A COMPARATIVE STUDY OF THE NUTRITIONAL STATUS AND DIETARY PRACTICES OF THE PREGNANT AND LACTATING WOMEN OF COIMBATORE AND ANDAMANS

BY

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I. INTRODUCTION

Women, whether belonging to the affluent society or economically backward sectors, constitute an important segment of the general population. They are important not just because of their numerical strength but also in view of their becoming a socio-economic work force to reckon with. They are destined to play a crucial role in the process of procreation - a process that is so vital and necessary for prepetuation of the human species in the bio kingdom. Conceiving and bearing children, and mothering the young ones in early years, is entirely the women's privilege (NIN, 1975).

More than three quarters of humanity lives in the developin world and upto 80 per cent of them in rural areas. In the villages and hamlets of the third world, the greater proportion of the world's babies are being born and brought up in the traditions and practices, which have existed for many generations. Rituals and beliefs existed in varying form in different societies throughout the different stages of life cycle. The traditional society has learned to recognize pregnancy as period of many risks because of high prenatal, and or maternal mortality.

Pregnant and lactating women infants and children consti-

tute vulnerable groups of a population from the nutritional standpoint and merit special considerations. The usual diets of women, in, most of the developing countries, have been found, nutritionally inadequate and the special needs of pregnancy and lactations seem to have received little consideration in the present society. Hence the state of physiological stress, may aggravate the condition of chronic dietary inadequacy, and thus adversely influence the course and outcome of pregnancy, fatal growth and as a consequence the health and growth of the infant. Therefore a high priority is being given to a study of maternal and infant malnutrition and of possible preventive measures. Since life for an infant starts before birth, during its prenatal stage, it becomes imperative that the attention is focussed on the health and nutrition of the mother right from pregnancy to the lactation. (Madhumath, et al, 1978).

Maternal nutrition is one of the most important influences on the courses and outcome of pregnancy. Attention to nutrition factors such as assessment of nutritional status constitute an essential component of prenatal care. Nearly all nutrients are required in increased amounts during gestation but the magnitude of the increase varies from nutrient to nutrients. The pregnant mother must pay special attention to the kind and quality of food that she consumes as on

this depends the health and wellbeing of both themother and the baby in the womb. The diet during pregnancy must contain large amounts of tissue building protective foods without any decrease in the energy fielding foods.

Nursing the child is an ancient physiological process. Human milk is highly protective against infant and nutrition and associated infective diarrhoea. The first step in successful breast feeding is maintaining at an optimal level of the nutritional status of the mother. The wellbeing of the infant depends to a considerable extent on the diets of its mother during pregnancy and lactation.(Devadas, et al, 1978).

Lactation makes nutritional demands on all mothers. The lactating mother must continue to eat an adequate and balanced diet as recommended during pregnancy but in slightly increased qualities to meet the demands of the period.

A high incidence of nutritional deficiency are seen among the pregnant and lactating mothers who belong to poor socio-economic group. Studies of Malavady and Gopalan(1961) in Hyderabad have shown that the diets are grossly inadequate especially in protective foods. The most striking findings on pregnancy and childbirth in present society is the young

age at which marriage usually takes place normally around the onset of menses. The diet of which are not only deficient in quantity but also in quality besides the diet is also deficient in essential nutrients. In addition to inadequate consumption of food, increasing number of pregnancies and early pregnancies contribute to poor maternal nutrition. They are also subjected to other stress like chronic infection and parasitic infestations which tend to aggravate the nutritional deficiencies. (ICMR, 1977).

It is hoped that this comparative study on nutritional status and food consumption pattern of pregnant and lactating women of Andaman and Nicobar islands and Tamil Nadu belonging to lower, socio-economic group will reveal a definite improvement of nutritional status and of good dietary practices followed among the pregnant and lactating women of Andaman and Nicobar islands than that of Coimbatore, though they are of the same ethnic group.

II. REVIEW OF LITERATURE

Literature pertaining the thesis " Socio-Economic status, meal pattern - dietary practices, Nutritional deficiency and health status of the pregnant and lactating women " is presented.

A. Need for Nutrients.

The average weight gains of well nourished pregnant women is usually of the order of 10-12 kg. Data from rural areas of India and west Africa indicate a corresponding figure of only 5.7 kg. The size of new born infants is lower in many developing countries. A mean birth weight of 2600-2800 g. was reported in several studies in low class Indian communities as compared with 3,300-3,500 g. in many developed countries. Several factors may contribute to lower birth weights in developing countries but family nutrition is often of most importance. In addition to these gross weight deficiencies, babies born of mal-nourished mother may be partially-depleted of nutrients such as iron, calcium, iodine and certain vitamin. During lactation the mother requires additional amounts of nutrients to replace those lost in milk and in the energy used for its production. However it is striking that even on severely mal-nourished mothers lactation may continue for a considerable period with slight deterioration

of the quantity and quality of milk. (FAO/WHO, 1967)

B. Dietary Requirements of Pregnant Women.

Normally a woman gains about 10-12 kg. of body weight during pregnancy if her diet is not adequate, of this 3-3.5 kg is foetus, 4 kg. by the fat accumulated by her and rest by placenta, membraneous fluids incidental to pregnancy. The fat stored by the mother acts as a reserve protecting against a possible food storage at a later stage of pregnancy. During pregnancy extra energy is also required for the body movements of the heavier mother. Based on these observations energy cost of pregnancy has been calculated which amounted to be about 80,000 K calorie. Out of this 36,000 K calorie is considered to be allotted for by fat storage. Thus there is a case for an average increase about 285 Kilo calorie per day over the 280 days of pregnancy.

There is an increased need for protein during pregnancy to ensure proper tissue formation and growth of the foetus and to prevent the breakdown of mother's tissue. An extra 10 g of protein taken over and above the normal requirement taken atleast during the later half of pregnancy will ensure proper growth of the foetus.

Minerals and vitamins

Calcium is a nutrient of great importance during pregnancy.

The calcium requirement of a pregnant woman is about double. This nutrient is essential for the proper formation of bone. If the material diet is lacking in calcium, the nutrient is drawn from the woman's body reserves, leading to illness during pregnancy and thereafter. An intake of a gram of calcium per day throughout pregnancy is sufficient.

Iron

Due care must be taken to protect the pregnant woman from the ill effects of iron deficiency. Iron is required by the foetus not only for blood formation but also for its own iron stores which normally last for 4-6 months after birth. This can be achieved through a liberal intake of iron rich foods like greens.

Folic acid is also available from greens. Alternatively ingestion of a tablet containing iron and folic acid will satisfy the needs of pregnancy.

Vitamin A

This vitamin is required for proper eye sight of the baby. If the mother eats a diet containing sufficient amount of Vitamin A, the baby is born with enough stores in his liver, which protects her from deficiency of Vitamin A during early months of life. Preformed Vitamin A is contained in milk, egg, fleshy foods leafy vegetable and fruits like papaya, ripe mangoes, contains carotene which can be converted to

Vitamin A. Fruits in addition provide Vitamin C.

The other nutrients which are important for the health of the mother and the foetus are the B-group Vitamins thiamine, riboflavin, niacin and Vitamin B_{12} (Malathi, D. 1975).

C. Nutritional requirements of the lactating women.

Calories

Venkatachalam and Gopalan (1960) carried out studies onn basal metabolism of 14 lactating mothers in the low socio-economic group in different stages of lactation. They observed that the nursing women expended more calorie per unit surface area per hour. They calculated that this rate worked out to an increased requirement of 200 calories per day for the purpose of milk production.

Protein

Narasimha Rao, et al (1956) carried out nitrogen balance studies on 6 lactating women of the low socio-economic group in different stages of lactation in 3 different levels of protein intake, 61 g, 91g and 114 g. The subjects were merely on nitrogen balance on 60 g protein intake per day but retained considerable amount of nitrogen when the intake was increased to 99 g protein. There was a linear relationship between nitrogen intake and N_2 retained and between N_2 retained N_2 absorbed. They calculated from these relation-

suips that the protein requirement would be aroun 1.5g /kg body weight per day during lactation.

Vitamins

In long term supplementation studies Bhavani, Belavadi and Gopalan (1960) observed that an intake of 200 mg ascorbic acid per day was necessary for maintaining a sustained maximal level of Vitamin C in milk. Belavady observed that an intake of 0.3 mg riboflavin was necessary to maintain a high level of riboflavin in milk. An intake of 10mg thiamine was effective as 25 mg/day in maintaining a high level of thiamine in milk. It was not possible to increase the concentration of Vitamin A in milk by increased intake of Vitamin A and so, the requirements of Vitamin A to maintain a high level in milk could not be assessed.

D. Special needs during pregnancy and lactation.

Our successive census have shown that the Indian population contains fewer women than men, that the expectation of life for women is lower than that for men and that in terms of this index of welfare, the conditions of Indian women has not improved over time (Devadas, 1972).

Among young adult women (15-39) the mortality ratio is found to be strikingly higher in India than a most other countries except Burma and Pakistan (Naik et al, 1974).

The reasons that the intra family distribution of nutrition may be more adverse towards women in India than else where due to a combination of economic condition social and cultural factor. The other is partially related to the above because larger nutritional deficiency among women is responsible for low levels of energy and efficiency retardation of growth and low resistance to disease and infection. (Naik et al. 1974).

Among the human beings, the expectant and lactating women constitute the vulnerable groups from the nutritional stand point and merit special considerations.(WHO 1965 and Myers, 1967).

Requirement

Recommended allowances for pregnant women and lactating women by WHO/FAO (1974) and Indian Council of Medical Research (1968) shown in the table.

	FAO/WHO		ICMR	
Nutrients	Pregnancy	Lactation	Pregnancy	Lactation
Calories	2200+350	2200+550	2200+300	2200+700
Protein(g)	55+5	55+10	45+10	45+20
Calcium (mg)	1000+120	1000+120	1000	1000
Vitamin A (mg)	750	1200	750	1150
Vitamin C (mg)	30	30	50	80
Iron (mg)	14.28	14.20	40	30
Folic acid (mg)	400	300	300	150

The vulnerable groups of a population require proportionately greater amount of certain nutrients than one necessary for an average healthy adult. Additional calories are required during pregnancy and lactation, but there is little evidence that the rural woman does or is able to increase her total food consumption. The FAO/WHO expert group on protein requirement (FAO, 1965) recommends additional high quality protein 6g per head, per day during the later half of pregnancy and 15 g during lactation. Requirements of some vitamins and minerals are also higher (Whyte, 1972).

For successful lactation, the mother needs to eat a nutritious diet. The nursing mother needs extra food for adequate production of breast milk (NIN, ICMR, 1976).

Diet - The Basis for Better Nutrition.

A balanced diet is one which contains various food stuffs in suitable proportion to carry out adequately the three functions namely energy giving, body building and protective function.(Swaminathan, 1974).

Food requirements will vary according to the age, sex activity of the individual. Special demands are made during stress periods such as pregnancy, lactation, infancy and childhood.(Venkatachalam, 1971). Pregnancy and lactation are periods of considerable physiological stress, which calls for additional nutrient requirements. It becomes essential that these groups of population be ensured with sound nutritional care.(Swaminathan et al,1972 and Madhumath et al, 1978).

Thus during this periods, the individual needs increased amounts of body building and protective nutrients of the mother both during pregnancy and lactation and the child is not able to attain adequate nourishment - their health is likely to be impaired.(Venkatachalam, 1971).

In regard to pregnant and lactating women it was been estimated that for every 1000 population in Tamil Nadu there are 15 expectant and 30 lactating women. In India the pregnant and lactating women in Tamil Nadu rank the lowest as far as nutrition intake is concerned.(Rasheed et al, 1978).

In pregnancy the food requirements are more than that of non-pregnant women. The foods she eats should be sufficient for maintenance of her health as well as for the growth of foetus. It is necessary that she should increase her food intake.(NIN, 1970).

A baby's health is closely related to his mother's health and to her diet during pregnancy (Vasantha, 1968, Devadas 1974). During pregnancy, extra energy is needed for the growth of the foetus, as well as the placenta and associated material tissues and or the increased cost of movement for the heavier mother. The women who are doing hard work must need additional food to meet all the energy requirements.(Devadas,1974).

The women who had a very poor diet during pregnancy would have poor infant that is pre-maturity, congenital defects or still births.(Vasantha et al, 1968). There is not much gain in body weight during the early weeks of pregnancy because of vomitting so common at this time not only limit the intake of food that but also results in the loss of important nutrients.(Venkatachalam, 1962).

The diet of lactating women is the fundamental source from which she is able to produce milk for her diet. The diet followed for lactating women is the same as pregnant women but they are increased in amount of food.(Robinson,1970).

The lactating mother has to supply all the energy needs of both herself, her body, her baby and since the mamary gland is unlikely to be 100% efficient at converting the mother's diet into breast milk. The extra energy needs could be in the order of 1000 Kilo calorie. (English, 1976).

F. Disaster in Deficiency

Gopalan (1972) states that there are 20% pregnant women, Majority of whom belong to poor socio-economic groups continue to live on diets deficient in many respects (ICMR, 1977).

Many diet survey from different parts of the world and India indicated that their diet deficient in quantity but also in quality (ICMR, 1977). Besides the diet is also deficient in essential nutrients. This means the prevalance of both hunger and malnutrition. Malnutrition arises from lack of adequate amounts of protein and essential mineral and vitamin (Wynn, et al, 1975).

Protein deficiency impairs health and vitality and may result in a variety of illness called deficiency disease. Malnutrition and under nourishment contribute to reduced resistance to other diseases worsening of their consequences, increased child mortality and shorter span of life (FAO, 196).

Some studies have shown that nutritional deficiency dis-

ease is more prevalent among women with high parity than with low parity. This termed as maternal depletion syndrome. This syndrome vary in four different parts of the world includes osteomalacia, iron deficiency anaemia, iodine deficiency goitre.(Jelliffe, 1966).

Clinical nutritional assessment reveal that majority of mothers 70% showed one or more deficiency signs, the important ones being Vitamin A, Vitamin B complex, Vitamin C and mineral deficiency.(Belavady, 1969 and Rameeo et al, 1978).

It has been found that the women of child bearing age suffer from B complex deficiency, Vitamin A deficiency and low protein in blood.(Rao, 1977). Vitamin B deficiency disease also occurs among the expectant and lactating women who are living in the area with more rice mills.(Aykroyd, 1970). The common manifestations are glossitis, angular stomatitis and paraesthesious like burning feet and pins and needles in the limbs arise from B complex deficiencies.(Devenas et al, 1978).

Nutritional anaemia is a world wide problem but its prevalence with highest in the developing countries where it occurs in all the age groups especially in pregnant and lactating women.(Proceedings of Nutrition Society, 1972; WHO 1975).

In Madras it accounts for nearly 20% maternal deaths and another 20% is an associated factor (Yesudasan et al, 1978 and Menon 1971).

The blood levels of nutrients like serum iron, folic acid, B_{12}, riboflavin and vitamin A are significantly lower in women from the low income group as compared to reported values (NIN, 1974). About 47% pregnant and lactating women were suffering from anaemia of which 55% are iron deficiency anaemia, 40% due to want of folic acid, 5% due to lack of vitamin B_{12} (Bhattacharya, 1973).

The maternal mortality is highest in developing countries. Anaemia and toxemia seem to contribute to nearly 50-60% of maternal deaths in these population, indicating that maternal malnutrition and poor antinatal care result in high maternal mortality. (ICMR, 1977). Results of maternal mortality rates indicate that these are very high in India and other developing countries where the mothers are poor, malnourished and live in poor sanitary conditions (Swaminathan, 1971).

3. Factors influencing Occurrence of Deficiency Diseases

Nutritional deficiency diseases constitute a major proportion of ailments seen in the practice of tropical medicines clinically signs of deficiency diseases are seen in subjects

deprived of adequate diet for a length of time in those suffering from various organic diseases or chronic infections such as tuberculosis, chronic diarrhoea, etc. and commonly in those consuming poor diet and also suffering from chronic infections.(Bhattacharya, 1976).

The dietary inadequacies are mainly due to poverty, illiteracy and ignorance, regarding the nutritive value of readily available cheaper food stuffs, culture taboos, preventing intake of certain nutritious food stuffs; larger size of the family and peculiar status of women in a society where food has first to be distributed to the children and male members on a poverty basis, a superstition that larger babies will cause difficult delivery.(ICMR, 1977).

Biological factors

a) Poverty. Poverty caused by numerous social, economic and individual components is regarded as one of the principal reasons for the wide spread malnutrition and under nutrition in India. The major part of the income is spent in repayment of loans interest on debts incurred, ceremonies, fulfilment of social obligations and formalities, food and other necessities of the income is not sufficient then they get in money as debts. Debts create the vicious cycle of poverty, inadequate foods malnutrition and disease & poor working

capacity.(Murthy, 1975 and Devadas, 1968).

Even good portion of the income was spent on food, the meal pattern was monotonous with rice or ragi kali and sambar and butter milk. The inadequacies and no special food to supplement. (Devadas, 1968).

b) Ignorance.

Ignorance is perhaps the most important single factor underlying poverty and malnutrition; ignorance regarding the nutritional needs of the family, food values and prices lead to unequitable distribution of nutrients (FAO, 1965).

c) Joint family.

Lysander (1966) has pointed out that the hunger and under nutrition caused by poverty and lack of gainful employment are spread evenly among the members of the joint family and converted into the under nutrition of many in the absence of organised system of social security for unemployment, oldage and sickness.

d) Tradition, Attitudes and Customs Food Fads.

In our society food behaviour is interlinked with economic status, local availability of foods and to customs, traditions, thoughts and sentiments attached to certain foods by the family and society.(Kamalanathan, 1974).

Family attitudes towards the feeding of children and pregnant women in health and disease are often the direct causes

of malnutrition. Prevailing belief may prevent people from consuming vulnerable foods even when available. Some foods like rice in South India have social significance, while some like papaya have stigma attached to them. Feeding habits are so intertwined with the culture and value systems that changes in one area was bound to be influenced or occasioned by changes in the other (Gopalan, 1966).

In all culture, however simple on small, the staple food is prepared cooked and eaten according to strict rules within a definite group and with the observance of manners customs and traditional rites and taboos which are called 'deprived cultural imperatives'. (Devadas, 1968).

In India, in some caste, women resort to occasional fasting and follow restriction on the amount, composition and the number of meals on certain days and timings (Naik, et al, 1974). As on the result of their food beliefs restriction of the diet starts right from the time of pregnancy (ICMR, 1973).

Several nutritionally good foods such as greens, milk and fruits are available and within reach, but avoided by the expectant mothers. After child birth, the colostrum rich in Vitamin A is discarded very often and no additional foods are given to the child. Many foods such as green leafy vegetables are scrupulously avoided. The reason is either alleged hot or cold nature of the food or they are believed to cause diarrhoea, dysentary or other illness (Devi, 1967).

It has been established in many recent reports and other studies done during the past five years that, decreasing the quantity of food during pregnancy is an important belief in India. The reason for this is that if one eats less during pregnancy the child will be smaller and birth will be easier. (Parlato, 1973).

The new mother should not eat any new food, as it will affect the health of the child, when she is feeding, but she is given extra milk, ghee, garlic rasam, Jaggery water and white gourd for increasing her milk. Brinjal, drumstick leaves and roasted bengal gram are avoided as they would dry up the milk in the breast. (Devadas, 1968).

It is of utmost importance that the people should realise that most beliefs and taboos are fallacious and some have serious repercussions on the health of the people. (Khureshi, et al, 1973).

Habits and practices:

Eating habits have an emotional base, therefore any unfamiliar food is first rejected. For e.g., the ADT 27 new variety rice was not accepted by the people in Madras state because of sticky and glutinous nature. Hence tastes and practices governed by tradition made people willing to sacrifice economic gain for something, they esteemed as quality. (Devadas, 1968).

The third world food survey of the FAO (1963) reveals that

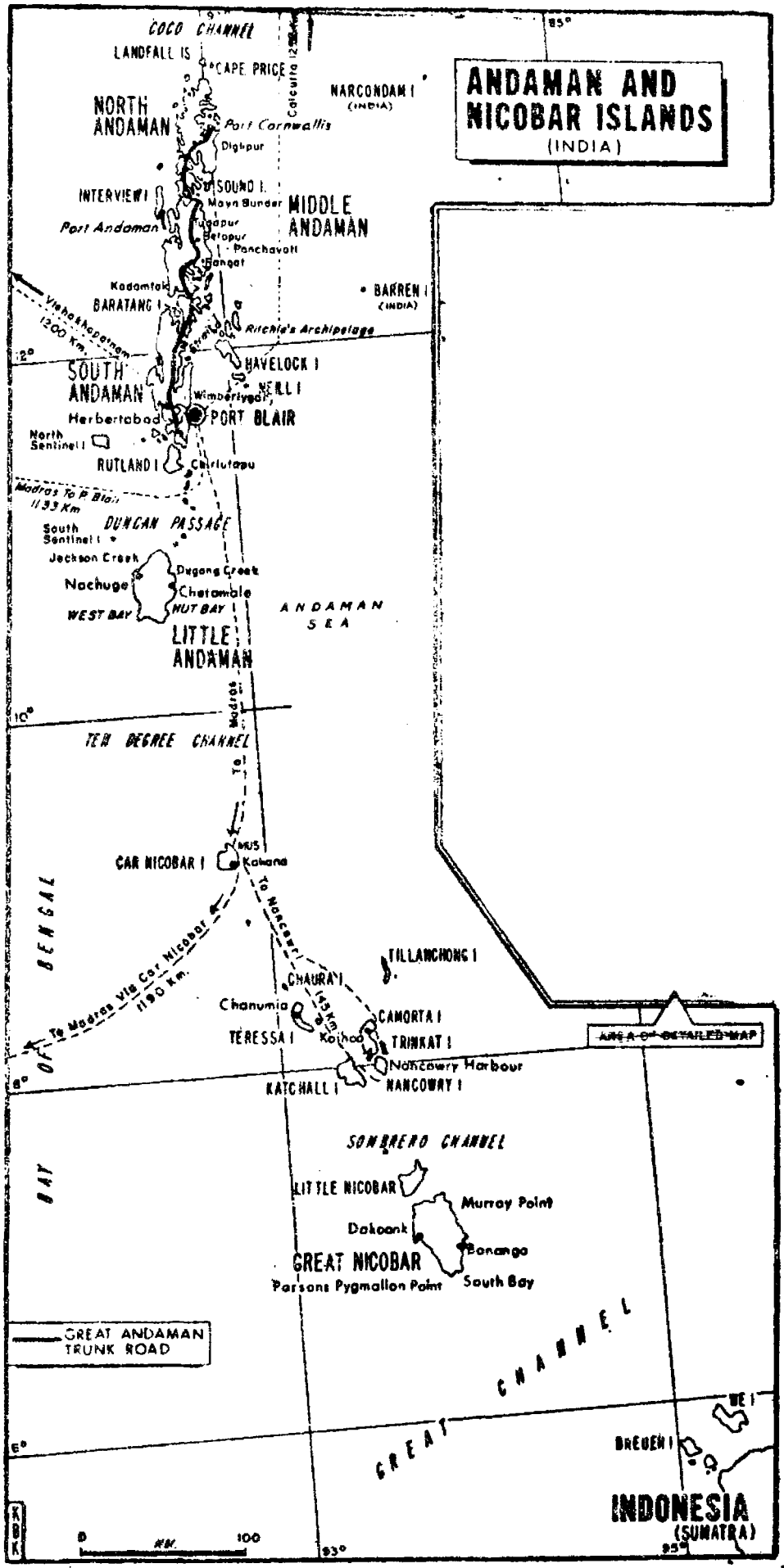
(Dietary history). Measurements made of current intake amount of food eaten during short period of time may be weighed or recorded in household measures, or an actual menu may be accurately recorded (Devadas, 1978).

Hollingsworth (1971) emphasises that from the data obtained from the dietary surveys the nutrient intake of families, groups, or individual can be assessed by calculation using figures from accepted tables of food values by direct analysis.

I. Andaman and Nicobar Islands.

1) Background Information

Situated in the middle with Bay of Bengal and Indian Ocean on one side and South China sea and the pacific on the other (Figure 1). According to the last population census of 1971, in these islands there were 115, 133 persons constituting of 70,027 males and 45, 106 females. For the country as a whole the total population at that time was 548,159,652 comprising 284,049,276 males and 264,110,376 females. A decade back the population of Andaman and Nicobar islands was only 63,548 persons. In ten years it has increased by 51,585 persons showing an increase of 81.17 percent. The country as a whole recorded a growth rate of 24.90 percent during the last decade 1961-1971.



The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line.
Based upon Survey of India map with the permission of the Surveyor General of India.

FIGURE-I

No.	State/Union Territory	Population	Rank in population	Provisional area figures furnished by Survey-or General as on 1-7-71 Sq. km.	Rank in area
1	Tamil Nadu	41,199,168	7	130,069	24
2	Andaman and Nicobar Islands	115,133	28	8,293	23

It may be seen from the above table, that Andaman and Nicobar Islands ranks 28th in terms of 1971 populations, whereas Tamil Nadu ranks 7th.

In terms of area, Andaman and Nicobar Islands occupy a better rank. It moves from 28th rank in terms of population to 23rd rank in case of area when compared with state (Tamil Nadu) of 11.

2) Distribution of Population in Various Tahsils.

The entire union territory comprised of one district and six tahsils at the time of 1971 census.

Name of Tahsil	Population			Area in sq.km.
	Persons	Males	Females	
Diglipur	9,470	5,281	4,189	8,840
Mayabunder	8,443	4,946	3,497	13,478
Rangat	15,243	9,343	5,900	1,098.2
South Andaman	60,312	38,311	22,001	3,010.4
Car Nicobar	13,504	7,101	6,403	329.0
Nancowry	8,161	5,045	3,116	1,823.6

From the above table it may be observed that South Andaman tahsil forms 52.4 percent of the total population. The lone town of Port Blair with a population of 26,218 also forms a part of South Andaman tahsil. The proportion of population occupied by other tahsils are Nangat 13.2 per cent, Car Nicobar 11.7 percent, Diglipur 82 percent, Mayabunder 7.3 percent and Rangoowry 7.1 percent.

3) Comparison of growth rate.

State/Union Territory	Percentage growth rate of population		Ranking by rate of growth	
	1951-61	1961-71	1951-61	1961-71
Tamil Nadu	11.85	22.30	27	26
Andaman & Nicobar Islands	105.19	81.17	2	2

Since 1951, the population increase has been sharp due to the substantial-in-migration for settlement of displaced persons from the main land and to progress, the developmental activities started after the advent of independence in case of Andamans group of islands. In case of Nicobar group of islands, the growth since 1951 is again mainly on its course of steady natural increase.

4) Agriculture and food

The Andaman and Nicobar Islands began as a penal settlement in the year 1858. The islands were opened up for refuge settlement during the last three decades and settlement of

ex-servicemen in the last one decade. These settlements were basically planned for paddy cultivation through the settlers.

The Nicobarees in the Nicobar group of islands have taken to coconut and arecanut cultivation from the historical past. Coconut forms a major part of their diet. The other items which are grown successfully in these islands are pepper, clove, nutmeg, cinnamon, coffee, cocoa, oil palm, banana, papaya and maize. Cereal cultivation in these islands are not satisfactory.

III. EXPERIMENTAL PROCEDURE

Women of the vulnerable group during pregnancy and lactation are easily affected by nutritional deficiencies, infection and infestation, and the consequences of maternal malnutrition not only affect the mother but also the survival of her child. Hence a comparative study of nutritional status and food consumption pattern of pregnant and lactating women of Andaman and Nicobar Islands with those of Tamil Nadu belonging to lower socio-economic group was aimed at. The study comprised of eliciting information on socio-economic status; Meal pattern, daily food consumption and dietary practices and Nutritional and health status.

The experimental procedure pertaining to this study is:

A. Selection of the Area of Study:

For this comparative study, the area selected were Andaman and Nicobar Islands and Coimbatore. As the investigator has had the experience of staying at Andamans, she was deeply interested in food practices followed among them. Since coming over to Tamil Nadu, she found more or less similar type of food practices prevalent among the people of Andaman and Nicobar Islands, she was interested in a comparative study. The area selected were Junction point, Haddo, Dilanipur and Atlanta point where as at Coimbatore Thudiyalur, Thelun upalayam, Housemean Nagar and Kathnapuri as these villages were already nutritionally educated through C.S.S.

B. Selection of samples:

Samples were selected at random from low socio-economic level. Random sampling refers to the sampling technique in which each and every item of the population has an equal and independent chance of being included in the samples. Twentyfive pregnant and twentyfive lactating women were selected at random from the selected villages of Andaman and Nicobar Islands and Coimbatore.

C. Selection of Methods:

Interview schedule was formulated on 1) socio-economic status 2) the meal pattern and dietary practices 3) Nutrition and health status of the pregnant and lactating women belonging to the lower socio-economic group. Interview was conducted with the subjects with the help of this schedule. A schedule is a set of questions which are asked and filled in a face to face situation with another person.

Interview schedule has much scope for getting response from the interviewer. Weighment method was used for collecting information on daily food consumption.

D. Collection of data through Interview Schedule Method:

Rapport was developed with the subject by visiting each family. To conduct interview, a questionnaire was formulated (Appendix I). According to Devadas (1976), " A questionnaire refers to a set of statement and/or questions to be answered by the respondent in the face to face interview and filled in by the interviewer."

Prepared questionnaire covered the following areas-

1) Socio-economic status

Questions pertaining to these were on types of family, family background, sources of income, debts, mode of savings and expenditure pattern.

2) Meal pattern

Questions pertaining to number of meals, daily meal pattern, daily food consumption pattern, food produced at home, cooking methods followed and food taboos were included.

3) Nutritional Deficiency and Health Status

Questions pertaining to these were on personal hygiene house hold cleanliness, environmental cleanliness, stages of pregnancy and immunisation. Height, weight, mid arm circumference, chest circumference, head circumference were also measured. Nutritional deficiency symptoms were also determined by the investigator.

4) Weighment survey

A weighment survey was also conducted to find out the individual consumption of the subjects for three consecutive days, using weighment of raw and cooked weights of the food. For this, the investigator stayed with the families so that she could be present to weigh the foods personally and to check the weight of raw and cooked foods before and after cooking the food. Consumption of the subjects were ascertained. The cooked food left after consumption was also weighed and

recorded. From these data the actual quantity of food consumed by the individual was calculated.

IV. RESULTS AND DISCUSSION

The aspects of the comparative study on the nutritional status and dietary practices of pregnant and lactating women of Coimbatore and Andamans are discussed under:

A) Socio-economic profile

B) Meal pattern

C) Nutritional and health status

A. Socio-economic profile:

The pattern of life of the selected families of twentyfive pregnant and twentyfive lactating women, were studied with the help of socio-economic survey. Data pertaining to the salient features such as education, occupation, income, budget debts and savings were collected and it revealed many interesting findings.

Even though the samples were selected at random it was found that all of them belonged to nuclear families. Age-wise distribution of the pregnant and lactating women are given in Table I.

TABLE I

AGEWISE DISTRIBUTION OF THE SAMPLES

Group	Below 19 years	20-25 years	26-30 years	30 and above
Pregnant				
Coimbatore	8	52	24	16
Andamans	44	32	24	..

Lactation				
Coimbatore	24	60	..	16
Andamans	24	60	16	..

It is evident from the table that there are only few adolescent women in the prenative stage in Coimbatore compared to those of Andamans. In other age groups also a similar pattern is seen in both the places.

The literacy percent and occupational status of the subjects are presented in Table II.

TABLE II

LITERACY PERCENT AND OCCUPATIONAL STATUS OF THE SUBJECTS

Group	Education					Occupation			
	Illiterate	Below 5th	Elementary	SSLC	Graduates	House wife	Aya	Hard manual labour	Clerical
Pregnant									
Coimbatore	40	12	32	12	4	80	4	16	..
Andamans	24	36	32	28	..	92	..	..	8
Lactating									
Coimbatore	44	16	20	20	..	80	4	16	..
Andamans	..	8	20	72	..	100	..	..	..

The above table revealed that percentage of illiteracy was maximum for pregnant and lactating women of Coimbatore (40, 44 percent respectively) when compared to the subjects of Andamans (24 percent). It was found that the young adolescent women had more education than the older ones. The percentage of illiteracy was greater among the pregnant women of Andamans (24 percent), when compared to the lactating women.

Regarding the occupation, though greater percentage of the subjects at Andamans were literate, 90-100 percent of them remained as housewives, only 8 percent of the pregnant subjects went for clerical job, whereas at Coimbatore, nearly 20 percent of women belonging to pregnant and lactating groups were employed as aayas and labourers showing that there was tendency for women at Coimbatore to take up occupation. Nevertheless a greater percent (80) remained as house wives.

Total family income of the subjects is presented in Table IIIa.

TABLE IIIa

1) FAMILY INCOME PER MONTH

Group	Income per month			
	Below 100 rupees	100-250 rupees	250-500 rupees	500-700 rupees
Pregnant				
Coimbatore ..		68	24	8
Andamans ..		4	84	12

Lactating				
Coimbatore	..	20	60	20
Andamans	..	..	72	28

Regarding the monthly income of the subjects of Coimbatore, pregnant samples (68 percent) mainly belonged to the low income group (Rs.100 - 250), whereas at Andamans the basic income itself was high compared to Coimbatore, revealing that this higher income would have an effect on food consumption and health status.

Food production and consumption pattern of the subjects are summarised under Table IIIa(ii).

TABLE IIIa(ii)

FOOD PRODUCTION AND CONSUMPTION

Group	No	Yes	Kitchen garden	Poultry	Dairy	Family use
Pregnant						
Coimbatore	100	..	..	..	..	..
Andamans	80	20	16	4	..	20%
Lactating						
Coimbatore	80	20	8	..	4	20%
Andamans	76	24	8	8	4	24%

From the above table it is evident that very few samples in Coimbatore had other sources of income like kitchen garden,

poultry and dairy. Of those who had, it was found that the products were used for the family consumption. It was seen that a higher percentage of the women of the Andamans maintained kitchen garden, poultry and dairy.

b) Budgeting:

Most families at Coimbatore did not plan their budget, whereas very few among the pregnant group and few among the lactating group at Andamans had planned a budget to save their families from debts.

TABLE IV

EXPENDITURE PATTERN (IN PERCENT)

Group	Food						Clothing						Shelter				
	40–50	50–60	60–70	70–80	80–90	90–100	5–10	10–15	15–20	20–25	25–30	Above 30	5–10	10–15	15–20	Above 20	Nil
Pregnant																	
Coimbatore	Nil	12	8	4	32	44	Nil	8	24	20	4	..	40	12	..	..	8
Andamans	28	52	16	..	4	..	8	20	48	24	..	..	16	52	16	16	..
Lactating																	
Coimbatore	4	28	32	12	16	8	4	40	44	..	4	..	60	28	4	..	4
Andamans	4	32	60	..	..	4	32	28	36	..	..	..	40	48	..	..	12

44 percent of the subjects belonging to Coimbatore spent 100 percent of their income on food and 32 percent of them spent 80-90 percent of the income on food. From table (III) it is clear that 68 percent of them belonged to the low income group of Rs.100-250 per month. In Andamans majority of the subjects spent only between 40-60 percent on food as greater percentage of subjects (84 percent) belonged to the income group of Rs.250-500 the percentage money spent on food is between 50-70 percent. These data thereby reveal that percentage of money spent on food decreases with an increase in the family income. Regarding clothing in both the places, 15-20 percent of income is spent for clothing whereas for shelter ... the maximum percent spent was 5-15 at both the places.

TABLE V

DEBTS

Group	Nil	Below 100	100-250	250-500	500-1000	1000-2000	2000 and above	Total
Pregnant								
Coimbatore	12	4	28	20	12	12	12	88
Andamans	76	..	8	..	4	4	8	24
Lactating								
Coimbatore	44	..	24	8	8	..	16	56
Andamans	92	..	..	..	4	..	4	8

The income level also has an effect on the amount of debts incurred by the subjects. As a majority of the preganant samples of Coimbatore belonged to the low income group of Rs.100-250, 88 percent of the subjects had debts. Thus the pregnant subjects of Andamans had lesser debts when compared to those of Coimbatore.

Whereas among the lactating group majority of the Coimbatore and Andamans subjects come under the income group of Rs.250-500 per month, a percentage of subjects with debts decreased that is 56 percent in Coimbatore and 8 percent in Andamans.

TABLE VI

SAVINGS

Group	Yes	No	Source
Pregnant			
Coimbatore	4	96	Bank - 4 percent
Andamans	44	50	Bank - 28 percent; Chits-12 percent Post office - 4 percent
Lactating			
Coimbatore	28	72	Bank-16 percent; Post office - 8 percent Chits - 4 percent
Andamans	76	24	Bank - 36 percent Chits - 16 percent Post office - 24 percent

The above table revealed that the habit of saving is very less among the subjects of Coimbatore when compared to those of Andamans. This may be attributed to their low income. The lactating women of both Coimbatore and Andamans had a higher percentage (28 and 4 respectively) of savings when compared to the pregnant women.

Regarding the source for savings, bank, post office and chits seem to be the popular source among the subjects of Andamans than those of Coimbatore.

B. Meal Pattern

Frequency of consumption of meals of the subjects are as follows:

TABLE VII (1)

MEAL PATTERN

Group	Number of meals			
	4	3	2	1
Pregnant				
Coimbatore	20	56	24	Nil
Andamans	80	20	..	Nil
Lactating				
Coimbatore	44	44	12	Nil
Andamans	100	..	..	Nil

The table reveals that in Coimbatore, 3 meals among the

pregnant samples and 4 meals among the lactating samples are more prevalent whereas at Annamanai 4 meals a day is the routine.

ii) Meal Planning

Only 4 percent of the pregnant women of Annamanai did meal planning, whereas it was non-existent among the samples chosen from Coimbatore.

Frequency of consumption

The consumption pattern of various foodstuffs by the women of Coimbatore and Annamanai are given in Table VIII.

TABLE VIII

FREQUENCY OF CONSUMPTION

Group	Food stuff		Twice a day	Twice a day	Once a day	Two to three times a week	Once a week	Rarely	Nil
Pregnant	C'	C	72	28	••	••	••	••	••
		A	96	4	••	••	••	••	••
Lactating	C'	C	72	24	4	••	••	••	••
		A	100	••	••	••	••	••	••
Pregnant	P	C	44	56	••	••	••	••	••
		A	16	84	••	••	••	••	••
Lactating	P	C	8	84	8	••	••	••	••
		A	12	88	••	••	••	••	••
Pregnant	Q	C	••	••	12	4	24	60	••
		A	••	••	28	4	52	16	••
Lactating	Q	C	••	••	8	••	72	20	••
		A	••	••	8	8	68	24	••
Pregnant	R	C	••	••	20	48	32	••	••
		A	•••	8	60	12	16	4	••
Lactating	R	C	••	••	40	4	44	12	••
		A	••	8	80	8	4	••	••
Pregnant	Q.V	C	••	12	60	12	4	12	••
		A	•••	80	20	••	••	••	••
Lactating	Q.V.	C	4	56	40	••	••	••	••
		A	••	88	12	••	••	••	••
Pregnant	FF	C	••	••	••	••	52	32	16
		A	••	••	12	32	56	••	••
Lactating	FF	C	••	••	••	16	52	32	••
		A	••	••	4	56	40	••	••

Group		Food stuff	Thrice a day	Twice a day	Once a day	Two to three times a week	Once a week	Rarely	Nil
Pregnant	F	C	••	••	••	••	12	80	8
		A	••	4	44	8	20	24	••
Lactating	F	C	••	••	4	40	4	40	12
		A	••	••	4	44	28	24	••

C - Coimbatore
A - Annamalai
C' - Cereal
P - Pulse
G - Greens
R - Roots and Tubers
O.V.- Other vegetables
FV - Fleshy foods
F - Fruits

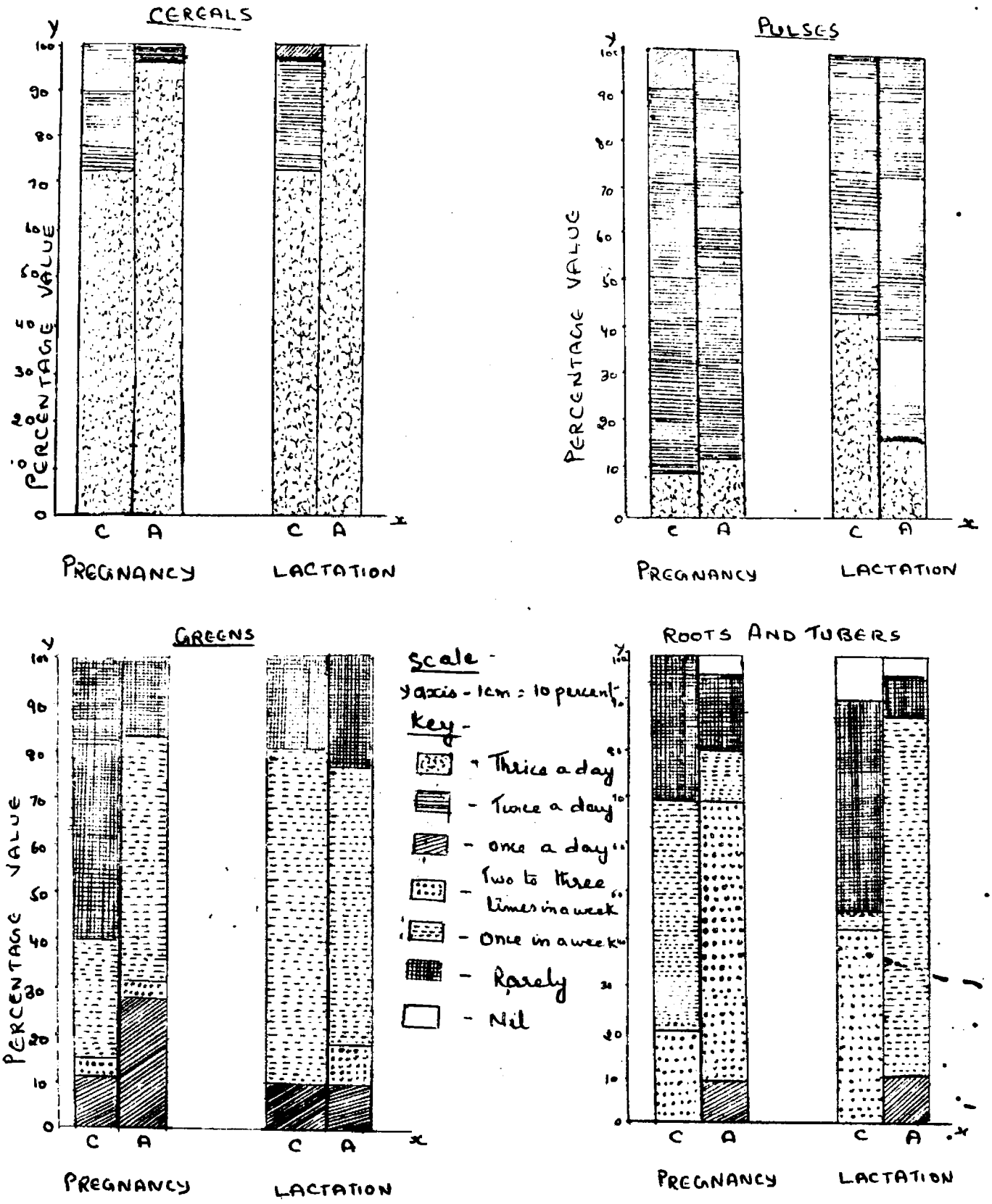
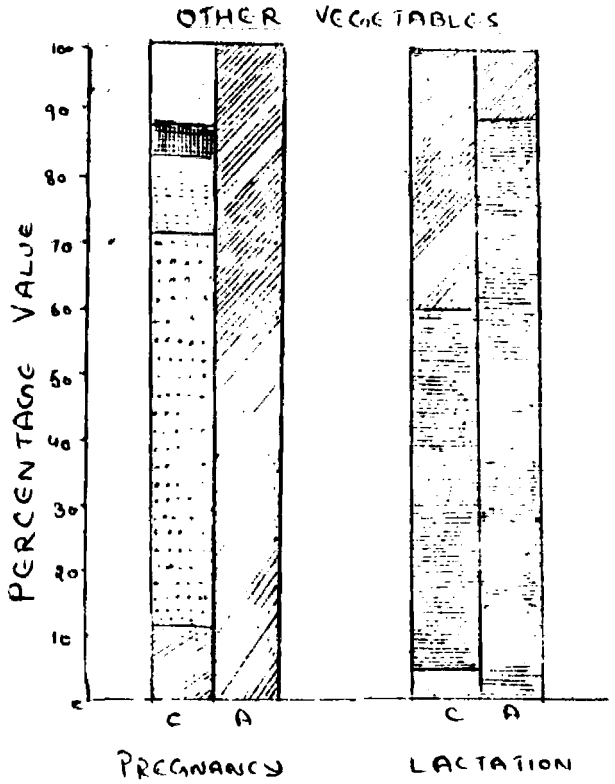
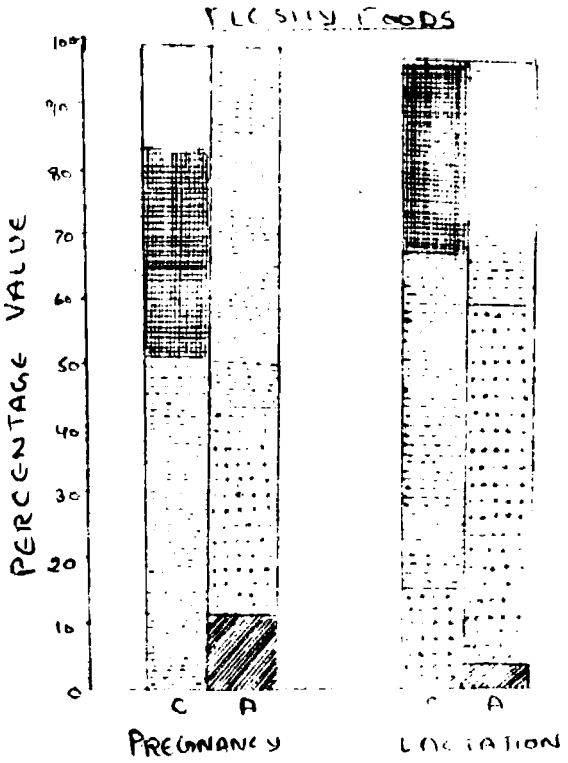
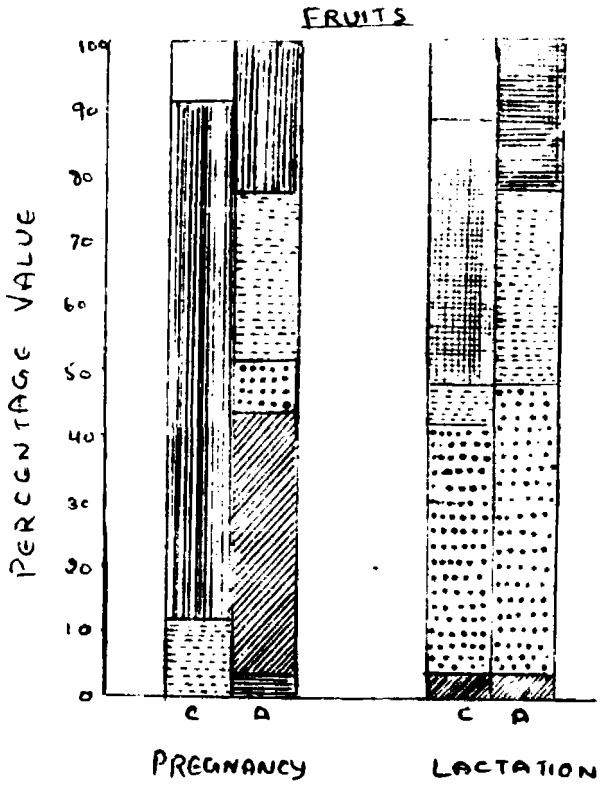


FIGURE - II

FREEQUENCY OF CONSUMPTION PATTERN







Scale

1 cm = 10 percent

Key

- Thrice a day
- Twice a day
- Once a day
- Two to three times in a week
- Once in a week
- Rarely
- Nil

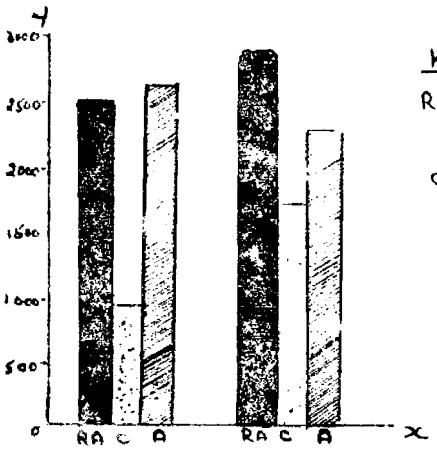
FREQUENCY OF CONSUMPTION PATTERN

Cereal was the main staple food among the women of Coimbatore as well as Andamans. The subjects of Andamans consumed cereals thrice a day whereas lesser percentage did so at Coimbatore. The consumption of pulse was less in Andamans when compared to Coimbatore, because of the common belief that it is gas producing.

Greens are used more by the subjects of Andamans compared to subjects of Coimbatore. Consumption of roots and tubers and other vegetables is more at Andamans than at Coimbatore owing to the low purchasing capacity.

Fleshy foods are being consumed in a greater percent at Andamans compared to that of Coimbatore. It is interesting to note that the consumption of fleshy foods like pork, fish is high among the onges and Nicobarese and this contributes to the phenomenally high intake of protein by these groups. (NIN, 1971). Similarly Indians at Andamans also consumed fleshy foods, especially fish frequently, as these are easily available and economical.

Fruits were more frequently included in the diets by the subjects of Andamans than by the subjects of Coimbatore because for the majority of the samples it was far beyond their purchasing power.



Scale
Y axis
1 cm = 500 calories

Key
RA - Recommended allowance
C - Coimbatore
A - Andamans.

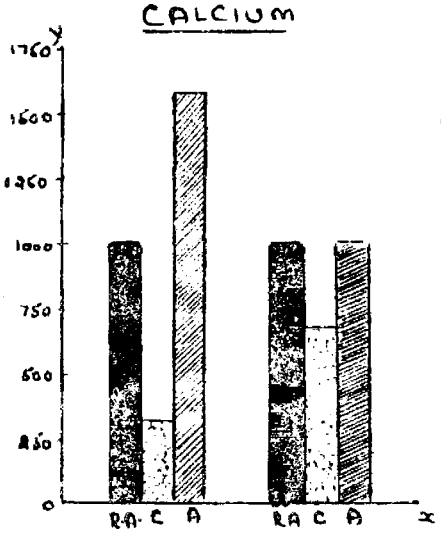
ENERGY

Scale
Y axis
1 cm = 10g

Key
RA Recommended allowance
C Coimbatore
A - Andamans.

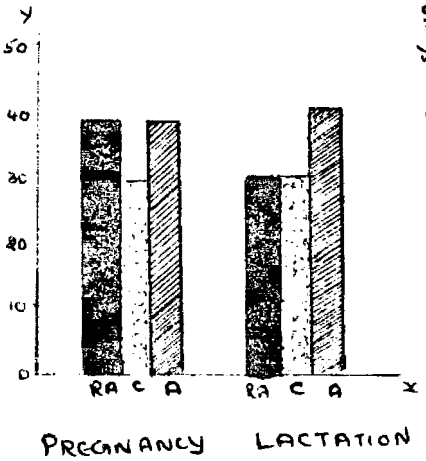
PROTEIN

CALCIUM



Scale
Y axis
1 cm = 250mg
RA - Recommended allowance
C - Coimbatore
A - Andamans

IRON

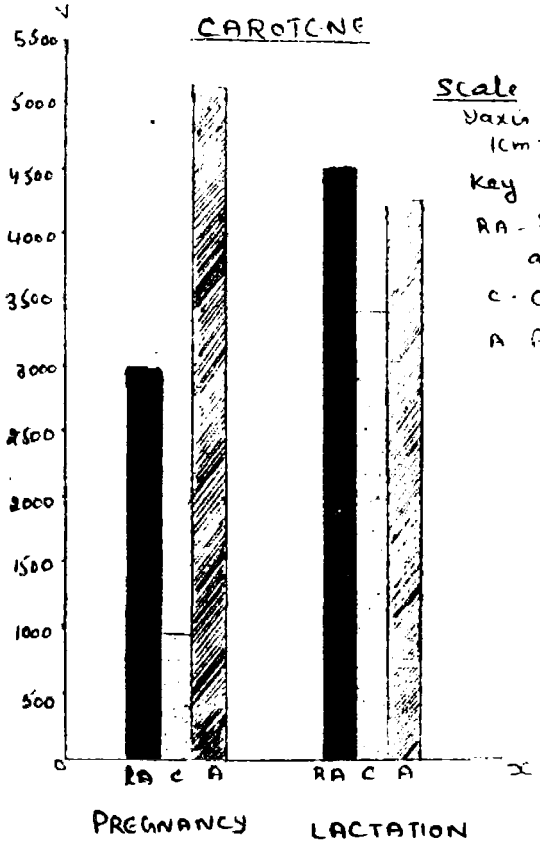


Scale
Y axis
1 cm - 10mg
RA - Recommended Allowance
C - Coimbatore
A - Andamans

FIGURE - III

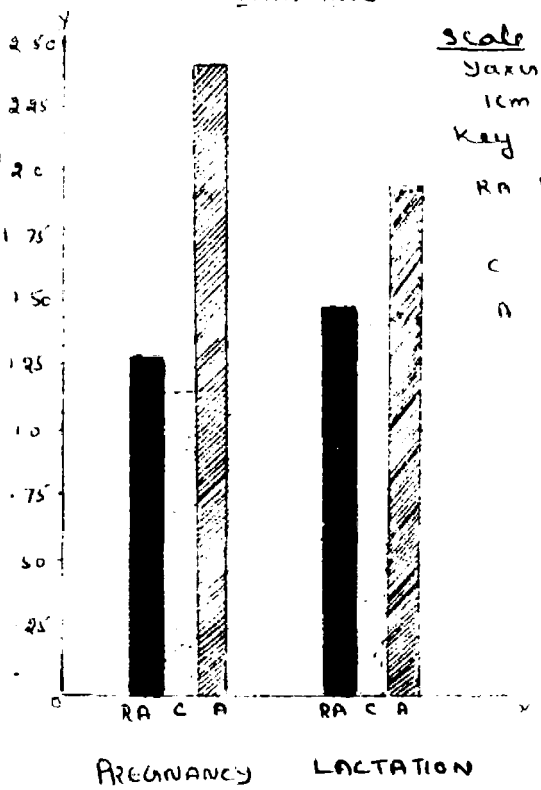
RECOMMENDED AND ACTUAL INTAKE PATTERN OF PREGNANT AND LACTATING WOMEN OF COIMBATORE AND ANDAMANS

CAROTENE



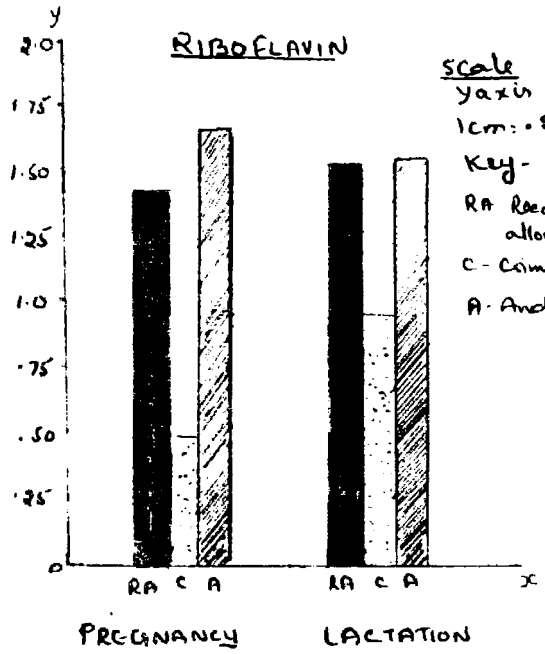
Scale
Yaxis
1cm - 500mg
Key
RA - Recommended allowance
C - Coimbatore
A Andamans

THIAMINE



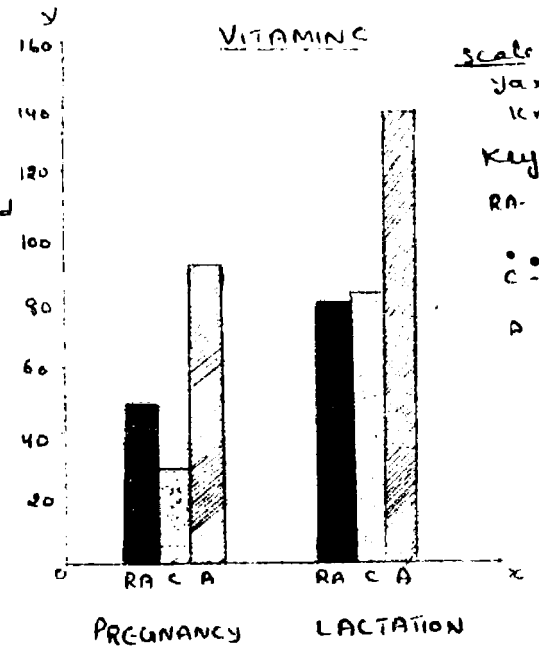
Scale
Yaxis
1cm - .25mg
Key
RA Recommended allowance
C Coimbatore
A Andamans

RIBOFLAVIN



scale
yaxis
1cm: .25mg
Key-
RA Recommended allowance
C - Coimbatore
A - Andamans

VITAMIN C



Scale
Yaxis
1cm : 20 mg
Key
RA- Recommended allowance
C - Coimbatore
A Andamans

Individual Consumption

The mean nutrient intake of pregnant and lactating women are given in Table IX. Their individual nutrient intake are presented in Appendix II.

TABLE IX

MEAN NUTRIENT INTAKE OF PREGNANT AND LACTATING WOMEN

Nutrients	ICMR recommended allowances for pregnancy	Pregnancy		ICMR recommended allowances for lactation	Lactation	
		Coimbatore	Andamans		Coimbatore	Andamans
Energy (K.cal.)	2500	911	2664	2900	1713	2293
Protein (Gms)	55	21.5	73.2	65	51.4	60.9
Calcium (mg)	1000	315	1578	1000	710	1015
Iron (mg)	40	29.7	39.5	30	30.7	41.9
Carotene (mg)	3000	1064	5236	4600	3555	4328
Thiamine (mg)	1.3	1.2	2.4	1.5	1.4	1.9
Riboflavin (mg)	1.4	.55	1.7	1.6	1.0	1.6
Vitamin C (mg)	50	28	94	80	81	144

Diets consumed by the pregnant women of Coimbatore were markedly inadequate in all the nutrients listed above showing the effect of low income and greater family size on food intake. The diets consumed by lactating women of Coimbatore were also inadequate in all the essential nutrients but to a lesser extent. Results of the studies carried out by Gopalan, et al (1971) indicate the woeful inadequacy of the diets even on the staple cereal and other protective foods. Except for the nutrients like iron and energy, the intake of which was below the recommended allowance by ICMR (1978), the other nutrients were supplied in adequate amounts from the diets consumed in Annamalai.

The intake of all the foods including cereals by the pregnant and lactating women of Coimbatore were much below the recommended allowances. It is noticeable that though foods like vegetable and milk were available in rural areas, they were not included in the diet and hence the reason could be attributed to per capita income. Certain food fads, ignorance and the improper cooking methods followed by them.

The below table will clearly reveal the different cooking methods followed by the selected subjects of Coimbatore and Annamanai.

TABLE I

COOKING METHODS FOLLOWED

Group	Food stuff	Boiling	Steaming	Boiling and steaming	Frying	Stewing and roasting
Pregnant C	C	44	32	24	••	••
	A	60	8	32	••	••
Lactating C	C	72	20	8	••	••
	A	64	16	36	••	••
Pregnant P	C	80	••	20	••	••
	A	80	20	••	••	••
Lactating P	C	24	68	8	••	••
	A	68	20	12	••	••
Pregnant G	C	28	••	28	44	••
	A	56	24	••	20	••
Lactating G	C	80	4	8	8	••
	A	84	16	••	••	••
Pregnant R	C	80	20	••	••	••
	A	44	20	32	4	••
Lactating R	C	20	48	32	••	••
	A	60	20	••	20	••
Pregnant OV	C	48	16	12	24	••
	A	80	8	••	12	••
Lactating OV	C	24	40	28	8	••
	A	60	16	8	16	••
Pregnant FF	C	60	••	••	40	••
	A	40	12	••	24	24
Lactating FF	C	72	4	16	8	••
	A	48	28	12	12	••

C - Cereals G - Greens OV - Other vegetables
P - Pulses R - Roots and tubers FF - Fleshy foods
C - Coimbatore A - Annamanai

Boiling was found to be the popular method used for the preparation by subjects followed by steaming. Frying is used only in the case of vegetables and fleshy foods while steaming is used mainly for fleshy foods. The subjects belonging to Coimbatore used steaming more than the subjects of Andamans. On studying cooking methods used for each food stuff in both Coimbatore and Andamans rice is cooked by boiling and absorption than by boiling and straining method. Regarding pulses also, boiling is most popular method. In Andamans greens is also cooked by boiling. In Coimbatore both boiling and frying seems equally popular. Regarding cooking of roots and other vegetables frying is used by a small percentage of subjects but majority of them use boiling. Frying is used more in the preparation of fleshy foods by the subjects of Coimbatore than the subjects of Andamans.

TABLE XI
1) FOOD TABOOS OF THE SUBJECTS OF COIMBATORE

S.no.	Foods	Percentage	Reason
1	Papaya	76	Causes abortion
2	Roots and tubers	20	Gas producing
3	Gingelly seeds	12	Hot food
4	Pineapple	10	Hot food
5	Egg	4	Size of the baby will increase and can cause stomach upset for the mother
6	Brinjal	4	Causes itening and indigestion
7	Cold rice	8	Causes cold to the baby
8	Ragi	4	Decreases milk production
9	Cucumber	4	Cold food avoided during lactation

11) FOOD TABOOS OF THE SUBJECTS OF ANDAMANS

S.No.	Food	Percent	Reasons
1	Papaya	48	Hot food, causes abortion
2	Egg	8	Increases the baby's size in the womb
3	Pulses	16	Gas producing
4	Roots and tubers	24	Gas producing
5	Cold foods	4	Avoided during lactation because of their coldness
6	Mango	4	

More foods were being avoided during pregnancy than lactation periods. Foods like papaya, roots and tubers, gingelly seeds, brinjal, egg and pineapple were avoided during pregnancy but during lactation, foods avoided were radish, cucumber and cold food stuffs.

During the pregnancy period, majority of the subjects at Coimbatore avoid papaya (76 percent), roots and tubers were avoided during pregnancy as they believed that it was gas producing and could cause a lot of discomfort; while gingelly seeds and pineapple were avoided because it was believed to be heat producing. While egg and brinjal were avoided by a small percentage (4 percent) as they are scared that baby will be of big size and some are also scared of the fact that they might get stomach upset.

SCALE

Yaxis 1cm = 10percent

KEY

C - Coimbatore

A - Andamans

- Normal
- Oedema
- Vitamin A
- Vitamin B
- Vitamin C
- Anaemia
- Flurosis
- Muscle-wasting
- Protein-deficiency

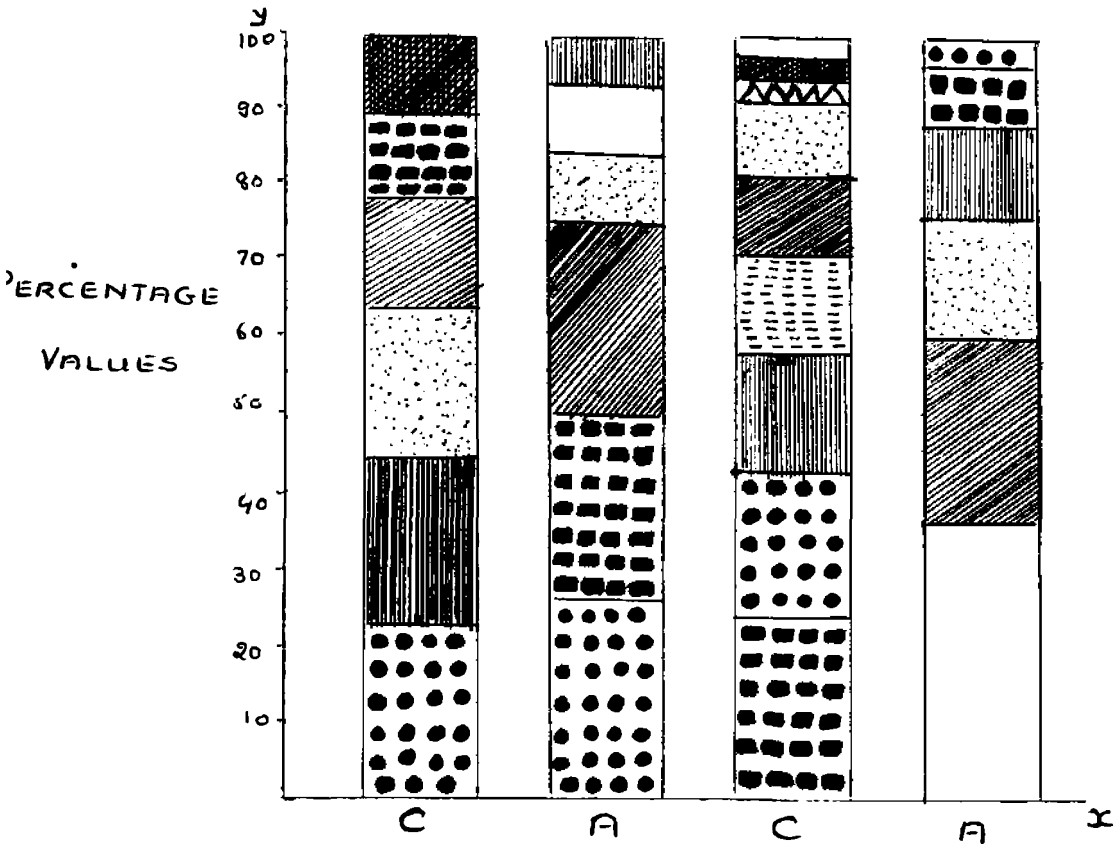


FIGURE-IV

DEFICIENCY SYMPTOMS PREVALENT AMONG THE PREGNANT AND LACTATING WOMEN IN COIMBATORE AND ANDAMANS.

During lactation certain foods which cause cooling effect to the body are avoided as they believe that the child also can get a cold. So for this reason cucumber and cold foods of all kinds are avoided. Ragi is avoided by 4 percent mainly because it is believed that it decreases milk production.

On comparing this beliefs method those of Andaman Islands subjects we find certain similarities as well as dissimilarities which can be seen from the table X (b).

During pregnancy 48 percent of them avoid papaya and 24 percent of them avoid roots and tubers for the same reason as those believed by subjects in Coimbatore 16 percent of them avoid pulses as they believe it to be gas producing. This belief is verified by the reason why pregnant women in Andamans consumes dhal to lesser extent to the pregnant women in Coimbatore.

During lactation the subjects of Andamans also avoid cold foods and mango which they believe can cause cold in children.

Thus we see that even though the people stay at different parts of India, the taboos prevalent among the same ethnic group is more or less similar.

C. Nutritional and Health Status

TABLE XII

STAGE AND FREQUENCY OF PREGNANCY

Group	Stage of pregnancy in months						Frequency of pregnancy					
	5	6	7	8	9	10	1	2	3	4	5	6
Pregnant												
Coimbatore	1	4	8	5	3	4	4	7	3	7	3	1
Andamans	10	3	3	4	3	2	4	13	6	2	.	.

1. Stage of pregnancy

Among the 25 pregnant women, 13 were in second trimester and 12 were in third trimester whereas among 25 pregnant women of Andamans, 16 were in second trimester and 9 were in third trimester.

Out of the 25 pregnant women in Coimbatore, 4 were pregnant for the first time, 7 for second time, 3 for third time, 7 for fourth time and 12 for 5th time and one for the sixth time. Out of the 25 pregnant women at Andamans, 4 were primipara, 13 were pregnant for second time and 6 and 2 women were pregnant for third and fourth time respectively.

TABLE XIII

11. SELECTED CHARACTERISTICS OF THE CHILD

S.No. Group	Stage of lactation				Which being nursed				
	Below 6 months	6-12 months	One year	Two years	1	2	3	4	5
Lactation									
Coimbatore	10	8	7	..	6	9	7	1	2
Andamans	8	2	9	6	5	16	3	1	..

Children of both the places were breast fed and the data shows that the child was being fed till 2 years. At Coimbatore the families had upto 5 children whereas in Andamans themaximum number of children were three in the samples selected. This shows that women at Andamans were practising family planning.

TABLE XIV

A. HEALTH AND HYGIENE OF THE MOTHER

S.No.	Particulars	Samples of Coimbatore			Samples of Andamans		
		Good	Fair	Poor	Good	Fair	Poor
1.	Personal hygiene	10	84	6	58	42	..
2.	Household cleanliness	12	72	16	24	76	..
3.	Environmental cleanliness	8	78	14	30	70	..

It is clear from the table that samples at Andamans were residing in an healthy environment and were possessing a

good personal hygiene compared to the subjects of Coimbatore. The poor personal hygiene, household cleanliness and environmental cleanliness had lead to infections in the pregnant women, in the past years except the weakness no other effect is shown now.

b. Immunization

Regarding immunization it has been found out that most of the samples at Andamans had taken up immunisation against small pox and chicken pox compared to the samples of Coimbatore.

III. Clinical Assessment

In order to assess the nutrition status of the women clinical assessment were carried out by the investigator.

ii. General Nutritional conditions

TABLE IV
NUTRITIONAL CONDITION

Group	Good %	Fair %	Poor %
Pregnant			
Coimbatore	..	76	24
Andamans	48	52	..
Lactating			
Coimbatore	4	92	4
Andamans	32	64	4

While considering the general nutritional condition of the subjects it was the subjects of Andamans who had a better

nutritional condition than the subjects of Coimbatore. The reason for this could be higher basic income compared to the subjects of Coimbatore, awareness of proper methods of cooking and good food habits.

5) Anthropometric measurements

The anthropometric measurements of height, weight, mid arm circumference, chest circumference are given in tables XVI (i, ii, iii). The individual values of the same are presented in Appendix (III)

TABLE XVI

i. MEAN WEIGHTS OF PREGNANT WOMEN OF ANDAMANS AND COIMBATORE

Stage of pregnancy	Weight (kg)		
	Recommended weight during pregnancy (NIN)	Actual weight of samples (kg)	
		Coimbatore	Andamans
Second Trimester	51.5	45.6 ± 5.29	46.8 ± 4.0
Third Trimester		46.8 ± 6.65	47.7 ± 4.65

Table XVI reveals that the weights of the pregnant women (Second and third trimester) of Andamans was higher when compared to the pregnant women of Coimbatore. However, the weights of pregnant women of both Andamans and Coimbatore were lower than the recommended weight of 51.5 kg.

TABLE XVI (ii)

ii. ANTHROPOMETRIC MEASUREMENTS OF PREGNANT WOMEN

Particulars	Group Pregnant	
	Coimbatore	Andamans
Height (cm)	143.65 ± 1.34	156.2 ± 3.9
Mid arm circumference(cm)	24.75 ± 0.49	25.1 ± 1.9
Chest circumference(cm)	80.1 ± .01	82.2 ± 2.3
Head circumference (cm)	53.6 ± .21	53.4 ± 1.1

Regarding the above mentioned anthropometric measurements of pregnant women at both the places; though the anthropometric measurements did not differ too much, it was the lactating women of Andamans who had a comparatively better frame of health than those of the Coimbatore women.

TABLE XVI(iii)

iii. MEAN ANTHROPOMETRIC MEASUREMENTS OF LACTATING WOMEN

Group	Weight (kg)	Height (cm)	Mid arm circumference (cm)	Chest circumference (cm)	Head circumference (cm)
Lactation					
Coimbatore	45.5 ± 7.3	150.2 ± 6.4	23.5 ± 2.3	77.7 ± 4.27	52.6 ± 2.18
Andamans	48.3 ± 5.1	152.8 ± 8.5	27.5 ± 3.6	81.7 ± 4.2	55.3 ± 1.8

In the case of lactating women of both the places though the anthropometric measurements did not differ too much, it was the lactating women of Andamans who made better health. The reason for the similarity in the anthropometric measurements could be attributed to the same ethnic group, to which they belong.

e. Signs and Symptoms of Deficiency Diseases

The clinical assessment revealed that majority of women showed one or more deficiency signs. The important being that of vitamin C, B, and A and minerals. It is shown in the table below.

TABLE XVII

SIGNS AND SYMPTOMS OF DEFICIENCY DISEASES (PERCENT)

Deficiency	Group			
	Pregnant		Lactating	
	Coimbatore	Andamans	Coimbatore	Andamans
Protein deficiency	••	••	4	••
Oedema	32	32	24	4
Muscle wasting	16	32	28	8
Vitamin A	28	12	12	16
Vitamin B	16	••	4	••
Vitamin C	32	8	20	12
Iron	20	32	12	24
Flourine	••	••	16	••
Nil	••	12	4	36

NIN (1964) studies have shown that the manifestations are glossitis, angular stomatitis, burning feet, pins and needles in the limb arising from B-complex deficiency. A larger number of cases of anaemia are also encountered among the expectant mother. Nutritional anaemia is a major public health problem in India, particularly among expectant women.

As seen in Table XVII four percent of lactating mothers had deficiency like sparse hair while oedema was prevalent in all the pregnant women. Muscle wasting was more among the

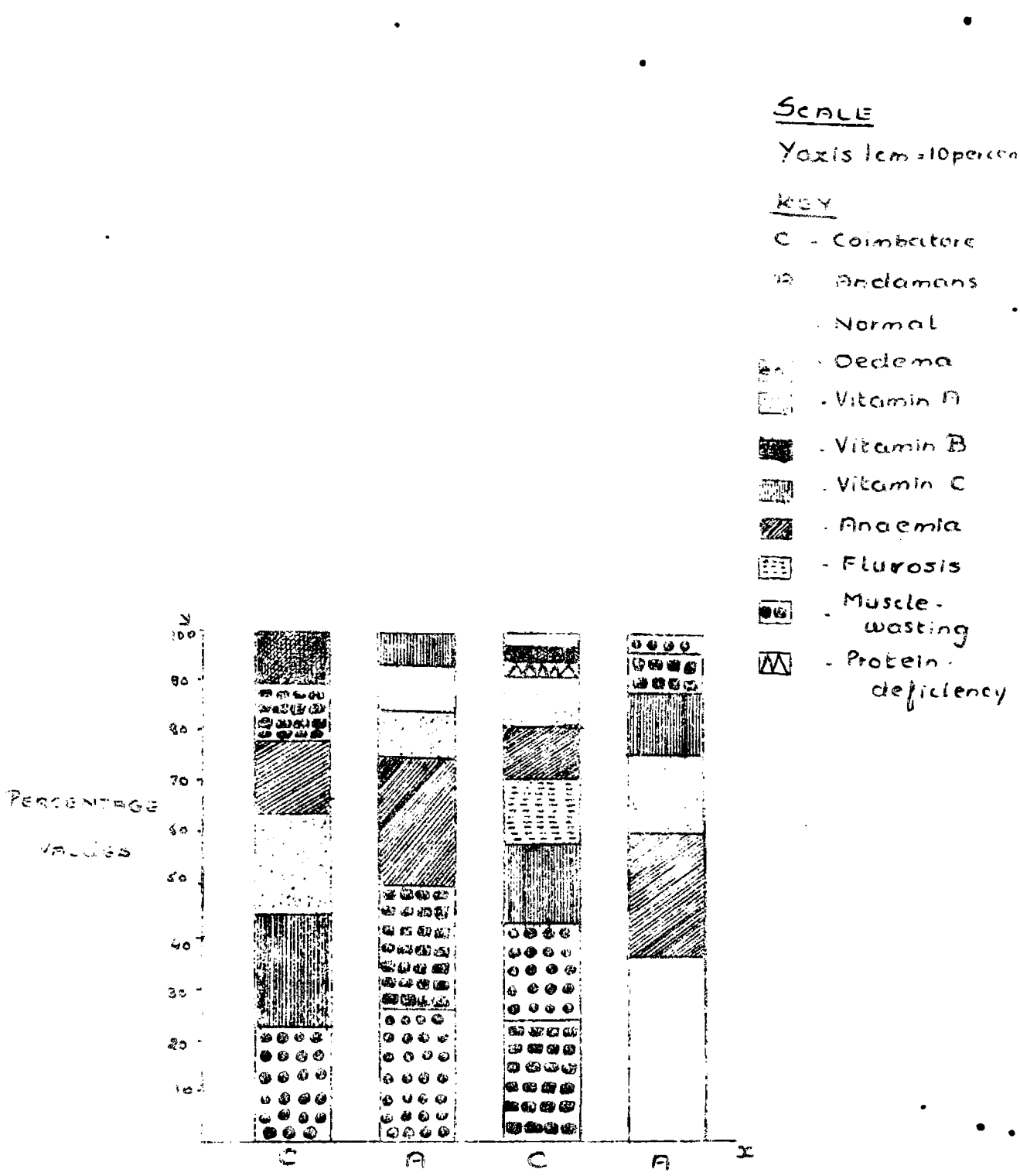


FIGURE-V

DEFICIENCY SYMPTOMS PREVALENT AMONG THE PREGNANT AND LACTATING WOMEN IN COIMBATORE AND ANDAMANS.

subjects of Coimbatore. Vitamin deficiency was also prevalent at a higher rate with special emphasis to vitamin C and Vitamin A. The symptoms noted were bleeding gums, bitot spots, kerato malacia and xerosis respectively. Symptoms of B vitamins like angular stomatitis and glossitis were noted among the subjects of Coimbatore. Flourosis was seen among the lactating women of Coimbatore due to mineral deficiency anaemia was more prevalent among the subjects of Annamans.

V SUMMARY AND CONCLUSION

The food consumption pattern and nutritional status of pregnant and lactating women of Andaman and Nicobar Islands were compared with similar group in Tamil Nadu (Coimbatore) all belonging to low socio-economic group. Twenty five pregnant and twenty five lactating women were selected for this study. The findings of this study revealed that

Socio-economic profile:

In Coimbatore 40 percent of pregnant and 44 percent of lactating women and in Andamans 24 percent of pregnant women were illiterate. In Coimbatore 20 percent of pregnant and lactating women went for hard manual labour compared to 8 percent of pregnant women in Andamans who went for clerical job 68 percent of pregnant and 20 percent of lactating women at Coimbatore belonged to very low income group of Rs.100-250 per month, whereas at Andamans 84 percent pregnant and 72 per cent lactating women belonged to basic income of Rs.250-500 per month. 88 percent among pregnant and 56 percent among lactating women had incurred debts.

Food consumption pattern:

Cereal is the staple food for both the women of Coimbatore and Andamans. Though the quantity of pulse consumed by women of Andamans (56 g) is more compared to that of women of Coimbatore (48 g), the frequency of consumption in Andamans less,

i.e. 26 percent of women at Coimbatore consume pulse thrice a day as against 14 percent of women at Andamans. Consumption of greens, roots and tubers, other vegetables and fruits at Andamans meets the dietary recommended allowance, whereas in Coimbatore it is not so. Consumption of flesh foods (99 g) at Andamans was comparatively higher than that of the recommended dietary allowance (30 g). The consumption of flesh foods by pregnant and lactating women of Coimbatore was very low. The cooking methods followed was mostly boiling in both the places. However the steaming method was also adopted.

Tradition regarding Food:

Food taboos, fads and fallacies in both the places were found to be similar. In both the places papaya, roots and tubers, gingelly seeds, pineapple, ragi and cold foods were avoided during pregnancy and lactation. Thus we see that even though people stay at different parts of India, the taboos prevalent among the same ethnic group is more less similar.

Nutritional profile:

Diet consumed by the pregnant and lactating women of Coimbatore were markedly low in all nutrients as compared with those of Andamans thus showing the effect of low income. The calory as well as iron intake was slightly below the recommended allowance for the women of Andamans. The higher intake of protein in Andamans may be attributed to high

consumption of flesh foods. Weights of women at Andamans as well as at Coimbatore were below the recommended weight of 51.5 kg (ICMR). The weight of women of Andamans were higher than weights of women of Coimbatore. However in the case of lactating women of both the places the anthropometric measurements did not differ much but the weights of lactating women of Andamans were superior to that of the women of Coimbatore.

Deficiency symptoms like glossitis, angular stomatitis were common among the women of both the areas. A higher degree of prevalence was noticed among the subjects of Coimbatore. Anaemia was more prevalent among the subject of Andamans.

This study indicates that in the same ethnic group though geographical changes may be present, tradition plays an important role in food consumption pattern and health status. Hence nutrition education should be geared for making the best use of available resources and eradication of existing food, facts and fallacies. In this, a Dietition, a Food Service Administrator or an Home Scientist can play a crucial role.

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APPENDICES

APPENDIX I

QUESTIONNAIRE

Date:

A. SOCIO ECONOMIC SURVEY:

1. Name of the investigator :

2. Name of the interviewee :

3. Name and address of the Head of the family :

Door No. Address

4. Type of the family : Joint or Nuclear

Religion and Caste :

Vegetarian/Non-Vegetarian :

5. Family back ground

Sl. No.	Name of the family member	Relation to the Head of the family	Marital status	Age	Sex	Education				
						Studied upto	Studying	Illiterate	Occupation	Income

6. Other sources of income per month. :

(a) Business earnings :

(b) Receipts from properties :

(c) Other specify :

7. Do you plan your budget? : Yes ☐ No ☐
   Reasons

(b) Debts

Amount	Reasons for taking	Source	Whether repaying at present

8. Small Savings
   a) Do you save money? : Yes ☐ No ☐

   b) If yes, sources : Reasons

   Bank ☐ Chits ☐

   Kuri ☐ Post Office ☐ Others

9. EXPENDITURE PATTERN

Sl. No.	Items	Amount spent per month	Percentage	Mode of payment cash/credit
1.	Food			
2.	Clothing			
3.	Shelter			
4.	Furniture			
5.	Personal expenditure			
6.	Transport			
7.	Education			
8.	Recreation			
9.	Health			

10. Other items			
Pan			
Tobacco			
Drinks			

B. DIETARY SURVEY

1. Meal Pattern

S.No.	Number of meals	Numbers
	4 Meals	
	3 Meals	
	2 Meals	
	1 Meal	

2. Daily Meal Patterns: 3 days

Days	Breakfast	Lunch	Tea	Dinner

3. DAILY FOOD CONSUMPTION PATTERN

S.No.	Items	Frequency of consumption						
		Thrice a day	Twice a day	Once a day	Two to three times in a week	Once in a week	Rarely	Nil
	Cereals							
	Pulses							
	Vegetables							
	Green leafy vegetables							
	Roots and tubers							
	Fruits							
	Milk							
	Fleshy foods							
	Egg							
	Tea							
	Coffee							
	Sugar							

4. Individual consumption

S.No.	Raw weight of the food	Cooked weight	Individual consumption	
			Cooked weight	Raw equivalent

5. Is meal planning done in advance?

Yes ☐ No ☐ Reasons :

6. Food Produced at home.

Do you possess any of these?

Kitchen garden ☐ Bee keeping ☐

Poultry ☐ Others ☐

Dairy ☐

If yes

Items	Production per month	Income per month	Use of produce		
			By the family	Gift or sales	Sales and family use

7. Cooking Methods followed:

Foodstuff	Boiling	Steaming	Boiling and Straining	Frying			Stewing & Roasting
				Ordinary	Shallow	Deep	
Cereal							
Pulses							
Vegetables							
Green leafy vegetables							
Roots & Tubers							
Fruits							
Milk							
Fleshy foods							

8. FOOD TABOOS

Group	Foods given	Reason	Foods avoided	Reason
Pregnant				
Lactating				

9. HEALTH AND HYGIENE

	Good	Fair	Poor
A) Personal hygiene of the family member	☐	☐	☐
b) Household cleanliness	☐	☐	☐
c) Environmental cleanliness	☐	☐	☐

C. HEALTH STATUS OF THE MOTHER.

1. Name and age of the Pregnant/Lactating women:
2. Stage of pregnancy/Lactation :
3. Age and sex of the child nourished. :
4. Which being nursed/pregnant :
5. General appearance : Good Fair Poor
6. Have you had all Immunisation?

Tests	Dates of Immunisation			
	Before 3 months	Before 6 months	Before 9 months	Above

7. Do you take bath?

Daily :

Alternatively :

Weekly :

8. Family history:

Pregnancy of Group	Number of children delivered	Number of children dead	Number of children alive	Breast feed or not
1. Pregnant women				
2. Her mother				
3. Grand mother				

9. SCHEDULE FOR CLINICAL ASSESSMENT.

Name Age Condition Pregnant/lactating

2. General Nutritional conditions : Good ☐ Fair ☐ Poor ☐ Very poor ☐

3. Clinical examinations:

Weight of the mother Pregnant/Lactating :

Height of the mother :

Mid arm circumference :

Chest circumference :

Head circumference :

4. Whether the mother had any infectious disease during past years or in pregnancy periods. : Yes ☐ No ☐

If yes, whether there is any effect of diseases shown now:

5. Signs and Symptoms of deficiency diseases :

A) Protein Calorie Malnutrition
1. Oedema :
2. Muscle wasting :
3. Moon face :

B) Vitamin A Deficiency
1. Xerosis :
2. Keratomalacoia :
3. Bitot Spots :

C) Vitamin B Deficiency
Angular stomatitis :
Calf muscle tenderness :
Tongue fissures :
Smooth fissures :

D) Vitamin C Deficiency
Bleeding gums :

E) Iron Deficiency
1. Pallor haemoglobin :
2. Low Haemoglobin content:
3. Anemia :

F) Other findings :

APPENDIX II(1)a

ACTUAL NUTRIENT INTAKE OF THE PREGNANT WOMEN OF COIMBATORE
(FOR THREE DAYS)

Category	Days	Energy K.cal.	Protein (g)	Calcium (mg)	Iron (mg)	Carotine (Mg)	Thiamine (mg)	Riboflavin(mg)	Vitamin C (mg)
Pregnant									
A	I	1187	19.2	128	15.1	24	0.59	0.16	1
	II	1055	44.1	198	16.3	98	0.94	0.39	5
	III	1237	29.1	154	14.3	321	0.76	0.26	3
	Average	1159	30.8	160	15.2	147	0.76	0.27	3
B	I	395	18.4	716	35.4	5541	0.50	0.47	100
	II	855	12.5	403	8.8	32	0.52	0.19	6
	III	674	11.3	443	8.0	39	0.48	0.19	6
	Average	808	14.0	520	52.2	1870	1.56	.28	37
C	I	705	18.4	215	24.3	56	1.53	0.16	10
	II	1036	20.3	322	13.9	3403	0.60	0.17	123
	III	557	20.6	263	27.1	68	1.4	0.20	1
	Average	766	19.7	266	21.7	1175	1.2	1.1	44

APPENDIX II(1)b

ACTUAL NUTRIENT INTAKE OF THE PREGNANT WOMEN OF ANDAMANS FOR THREE DAYS

Category	Days	Energy K.Cal.	Protein (g)	Calcium (mg)	Iron (mg)	Carotine (Ug)	Thiamine (mg)	Riboflavin(mg)	Vitamin C (mg)
Pregnant	I	2407	71.6	824	40.8	3451	1.5	1.5	102
	II	2490	62.3	814	29.5	3658	4.6	1.9	33
A	III	2517	56.3	883	36.9	4412	2.3	1.1	60
Average		2471	63.4	840	35.1	3840	2.8	1.5	65
	I	2756	85.3	3255	46.5	6539	2.3	1.6	133
	II	2432	91.5	4275	35.5	2489	2.1	2.2	55
B	III	2319	74.4	753	32.4	844	2.3	1.4	37
Average		2502	83.7	2761	38.1	3291	2.2	1.7	75
	I	2537	72.2	1441	38.8	12241	1.4	1.6	249
C	II	4212	67.7	1122	61.2	6625	2.6	1.9	168
	III	2313	77.5	838	33.9	863	2.4	2.4	18
Average		3020	72.5	1134	44.6	8576	2.1	1.5	143

APPENDIX II(11)a

ACTUAL NUTRIENT INTAKE OF THE LACTATING WOMEN OF COIMBATORE
(FOR THREE DAYS)

Category	Days	Energy K.cal.	Protein (g)	Calcium (mg)	Iron (mg)	Carotine (Mg)	Thiamine (mg)	Riboflavin(mg)	Vitamin C (mg)
Lactating	I	2075	75.6	766	41.6	4693	1.5	1.3	84
	II	2679	80.75	1411	35	4532	1.04	1.069	89
D	III	1896	56.64	860	28.09	5571	1.562	.804	135
Average		2216	70.9	1012	34.88	4932	1.36	1.05	102
	I	1979	45.5	443	22.1	1373	1.19	.96	100
	II	1599	59.06	688	42.32	3751	1.89	2.2	87
E	III	2362	57.6	938	31.21	2792	1.9	.94	59
Average		1980	54.05	689	31.87	2639	1.6	1.38	82
	I	1186	38.8	584	44.5	5712	2.9	1.5	100
	II	609	18.1	207	7.3	543	.47	.39	29
F	III	1035	30.9	501	24.6	3029	.8	.43	56
Average		943	29.3	430	25.46	3094	1.39	.77	61

APPENDIX II(ii)b

ACTUAL NUTRIENT INTAKE OF THE LACTATING WOMEN OF ABUAMABS (FOR THREE DAYS)

Category	Days	Energy K.cal.	Protein (g)	Calcium (mg)	Iron (mg)	Carotene (kg)	Thiamine (mg)	Riboflavin (mg)	Vitamin C (mg)
Lactating	I	2053	53.05	570	15.9	2603	1.8	1.4	33
	II	1762	60	958	43.4	6784	1.8	1.4	176
D	III	2463	55.7	926	45.7	5289	2.2	2.2	174
Average		2093	56.2	818	35	4889	1.9	1.8	127
	I	2706	67.8	1411	39	7411	3.1	1.6	258
	II	2244	87.3	1469	58.8	10268	2.3	1.8	203
E	III	2444	71.9	1520	62.4	9632	1.3	1.7	183
Average		2465	75.6	1463	53.4	9103	2.2	1.7	215
	I	2435	54.6	583	26.0	1428	2.8	2.1	65
	II	2172	82.5	591	18.6	546	.82	1.4	13
F	III	2568	69.9	1120	67.7	9676	1.47	1.16	176
Average		2391	69	764	37.4	3883	1.7	1.7	91.3

APPENDIX II(iii)

MEAN NUTRIENT INTAKE OF PREGNANT WOMEN OF COIMBATORE AND ANDAMANS

Category	Subject	Energy K.cal.	Protein (g)	Calcium (mg)	Iron (mg)	Carotene (µg)	Thiamine (mg)	Riboflavin(mg)	Vitamin C (mg)
Pregnant women of Coimbatore	I	1159	30.8	160	15.2	147	.76	.27	8
	II	808	14.0	520	52.2	1870	1.56	.28	37
	III	766	19.7	266	21.7	1175	1.2	1.1	44
Mean		911	21.5	315	29.7	1064	1.17	.55	28
Pregnant women of Andamans	I	2471	63.4	840	35.7	3840	2.8	1.5	65
	II	2502	83.7	2761	38.1	3291	2.2	1.7	75
	III	3020	72.5	1134	44.6	8576	2.1	1.9	143
Mean		2664	73.2	1578	39.5	5236	2.4	1.7	94

APPENDIX II(iv)

MEAN NUTRIENT INTAKE OF LACTATING WOMEN OF COIMBATORE AND ANDAMANS

Category	Subject	Energy K.cal.	Protein (g)	Calcium (mg)	Iron (mg)	Carotene (mg)	Thiamine (mg)	Riboflavin (mg)	Vitamin C (mg)
Lactating women of Andamans	I	2216	70.9	1012	34.9	4932	1.4	1.05	102
	II	1980	54.0	689	31.8	2639	1.6	1.3	82
	III	943	29.3	430	25.7	3094	1.4	0.77	61
Mean		1713	51.4	710	30.7	3555	1.4	1.04	81
Lactating women of Andamans	I	2023	56.2	818	35	4889	1.9	1.6	127
	II	2465	75.6	1463	53.4	9103	2.2	1.7	215
	III	2391	69	764	37.4	3863	1.7	1.7	91
Mean		2293	66.9	1015	41.9	4328	1.9	1.6	144

APPENDIX III(1)

ANTHROPOMETRIC MEASUREMENTS OF THE PREGNANT WOMEN OF COLLABATORS

Second trimester	Weight (kg)	Height (cm)	Mid arm circumference (cm)	Chest circumference (cm)	Head circumference (cm)
1	45	158	20	82	54
2	43	140.5	23.5	79.5	54
3	45	155.5	26	82	54
4	50	158	26	87	54
5	40	143	26	74.5	54
6	50	140.5	26	87	54
7	45	150	26	76.5	54
8	52	135.5	26	79.5	53.5
9	40	150	23.5	76.5	51.5
10	50	150	26	76.5	56.5
11	45	150	28.5	76.5	54
12	35	133	23.5	82	54
13	53	155.5	20.5	82	51.5
Mean	45.6 ± 5.29	147.7 ± 8.39	25.1 ± 2.89	80.1 ± 4.02	53.7 ± 1.24

(contd.)

Third Trimester	Weight (kg)	Height (cm)	Mid arm circumference (cm)	Chest circumference (cm)	Head circumference (cm)
1	40	150	26	76.5	56.5
2	45	155.5	23.5	82	54
3	40	150	26	79.5	51.5
4	45	150	31	82	54
5	35	140.5	26	74	51.5
6	49	150	20.8	74	54
7	45	150	28	79.5	56.5
8	52	158	28.5	92	51.5
9	55	155	26	84.5	56.5
10	60	143	26	82	56.5
11	47	150	20.5	71.5	51.5
12	48	140.5	20.5	84	54
Mean	46.8 ± 6.85	149.6 ± 5.92	24.4 ± 2.98	80.12 ± 5.63	54 ± 2.13

APPENDIX III(11)

ANTHROPOMETRIC MEASUREMENTS OF THE PREGNANT WOMEN OF ABUAKWA

Stage of pregnancy	Weight in kg.	Height in cm.	Mid arm circumference (cm)	Chest circumference (cm)	Head circumference (cm)
Second trimester					
1	40	140.5	28.5	74	54
2	48	155.5	23.5	79	54
3	50	158	23.5	84.5	51.5
4	48	140.5	20.5	76.5	51.5
5	40	143	20.5	76.5	49
6	45	150	23.5	82.0	51.5
7	50	160.5	28.5	84.5	54
8	45	158	26	71.5	49
9	48	158	18	79.0	54
10	48	143	26	76.5	54
11	40	160.5	18	82	51.5
12	48	150	26	82.0	54
13	50	160.5	26	84.5	54
14	52	160.5	26	82.0	54
15	45	155.5	26.	84.5	54
16	52	163	20.5	82	51.5
Mean	46.8 ± 4.0	153.5 ± 7.91	23.8 ± 3.4	80.06 ± 4.07	52.6 ± 1.82

..conto.

Stage of pregnancy	Weight in Kg.	Height in cm.	Mid arm circumference (cm)	Chest circumference (cm)	Head circumference (cm)
Third trimester					
1	40	158	26	76.5	54
2	44	150	26	84.5	56.5
3	55	163	28.5	84.5	54
4	50	150	28.5	82	56.5
5	47	150	26	84.5	54
6	45	163	23.5	84.5	58
7	54	160.5	31	87	54
8	45	160	23	84.5	51.5
9	49	158	26	87	54
Mean	47.7 ± 4.85	159 ± 9.49	26.5 ± 2.51	83.9 ± 3.15	54.2 ± 1.42

APPENDIX III(111)

MEAN ANTHROPOMETRIC MEASUREMENTS OF LACTATING WOMEN OF COIMBATORE

S.No.	Weight (Kg)	Height (cm)	Mid arm circumference (cm)	Chest circumference (cm)	Head circumference (cm)
1	45	140.5	23	76.5	51.5
2	60	143	20.5	82.5	54
3	45	150	26	76.5	51.5
4	50	158	23	76.5	51.5
5	48	155.5	26	76.5	54
6	45	150	23	76.5	51.5
7	50	158	26	87	54
8	35	150	23	76.5	49
9	65	150	28.5	87	56.5
10.	40	150	23	76.5	51.5
11	40	163	18	71.5	51.5
12	40	140.5	23	76.5	54
13	56	158	33	76.5	54
14	40	140.5	26	76.5	56.5
15	45	150	23	79.5	54
16	40	150	23	82	54
17	35	140.5	20.5	74	49
18	45	158	28.5	84.5	54
19	45	150	23	71.5	51.5
20	38	140.5	23	76.5	54

(contd.)

S.No.	Weight (kg)	Height (cm)	Mid arm circumference (cm)	Chest circumference (cm)	Head circumference (cm)
21	45	150	23	72	51.5
22	42	153	23	74	54
23	53	150	23	76.5	49
24	40	155.5	23	79	51.5
25	50	150	23	82	50.5
Mean	45.48 ± 7.35	150.18 ± 0.44	23.52 ± 2.30	77.78 ± 4.27	52.8 ± 2.18

APPENDIX III (iv)

MEAN ANTHROPOMETRIC MEASUREMENTS OF LACTATING WOMEN OF ANDAMANS

S.No.	Weight (Kg)	Height (cm)	Mid arm circumference (cm)	Chest circumference (cm)	Head circumference (cm)
1	45	163	28.5	82	54
2	40	150	36	77	51.5
3	50	150	26	82	56.5
4	50	160.5	23	74	56.5
5	45	130.5	23	77	54
6	55	130.5	26	82	56.5
7	48	155.5	23	82	57.5
8	55	158	23	82	59
9	50	150	26	87	56.5
10	50	158	28.5	87	56.5
11	50	150	20.5	77	56.5
12	45	150	23	77	59
13	46	138	28.5	82	59
14	50	160.5	28.5	84.5	56.5
15	40	150	28.5	75.5	56.5
16	48	160.5	28.5	82	56.5
17	40	158	28.5	87	54

(contd.)

S.No.	Weight (Kg)	Height (cm)	Mid arm circumference (cm)	Chest circumference (cm)	Head circumference (cm)
18	48	155.5	38.5	89.5	56.5
19	39	155.5	28.5	84.5	56.5
20	45	155.5	33.5	77	51.5
21	54	150	31	77	54
22	49	160.5	31	84.5	54
23	56	150	28.5	77	56.5
24	55	164	31	82	54
25	55	155.5	28.5	89.5	54
Mean	48.32±5.13	152.78±8.8	27.58±3.61	81.36±4.23	55.34±1.82