NUTRITION PROFILE OF A TRIBAL AREA

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDICES

I. INTRODUCTION

Eversince the era when man hunted for his food, one of the main reasons why he organised himself into societies was to ensure an adequate food supply for all. If people are to be productive, they must enjoy a satisfactory level of health. Only then they will be able to improve their work capacity and help to create the conditions required for improving their own well being and that of the society of which they are members. Hence, the fundamental role of any society is to ensure the well being of its members.

A substantial section of the population in developing countries suffers from undernutrition or malnutrition or both (Shanti Ghosh, 1976). Sukhatme (1967) states that over 50 per cent of the people in South East Asia suffer from undernutrition. Ninety per cent of Indian Children surveyed had heights and weights which corresponded to the lowest 10 per cent of the American children (Gopalan, 1973).

The death rate in the rural areas of India is around 19 per thousand population as against 10 in the urban areas. These depressing figures indicate the magnitude of the problem of undernutrition and ill health among the rural communities (Gopalan, 1977). Out of 100 million preschool children 3 to 4 million suffer from severe types of malnutrition and probably 1 million die because of this every year (Shanti Ghosh, 1976).

The factors responsible for such high percentage of malnutrition are complex. Several factors such as low agricultural production, poverty, population explosion, ignorance and poor environmental sanitation appear to cause and aggravate malnutrition (Devadas, 1970; Gopalan, 1975; Srikantia, 1975). Malnutrition is a multifaceted problem, hence, it requires a multi-dimensional approach for total eradication. Supplementary feeding programmes tend to alleviate the problem to certain extent by avoiding hospitalisation of children and letting them die(Alfredo, 1973). But the ultimate solution lies in helping people attain a level of socio-economic development and food production and a pattern of income distribution which will make supplementary feeding unnecessary.

Successful prevention of malnutrition depends on knowledge of causation, identification of risk groups, availability of prophylactic or early detection measures, a favourable climate of social policy and continual evaluation and improvement, development of procedures applied (WHO, 1979).

Regional ecological differences including widely, varying agroeconomic and climatic conditions make it necessary that planning procedures are based upon experiences which have been made in the initial phase for development. Similarly, evaluation of achievement and failure at a latter stage, will require information from several sources (Kreysler, 1975).

Hence there is a great need for different types of health and nutrition surveys to depict the present status and conditions before launching any nutritional or health programmes on a large scale basis.

With the objective of gathering baseline information to serve as guide lines for integrating nutrition-health education with the curriculum at the primary stage, a national project has been sponsored by the NCERT/UNICEF/ Government of Tamil Nadu and executed by the Apex Centre, Sri Avinashilingam Home Science College for Women, Coimbatore. Background information on the socioeconomic status was collected along with qualitative dietary nutritional survey, from several areas. This study is a survey of a tribal community nutrition before launching a nutrition/health education programmes.

II. REVIEW OF LITERATURE

The literature related to the study are discussed under the following heads:

A. Need for assessing nutritional status of the community

B. Methods available for assessing the nutritional status of the community:

1. Anthropometric measurements
2. Clinical assessment
3. Dietary survey
4. Food consumption survey
5. Biochemical examination

C. Factors affecting nutritional status of the community and

D. Studies on tribal communities.

A. Need for Assessing Nutritional Status of the Community:

The nutritional well being of a community or nation is an important determinant of its health status (FAO, 1976). Three hundred million children in the world today are physicall and mentally retarded due to malnutrition. Hence in order to distinguish the well nourished from the malnourished and undernourished assessing the nutritional status of the community is indispensable (Gopalan, C., 1976).

Successful prevention depends on knowledge of causation, identification of risk groups, availability of

prophylactic or early detection measures, a favourable climate of social policy, and continual evaluation and development of procedures applied (WHO, 1979). Hence there is a greater need for different types of health and nutrition survey to depict the present status and conditions before launching any nutritional or health programmes on a large scale basis. The present study is an endeavour by the investigator to know the present trend of morbidity of children.

A simple, properly functioning surveillance systems that detect the incidence and severity of cases and changes that occur will serve to provide early warning of the threat of epidemics indicating the need for laboratory epidemiological investigations, reinforcement of treatment and sanitation facilities and institution of control measures.

Miller (1970) views that nutritional status is the extent to which a customary diet meets the requirement. Martin (1963) and WHO (1963) defines, nutritional status of an individual or a population as the level of health resulting from the intake and utilisation of nutrients.

Morgan (1955) defines "nutritional status or, the state of health of the individual or group as considered by the choice and amounts of foods, or the nutrients taken". Many methods have been developed to study the nutritional status. It could be assessed by anthropometry et al

(1963) recommend the following methods (1) Diet surveys (2) Anthropometric measurements (3) Biochemical tests (4) Clinical examinations (Jelliffe, 1966; Davidson et al., 1973; Swaminathan, 1974; Blackburn, 1971; Gopalan, C., Visveswara Rao, K., 1972).

In the formulation of the policy and plans to improve the nutritional condition, of the vulnerable groups, it is essential that the actual types and amounts of food consumed by the groups different in age, sex, occupational, social or economic status are ascertained only then a change for the better can be brought about in the dietary habits of the people. Furthermore, such information will help to reveal the special needs of vulnerable groups such a revealation will indicate the scope for improvements in areas such as hygiene and judicious expenditure of money on food. The scope for improvement is large.

B. Methods Available for Assessing Nutritional Status of the Community

1. Anthropometric measurements

Nutritional anthropometry is concerned with measurement of the variation of the physical dimension and the gross composition of the human body at different age levels and degrees of nutrition (Jelliffe, 1966).

Anthropometric measurements are those which measure the physical growth of an individual. They comprise,

weights, heights, abdomen measurements and chest measurements. Bansi (1961) considers checking the weights of people as the most obvious method of checking their nutritional status.

The investigations of Ebbs et al. (1941) and Burke et al (1949) show the important relationship between maternal diet on one hand, and the condition of the foetus at birth on the other. Gopalan (1961) regards the birth weight in a community as an index of neonatal viability. He points out that low birth weight in the low socio-economic groups are also associated with prematurity and infant mortality.

Gurney (1969), Jelliffe (1970), Mathan (1971), Gordon and Scrimshaw (1972) and Sarbyesan (1973) opine that measurements of head, chest and arm circumference, all form important anthropometric indices. Arm circumference along with other measurements like height and weight will be of use for the assessment of nutritional status (Lowy, 1971 and ICMR, 1976).

According to Sihri (1972), Vijayaraghavan (1976) and WHO (1979) weight and height are best sensitive and relative anthropometric trials to determine the growth pattern of a subject particularly of a specific population group.

2. Clinical assessment

Clinical assessment is one of the most essential and the simplest tool used in the evaluation of human nutritional status (FAO, 1970).

Nelson (1963) and Swaminathan (1969) point out that clinical examination adopted in nutritional survey is a careful examination including medical history with special attention given to various symptoms and signs that are more or less associated with nutritional deficiencies. The common nutritional deficiency signs, that are looked for, are pale conjunctiva, bitot's spots, angular stomatitis, retarded growth, skin changes, bleeding spongy gums, pigeon chest, bow legs, knock knees and changes in the tongue (Mathur et al., 1974).

According to Davidson and Passmore (1963) clinical examination provides a means of obtaining the estimate of the net state of nutrition. According to D'Alonso (1962), high blood pressure, medically called hypertention is a disease condition and is the greatest killer of expectant women. He Compared two groups of expectant women, one on a low protein diet, and the other on a high protein diet, and the other on a high protein diet.

Davidson and Passmore (1963) view that the difference between the well and poorly nourished children can be assessed through clinical examinations. However, the

usefulness of clinical examinations can be greater when carried out in conjunction with a family dietary social and economic survey. According to Plough (1963), of all the procedures that may be employed in the evaluation of human nutritional status the simplest and most basic is clinical examination. Gopalan and Rao (1961) remark that clinical assessment of malnutrition has gained particular importance in India due to the wide spread signs of frank deficiency. Rao et al (1954) stress that while clinical signs can serve as an index of nutritional status, they are not adequate in themselves, since malnutrition can exist without specific signs. Behar et al. (1960) opine that three types of findings, clinical, biochemical and dietary complements one another, and together make possible an evaluation of the nutritional status, which cannot be achieved without all the three. Clinical examinations brings to light symptoms of several deficiency status such as vitamin A deficiency as manifested by conjunctival xerosis, Bitot's spots, follicularis and follicular keratosis as observed by the ICMR (1953), (1956), Rao et al. (1954), Swaminathan et al (1960), Rao et al (1961), Bajpai and Sen (1961) and Murray (1962). Riboflavin deficiency as revealed by cheilosis, buccal, mucous stomatitis, angular stomatitis and atrophic papillae, as recorded by the ICMR (1953) (1955), Martin (1954), Swaminathan et al (1960), Venkatachalam and

Gopalan (1960) and Rao et al (1961). Ascorbic acid deficiency as indicated by hyperaemic lesions of the skin, as noted by Rao et al. (1961).

3. Diet surveys

Gopalan and Rao (1972) and Negated (1972) states that dietary studies contribute an essential part of any complete nutrition survey. Dietary surveys are carried out to obtain information on dietary intake to determine in large measure the nutritional level and health of its people and to identify groups and rectifying the effects of ill balanced diets (Martin, 1963; Sjolin, 1969; Burke, 1972, and Davidson et al., 1973).

Davidson and passmore (1963) report that the quantitative information about the food eaten by a people or a community if compared with the physiological standards of human needs can serve as a tool for the assessment of nutritional status according to Epright et al (1953), food habits of the people, the kinds of foods eaten, the distribution of foods among meals and the estimated intake of nutrients will be shown by dietary studies, diet survey have been used as a method in nutritional status assessment by several workers. Rao (1960) and Davidson and Passmore (1963) state if repeated dietary surveys are carried out systematically, it is possible to forecast whether or not the quantity or quality of the food consumed is improving

or declining. Diet survey carried out in India and reported by Pandit (1964) reveal that the diet of an average villager is ill balanced and defective with a preponderance of cereals, lacking in protective foods such as milk, fish, eggs and fruits.

The 3rd World Food Survey of the FAO (1963) has revealed that in the developing regions, the daily per capita consumption of animal protein is 9 grams which is 1/5 of the consumption of animal proteins reported, in the developed areas. Sielde (1963) has stressed that such low consumption of animal proteins results in the prevalance of a high degree of protein malnutrition. This is particularly common in India, where milk, which is almost the only source of animal protein (1963) in family diets, is produced in limited quantities, being 50 kg per person per year, as against more than 300 kg in France, and 300 kg in the U.S.A.

Gopalan (1961) points out the diet surveys directed towards the vulnerable segments of the population are an essential prerequisite to obtain baseline information for any programme designed towards the betterment of their nutritional status. Hollingsworth (1961) emphasises that from the data obtained from the dietary surveys, the nutrient intake of families, groups or individuals can be assessed by calculations using figures from accepted tables of food values or by direct analysis.

a) Food consumption surveys

Food balance sheet data relate to total food supplies in a country and indicate only average consumption levels of the population, as a whole. A household survey of properly conducted will provide data on the distribution of food consumptiomof different groups in a population.

Three basic methods are used to collect information through household surveys:

1. To conduct interview with selected families
2. To ask families to maintain a daily account of foods they buy.
3. To weigh all the food stuffs used by each household during the survey period.

The interview is most practicable method and it involves the least cost, but it can engender many errors. Families may not remember clearly what they have eaten and in what quantities during the given period.

The daily records and weighing methods are much more accurate as there is less need for reliance on pupils memory, but even these are not free from flaws. They require far more cooperation on the families than does the interview (FAO, 1966) Whiting and Leverton (1960) regard the weighing method especially if combines with chemical analysis as an accurate estimate of intake of individuals.

According to Rao (1975) food consumption studies are greatly needed for disclosing possible dietary defects and for planning improved food habits.

4. Biochemical examinations

Biochemical findings are extremely valuable in assessing the subpptimal nutritional where physical symptomology cannot be recognised (Schaefer, 1960). They help to locate the pattern of deficiency biased on the examination of blood and urine which can be sampled easily (Someswara Rao, 1961; Wilson, 1964 and Whitehead, 1969).

Arroyave (1960) has defined the biochemical methods as those which measure directly the supply of nutrients and those which detect the biochemical changes indirectly reflecting metabolic alterations.

C. Factors Affecting Nutritional Status of the Community

Malnutrition creates a great hindrance to the growth and development of the children, and in turn that of the country (WHO, 1979). The immediate consequence of malnutrition are high morbidity and mortality (WHO, 1979) and the long term consequences are chronic undernutrition, retarded growth and mental development, stunted adult status, low working capacity and poor stature (Devadas, 1977; Arya, 1979 and Chandrasekhara, 1979, WHO, 1979).

A child deprived of health care during these most impressionable years, is deprived of the opportunity of

growing into a normal human being and the damage done in the first few years could be irreversible throughout one's life (Dhamnati et al. 1979, Dhamnati, K.M., Mathur, G.M. and Sharma, R., 1979).

The main causes for malnutrition are poverty, poor socioeconomic status, inadequate food intake, ignorance, false beliefs, traditions, caste, poor living and recreational facilities and faulty food habits (Bravarian, A.P. and Sahar, 1978).

The mortality and morbidity rate is universally recognised not only as a most important indicators of the health status of the children but also of the level of social development (WHO, 1979).

The survivors of early malnutrition start with a developmental path characterised by defective psychological functioning, power of concentration, school failures, poor intellectual performance and lowered adaptive functioning and decreased response to stimulation (Gopalan, 1976, Devadas et al, 1978 and Arya, 1979). Therefore malnutrition can no longer be considered as a micro clinical problem. It is a macro social problem (Sundaram, 1973, Gopalan, 1971 and Devadas, R.P., 1979).

Goldsmith (1971), Aggarwal (1973), Devadas (1974), Umpathy (1976), Jain (1977) states that in an country people suffer from under nutrition, malnutrition and other

serious defects in their levels of living due to lack of elementary health and educational facilities, extremely bad housing condition and sanitation, poverty, broken or unhappy homes, over protection or pampering by parents, lack of educational and recreational facilities.

Surveys have shown that great majority of young children who belong to the poor income groups in the developing countries are malnourished. They suffer from various grades of protein calorie malnutrition (Srikantia, 1971).

Gopalan (1973) states that the two most outstanding problems facing mankind today are the interrelated problems of malnutrition and population growth. It is believed that malnourished population of the world have in general, a high fertility rate.

D. Studies on Tribal Communities:

The definition of "tribe" as it has emerged from attempts of scholars on tribal life is a social group usually with a definite area, dialect, cultural homogenity, and unifying social organization. It can include several sub-groups, such as clans or sibs. A tribe ordinarily has an ancestor and a patron deity. The families or groups composing the larger tribal units are linked through "blood ties" as the term is commonly used and through religious, social and socio economic functions.

India has perhaps the highest tribal population for any single country whose major population is non-tribal. Tribes in India form about 7% of our total population. The populationof scheduled tribes in the state of Madras is 1.86 lakhs which forms 0.6% of the total population of the state. The State Government has, however, estimated the total population at 1.84 lakhs. The tribal population of Nilgiris district is estimated to be 12,302. The main tribes are Irulas, Paniyas, Pulayars, Todas, Kotas and Kodas, Paniyas, Kadas and Irulas form the weaker section among the tribes. Tribes Commission Vol.II(1960-61).

The name Irulas has been given by thepeople of the "plains". They callthemselves "Adivasis". Irulas man is dark in colour. Hemmy work in coffee estates wear turban brass earnings and plain grain cloth wrapped round the body and reachin below the knees. Irulas women are useful for earning their livelihood as man (Thurston and Rangachari, 1909 and Sivasankarapillai, 1978).

Irulas are found all over the state of Tamil Nadu. Irulas are known as "Villis" in the Chingelpet district because they use bow and arrows and "yenadhis" in the northern part of Chingelpet district meaning the original man and as "Cholagar" in the thick jungles (Venkataraman, 1974).

Tribal diets are subject to seasonal variations and the main food item changes depending on their location (Rao, 1972).

Sri Venkatarapillai (1978) opines that Irulas of Attapady are more advance than the other two tribes, Mudugar and Kurumbas learnt about fertilizers, seeds and pesticides. They saw in demonstration farms crops like wheat, soyabeans, vegetables, groundnut and banana in addition to the families, millet, ragi, thinai, redgram and amaranthus.

Oomen and Cardon (1970) encountered a tribal group in the new guineas who were found to have certain nitrogen fixing flora in their intestinaltract enabling them to remain in good health on starchy food along with negligible protein intake.

A study (Bhandari and Gupta, 1972) of the nutritional status of tribal and non-tribal rural school children revealed that most of the tribals have small land holdings without wells, situated on slopes of the hills, thus depending mainly on rains for irrigation. The staple crop is maize. The results showed that the tribals are a poorer section of the society when compared with the non-tribal community of the same villages. The tribal children were in general, thin, under clothed and undersized with poor musculature. The tribal children were more undernourished

than non-tribal children but on the whole, both the communities were poorly nourished when compared with the national averages published by the ICMR. Boys had higher measurements than the girls in all the age groups in both the communities non-tribal children were bigger in all the measurements. The chest circumference crossed the head measurement.

III. METHODOLOGY

The methodology that was followed to findout the Nutritional Profile of a Tribal area included the following steps.

1. Selection of the area
2. Selection of the sample
3. Selection of the survey technique
4. Formulation of questionnaire
5. Conducting the survey
6. Weighment survey
7. Clinical assessment and
8. Tabulation and presentation of the findings.

1. Selection of the Area:

Manjapanni and Kolliharai the most backward area where the tribes 'Irulas' live were selected for this study. Since many studies concerning nutrition, health education have been conducted in and around Coimbatore district, and since there is no information regarding the nutritional profile of the tribal community, this particular area was selected. This area is situated on the highways between Mettupalayam and Kotagiri and is about 70 K.M. away from Coimbatore city.

2. Selection of the Sample:

a) Kanjapanni, Kolimarai are two small tribal hamlets or 'padi' consisting about 100 households in each of the two hamlets. Hence a complete enumeration of the population was made to collect information on their socio-economic and lifestyle data on feed habits. All the children within the age group of 0-9 in both the hamlets were included for conducting the clinical assessment. For the food weighment survey 10 school going children from each of the two hamlets, studying in Class III were selected.

b) Time of Conducting the Survey:

The choice of the time of the year the survey will take place is of great importance due to the influence of the time on food behaviour. For example, the food behaviour of a community will be different before and after the harvest period and during feast days and periods of fasting. With all these considerations in mind, this survey was conducted during the months of September and December which were not in a harvest season nor were festivals during this seasons.

3. Selection of the Survey Techniques:

The techniques adopted to conduct the survey were

a) Observation of the target population and its environment.

b) Personal interviews structured by a questionnaire as recommended by Siber (1973).

4. Formulation of Questionnaire:

A questionnaire consisting questions to elicit information on the socio economic factors and dietary habits was formulated and the efficacy of the questionnaire was tested by a pilot study consisting of 20 households in a similar tribal area in Kotagiri Block (Appendix III).

5. Conduct of Survey:

The investigator stayed in the selected hamlets and through direct interview with the homemakers gathered the information. This was complemented with participant observation for more reliable data. The investigator, with the help of the village head man, developed good rapport to get their cooperation.

6. Weighment Survey:

A weighment survey was conducted by weighing the raw foods before cooking each meal. Weighing the cooked and the left over meal gave the amount consumed by the sample. From the cooked amounts consumed, the raw equivalents were calculated for computing the calorie and nutrient intake.

7. Clinical Assessment:

Clinical assessment was conducted by the Registered Medical Practicners of the primary Health Centre of Kotagiri Block using the schedule given in Appendix.

8. Tabulation and Presentation of Findings:

The findings of the survey were tabulated, analysed and presented quantitatively.

IV. FINDINGS OF THE SURVEY

The findings of the survey are presented under the following heads:

A. General Background of the Village
B. Socio-economic Conditions of the Families
C. Findings of the Diet Survey
D. Feeding Practices of the Families
E. Mortality and Morbidity among Children
F. Possession of Poultry, Cattles and Goats among the Households

and G. Nutrition Knowledge of the Mothers

A. General Background of the Villages

Irulas, is a small tribe, speaking Tamil, found on the lower slopes of the Nilgiris hills. They are an unsettled vagrant race, not confining themselves to one spot, but delight in wandering from place to place.

Kunjapanai and Kolikarai are two small tribal hamlets situated on the highways between Mettupalayam and Kotagiri in the mountain region of the Nilgiris District, at an altitude of 1,000 meters. The main rainy season is June to September. The two villages are thinly populated with a total population of 382 and 179 in Kunjapanai and Kolikarai respectively. The main occupation in these areas is subsistence agriculture like coffee, jackfruit, and

gueva. The houses in these area for most part are huts with thatched roofs and line houses with flat corrugated roofs constructed by the Harijan Welfare Departments. The huts and houses are very bare, with few household utensils. The families crowd in at nights to sleep on the cots. It is not usual to dig latrines and the surrounding forest area is used freely for indiscriminate defecation.

The educational facilities available are a Balwadi in each hamlet and a Government Tribal Residential Middle School run by the Harijan Welfare Department. Children after completing class VIII go either to Ooty or Coonoor where Government High Schools are available. Each hamlet has a well and a petty shop and tea shop where snacks are sold. For purchase of ration like rice, oil, sugar etc., they go to Kotagiri, 15 Kms away from the place of their residence.

The Tribal Welfare Department of Harijan Welfare Department has given 5 Acres of land in the purampok area freely for each household, and a small subsidy for raising coffee plants.

No medical facilities are available in both the hamlets except for the visit of the doctor from PHC once in a week. Hospital facilities are available only at Kotagiri.

B. Socio Economic Conditions of the Families

Demography:

Table I shows the classification by age and sex of the population of Kunjapanai and Kolikarai (Hamlet I and II).

TABLE I

CLASSIFICATION BY AGE AND SEX OF THE POPULATION

Age in years	Male [Numbers]		%		Female (Numbers)		%	
	I	II	I	II	I	II	I	II
0 - 4	30	10	10.6	5.6	25	12	8.9	6.7
5 - 9	16	6	5.7	3.4	18	10	6.4	5.6
10 - 14	6	5	2.1	2.8	9	4	3.2	2.2
15 - 19	15	8	5.3	4.5	14	8	5.0	4.5
20 - 29	30	17	10.6	9.5	35	20	12.4	11.2
30 - 39	17	20	6.0	11.2	20	18	7.1	10.1
40 - 49	12	10	4.3	5.6	8	7	2.8	3.9
50 - 59	15	10	5.3	5.6	7	8	2.5	4.5
60 & above	4	2	1.4	1.1	1	2	0.4	1.1
Total	145	88	51.3	50.7	137	91	48.7	49.3

I - Kunjapanai

II - Kolikarai

The population is classified in accordance with five year groups expressed in absolute numbers and as per hundred.

Children within the age group of 0-4 years constituted 19.5 percentage and 13.3 percentage of the total population in Kunjapanai and Kellikari respectively. Adults within the age range of 20-39 form the highest percentage of population in both the hamlets.

TABLE 11

NUMBER OF PERSONS IN THE HOUSEHOLDS

Hamlet	Household size	1	2	3	4	5	6	7	8	9	10	Total
Kunjapanai	Number of households	—	—	30	—	2	6	8	10	—	4	50
	Number of persons	—	—	60	—	10	36	56	80	—	40	282
Kolikarai	Number of households	7	10	9	13	6	1	—	4	1	—	50
	Number of persons	7	20	27	48	30	6	—	32	9	—	179

Table II depicts the household size in the two hamlets. Among the 50 families in Kajaponai, 20 families have only 3 persons and 10 families have 8 persons, and are joint families. In hamlet II, 7 families has only one person. They are widows and widowers without any issues. 12 families have 4 persons and one family has 10 persons which is a joint family. The family size is one of the factors that affects the nutritional status of the person. If there are more mouths to be fed, lesser will be the intake of food (Gopalan, Visveswara Rao, 1973). As evident from the Table II the family size is not large and even in cases of large families children are put in the residential school and only the adults are to be fed.

Table III gives the marital status of the population.

TABLE III

THE MARITAL STATUS OF PERSONS OF 15 YEARS AND OLDER AGE GROUPS

Age in years	Male								Female							
	Married		Single		Widower		Total		Married		Single		Widower		Total	
	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II
15–19	—	3	15	5	—	—	15	8	11	5	3	3	—	—	14	8
20–29	34	4	6	9	—	2	30	13	36	16	7	4	—	[illegible]	36	30
30–39	15	15	2	3	—	2	17	20	30	18	—	—	—	—	20	18
40–49	10	8	2	2	—	—	12	10	5	5	—	2	3	1	8	7
50–59	12	6	—	4	3	—	15	10	5	7	—	—	2	2	7	9
60 & above	4	2	—	—	—	—	4	2	1	—	—	—	—	—	1	2
Total	68	38	25	23	3	4	93	64	70	51	10	9	5	3	85	63

In the tribal community the girl gets married at an very early age. Once she attains puberty, the marriage is fixed. As it can be seen from Table II, in hamlet I, 11 girls within the age of 15-19 are married and in hamlet II, 5 are married. Marriage at an young stage where young girls have got yet recovered from the stress of puberty is one of the reasons for low birth weight of infants and wastage of pregnancy.

Table IV gives the educational level of the two hamlets.

TABLE IV

EDUCATIONAL LEVEL OF THE POPULATION

Age in years	Illiterate				Primary school				Middle school				Secondary Teachers and Vocational Training			
	I		II		I		II		I		II		I		II	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
5 years	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6 - 9	4	5	3	5	12	31	13	6	—	—	—	—	—	—	—	—
10 - 14	—	3	—	6	30	37	10	9	—	—	4	6	—	—	—	—
15 - 19	—	1	4	3	4	4	4	4	9	9	8	3	1	—	—	—
20 - 29	3	3	8	4	5	1	5	3	7	17	—	—	—	—	—	—
30 - 39	11	26	11	7	—	—	—	—	—	—	—	—	—	—	—	—
40 - 49	13	8	13	6	—	—	—	—	—	—	—	—	—	—	—	—
50 - 59	6	8	5	4	—	—	—	—	—	—	—	—	—	—	—	—
60 & above	9	3	2	2	—	—	—	—	—	—	—	—	—	—	—	—
Total	47	46	46	37	41	53	32	32	16	26	12	9	1	—	—	—

The educational levels of the Irulas are low. The highest class completed was middle school.17 women within the age range of 20-29 have completed the middle school in Hamlet I, as against 7 men of the same age range. This may be due to the residential school situated in the village itself. Only one person has got secondary grade Teachers Training who is now employed in the local school. Most of the women are illiterates and have very few interests outside the rearing of the youngest baby.

Table V presents the occupation pattern of the population.

TABLE V

PRIMARY AND SECONDARY OCCUPATION

Primary Occupation	Secondary occupation							
	Farming		Collecting Fire wood		Collecting Forestry Products			
	I	II	I	II	I	II	I	II
Agricultural Labourers	177	132	99	100	90	69	106	55
Trader	—	—	—	—	—	—	—	—
Driver	—	—	—	—	—	—	—	—
Teacher	1	—	—	—	—	—	—	—
Artisan	—	—	—	—	—	—	—	—
Others	—	—	—	—	—	—	—	—

The main occupation of the population in these two hamlet is agricultural labourer which includes tea plucking, and coffee beans picking in the nearby estates. The secondary occupations are farming, felling trees in the forests and selling them, and collection of forestry products such as nutmeg, honey and a type of tubers known as vetrillai valli kilangu, jack fruit, guava, etc. Often these products are sold for very low prices in the market. Irula women are useful for earning their livelihood as men.

Table VI presents the monthly income of the households.

TABLE VI

MONTHLY INCOME OF THE HOUSEHOLDS

Name of the village	Income in Rupees					
	0-100	101-200	201-300	301-400	401-500	Total
Kanjapanai	—	10	30	12	8	50
Kalikaval	—	13	18	13	7	50

The average income of the families fall within 101 to 500 Rs. per month. The composition of the family and the members living together affect the standard of life. Furthermore, the resources vary with seasonal crops, supplies, and the working capacity of the members of the family. The entire population live below the poverty line.

Table VII gives the monthly expenditure pattern of the households.

TABLE VII

MONTHLY EXPENDITURE PATTERN

S.No.	Items of Expenditure	Percentage of Expenditure																			
		10%		20%		30%		40%		50%		60%		70%		80%		90%		100%	
		I	II	I	II	I	II	I	II	I	II	I	I	I	II	I	II	I	II	I	II
1.	Food	—	—	—	—	1	—	2	4	4	8	6	5	30	30	12	4	5	2	—	—
2.	Clothing	30	25	16	10	4	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.	House Rent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4.	Education	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5.	Electricity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6.	Fuel	50	50	—	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7.	Medicine	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8.	Recreation	8	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9.	Miscellaneous	30	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table VII reveals the monthly expenditure of the households. 5 families in hamlet I and 2 families in hamlet II spent 90 per cent of their income for food. 20 and 30 families in hamlet I and II respectively spent 70 per cent for food. Food takes more than 60 per cent in 84 families. When expenditure on clothing is compared with food expenditure is very less. Only once in a year (i.e.) during Pongal they go in for new dress. House rent and education is completely free. Even the reading materials for school children are supplied free of cost.

A good percentage of the income is spent for recreation. The only recreation is cinema for which they have to go to either to Kotagiri or Mettupalayam. They do not have social clubs and as such, even all the three shows of the same cinema may be seen by them in a single day.

C. Findings of the Dietary Survey:

a) Food expenditure:

Table VIII shows the monthly food expenditure of the families.

TABLE VIII

MONTHLY FOOD EXPENDITURE

S.No.	Food items	Percentage																			
		10%		20%		30%		40%		50%		60%		70%		80%		90%		100%	
		I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	I
1.	Cereals	—	—	1	-	8	5	10	8	10	7	11	20	8	3	5	7	-	-	-	
2.	Pulses	20	25	12	22	18	13	-	-	-	-	-	-	-	-	-	-	-	-	-	
3.	Vegetables	25	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
4.	Roots & tubers	10	8	5	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
5.	Milk & Milk Products	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
6.	Meat, fish & Egg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
7.	Sugar and Jaggery	20	15	20	15	10	20	-	-	-	-	-	-	-	-	-	-	-	-	-	
8.	Fats and Oils	12	15	13	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
9.	Spices and Condiments	30	28	20	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

The standard of living is very low as indicated by the money spent on cereals, rice and ragi. Vegetables are seldom consumed. The family diet is completely devoid of milk and milk products and meat. Chickens are sacrificed only for special feasts.

b) Frequency of food consumption

A 24 hour recall method was used to find out the foods actually eaten and the frequency of foods included is given in Table IX.

TABLE IX

FOODS CONSUMED

S.No.	Foods	Frequency of Consumption	
		Kunjapanni	Kolimarai
1.	Rice	143	110
2.	Ragi	136	69
3.	Redgram dhal	80	95
4.	Vegetables	10	8
5.	Roots and Tubers	35	32
6.	Green leafy vegetables	—	—
7.	Meat, Fish and Egg	—	—
8.	Milk and Milk Products	—	—
9.	Jaggery	—	—
10.	Fats and Oils	60	55

Table X gives the food intake of school going children.

TABLE X

FOOD INTAKE OF SCHOOL GOING CHILDREN'S AGE IN YEARS 10 - 12 YEARS

S.No.	Food items	Actual Intake in Gms.										ICMR Recommended Gms.
		I	II	III	IV	V	VI	VII	VIII	IX	X	
1.	Cereals	280	300	250	200	250	340	200	200	340	272	320
2.	Pulses	30	40	35	20	30	40	40	25	30	30	70
3.	Green leafy vegetables	5	5	—	50	100	—	—	—	—	—	100
4.	Other vegetables and Roots and tubers	—	40	100	275	100	100	—	60	50	30	75
5.	Fruits	100	20	100	15	15	—	20	50	65	60	50
6.	Milk	—	—	—	—	—	—	—	—	—	—	200
7.	Fats and Oils	20	4	30	15	30	30	20	10	15	10	35
8.	Meat and Fish and Egg	—	—	—	—	—	—	—	—	—	—	30
9.	Sugar and Jaggery	—	—	—	10	30	—	15	25	15	20	50

The diet is characterised by its extreme monotony. Cooked rice and ragi with wild chilly chutney provide the nourishment for the weanling through adulthood to old age. Animal protein is rarely available, although the Irulas are non-vegetarians. Since game has been exterminated, meat is a rare dish in the dietary.

A weighed record of all foods eaten by the school going child at home was maintained for one day to findout the amount consumed. The results are given in Table X.

The amounts consumed by the children were inadequate in all respects when compared with the ICMR recommended allowances. The diets were predominantly cereal based and contained low amounts of pulses. Consumption of fat, green leafy vegetables, fresh vegetables was very low. However, children eat a sizeable amount of fruits as they are available in plenty during seasons.

The energy value of the diet is dependent on the consumption of large quantities of cooked rice and ragi kali.

Table XI presents the nutrient intake of school going children.

TABLE XI

NUTRIENT INTAKE OF SCHOOL GOING CHILDREN

Subjects	Calories (K.cal)	Protein (gm)	Calcium (gm)	Iron (mg)	B-carotene (ug)	Thiamine (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
I	1400	30.0	0.2	10	810	0.7	0.9	10	40
II	1600	25.0	0.3	13	500	0.8	0.5	11	10
III	1300	23.0	0.1	9	584	0.5	0.3	9	40
IV	1150	12.5	0.05	16	1160	0.3	0.2	12	8
V	1600	20.0	0.3	20	600	0.3	0.8	13	7
VI	2200	35.0	0.45	22	1475	0.4	0.7	10	5
VII	1150	28.0	0.05	16	800	0.6	0.8	5	15
VIII	1150	15.0	0.05	18	750	0.9	0.6	8	20
IX	2100	30.0	0.5	20	1100	0.8	0.5	7	25
X	1500	20.0	0.25	12	600	0.7	0.9	9	26
ICMR	2100	41.0	0.4-0.5	15-20	2400	1.0	1.2	14	30 - 80

As seen from the above table it shows that the calorie intake of eight subjects were much lesser than the ICMR recommended allowances. Protein intake of all the 20 subjects was far below the ICMR allowance. Iron intake met the ICMR allowance for 6 subjects. B-carotene intake did not meet the ICMR allowance even for intake did not meet one subject. Thiamine was too low for 4 subjects. The nutrient intake of all the subjects were far from satisfactory.

c) Cooking practices

i) Methods of cooking:

Boiling is the common method of cooking of cereals and pulses. The cooked water is drained in rice and for preparing kali correct amount of water is used in all the households. Vegetables are rare in their dietary but when used, the cooked water is thrown off. The same practice is followed in cooking green leafy vegetables. Fortunately vegetables are cut into big pieces. This finding is in agreement with those of Church (1971) who states that the suitability of the cooking method the mother uses will depend on knowledge and attitudes concerning food preparation and on the time she has available for cooking. As the mothers go out for earning their daily wages they adopt easy methods of cooking. Besides they are ignorant of other cooking methods.

11) Frequency of daily cooking in the households

Table XII gives the frequency of daily cooking.

TABLE XII

FREQUENCY OF DAILY COOKING OF HOUSEHOLDS

Place	Once	Twice	Three times	Total
Kunjapanni	36	14	—	50
Kolimarni	33	17	—	50

A majority of the families cook only once in a day. They have no fixed meal times. The meal timings are adjusted along with the husband's availability of time. The meal is usually cooked in the nights and the left over food is shared among the family members in the next mornings. The men usually rise with the sun and go for farming and then they go to work in the estates.

Table XIII indicates the person who cooks the food.

TABLE XIII

PERSONS WHO COOK IN THE HOUSEHOLDS

Place	Homemaker alone	Husband and wife	Daughter	Total
Kunjapanai	43	3	4	50
Kalikkarai	46	2	2	50

In 86 per cent and 92 per cent of the households in hamlets I and II respectively, the homemaker alone cooks the food. Only in three families cooking is a joint enterprise of the husband and wife. The preparation of meals is the complete responsibility of the homemaker and she wields a good influence over it.

Table XIV presents the members of the household responsible for buying the food.

TABLE XIV

MEMBERS OF THE HOUSEHOLD RESPONSIBLE FOR BUYING THE FOOD

Place	Husband	Wife	Husband and wife	Children	Total
Kunjapanai	10	35	3	2	50
Kalikkarai	16	24	9	1	50

Unlike the rural homemakers, the tribal home makers are given the responsibility of buying food from the market. This has an important implication. The homemaker of the tribal community, can become a strong link for nutrition education. Since she is responsible for purchasing and cooking food, she will be a good change agent if nutrition education is given to her (Church, 1971).

b. Feeding Practices of the Families:

a) Infants:

Table XV indicates the period of breast feeding.

TABLE XV

THE PERIOD OF BREAST FEEDING

Mothers interviewed: 30

Place	Period in Months						
	Less than 3 months	3-5	6-8	9-11	12-17	18-24	Total
Kanjapanni	-	-	1	-	2	12	15
Kelikarai	-	1	1	-	5	6	13

Invariably, the mothers breast feed their babies byond two years. The mothers have a natural relaxed approach to breast feeding and generally accept this as the only method of rearing the baby. Feeding is on demand and the breast used as a comforter besides.

Table XVI indicates the supplementary foods given to the infants.

TABLE XVI

SUPPLEMENTARY FOODS GIVEN BY MOTHERS INTERVIEWED TO INFANTS THEIR AGE AND METHOD OF FEEDING

Mothers Interviewed: 38

Items	Age in Months												Method of Feeding							
	0-3	3-5		6-8		9-11		12-24		24+			Self Help		Thumbler		Feeding bottle		Hand	
		I	II	I	II	I	II	I	II	I	II		I	II	I	II	I	II	I	II
Rice	-	-	-	-	-	12	13	15	18	16	18		30	38	12	17	-	-	-	7
Plantain	-	-	-	-	-	2	3	-	-	-	-		-	-	-	-	-	-	2	3
Biscuits	-	-	-	-	-	4	3	-	-	-	-		-	-	-	-	-	-	4	3
Bonda	-	-	-	-	-	5½	1	6	3	5	4		3	3	-	-	-	-	13	5
Milk(cows)	-	-	-	-	-	-	-	5	3	2	5		3	2	-	-	-	-	5	5
Egg	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-
Vegetables	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-
Gruel	-	-	-	-	-	10	12	-	-	-	-		-	-	-	-	-	-	10	12

No mother starts supplementary foods from 4th month onwards. No special foods are prepared for the infants and in most cases adult food is mashed and given. Infants are served the food and solid foods are eaten with self help. Liquid foods are given in tumblers and feeding bottle.

Usually, weaning is done by force with small pellets of rice. The weaning process itself is usually rapid, coinciding with the next pregnancy.

Table XVII shows the foods included and avoided during pregnancy and lactation.

TABLE XVII

FOODS GIVEN DURING SPECIAL CONDITIONS - PREGNANCY AND LACTATION

Persons Interviewed: 30

Conditions	Foods included	Reasons	Foods Avoided	Reasons
Pregnancy	Rice, Ragi	Easy to digest	Vegetables, meat, fish, egg, thinai Varagu, Samba, Pulses	Makes the foetus big and leads to complication during delivery
Lactation	Rice, Ragi, Ragi Kali	Good for Infants health	No vegetables are added till 8 months after delivery	It upsets the infants stomach

It is very strange to note that expectant women from 6th month of conception till 3rd month after delivery survive only with rice and rasam. If masan persists after 6th month of pregnancy, they are kept in isolation, in a room separately made for them in the hamlet.

During pregnancy there is a great belief among the tribal women that foods with heating qualities such as horse gram, cow gram, gingely seeds and thinai should not be eaten as these could cause miscarriage. Certain foods like eggs, buffalo milk, Bengal gram dhal and other pulses are avoided in the latter part of pregnancy in the belief that they produce a large baby which might entail a difficult delivery.

The first food given to the new born baby is usually sweetened water, the mother's colostrum is often considered harmful being thick and indigestible. Breast feeding is commenced on the third day after delivery.

The women who is delivered will be given solid foods only after giving the juice of some herbs grown in the dense forests. This is known as 'Kilangi' leaves in their language.

Foods given during illness:

Table XVIII shows the foods given during illness.

TABLE XVIII

FOODS GIVEN DURING ILLNESS

Illness	Foods given	Reasons
Chickenpox	Banana, rice kanjee	Cools the body and prevents itching
Fever	Rice kanjee and meat curry	Gives energy and results in quick recovery
Diarrhoea	Bread, biscuits	Stops diarrhoea
Common cold	Rice kanjee	Relieves headache

Almost all the mothers interviewed gave the same reply. Rice Kanjee is one food which is given during any kind of illness. Usually the tribal people do not go to the hospital for treatment, since they go in for herbal juices. Their tradition is also that one should die in the place where he is born. If the patient is too serious he will be thrown near the burning fire till he dies. However the days are now changing. They have gradually started going to the doctor if they fall sick.

E. Morbidity and Mortality Among Children

Table XIX presents the great grades of malnutrition.

TABLE XIX

GRADES OF MALNUTRITION OF CHILDREN(IN PERCENTAGE)

Age in months	Severe		Moderate		Mild		Normal	
	I	II	I	II	I	II	I	II
6 - 12	30	43	28	35	17	11	31	22
13 - 24	20	33	33	35	11	22	36	30
25 - 72	50	25	24	50	20	10	6	15

In the nutrition survey of preschool children covering 100 households, malnutrition was wide spread. 50 per cent of children within the age of 25 - 72 months suffer from severe malnutrition. This may be due to the fact of sudden weaning of children to starchy adult diet.

Table XXI indicates the deficiency diseases found among the children.

TABLE XX

DEFICIENCY DISEASES FOUND AMONG CHILDREN

Age in months	Kwashiorkor		Marasmus		Marasmic kwashiorkor		Angular stomatitis		Bitot Spots		Anaemia		Scabies	
	I	II	I	II	I	II	I	II	I	II	I	II	I	II
6 - 12	-	-	15	18	-	-	-	-	-	-	10	18	18	21
13 - 24	-	-	-	-	-	-	20	15	10	12	20	30	28	11
25 - 72	22	21	-	-	18	21	33	40	18	11	33	42	32	20

Infants within the age group of 6 - 12 months suffered from marasmus, and anaemia. 15 to 18 infants in hamlet I and 21 infant from hamlet II suffered from scabies, mainly due to unhygenic conditions and also from Vitamin A deficiency, children within the age group of 13 - 24 months suffered from angular stomatitis, bitot spots, anaemia and scabies. 43 children had kwashiorkor and the main reason for high incidence was due to the fact that children at the age of 25 - 72 months were suddenly weaned to family's starchy diet.

Table XXI indicates the percentage of distribution of death.

TABLE XXI

PERCENTAGE OF DISTRIBUTION OF DEATH BY CAUSE AGE AND SEX

Cause of Death	Less than 1 year				1 to 4 years			
	M		F		M		F	
	I	II	I	II	I	II	I	II
Fever	13	—	—	20	20	20	4	4
Respiratory Disease	27	30	—	—	—	—	—	—
Diarrhoea	15	17	15	40	20	37	4	4
Other Infant Death	13	—	—	—	—	—	—	—

The commonest causes of infant mortality as seen from table XXI are respiratory diseases, diarrhoea and fevers. Diarrhoeal disorders are more frequent in children above the age of one year child. This is in consonant with Rao and Gopalan (1972).

Table XXII gives the mean weight and height of various age groups.

TABLE XXII

MEAN ANTHROPOMETRIC MEASUREMENTS OF DIFFERENT AGE GROUPS

Subjects	No. of person		Weight in kg.		Tamil Nadu Standard Weight in kg.	Height in cm		Tamil Nadu Standard Height in cm
	I	II	I	II		I	II	
School going boys	6	8	17.05± 2.115	17.00± 1.005	31.42	117± 4.115	115± 3.115	120.48
School going girls	9	14	17.05± 1.185	16.42± 1.133	31.34	116± 3.100	117± 2.116	122.18
Expectant Women	10	15	30.0± 3.151	38.0± 3.004	51.05	130.8± 4.183	126.4± 3.146	140.3
Nursing Women	12	10	32.5± 3.107	30.8± 2.110	50.08	130.5±3.175	128.5±2.186	140.3
Adult men	90	85	31.36±1.856	41.75±3.604	52.8	141± 4.116	143.25±3.196	159.3
Adult women	80	70	36.35±3.306	36.35±3.108	50.8	145±4.052	140.49±3.306	140.3

The mean weight and height of the expectant and nursing women were very low when compared with Tamil Nadu Standard weight and height. This may be due to the limited choice of foods due to their customs and traditions. In general the weights and heights of all the groups were lower than the Tamil Nadu Standard.

F. Possession of Poultry, Cattles and Goats Among the Households

Table XXIII gives the possession of poultry cattles and goats.

TABLE XXIII

POSSESSION OF POULTRY CATTLES AND GOATS AMONG THE HOUSEHOLDS

Animals and birds	Number of possessing	Use of the Produce	
		By Sale	Use by Themselves
Poultry	73	73	—
Cattles	18	18	—
Goats	6	6	—

Among the 100 households, 73 have poultry, and 18 cattle and six goats. Though 73 percentage possess poultry no one has made use of the produces for themselves.

Table XXIV presents the knowledge of mothers regarding nutrition.

TABLE XXIV

KNOWLEDGE OF MOTHERS REGARDING NUTRITION

Growth promoting foods as listed by mothers	Number stated		Energy Giving Foods listed by mothers	Number stated	
	I	II		I	II
Cereals	35	28	Cereals	40	45
Pulses	20	17	Pulses	25	20
Vegetables	20	30	Vegetables	30	25
Flesh Foods	25	35	Meat, fish and egg	30	41
Milk and milk products	40	45	Milk and milk products	30	41

Mothers knowledge about nutrition is very poor. They are placing much importance for cereal diet and say that cereals give energy and help them to grow. However meat, fish and egg is also listed as growth promoting and energy giving foods by many mothers.

V. SUMMARY AND CONCLUSIONS

50 households in Kunjapanai and 50 households in Kolikarai were included in the survey to find out the existing conditions of the hamlets regarding socio economic conditions, health, nutrition and dietary practices of the tribal community to plan for the nutrition and health education programme. The findings are summarised below:

1. The two hamlets are thinly populated with a total population of 282 and 179 in Kunjapanai and Kolikarai respectively.

2. Girls get married at a very young age, soon after they attain puberty.

3. The educational level of the adults is very low, with the highest qualification being middle school. Only one person has a secondary grade teachers training.

4. The primary occupation is agricultural labour with secondary occupation of farming, wood collection and forestry products.

5. The average monthly income ranged from Rs. 101 to 500 with slight increase during harvest seasons.

6. Money is spent mainly on foods, clothing and in buying few household utensils.

7. The staple diet is rice and ragi as such a sizable amount of money is spent on cereals.

8. The food intake of school going children is less than the ICMR recommended allowances. However, children studying in the residential schools consume more pulse and vegetables supplied free of cost by the Harijan Welfare Department.

9. Boiling is the method commonly practiced for cooking. Excess water from the rice is drained and the water used for cooking vegetables and green leafy vegetables is thrown away.

10. Home makers are responsible for cooking and purchasing food from the market.

11. They cook the food only once a day and the meal times are adjusted according to the husband's convenience.

12. Children are breast fed till two years of age and in 75 per cent of cases they are weaned due to the onset of next pregnancy.

13. Supplementary foods are given from one year onwards. No special foods are made for the purpose. Only adult foods are mashed and given.

14. Rice and rasam are the only foods given to the expectant mother till the third month after delivery. Pulses are avoided for fear of the baby becoming big.

15. Infants are breast fed three days after delivery, as they are afraid that the thick colostrum causes stomach upset.

16. Mothers are given solid food only after taking some herbal extract after delivery.

17. Meat is considered to give energy during fever. Rice kanjee is the common food given for any illness.

18. 65 per cent of children within the age group of 1-4 years die due to diarrhoea. 57 per cent of infants less than one year old suffer from respiratory infections.

19. 73 per cent of them own poultry and cattle but none of the produce is used by the family. They are sold.

20. Mothers' knowledge about nutrition is very poor.

Recommendations:

1. The cultural factors contributing to malnutrition in the tribal area should be studied further.

2. The medicinal and nutritive value of the herbs used must be analysed and the toxic effects, if any, are to be found out.

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APPENDIX I

SRI AVINASHILINGAM HOME SCIENCE COLLEGE FOR WOMEN: COIMBATORE-43

INTERVIEW SCHEDULE TO COLLECT BACKGROUND INFORMATION FROM PARENTS

1. Name of the Family ..
2. Head of the Family ..
3. Name of the Tribe ..
4. Year No. ..
5. Type of Family:
   a) Joint Family ▱
   b) Nuclear family ▱
6. Composition of the family:

S.No.	Name	Sex		Age	Education	Occupation	Monthly Income
		Male	Female				

P.N.B.: Put a *mark against those who have stopped going to the school within fifteen years.

7. Monthly expenditure pattern:

S.No.	Item	Amount spent in Rs.	Percentage
1.	Food		
2.	Clothing		
3.	House rent		
4.	Education		
5.	Electricity		
6.	Fuel		
7.	Medicine		
8.	Recreation		
9.	Miscellaneous		

8. Food expenditure pattern:

S.No.	Item	Amount spent in Rs.	Duration of Purchase			
			Weekly	Fort-night	Mon-thly	Percen-tage
1.	Cereals					
2.	Pulses					
3.	Roots and tubers					
4.	Vegetables					
5.	Leafy vegetables					
6.	Fruits					
7.	Oils					
8.	Milk and Milk products					
9.	Fleshy foods					

10. Sugar and jaggery

11. Spices and condiments

12. Other items

- -

9. Methods of cooking:

S.No.	Food items	With enough water	With excess water
1.	Rice		
2.	Ragi		
3.	Green leafy vegetables		
4.	Other vegetables		
5.	Roots and tubers		

- -

10. Who cooks the food?

Wife alone ☐

Daughter ☐

Husband ☐

Husband and wife ☐

11. Who purchases the food?

Wife alone ☐

Daughter ☐

Husband ☐

Husband and wife ☐

12. How long do you breast fed your baby?

6 month [ ] 1 year [ ]

2 year [ ] above 2 years [ ]

13. When do you start supplementary foods?

6 month [ ] 1 year [ ]

1 1/2 year [ ] 2 year [ ]

14. Supplementary foods given during infancy and methods:

S.No.	Item	Age in months: 3	3-5	6-8	9-11	12-	24+	Total	Method of feeding: Self help	Thumble	Feeding bottle	Hand
1.	Rice kanji											
2.	Bread											
3.	Biscuits											
4.	Bonda											
5.	Ragi kali											
6.	Meat											
7.	Vegetables											
8.	Coffee											
9.	Egg											

15. Frequency of daily cooking of households

Place	Once	Twice	Three times	Total

16. Mortality and morbidity rate among children (1-6 years)

S.No.	Name	Age	Sex		Name of the present	
			Male	Female	Disease	Health condition
1.						
2.						
3.						
4.						
5.						
6.						
7.						

N.B.: Put a mark if the person is no more

17. Foods given during special conditions:

S.No.	Condition	Foods included	Foods avoided	Reasons
1.	Pregnancy			
2.	Lactation			
3.	Preschool children			
4.	Sickness			
	a)			
	b)			
	c)			

18. Do you have a kitchen garden?

Yes ☐ No ☐

1. If yes, what do you grow?
   a) Roots and tubers
   b) Green leafy vegetables
   c) Fruits
   d) Vegetables
2. Use of the kitchen garden produce
   a) By sale
   b) Give away as gift
   c) Using it for their own purpose
3. Do you have poultry/cows/goats?

Yes ☐ No ☐

4. What do you do with the produce?

a) By sale

b) Give away as gift

c) Using it for their own purpose

19. Food beliefs

a) List the 'hot' foods

1.

2.

3.

4.

5.

b) List the 'cold' foods

1.

2.

3.

4.

5.

20. Meal patterns

List out the foods eaten during the past 24 hours.

APPENDIX - II

FAMILY AND INDIVIDUAL FOOD CONSUMPTION SURVEY - WEIGHMENT METHOD

Name of the Investigator: Door No:

Name of the subject : Address:

Age of the subject : Date :

Name of the meal	Menu	Weight of total raw ingredient used by the family (g)	Weight of total cooked food consumed by the family (g)	Amount of cooked food consumed by the individual (g)	Raw equivalents used by the individual (g)
BREAKFAST					
LUNCH					

Name of the meal	Menu	Weight of total raw ingredients used by the family (g)	Weight of total cooked food consumed by the family (g)	Amount of cooked food consumed by the individual (%)	Raw equivalents used by the individuals (g)
TEA					
DINNER					
OTHER					

APPENDIX – III

SRI AVINASHILINGAM HOME SCIENCE COLLEGE FOR WOMEN: COIMBATORE 43

SCHEDULE FOR CLINICAL ASSESSMENT

Date:

Name	..
Age	..
Sex (M/F)	—
Height (in cms)	..
Weight (in kg)	..
Name of the father or guardian	..
Occupation	..
Income	..
Size of the family	..
Address	..

CLINICAL ASSESSMENT

Grade I Health and free from any deficiency symptoms

Grade II

a) Poor musculature

b) Deficient subcutaneous fat

c) Mild anaemia

d) Lack of interest in surroundings

e) Mild signs of not more than one of the specific nutritional disorders or deficiencies mentioned under group 3 of Grade III

Grade III

a) Equal weightage highly significant of malnutrition

b) Nutritional oedema

c) Gross muscular wasting

d) Marked anaemia

e) Xerosis of the cornea

Group 2 - Significant of malnutrition

a) Tenderness of the calf

b) Red and/or Raw tongue glazed tongue

c) Angular stomatis

d) Bleeding gums

e) Angular conjunctiva

Group 2 - Less significant

a) Xerosis or pigmentation of conjunctiva

b) Bitot spots

c) Caries

d) Dry/or rought skin

e) Crazy pavement skin

f) Hyperkeratosis

Special remarks: If any:

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date: Signature of the Examiner