PROJECT CONDUCTED IN KALAPPANAICKENPALAYAM VILLAGE, COIMBATORE DISTRICT.

By

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I INTRODUCTION

The importance of nutrition and its relation to health have been known in our country from the Vedic times. In Yajurveda (1960)[1], a prayer runs thus "Oh! God, give us food which does not cause any disease and also give us strength." Mahabharatha (1960)[1] also echoes, "He who takes food in proper measure lives a long life and lives without disease, gets strength and alertness of mind. Moreover his children are born healthy and without any deformity or disease."

FAO (1958)[2] reports that the modern science of nutrition has shown that diet has a far reaching influence on health and has established certain criteria for adequate nutrition. In terms of these criteria it has been found that a large proportion of the world's population is inadequately fed. In a few countries most of the people enjoy a full and adequate diet. They live long and useful lives, for example, the Maories of New Zealand (1959)[3]. From a quarter to a third of the world's population live in such countries. The FAO (1958)[4] reports that a large majority of the people of the world are never well fed. Today the satisfaction of hunger is the major task of three quarters of humanity and when the day ends a large part of the world

still remains hungry. The Ministry of Agriculture and Fisheries of United Kingdom (1961)[5] points out that in the underdeveloped countries, today four out of five who are hungry, are hungry everyday of their life, hungry when they die, hungry when they were born and many, hungry before they were born.

Hunger, famine and starvation have been known and feared by mankind since the beginning of time. Undernutrition and malnutrition are still found in many parts of the world. Undernutrition is used to describe a sustained failure to obtain sufficient food to supply the energy needs of the body. Malnutrition indicates a condition in which a diet meets or may exceed the energy needs of the body while at the same time the food consumed does not provide the amounts of protein, vitamins and minerals required for normal health, development and vigour. Malnourished people may not be ill, but they are not well. Their bodies and minds may not be functioning to their full potential. Without an adequately nourished population a country cannot expect to achieve the national vigour for continued economic and social development, and political stability.

As Aykroyd (1956)[6] points out one of the aims of the Food and Agricultural Organisation of the United Nations is to raise the levels of nutrition. Their target is to see that people get

enough of the right sort of food to eat. Patel (1963)[7] states that nutrition has been defined as a science dealing with adequate provisions for the process and growth, maintenance and repair. This process begins with conception and extends upto death. Hence it is a sad fact millions of persons are starving today.

In India, the problems of hunger, undernutrition and malnutrition are vast. As Dey (1962)[8] warns, there is a danger in living with these problems too long. He says further that one can get used to uncomfortable and unlovely ways of living in many respects, but to have the "Burning fire in the belly" as the saying goes in Bengali, is the starkest and most extreme aspect of poverty. Therefore to fight against the problem of hunger, India is expanding her frontiers of food production in all fronts, to conquer the battle of malnutrition.

Aykroyd (1948)[9] stated that to define the problems of nutrition in any country, it is necessary to obtain information about the kinds of diets which the people of the country eat. Statistics of agricultural production and food imports give a rough idea of average food consumption, but average figures even if accurate, may conceal wide variation: in food intakes in different areas within the country, and in different economic

and social groups. Diet surveys in which food intakes of representative groups are studied for warying periods help to provide information which in many respects are more useful and accurate. They surveys need to be conducted in small groups of communities.

Goodwill (1958)[10] states that a community does not mean group of people of the same stock or ancestral origin, but humanity. It is composed of people at all stages of growth from conception, through infancy, preschool age, adolescence, adulthood to old age. Community nutrition deals with all the nutritional aspects of a community. The nutrition in health and sickness of all the individuals living in a community under different socio-economic conditions is the scope of community nutrition. Eighty per cent of her population are villagers. Their problem is India's problem. Ramachandran (1956)[11] points out, the rural community in India is not one among several communities in the country, but, is India itself. Therefore to study India's nutrition problems, one should start work in the villages.

Therefore this survey was on the nutritional assessment of the status of a community in the village Kalappanaickenpalayam of Coimbatore District. It aimed at:

a) Conducting a diet survey of fifty selected families in the village

b) Observing the cooking practices in the families

c) Carrying out a clinical survey among the children of the families surveyed.

d) Planning and executing a nutrition education programme

and e) Evaluation of the nutrition education programme.

II REVIEW OF LITERATURE

The following aspects are reviewed from the literature available:-

A. Different Methods of Assessing Nutritional Status

Sherman (1950)[12] defined nutritional status as indicating all aspects of the body's condition of nutrition. Bogert(1955)[13] defines nutrition as the science of nourishing the body properly, that is, providing adequately for its growth, maintenance and repair. Davidson et al (1959)[14] point out that nutritional status can be assessed through

1 Diet surveys

2 Clinical and nutritional surveys

3 Biochemical and laboratory tests

4 Study of Anthropometric data

and 5 Vital statistics.

1. Diet Surveys

A large number of diet surveys have been carried out in India from 1936, in the different parts of the country (1951)[15]. The Indian Council of Medical Research (1951)[16] lists the following four methods as suitable for conducting diet surveys.

a) Oral questionnaire

b) Checking of stock by inventory

c) Weighment of raw foods

and e) Survey of cooked foods.

a) Oral Questionnaire: Oral questionnaire helps to collect information through interviewing the head of the household or the housewife. on the nature and the quantity of foods eaten during a given period as per a prepared schedule.

b) Checking of Stock by Inventory or Log Book In this method, the investigator takes an inventory of the food stuffs in the house by actual weighment at the beginning of the survey, and requests the housewife to make the necessary entries of all purchases made till the end of the period of enquiry, in a diary or booklet specially prepared for this purpose. The investigator makes a final visit to the house at the conclusion of the survey period. and takes an inventory of remaining foodstuffs. This is the method widely used in countries where the homemakers are literate.

c) Weighment of Raw Foods In this method the amount of raw food to be cooked for the family is weighed daily and recorded. The weighment method has been used often in India since it is more reliable than others. To use this method the investigator needs to stay in the village or a place closely, so that she can weigh the foods personally.

d) Survey of Cooked Foods The investigator visits the family under survey every day for a defined period during all meal hours, and collects information about the cooked foods, the amounts served, consumed, left over and wasted.

Surveys can be conducted on individual, family or mass basis.

Individual Surveys In the individual surveys, trained investigators weigh and measure all the foods consumed at each meal by selected individuals. This is an exausting task. A great deal of cooperation and intelligence are needed on the part of the subjects. Widowson (1948)[16] regards the family survey unsuitable because of requirements. If the family is fractionated in terms of man value scale, it does not give a true picture. Only individual studies are of value to interpret individual requirements.

To answer the question whether groups of population are sufficiently or properly fed, dietary surveys of the families which is the purchasing unit will be the proper choice.

Family Surveys The family is the basic unit for surveys which use the log book or inventory method. All the foods eaten in the household is recorded. The age, sex and occupation of the members, the number of visitors eating occasional meals and the number of meals eaten outside by the members of the family are all noted.

Dietary surveys should be conducted for a minimum of seven days to get satisfactory results. Young et al (1953)[17] stated that for an estimate of the average nutrient intake for a group, a seven days record was adequate as compared with a 28 days' record of the same group. Steel et al (1951)[18] found that there

was no difference between a checked and unchecked seven days record for a group.

The nutritive value of data obtained from the dietary surveys is next calculated with the help of the food tables available. Most of the food tables deal with raw foods. Only a few cooked foods have been analysed by the Central Food Technological Research Institute (1960)[19].

2. Clinical and Nutritional Investigations

When due to inadequate diet or poor habits of eating, an individual develops malnutrition, he manifests certain clinical symptoms which are characteristic for the particular deficiency.

Clinical examination is a thorough examination of the subject for the presence or absence of certain symptoms which are presumed to be arising from the inadequacies in the diets eaten. Clinical examinations are useful when carried out in conjunction with a family dietary, or social survey.

3. Biochemical and Laboratory Tests

Arroyave (1960)[20] states that variations in quantity and composition of diets are reflected by changes in concentration of chemical substances in tissues and body fluids or by the appearance or disappearance of specific metabolites. Therefore their measurements help to assess nutritional status.

The biochemical tests which are comonly used for this purpose are:-

1 Red Blood Cell Count (R.B.C)

2 White Blood Cell count (W.B.C)

3 Differentiate Leucocyte Count (D.L.C)

4 Coagulation tests

and 5 Microscopic examination of sputum and faces.

4. Anthropometic Data

Davidson et al (1959)[21] state that anthropometry consists of a particular group of people assessing the nutritional status from their physical measurements. Different measurements of adults and children at various stages, have been used as indices of nutritional status and have proved valuable when correctly interpreted. By these means detection of the subnutrition conditions is facilitated. Thenourished individuals can then be guided to take a medical examination and necessary treatment. David son et al (1959)[21] point out that the heights and weights are compared with the standards like the Staurt Merdieth growth norm. If children do not get proper food, they fail to grow. Similarly, adults without enough to eat, lose weight and those who over eat become obese. Weighments are useful for investigating the nutritional status. In determining the nutritional status through anthropometry, correlation with others measurement is useful.

5. Vital Statistics

From the record of the statistics on population it is possible to draw certain inferences about the nutrition of the people. The neo natal mortality and the still birth rate give an index of the health status of the mothers in a community.

In amany infectious diseases notably, pulmonary tuberculosis, measles and whooping cough, the chances of survival are greatly reduced if the nutritional status of the patient is poor. Hence vital statistics may be taken as a measure of the health status, which in turn is determined by nutrition.

B. Diet Surveys Conducted in India

The dietary habits and the nutritional status of selected sections of the Indian population have been studied by many workers. Sen Gupta (1952)[22] observed that in the Abor Hill areas of the North Eastern Frontier inhabited by aboriginal tribes, milk and its products, fats and oils, and sugars and jaggery were unknown. Only 63 per cent of the families of the higher income group, and 40 per cent in the rest were receiving 3000 Calories per Consumption Unit per day. While the intakes of protein, calcium, vitamin B_1 and nicotinc acid were satisfactory, those of vitamin A, C and riboflavin were inadequate. Lal (1950-53)[23] found that the depressed classes of Bihar, Chiro and Densadh had inadequate intakes of all nutrients where as the Nomia and the Chammars had adequate

energy intake, but low intakes of calcium and vitamin A.

In a survey of Danges District of Bombay State, Rao (1954)[24] found that the Dangies lived on a diet which was inadequate in quantity, made up only of cereals and starchy tubers and almost totally free from cooking oils and animal foods.

De Mello et al (1950)[25] found that in 29 families of factory workers in Bombay, the average intake of protein and vitamin A_1 B_1 and C was low. Mayer et al (1956)[26] conducted a diet survey in a jute mill in Calcutta and found that the intake of total protein, vitamin B_1, niacin and C were adequate, but that of riboflavin was low. Bannerjee (1953)[27] reported that both the male and female students of Assam Medical College, were consuming satisfactory diets, except for the iron, vitamin A, B1 and riboflavin contents. Rao (1956)[28] reported the results of diet surveys carried out during 1945 to 1950, in 454 messes attached mostly to colleges and school hostels spread over 19 districts of the then Bombay Province.

Commenting on the nutritional data obtained from the surveys of Madras, Hyderabad, Bihar, Assam, Bombay and Mysore Gopalan and Rao (1961)[29] showed that a certain percentage of children in all these areas exhibited always frank signs attributable to a deficiency of one food factor or another. The commonest of them, however, was those of either avitaminosis A or a deficiency of vitamin B complex.

In a nutritional survey conducted of 4191 children during the years 1948 and 1949, in 44 tea estates in the Brahmaputhra valley of Assam Gilory (1961)[30] found that xerophthalmia was very common, dry skin moderately common and phrynoderma absent. Patwardhan and Jagannathan (1961)[31] reviewed that results of the diet and nutrition surveys with families in Sirur of Poona District and the Community Project area in Kolaba district, showed that the average diets were unsatisfactory being low in protective foods and in fats. In a clinical assessment of the nutritional status of 6371 school boys (90 per cent of them being from rural areas and between the age range 5 to 16 years Gouil (1952)[32] found that growth was greatest between 13 to 15 years, 59.3 per cent of them were affected by one or more of deficiency conditions, the incidences of vitamin A deficiency was common, the incidence of deficiency of other vitamins was high in the group with poorer physique, and only 18.3 per cent of the boys had dental caries.

Singh (1955)[33] found that of 46650 children who attended the hospital outpatient department in the years 1952 to 1954, five per cent showed conjuctival xerosis and 1.5 per cent had clinical rickets. Out of 3239 children admitted as inpatients, 0.6 per cent had rickets, and 0.4 per cent scurvey. It was noted that although a large proportion of the child population was malnourished, only a small proportion developed gross, anatonical changes requiring treatment in hospital.

C. Nutrition Education

According to Dr. Maynard (1957)[34] nutrition education means developing a public consciousness of the importance of good nutrition and sound food policies for the promotion of national vigour and stability. Ritchie (1950)[35] stated that health and wellbeing are impossible without a good diet, which is satisfactory both in quantity and quality. Human beings do not instinctly choose their diet in accordance with nutritional principles. Todhunter (1953)[36] said that good nutrition is dependent on the nutrients which supply the needs of the body. Nutrients are obtained from foods. We need to know which foods supply the needed nutrients. Further more, the foods must be prepared and served in ways to obtain maximum food values. Therefore buying, food, and meal planning and preparation are important aspects of nutrition education. Lack of knowledge of the simplest facts of nutrition is the main cause of malnutrition and under nutrition.

Karnad (1963)[37] emphasises the fact that malnutrition is widespread in our country especially among people of low economic level, mainly due to factors like high price, shortage of protective foods, faulty food habits and ignorance of the need for well balanced diet. This problem is accentuated by the rising population in the country.

The F.A.O.(1962)[38] points out that the principal target of nutrition education is the family. In rural societies the family produces most of its own food. Most of the families eat at least some of their meals together, and the interaction, between the various members of the family exert a profound influence, on the development of eating habits and attitudes towards food among children. Therefore educational programmes in nutrition should be planned around the needs and interests of the whole family.

According to Moline (1961)[39] growing foods and cooking them to save all the food values, is only one phase of nutrition. Learning to use all the edible foods available in the area is the other. Food prejudices, are often overcome when the values of the foods become known. Moline (1961)[39] stresses the point that the problem of balancing diets when there is a shortage of some foods can be overcome through learning how to use substitutes. Kitchen garden in which a variety of vegetables and fruits are grown can stimulate interest in the types of foods needed and this improves the nutritional status of families. Scientific information developed in technological institutes must be applied through home science, to all phases of food and nutrition, such as planning and preparing nutritious meals and preservation and storage of foods.

The F.A.O.(1957)[40] suggests that the first step in any nutrition education programme is a definition of the problem and determination of goals and objectives. For this, collection of basic facts about a community is important. Planning the nutrition education programme should be initiated later. Todhunter (1953)[36] stresses that the teaching of nutrition should be directed towards modifying the existing food customs and not to superimpose an entirely new set of practices.

Harvard School of Public Wealth (1953)[41] believes that it is possible to improve nutritional practices of large groups of people by improving the food behavior of children. If children have an opportunity to learn about the practice principles of good nutrition in school, they will acquire better food habits and attitudes which will carry over into adulthood, and in time, become the habits and attitudes of their children. Whitehead Lockhart (1952)[42] has also emphasize that nutrition education is more effective when it is given to children.

Leagans (1961)[43] defines extension education as an applied science drawing its content from research; accumulated field experiences, relevant principles drawn from the behavioural sciences synthesised with useful technology into a body of philosophy, principles content and methods focussed on the problem of out-of-school education for adults and youth.

For imparting nutrition education a variety of teaching methods are available. They are

1 Farm and home visit.

2 General meetings

3 Group contacts

4 Method Demonstrations

5 Result demonstrations

6 Campaigns

7 Use of voluntary and local leadership

8 Exhibitions

9 Conducted tours and field trips

10 Distribution of literature

11 Homemakers and farmers call

1. Farm and Home Visits: The farm and home visits help extension workers to establish direct contacts with the farmer or the members of his family at his home or on his farm, for specific purpose.

2. General Meetings General meetings are getting together of heterogenous participants to pass on certain information on for their consideration and future action.

3 Group Contacts According to Hall (1950)[44] a group is a body of individuals drawn together around a common interest. Such a

group preferably not exceeding twenty in number reaching collective decisions through cooperative discussions is utilised to promote an objective. Hall (1950)[45] points out that solutions to most problems are reached through thinking.

4. Method Demonstration Method demonstrations are a short time demonstrations given before a group to show how to carry out an entirely new practice, or an old practice in a better way.

5. Result Demonstration Result demonstrations are ways of showing people the value or result of a new practice. The result demonstration may be for a single recommended practice, or for a series of practices that come in sequence with respect to a problem.

6. Campaigns Campaigns are an intensive teaching activities undertaken at an opportune moment for a brief period, focussing attention in a concerted manner towards a particular problem so as to stimulate the widest possible interest in the community.

7. Use of voluntary and local leadership This method involves use of the leader-follower pattern, existing in any community.

8. Exhibition Exhibition are systematic displays of models, speciments, charts, information, posters in a sequence, to facilitate teaching or creat interest in the participating members. An exhibition all the three stages of extension education, arousing interest, creating desire to learn and providing a chance to take a decision.

9. Conducted Tours and field trips Conducted tours and field trips help to get together groups of people for the purpose of seeing an improved per ormance, or result of a practice in actual situations. This requires the group to move out of the area for a considerable period with a definite programme. Field trips are essential part of any teaching programme. Visitors to a field are able to see things in their natural setting, and the efforts made by man, and thus obtain first hand information about experiences in different fields.

10. Distribution of literature Written material supported by appropriate illustrations to an excellent tension tool for a literate group.

11. Homemakers and farmer's calls Calls made by the homemakers, or other group individually on the extension worker at her office or home with the purpose of obtaining information, getting assistance or getting acquainted is another method.

12. Radio programmes Using the radio for communication, seeking to build up the attitudes of people toward effective desired chances through debates on selected problems, talks, dialogues, folk songs, dramas is another effective method.

The audio visual aids which are commonly used are Displays and exhibits Leagans (1961)[43] describes that display and exhibits are motivating, interest creating and instructional. Colour chosen to depict happily the spirit of the display.

Few colours may be used and repeated so as to tie the whole display together. Each exhibit displayed should look as different as possible from the one next to it.

Photographs Photographs are easily understood. The best way to use them is to put them up on a bulletin board. Good photographs are those which show some action and catch the feelings and emotions of the people.

Black boards A black board is universally used with great advantage to supplement takes at meeting and discussinn in groups.

Bulletin board The bulletin board serves as wall news papers in a village, in making announcements in displaying events of a short duration, and putting up long term projects.

Flannel graphs or Khadigraphs Flannel graphs and khadigraphs are used to highlight informal talks or lecturers.

Flash cards Flash cards are small compact cards approximately 10" x 12" in size. They are flashed to bring home an idea. The villagers see the pictures in sequence are and follow a story more easily.

Puppets Puppet shows are very popular with our village audience. They can be affectively used to stimulate interest among the rural people. Simple dramas with puppets can be organized with puppettry easily.

Slides Slides are useful in illustrating a talk or showing to the villager the various stages or aspects of a development programme.

Films and film strips Projected pictures on the screen arouse a good deal of interest amongst the villagers. The advantage of a film is that it can be shown to a bigger audience. People find it easy to gather for a meeting organized around a film show. A film show should be followed by a discussion by the villagers.

Models Models are representation of real things in three dimensions whereas photograph or a poster has only two dimensions. Models have depth, thickness and comprehensiveness. Models may represent structures of an immense size like a dam, or a very small fly or insect. Models create a sense of realism within the individual.

Drama and cultural programmes Dramatisation of a theme or a story creates lively interest amongst the spectators. They catch their eye and leave lasting impacts on their minds. Sometimes songs and dances related to subjects of local importance and enacted on stage bring home the ideas more forcefully.

According to Leagans (1960)[43] programme planning is an intellectual activity, for it involves study and use of facts and principles. It requires knowledge, imagination and reasoning ability. It is basically a process of making decisions that will carry into the future. Decisions have to be made about what the present situation is, how it could and ought

to be changed and what means can be used to accomplish the new and more desirable situation.

Audio visual aids are helpful in nutrition education. Sehgal (1960)[46] points out that visual aids are powerful means of influencing thought and social action. Their value in our country of where a great majority is still illiterate, is greater than that of the printed script or the spoken word. The mind can always grasp a picture, where it cannot comprehend a printed letter or the spoken message. Age or sex offers no inhibition to the use of these aids to make an enduring impact on the mind. As Strauss and Kidd (1948)[47] write "Audio visual aids are exceedingly helpful media if they are used effectively in the proper preparation, presentation, application and following up.

III CONDUCTING THE PROJECT

This nutrition project was conducted in the following sequence:

A Selection of the village

B Study of the socio-economic background of the village

C Planning the dietary survey forms

D Residence in the village

E Selection of the sample

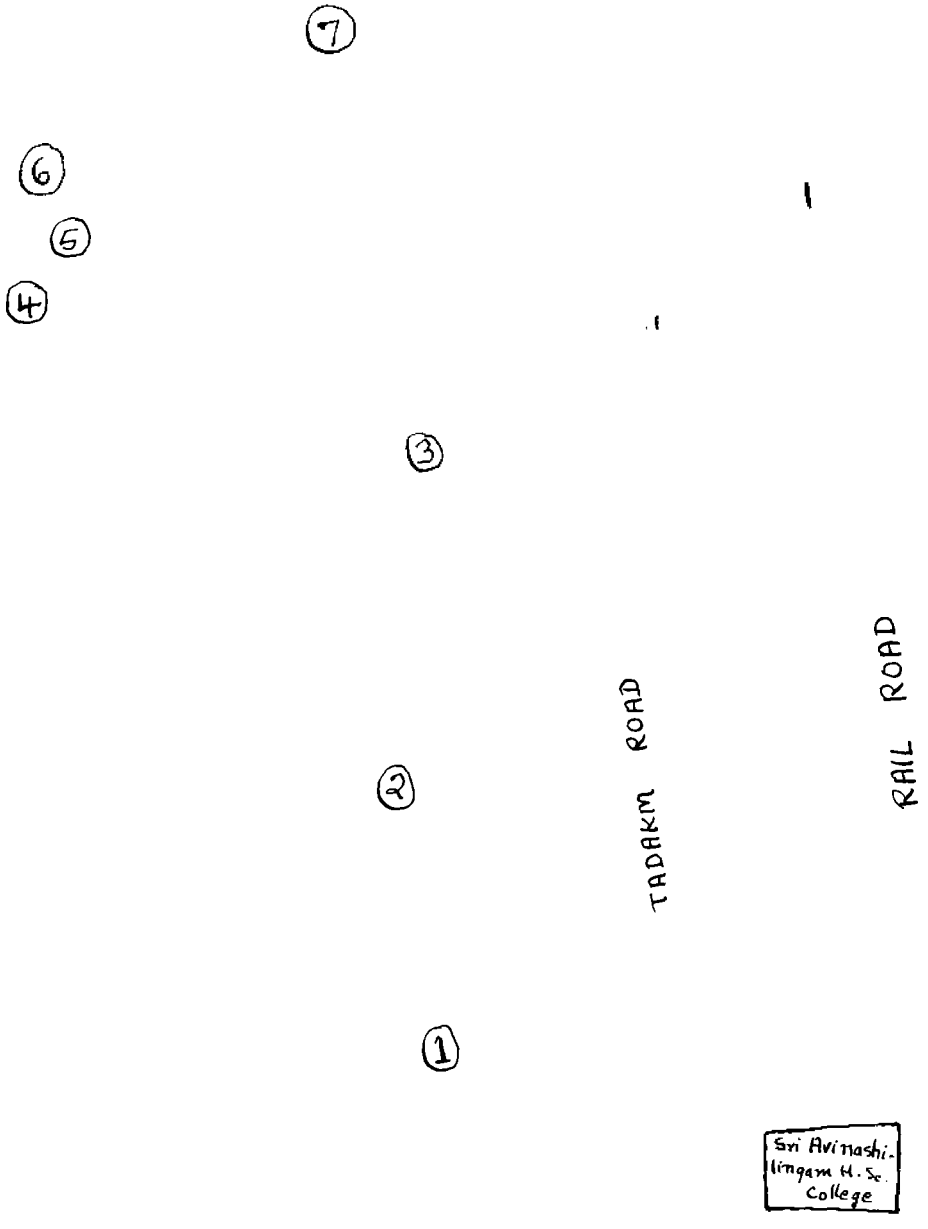
F Study of the background of the sample

G Conducting the survey

H Analysis of the dietary survey data

A. Selection of the village

As 80 per cent of the population of India live in villages, we decided that the diet and nutritional survey be conducted in a village as basis for the nutrition education programme. The village Kalappanaickenpalayam of Somayampalayam Panchayat in Coimbatore district was selected for the purpose. The reason for selecting Kalappanaickenpalayam was that the Mukhya Sevika trainees of Sri Avinashilingam Home Science College, had previously worked in the village and established good rapport with the villagers.



Key

1. Velandipalaiyam.
2. Edayarpalaiyam.
3. T.V.S. Nagar.
4. Kasturinaickanpalaiyam.
5. Kalappanaickanpalaiyam.
6. Somayyampalaiyam.
7. Kavuvoipalaiyam.

FIGURE 1

LOCATION OF THE VILLAGE KALAPPANAICKANPALAYAM.

Twenty acres of land is under cultivation by the Cooperative Farming Society in the village, offering employment opportunities, to some those living in the Harijan colony.

6. Occupation The main occupation of one hundred and fifty villagers is agriculture. Among the rest of the population for ten and eleven families respectively milk selling and mat weaving are subsidiary occupations. There were ten bullock cart drivers, one carpanter and one auto riksha driver in the village. There are no industries in the village. Twenty men and women are employed as coolies in factories in Coimbatore.

7. Income The average per capita income in the village is Rs. 300/- per annum. Nearly 80 per cent of the villagers are in debts.

8. Health and sanitation All the houses in the village are ventilated. There are no medical facilities such as a hospital, maternity centre, child welfare centre or family planning centre, There is no evidence of any personnel from such centres visiting the village. Therefore, the villagers go to Coimbatore covering a distance of eight miles, for medical help.

There are four wells for public use. Besides most of the houses have wells for drinking water. There are no facilities however for drainage, but some families are using compost pits

introduced by the Mukhya Sevikas for waste disposal. There were common bathrooms but no latrines.

9. Climate Kalappanaickenpalayam has a dry climate. The people depend on rainwater for cultivation. The climate is generally cool and pleasant throughout the year, because of its nearness to the Blue Mountains.

10. Market facilities There are only two very small retail shops. The villagers travel two miles, to reach the nearby market for their daily purchases.

11. Community organisation There are no social, cultural or religious organisations, except a women's organisation "Mathar Sangam" in the village.

12. Recreational facilities There are no recreational facilities for the village families.

C. Planning the diet survey forum

The purposes of conducting the dietary surveys were to: study the adequacy of the diets of a selected group of village families by comparison with the recommended dietary allowances as given by I.C.M.R. (1963)[48], locate or identify the causes for the existing inadequacies and plan an educational programme to improve the food habits and ensure the best use of available food supplies.

In order to study the adequacy of the diets and nutritional

status of the selected families of the village of Kalappanaicken-palayam, an observation schedule was evolved by the investigator as given in Appendix I. It called for personal or face data on the general background of the families such as income, budget, expenditure on food, home produced food, consumption of various kinds of foods, daily meals, methods of food preparation, foods used for special occasions and conditions, and the methods of preserving foods. The schedule thus formed was pretested with three families on the college campus, and the required modici-cations made and finalised.

D. Stay in the village

The investigator should decided to live in the village, and practice the principles of nutrition, during the diet survey period. Plans for the residence in the village were thus made in advance. The headmaster of the Kanuvai school was kind enough to make his house available for the investigators to stay in the village for fifteen days. The investigators were introduced to the village housewives by one of the staff members of the Mukhya Sevika trainees who knew the villagers very well.

E. Selection of the sample

The investigator selected fifty families by random sampling taking every second house in the locality for the diet survey.

Out of these ten families were selected for the diet survey by the weighment method.

F. Study of the background of the sample

1. Age range and sex distribution of the members

Table I shows the distribution of the members of the fifty families according to age and sex.

TABLE I

DISTRIBUTION OF THE MEMBERS IN THE FIFTY FAMILIES ACCORDING TO AGE AND SEX.

Age range	Male	Female	Total
Below 5 years	2	3	5
6 to 10 years	7	8	15
10 to 20 years	4	6	10
20 to 30 years	1	3	4
30 to 40 years	5	7	12
40 to 50 years	12	14	26
50 to 60 years	3	8	11
60 to 80 years	1	2	3
	35	51	86

It can be seen from Table I, that the largest number of people are found in age range 40 to 50 years. Next comes the range six to ten years.

2. Caste distribution

Table II gives the distribution of caste of the sample

TABLE II

CASTE DISTRIBUTION OF THE SAMPLE

Caste	Number of families
Gounders	36
Naidus	3
Ghettiars	2
Gounder Vellalas	6
Harijans and Backward classes	3
Total	50

It can be seen from the Table II, that the predomenant caste of the sample 50 families was Gounder caste, 36 belonged to this sample.

3. Occupations Table III shows the distribution of the sample according to occupation.

TABLE III

OCCUPATION OF THE FAMILIES SURVEYED

Occupation	No. of families
Coolies	21
Farmer	14
Mill worker	6
Milk seller	3
Stone cutter	3
Autoriksha driver	1

It is evident from Table III that the largest number of families work as coolies. The next popular occupation is farming. While the men in the families are busy in occupations the women go to the nearby forests for work. Two women work as coolies in mills and five at stone cutting. The women lookafter poultry. In three families, women tend kitchen gardens.

4. Income Table IV shows the distribution of the families according to income.

TABLE IV

DISTRIBUTION OF THE FAMILIES ACCORDING TO MONTHLY INCOME

Income range Rs.	No. of families
50 - 99	16
100 - 149	12
150 - 199	5
200 - 249	7
250 - 299	4
300 - 349	4
400 - 500	2

As can be seen from Table IV, the largest number of families that is 16, has an income of Rs. 50 - 99 per month,

and the majority, that is 28 families have a monthly income Rs. 50 and Rs. 149.

5. Educational levels Forty three men in the sample are literate and only twenty women could read and write. The children were going to the primary school in the village, Four children go to Coimbatore to attend High School.

6, Sanitation The sanitary conditions of the fifty houses are fairly good. Four of the families had sokage pits constructed by the Mukhya Sevikas.

G. Conducting the surveys

All the 50 families were visited once a day and data on their dietary intakes were recorded by the oral questionnaire method for seven consecutive days. The survey was conducted by the weighment method in the ten selected families two times a day by weighing the raw foods, before cooking. All the raw foods were weighed. Even total leaves and chunam were weighed.

The meal timings of the sample generally depended upon the occupation of the earning members of the family. The farmers would take their lunch at 1.0' clock in the afternoons even later. The mill workers took the lunches along with them, when they left for work in the mornings. Therefore meals were cooked in these families in the mornings and in the evenings only.

These families were visited in the mornings between 6.30 a.m. to 8 a.m., and in the evenings between 5 p.m. to 7 p.m. for the weighment of food. Even betal leaves and chuna were weighed.

During the period of the survey, some members were absent in a few families for one or two meals. Sometimes guests were present. In such cases, the absentees and the guests were noted and the food intake per Consumption Unit per day was calculated after making the necessary corrections.

It was observed that there was no plate waste in these families. Any left over food, from the first meal, was consumed generally the next meal.

H. Analysis of the Findings of the diet survey

The data collected in this survey are analysed and discussed as under:

1. Percentage of income spent on food and other items by the different income groups.
2. The average intake of each item of food in the different income groups.
3. The nutrient content of the diets of the families
   a) The sample of fifty families
   b) The sample of ten families - weighment
4. Foods given for special conditions.
5. Foods given for infants.
6. Diets in diseases
7. Cooking practices.
8. Nutritional status of the school going children.

1. Percentage of Income spent on food and other items by the different income groups in the fifty families

Table V presents the percentage of the income spent by the families in the different income groups of the sample.

TABLE V

THE PERCENTAGE OF TOTALINCOME SPENT ON FOOD AND OTHER ITEMS BY THE FIFTY FAMILIES IN THE DIFFERENT INCOME RANGES

Income Range Rs.	No. of families	Average expenditure on food Rs.	Percentage of total income spent on							
			Food	Clothing	Home rent	Education	Health	Recr-eation	Trave-lling	Saving and others
50- 99	16	40.5	81.0	5.2	3.0	2.5	3.3	2.0	2.0	1.0
100 -149	12	36.1	72.2	4.6	4.5	3.2	2.2	3.1	2.7	7.5
150 -199	5	29.5	59.0	4.5	4.3	5.1	3.2	6.3	7.1	1.0
200 -249	7	28.9	57.8	5.8	4.4	5.2	2.2	6.4	7.2	11
250 -299	4	28.6	57.2	6.3	4.1	5.3	2.3	6.6	6.4	11.2
300 -349	4	27.2	54.4	6.4	5.2	6.4	2.3	6.8	6.2	12.5
400 -500 and above	2	21.5	43.0	7.1	6.2	6.5	2.5	6.6	6.8	21.3

It can be seen from Table, as the income goes up, the percentage of expenditure on food comes down. In the low income groups with a monthly income from Rs. 50/- to 99/- 81 per cent of income is spent on food. On the other hand as the income increases a greater percentage of the income is spent on other items such as clothing, rent, education, health recreation travelling and also saving is more.

2. The average intake of each item of Food in the different income groups

Table VI shows the average intake of food stuffs per Consumption Unit in the different income groups, as compared with the Recommended Dietary allowances of the I.C.M.R.(1963)

TABLE VI

THE AVERAGE INTAKE OF DIFFERENT FOOD STUFFS IN THE DIFFERENT INCOME GROUPS

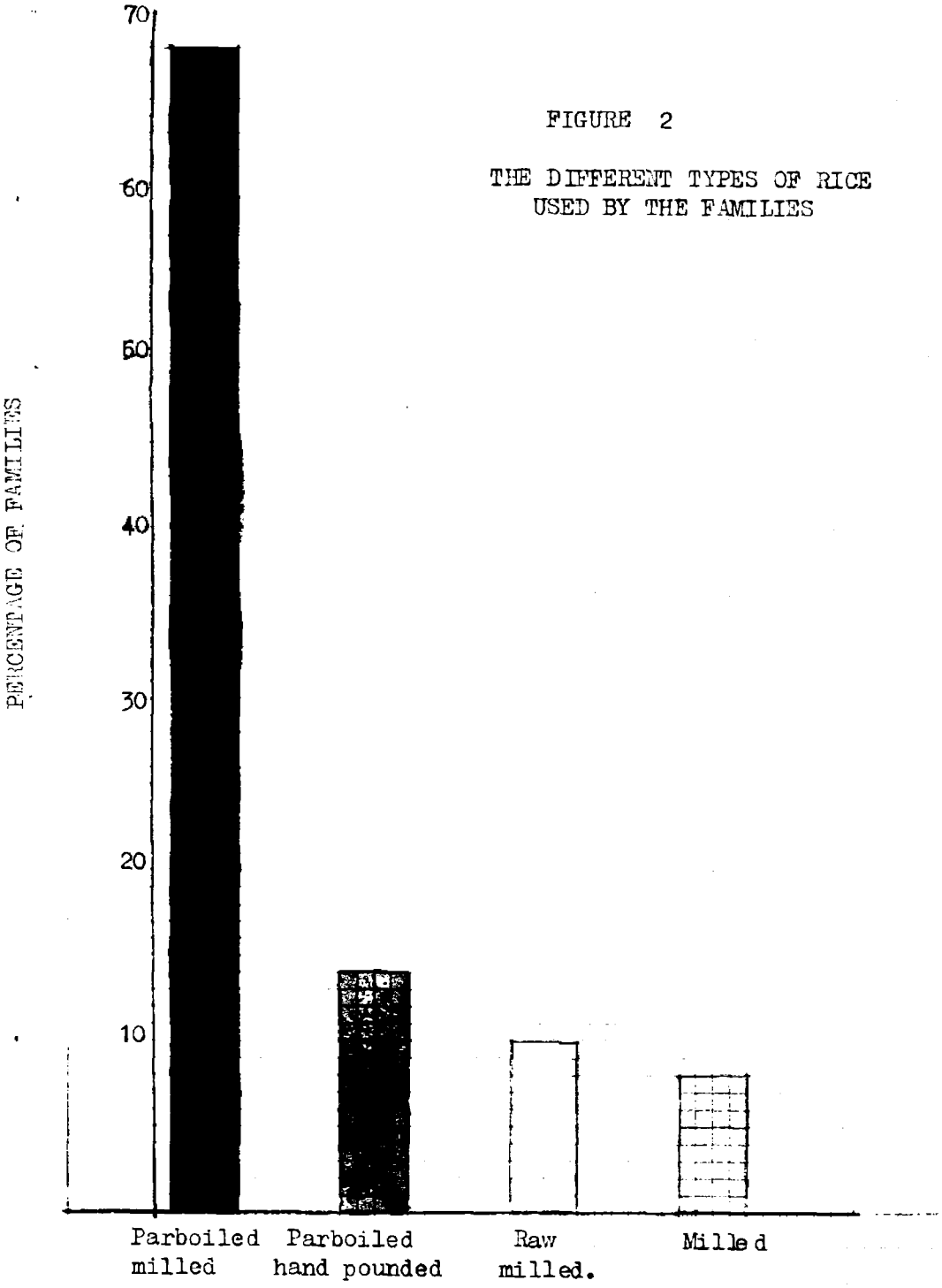
	Cereals grm	Pulses grms	Leafy vege-tables grms	Root vege-tables grms	Other vege-tables grms	Fruits grms	Milk and milk pro-ducts grms	Sugar and jaggery grms	Oil grms	Animal foods grms
Recommended Allowances	400	85	114	85	85	85	284	57	57	85
Income groups										
50- 99	450	35	-	50	25	12	85	35	20	-
100-149	420	38	33	65	27	18	84	40	25	62
150-199	425	35	-	70	28	16	93	38	30	-
200-249	422	40	34	72	29	18	95	42	32	-
250-299	412	42	37	25	68	20	112	40	36	-
300-349	425	40	42	32	70	36	99	50	37	-
400-500 and above	412	60	40	72	38	40	150	64	40	40

It is clear from Table VI that except in the case of cereals, the intake of all the other food stuffs was inadequate in all the income groups surveyed. Considering each class of food stuffs the following facts are evident.

Cereals The cereals consumption when compared with the recommended of I.C.M.R. was adequate in all the income groups. Parboiled milled rice was the cereal used as the staple food by the most of the families as illustrated by Figure 2.

FIGURE 2

THE DIFFERENT TYPES OF RICE
USED BY THE FAMILIES



Sixty eight per cent of the families were using per boiled milled rice. Only six per cent of the families used parboiled home pounded rice. Eighteen per cent of the families used milled raw rice. Only eight per cent of the families used raw home pounded rice.

Sorghum was used mostly among the low income groups Rs. 50 to 200. The groups with income range above Rs. 200/- considered it below their dignity to use sorghum. In eleven families rice and sorghum were consumed in combinations. Only eight per cent of the families used ragi. Rice was used daily in various types of preparations. Rice and sorghum were cooked in half-half proportions as 'Kali'.

The consmuption of wheat was very low. Wheat was used only for uppuma like preparations. No other cereals were used in these families.

Pulses The consumption of pulses in all the families was below the recommended allowances. As the income increased the amount of pulse intake also increased but, even then it did not meet the recommended requirements. The most commonly used pulse was red gram dhal. Black gram, horse gram and bengal gram were also used to some extent. The use of green gramdhal was negligible.

Reg gram was used in the preparation of rasam and sambar. Black gram was used for preparing iddli, dosai and vadai. Bengal gram and horse gram were used for 'Sundal'

Leafy vegetables The consumption of leafy vegetables was far below the recommended allowances in all the families. The leafy vegetables used by the villagers were amaranth, cabbage, parpu, keerai and drumstick leaves. In one family 'Chekurmani' was being used.

Root vegetables The commonly consumed roots and tubers were yams, potatoes, onions, beet roots and carrots. In only one Malayali family tapioca was being used.

Other vegetables The consumption of other vegetables was low. The vegetables used were brinjals, bitter gourd, snake gourd, ridge gourd, drumstick, french beans, raw plantain and tomatoes.

Fruits The seasonal fruits plantain, mangoes, papaya, sweet lime, guava, jack fruit and lemon were used by the families in small amounts.

Milk and milk products The consumption of milk in all the income groups was far below the recommended allowances. Thirty families used cow's milk. Buffaloe's milk was also available. Butter milk and curds were the milk products used. The families did not use ghee at all.

Sugar and Jaggery Only in five families sugar was used. All the other families used jaggery.

Oil The most commonly used vegetable oils were gingelly oil, ground nut oil and in some families, coconut oil.

Animal foods Lamb was used by all the non-vegetarian families. The scheduled castes used beef also. Hen's eggs were consumed in three families. On the whole, the amount of animal food was below the recommended allowances.

The dietary pattern of the families surveyed was thus far from satisfactory. A large amount of cereals gave bulk to the diets.

The severe scarcity of water in the village and the lack of knowledge about the use of waste water, prevented them from growing vegetables in the village. The families used roots, tubers and other vegetables as these could be preserved for a few days, after purchasing from Coimbatore. Greens were used rarely as they need to be used when fresh fruits were not ordinarily included in their diets because of the costs.

Milk was given to small children and used for coffee by adults. In some cases, water was added to the milk to 'increase' quantity. Most of the male members of the family did not consume animal foods, as they believed in Gandhism. The three families who kept poultry sold the eggs produced. 'Karpatti' the palm jaggery which is rich in iron is used instead of sugar.

Groundnuts, coconuts, puffed rice, roasted bengal gram were used as snacks.

TABLE VII

THE NUTRITIVE VALUE OF THE DIETS OF PER CONSUMPTION UNIT IN DIFFERENT INCOME GROUPS IN THE FIFTY FAMILIES

Income group	income range Rs.	Calories	Protein g	Calcium g	Iron mg	Vitamin A I.U	Vitamin B1 ug	Vitamin C mg
Recommended allowances		2800	55	1	20 to 30	3000 to 4000	1.0 to 2.0	50
I	50- 99	2184	32.78	0.34	9.22	1460	1179.7	15
II	100-149	2110	40.78	0.51	18.13	2510	1444.5	38
III	150-199	1801	42.11	0.63	6.08	1661	1823.2	35.06
IV	200-249	2223	43.55	0.67	17.65	2575	1367	40.1
V	250-299	2014	43.82	0.68	25.18	2700	1460.9	40.9
VI	300-349	2336	44.13	0.68	20.70	2886	783.4	41.26
VII	400-500 and above	3149	52.66	0.87	23.88	3083	1411.9	41.1

THE NUTRIENT CONTENT OF THE PER CONSUMPTION UNIT DIETS OF THE FIFTY FAMILIES.

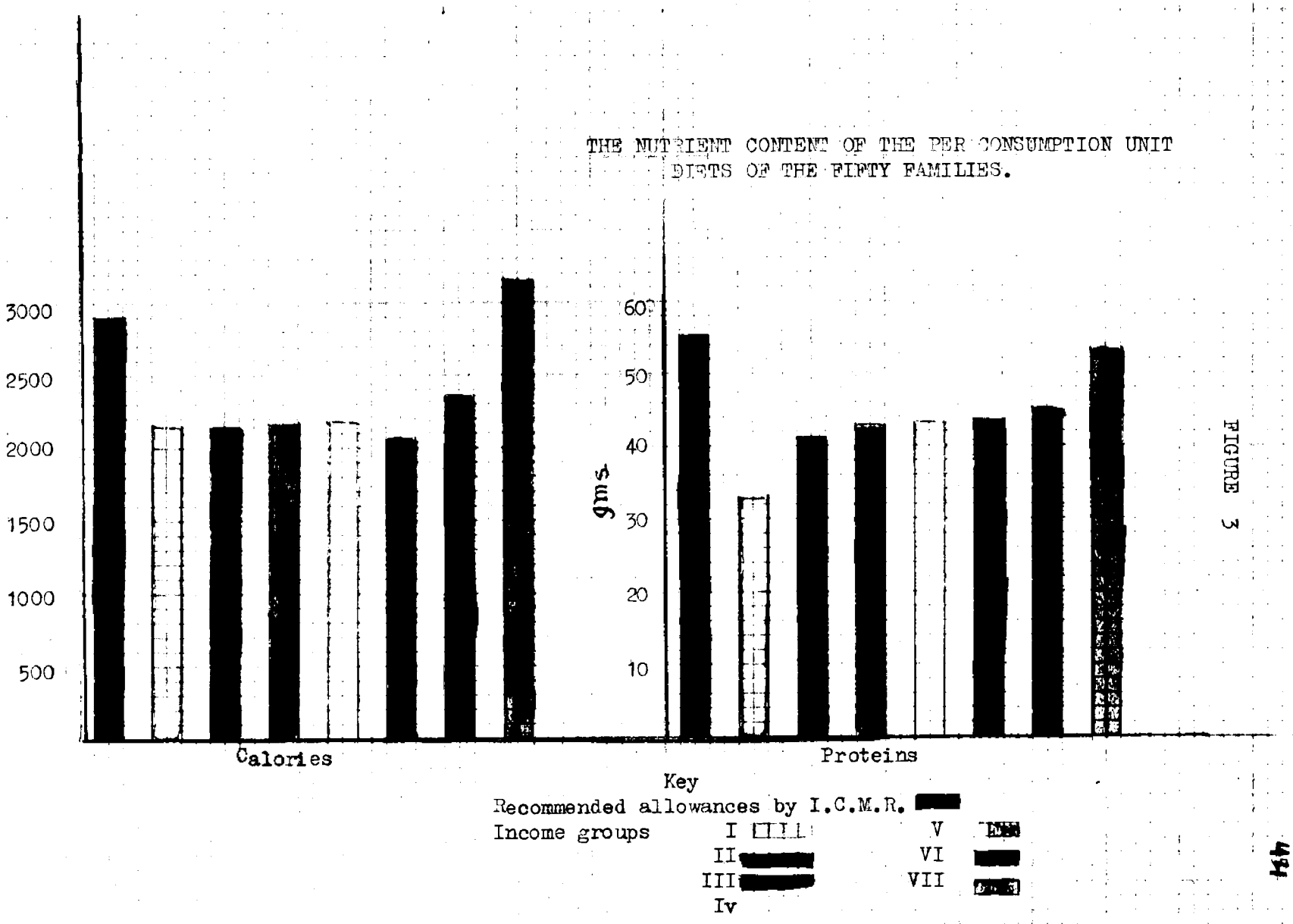


FIGURE 3

THE NUTRIENT CONTENT OF THE PER CONSUMPTION UNIT DIETS OF THE FIFTY FAMILIES

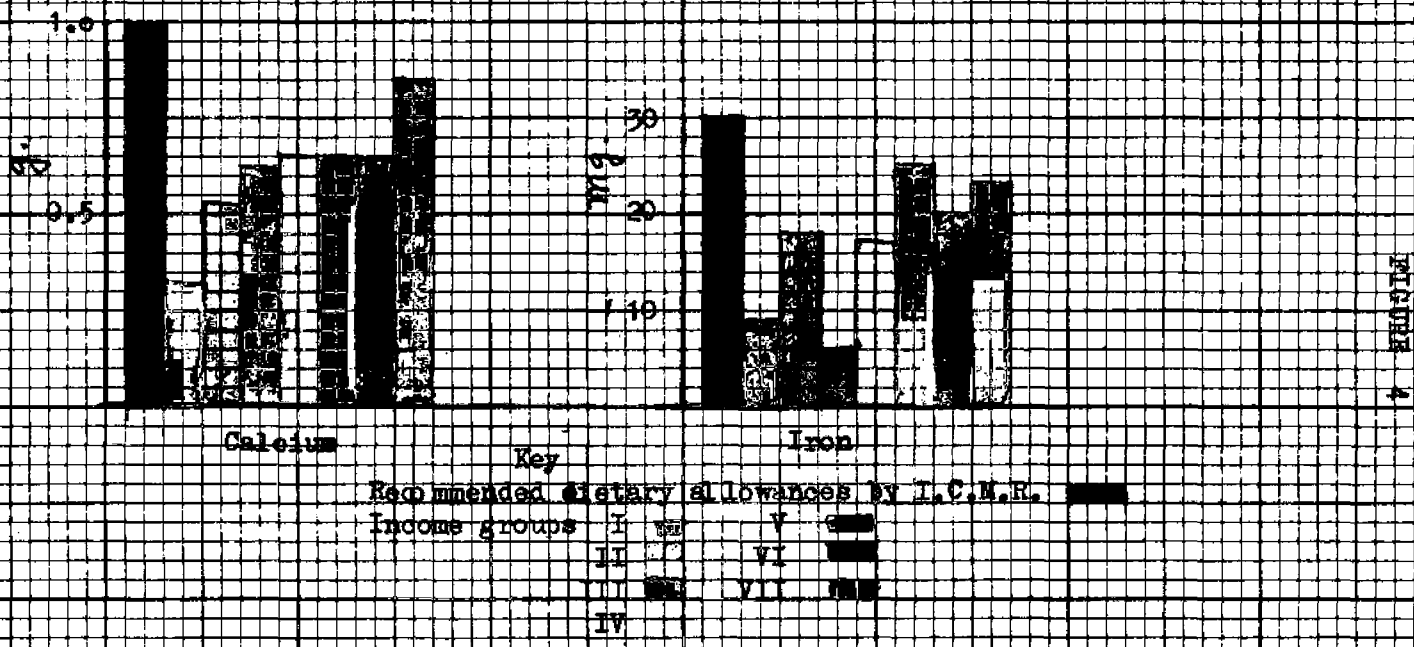


FIGURE 4

THE NUTRIENT CONTENT OF THE PER CONSUMPTION UNIT
DIETS OF THE FIFTY FAMILIES

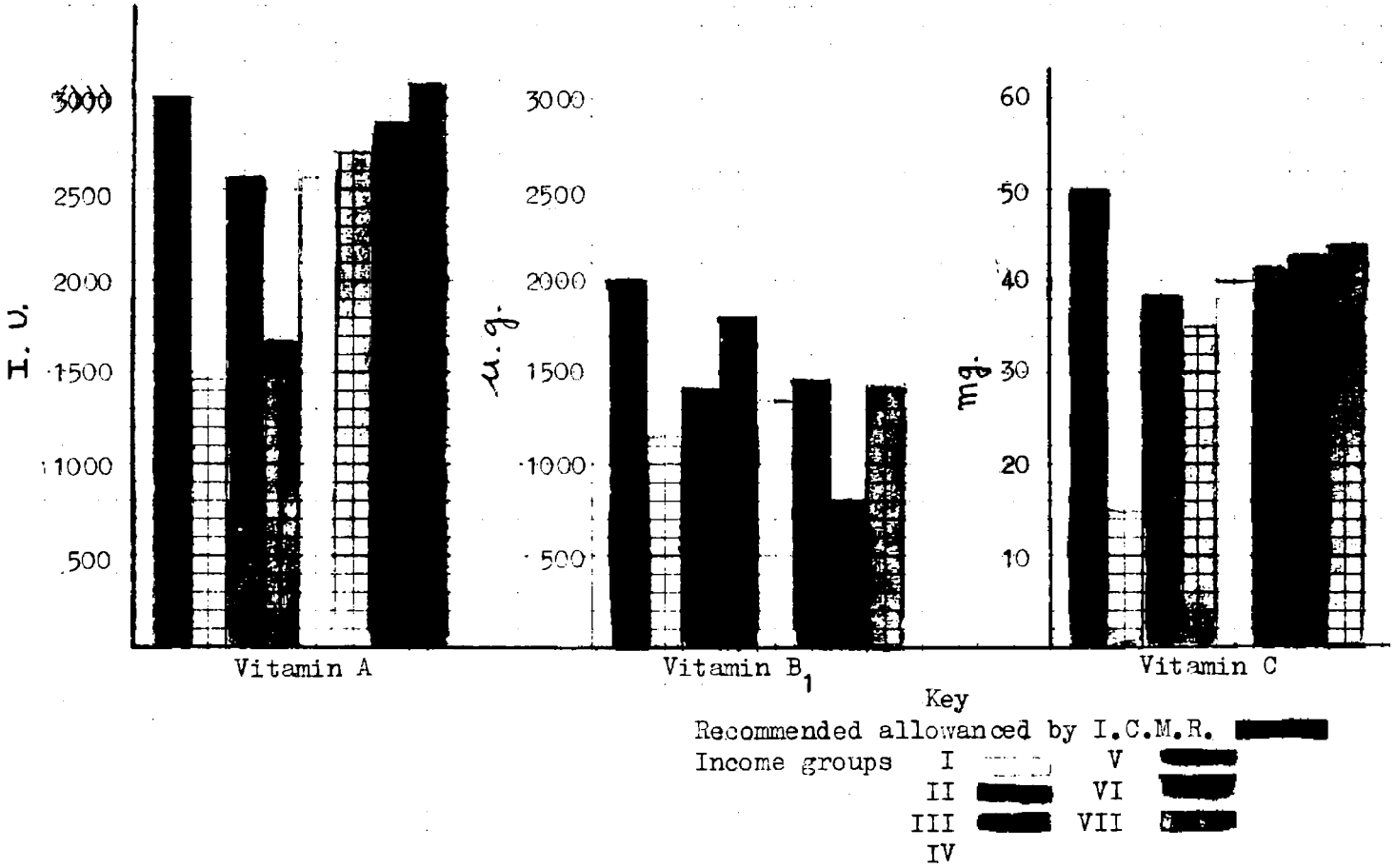


FIGURE 5

In general, the nutritive values of the diets of all the fifty families were inadequate. The consumption of food stuffs was low and therefore the nutrient intake was also low. The nutrients will be now discussed considered individually.

Calories The intake of calories was fairly sufficient in all the groups being highest in the highest income groups.

Proteins The intake of total proteins in all the economic groups was below the recommended level, mainly due to the lower consumption of pulses and animal foods. In the highest income group the intake of protein was higher due to higher consumption of milk, pulses and flesh foods.

Calcium The intake of calcium was below the recommended level in all the income groups.

Iron The intake of iron was upto the recommended level in the income groups V, VI and VII due to the higher consumption of leafy vegetables. In the other four groups, the iron intake below the recommended level, is due to the higher inclusion of leafy vegetables and the higher quantities of the other food stuffs.

Vitamin A Except in the income group VII the intake of vitamin A was low in all the other income groups, due to the low intake of milk and leafy vegetables.

Vitamin B1 The intake of vitamin B1 was satisfactory in all the income groups.

Vitamin C The intake of vitamin C was below the recommended level in all the income groups, due to the low consumption of the leafy vegetables, raw vegetables, and fruits.

The Intakes of the Ten Families surveyed by Weighment method

The data was collected by the weighment method in ten selected families. Among the families surveyed, six belonged to Gounder caste, two were Harijan families, one each Naidu and Vellala. Three families had farming as occupation, four were coolies, two milk sellers and one autorikshaw driver.

According to their incomes the ten families are divided into three groups as given in Table VIII

TABLE VIII

DISTRIBUTION OF THE TEN FAMILIES ACCORDING TO THEIR INCOME

Groups	Income range Rs.	No. of families
I	50 - 149	5
II	150 - 249	3
III	300 - 400	2

As it is evident from the table the five families had a income of Rs. 50 to 149, and two families Rs. 300 to 400

The age of the members in the ten families ranged from 2 to 50 years as can be seen from Table IX.

TABLE IX

THE AGE RANGE OF THE MEMBERS IN THE TEN FAMILIES SURVEYED BY WEIGHMENT METHOD

	Age range in years							
	0 to 4 years 11 months	5 to 9-11	10 to 14-11	15 to 19-11	20 to 24-11	25 to 29-11	30-to 34-11	35 to 39-11	40 to 50
Male	1	5	0	2	5	4	4	2	6
Female	2	1	3	5	3	5	3	5	7

Analysis of the Diet Survey Data

The average intake of each class of food stuffs per Consumption Unit per day by the ten families was calculated from the seven days data collected by the investigator, as given in Table X, and Figure 6. Figure 6 gives the food intake by the different income groups as compared with the recommended allowances.

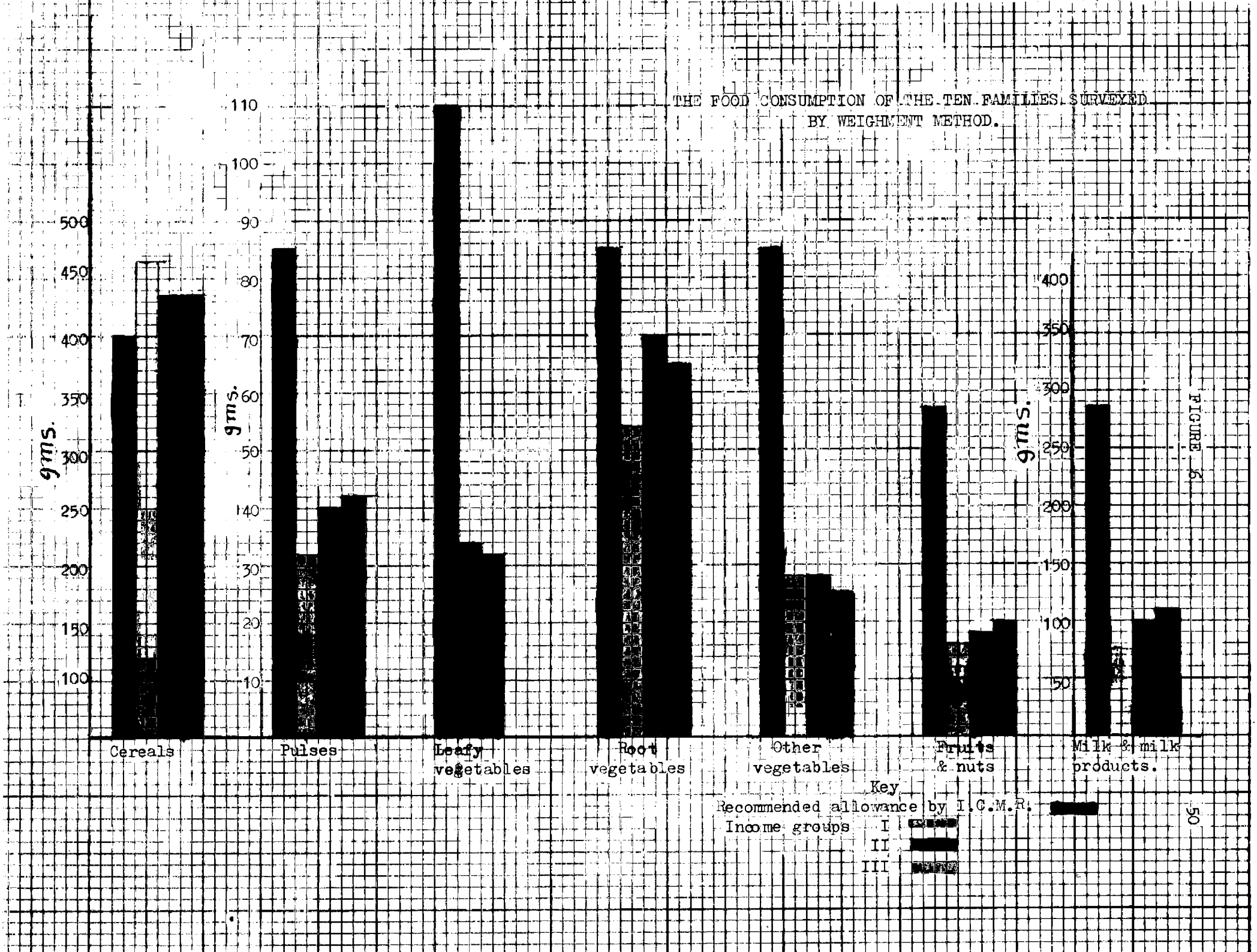

THE FOOD CONSUMPTION OF THE TEN FAMILIES SURVEYED BY WEIGHMENT METHOD.
gms.
gms.
gms.
Cereals
Pulses
Leafy vegetables
Root vegetables
Other vegetables
Fruits & nuts
Milk & milk products.
Key
Recommended allowance by I.C.M.R.
Income groups I
II
III
FIGURE 6.
50

TABLE X

THE AVERAGE INTAKE OF FOOD STUFFS BY THE TEN FAMILIES

No. of families		Cereals	Pulses	Leafy vege tables	Root vege table	Other vege tables	Fruits and nuts	Milk and Milk pro-ducts	Su-gar	Oil	Animal foods
5	Recommended allowances	400	85	114	85	85	85	286	57	57	85
5	Income Rs. 50-149	465	32	0	56	28	16	75	32	25	30
3	150-249	422	40	34	70	28	18	100	42	28	0
2	300-400	422	42	32	75	35	20	110	42.5	31.5	0

As can be seen from Table X and Figure 6, the average intake of all the food stuffs except cereals, was much below the recommended levels, particularly the protective foods such as vegetables, fruits, milk and milk products and fleshy foods were defficient. The pattern of consumption of different foods, in these ten families was similar to that of the 50 families.

During the rainy and winter seasons, tomatoes, cauliflower, ladies finger, beans are included being available. However, during the period of the survey i.e., June, the average consumption of all the vegetables was only 19 grams per Consumption Unit per day, while the recommended allowance is 284 grams.

Of the ten families, only two families used sugar, in very small quantities. All the families used Karpatti, for the preparation of coffee and sweets. No butter, ghee or hydrogenated oil was used in the families. The vegetable oil used by all the families was groundnut oil. During the period of survey eggs were consumed by three families. The other families were either vegetarians, or because of non-availability, they did not buy fleshy foods.

The Nutrient content of the Diets consumed by the Ten Families

The nutritive value of the diets consumed by the ten families is given in Appendix III, with a comparison with the recommended allowances of I.C.M.R.

The pattern of the nutrients content of the diets was similar to that obtained in the oral questionnaire survey. The protein intake was not satisfactory due to the lower consumption of pulses, milk and animal foods in all income groups. There was no significant difference in the protein intake due to income. The diets of all the three income groups were lacking in calcium. The intake of iron was lower in the second and third income groups. Vitamin A intake was very low in all the income groups specially in the first and second income groups, due to meagre intakes of fresh vegetables, fruits and milk.

The diet surveys showed that there was not much difference in thedata obtained by the interview method and the weighment method, except that when the data were collected by the interview method, the intake of food stuffs was showing slightly higher, than when the food was actually weighed.

There was not much difference in the meal pattern of the families. Table XI gives one week's menu of a family.

The preparations using pulses were iddli and dosai. Preparations such as murukku, vadai, payasam, laddu, baraphi, bonda, Mysorepak, and sundal were seldom used. Kali in which rice and sorghum are boiled together in the proportions of half; half is used widely. None of the families made chapathies with sorghum. Sorghum was consumed only in the boiled form, as they did not know any other method.

Cooking of Vegetables

Brinjal, bittergourd, ridge gourd, ladies finger, pumpkin, drumstick, yam and raw plantains were the vegetables used by the families.

All the vegetables were cooked by the boiling method. In some preparations cut vegetable pieces were rolled in bengal flour batter, and deep fat fried. Carrot was used in the raw form as salad. As far the handling of these vegetables prior to cooking, potatoes and beet roots were peeled. The other vegetables were cut into small pieces that of size $\frac{1}{4}$ inch square and cooked in a short time in sambar or porial.

Thirty five per cent of the families surveyed, cook vegetables, leaving the sambar or porial on the 'chula' itself, to keep them hot at the time of serving. Six per cent of the families cooked the vegetables in the mornings and reheated before using them in the nights. The time lag between cooking the vegetables and serving

was found to be two hours in 30 per cent families, three hours in 26 per cent families, and six hours in 44 per cent families.

Fruits are being consumed without cooking.

Beverages

The main beverage used was coffee. Milk was also used along with ravai kanjee. Buttermilk seasoned with ginger, green chillies, curry leaves and cut lemon pieces was an another beverage.

Foods preserved

'Appalam' and sun dried vegetables were the foods preserved in the families. Thirty five per cent of the families use 'appalams' three to five times a month. In 12 per cent of the families, ladies finger, potato and green chillies are cut, sun dried and used after deep fat frying.

Pickles

Only in eight per cent families, lime is pickled by adding salt and gingelly oil, sometimes ground nut oil.

Cooking of Flesh Foods

Only lamb and eggs are consumed after cooking them by boiling and frying methods.

Types of Utensils Used

Table XIV shows the types of vessles used for cooking by the families.

TABLE XIV

TYPES OF UTENSILS USED FOR COOKING

Types of utensils	Percentage of family using them
Brass	55
Aluminium	33
Mud pots	12
Stainless steel	nil
Bronze	nil

It can be seen from Table XIV that majority of the families i.e. 55 per cent used brass utensils, 33 per cent aluminium utensils and only 12 per cent used mud pots. None of the families used stainless steel utensils for cooking food.

Among the 50 families surveyed, only eleven families had smokeless chula six of which were in actual use. Others did not use the chulas, as they thought that the fuel consumption was higher than other chulas, and longer time was taken for the foods to be cooked. None of the families used stoves for daily cooking. No family had cooker.

The problems observed in the methods of cooking, in these families were:-

The cooking water of the rice was, strained and discarded.

The methods of cooking pulses were satisfactory. They can improve their nutritional status by using sprouted grams which will help to increase the vitamin C content in their diet.

The families were using wrong methods of cooking vegetable such as cutting them into very small pieces, soaking in water for one or two hours to remove dust or mud before cooking, and allowing the cooking vegetables to be on 'chula' until serving in order to keep them hot. All these wrong practices deprive the families of good nutrients. They do not know the nutriet losses occurring during cooking cereals and vegetables. Introducing hay box and demonstration of better ways of cooking vegetables may help them greatly.

8. The Nutritional Status of the School going children of Age Group 5 to 9 years

A clinical survey was conducted on the children in the families to assess the correlation between their nutritional status and the diets consumed. There were 16 children between 5 to 9 years in the sample. The 16 children were divided into five groups as given in Table XV.

TABLE XV

DISTRIBUTION OF THE SIXTEEN CHILDREN ACCORDING TO THEIR AGE

Group	Age in Years	No. of children.
I	5	1
II	6	1
III	7	3
IV	8	5
V	9	6

These groups were selected for the clinical survey because the children were in rapidly growing stage and could show clinical symptoms more evidently reflecting their nutritional status. Moreover it was found convenient to collect them in one place from their homes for the survey.

The clinical survey was conducted with the help of the college physician, using a nutritional assessment schedule prepared by I.C.M.R. (1948)[49] which is given in Appendix V. The details included in the schedule were: children's age, sex, height, weight, general appearance, condition of the different organs of the body deficiency symptoms, Red Blood cell (R.B.C) count and haemoglobin level.

For the general appearance of the children, scores were assigned as follows:

Good - 0

Fair - 1

Poor - 2

Very poor - 3

Procedure

The children assembled in the morning at 8 0' clock for one day, and their height, weight, R.B.C. count, and haemoglobin percentage were recorded as each child was examined by the physician.

Height

The height of the children were taken by asking them to stand errect with heals and scapulae against a wall which had been graduated upto 50 centimeters, the line of sight was horizontal, with heels and scapulae. A scale was placed over his head and the height was determine to the nearest centimeter when the scale just touched the head in right angles to the measuring scale, with a girm contact with scalp. Thus the height gave the distance from the sole of the feet to the top of the head.

Weights

The weights of the children were taken in the morning before breakfast, using a weighing machine graduated in pounds, and ounces. The weights taken to the nearest ounces were converted to milligrams.

Red Blood cell counts

The total number of red blood cells in a cubic millimeter of the blood was counted by means of a Thomazeiss Haemocytometer as per procedure given in Appendix VI.

Haemoglobin Level

The haemoglobin level of children was determined by Sahli Hezige method described in Appendix VII.

Analysis of the clinical survey data

Table XVI shows the details of the heights, weights haemoglobin level and R.B.C. count of the children examined.

TABLE XVI

THE HEIGHTS WEIGHTS HAEMOGLOBIN LEVELS AND RED BLOOD CELL COUNT OF THE SIXTEEN CHILDREN.

Age groups	Age in years	Sex	Height in cms.	Weight in Kg.	Haemo-globin in gms.	R.B.C. in millions
I	5	F	100.0	13.2	9.3	2.5
II	6	F	108.7	14.4	13.9	4.1
III	7	M	100.0	14.4	12.1	3.1
	7	M	102.5	14.4	12.6	3.2
	7	M	110.0	16.3	13.8	3.2
IV	8	F	107.5	17.2	14.3	3.9
	8	M	112.5	19.0	14.5	3.8
	8	M	110.0	17.2	14.1	4.0
	8	M	110.0	14.4	12.3	2.2
	8	M	103.7	14.0	12.4	3.0
V	9	M	115.0	18.0	14.2	4.2
	9	F	110.0	14.4	12.1	2.9
	9	F	106.2	16.8	14.4	4.3
	9	M	115.0	17.2	14.1	3.6
	9	F	106.2	14.5	13.6	3.9
	9	M	112.5	17.2	11.5	3.6

Height

Figure 8 shows that the mean height of the children and weight increased with age. When the mean height of the girls are compared with that of boys as shown in Figure 7, the boys were taller than girls.

Weight

Figure 8 shows the mean weight of the children of five to nine years age group. As can be seen from the figure, the weight increased along with the age. When the mean weight of the girls and boys are compared. It was observed that there is not much difference due to sex.

Haemoglobin level

The haemoglobin level of the children shows that the children in the age group eight to nine years were quite healthy, as their haemoglobin level ranged whereas the seven year olds, had less haemoglobin, ranging from 12.1 to 13.8.

Red Blood cell count

The total number of red blood cells in a cubic millimeter of the blood of the children as counted by means of a Thoma-Zeiss Haemocytometer as per procedure given in Appendix VI. The R.B.R. count among the sixteen children ranged from 2.2 to 4.3 millions. Most of the children showed good health when R.B.C. count considered.

FIGURE 7

THE AVERAGE HEIGHT OF 5 TO 9 YEAR OLD GIRLS AND BOYS.

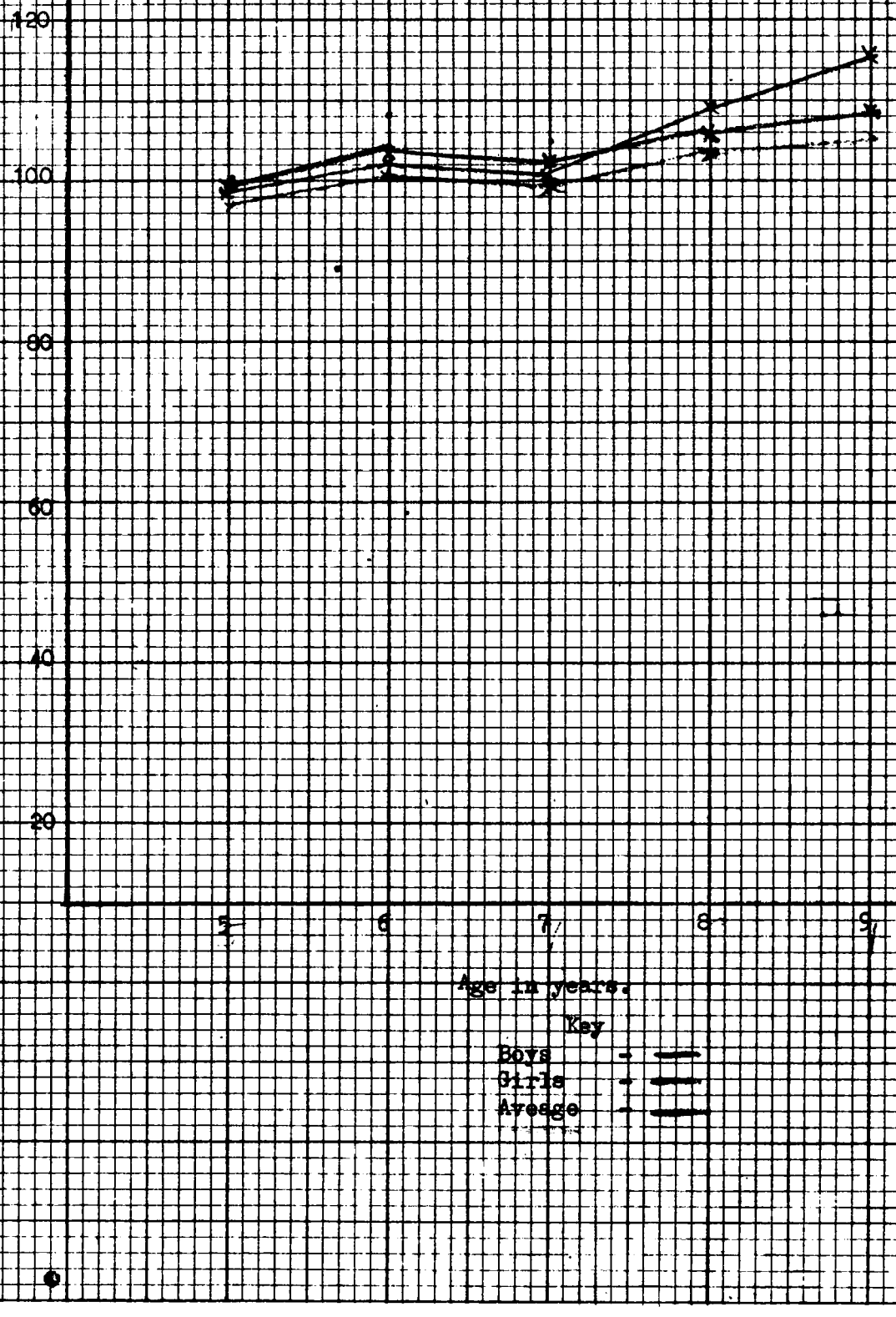
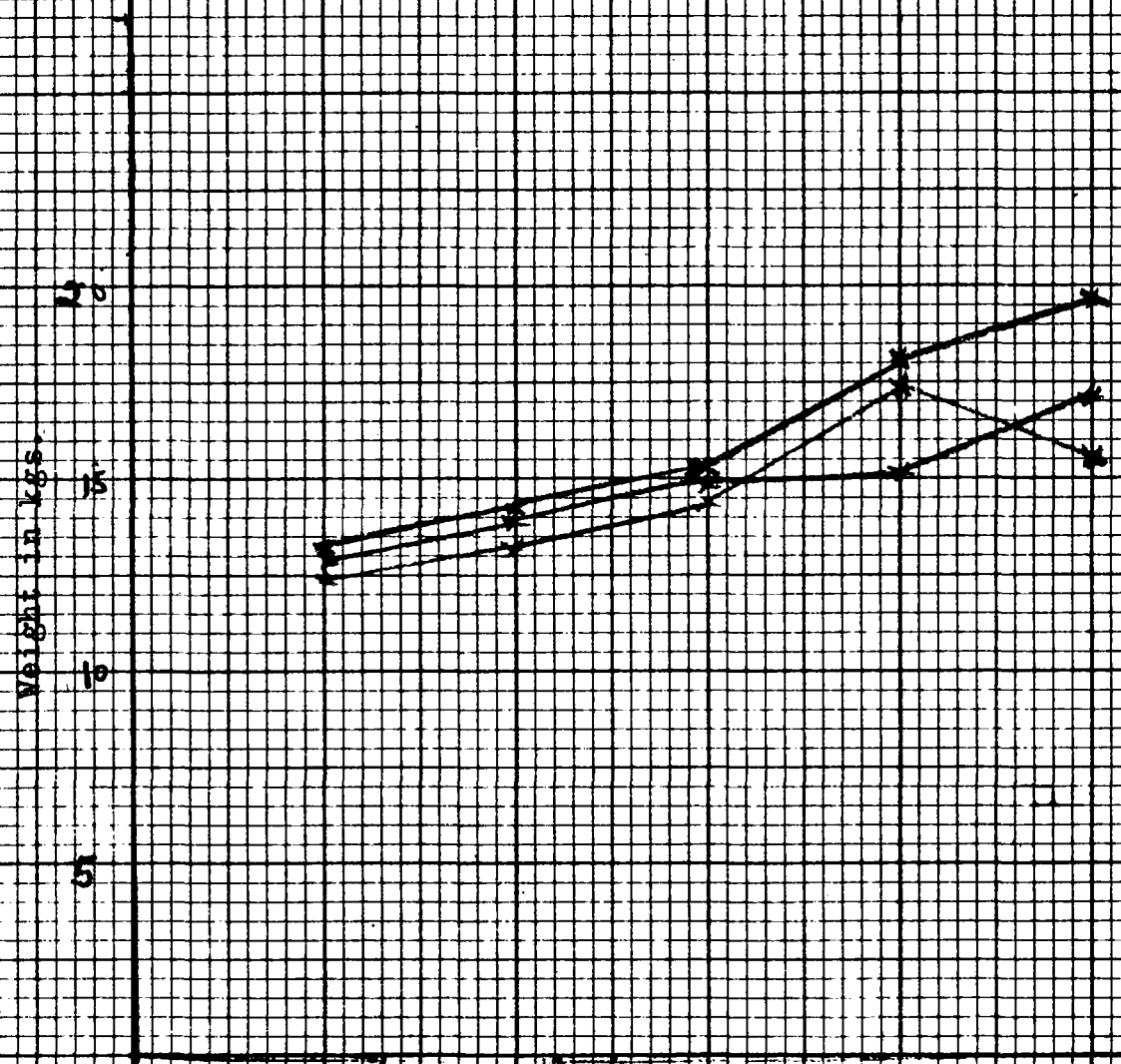


FIGURE 8

THE AVERAGE WEIGHT OF 5 TO 9 YEARS OLD CHILDREN



Key

Boys –

Girls –

Average –

X axis – age in years

Y axis – weight in kgs.

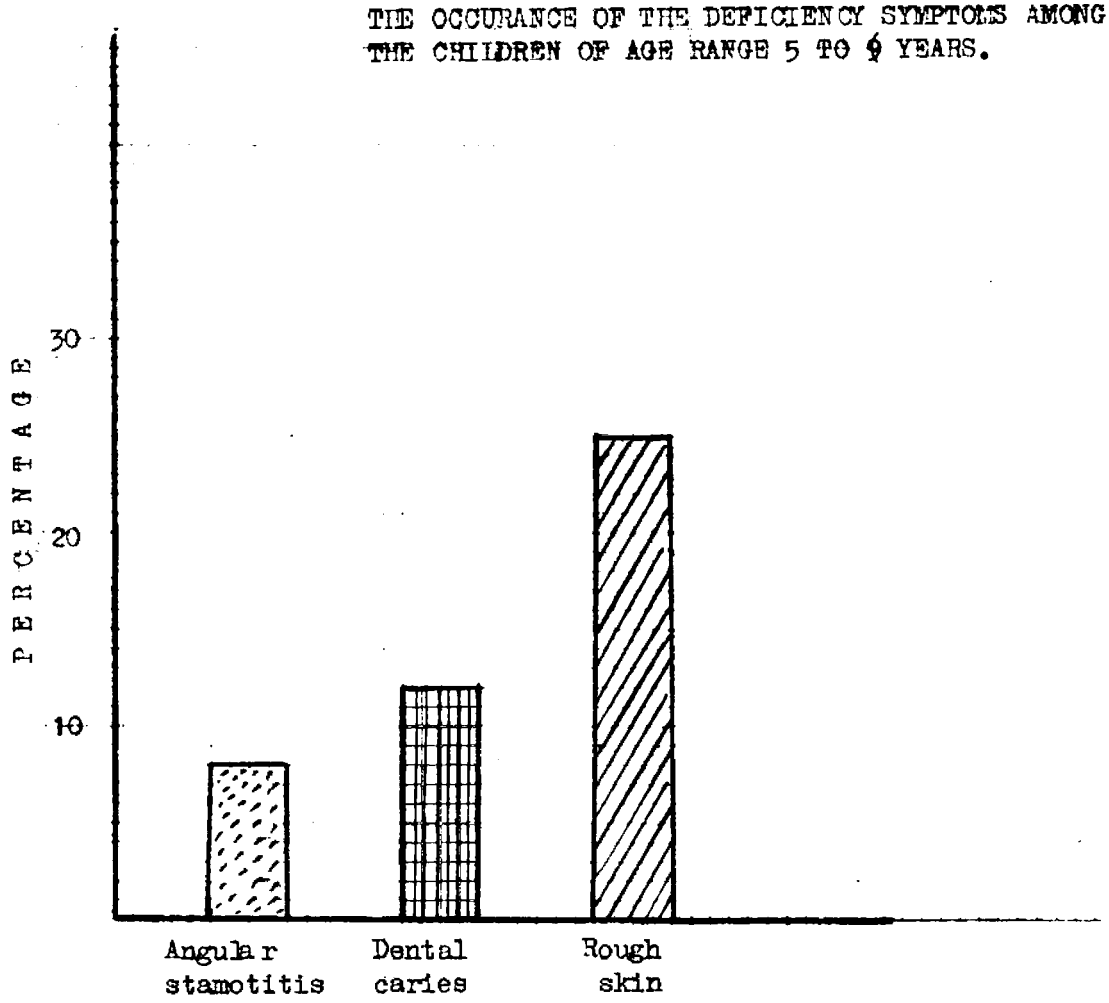
Deficiency Symptoms

Figure 9 shows the occurrance of deficiency symptoms.

Eight per cent of the children showed stamotitis and rough skin. Fourteen per cent children had dental caries. The examination of the children's general appearance showed that sixty per cent of the children had good physique, twenty five per cent of the children were fair in health and only 10 per cent had very poor health.

FIGURE 9

THE OCCURANCE OF THE DEFICIENCY SYMPTOMS AMONG THE CHILDREN OF AGE RANGE 5 TO 9 YEARS.



IV CONDUCTING NUTRITION EDUCATION PROGRAMME

The diet survey carried out in Kalappanaickenpalayam from 6th May to 18th May 1963 brought to light many problems of the villagers regarding food consumption and habits. The findings of the diet survey showed that the diets were unbalanced consisting mainly of cereals. The amount of protective food was negligible. Therefore, it was decided to conduct a nutrition education programme in the village, to help the homemakers include protective foods in their daily menus.

After adequate planning, the nutrition education programme was conducted, for three days during 26th July 1963 to 28th July 1963. The investigator visited the villave daily in the evenings for the purpose. Education about nutrition was given to the people through films, film strips, dramas, puppet shows, exhibition, demonstrations and talks. It was felt at the end of the programme that more efforts would need to be concentrated towards improvements of the food practices of that area.

Hence another programme was planned, selecting three of the most important problems for solution. The selection of the problems and plan for it, is given in Appendix VIII.

The problems were:

1. Cooking of rice by the straining method and throwing off the cooking water (Kanjee).

Out of the 50 families surveyed 34 were cooking rice in large quantities of water and throwing away the cooking water after straining. The objective of this problem was to motivate them to use hay box as a means of cooking rice by absorption method.

2. Cutting vegetables into very small pieces and then washing them.

3. Cooking greens for long durations.

Planning the Programme

A detailed plan was made for conducting this nutrition education programme on the basis of previous experience it was felt that the effectiveness and success of the programme would be enhanced if the investigator camped in the village. Accordingly the investigator stayed in the village for five days.

The programme conducted during the five days stay is summarised in the Table XVII.

TABLE XVII

THE TIME TABLE FOR THE NUTRITION EDUCATION PROGRAMME

Date	Mornings		Evenings	
11th February	10 a.m. to 11.30 a.m.	Home visits	2.p.m. to 5 p.m.	Demonstration on preparing and cooking greens and Bal wadi classes
12th	9 a.m. to 11 a.m.	Home visits	2 p.m. to 4 p.m. 5 to 7 p.m.	Demonstration. Film show
13th	----------F i e l d Trip ----------			
14th	9 a.m. to 11 a.m.	Home visits	2 p.m. to 4 p.m. 4 p.m. to 6 p.m.	Demonstration Balwadi classes
15th	9 a.m. to 11 a.m.	Cooking competition	7 p.m. to 9.30 p.m.	VaValidictory function

As can be seen from Table XVII the programme included:

1 Home visits

2 Balwadi classes

3 Demonstration

4 Field trip

5 Exhibition

6 Drama

7 Film show

8 Puppet show and cultural programme

The time for home visits was fixed in the mornings in order to meet the home makers before they left their houses for work. Figure 10 shows the investigator interviewing a homemaker.

FIGURE 10

HOME VISIT

The home visits served the following purposes to

1. Establish a good rapport with the home makers
2 Suggest probable solutions to their problems
3 Invite them to attend the group or public meeting later in the afternoon.

A. Cooking Rice Properly

The following methods were used to educate the villagers about the proper method of cooking rice.

1 Film show
2 Field trip

1. Film show

A film show was shown to the villagers. In this film along with the selection, and preparation of foods, it was also shown that rice should be cooked by absorption method. For the film show 110 children and 108 adults were present.

2. Field trip

On the 13th February, 21 women and 23 children were taken on a field trip to Sri Avinashilingam Home Science College, where a drama and a demonstration were shown to them giving information of cooking rice in hay box, and also the preparation of selected vegetables prior to cooking. The content of the drama is given in Appendix IX, in which the faults of cooking rice by the straining method and the importance of hay box were brought out.

A demonstration was given about the use of hay box details of which are given in Appendix X. as shown in Figure 10. It is seen from the picture that the village women were keenly interested in this new method of cooking rice.

After the rice was cooked the homemakers tested its appearance, texture, colour and doneness. From the audience three homemakers said that they will start using the hay box in their homes immediately.

Later, the homemakers were taken round the college kitchen, where they saw how rice was cooked in a large cemented tub hay for two hundred girls in the hostel.

B. Preparation of Vegetables. Such as Greens, Potatoes Prior to Cooking to conserve Nutrients

The methods used for teaching the preparation of vegetables prior to cooking were

1. Demonstration
2. Exhibition

1. Demonstration A demonstration was given showing the methods of washing peeling and cutting potatoes and carrots, emphasizing that both vegetables should be washed first before peeling and cutting, while peeling thin layers of skin should be cut into large pieces as shown in Figure 12.

FIGURE 11

HAY-BOX DEMONSTRATION.

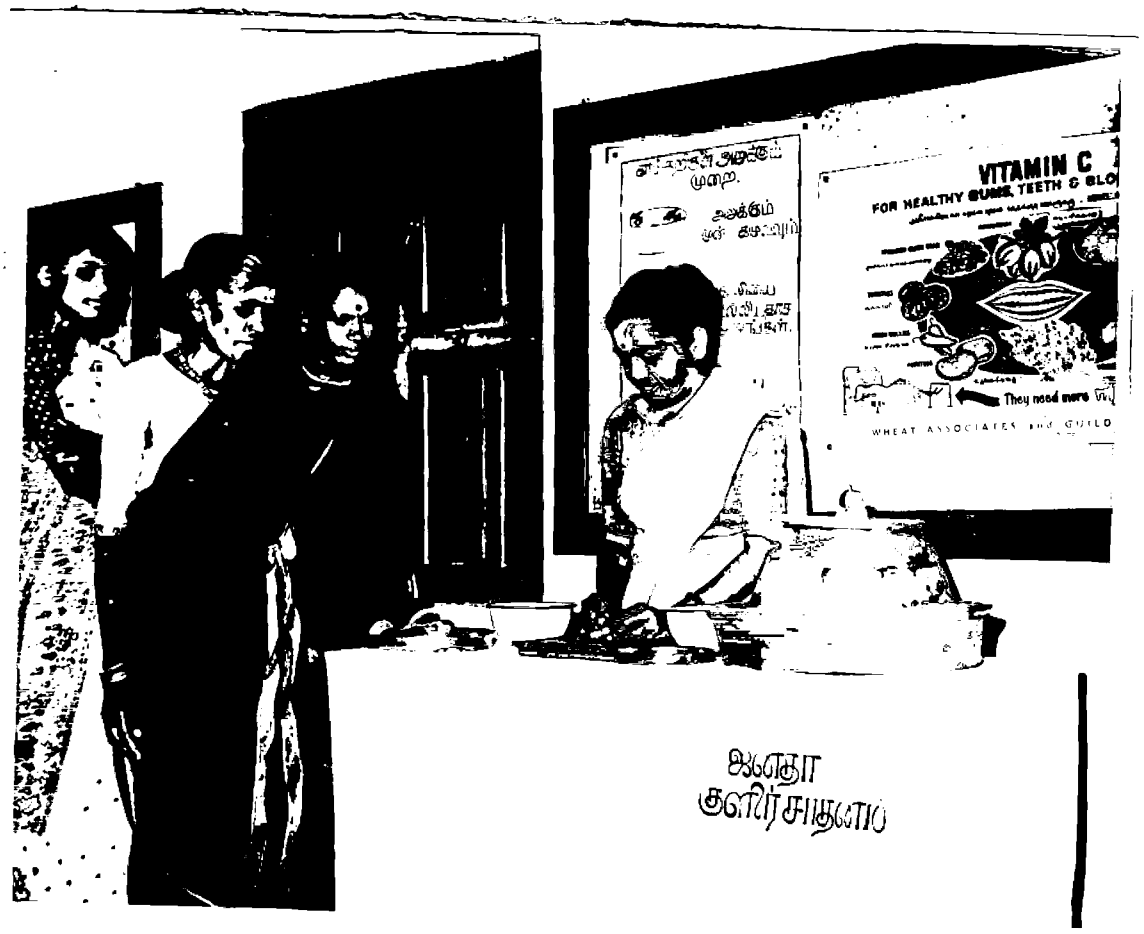


FIGURE 12

DEMONSTRATION OF CUTTING VEGETABLES

4. The greens should be removed after seven minutes as soon as it starts boiling.

The audience were very attentive and raised several questions about the reasons for cutting greens into big pieces, for not throwing away the excess of water and for not covering the cooking utensil.

After the demonstration all of them tasted the cooked product.

The home makers liked the texture and taste of the product and appreciated its preserved green colour.

Evaluation

The enthusiasm with which the homemakers attended the demonstration inspired the investigators to organise jointly a competition for cooking greens. Six home makers participated in the competition. The competitors themselves brought their 'chula' fuel, utensils, knife and cutting board. Greens and other ingredients were provided for them, in equal amounts. The spices and seasoning materials were kept in one place, for the participants to use. All the homemakers were judged for their method of preparing the greens, cooking it and for its taste. Figure 13 shows the enthusiastic participation of the competitors.

FIGURE 13

COOKING COMPETITION

All the home makers followed the correct methods of cooking greens, demonstrated to them by the investigators earlier. The taste of the product was good.

On the final day a validictory meeting was organized. The youth club of the village came forward, got printed the invitations and helped in distribution of the same. A sample of the invitation is given in Figure 14.

நிகழ்ச்சி நிரல்.

மாலை 7-00 மணி.

1. இறைவணக்கம்
2. வரவேற்புரை:
   திரு. கா. சு. இராமசாமி
   (தலைவர், சேவா சங்கம்.)
3. தலைவர் முன்னுரை:
   திருமதி. டாக்டர் ராஜம்மாள் P. தேவதாஸ் அவர்கள்
4. அறிக்கை வாசித்தல்:
   குமாரி சங்கரி
5. சிறப்புரை:
   திருமதி. சாவித்திரி சண்முகம் அவர்கள்
6. காந்திஜி படத் திறப்பு:
   திரு. R. முத்துசாமிக் கவுண்டர் அவர்கள்
   (தலைவர், சோமையம்பாளையம் பஞ்சாயத்து.)
7. நூலகத் திறப்பு:
   திரு. K. துரைசாமி நாயுடு அவர்கள்
   (தலைவர், பஞ்சாயத்து யூனியன்.)
8. பரிசு வழங்கல்:
9. கலை நிகழ்ச்சி:
   மாதர் சங்க உறுப்பினர்கள்,
   எம். எஸ். ஸி. மாணவிகள்
10. தலைவர் முடிவுரை
11. நன்றி நவிலல்:
    குமாரி உஷா
12. நாட்டுப்பண்

சுபம்.

எஸ். பி. கே. பிரஸ், சு. மு. வீதி, கோவை — '64.

"சமூ

"நூல

அன்புடையீர்
ஸ்ரீ அவஞ்சி
பயிலும் ||
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திட்ட முகா
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திருமதி

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வேண்டிக்

காளப்பநாய்க்
பாளையம்
12—2—19

FIGURE 14

INVITATION OF THE VATEDICTORY FUNCTION.

Our Principal presided over the function. A cultural programme was put up to highlight the principles of nutrition. The children from the village participated in the programme. The audience included 300 men, women and children. Figure 15 shows the keen audience attending the function.

FIGURE 15

THE ALERT AUDIENCE

The members of the 'Mathar Sangham' [Ladies' Club] also participated in the programme with enthusiasm. They made preparations with ragi, and multipurpose food and along with their home produced foods, eggs and milk, exhibited them during the programme.

The Chairman and Commissioner of Periyanaickenpalayam Panchayat Union attended the function and delivered speeches to the villagers. A well known social worker Smt. Savithri Shanmugham distributed prizes to the women and children who won prizes in competition of cooking, singing and reciting poems.

Figure 16 shows a home maker receiving prize for cooking from Smt. Savithri Shanmugham.

FIGURE 16

PRIZE-DISTRIBUTION

The news papers 'Hindu', Indian Express and Dinamani published reports about the Nutrition Education Programme, conducted in Kalappanaickenpalayam. The paper cuttings of the news are given in Figure 17.

The Indian Express February 19, 1964

Nutrition Education Project

COIMBATORE, Feb. 18

The nutrition education project undertaken by a bunch of young post-graduate students of Sri Avinashilingam Home Science College, Coimbatore, at a tiny hamlet of Kalappanaickenpalayam, came to a close on Saturday.

These enterprising young women stayed in the village for more than four weeks and taught the rural folks the need for including nutritious but cheap foods in their diets, such as protein-rich Indian multipurpose food.

The valedictory function of the project was held on Saturday. Dr. Rajammal Devadas, Principal, presiding, Smt. Savithri Shanmugham delivered the valedictory address.

Mr. K. Doraiswamy Naidu, chairman of the Perinaickenpalayam panchayat Union, distributed prizes.

THE HINDU FEBRUARY 22, 1964.

EDUCATION IN NUTRITION

VILLAGERS TAUGHT PRINCIPLES

(FROM OUR CORRESPONDENT)

COIMBATORE, Feb. 20.

Five of the second year M.Sc. students majoring in Food and Nutrition from the Sri Avinashilingam Home Science College, Coimbatore, conducted an intensive nutrition survey on individual farming basis for three weeks in Kalappanaickenpalayam village of Perianaickenpalayam Block during May-June 1963.

Based on the findings of their survey, a nutrition education programme was planned and carried out.

The students camped in the village again for a week this month to intensify the nutrition education project using several extension methods such as demonstration, home visits, study tour, discussions and film propaganda to reach all people in the 200 families in the village. Their efforts were directed mainly towards women, young girls, school going and Balwadi children. The emphasis of the programme was on the inclusion of nutritious but cheap food in their diets such as the protein-rich Indian multipurpose food and to improve the methods of cooking in order to conserve the nutrients.

An on-the-spot evaluation made by organising a competition in cooking greens showed that many women had grasped the major principles taught to them.

DINAMANI (21--2--1964)

சத்துள்ள உணவுக் கலவி திட்டம்

கோவை, பிப். 17— கோவை ஸ்ரீஅவினாஷி குடும்பக்கலைக்கல்லூரியின் பட்டமேற்படிப்பு மாணவிகளின் குழுவொன்று கலப்பச்சக் கென்பாளையத்தின் சிறுகிராமமொன்றில் சத்துள்ள உணவு கல்வித்திட்டத்தை மேற்கொண்டது. இதுசென்ற சனிக்கிழமையுடன் முடிவுற்றது.

இந்த இளம்பெண்கள் அந்த கிராமத்தில் 4 வாரங்கள் தங்கியிருந்து கிராமமக்களுக்கு சத்துள்ள உணவுபற்றி போதித்தனர்.

பூர்த்திவிழாவுக்கு கல்லூரி பிரின்ஸ்பால் டாக்டர் ராஜம்மாள் தேவதாஸ் தலைமைவகித்தார். ஸ்ரீமதி சாவித்திரி சண்முகம்பேசினார்.

பெரியநாயக்கன்பாளையம் பஞ்சாயத்து யூனியன் தலைவர் ஸ்ரீகே. துரைசாமி பரிசுகளை வழங்கினர்.

FIGURE 7

REPORTS PUBLISHED IN THE LOCAL DAILIES.

V EVALUATION OF THE NUTRITUION EDUCATI

A month after conducting the nutrition education programme the village was revisited to make an evaluation of the programme. In order to determine the effectiveness of the Nutrition Education Programme, twenty two home makers who attended the Nutrition Education Programme were interviewed. They included those who belonged to the families where the diet survey was conducted byw weighment method and the interview method, and those who were not surveyed. The purpose of interviewing them was to elicit their responses to a questionnaire, which is given in Appendix XI. The questionnaire was based on the mthod of cooking rice, preparing vegetables and method of cooking greens.

Methods of Cooking Rice Using a Hay Box

Out of the twelve homemakers who attended the demonstration on the use of the hay box, ten could say how it was useful. Only one home maker actually using it.

Out of the ten homemakers selected for the weighment survey, four homemakers who attended the demonstration on hay box and another four who had not, were interviewed. The comparison of their replies revealed that the former had a better understanding of the use of hay box, and had even informed three other homemakers abouts its usefulness. One homemaker was also using it.

The homemaker who is using hay box reported that it saved time, saved fuel, and gave a good texture to the cooked product and was very convenient.

Method of preparing carrots and potatoes prior to cooking

Of the twelve homemakers who attended this demonstration, ten had a good understanding of the steps to be followed in preparing these root vegetables. They mentioned these vegetables should be washed first and then if necessary very thin layers of peels should be removed and the vegetables should be cut into big pieces.

Comparing the answers of homemakers who attended the Education Programme with those who idd not, it was found that only the former could enumeratet the reasons for washing before cutting, removing only thin layers of peels and cutting into big pieces.

Method of Preparing and Cooking Greens

Of the twelve familites who had attended this demonstration, nine had gained knowledge about the proper method of preparing and cooking greens.

General changes

Apart from this evaluation through interviewing the individuals some general questions, pertaining to their meal pattern, were asked of the homemakers, to see whether or not any change had occured in their dietary patterns, through the total impact of the education programme conducted by the five investigators.

Forthis purpose the menus used during the previous three days and the foods used during the last one or two weeks were recorded.

Cereals

Apart from their staple food i.e. rice and sorghum, more emphasis was given to the use of ragi. In two of the families

ragi malt was prepared daily and given to children. Two families also tried ragi leaf cake a new preparation demonstrated. The other families knew about the usefulness of ragi, but four of them did not use it because of its unavailability. Five of the homemakers informed that they have leanred that parboiled rice has better nutritive value.

Pulses

More emphasis was now given on the use of green gram. All the families use thid dhal, butoonly four of them use sprouted green gram which is a good source of vitamin C. The other families use this dhal for other preparations, but after telling to them again about the benefits of sprouting it, they agreed to use sprouted green grams. Two families use sprouted Karamani, red gram and horse gram.

Vegetables

The people realised the benefits of including vegetables in their diet. All the twelve homemakers interviewed had used some vegetables or other in the last two weeks. Although they knew the nutritional importance of vegetables, they buy them from Coimbatore, only when it is convenient for them. In the local gardens, only tomato is grown, which is consumed by the families andthey have also started using jungle greens.

From the evaluation it was found that one family used green leafy gegetables daily, another three times a week, four others twice a week and others used it once a week or fortnightly. Some of the greens used by these families are drumstrick leaves, agathi and jungle greens.

The other vegetables used in the village homes are potatoes, carrots, sweet potato, yam, pumpkin, brinjal, cabbage and ladies finger. Before the frequency of use of these vegetables potato, yam, brinjal were used by all the families, at least once during the last week. In two families pumpkin, cabbage and carrots were used twice, and only one family used ladies finger and sweet potato.

Fruits

All the twelve families used plantains. One daily, four three times a week, and the others atleast once a week.

Tomato is available in the local market and used by all the families during the last two weeks. Two homemakers used Papaya and one had used orange during the last week.

Meat

Three homemakers had cooked meat during the last fortnight.

Eggs

Three families have included eggs in their diet. Two of them included it once a week and the other every alternate day.

Multipurpose Food

Multipurpose food which was sold during the education programme was used by all the twelve homemakers. One of them had shared her M.P.F. with another who had not known about it. The evaluation also revealed that six homemakers who did not know about M.P.F. had learned about it, from those who were using it. Two among the twelve placed an order for M.P.F. along with fresh order for nine homemakers, who had already started using it.

The homemakers seemed to relish the taste and flavour of M.P.F.

since they had missed these demonstrations.

Seven homemakers who had attended all the Nutrition Education Programme, had gained the maximum information. Three of them are now using M.P.F., including green leafy vegetables, and ragin in their diets, and are following the correct methods of preparing and cooking greens.

Of all the homemakers who attended all the programmes, only one homemaker was practising everything that was taught or shown to her. She is using ragi preparations, M.P.F. and sprouted green gram. She is also using a hay box for cooking rice.

The investigator also observed what the homemakers had cooked on the day of their visit. It was observed that she cooked rice in the hay box, and prepared jungle greens by following the correct steps taught during the nutrition education programme. She also has a small kitchen garden growing bittergourd, tomato, coriander and curry leaves.

The investigator was able to make another evaluation on 24th March 1963, when Dr.C.G. King, Dr.Anderson, the world famous nutritionists, our Principal and the founder of Sri Avinashilingam Home Science College visited the village. One of the homemakers invited them to her house to show the new points she learned from the nutrition education programme. She prepared ragimalt, sweets made of Multi Purpose Food, and other preparations of greens and sprouted green gram. Figure 18 illustrates the proud homemaker showing Dr.Anderson and our Principal, the rice which she cooked in her hay box.

FIGURE 18

Dr. ANDERSON'S VISIT

In summary it can be said that (1) the homemakers who attended the nutrition education programme had gainedknowledge about nutritiour food to be included in their diets (2) the homemakers who attended all the programmes had carried the knowledge into practice more effectively and (3) the nutritional knowledge is slowly spreading from one another.

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APPENDICES.

APPENDIX I

SRI AVINASHILINGAM HOME SCIENCE COLLEGE
COIMBATORE.11

Geeta Patrath
I M.Sc.(F & N)

Part I.

DIET SURVEY FORM

Date:
Family No:

Name of the head of the Family:

Village: District:

Religion: Caste: Mother Tongue:

Information about family:

S.No.	Family member name	Relation to housewife	Age	Sex		Vegetarian	Non-vegetarian	Occupation	Income
				Male	Female				

Expenditure on food:

	Weekly		Monthly	
	Quantity	Value Rs. Np.	Quantity	Value Rs. Np.
Cereals				
Pulses				
Vegetables				
Salt& Spices				
Sugar & Sweets				
Milk Curds etc.				
Butter Ghee Oil				
Meat Fish Eggs				
Others.				
Total				

Other expenditure

	Weekly		Monthly	
	Rs.	nP.	Rs.	nP.
Clothing				
Rent				
Education				
Charity				
Health				
Recreation				
Saving				
Miscellaneous				
Total				

Foods taken:

Name of the foods	Daily	Weekly	Occasionally
Cereals			
Rice			
Cholam			
Wheat			
Ragi.			
-			
-			
-			
-			
Pulses			
Red gramdhal			
Black gramdhal			
Bengal gramdhal			
Green gramdhal			
Lentil			
Peas dried			
-			
-			
-			
Leafy vegetables			
Amaranth			
Cabbage			
Coriander			
Currileaves.			
-			
-			
-			
Root vegetables			
Beetroot			
Carrots			
Onion			
Bitter Gourd			
Drum stick			
-			
-			
-			

Name of the foods	Daily	Weekly	Occasionally
Jack fruit			
Peas			
Plantain (raw)			
Pumpkin			
Tomatoes			
Turnip			
Cucumber			
Ladies fingers			
Nellikai			
Potatoes			
Yam			
Tapoika			
Sweet potato			
Radish			
Brinjal			
Cashewnuts			
Tamerind			
-			
-			
-			
Fruits			
Banana			
Grapes			
Gnava			
Lemon			
Jack fruit			
Mango			
Papaya			
-			
-			
-			
Fish			
Meat			
Eggs			
Milk			
Sugar			
-			
-			
-			

Number of meals.	Time of cooking	Time of cooking
Breakfast		
Midday meal		
Afternoon tea snacks etc.		
Evening meal		

Foods restricted - Recommended for Special Conditions

Conditions	Foods	Restricted	Specially given	Reasons
Pregnancy				
Lactation				
Weanling period				
Childhood				
Adolescence				
Old age				
Sickness				
Fever				
Small pox				
-				
-				

Home Food Products:

Vegetable Garden	Cattles	Poultry
Yes/No	Yes/No	Yes/No

Vegetables grown	Number of cattles milk obtained	Number of hens Eggs obtained.

Intake of Foods:

Food stuffs.	Code	Initial stock.	Final stock	Survey-Days 1	2	3	4	5	6	7	Gross. quantity	Waste.	Net quantity	Quantity per person per week	Quantity per person per day.
Cereals															
Rice															
Ragi															
Wheat															
Cholam															
-															
-															
-															
Pulses															
Red gramdhal															
Black gramdhal															
Bengal gramdhal															
Green gramdhal															
Lentil															
Peasdried															
-															
-															
-															

contd.

Food stuffs	Code	Initial stock	Final stock	Survey-Days 1 2 3 4 5 6 7	Gross. te. quantity	Waste quantity	Net quantity	Quantity per person per week	Quantity per person per day.
Leafy vegetables									
Amaranth									
Cabbage									
Drumstick									
Lelluce									
Mint									
Corriander									
Spinach									
-									
-									
-									
Root Vegetables									
Beetroot									
Carrot									
Onion									
Potato									
Radish									
Sweet Potato									
Tapioca									
Yam									
-									
-									
-									
Other Vegetables									
Bitter gourd									
Brinjal									
Califlower									
Drumstick									
Jackfruit									
Ladies finger									
Nellikai									
Peas									
Pumpkin									
Plantain									
Tomato									

contd.

Food stuffs	Code	Initial stock	Final stock	Survey days 1 2 3 4 5 6 7	Gross. quantity	Waste. quantity	Net quantity	Quantity per person per week	Quantity per person per day.
Nuts									
Cashewnut									
Cocoanut									
Gingelly seeds									
Groundnut									
-									
Spices									
Cardamom									
Chillies-green									
Chillies-dry									
Corriander									
Garlic									
Ginger									
Mustard									
Tamerind									
Turmeric									
Fruits									
Banana									
Grape									
Gnava									
Lemon									
Mango									
Orange									
Papaya									
Plantain									
Flesh foods									
Mutton									
Fish									
Eggs									
Milk and milk Products									
Milk									
Curds									
Buttermilk									
Cheese									
Oils & Ghee									
Cocoanut oil									
Gingelly oil									
Dalda									
Ghee									
Miscellaneous									

APPENDIX II-B

NUTRITIVE VALUE OF THE DIET OF GROUP II*

FOOD STUFFS	AMOUNT G	CALO-RIES.	PROT-EINS. G	CAL-CIUM G	IRON MG	VITA-MIN.A. I.U	VITA-MIN.B MG.	VITA-MIN.C MG.
Cereals	420	1453	26.8	0.04	0.80		88	
Pulses	38	126.5	8.4	0.05	3.3	83.60	171	
Leafy vegetables.	33	15.5	1.61	0.16	7.06	825	16.5	22.6
Root vegetables.	63	16.7	0.81	0.13	0.47	1360	27.2	8.4
Other vegetables.	27	81.18	0.25	..	0.35	1.35	12.15	6.2
Fruits and nuts	18	20.0	0.29	...	0.13	8.6	13.5	2.1
Milk and milkproducts	84	12.28	2.77	0.10	0.16	136.0	33.60	...
Sugar or Jaggery	40	46.8	1.6	0.03	0.56	112	8	...
Oil	25	225	...	...	...	...	...	...
Animal foods	62	107.2	8.2	0.03	1.30	984	80.6	..
Total		2110.16	50.73	0.51	18.13	2510.5	1444.5	38.3

*Income range Rs.100 to Rs.149.

APPENDIX II C

NUTRITIVE VALUE OF THE DIET OF GROUP III*

Foodstuffs	Amount g.	Calories	Protein g.	Ca g.	Iron mg.	Vit.A I.U.	Vit.B mg.	Vit.C mg.
Cereals	425	11.07	20.48	0.03	0.64	0	472	0
Pulses	35	116	7.81	0.04	3.0	77	157	0
Leafy vegetables	Nil	-	-	-	-	-	-	-
Root vegetables	70	35.7	0.08	0.12	0.49	1400	28.0	7.7
Other vegetables	28	0.9	0.36	0.00	0.36	1.4	12.6	6.6
Fruits and nuts	16	16.6	0.17	0.01	0.08	19.8	8.0	0.96
Milk and Milk products	93	108.8	3.06	0.11	0.18	150	38	-
Sugar or jaggery	38	145.4	0.15	0.03	4.33	23	7.6	-
Oil	30	270	-	-	-	-	-	-
Animal foods	-	-	-	-	-	-	-	-
Total		1800.4	32.11	0.63	6.08	1661.2	823.2	15.06

*Income range Rs. 150/ to 199/-

APPENDIX II D

NUTRITIVE VALUE OF THE DIETS OF GROUP IV*

Foodstuffs	Amount G.	Calories	Protein G.	Ca G.	Iron mg.	Vit.A I.U.	Vit.B_1 ug.	Vit.C mg.
Cereals	422	1455	26.9	0.05	0.90	0	826	0
Pulses	40	133	8.9	0.05	3.51	80	180	10
Leafy vegetables	34	15.9	1.6	0.17	7.27	760	170	33.6
Root vegetables	72	36.7	0.86	0.12	0.50	1440	123	16.5
Other "	29	9.87	0.37	0.05	0.4	1	13	6
Fruits and nuts	18	15	0.15	0.03	0.1	17	7	1
Milk and milk products	95	109	3.17	0.11	0.19	152	39	-
Sugar or jaggery	42	160.8	1.6	0.03	4.78	117	9	-
Oil	32	289	-	-	-	-	-	-
Animal foods	-	-	-	-	-	-	-	-
Total	-	2223.2	43.55	0.67	17.65	2575	1367	47.1

* Income range Rs. 200/ to 249/-

APPENDIX II E

NUTRITIVE VALUES OF THE DIET OF GROUP V*

Food-stuffs.	Amount g.	Calo-ries	Pro-tein g.	Ca g.	Iron mg.	Vit.A I.U.	Vit.B$_1$ mg.	Vit.C mg.
Cereals	412	1418	26.24	0.04	8.2	0	865	0
Pulses	42	139.8	9.36	0.05	3.6	92.4	189	0
Leafy vegetables	37	45.3	1.81	0.18	7.9	925	18.5	26.6
Other vegetables	25	8.50	0.32	0.00	0.32	1.2	11.2	5.7
Root vegetables	68	34.6	0.81	0.08	0.47	1360	27.2	7.4
Fruits and nuts	20	20.8	0.32	0.00	0.10	24.8	10.0	1.2
Milk and Milk products	112	171	5.8	0.12	0.03	185	336	0
Sugar or jaggary	40	155.2	0.16	0.03	4.56	112.0	8.0	-
Oil	36	324	-	-	-	-	-	-
Animal foods	-	-	-	-	-	-	-	-
Total		2014.2	42.82	0.50	25.18	2700.5	1460.9	30.9

* Income range Rs.250/ to 299/-

APPENDIX II. F

NUTRITIVE VALUES OF THE DIET OF GROUP VI*

Food Stuffs	Amount	Calores	Proteins	Calcium	Iron	Vitamin.A	Vitamin.B_1	Vitamin.C.
	g	g	g	g	mg.	I.U.	ug.	mg.
Cereals	425	1470	20-48	0.03	0.64		472	..
Pulses	40	133	8.9	0.05	3.51	88	180	..
Leafy vegetables.	42	19.7	2.05	0.21	8.98	1050	21	26.0
Other vegetables.	32	10.8	0.41	...	0.41	01.6	14.4	7.36
Root vegetables.	70	25.7	8.4	0.12	0.49	14.00	28	7.7
Fruits & nuts.	36	37.41	0.39	...	0.18	44.6	18.0	2.16
Milk & milk products.	99	116.9	3.3	0.12	0.2	162	40	...
Sugar or Jaggery	50	191.5	0.2	0.04	5.7	140	10	...
Oil	37	333	...	...	...	...	...	...
Animal foods	...	...	...	...	...	...	...	...
Total		2336.0	44.13	0.57	20.7	2886.2	783.4	41.26

*Income range Rs.300 to Rs.349.

APPENDIX II - G.

NUTRITIVE VALUE OF THE DIET OF GROUP VII*

Food stuffs	Amount g	Calories	Proteins g	Calcium g	Iron mg.	Vita-min.A I.U.	Vita-min,B_1 ug.	Vita min-C mg.
Cereals	415	1418	26.24	0.04	0.82		861	...
Pulses	60	199	13.20	0.08	2.80	132	270	...
Leafy vegetables.	40	18.7	1.9	0.22	8.58	1000	20.0	23.6
Root vegetables	72	36.7	0.86	0.12	0.50	1440	123	16.5
Other vegetables	38	12.9	...	0.49	1.5	17.1	..	8.7
Fruits & nuts	40	41	0.44	...	0.20	49.6	20.0	2.4
Milk & milk products.	150	140	3.96	0.14	0.24	194.4	36-0	...
Jaggery	64	245.1	0.25	0.05	7.29	179.2	12.8	...
Oil	40	360	...	...	...	...	...	...
Animal foods	40	69.2	5.32	0.02	0.96	48.0	52.0	...
Total		3149	52.66	0.67	21.88	3083.0	1411.9	41.1

*Income range Rs.400 to Rs.500.

APPENDIX III- A

THE AVERAGE INTAKE OF DIFFERENT FOOD STUFFS AND THEIR NUTRIENT CONTENT AS OBSERVED BY WEIGHMENT METHOD IN TEN FAMILIES IN GROUP I *

Food stuffs	Amount g	Calories	Proteins g	Calcium mg.	Iron mg.	Vitamin.A I.U.	Vitamin.B mg.	Vitamin.C. mg.
Cereals	465	1608.9	29.7	0.04	0.94	...	976.5	...
Pulses	32	106.5	7.1	0.04	2.68	70.4	144	...
Leafy vegetables	...	...	...	...	...	...	...	...
Root vegetables	56	28.5	0.6	0.10	0.39	1120	22.4	6.16
Other vegetables	28	9.5	0.34	...	0.36	01.4	12.6	6.4
Fruits & nuts	16	16.6	0.17	0.001	0.08	19.8	8.0	0.96
Milk & milk products	75	87.7	2.47	0.09	0.15	123.8	30.0	...
Jaggery	32	12.8	0.12	0.02	3.6	89.6	6.4	...
Oil	25	225	...	...	...	...	...	...
Animal foods	30	519	3.9	0.18	0.63	360	39	...
		2614.6	44.40	0.47	8.24	1785.0	1236.9	12.52

*Income range Rs.50 to Rs.149.

APPENDIX III-B

THE AVERAGE INTAKE OF DIFFERENT FOOD STUFFS AND THEIR NUTRIENT CONTENT AS OBSERVED BY WEIGHMENT METHOD IN TEN FAMILIES IN GROUP II*

Food stuffs	Amount g	Calories	Proteins g	Calcium mg	Iron mg	Vitamin.A I.U.	Vitamin.B mg.	Vitamin.C mg.
Cereals	422	1445	26.9	0.05	0.90	...	826	...
Pulses	40	133	8.9	0.05	3.51	88	180	...
Leafy vegetables	34	15.9	1.6	0.17	7.27	760	170	23.6
Root vegetables	70	35.7	0.84	0.12	0.49	1400	28.0	7.7
Other vegetables	28	0.9	0.36	...	0.36	1.4	12.6	6.4
Fruits & nuts	18	18.7	0.19	0.18	.09	22.3	9.0	1.08
Milk & milk products	100	117	3.3	0.12	0.2	162	40	...
Jaggery	42	160.8	1.6	0.03	4.78	117	9	...
Oil	28	252	...	...	...	...	...	...
Animal foods	...	...	...	...	...	...	...	...
		2189-0	43.69	0.72$	17.60	2550.7	1264.6	38.78

*Income range Rs.150/- to Rs.249/-.

APPENDIX III- C

THE AVERAGE INTAKE OF DIFFERENT FOODS STUFFS AND THEIR NUTRIENT CONTENT AS OBSERVED BY WEIGHMENT METHOD IN TEN FAMILIES IN GROUP III*

Food stuffs	Amount g.	Calories	Proteins g.	Calcium mg.	Iron mg.	Vita-min.A I.U.	Vita-min,B Mg.	Vita-min.C Mg.
Cereals	422	1460	27.00	0.04	0.8	...	686	...
Pulses	42	139.8	09.36	0.05	3.61	92.4	189	...
Leafy vegetables	32	15.0	01.56	0.16	6.84	800	16	32
Root vegetables	65	33.1	0.78	0.13	0.45	1300	26.0	7.15
Other vegetables	25	8.5	0.32	0.01	0.32	1.1	11.2	5.7
Fruits & nuts	20	20.0	0.24	0.03	0.14	400	8	2.4
Milk & milk products	110	128.0	3.63	0.13	0.22	178.2	44	...
Jaggery	42.5	162.7	1.7	0.03	04.8	119	8.5	...
Oil	31.5	283.5	...	...	...	...	...	...
Animal foods	...	...	...	...	...	...	...	...
		2251.4	44.58	0.58	17.18	2890.7	997.2	46.26

*Income range Rs 300 tp Rs 400.

APPENDIX IV

SURVEY FORM TO STUDY THE COOKING PRACTICES OF FAMILIES

SRI AVINASHILINGAM HOME SCIENCE COLLEGE
COIMBATORE 11.

Geeta Patrath.
I M.Sc.(F & N)

Date .....

Place .....

Name of the head of the family.....

Address .....

Religion..... .. Caste.....Mother Tongue.....

Details about members of the family

Name	Age	Sex		Vegetarian	Non-vegetarian	Education
		Male	Female			

I Rice

Types	Times washed before cooking	Absorption	Straining	Used cooker	Used Haybox	Others

2. Use of Canjee

Name of therice	No canjee	Thrown off	Used as beverage	Others.

Rice Preparations:-

Name	Method of cooking
Iddli	
Dosai	
-	
-	
-	

II Pulses

Name	Absorption	Straining	In cooker	Hay-box	Others

Pulse Preparations

Name	Methods of cooking
Iddli	
Dosai	
-	
-	
-	
-	
-	

III Vegetables

Name	Approximate amount	Avoided	Preferred	Reasons

Methods of Cooking vegetables

Name of vegetable	Name of preparation	Boiling	Stewing	Frying	Steaming	Raw	Others

Preparation of vegetables before cooking

Name of the vegetable	Whether peeled or not	Approximate size cut	Cut before washing or after	Timelag between cutting and actual cooking.	Timelag between cooking and serving	Yes/No Reheated before serving

Common vegetable preparations

Name of thevegetable	In sambar	Poriyal	Kari

IV Fruits

Name of fruits	Eaten raw or cooked	Preparation
Mango		
Guava		
Plantain		
Apples		
Banana		
Papaya		

V Beverages

Name of the Beverage	Method of preparation
Coffee	
Tea	
Milk	
Buttermilk	
Others	
-	
-	
-	

VI Foods Preserved

Name of the produce	Sun drying	In sugar	In salt	In Oil	In Vinegar	Other methods

VII Animal foods

Name of thefoods	Preparations
Mutton	
Fish	
Eggs	
Others	

Fats and Oils:

Name of the fat or oil	Quantity used
Cocoanut oil	
Gingelly oil	
Groundnut oil	
Mustard oil	
Ghee	
Dalda	

IX. Types of vessels used

Alumium
Brass
Bronze
Stainless steel

X. Labour Saving devices used

Types of Stoves	Types of Storage	Types of cooker(if used)
Ordinary chula	Cane basket	Rukmini cooker.
Smokeless chula	Janata Refrigerator	Ratna cooker.
Kerosine Stove	Wirenet cupboard	
-		
-		
-		
-		

XI Preparations for special occasions

Name	Name of the preparation	Method of cooking

XII Preparations in diseases and other conditions

Diseases and other conditions	Name of preparation	Method of cooking
Fever		
Pneumonia		
Smallpos		
-		
-		
-		
Babyhood		
Childhood		
Adolescence		
Pregnancy		
Lactation		
Old age		
-		
-		
-		
-		

APPENDIX V

SRI AVINASHILINGAM HOME SCIENCE COLLEGE
COIMBATORE. 11.

NUTRITIONAL ASSESSMENT SCHEDULE AGE GROUP 5 TO 9 YEARS SCHOOL GOING CHILDREN

Name:

1. Sex - male/female .....

2. Age .....

3. Height .....

4. Weight .....

I General.

5. Appearance

0 Good .....
1 Fair .....
2 Poor .....
3 Very poor .....

II Eyes

A. Conjuctiva

6. Xerosis

0 Absent, glistering and moist
1 Slightly dry on exposure for ½ minute, lack of lusture....
2 Conjuctiva very dry and Bitot's spots present.....

7. Pigmentation:

0 Normal colour .....
1 Slight discolouration .....
2 Moderate browning in patches
3 Severe earthy discolouration

8. Discharge

0 Absent .....
1 Watery excessive lachrymation
2 Mucopurulent .....
3 Purulent

B Cornea

9. Xerosis

0 Absent .....
1 Slight dryness and diminished sensibility .....
2 Haziness and diminished transparency .....
3 Ulceration .....

10. Vascularisation:

0 Absent .....
1 Circumcorneal injection of blood vessels .....
2 Vascularisation of cornea .....

C Lids

11. Excoriation

0 Absent .....
1 Slight excoriation .....
2 Blepharitis .....

12. Folliculosis:

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

13. Angular Conjuctivities.

0 Absent ....
1 Present .....

D Functional.

14. Night-blindness

0 Absent .....
1 Present .....

N.B. Exclude other eye diseases not associated with nutritional defects.

III. Mouth

A: Lip.

15. Condition

0 Normal
1 AAngular stomatitis, mild
2 Angular stomatitis, marked

B Tongue

16. Colour

0 Normal
1 Pale but not coated
2 Red
3 Red and raw

17. Surface

0 Normal
1 Fissured
2 Ulcered
3 Glazed and atropic

C Buccal Mucosa:

18. Condition

0 Normal
1 Stomatitis

D Gums

19. Condition

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

E Teeth

20. Fluorosis

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

21. Caries

0 Absent
1 Slight
2 Marked

IV Hair

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

V Skin

A General

23. Appearance

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

24. Elasticity:

0 Normal
1 Diminished
2 Wrinkled skin
3

B Regional

25. Trunk:

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

26. Face:

0 Normal
1 Nasolabial seborrhoea
2 Symmetrical sub-orbital pigmentation.

27. Perineum

0 Normal
1 Scrotal or pudendal dermatitis

28. Extremities:

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

VI ALIPOSE TISSUE (To be examined on the arm over Biceps)

APPEN

ENUMERATION OF RED BLOOD CORPUSCLES.

Apparatus Required

Thoma Zeiss haemocytometer, Thoma Zeiss, Hamocytometer slide (number ruling bar), Mayemis solution (diluting fluid), microspcope, pricking needle, rectified spirit, cotton.

Procedure

The haemocytometer slide is cleaned well, dried and focussed under the microscope. The pipette is cleaned well, the tip of the finger sterilized and diluting fluid is kept ready in a watch glass. A deep prick is made on the tip of the finger, with a sterilized needle so that the blood flows freely. The pipette is applied to the drop on a slanting position and the blood is sucked upto 0.5 mark. The tip of the pipette is wiped and immediately the diluting fluid is sucked upto the 110 mark. Then gently the tube is rolled between the palms to ensure thorough mixing. The fluid in the stem is discarded and a drop is placed between the counting chamber and the coverslip. The chamber is left aside for even spreading of the fluid and the R.B.C. are allowed to settle. The centre one square millimeter is counted at the four corner square and one centre square. In counting, the cells touching the top and left hand side are counted omitting the bottom and right hand side to avoid double counting.

Calculation:

No.of R.B.C. in 80 squares = A

No.of R.B.C. in one square = B

APPENDIX VII

SAHLI HEZZICE METHOD

Estimation of Haemoglobin

Apparatus Required

This method employes a standard comparison with permanent coloured glass. The haemoglobin in the diluting tube converted to haematin and the colour made to match by dilution with distilled water.

The diluting tube occupies a central place with the two slides (coloured) on both the sides.

The haematometer consists of a long narrow stem with a ball shaped body which has 20 millimeter mark on it.

Method

First the diluting tube and the pipette are cleaned well and allowed to dry. The tip of the finger is sterilzed and is pricked with a sterilized needle, sharply to allow free flow of blood. The pipette is applied in a standing position, the blood is such upto 20 c.m.m mark.

Meanwhile, the diluting tube is filled with $\frac{N}{10}$ HCI upto the mark 10. The blood in the pipette is flown gently into the tube. The pipette is rinsed out with acid. The tube is then allowed to stand for 5 minutes. Thereafter, distilled water is added tothe diluting tube, drop by drop with constant stirring and the colour matched against a white background. When the colour matches the two standard coloured slides the tube is taken out and the reading on the tube is noted down.

Calculations:

The standard reading - 14.5

The reading of the diluting tube A

Percentage of Haemoglobin in the blood - $\frac{A \times 100}{14.5}$

APPENDIX VIII - a.

SELECTION OF PROBLEMS FOR THE NUTRITION EDUCATION PROGRAMME

Problems	Facts supporting	Causes
1. Cooking rice by straining method and throwing off the strained water	Sixty eight percent of the families surveyed use this practice	According to the homemakers this method gives a good texture to the cooked rice. According to the investigator's observation this has become a habit in order to avoid charring of the rice. They are not aware of the nutrient loss either.
2. Vegetables are cut into very small pieces and soaked in water for prolonged time before cooking.	Fifty eight percent of the families cut vegetables into very small pieces in $\frac{1}{4}$" square pieces and soaked them in water for $\frac{1}{2}$ an hour before cooking.	It is their habit. They are not aware of the nutrient loss by these practices.
3. Method of cooking greens.		
(a) Cooking greens in large quantities of water and then discarding the excess water.	These practices are found in fifty percent of families	(a) They say that they add excess of water to increase the quantity or to prevent charring.
(b) Cooking greens for long time		(b) They cook and leave the greens on the chula as it is, to serve it hot while eating.

APPENDIX VIII-b

PLAN FOR THE NUTRITION EDUCATION PROGRAMME.

Objectives	Type of audience	Methods
1. To motivate them to use the hay-box as a means of cooking rice by absoprtion method.	Homemakers and young girls	1. Result demonstration of cooking rice in hay-box followed by a discussion with the audience for clearing their doubts. 2. Home visit. 3. Drama emphasizing the cooking or rice by absorption method, using a hay-box.
2. To show the cutting and washing of common vegetables in a way so as to preserve nutrient content to some extent.	Homemakers and young girls.	1. Demonstration of peeling potatoes and carrots, washing and cutting greens, potatoes and carrots. 2. Charts to show the loss and preservation of the nutrients in cutting and washing vegetables. 3. Discussion.
3. To teach the correct methods of cooking.	Homemakers and Balwadi-children.	1. Drama. 2. Demonstration. 3. Song (If the children could learn Hindi son)

APPENDIX IX

Drama

LET US LEARN

Characters:-

Father:- He believes in his old customs and tradition liking only white rice which is cooked after discarding the cooking water.

Mother: She is very much interested in knowing about nutrition.

Neighbour: A very rich woman with no knowledge of nutrition but very conscious of her health.

Social worker: A patient woman who tries to introduce good nutritional practices to the families.

(Enter Father and Social Worker)

Father: Vanakkam.

Social worker:- Vanakkam.

Father: Where are you going?

Social worker: To your house only.

Father: To my house! Oh! enough of it. What did you teach my wife yesterday? I could not eat anything.

Social worker: Why? What is wrong? Let us see come.

(Father and Social worker enter the house. Mother is sitting and cutting vegetables. Further pours a bagful of vegetables of in front of her)

Father: See. What a bargain! I got such a lot of vegetables for only 25 nP. How cheap it is!

Mother: Sarveshwara---! What rotten vegetables you have bought! What bulk!

Father: What are you saying! I need not go for shopping for another eight days. I can save a lot of time.

Mother: What is the use. See half the portion is a waste (chopping of the outer peels)

Father: It does not matter much . You peel it off nicely. Take the innter portion and cut it into small pieces. It will be very nice to look at also.

Social Worker: (looking at the tiny pieces of cut vegetables, which the mother was putting in water to be washed) Oh! What a waste! It is really not good to peel the vegetables so much, and cut them into such small pieces. These skin also contain nutrients. And when you peel, cut into small pieces and put these vegetables in the water for washing, all the nutrients are lost. You need not peel the vegetables.

(Says demonstrating) - You should wash the vegetable first, then peel , if necessary and then cut into big pieces, it will save nutrients. And how do you store these vegetables?

Mother: Just keep it in the basket.

Social Worker: That is not the right way. Come on. I will show you the use of Janata Refregerator, when I will take you to the centre.

Father: Don't teach my wife anymore. Yesterday the rice she prepared was so sticky, it was just a waste.

Social Worker: Why? You don't know the use of hay box. I will show you that also in the centre.

(Entering neighbour)

Mother: Come in. Come in.

Neighbour: I want little bakingsoda. Daily I add soda to cooking greens. It gives very beautiful colour. The soda I had is finished and I am afraid my children won't eat the greens.

SocialWorker: Oh! do you add soda to theg greens.

Neighbour Mami: Then what! You come to our house. I cook greens so well -- You come and see.

Social Worker: You can tell me how you cook greens?

Neighbour Mami: I cut the greens very fine, wash them nicely and then cook it with various types of ingredients and spices. The soda I add in it gives a very good colour. Unless you come and see in my house, you wouldn't how well I prepare greens.

Social worker: Mami, I know how good you cook the food. May I tell you one thing. The greens you cook may be tasty but the method you use for cooking is very harmful.

Neighbour Mami: Why? What can be a better way than this.

Social Worker: First cutting the greens into small pieces is not good.

Mami: Only small pieces get cooked soon.

Social worker: No Mami, the greens contain many nutrients(satvas), specially vitamin C which is an important nutrient for

the health of teeth and gums. To save this vitamin in all the steps of cooking greens you should be very careful.

Mami: All right. I know you are educated, and know things better than me. Tell me the correct method of cooking greens.

Social worker: First you should wash the greens and then cut into big pieces. Add the greens to boiling water for cooking, and you should use only enough amount of water.

Mami: What should we do if there is more water. We can discard it, can't we?

Social worker: Oh no! You should never discard the cooking water. It contains all the soluble nutrients of the greens. You can use the excess of water for rasam, or you can add cooked dhal to the greens, and a little scrapped cocoanut. It will give a good taste.

Mother: I remember once you told us about Multi Purpose Food, and you said you can add it to all the preparations.

Social Worker: That is good. You remember what I said. Of course, you can add M.P.F. to the greens.

Mami: And what about adding soda? It gives very good colour to greens.

Social worker: No Mami, Addition of soda destroys the nutrients. You should cook greens in an open vessel, it will retain its colour.

Mami: All right then I will cook greens as you have told me.

Social worker: Yes, and one thing more I want to tell you, Please come to the centre today in the evening. There we are going to demonstrate the cooking of rice by absorption method using a hay box.

Father: Surely, You take my wife also. I won't be able to come there. Can you tell me what this hay box is?

Social Worker: It is a box with hay in it with a hollow space in the centre, tokeep the pot. It is very easy to make. The thing we have to do is, to bring the rice to boil and then keep the vessel in the hay box. The rice vessel should be covered with its lid. Then place hay cushion over it. Now the rice will get cooked with its own heat. The rice will be ready within 15 - 20 minutes. There is no need to strain the rice. The hay box cooks the rice without charring or burning, retains the flavour of the rice.

Father: Thank God. Hereafter I will not have to eat that sticky lumps of rice.

Social worker: Yes. It is good. Every house should have a hay box.

--ooOOOoo--

APPENDIX X

Demonstration of Hay Box

Objective: To help the homemakers realise that by using a Hay Box, rice can be cooked with less fuel by the absorption method, thereby saving labour and the nutrients in rice.

Material required

1. Woodean Box
2. Hay
3. A pot with a tight fitting lid
4. A hay cusion
5. Rice 1 cup
6. Water $2\frac{1}{2}$ cups
7. Stove
8. Vessels to wash the rice and throw the washings.

Method

Making the hay box

1. Take a wooden case
2. Spread hay to a depth of four inches in the box
3. Then spread another four inches
4. Make a hollow space in the centre of the hay box
5. Place the pot in which rice is to be cooked, in the hollow space.
6. Surround the pot well with hay, on all sides.
7. Press the hay till it comes to the mouth of the pot.
8. Remove the pot now, you will find a hollow space left in the place of pot.

9. Make a gunny bag, the length and bredth of which will be same as that of the top area of the box and fill it will hay.
10. Place the stuffed gunny bag over the pot and hay layer.
11. See that the box closes tight

Now the box is ready for cooking rice.

Cooking rice using Hay Box

1. Keep $2\frac{1}{2}$ cups of water on the stove to boil.
2. Wash 1 cup of rice with water.
3. Put the rice in the pot.
4. Close the pot with a lid.
5. Bring the rice to boil for 10 to 15 minutes.
6. Remove the vessel at once from the stove.
7. Keep the pot in the hollow space in the Hay Box.
8. Place the gunny cusion over the closed pot and close the box.

The rice will be ready within 15-20 minutes. There is no need to strain the rice. The hay box cooks the rice without charring or burning and retains the flavour of rice. Hay box is easy to make. Instead os using a hay box you can enclose a corner of your kitchen with mud walls to make a box. It saves time, labour and fuel. The cooked rice in the hay box can be kept hot for more than six hours.

APPENDIX XI

QUESTIONNAIRE TO EVALUATE THE NUTRITION EDUCATION PROGRAMME CONDUCTED IN KALAPPANAICKANPALAYAM FROM 13 th TO 16th FEBRUARY 1964.

...

Name of the Homemaker.

A. Use of Hay Box

1. Are you using a hay box? Yes: No:

2. If 'yes' frequency of use -

3. Purposes for which it is used -

4. If 'no' why? Reasons:

   a.

   b.

   c.

   d.

5. According to you in what ways is it useful?

   a.

   b.

   c.

   d.

B. Preparing and Cooking of Vegetables.

I. Greens

a) When do you wash greens? Cutting: Before / After

b) Why?

c) How do you cut greens? Pieces: Big / small