

SOCIO-CULTURAL MALNUTRITION IN THE ESTATE SECTOR IN SRI LANKA

I. Social, cultural, demographic, economic and dietary characteristics of the population studied

by

CHANDRANI E. LIYANAGE and T. W. WIKRAMANAYAKE*
Faculty of Medicine, University of Ruhuna, Sri Lanka.

SUMMARY The social, demographic, cultural, economic and dietary characteristics of 300 households, living on 4 estates in the Kandy and Nuwara Eliya Districts, are described. There is a gradual increase in family income with family size. The intakes of energy and nutrients by the estate workers are less than the allowances recommended by the Indian Council of Medical Research for moderately active persons, although the average percentage household expenditure on food was more than 70% of the income. Comparison with results of surveys done earlier shows that the consumption of cereals, milk and sugar has decreased between 1970 and 1982.

INTRODUCTION

The pattern of health and disease in a community depends upon the interaction between the individuals in the community and factors in their environment such as social, cultural, nutritional and infective. The observation that growth retardation occurs among children in financially stable groups in industrialised nations¹⁵ indicates that growth failure could be due to factors other than poverty and non-availability of food.^{11, 13, 16} The term socio-cultural malnutrition has been suggested to denote this type of nutritional deprivation⁸.

It is generally accepted that the status of health and nutrition in the estate labour population in Sri Lanka is poor, with high infant and maternal mortality rates.⁶ The Kandy Superintendent of Health Services (SHS) Division has the highest prevalence rates for "chronic undernutrition" in the island⁷. Accordingly, a study was carried out on pre-school children (6 years or less) in four estates during the period 1980-81, in the expectation that an appreciation of the factors involved in determining nutritional status will assist in the formulation of ameliorative measures suitable to the entire community.

The results of this study will be presented in three parts. In the first, the social, demographic, cultural, economic and dietary characteristics of the population will be described. The second will present some anthropometric, biochemical and haematological characteristics and an assessment of the nutritional status of the children, and in the third an attempt will be made to correlate nutritional status to the factors described in the first part.

*Present address: Faculty of Science, University of Kelaniya, Sri Lanka.

MATERIALS AND METHODS

Two estates in the Kandy District, Hantane and Oodewela, and two in the Nuwara Eliya District, Kaloogala and Melfort, were selected, all four in the Kandy SHS Division and under the management of the Janatha Estates Development Board. All of them are at an altitude of about 750m, with an ambient temperature of 15 to 17°, relative humidity 60 to 80% and an annual rainfall of 195-216 cm. About 93% of the population were Tamils of recent South Indian origin, residing in dwellings ("lines") in the estate, each line housing 10 to 20 families. Most of their requirements of food are supplied by the management.

Seventy-five families were selected from each estate by random sampling and the nutritional status of the 420 pre-school children in these families was assessed, to serve as an indicator of the nutritional status of the entire community¹.

By means of a questionnaire, information was collected from the 300 mothers on their economic, educational and work status, expenditure on food, the feeding pattern of infants and pre-school children and of pregnant and lactating mothers, on food habits, prejudices and practices, on the food consumption pattern of the family and on the mother's knowledge of basic nutritional principles. The history of feeding of the child from birth, the type of supplementary feeding and transitional foods used during weaning, and the influence of elders in conditioning the feeding habits of the children, were also recorded.

The questionnaire was first tested among mothers on an estate near Kandy, to ensure clarity and non-ambiguity of the questions. This also served the purpose of orienting two Tamil female undergraduates who assisted during the entire study as interviewers. A satisfactory relationship was first established with the mothers of the 4 estates at maternity homes, dispensaries and creches. Once rapport was established and the subjects became co-operative, interviews were conducted in the privacy of their homes. The interviewers were accepted by all members of the households. By a household is meant a group of two or more persons, related or unrelated, who combined to occupy the whole of an estate housing unit and jointly provided themselves with food and other living essentials.

RESULTS

Ethnic group and religion

Nearly 93% of the population studied were Tamil and 92.1% were Hindu. The Sinhalese formed 7% and there were 6.5% Buddhists and 1.4% Christians.

Household size

The average household size was six, 55% being of medium size (4 to 6), 29% small (2 to 3 members), only 16% consisting of 7 or more members (Table 1). Nearly 78% were nuclear families.

TABLE 1. Distribution of households by household size
(parents and children only)

Family Size	Number Total	of families %
2	5	1.7
3	82	27.3
4	73	24.3
5	53	17.7
6	39	13.0
7	23	7.7
8	13	4.3
9	8	2.7
10	4	1.3
	300	99.9

Age and Sex

Of the population, 28.4% were pre-school children, 14.9% between 7 and 15 years, 6.8% between 16 and 19 years, the rest being adults. There were more males than females in all age groups except in the age-group 15 to 25 years (Table 2).

TABLE 2. Distribution of population by age and sex

Age group	Number	%	Males		Females	
			n	%	n	%
0-6	420	28.4	212	50.5	208	49.5
7-10	93	6.2	52	55.9	41	44.0
11-15	128	8.7	74	57.8	54	42.1
16-19	101	6.8	45	44.6	56	54.4
20-25	169	11.4	74	43.8	95	56.2
26-30	154	10.4	77	50.0	77	50.0
31-72	413	27.9	234	30.5	179	25.2
Total	1478	100.0	768	52.0	710	48.0

Income and Expenditure

In a majority of households the total income ranged from Rs. 150 to Rs. 1340 per month. Most families with higher incomes were also larger in size (Table 3).

TABLE 3. Relationship between a family income (in rupees) and the size of the family

Income	Family Size									Total
	2	3	4	5	6	7	8	9	10	
150+	—	9	5	1	1	—	—	—	—	16
300+	—	6	13	15	7	1	—	—	—	42
450+	4	53	36	23	21	5	3	1	—	146
600+	—	12	14	12	5	10	3	2	1	59
750+	—	—	3	1	3	3	—	—	—	10
900+	1	1	1	1	1	3	3	3	1	15
1200+	—	1	1	—	1	—	3	2	1	9
1500+	—	—	—	—	—	—	—	—	—	—
1800+	—	—	—	—	—	—	—	—	1	1
2000-2400	—	—	—	—	—	1	1	—	—	2
Total	5	82	73	53	39	23	13	8	4	300

The per capita monthly income varied from Rs. 50 to Rs. 200. Whereas 92% of the households had a per capita income less than Rs. 200, more than 96% spent less than this sum on food (Table 4).

TABLE 4. Relationship between monthly per capita income (in rupees) and the average per capita expenditure on food

Per capita income Rs.	Households		Per capita expenditure on food			Average monthly expenditure on food	
	n	%	Rs.	households n	%	Rs.	% of income
≤49	5	1.7	≤49	27	9.0	62	96
50 - 99	104	34.7	50 - 99	141	47.0	89	96
100 - 149	100	33.4	100 - 149	98	32.7	94	78
150 - 199	68	22.7	150 - 199	24	8.0	119	70
200 - 249	14	4.7	200 - 249	10	3.3	137	66
250 - 300	9	3.0	250 - 300	—	—	170	68

TABLE 5. Percentage of household income spent on food

% of income	Number of households	
	Total	%
<50	9	3.0
50 - 70	72	24.0
70 - 90	208	69.3
>90	11	3.7

The average monthly expenditure on food ranged from about 96% of the per capita income in the lowest income class to about 68% in the highest.

A number of households added to their income from wages by rearing livestock (47%) and/or growing vegetables (40%), as shown in Table 6. Only 8% in one estate could get an additional income from cash crops such as cloves and cardamoms. Most of the eggs and milk produced were sold (Table 7). However, of the 20% of households rearing poultry, about one quarter consumed some of the eggs collected and nearly half the families rearing cows and goats consumed some of the milk. Therefore, over and above the addition to family income with probable indirect influence on the food intake, such pursuits would have a direct bearing on the nutritional status of the members of these households.

TABLE 6. Number of households rearing livestock and tending home gardens

Tea Plantation	Cows and Goats		Poultry		Fruit		Vegetables		Cash Crops		None	
	n	%	n	%	n	%	n	%	n	%	n	%
A	27	36.0	19	25.3	05	6.7	24	32.0	06	8.0	26	34.7
B	20	26.7	20	26.7	01	1.3	31	41.3	—	—	31	41.3
C	20	26.7	15	20.0	—	—	41	54.7	—	—	29	38.7
D	17	22.7	26	34.7	03	4.0	51	68.0	—	—	15	20.0

TABLE 7. Production and consumption of milk and eggs by households

	Milk		Eggs	
	Number	%	Number	%
Number of households producing	67	22.3	62	20.7
Sale of total production	30	10.0	41	13.7
part of production	32	10.7	17	5.7
Consumed all	5	1.7	4	1.3
Consumption: All members	9	3.0	9	3.0
All children	16	5.3	9	2.9
Infants only	12	4.0	3	1.0

Food selection and consumption

In about 62% of the families the food requirements of each member of the family were discussed often before marketing (Table 8). In most instances the purchasing was made by a parent. When preparing the food, the young child's needs and tastes were seldom considered.

TABLE 8. Data on the planning of meals, selection of foods and preparation of meals by the households studied

Food needs of each member discussed before purchasing	Number of households		Purchasing by	Number of households		Food preparation satisfying tastes of	Number of households	
	Total	%		Total	%		Total	%
Always	87	29.0	Husband	171	57.0	Husband	242	80.7
Sometimes	99	33.0	Wife	99	33.0	Wife	30	10.0
Rarely	38	12.7	An elder child	19	6.3	Eldest child	2	0.7
Never	76	25.3	A younger child	11	3.7	Every member	26	8.7

When the quantity of each category of food purchased is compared with recommendations by the Indian Council for Medical Research (ICMR) for a moderate worker (Table 9), it is seen that insufficient amounts of all items were purchased, especially in energy-rich and protein-rich foods. The total fat in the diet is very low whereas the intake of vegetables is marginally adequate (Tables 10 and 11).

TABLE 9. Quantity of each item of food purchased per consumption unit (c.u) per week, and the percentage of households purchasing the item

Food	Quantity per c. u. g	% of households	Recommended* amount/c.u./wk. g
Rice	1620	100	3325
Bread and wheat flour	873	92.6	
Yams, bread fruit, jak	40	40.0	525
Pulses	162	81.3	455
Meat, egg, dried fish	98	68.0	420
Milk & milk products	110	46.6	700
Fruit and vegetables	418	90.3	735
Leafy vegetables	624	45.6	875
Sugar and jaggery	114	100	280
Oils and fats	99	82.6	280

*ICMR recommendations for one engaged in moderately heavy work⁹.

TABLE 10. The intake of energy from cereals per consumption unit (c.u) per day

Food Item	Consumption in g/c.u./day		Energy	
	Mean	Range	kJ	kcal
Rice	218	187 - 263	3014	718
Bread	21	6 - 65	216	51
Wheat Flour	121	62 - 190	1768	421
Total	360		4998	1190
Recommended amount*	475		6883	1637

*ICMR recommendation for one engaged in moderately heavy work⁹.

TABLE 11. Consumption of protein - rich foods per consumption unit (c.u.) per day

	Consumption in g/ c.u. / day	
	Mean	Range
Vegetable protein	23.7	9.5 - 37.8
Milk protein	15.8	2.4 - 40.0
Other animal protein	15.6	8.7 - 42.6
Total protein	56.6	

The results indicate that although the energy intake per consumption unit is grossly inadequate, the protein intake is satisfactory, there being a reasonable balance between protein from animal and vegetable sources.

Breast-feeding and weaning practices

The data on breast-feeding and weaning practices among the households studied have been published already¹². Although less than 18% commence breast-feeding within a few hours after delivery, within 48 hours about 75% of the infants are being breast-fed. Colostrum is discarded by more than 82% of the mothers. Many expressed the belief that boiled and cooled water with a little castor oil and sugar would suffice until the third day *post-partum*. Breast-feeding is continued for about 12 months by about 85% of the mothers; only about 10% stop nursing by the end of the 6th month. Complete breast-feeding is discontinued early owing to employment of the mothers on the estate. From 3 months of age most of the babies were breast-fed only at night and early in the morning, with a third feed being given by some in the evening. One-third of the mothers continued breast-feeding for 2 years and another third for more than 2 years.

Milk powder is used as a breast-milk supplement, being introduced in the 4th month by nearly half the mothers and by more than 60% by the end of the first year. Sweetened coriander water is the next most popular weaning food. Rice gruel is given by a few mothers only, "kola kanda" (rice gruel prepared with a little coconut milk and the juice of green leafy vegetables) being less popular. Bread, biscuits and soft rice are the first solids to be introduced, by the 6th month. Only about 22% of the children shared the family's rice and curry meals when they were 12 to 18 months old. After the first birthday nearly half the children were fed either egg, meat or fish, although very infrequently.

Food beliefs and avoidances

Data on food beliefs and avoidances, especially during pregnancy and lactation, have been discussed already.¹²

Availability of health services

Health services on the four estates are inadequate by whatever criteria they may be judged. In view of the great distances involved and the difficult terrain both the facilities and the health personnel available were insufficient to provide the minimum of primary health care. In each estate there was one health centre staffed by one medical assistant and one labourer. The health care administered was curative and confined to the treatment of trivial illnesses, those that could not be treated at these centres being referred to district and base hospitals in towns nearby. There are no public health nurses on the estates. There are no regular ante-natal or "well baby" clinics and programmes for education on nutrition and family health are virtually non-existent.

Living conditions

The living conditions of the estate labour are unhealthy. Overcrowding and lack of ventilation, latrines, washing facilities, a reliable source of potable water and space for home gardens and livestock were outstanding deficiencies. Latrine availability was one per 16 persons and only 62% of persons questioned used latrines. There were no wells; water was obtained from streams and reservoirs. A few families rearing livestock accommodated the animals in pens very close to their line-rooms. Waste-water drains were badly sited, immediately in front of the lines and many were blocked or in disrepair.

DISCUSSION

Family income and expenditure

The accurate assessment of the total income of a family in an estate setting is difficult. Non-monetary benefits such as free fire-wood available for collection and green leafy vegetables found in home gardens and elsewhere, cannot be quantified. Income earned by members of the household by undertaking jobs other than their

regular employment cannot be accurately assessed. The data in Table 3, which relates the total family income to family size, shows that families with 3 children or less had a very limited income, and 93% of families with 5 children or less had a monthly income Rs. 900 or less. With increase in family size there is a gradual increase in household income. Households with more than 6 children had one or more children employed by the estate.

The survey carried out by the Food and Nutrition Policy Planning Division of the Ministry of Plan Implementation⁶ reveals that the average percentage of household expenditure on food in the estate sector is about 76.7%, which is low in comparison with data in Table 5. Consumer Finance Surveys of the Central Bank of Ceylon carried out in 1963 and 1973 showed that the ratio, expenditure on food to total household expenditure, was 61.9% and 59.6%, respectively. The Socio-economic Survey of the Department of Census and Statistics, 1969/70, indicated a value of 59.3%. Thus, the percentage of income spent on food has risen from about 60% in the period 1969-1973 to 76% in 1981 and 78 to 100% among the lower income groups in 1982. In the present study, when computing expenditure on food, foods purchased but not consumed during the period of the survey were not taken into account. Foods received free or obtained from the home garden were also excluded.

Food consumption pattern

Expenditure on food and food consumption are influenced by income as well as by habits. Although at higher income levels there appears to be an increased expenditure on food (Table 4), there is no guarantee that additional amounts spent on food would always lead to a better diet and improved nutritional status. An examination of individual foods consumed by households of varying size and age composition gives an idea of the relationship between foods purchased and their impact on nutrition. Table 9 shows that whereas all households purchased cereals and sugar, only 46% spent on milk and 68% on other animal foods, and the amounts purchased were grossly inadequate. Similar results were obtained in the FNPPD survey⁷. In the low-income group 33 to 35% of expenditure on food was on cereals 3 to 4% on fish and meat, 2 to 3% on milk, 6 to 8% on sugar and jaggery, and 8 to 10% on tobacco and alcohol.

In the FNPPD survey and other surveys referred to above, results have been expressed as food consumption per capita, on the assumption that the household expenditure on food is distributed equally among all members of the family, and that a small child is able to eat as much food as an adult. However, it has been shown, particularly in less developed countries, that women and children may not enjoy an adequate diet because of the habit of serving the adult male first, especially with nutritionally - rich items of the menu^{7, 14}. This is borne out by the data in Table 8. In most instances, it was the parent who selected and purchased food items, and food was prepared to satisfy the tastes of the husband. Adolescent girls and the mother ate last.

Tables 9 and 10 show that the consumption of the principal food items is inadequate when compared with ICMR recommendations for a moderate worker.⁹ The protein intake of the population appears to be adequate (Table 11). Table 12 compares the results of the Socio-Economic Survey carried out in 1969/70 in the estate sector by the Department of Census and Statistics, with results of the present study. The monthly consumption of rice per consumption unit in 1982 was 14.27 lbs. Wheat flour and bread consumption has decreased from 25.4 lb in 1969/70 to 7.7 lb. More vegetables and green leaves were eaten in 1982. The intake of energy from cereals had decreased from 5.11 MJ (1221 kcal) per capita per day to 4.98 MJ (1190 kcal) per consumption unit per day. The daily intake of proteins from animal sources has increased from 9.4 g per head to 31.4 g per consumption unit, while the proteins derived from vegetable sources have declined from 52.2 g to 23.7 g. The high cost of food appears to have compelled the lower income groups to lower food intake. This decline must exert a strong influence on their nutritional status.

TABLE 12. Comparison of some of the results of the present study with those obtained in 1969/70*

Food Item	Monthly consumption	
	in 1969/70 per capita	in 1982 per consumption unit
Rice, lb	16.42	14.27
Wheat flour, lb.	11.69	7.70
Bread, lb.	1.34	
Pulses, lb.	1.80	1.42
Vegetables and fruits, lb.	3.28	6.47
Leafy vegetables, lb.	1.01	5.50
Milk, bottles	1.94	0.97
Milk powder, lb.	0.09	
Sugar, lb.	2.58	1.00
Energy and Protein, per day		
Energy from cereals, kcals	1221	1190
Animal protein, g	9.4	31.4
Vegetable protein, g	52.2	23.7

*Socio-Economic Survey in the Estate Sector 1969/70, in "Statistical Profile of Children, Sri Lanka" A publication of the International Year of the Child. Department of Census and Statistics, Colombo.

Weaning Practices

Breast-feeding is practiced by all mothers, breast-milk being supplemented with other feeds only when the mother has to go to work. An effort should be made to encourage breast feeding from the first day. Early introduction of biscuits and rice gruel should be encouraged, as also the feeding of well-boiled and mashed pulses with rice by the 6th month, once solids are accepted. An attempt should be made to ensure that all children are fed rice by the end of the first year.

Food beliefs and avoidances

Food taboos influence the diet of the estate population less than they do in South India ^{4,5} whence they came, probably due to the estate population being more exposed for generations to hospitals and health centres.

It is difficult and probably unwise to attempt to change drastically customs and habits that have been hallowed by tradition, especially where scientific reasons are lacking for discouraging a particular belief. For instance, the belief that pineapple acts as an abortifacient is almost universal and the contrary has not been proved. That papaw could discolour breast milk has to be admitted. Evidence, both published ³ and unpublished, indicates that eating one or two papaws daily for a few days produces yellow discolouration of skin and conjunctiva due to carotenaemia. In a health education programme it could be pointed out that one or two servings of papaw a day are harmless, and that the pigment, carotene in the milk would be beneficial to the infant. The eating of dried fish should be encouraged, both during pregnancy and lactation and more of it should be made available at the co-operative store at subsidised rates.

The figures in Table 2 indicate a high preponderance of pre-school children. It is very likely that this is the pattern in all estates in the Kandy SHS Division, if not for the entire tea estate population. With the improvement in living conditions that has recently been initiated and with improved health facilities, it is likely that in 10 or 15 years, this group will emerge as a large adolescent, employable work force which may be in excess of what the estates need for producing tea. It seems advisable to settle some of the young families in the Mahaweli settlement areas, and also to train some of the youth in other pursuits.

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