1	0.6	-	-	-	-	-	-	-	-	1	0.6	-	-	-	-	-	-
36 - 40	2	1.1	-	-	-	-	1	0.6	-	-	-	-	-	-	-	-	-	-
41 - 45	3	1.7	-	-	-	-	1	0.6	-	-	-	-	-	-	-	-	-	-
46 - 50	3	1.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51 - 55	4	2.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
56 - 60	1	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
61 - 65	5	2.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
66 - 70	14	7.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
71 - 75	20	11.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
76 - 80	24	13.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
81 - 85	30	17.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
86 - 90	44	24.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
91 - 95	22	12.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
96 - 100	4	2.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

families surveyed reported to have a monthly income above Rs.1000.

Monthly expenditure pattern of the families

Details related to the monthly expenditure of the families are presented in Table 2.12.

From Table 2.12, it is evident that many of the families are not in the habit of spending money for recreation, purchasing gifts, ceremonies etc. In general such expenditure are not favourably considered by the tribal families. Similarly expenditure incurred under travel, education, housing and clothing are also negligible. Major expenditure of the tribal families surveyed is on food.

Details regarding savings

Data regarding the money kept apart as savings by the tribal families surveyed during the period of survey are given in Table 2.13.

Out of 177 families only 53 families had money savings. Four families with savings reported that their savings are mainly for the education of their children, while the rest 49 families save the money for some unforeseen need.

Table 2.13. Savings

Amount	Details of families	
	Savings deposited in the bank	Savings through chit fund
Below Rs. 100/-	29	6
100 - 200	6	3
200 - 300	4	2
300 - 400	2	-
400 - 500	-	-
Above Rs. 500/-	1	-
Total	42	11

Liabilities incurred by the families

Data regarding the number of tribal families in debt during the period of survey is given in Table 2.14.

As depicted in Table 2.14, 156 of the total 177 families surveyed were in debt during the period of survey Only 21 families were free from such financial difficulties.

3. Food consumption pattern and dietary habits of the families

Food consumption pattern and dietary habits were

Table 2.14. Liabilities incurred by the families

Liabilities in cash	Number	Percentage
Nil	21	11.9
Upto Rs. 500/-	12	6.8
501 - 1000	29	16.4
1001 - 2000	38	21.5
2001 - 3000	24	13.5
3001 - 4000	18	10.2
4001 - 5000	14	7.9
5001 - 6000	9	5.0
6001 - 7000	6	3.4
7001 - 8000	4	2.3
8001 - 9000	2	1.1
Total	177	100

studied in detail among 50 selected households. This includes details of food expenditure pattern, frequency of the use of various foods, cooking pattern, food preservation and storage, three day meal pattern, quality and quantity of food consumed in normal and special conditions, infant feeding practices, foods given or avoided during special occasions and conditions, habits and customs of

the people and attitudes and concepts of the womenfolk regarding food science and nutrition.

Food expenditure pattern with reference to different food groups

The food expenditure pattern of the 50 houses surveyed with reference to different food groups are presented in Table 3.1.

As revealed in Table 3.1, major expenditure is towards the purchase of cereals. Rice followed by wheat are the cereals used commonly by the tribal families surveyed. Fish is the food item frequently purchased next to cereals as can be seen in the above table. Expenditure incurred for purchasing all other food item is comparably very low.

Frequency of the use of food

An important way to assess the popularity of food item is to assess the frequency of use of these items in the daily diet. Data collected on these lines are presented in Table 3.2.

As revealed in Table 3.2, cereals, roots and tubers and fish are the three food groups which all the fifty tribal families surveyed, invariably include in their

daily menu. Milk is used daily only by 19 families, while the rest 31 families never include milk in the diet. Vegetables and oil seeds, namely coconut is included more than once weekly in the diet by most of the families. Animal foods like meat and egg is used only once in a month or occasionally. 10 to 12 families reported that they never use meat and egg. None of the fifty families surveyed are using oil and sugar daily, though it is being used more than once weekly or fortnightly in some houses.

Methods employed for preparation of food articles prior to cooking

Data collected on the different methods employed by the 50 Kanikkar families surveyed for preparing food articles prior to cooking is presented in Table 3.3.

Table 3.3 reveals that in all the fifty Kanikkar families surveyed, cereals and pulses are cleared and washed just prior to cooking. While pulses if ever included in the diet are washed only once prior to cooking. Cereals are washed twice by most of the families. Vegetables are washed once prior to cutting and cooking while in majority of the families roots and tubers and flesh foods are washed twice.

Cooking practices of the families surveyed

Data on methods employed for cooking different food

Table 3.1. Food expenditure pattern with reference to different food groups

Percentage of the expenditure pattern of various food groups	Details of families										
	Cereals	Pulses	Roots and Tubers	Vege-tables	Oil seeds	Fish	Milk	Meat	Egg	Oil	Sugar
0 - 5	-	48	30	50	5	2	35	41	48	32	47
6 - 10	-	1	-	-	8	2	4	7	2	10	3
11 - 15	-	-	-	-	11	5	6	2	-	8	-
16 - 20	1	1	-	-	14	5	3	-	-	-	-
21 - 25	5	-	-	-	9	11	1	-	-	-	-
26 - 30	6	-	-	-	1	9	-	-	-	-	-
31 - 35	5	-	-	-	1	3	-	-	-	-	-
36 - 40	10	-	-	-	1	5	-	-	-	-	-
41 - 45	6	-	-	-	-	2	-	-	-	-	-
46 - 50	4	-	-	-	-	2	-	-	-	-	-
51 - 55	4	-	-	-	-	-	-	-	-	-	-
56 - 60	5	-	-	-	-	-	-	-	-	-	-
61 - 65	1	-	-	-	-	-	-	-	-	-	-
66 - 70	3	-	-	-	-	-	-	-	-	-	-
Total	50	50	50	50	50	50	50	50	50	50	50

Table 3.2. Frequency of the use of different food groups by the families

Frequency of use	Number of families coming under each category										
	Cereals	Pulses	Roots and Tubers	Vege-tables	Oil seeds	Fish	Milk	Meat	Egg	Oil	Sugar
Daily	50	-	50	5	10	50	19	-	-	-	-
Weekly	-	4	-	40	35	-	-	-	9	11	9
Fortnightly	-	-	-	5	5	-	-	-	5	16	-
Monthly	-	-	-	-	-	-	-	20	10	3	5
Occasionally	-	26	-	-	-	-	-	18	16	9	5
Never	-	20	-	-	-	-	31	12	10	9	31
Total	50	50	50	50	50	50	50	50	50	50	50

Table 3.3. Methods employed for preparation of food articles prior to cooking

Methods	Number of families coming under each category				
	Cereals	Pulses	Vege-tables	Roots and Tubers	Flesh foods
Clearing/winnowing and washing just before cooking	50	50	-	-	-
Washing once	-	50	50	20	-
twice	40	-	-	30	28
thrice	10	-	-	-	22
Cutting into small pieces	-	-	-	20	50
Cutting into big pieces	-	-	-	30	-
Cutting according to the preparation	-	-	50	-	-

articles were collected to assess their knowledge regarding correct cooking methods. The data are presented in Table 3.4.

As indicated in Table 3.4, forty of the total fifty families surveyed cook cereals, mainly rice by the excess water method and the remaining ten families by the straining method. Pulses and leafy vegetables when included in

Table 3.4. Methods employed for cooking

Methods employed	Details of tribal families					
	Cereals	Pulses	Roots and Tubers	Leafy vegeta-bles	Other vege-tables	Meat and Fish
Absorption	-	50	-	50	-	-
Straining	10	-	50	-	-	-
Curries	-	-	-	-	8	48
Frying	-	-	-	-	-	2
Boiling	-	-	-	-	42	-
Excess water method	40	-	-	-	-	-
Total	50	50	50	50	50	50

the menu is cooked by the absorption method in all the families surveyed. Other vegetables are boiled and used while meat and fish are prepared into curries. Roots and tubers, mainly tapioca is cooked and strained by all the families.

Preservation and storage of food at home

Method of preservation and storage of food is an important factor which may throw light on the hygienic aspect of handling food. Hence data on food storage practices were collected. The data are presented in Table 3.5.

As revealed in Table 3.5 sun-drying, pickling and salting are the three methods commonly used to preserve foods by the Kanikkars.

Table 3.5. Preservation and storage methods of food articles at home.

Food item	Pre-treatment given	Period	Families employing the method		Storage
			Number	Percentage	
Cereals (Paddy)	Sun-dried	One year	3	6	In earthen pots placed in pits dug out in the soil
Rice, Wheat	Nil	2-3 days	40	80	In earthen pots or baskets
Roots and Tubers	Sun-dried	6 months	20	40	In earthen pots placed in pits dug out in the soil or baskets
Fruits	Pickling	1 week	25	50	In earthen pots or bottles
	salted	1 year	10	20	In earthen pots or baskets above the fire place
Fish and meat	salted and sun-dried	2-3 weeks	20	40	In earthen pots or baskets above the fire place

Meal pattern of the families

An assessment of the daily meal pattern helps to indicate the distribution of various foods in different meals in a day. Therefore the meal pattern of three consecutive days were collected by recall method and the results are presented in Table 3.6.

As revealed in Table 3.6, food is cooked twice a day in most of the families eventhough the pattern is three meals a day. Either cereal alone or cereal and fish combination is used mostly by the families for breakfast. For lunch, tubers are the main food in twenty two of the fifty families surveyed. Tapioca with chillies as food taster is the main combination used. In the remaining houses cereal and fish or tuber and fish combination are used for lunch. Cereals with tuber and fish is the main combination for supper in thirty two families. Vegetable preparations are included mostly with supper.

Average quantity of foods consumed in normal and special conditions

The average quantity of foods consumed by the normal as well as pregnant and lactating women is presented in Table 3.7.

As revealed in Table 3.7, the diets of women in normal and special conditions are inadequate for majority of food groups, except for roots and tubers, other vegetables and fish.

Average nutrient consumption of women in normal and special conditions

Average nutrient consumption of women in normal, pregnant and lactating conditions are presented in Tables 3.8, 3.9 and 3.10 respectively.

From the above tables it is evident that for all the three conditions only the requirement of vitamin C is met completely, while the requirements of all other nutrients are met only to a very low extent. For women in normal condition, the requirement of Calcium also is met completely.

Infant feeding practices

Data collected on infant feeding practices have revealed the fact that for a child of zero to twelve months breast milk is the major source of sustenance.

Information about the time of initiation of breast feeding collected from fifty selected families are presented in Table 3.11.

Table 3.6. Three day meal pattern of the families (in numbers)

	Breakfast			Lunch			Dinner		
	I Day	II Day	III Day	I Day	II Day	III Day	I Day	II Day	III Day
	No. of houses (in numbers)			No. of houses (in numbers)			No. of houses (in numbers)		
Without any food	-	-	2	5	6	4	-	-	-
Cereals and Chillies	1	-	-	-	-	1	-	-	-
Tubers and Chillies	-	-	-	18	22	20	4	4	6
Cereals alone	23	20	20	3	-	-	-	-	-
Tuber alone	3	6	4	6	3	-	-	-	-
Cereals and Fish	20	20	18	4	9	5	5	4	7
Tuber and Fish	-	3	4	5	10	8	-	-	-
Cereal with Tuber and Fish	-	-	2	3	-	5	26	32	24
Cereal with vegetable and Fish	-	-	-	6	-	5	-	-	-
Cereal and Pulse	3	-	-	-	-	2	-	-	-
Cereal with Tuber and Fish and Vegetables	-	-	-	-	-	-	15	10	13

Table 3.7. Average quantity of foods consumed in normal and special conditions

Food groups	Normal woman n = 7			Pregnant woman n = 2			Lactating woman n = 1		
	Amount consumed (g)	RDA (g)	Percentage of RDA met	Amount consumed (g)	RDA (g)	Percentage of RDA met	Amount consumed (g)	RDA (g)	Percentage of RDA met
Cereals	95	575	16.5	80	610	13.1	75	635	11.8
Pulses	5	30	16.6	10	45	22.2	-	60	-
Roots and Tubers	450	60	750.0	500	60	833.0	500	60	833.0
Nuts and oil seeds	15	40	37.5	15	40	37.5	15	40	37.5
Fruits	-	30	-	-	30	-	-	30	-
Fish	50	30	167.0	65	30	217.0	50	30	167.0
Other vegetables	320	100	320.0	300	100	300.0	300	100	300.0
Green leafy vegetables	15	50	30.0	15	50	30.0	15	50	30.0
Fats and oils	3	45	6.6	3	45	6.6	3	55	5.5
Sugar	4	40	10.0	4	50	8.0	4	50	8.0
Milk and milk products	30	200	15.0	30	300	10.0	30	300	10.0

Table 3.8. Average nutrient consumption of normal women

	Calories (Kcal)	Proteins (g)	Calcium (mg)	Iron (mg)	β-carotene (μg)	Thiamine (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
Average nutrient intake	1439	32.0	675.0	17.6	1134.0	0.5	0.7	4.5	192.0
R.D.A.	3000	45.0	500.0	32.0	3000.0	1.5	1.8	20.0	40.0
Percentage of R.D.A. met	48.0	71.0	135.0	55.0	38.0	33.0	38.8	23.0	480.0

Table 3.9. Average nutrient consumption of pregnant women

	Calories (Kcal)	Proteins (g)	Calcium (mg)	Iron (mg)	β-carotene (μg)	Thiamine (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
Average nutrient intake	1488.0	35.0	750.0	18.0	1137.0	0.5	0.8	4.5	202.0
R.D.A.	3300.0	59.0	1000.0	40.0	3000.0	1.7	2.0	22.0	40.0
Percentage of R.D.A. met	45.0	59.3	75.0	46.0	38.0	31.0	40.0	20.0	505.0

Table 3.10. Average nutrient consumption of lactating women

	Calories (Kcal)	Proteins (g)	Calcium (mg)	Iron (mg)	β-carotene (μg)	Thiamine (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
Average nutrient intake	1421.0	29.0	688.0	17.0	1132.0	0.4	0.7	4.1	202.0
R.D.A.	3400.0	70.0	1000.0	32.0	4600.0	1.7	2.0	23.0	80.0
Percentage of R.D.A. met	41.8	41.4	69.0	53.0	25.0	23.5	35.0	17.8	253.0

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Majority of the women started breast feeding their babies on the 2nd day. They also reported that till the time of starting breast feeding by the mother, the child is either breast fed by other women or the child is given boiled and cooled water with sugar dissolved in it. Reason for not starting breast feeding before the 2nd day is lack of breast milk. Only 6 per cent of the women surveyed reported to have started breast feeding their babies on the first day itself.

Table 3.11. Time of initiation of breast feeding

Age in hours/days	Number	Percentage
Less than 6 hours	1	2
7-12 hours	2	4
13-24 hours	3	6
2nd day	20	40
3rd day	10	20
4th day	8	16
after 4 days	6	12

Duration of breast feeding is presented in Table 3.12.

As revealed in Table 3.12 infants are usually suckled by the mothers till the next pregnancy was ascertained.

All the mothers reported that they breast feed the child according to the needs of the child.

Data collected on supplementary feeding practices revealed the fact that no special food is prepared in the tribal homes for the infants.

Table 3.12. Duration of breast feeding

Duration of breast feeding in months	Number	Percentage
Less than 12	0	0
12 - 18	1	2
19 - 24	8	16
25 - 36	22	44
Above 36	19	38
Total	50	100

Information about the age of initiation of supplementary foods collected from fifty selected families are presented in Table 3.13.

As revealed in Table 3.13, forty per cent of the mothers introduced supplementary foods from the 6th month onwards. However, ten per cent introduced supplementary foods only after one year.

Table 3.13. Age at which supplementary feeding is introduced

Age in months/years	Number	Percentage
Before the 6th month	-	-
6th month	20	40
6 - 8 months	18	36
9 - 12 months	7	14
After one year	5	10
Total	50	100

Foods specially given or withheld in conditions of infections or illness

Data collected on foods given or avoided during illness like fever, diarrhoea and cold are given in Table 3.14.

As revealed in Table 3.14, a certain level of food restriction is adopted by the tribal families during illness and infections. In addition to the restricted diet they consume other herbal home-made medicinal preparations also.

Foods given or avoided during different physiological conditions

Information about foods given or avoided during

Table 3.14. Foods given or withheld in infections or illness

Food items	Common infections and illness					
	Fever		Diarrhoea		Cold	
	Number	Percentage	Number	Percentage	Number	Percentage
Given						
All foods	-	-	0	-	50	100
Tea	50	100	50	100	50	100
Bread	6	12	-	-	-	-
Rice porridge	50	100	50	100	50	100
Strained liquid from rice porridge	50	100	50	100	50	100
Avoided						
Milk	15	30	50	100	20	40
Milk products	50	100	50	100	50	100
Egg	50	100	50	100	50	100
Meat	50	100	50	100	50	100
Fish	-	-	40	80	-	-

infancy, pre-school age, school going age, adolescence, puberty, pregnancy, after delivery period, lactation and old age were collected. The data are presented in Table 3.15.

Table 3.15. Foods given or avoided during different physiological conditions

Condition	Foods given	Foods avoided
Infancy	Breast milk, Cow's milk, rice porridge, tea with milk, fruits.	Egg, meat, fish
Pre-school	All adult foods	Nil
School-going	"	"
Adolescence	"	"
Puberty		
Boys	All adults foods	Nil
Girls	Egg, Gingelly oil, sweets, meat	Fish
Pregnancy	All foods	Papaya, Pumpkin, egg, ghee, certain types of fish
After delivery	Gingelly oil, jaggery, rice porridge, pepper, arrack	Fish and meat for ten days
Lactation	All foods	Nil
Old age	All foods	Nil

As revealed in Table 3.15 cow's milk, rice porridge, tea with milk etc. are the main supplementary food items given to infants along with breast milk. Solid foods are given to infants from the time they are about to chew them. Egg, meat and fish are not given to the child during the first year. During pre-school, school-going and adolescent

period no special foods are given. Girls at puberty are given egg, and other nutritious foods, but only for a few days and fish is completely avoided during these days. No special food is given during pregnancy, while certain foods like papaya, egg, ghee are avoided. For about ten days after delivery the woman is given arrack, medicinal preparations with pepper and chillies, and also jaggery and gingelly oil. She is fed on rice porridge for this period and is not allowed to eat fish and meat. No special food is given or avoided during lactation period and also old age.

3-16. Food given during special occasions

Marriage, death, menarchy of girls, birth and other important religious days are occasions in which feasts are an essential item. Data collected on the foods given during special occasions are given in Table 3.16.

As the tribal people surveyed are Hindus by faith only vegetarian foods are prepared on special occasions. Many of these functions are a social get-together where relatives and friends attend.

Minor vices among Kanikkar tribal people

Survey on minor vices prevalent among Kanikkar

Table 3.16. Foods given during special occasions

Occasion	Foods given	Method
Marriage, birth	Sweet preparations with cereals like rice or wheat and jaggery and coconut	Steaming
Death	Rice with vegetables, pappads and payasams	Rice-cooked and strained. Vegetable curries. Fried pappads.

tribal people in ten selected households reveal the prevalence of minor vices such as alcoholism, betel chewing and smoking. The details are presented in Table 3.17.

Table 3.17. Minor vices common among the tribal people

Minor vices	Men		Women	
	Number	Percentage	Number	Percentage
Alcoholism	7	87.5	2	18.2
Betel chewing	5	62.5	7	63.6
Smoking	5	62.5	4	36.4
Betel chewing and alcoholism	2	25.0	-	-
Betel chewing and smoking	-	-	1	9.0
Betel chewing, smoking and alcoholism	3	37.5	2	18.2

As revealed in Table 3.17 most of the men are victims to minor vices. Women admitted that they started to use alcoholic drinks after the delivery of their children, since immediately after delivery they are given alcohol as a medicine for about 10 days. None of the tribal surveyed is found to be in the habit of using narcotics.

3.18. Attitudes and concepts of the women regarding Food and Nutrition

Six statements to assess the awareness of the women regarding nutrition were prepared and administered to fifty house-wives. Performances of the women in this regard are given in Table 3.18.

As revealed in Table 3.18, most of the women answered correctly to the three statements related to food and nutrition. The question on persons requiring special feeding in a family was answered correctly by only thirty per cent of the women, while causes of overweight were unknown to fifty eight per cent of women surveyed.

4. Biochemical and clinical observations

Biochemical and clinical observations of the selected tribal women include data on the haemoglobin level of the women and prevalence of nutritional disorders among them.

Table 3.18. Attitudes and concepts of women regarding food and nutrition

Statements	Correct answers		Incorrect answers	
	Number	Percentage	Number	Percentage
1. Which are the foods you think are essential to healthy living?	41	82	9	18
2. What is health?	37	74	13	26
3. What is the cause of over weight?	21	42	29	58
4. What is the cause of under weight?	29	58	21	42
5. Who are the persons requiring special feeding in a family?	15	30	35	70
6. What do you think about the free feeding programmes implemented in your area?	45 (Satisfactory)	90	5 (Not satisfactory)	10

Haemoglobin level of the women

Data on haemoglobin estimation carried out among the women are presented in Table 4.1.

Table 4.1 shows that 60 per cent of the women tested have haemoglobin levels below 12 and hence anaemic. Of

the ten women tested, two of them were in their sixth and seventh months of pregnancy, and both were found to have haemoglobin levels below 11.

Table 4.1. Haemoglobin level of the women

Haemoglobin concentration g/dL	Number of women within the range	Percentage
9.1 - 10	1	10
10.1 - 11	2	20
11.1 - 12	3	30
12.1 - 13	2	20
13.1 - 14	2	20
14.1 and above	-	-

Height and weight profile of the women surveyed

Table 4.2 gives the observed values of height and weight of the adult women surveyed and the standard values of height-for-age and weight-for-age for adult women of Kerala (NNMB, 1982).

As revealed in Table 4.2 the anthropometric status of the tribal women in the present study is below that of the average Keralite counterpart.

Table 4.2. Height and weight profile

Age of the woman surveyed	Height (cm)		Weight (kg)	
	Observed value	Standard value	Observed value	Standard value
16	140.0	150.4	35.0	40.5
17	145.0	151.7	47.0	42.4
18	140.0	150.4	36.0	43.0
22	150.0	152.6	42.0	43.5
23	149.0	152.6	42.0	43.5
24	150.0	152.6	42.0	43.5
25	144.0	152.6	38.0	43.5
28	136.0	151.7	30.0	43.0
29	149.0	151.7	43.0	43.0
35	149.0	150.1	36.0	45.2

Prevalence of nutritional disorders among the Kanikkar women

The nutritional disorders prevalent among the Kanikkar women were identified with help of a physician and the results of the clinical examination are presented in Table 4.3.

As revealed in Table 4.3, anaemia is the deficiency disease most common among the Kanikkar women. Results

obtained for food consumption survey also clearly indicate gross deficiencies in iron among the women surveyed. Vitamin A and niacin deficiency are also noted among the women. These findings are strengthened by the morbidity data collected and presented in Table 4.4.

Table 4.3. Prevalence of nutritional disorders among the Kanikkar women

Clinical signs	Number	Percentage
Anaemia	9	90
Night blindness	3	30
Hair-easily plucked	8	80
Oedema	2	20
Pellagra	1	10
Gums-spongy, bleeding	2	20
Teeth-mottled enamel	1	10
Enlargement of liver	1	10
Tongue - papillae Atrophic	2	20
" Hyper-trophic	2	20

N = 10; N denotes sample size

As revealed in Table 4.4 the most prevalent diseases are found to be pyrexia, respiratory complaints, gastro-intestinal diseases and rheumatic diseases. Among the

adult women gynaecological complaints and deficiency diseases too are common. Bodily injuries are found to be more in both the age groups due to the nature of their work and the undulating nature of the area.

Table 4.4. Morbidity profile of Kanikkar women in Amboori

Disease	N = 214 Adult women		N = 54 Adolescent girls	
	Number	Percentage	Number	Percentage
Pyrexia	15	7	4	7.4
Respiratory diseases	23	10.7	4	7.4
Gastro-intestinal diseases	11	5.1	10	18.5
Physical injuries	19	8.9	18	33.3
Rheumatic diseases	24	11.2	0	0
Deficiency diseases	12	5.6	0	0
Gynaecological complaints	19	8.9	2	3.7
ENT problems	3	1.4	2	3.7
Skin diseases	2	0.9	2	3.7

N - denotes sample size

5. Time and motion studies

Kanikkar women, perform a large number of activities

both economic and domestic. Economic activities include agriculture operations, animal husbandry, collecting fuel, fruits and roots from the forest, selling the home produced agricultural goods etc. Domestic activities include preparation and cooking of food, care of children, cleaning in and around the house, fetching water for cooking and other routine chores. Several of the activities of the women are time intensive and seasonal. Table 5.1 shows the time spend by the Kanikkar house-wife in Amboori on different routine activities.

Table 5.1 reveals the Kanikkar house-wife in Amboori utilises a major portion of her total waking hours for agricultural and other economic activities. Time spend for child care and other domestic activities are comparatively less.

Effect of size of family on time utilization pattern

The average time spend by the house-wives of family size of upto four members and above four members for carrying out the different domestic chores is given in Table 5.2.

Table 5.2 shows that the averages for both the groups in most of the activities is more or less the same. A correlation test was done to find the effect of family size on the working hours of the house-wife and no correlation

Table 5.1. Time spend by a Kanikkar house-wife in Amboori on daily activities

Activities	Time spend (hr)	Proportion of waking time (in percentage)
Cooking	2.5	15.7
Cleaning in and around the house	0.5	3.1
Washing clothes	0.3	1.9
Waste disposal	0.5	3.1
Attending to young children	1.0	6.3
Collecting fuel	0.5	3.1
Collecting water	0.8	5.1
Chopping fire-wood	0.3	1.9
Care of domestic animals	2.0	12.6
Agriculture activities	3.0	19.0
Going to the market	2.5	15.7
Collecting agriculture produce from the field	0.5	3.1
Personal activities	0.5	3.1
Rest	1.0	6.3
Total Waking Hours	15.9	100

Table 5.2. Effect of size of the family on time utilization pattern n - denotes sample size

Different activities	Average time spent (in minutes)	
	Upto four family members	Above four family members
	n = 7	n = 3
1. Cooking	130	130
2. Washing clothes	26	25
3. Cleaning in and around the house	24	24
4. Collecting fuel	40	40
5. Collecting water	79	77
6. Agriculture activities	219	220
7. Going to the market	149	149
8. Personal activities	30	30
9. Rest	40	45
10. Other domestic chores	173	170

is observed between the size of the family and the number of working hours of the house-wife ($r = 0.46672$). Thus it is noted that there is no significant effect of size of the family on daily time utilization pattern of the tribal women in home and field activities.

Effect of number of adult women in the family on time utilization pattern of the house-wife

The average time spend by the house-wives of families having only one adult woman and families having more than one adult woman on the time using pattern of the house-wife is given in Table 5.3.

Table 5.3. Effect of number of adult women in the family on time utilization pattern of the house-wife

Activities	Average time spend (in minutes)	
	Family with only one adult woman	Family with more than one adult woman
	n = 4	n = 6
1. Cooking	143	122
2. Washing clothes	35	23
3. Cleaning in and around the house	28	19
4. Collecting fuel	43	23
5. Collecting water	93	60
6. Agriculture activities	195	235
7. Going to the market	125	175
8. Personal activities	30	30
9. Rest	45	55
10. Other domestic chores	193	188

Table 5.4. Effect of the number of acres of land held by the family on time utilization pattern of the house-wife

Different activities	Mean time spend (in minutes)	
	Family with 1-5 acres	Family with 6-10 acres
	n = 7	n = 3
1. Cooking	139	110
2. Washing clothes	29	17
3. Cleaning in and around the house	27	10
4. Collecting fuel	39	30
5. Agriculture activities	219	220
6. Collecting water	83	50
7. Going to the market	190	150
8. Personal activities	30	30
9. Rest	45	43
10. Other domestic chores	179	270

No significant difference is observed in the time utilization pattern of the house-wives in both the category of houses. The correlation between the number of adult women in the family and the number of working hours of the house-wife was found out and no correlation is observed ($r = 0.0147$)

Effect of number of acres of land possessed by the family on time utilization pattern of the house-wife

The mean time spend by the house-wives of families with number of acres of land of upto 5 and from 5 to 10 is given in Table 5.4.

As revealed in Table 5.4 no significant difference was observed between the two groups and no correlation is also observed between the number of acres of land held by the family and the number of working hours of the house-wife ($r = 0.27$).

DISCUSSION

DISCUSSION

Malnutrition occurs in close conjuction with other adverse environmental factors such as poverty, insanitation, high infection rate, illiteracy and many other closely related factors. In India, majority of the women, belonging to low socio-economic groups, have chronically low intake of various essential constituents of food. Dual stress of pregnancy and lactation would certainly widen the already yawning nutritional gap between actual dietary intake and nutritional requirement in women from low income group. In the foregoing attempt to understand the effects of different eco-socio-demographic variables and dietary pattern on the nutritional status of the Kanikkar women in Amboori area, the following facts stand out clearly and are discussed below.

Demographic features of the tribal population

The nuclear family type is more evident among the tribals who appear to be unwilling to live in larger groups under one roof. About 95 per cent of the families surveyed are nuclear families and the remaining 5 per cent joint, with either aged parents or married children or relatives living with them. Among the 177 tribal families surveyed 53 per cent of the families are of small size with a maximum of four members.

Vulnerability of a community is generally decided by the per cent of the "biologically dependent" population. In this survey 82 per cent of the total population are found to be of this category. The vulnerable population constituted by pre-school children, pregnant women and lactating mothers came upto 23.4 per cent of the total population at the time of study. The female population constitute 52.9 per cent of the total population surveyed. This is in line with the 1981 census data of Kerala. Of the total female population 45 per cent are in the reproductive age group of 18 to 45 years and 48 per cent belong to the growing stage. In the zero to five years age group there is a slight preponderance of female children over male children. The male-female ratio among the tribal people is 366:411.

According to Ramachandran (1987) the nutritional status of an individual is affected by living conditions. Data collected on these lines from the tribal families in the present study support this view. Over 80 per cent of the tribal families live in Kucha huts built up of mud walls and grass thatches (Kakkad grass) invariably with not more than three rooms. These thatches are replaced once in two to three years, the materials needed for house construction are collected from the adjacent forests. The

survey has revealed that over 80 per cent of the families do not have houses with reasonable number of rooms and ventillation facilities. The Tribal Welfare Department has a housing scheme for the tribal people of this area and about 10 per cent of the families have benefitted from this programme. Accordingly pucca houses with two rooms and a verandah using cement, wood and tiled roofs have been provided. At present more houses are being constructed under the Rural Londless Employment Guarantee Programme. In these settlements twenty seven tribal houses were electrified under the Tribal Sub-plan 1985-86 and twenty latrines were constructed under the Special Component Scheme in 1986-87. Sanitary facilities and safe drinking water are practically unknown. Life of the tribal women is made more miserable by the drudgery causing activities like collection of fuel, water etc. Water collected from streams nearby the huts is the main source of drinking water. 67.2 per cent of the house-wives surveyed are reported to spend upto one hour for collecting drinking water daily. Non-availability of safe drinking water in the premises, can indirectly affect the health status of the population. During summer, they have to traverse more than 2 km of steep hill slopes for procuring water. They are involved in collection of water for more than 4 hr daily during this period of the year. Besides water collection fuel collection

is also reported to be an important activity causing drudgery to the tribal woman. Fuel is collected from the forests around the house. About 65 per cent of the house-wives reported that they wander around for about one km searching for fuel, while the women in the remaining houses covered 2-5 km for collecting fuel. Time spend for collecting fuel in 33 per cent of the houses is upto one hour while the remaining spend upto two hours and more for collecting fuel. House-wives in 69 per cent of the families collected fuel on their own, while in the rest of the families it is a group exercise for all the family members. Realising the problems faced by the tribal women, smokeless choolas were installed in 100 tribal houses in 1986, of which 35 are currently in use. The remaining 65 choolas were not in working condition during the period of study. However the factors causing drudgery among the women might have influenced their health condition.

In earlier studies the level of literacy of a community is reported to be an important predisposing factor in determining their health status (Gupta and Rajput, 1982). However in the present study this factor has not much affects their nutritional status. The level of literacy among men (50.8 per cent) as compared to the women (50.4 per cent) is more or less the same. Reasons for illiteracy are

reported to be due to their ignorance and indifference to studies, unapproachability to educational institutions and physical unfitness. Educational facilities available in the area include only three Balawadies run by the Commissionerate of Rural Development and a tribal primary school run by the Department of Education.

Agriculture is the principal occupation of the Kanikkar people in these settlements. Twenty five per cent of the tribal people work as casual agriculture labourers. Only 27 per cent of the total population are found to be gainfully employed. Most of the families possess 4 to 6 acres of land. The per cent of the people not employed gainfully confine to agriculture activities in their own land. 20 per cent of the tribal mothers who work all the year round usually leave the young children in the care of an older sibling or in charge of elder dependents. Marginal and unproductive land holdings are much more common among the tribal families. Fifty per cent of the adult population can be considered as economically independent since they are gainfully employed.

The average monthly income of the tribal families surveyed is about Rs.400. Of the total families surveyed 65 per cent of the families are to be categorised under poverty line (Adikshiah, 1987).

Monthly expenditure pattern of the tribal families were comparable with earlier studies conducted among similar ethnic groups. According to Rao (1987), the poorest 40 per cent of the rural population in India are reported to spend over 80 per cent of their income on food. In this study more than 85 per cent of the tribal families show similar trends. The major expenditure of the Kanikkar families surveyed is on food.

Most of the tribal families surveyed reported that they are aware of the need and significance of saving money, but they are unable to do so in their present condition. Indebtedness which may indirectly influence the physical and mental well being of an individual is a major constraint among the Kanikkar tribals. Exploitation by middle men in the transaction of agriculture produce and the high rates of interests charged on loans by local private money lenders are important problems faced by them. Among the families surveyed only 12 per cent of the families were free from debts during the period of survey.

Food consumption pattern and dietary habits of the Kanikkar tribal people

The calorie intake and the quality and quantity of nutrient intake in an individual can be precisely measured by assessing the food consumption levels.

The food expenditure pattern of fifty selected tribal house-holds studied reveal that they spend most on cereals, followed by fish and oil seeds (coconut). Though tapioca is the most popular food, no expenditure is incurred for this food as it is completely produced in their own lands. Their diets predominantly consist of tapioca, rice and fish. In addition it also includes yam and other minor tubers. The type of vegetables included in the diet varied with the season. Milk is included in the daily diet by about 38 per cent of the families, while egg and meat are eaten only less frequently. Kanikkar families are reported to follow hygienic practices in preparing foods prior to cooking. However their culinary practices indicate that they are not aware of the nutritional disadvantages. Cereals are cooked by the excess water method. Absorption method which helps to retain water soluble nutrients is not adopted for cereals, but a food mixture with pulses and cereals if included in the menu is cooked by this method. Roots and tubers are cooked in excess water and then strained. Meat and fish are prepared as curries mostly. Frying method is popular only among four per cent of the houses surveyed. No definite reason has been given for the adoption of these culinary practices by the tribal families. However these families do not have any specific or peculiar practices of their own. Many of the practices are similar to the

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culinary practices adopted by the rural families residing around and elsewhere in the state. Many of these practices contribute a lot to lessen the nutrients present in the meagre foods consumed by them.

The tribal families are not in the habit of storing food articles at home. Marketing facilities for purchasing food and other essential commodities are available only outside the settlement and the tribal women have to walk for more than two hours for making their daily purchases. The economic position of the families may be mainly responsible for this marketing behaviour of the tribal families. Sun-drying, pickling and salting are the common techniques used by the tribal families for preserving food. Only 50 per cent of the tribal families surveyed are in the habit of preserving foods, and they preserve and store foods according to the availability of the food articles.

Three-meal-a-day system (in the morning, afternoon and night) observed in most of the tribal families is more or less in tune with various studies conducted in the same district by George (1987) and elsewhere in the state by Jayasree (1987). Evening snacks are not found in the regular meal pattern. About 12 per cent of the tribal houses are found to skip lunch after having a late breakfast thus having only two meals a day.

A three day food weighment survey carried out in ten houses reveal that the diets of normal, pregnant and lactating women are quantitatively inadequate in all food groups except roots and tubers, other-vegetables and fish. The average consumption of cereals range from 75 g to 95 g per day. Pulses, milk and milk products and other animal foods which are the major sources of protein are lacking in their diets. The percentage of R.D.A. Balanced diet (ICMR, 1981) of cereals met for the normal woman in 16.5, pregnant 13.1 and lactating woman 11.8. Inadequate intake of pulses is observed in all the three groups. No pulse was consumed by the lactating woman during the period of survey, while 16.6 per cent of the R.D.A. is met for the normal woman and 22.2 per cent for the pregnant woman. It is noticed that the tribes compensated for their lesser intake of cereals and pulses with an excess intake of roots and tubers. This excess intake is also observed in the case of fish and other-vegetables. Earlier studies indicated that excess consumption of fish and tapioca is common in the dietary pattern of Keralites (Gopalan, 1979). Tender jackfruits formed the main part in the other-vegetable group during the period of survey, as the survey was conducted during the season in which tender jackfruits are available in plenty. Only 30 per cent of the requirement of Green-leafy-vegetables is met by all the groups.

Consumption of this food article is found to be better when compared to the non-tribals belonging to the same socio-economic background (George, 1987). The requirement for milk and milk products is very poorly met as their intake came upto only five to ten per cent of the R.D.A. This is comparable to similar studies conducted by NNMB (1982) in the non-tribal areas of the District. The requirements of fruits, sugar, fats and oils are also very negligibly met.

Average calorie consumption is found to be below the recommended level for the normal, pregnant as well as lactating woman. The percentage of R.D.A. met for the three groups is, 48, 45 and 41.8 respectively. Earlier studies conducted among Kanikkars in the Pottomavu area in Trivandrum District by Prema (1982) has also indicated similar results. Mean protein intake is below the recommended level by all the three groups. In the case of normal woman, 71 per cent of her daily protein requirement is met, while for the pregnant and lactating woman only 59.3 and 41.4 per cent respectively of the protein requirement is met. Kerala diets are reported to be deficient in calories and proteins by Cook (1985).

In the present study highest consumption of Calcium is noticed for the normal woman, where her intake exceeded the R.D.A. requirement. Probably this may be due to the

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excess consumption of foods such as tapioca and fish. Only 75 and 69 per cent of the daily requirement is met in the case of the pregnant and lactating woman. The Calcium intake of lactating woman is the poorest. Similar deficits of Calcium in the diets of pregnant and lactating tribal women of Western and Central India has been reported by Gopaldas (1987). In the present study, the mean intake of Iron is found to be low. Only 55, 46 and 53 per cent of the R.D.A. requirement for dietary iron is met for the normal, pregnant and lactating woman respectively, this observation can be supported by similar findings among the Lanjia Saoras tribes of Orissa by Ali (1987). NNMB report for the year 1978 has shown a low level of vitamin A in the Kerala diet and almost similar observations are made in the present survey also. Only 38 per cent of the β-carotene requirement is met for the normal and pregnant woman and 25 per cent for the lactating woman. As was the case in the rest of Kerala as per the NNMB report for the year 1988, the thiamine intake is found to be below one milligram in the present study also. Only 33, 31 and 23.5 per cent of the R.D.A. is met for the normal pregnant and lactating woman respectively. While only about 35 to 40 per cent of the requirement for Riboflavin is met for the three groups, it went further low for Niacin from 17.8 to 23 per cent. Similar observations has been

made by Ali (1980) among the Pauri Bhuniya Tribes. In the present study it is noticed that the average consumption of vitamin C for exceeded the R.D.A. requirement for the normal, pregnant and also the lactating woman. This may be due to the inclusion of large quantity of foods in the other-vegetable group especially tender jack fruits in their diets.

Infant feeding practices of the Kanikkars is according to their traditional norms and feeding is found to be inadequate for the healthy growth of the child. The mean period of breast feeding is 30 months, at a range of 15 months to above 3 years. Similar observations were also made among the tribal people of Mandla by Mudgal and Kaul (1982). In the present study the first food is introduced from the family's fare between six to twelve months of age. The mothers use these foods to familiarize the children with the new foods rather than as a supplement to breast feeding. Infants are breast-fed by majority of the mothers (70 per cent) till the next pregnancy. No special food is prepared in these tribal homes for the infants. Cow's milk, rice porridge and tea with milk are the main supplementary food items given to infants. Similar practices were also observed among the non-tribals of the same district (George, 1987).

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Kanikkar tribal people are aware of food restrictions during illness. Fever, cold and diarrhoea are found to be common among these people. Certain foods and food combinations are given or withheld by them during infections and illness. Data indicate that they are in the habit of taking light foods during illness. However along with meat and fish, milk is also considered as a food to be avoided during such conditions.

Among different stages of physiological conditions in a life cycle, tribal people are found to give due importance to puberty and the period soon after delivery. Foods like egg, gingelly oil, sweets and meat are given during the puberty period and gingelly oil, jaggery, pepper drinks, arrack and rice porridge during the post-delivery period, while foods like papaya, pumpkin, egg, ghee and certain types of fish are avoided during the puberty period and fish and meat avoided for ten days for the post-delivery period. Similar observations were made about Rathwas of Gujarat by Gopaldas (1987). In the present study it is noticed that they do not give much importance to pre-school, school going, adolescence, lactation period and old age, since only common adult foods prepared at home are given to all these people without any weightage even in apportioning foods.

Marriage, death, attainment of puberty by girls, birth and other religious days are occasions in which feasts are an essential item. As the tribal people surveyed are Hindus by faith only vegetarian foods are prepared on special occasions, though at other times they follow non-vegetarianism.

Among minor vices, alcoholism is found to be popular among the tribal people. Certain customs observed during delivery are found to be responsible for women acquiring such vices. However the most unfortunate situation is that they spend a major part of their earning for drinking alcoholic liquors causing great financial stress to their families. Next to alcoholism, the tribal people, both men and women are observed to be in the habit of betel chewing and smoking. An ill balanced diet with much vices are found to be mainly responsible for the health disorders among these tribal people.

As to the awareness of women regarding nutrition it is revealed after the attitude survey that they are not aware of persons requiring special feeding in a family, as well as the causes for overweight and underweight in people.

Barbara et al. (1984) has observed that laboratory measurements of the nutrient adequacy of body fluids or

tissues can provide objective, specific and sensitive indicators of nutriture since prolonged dietary inadequacy alters the bio-chemical milieu of the body and consequently the enzymatic activities, in advance to the appearance of clinical symptoms and signs. Among the routine surveys, only haemoglobin estimation appears to be relevant and reliable biochemical parameters. In fact, of the several biochemical parameters WHO recommends only haemoglobin for the assessment of nutritional status and suggests that other examinations be used only for the follow-up purposes (Vijayaraghavan et al., 1987). Estimation of the haemoglobin level of ten tribal women showed that 60 per cent of them had haemoglobin levels below 12 each and hence they are anaemic. According to Vijayaraghavan et al. (1987) anthropometry, coupled with clinical examination, for symptoms of deficiencies appear to be the most acceptable set of indicators for assessing the nutritional status of individuals. A clinical examination conducted among the tribal people revealed that anaemia (90 per cent) vitamin A deficiency (30 per cent) and niacin deficiency (10 per cent) are prevalent among them. The morbidity profile of the area also conforms to be findings of the clinical examination. Anthropometric data collected also show gross deficiency in the height-for-age and weight-for-age profile on comparison with the accepted Kerala standards.

Time utilisation by tribal women at the household level is an important issue since it influences the family life. Time utilisation pattern predict that the tribal women spend more time in agriculture activities, marketing, cooking and in the care of domestic animals. Minimum time is spent on personal and child care and cleaning in all categories. In a tribal family, the woman spent a substantial portion of her time in doing house-hold and farm activities. However utilization of time for different activities was not same for all the home makers. A study of the time utilization pattern of the house-wives show that on an average a tribal house-wife in Amboori spent about 19 per cent of her total waking hours daily in agricultural activities. Cooking takes up 15.1 per cent of her time and another 15.7 per cent is utilized for going to the market. It is seen that child care occupies little of the tribal house-wive's time, ie. about six per cent only. The supervision of children is not seen as a separate activity among them. In houses with domestic animals, the care of animals takes 13 per cent of her time. Collecting water and fuel# takes 5 and 3 per cent respectively of the total time.

On assessing the effect of the size of the family, the number of acres of land held by the family and the

number of adult women in the house on the time utilization pattern of the house-wife it is revealed that there is no significant difference in the mean time spent by the house-wife belonging to the different groups for carrying out the daily chores. When the effect of family size on the house-wife's total work load was assessed it is seen that as the children in the family shouldered some of the responsibility of household maintenance, it led to a net reduction in the work load of the house-wife, same is the case of those houses with more than one adult woman.

SUMMARY

SUMMARY

The tribals constitute 7.53 per cent of the total Indian population and 1.03 per cent of the population of Kerala State. All the tribal communities have remained primitive and underdeveloped because of their secluded habitat.

The present study is on the nutritional profile of women of the Kanikkar tribal people who have settled in the southern parts of Kerala. This is assessed by a survey on the ecological and socio-economic conditions of all the 177 tribal families in the area, determination of food consumption and dietary habits of selected families (50) and anthropometric, clinical and biochemical status of selected women and by monitoring the time utilization pattern of tribal women.

The survey on the ecological and socio-economic conditions of the families throw light on their faith in Hinduism and their preference to have nuclear type families. The literacy status of the tribals reveal that they are more advanced than other tribal communities. The interest of tribals in agriculture often as independent marginal farmers or as agriculture labourers indicate their "settled habits". Few of the families whose primary

source of employment was the collection of minor forest produce are deprived of the opportunity to continue this occupation at present due to changes in forest policies and also due to the reason that this area is part of the Neyyar Wild Life Sanctuary. Majority of the tribal families (65 per cent) fall below the poverty line and are with more debts and less savings. They are in the habit of spending the most for food. Expenditure on education, health, travel, housing, clothing and recreation is found to be negligible. Their food consumption pattern reveal that they depend mainly on cereals, roots and tubers, fish and oil seeds. Foods like pulses, meat and egg are only rarely used. Vegetables are used once or twice in a week by majority of the families. Milk eventhough consumed daily by 38 per cent of the houses, the quantity consumed is very less. Excess water method of cooking as well as straining method are used for preparing staple food articles. Three-meal-a-day system is observed in 76 per cent of the houses surveyed. No special attention is given to the diets of the infants by these people. The diets of normal, pregnant and lactating women are quantitatively inadequate for majority of the food groups except roots and tubers, other-vegetables and fish. The daily requirement of vitamin C is met for women in all the groups and the requirement of Calcium is met for the normal women.

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But the daily consumption of all the other nutrients are below the ICMR recommended levels. Minor vices such as alcoholism, betel chewing and smoking are found to be prevalent among the women.

The weight and height for age profile showed significant difference when compared with the reference standard. Anaemia (60 per cent), vitamin A deficiency (30 per cent) and niacin and vitamin C deficiency (10 per cent) are the common nutritional disorders found among the women.

The assessment of the knowledge of the women regarding nutrition reveal that 70 per cent of the women are not aware of the special attention in diet needed by the vulnerable group and the effect of food on the body.

Study of the time utilization pattern of the housewives reveal that a tribal house-wife spend more time in agriculture activities, marketing, cooking and care of domestic animals. Time spend on personal and child care and house cleaning are comparatively negligible. Size of the family, number of acres of land held by the family and number of adult women in the family have no significant effect on time utilization pattern of the house-wife.

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* Original not seen

APPENDICES

Appendix-I

KERALA AGRICULTURAL UNIVERSITY
DEPARTMENT OF HOME SCIENCE
VELLAYANI

Ecological and socio-economic survey of Kanikkar families in Amboori

Serial number of the family :

1. Name of the house-wife :
2. Name of the head of the family :
3. House number and Address :

4. Religion and caste :
5. Marital Status : 1. Single 2. Married
   1. Within the caste 2. Intercaste
6. Type of family : 1. Joint 2. Nuclear
   1. Small 2. Medium 3. Large
7. Area available around the house:

   Environmental sanitary condition

   1. Around the house
   2. Within the house
8. Type of house : 1. Own 2. Rental
9. Details of housing:

   i) Thatching materials used -
      a) Straw b) Bamboo c) Coconut leaves d) Tiles
      e) Others

   ii) Walls : Type of wall -
      a) Mud b) Brick c) Stone d) Wood e) Reeds
      f) Bamboos

iii) Flooring -
a) Mud b) Cement c) Wood

iv) a) Number of rooms -
b) Number of windows -
c) Number of doors -

10) Drinking water facility:

1) Source of water - a) Dam b) Private well
c) Public well

2) Time spent for collecting water -

11) Fuel availability:

1) Source of fuel - a) From forest b) Purchased

If from forest - i) Time spent in a day for collecting fuel

ii) Person responsible for fuel collection

iii) Distance travelled for the purpose

12. Size and composition of the family:

Sl. No.	Relationship with Head of the family	Age	Occupation	Education				Children continuing education	
				Illiterate	U.P.	H.S.	College	Male	Female

13. Family Income

Sl. No.	Source of income	Daily	Weekly	Monthly	Annually	Total
1.	From Land					
2.	Animals					
3.	Farm					
4.	Trade					
5.	Forest					
6.	Others					
7.	Total					

14. Monthly expenditure pattern

Sl. No.	Items	Amount
1.	Food	
2.	Clothing	
3.	Housing :	
	Rent	
	Maintenance	
	Repaying loan	
4.	Health	
5.	Education	
6.	Travel	
7.	Recreation	
8.	Gifts	
9.	Ceremonies	

15. Liabilities incurred by the family:

16. Details regarding savings:

Sl. No.	Saving Agencies	Person responsible for saving	Reason for the particular type of saving	Amount saved per year	Way by which savings are used
1.	Bank				
2.	Hundi				
3.	Post Office				
4.	Cnit-fund				
5.	Any other				
	1.				
	2.				
	3.				

17. Details regarding female occupation:

Sl. No.	Name and status of person in the family	Type of work under-taken	Total No. of days in a month she will be em-ployed	Earnings		Amount spent	
				Daily	Month-ly	For the fa-mily	For perso-nal needs

Appendix-II

KERALA AGRICULTURAL UNIVERSITY
DEPARTMENT OF HOME SCIENCE
VELLAYANI

A survey on food consumption pattern and dietary habits of selected Kanikkar families in Amboori

Serial number:

1. Expenditure on food:

Sl. No.	Items	Frequency of purchase				Cash purchase		Person responsible for purchasing	Home production		Person responsible for home production
		Daily	Weekly	Fortnightly	Monthly	Qty.	Value		Qty.	Value	
1.	Cereals										
2.	Pulses										
3.	Oilseeds & Nuts										
4.	Leafy vegetables										
5.	Root vegetables										
6.	Other vegetables										
7.	Flesh food & egg										
8.	Milk										
9.	Milk products										
10.	Fruits										
11.	Fats & Oils										
12.	Sugar, Jaggery & Honey										
13.	Spices & condiments										

2(i) Frequency of the use of various foods

Sl. No.	Food articles	Frequency of use							
		Daily	More than 3 times/ week	Less than 3 times a week	Once in a week	Once fortnightly	Once monthly	Occasionally	Never
1.	Cereals								
2.	Pulses								
3.	Oil seeds & nuts								
4.	Leafy vegetables								
5.	Root vegetables								
6.	Other vegetables								
7.	Flesh foods & egg								
8.	Milk and milk products								
9.	Fruits								
10.	Fats and oils								
11.	Sugar, Jaggery & Honey								
12.	Spices & condiments								

ii) Who is the person responsible for deciding the frequency of the inclusion of various foods in the daily diet?

3. Methods of preparing various food articles prior to cooking

(i) Dry food articles (like cereals)

a) Washing and Drying (soon after purchasing)

b) Washing just before cooking

c) Clearing/winnowing and then washing

ii) Washing : specify number of times

a) Once b) Twice c) Thrice d) More

d) Washing till the water is clear

iii) Fresh food items:

When do you wash

	Before cutting	After cutting
1. Fruits		
2. Vegetables		
3. Meat		
4. Fish		

iv) How do you cut them?

1. Into very small pieces
2. Into small pieces
3. Into big pieces
4. According to the type of preparation

v) Do you use an iron knife to cut fruits and vegetables?

4. Methods employed for cooking

Sl. No.	Food	Methods of cooking generally used						Methods specially used by the tribals
		Stewing	Boiling	Absorption	Steaming	Frying	Fresh	Any other
1.	Cereals							
2.	Pulses							
3.	Oil seeds & nuts							
4.	Leafy vegetables							
5.	Root vegetables							

v) What are the type of cooking vessels used?

vi) How many vessels do you use daily for cooking?

vii) What is the type of cooking device used at home?

6. Daily Meal pattern (Dietary recall method)

Meal Time	Menu I Day	Menu II Day	Menu III Day
Early morning Time			
Breakfast Time			
Lunch Time			
Tea Time			
Dinner Time			
Any other (items)			

7. Meal serving pattern	Reasons
(i) Meals taken together by all the family members	
(ii) Meals taken by the head of the family first and then by others	
(iii) Meal taken by the male members of the family first and then by the female members	
(iv) Meal taken by the children first and then by parents	

Sl. No.	Food	Methods of cooking generally used							Methods specially used by the Tribals
		Steaming	Boiling	Absorption	Steaming	Frying	Fresh	Any other	
6.	Other vegetables								
7.	Flesh foods & egg								
8.	Milk & Milk products								
9.	Fruits								

5. Cooking methods usually adopted

i) How many times the meals are cooked

a) once b) twice c) thrice d) more than that

ii) Who does the cooking?

iii) Who assists in cooking?

iv) At what time do you prepare the meals

Meals	Time of preparation	Time of eating
1. Breakfast		
2. Lunch		
3. Tea		
4. Dinner		

8. Use of Left Over foods

(1) Do you use left over foods i) yes ii) No.

(2) If yes

Sl. No.	Items left over and re-used	How is it re-used

9. Methods of storage of food

Sl. No.	Food	Method of storage	Period of storage	Whether it is used or sold	Containers for storage	Area of storage	Reason
1.	Cereals						
2.	Pulses						
3.	Leafy vegetables						
4.	Other vegetables						
5.	Fruits						
6.	Milk						
7.	Meat						
8.	Egg						
9.	Fish						
10.	Others						

10. Food preservation at home

Foods preserved	Method used	How long it is pre-served	Method of using preser-ved item	Con-tainers used for preser-vation	Area	Reasons
1. Cereals						
2. Pulses						
3. Leafy vege-tables						
4. Other vege-tables						
5. Fruits						
6. Milk						
7. Meat						
8. Egg						
9. Fish						

11. Foods given, avoided for special conditions

Conditions	Foods Given	Foods Avoided	Reasons
1. Infancy			
2. Pre-school			
3. School going			
4. Adolescent:			
1. Boys			
2. Girls			
5. Puberty			
1. Boys			
2. Girls			
6. Pregnancy			
I. stage			
II stage			
III stage			
7. Soon after delivery			
8. Lactation			
9. Old age			

12. Foods prepared for special occasions

Occasion	Foods prepared	Reasons
1. Birth		
2. Death		
3. Marriage		
4. Feasts		

13. Infant feeding practice

(i) When do you start breast feeding the new born Baby?

I Day				II day	III day	Any other day
-	Hours	12 Hrs.	18 Hrs.	Any other time		

Reasons

(ii) a. What is the first item of food given to the new born baby?

b. When it is given?

c. Reasons?

(iii) How long do you breast feed the Infants?

1. Until next pregnancy

2. One year 3. Two years 4. Longer

(iv) What is the interval between feeds?

1. Whenever the child cries

2. When the mother feels that the child is hungry

3. Every 2 hours

4. Every 3 hours

(v) Weaning

(a) When are the children generally weaned?

(b) Reasons for weaning at a specific age?

(c) How is weaning done - Explain methods used:

(d) Do you make any weaning food: 1. YES 2. NO

If YES give details of the preparation

(vi) Supplementary feeding

1. When do you introduce new foods to an infant along with breast milk

Supplement	Age at which introduced	Quantity given at a time	No. of Feeds	Intervals	Reasons for introducing the food
Liquid foods other than breast milk					
1.					
2.					
3.					
4.					
Semi-solid foods					

Supplement	Age at which introduced	Quantity given at a time	No. of feeds	Intervals	Reasons for introducing the food
Solid foods					
1.					
2.					
3.					
4.					
5.					
6.					

14. Diet during illness

Common ailments	Cause if known	Treatment	Foods introduced	Reasons	Foods avoided	Reasons

* Allopathy, Ayurvedam, Homoeopathy, Mandram, Self-treatment or treatment by which Doctor

15. Common fads and fallacies related to food

Hot foods	Cold foods	Other believes

16. Problems that you have in feeding the family

Areas	Problems
1. In cooking	
2. In purchasing	
3. In preparing	
4. In storing	
5. In serving	
6. In planning	

17. Attitudes and concepts regarding foods and nutrition.

1. Which are the foods you think are essential to healthy living?

2. What is health?

3. What is the cause of overweight?

4. What is the cause of underweight?

5. Who are the persons requiring special feeding in a family?

6. What do you think about the free feeding programmes implemented in your area?

18. Minor vices prevalent among the family members

Minor vices	Details of family members coming under each group	Age	Number of years as addict	Source of money for indulging in the particular habit	Reasons for starting the habit
1. Alcoholism					
2. Betel chewing					
3. Smoking					
4. Narcotism					
5. Alcoholism and betel chewing					
6. Alcoholism and smoking					
7. Betel chewing and smoking					
8. Alcoholism, Betel chewing and smoking					
9. Any other					

Appendix-III

Kerala Agricultural University
Department of Home Science

Family diet survey (three day weigment) among Kanikkar families in Amboori

Serial No. Name of the head of the family Date

Name of hamlet

Age, sex and composition of the family

Family members	Sex	Age								
		Above 21 year	12-21	9-12	7-9	5-7	3-5	1-3	Below one year	Guests

Weight of raw food in grams

Food stuff	Weight (g)	Food stuff	Weight (g)

Cereals

1. Bajra
2. Jowar
3. Maize dry
4. Ragi
5. Rice
6. Wheat flour
7. Others

Pulses

8. Bengal gram
9. Black gram

Food stuff	Weight (g)	Food stuff	Weight (g)
10. Kesari dhal		Roots and Tubers	
11. Lentil		28. Carrot	
12. Reg gram		29. Colocasia	
13. Soyabean		30. Onion small	
14. Others		31. Potato	
Green leafy vegetables		32. Sweet potato	
15. Drumstick leaves		33. Tapioca	
16. Amaranth leaves		34. Yam elephalt	
17. Others		35. Others	
Other-vegetables		Nuts and oil seeds	
18. Amaranth stem		36. Cashewnut	
19. Bitter gourd		37. Coconut, dry	
20. Brinjal		38. Coconut, fresh	
21. Colocasia stem		39. Groundnut	
22. Cucumber		40. Others	
23. Drumstick		41. Condiments and spices	
24. Jack tender			
25. Papaya green			
26. Tomato green			
27. Others			

Food stuff	Weight (g)	Food stuff	Weight (g)
Fruits		**Milk and milk products**	
42. Amla		59. Milk	
43. Apple		60. Curds	
44. Banana ripe		61. Butter milk	
45. Jack fruit		62. Skimmed milk	
46. Lime and orange		**Fats and oils**	
47. Mango ripe		63. Butter	
48. Papaya ripe		64. Ghee	
49. Tomato ripe		65. Hydrogenated oil	
50. Others		66. Cooking oil	
Fish		**Other food stuffs**	
51. Fish, fresh		67. Betel leaves	
52. Fish, dry		68. Biscuit, salt	
53. Prawns		69. Biscuit, sweet	
Other flesh foods		70. Bread white	
54. Meat-Beef		71. Sugar	
55. Chicken		72. Jaggery	
56. Liver, Goat		73. Pappad	
57. Egg, Hen		74. Sago	
58. Others		75. Toddy	
		76. Horlicks	
		77. Farex, Amul etc.	
		78. Others	

Appendix-IV

National Institute of Nutrition

Nutritional assessment schedule

Date:

State: District: Taluk: Village:
Serial No. Family No. Block:

Name of the subject: Sex: Male/Female

Name of the Father/Guardian: Occupation:

Income (per annum): Date of birth:

Age:..... Yrs..... Mths.

Source: Parents/record

Breast fed/BF + Supplements/Not BF (BF) Pregnant/Lactating..... mths.

ANTHROPOMETRY:

Heights (cms.)	Fat fold at triceps (mms.):
Weight (kgs.)	Head circumference* (cms.):
Arm circumference (cms.):	Chest circumference*(cms.):

CLINICAL EXAMINATION:

Hair Sparse	Pellagra
Discoloured	Crazy pavement dermatosis
Easily plucked	Pigmentation at knuckles/fingers/toes
Moon face	Phrynoderma
Parotid enlargement (bilateral, painless)	Koilonychia
Oedema	Gums-spongy bleeding

Emaciation	Craniotabes
Marasmus	Epiphyseal enlargement
Conjunctival xerosis	Beading of ribs
	Knock-knees/bow legs
Bitot's spots	Frontal parietal boosing
Corneal xerosis/ Keratomalacia	: caries
Corneal opacity	Teeth : Mottled enamel
Night blindness	Enlargement of spleen
Photophobia	Enlargement of liver
Anaemia	Soft
Nasolabial dyssebacea	Firm
	Hard
Angular stomatitis	Thyroid enlargement
Cheilosis	Others
: red & raw	
Tongue: Papillae-atrophic	
Papillae-hypertrophic	

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*For children below 5 years only.

Appendix-V

Haemoglobin - Cyanmethaemoglobin method

Principle:- Haemoglobin is converted into cyanmethaemoglobin by the addition of potassium cyanide and ferricyanide. The colour of cyanmethaemoglobin is read in a photoelectric colorimeter at 540 n.m against a standard solution. Since cyanide has the maximum affinity for haemoglobin, this method estimates the total haemoglobin

Reagent: Drabkin's solution: Dissolve 0.05 g of potassium cyanide, 0.2 g of potassium ferricyanide and 1 g of sodium bicarbonate in one litre of distilled water.

Procedure 20 μ L of blood are measured accurately from a haemoglobin pipette and delivered onto a Whatman No. 1 filter paper disc. The filter paper is air dried, labelled and can be stored upto one week. The portion of filter paper containing the blood is cut and dipped in 5 ml Drabkin's solution taken in a test-tube. Wait for 30 minutes and mix the contents on a vortex mixture and take the readings.

Construction of standard curve

If the blood drawn from the subject contain haemoglobin 15 g/dL after estimation then prepare three reference standard as follows.

1. Reference standard A

   4 ml blood in 1000 ml. Drabkin's reagent contain haemoglobin 15 g/dL

2. Reference standard B

   300 ml of reference standard A + 200 ml, Drabkin's reagent contain haemoglobin concentration of 10 g/dL

3. Reference standard C

   200 ml of reference A + 300 ml Drabkin's reagent contain a haemoglobin concentration of 7.5 g/dL

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

Appendix-VI

Kerala Agricultural University

Department of Home Science

A questionnaire to elicit the time utilization pattern of the Kanikkar women

Serial number:

1. Name of the house-wife
2. Age
3. Marital status
4. Type of family
5. Size of the family
6. Number of adult women in the family
7. Number of acres of land held by the family
8. Time utilization pattern of the house-wife

Activities	Time spent in minutes		
	I day	II day	III day
1. Personal activities			
2. Cleaning in and around the house			
3. Washing clothes			
4. Waste disposal			
5. Collecting water			
6. Collecting fuel			
7. Chopping fire-wood			
8. Collecting agricultural produce			

Articles	I day	II day	III day
9. Agriculture activities			
10. Searching for food in the field			
11. Going to the market			
12. Care of domestic animals			
13. Attending to young children			
14. Cooking			
15. Rest			
16. Other activities			

NUTRITIONAL PROFILE OF KANIKKAR WOMEN IN AMBOORI AREA

BY

FELSY THOMAS

ABSTRACT OF THE THESIS
SUBMITTED IN PARTIAL FULFILMENT OF THE
REQUIREMENT FOR THE DEGREE OF
MASTER OF SCIENCE
IN FOOD SCIENCE AND NUTRITION
FACULTY OF AGRICULTURE
KERALA AGRICULTURAL UNIVERSITY

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VELLAYANI, TRIVANDRUM

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ABSTRACT

A study to assess the nutritional profile of Kanikkar women in Amboori area was conducted through ecological, socio-economic and food consumption survey, anthropometric, clinical and biochemical assessment and through time and motion studies.

The results of the survey conducted in eight Kanikkar hamlets which comprise 177 families depicted that all the families are of Hindu faith, with an average family size of four. Majority of the families are of nuclear type with equal literacy level among men and women. 65 per cent of the families surveyed are below the poverty line. 85 per cent of the tribal families spend more than 80 per cent of their income on food. Among food articles the major expenditure is towards the purchase of cereals, followed by fish and oil seeds (coconut). Tapioca which is the most popular food is completely home produced. Their culinary practices are similar to those adopted by the rural families residing around and elsewhere in the state. Only 50 per cent of the tribal families surveyed are in the habit of preserving foods. Three-meal-a-day system is adopted by them.

The weighment survey revealed that the diets of the women are quantitatively inadequate in all food groups

except roots and cubers, fish and other-vegetables (with seasonal variations). The average consumption of cereals range from 75 g to 95 g per day. Pulses, milk, milk products and meat are lacking in their diets. They compensated for their lesser intake of cereals with an excess intake of roots and tubers (tapioca), fish and other-vegetables. In general the diets of the Kanikkar women are deficient in all nutrients except vitamin C. No special food is prepared in the tribal homes for the infants. They follow food restrictions during illness and certain foods are given or withheld by them for girls at menarche and for women in the post-delivery period. Alcoholism, betel chewing and smoking are common among them.

An attitude survey among the women to test their knowledge about food and nutrition revealed that they are not aware of persons requiring special feeding in a family or effect of food on the body. Anthropometric data of the tribal women revealed gross inadequacy in the weight-for-height-for-age profile. Estimations of haemoglobin level showed that 60 per cent of the women tested are anaemic, in addition vitamin A deficiency (30 per cent) and niacin deficiency (10 per cent) have also been noted. Time and motion studies showed that the tribal house-wife spend maximum time for agricultural activities, cooking and going

to the market and minimum time for personal and child care. The size of the family, number of acres of land possessed by the family and number of adult women in the family have no significant effect on time utilization pattern of the house-wife.