Paper 13

NUTRITIONAL IMPACT OF
THE SCHOOL SUPPLEMENTARY FEEDING PROGRAMME

by

MIRNALINI KANDIAH AND TEE E SIONG
Division of Human Nutrition
Institute for Medical Research
Kuala Lumpur

ABSTRACT

This study attempts to evaluate the impact of the school Supplementary Feeding Programme in selected rural schools in Peninsular Malaysia. Results obtained at the end of the first year of evaluation in 1985, are presented. They cover the nutritional status indicators, dietary intakes and food habits of the children, as well as aspects related to implementation and acceptance of the feeding programme.

INTRODUCTION

The history of school feeding programme in Malaysia can be traced as far back as 1945, when the then British Military Army supplied free supplementary foods to school children. The next 20 years or so saw the expansion of the programme through various local and international agencies. In 1984, the Malaysian Government formally initiated the School Supplementary Feeding Programme in conjunction with a pilot project of the National Applied Food and Nutrition Programme (AFNP).

By 1979, this Programme had expanded to cover all districts in every states in Peninsuar Malaysia, Sabah and Sarawak, under the administration of the Ministry of Education. The primary aim of the school feeding programme was to improve the health and nutritional status of children, especially those from the rural areas, through a provision of a wholesome and balanced meal (Ministry of Education, 1971). Other more long term objectives were:–

1.   To enable children, and through them, their parents, to understand that proper nutrition is essential for good health;

2.   To teach children about the selection and consumption of a balanced diet;

3.   To teach children to develop desirable hygienic practices in relation to food handling, personal and environmental sanitation.

The present School Supplementary Feeding Programme attempts to provide a balanced meal based on a menu developed by the Institute for Medical Research (IMR) using local foodstuffs. The Government provides 35 cents (Malaysian) per child per day, and every pupil between the ages of 7 to 12 years, are provided with a free cooked meal, to supply the child with about 350 – 400 Calories and about 10 g protein daily for 150 school-going days. This meal supplement is provided only in those rural schools with a total enrolment of less than 200 pupils. Children who have just entered primary school, and who have received these meals for the first time, were studied

longitudinally for two years. This is to monitor its impact on nutritional status, dietary intake and food habits of the children.

OBJECTIVES OF THE PRESENT STUDY

In keeping with the objectives of the Ministry of Education's School Feeding Programme, the overall objectives of this study were to examine its impact on the following:—

1. Nutritional status of the recipients through anthropometry, biochemical and clinical parameters;

2. Dietary intake and food habits of the children;

3. School attendance and performance.

MATERIALS AND METHODS

Selection of Schools

The selection of schools for the study, was carried out in consultation with officers from the School Health Unit, Division of Schools, Ministry of Education.

Feeding Schools

These were chosen on the basis of the following criteria:—

1. Supplementary feeding programme is being carried out in the schools;

2. A keen interest shown by school authorities to participate in this study;

3. Good rapport and cooperation from headmasters, teachers and pupils;

4. Rural schools which are accessible by roads and which will facilitate periodic supervision.

Control Schools

These included schools which met the following criteria:—

1. Schools that did not have a feeding programme;

2. Schools within the vicinity of the feeding schools, which would not only facilitate logistics of operations but would also ensure a similar ecological background as that of the feeding schools;

3. Schools which have an enrolment very close to that of the feeding schools. This would minimise the effects of other confounding variables, such as, differences in socio-economic backgrounds, which are bound to creep in if schools with larger enrolment, were chosen;

4. Other criteria as mentioned in b — d above.

By the above criteria of selection of schools, 21 rural schools in two different districts were selected for this study, namely, Sepang District in the state of Selangor and Temerloh in Pahang. Of these, 15 schools were chosen to be in the feeding group and six to be in the control group.

Selection of Subjects

Feeding group – All children who has just entered primary school, in the selected feeding schools, were chosen to be in the feeding group.

Control group – All children who had just entered primary school, in the control schools, selected according to the criteria mentioned above, were chosen to be in the control group.

Nutritional Status Indicators

Nutritional status was evaluated on the basis of clinical, anthropometric, biochemical and dietary measurements.

A longitudinal approach was chosen so that adequate data will be obtained to show the pattern of changes in the various indicators. Anthropometry and other data were therefore collected at the beginning of the study and three months thereafter for two years.

All selected children were dewormed before the collection of baseline data. Thereafter periodic deworming was carried out to ensure that parasitic infestation would not be a confounding variable in the final analysis.

Anthropometric Measurements

The measurements that were taken were height, weight, mid-arm circumference and triceps skin fold. The methodology for height and weight measurements, was based on those proposed by WHO (1983). Height and weight measurements were converted to height-for-age, weight-for-age and weight-for-height standard deviation (S.D) scores based on the National Centre of Health Statistics (NCHS) reference. All computations were performed using the Centre for Disease Control (CDC), Atlanta computer programme for anthropometric data analysis.

Clinical Examination

Clinical examination for signs of nutritional deficiencies, was conducted by a medical doctor on every child at the beginning and at the end of the study. In addition, the skin conditions, scabies, head lice and other skin infections, were noted and a history of recent illnesses recorded.

Biochemical Measurements

Blood Specimens

Blood samples were obtained from all selected children by finger prick. Haemoglobin, hematocrit and albumin determination were performed on these samples.

Haemoglobin was determined by the cyanmethaemoglobin method using 0.02 ml of blood. Readings were taken either on a spectrophotometer or direct digital readout haemoglobinometer. Micro-haematocrit was determined after centrifuging on a micro-haematocrit centrifuge. Albumin

was determined on 0.025 ml plasma by the dye binding method using bromo-cresol (Pinnell and Northam, 1978).

Urine

Random samples of urine were collected into 30 ml capacity screw-capped bottles containing a few drops of hydrochloric acid as preservative and stored at $-15^{o}C$. The following tests were performed: hydroxyproline index (Whitehead, 1967); urinary urea determined by the diacetyl-monoxime method; and creatinine by the picrate method (Wootton, 1964).

Dietary Intake

Dietary intake was recorded for a sub-sample (50%) of the selected students at the beginning, and at the end of the study period. A dietary 24 hour recall for each child was performed by inter-viewing the parents. Amounts were recorded in terms of household measures and later converted into grams. Nutrient content of each dietary recall was calculated by computer using the Malaysian Food Composition Table (Tee, 1982).

Household Background Information

General household information on families of the children in the groups studied, was obtained through a questionnaire. Data collected include: – age and sex composition of the families; occupation, income, marital status, education of heads of households and their wives; housing conditions such as sanitation, lighting, water supply and waste disposal; ownership of residence and other properties; family food consumption and food expenditure. These data were intended to serve as indirect indicators of the relationship between the prevalence of malnutrition and socio-economic factors.

Knowledge and Attitude Survey

A questionnaire was designed to assess the knowledge and attitude among the parents and children with regards to the feeding programme.

School Performance and Attendance

School performance of the children, was assessed through the regular end-of-term examination on subjects, such as reading, writing and arithmetic. Information on attendance was obtained from attendance records maintained by the schools.

Statistical Analysis of Data

"Student's" t-test and "chi square"-test were two of the statistical procedures performed. A computer programme, Statistical Package for the Social Sciences (SPSS) was used for these deter-minations. In all the analyses the results were considered statistically significant if $p > 0.05$.

RESULTS AND DISCUSSION

Some results obtained from the measurement of the impact of the supplementary feeding pro-gramme on the nutritional status and food habits of the recipient and control children, based on

data collected at the beginning of the study in March 1985 and at the end of the first year of evaluation, are reported below.

Age and Sex Distribution of the Studied Children

Table 1 gives a breakdown of the demographic characteristics of the children studied. The mean age of the children ranged from 79.6 to 80.9 months. The children were therefore rather homogenous with regards to age. In the feeding group, the percentage of female children slightly outnumbered males in Temerloh, whilst in Sepang the reverse was true. In the control group, there was almost equal distribution of boys and girls.

TABLE 1: DEMOGRAPHIC DATA OF CHILDREN STUDIED

	Sepang		Temerloh	
	Feeding	Control	Feeding	Control
Sex distribution				
%M	51	52	41	51
%F	49	48	59	49
Mean age (months)				
M	80.1	79.6	80.5	80.3
F	80.4	80.3	79.6	80.9
Total number	202	103	186	134

Household Background Information

A total of 410 homes, representing 65% of all homes of the children studied were visited and interviews were conducted with their parents. Over 80% of the respondents were either heads of households or their wives. Interviews were conducted in the national language, *Bahasa Malaysia*. Response and cooperation from the parents were at all times satisfactory. The mean household size was found to be 5.7 and 6.2 persons in the feeding and control groups respectively.

Educational Status and Occupational Activities

Preliminary analysis of data on educational status and occupational activities of heads of households are summarised in Tables 2 and 3 respectively.

Of the 410 heads of households interviewed, 65% were found to have at least three years of primary school education. The main occupational activities of the heads of households studied in the two areas were rubber tapping, farming, fishing and employee in estates. Minor economic activities included processing of prawn and fish crackers (*keropok*), dried fish, processing of copra, home and fruit gardening.

TABLE 2: EDUCATIONAL LEVEL OF HEADS OF HOUSEHOLDS

	Feeding Group		Control Group	
	n	%	n	%
Primary school	173	66.5	94	62.7
Secondary school	4	1.5	3	2.0
Vocational school	1	0.4	0	0
College/University	2	0.8	3	2.0
Religious school	6	2.3	8	5.3
Adult education classes	2	0.8	3	2.0
No formal education	72	27.7	39	26.0
Number of households, n	260		150	

TABLE 3: OCCUPATION OF HEADS OF HOUSEHOLDS

	Feeding Group		Control Group	
	n	%	n	%
Government servant	10	3.8	3	2.0
Employees in private firms	12	4.6	5	3.3
Self-employed	55	21.2	36	24.0
Fishermen	11	4.2	6	4.0
Rubber tappers	128	49.2	78	52.0
Padi farmers	20	7.7	12	8.0
Other agricultural activities	24	9.3	10	6.7
Number of households, n	260		150	

Household Monthly Income and Expenditure on Food

The mean monthly household income was found to be around M$320 for both the control and feeding groups. The proportion of income spent on food was between 50–60% for all households studied.

Property Ownership and Housing Conditions

House ownership was common in majority (95%) of all those households interviewed. About 50% of the population also owned some land which were mainly an inherited property. Some of this land were put to good use as padi plots and fruit orchards, while in many cases they were left idle and overgrown with weeds.

Many of the homes visited were found to be lacking in basic amenities, such as, pipe water supply, electricity, proper sanitation and rubbish disposal systems. Wells and rivers were the main sources of water for drinking, cooking, laundry and bathing. Where there was no electricity, oil and kerosene lamps were the common means of lighting. Pour flush latrines were the most common means for sewage disposal. Rubbish and other household wastes were disposed off either by burning or burying, in the majority of homes.

Baseline information on the socio-economic conditions of the households from which the study subjects were drawn, did not show significant differences between the feeding and control groups.

Clinical Findings

The main clinical findings in relation to malnutrition in the children studied are as follows:

1. protein-energy malnutrition – features suggestive of muscle wasting and stunting were found in about 20% of the children studied.

2. anaemia – pallor of conjunctiva was seen in about 20% of the children in both groups.

3. vitamin A deficiency – the most common eye sign observed was dryness and wrinkling of the conjunctiva among 11% of the children in both groups.

4. dental health – 80% of the children had poor overall dental health, the majority of whom had tooth decay.

5. head lice – about 45% of the children, especially girls, were found to be infested with head lice.

6. scabies – was also commonly seen in both sexes in both groups studied.

Assessment of Nutritional Status

Anthropometry

Distribution of nutritional indicators

The distribution of nutritional indicators at the beginning of the study and at the end of one year of evaluation for the two districts are given in Tables 4 (Sepang) and 5 (Temerloh). As can be seen from the tables, the proportion of the children in the feeding group below median minus 2 S.D. is high for both weight-for-age and height-for-age indicators and lowest for weight-for-height indicator. A similar pattern is observed for the control groups, as well as, in both districts.

Prevalence of malnutrition

Tables 6 and 7 compare the prevalence of malnutrition between the groups studied in both districts. Prevalence values in the tables were derived from calculations recommended by WHO (1983) which took into account the proportion of children in the reference population i.e. the NCHS reference, falling below the median minus 1 S.D. for each of the three indicators. These "expected" proportions were respectively: 15.9% (below median −1 S.D.) and 2.3% (below median−2 S.D.) for all the three indicators. These two figures were subtracted from the values presented in Tables 4 and 5 to obtain the values in Tables 6 and 7.

It can be seen from the Tables that the prevalence of malnutrition both at the beginning and at the end of the first year of evaluation is moderately high for the three indicators in both groups studied, in both districts. Statistical tests (chi square) on comparisons of the prevalence of malnutrition between the groups studied show no significant differences for any of the indicators.

TABLE 4: **DISTRIBUTION OF ANTHROPOMETRIC INDICATORS AT THE BEGINNING AND END OF THE FIRST YEAR OF EVALUATION IN 1985: SEPANG DISTRICT**

	Weight/Age		Height/Age		Weight/Height	
	Start	End	Start	End	Start	End
No. examined						
Feeding	202	198	202	198	202	198
Control	103	101	103	101	103	101
Below Median −1 S.D.						
Feeding	85 (42.9)	83 (41.9)	89 (44.1)	86 (43.4)	64 (31.4)	58 (26.3)
Control	43 (41.7)	44 (43.6)	49 (47.5)	50 (49.5)	32 (31.1)	29 (28.7)
Below Median −2 S.D.						
Feeding	40 (19.8)	40 (20.2)	35 (17.3)	40 (20.2)	7 (3.4)	7 (3.5)
Control	16 (15.5)	19 (18.8)	13 (12.6)	13 (12.9)	3 (2.9)	5 (4.9)

Numbers in parentheses indicate percentages

TABLE 5: DISTRIBUTION OF ANTHROPOMETRIC INDICATORS AT THE BEGINNING AND END OF THE FIRST YEAR OF EVALUATION IN 1985: TEMERLOH DISTRICT

	Weight/Age		Height/Age		Weight/Height	
	Start	End	Start	End	Start	End
No. examined						
Feeding	184	173	184	173	184	173
Control	134	120	134	120	134	120
Below Median −1 S.D.						
Feeding	85 (46.2)	83 (47.9)	83 (45.1)	74 (42.8)	57 (30.9)	58 (33.5)
Control	66 (49.2)	60 (50.0)	65 (48.5)	55 (45.8)	42 (31.3)	39 (32.5)
Below Median −2 S.D.						
Feeding	44 (23.9)	34 (19.7)	42 (22.9)	40 (23.1)	8 (4.4)	7 (4.0)
Control	25 (18.7)	24 (20.0)	30 (22.4)	30 (25.0)	6 (4.5)	6 (5.0)

Numbers in parentheses indicate percentages

In general, at the end of the first year of evaluation, in the district of Sepang there appears to be a reduction in the prevalence of malnutrition for all the three indicators among the feeding group, falling below median−1 S.D., while the control shows an improvement in the weight-for-height indicator only. For those children in the feeding group who fall below median−2 S.D., no reduc-

tion in the prevalence of malnutrition is seen. Comparable values are also observed in the controlled group subjects.

Reduction in prevalence of malnutrition

Data in Tables 6 and 7 were used in the calculation on the reduction (if any) in prevalence of malnutrition among children in both the districts. These are presented in Tables 8 and 9. In the case of the feeding group, these figures also provide a measurement of the impact of the feeding programme on their nutritional status.

TABLE 6: PREVALENCE* OF MALNUTRITION AT THE BEGINNING AND END OF THE FIRST YEAR OF EVALUATION IN 1985: SEPANG DISTRICT

	Weight/Age		Height/Age		Weight/Height	
	Start	End	Start	End	Start	End
Excess below Median −1 S.D.						
Feeding (%)	27.0	26.0	28.2	27.5	15.5	10.4
Control (%)	27.8	27.7	31.6	33.6	15.2	12.8
Excess below Median −2 S.D.						
Feeding (%)	17.5	17.9	15.0	17.9	1.1	1.2
Control (%)	13.2	16.5	10.3	10.6	0.6	2.6

* Prevalence is expressed as percentage in excess of the value in the reference population (−1 S.D. : 15.9%; −2 S.D. : 2.3%)

As suggested by WHO (1983), impact of the programme on nutritional status is expressed in terms of percentage reduction in the prevalence of malnutrition at the median minus 2 S.D. level. Results obtained thus far indicate a reduction in the prevalence of malnutrition only in

TABLE 7: PREVALENCE* OF MALNUTRITION AT THE BEGINNING AND END OF THE FIRST YEAR OF EVALUATION IN 1985 : TEMERLOH DISTRICT

	Weight/Age		Height/Age		Weight/Height	
	Start	End	Start	End	Start	End
Excess below Median −1 S.D.						
Feeding (%)	30.3	32.0	29.2	26.9	15.0	17.6
Control (%)	33.3	34.1	32.6	29.9	15.4	16.6
Excess below Median −2 S.D.						
Feeding (%)	21.6	17.4	20.6	20.8	2.1	1.7
Control (%)	16.4	17.7	20.1	22.7	2.2	2.7

* Prevalence is expressed as percentage in excess of the value in the reference population (−1 S.D. : 15.9%; −2 S.D. : 2.3%)

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TABLE 8: REDUCTION* IN PREVALENCE ON MALNUTRITION AS AT THE END OF THE FIRST YEAR OF EVALUATION IN 1985 : SEPANG DISTRICT

	Weight/Age	Height/Age	Weight/Height
Below Median −1 S.D.			
Feeding (%)	3.7	2.5	32.9
Control (%)	0.4	−6.3	15.7
Below Median −2 S.D.			
Feeding (%)	−2.2	−19.3	−9.1
Control (%)	−2.5	− 2.9	−

* Reduction is expressed as the difference between the final and initial prevalence value as a percentage of the initial value, i.e. initial value minus final value, divided by initial value, multiplied by 100.

TABLE 9: REDUCTION* IN PREVALENCE OF MALNUTRITION AS AT THE END YEAR OF EVALUATION IN 1985 : TEMERLOH DISTRICT

	Weight/Age	Height/Age	Weight/Height
Below Median −1 S.D.			
Feeding (%)	−5.6	7.9	−17.0
Control (%)	−2.4	8.3	− 7.8
Below Median −2 S.D.			
Feeding (%)	19.4	−1.0	19.0
Control (%)	−7.9	−12.9	−22.7

* Reduction is expressed as the difference between the final and initial prevalence values as a percentage of the initial value, i.e. initial value minus final value, divided by initial value, multiplied by 100.

the district of Temerloh. On the other hand, no significant impact was observed in Sepang for the period studied.

Biochemical Paremeters

Haemoglobin(Hb) Status

Table 10 compares the mean levels and prevalence of anaemia between the studied groups in both districts. The mean levels of Hb is slightly more than 12g/dl for the studied groups both at the beginning and end of the first year of evaluation. However, an increase in the prevalence of anaemia (Hb < 12g/dl) is noted for all groups, with the exception of the control group in Sepang. A marked reduction in the prevalence of anaemia is seen for all the groups when cut-off level at 11 g/dl is used.

Mean values of plasma albumin for the groups studied in both the districts are shown in Table 11. A significant increase is seen in the mean albumin level in the feeding group in Sepang, at the end of the first year of evaluation. In addition, there is a considerable reduction in the percentage of children having albumin < 3.5 g/dl. A small reduction in the albumin level is also observed in

	Sepang				Temerloh			
	Feeding		Control		Feeding		Control	
	Start	End	Start	End	Start	End	Start	End
N (sexes combined)	202	202	103	101	165	165	155	123
Mean Hb (g/dl)	12.8	12.7	13.2	13.2	13.1	12.5	12.9	12.4
S.D.	± 0.45	± 0.65	± 0.17	± 0.86	± 0.63	± 1.09	± 0.45	± 1.08
% below Hb 12 g/dl	14.4	18.8	9.7	8.7	13.5	26.2	15.9	27.5
% below Hb 11 g/dl	4.5	5.5	3.9	3.1	3.7	5.8	8.4	6.8

the control group in Sepang. A similar pattern in Temerloh is also observed for the feeding group. This, however is not true in the case of the control group in Temerloh.

TABLE 11: PLASMA ALBUMIN LEVELS AT THE BEGINNING AND END OF THE FIRST YEAR OF EVALUATION IN 1985

	Sepang				Temerloh			
	Feeding		Control		Feeding		Control	
	Start	End	Start	End	Start	End	Start	End
N (sexes combined)	183	166	95	84	158	147	155	100
Mean (g/dl)	3.7	4.5	3.7	4.4	4.1	4.4	4.1	4.2
S.D.	± 0.15	± 0.47	± 0.06	± 0.43	± 0.14	± 0.47	± 0.21	± 0.51
% below 3.5 g/dl	18.6	4.2	5.3	3.6	2.0	1.4	3.0	3.0

Impact on Dietary Intake and Food Habits

Table 12 shows the distribution of the children in the two studied groups for their daily dietary intake and food habits. The percentages of children studied in the two districts range from 50–60% in the feeding group and from 30–35% in the control group.

TABLE 12: PERCENTAGE DISTRIBUTION OF CHILDREN IN BOTH GROUPS STUDIED FOR DIETARY INTAKE

	Sepang		Temerloh	
	Feeding	Control	Feeding	Control
Total number of children in group	202	103	186	134
Number (%) studied for dietary intake	105 (52)	36 (35)	112 (60)	40 (30)

Number in parentheses indicate percentages

Table 13 describes the types of foods typically eaten by the children at the various meals during the day. Dietary patterns among both groups of children in the two districts are found to be monotonous and rather uniform. A typical meal pattern of breakfast, lunch, tea and dinner, is seen for nearly all of the children. No significant differences are observed in the meal patterns and composition from the beginning and at the end of the first year of study.

Tables 14 and 15 show the results of a preliminary analysis of the daily energy and protein intake of the children, with and without the school supplement, in relation to the recommended dietary allowance (RDA) (Teoh, 1973). Preliminary analysis of the diets of 50 pupils in the feeding groups in both the districts show that the mean daily energy intake, inclusive of the meal taken at school, met only 79% of RDA. Breakfast and snacks contributed each between 10–14% of RDA; lunch and dinner each provided nearly one third of RDA, with the highest consumption being at dinner. From this preliminary analysis it appears that despite the school feeding programme, the children do not obtain their requirement for energy.

TABLE 13: MEAL PATTERN AND COMPOSITION

Composition	% Consuming	
	Feeding Group	Control Group
Breakfast		
Fried noodles	32	35
Fried banana	55	42
Local cakes	65	68
Black coffee + sugar	75	81
Malt and milk drinks	2	3
Lunch		
Plain boiled rice	98	97
Fried vegetable	84	90
Fish gravy	75	78
Fried dried fish	31	27
Ground chilly with prawn paste (*Sambal belacan*)	42	51
Snacks (Evening)		
Plain tea + sugar	52	63
Tea with milk and sugar	15	8
Biscuits, buns	10	12
Extruded snack foods	75	81
Local cakes	17	15
Other beverages	2	2
Dinner		
Plain boiled rice	97	98
Fried vegetable	35	48
Chicken/meat/egg dish	4	5
Fried fish/dried fish	43	45
Ground chilly with anchovies (*sambal tumis*)	55	47

TABLE 14: ADEQUACY OF CALORIE INTAKE OF CHILDREN STUDIED WITH AND WITHOUT FOOD SUPPLEMENT

	Sepang		Temerloh	
	Mean Intake (Cal)	% RDA*	Mean Intake (Cal)	% RDA*
Total in a day with food supplement	1728	79	1690	77
Total in a day with no food supplement	1530	69	1480	67
Intake for each meal				
Breakfast	300	14	280	13
Lunch	500	23	480	22
Dinner	530	34	500	23
Snacks	200	9	220	10

%RDA = 2190 Calories

The mean intake of protein seems better than mean energy intake. The total protein intake inclusive of meal taken at school provide between 89–95% of RDA for protein. Breakfasts and snacks provide 6–11% while lunch and dinner provide between 24–37% of RDA.

Table 16 shows the percentage frequency of participation of the children in the various meals during the day. While the majority in both groups appear to have all their meals regularly, the percentage of children in the feeding group seems to be less than the control group. Fourteen percent of the children in the feeding group were found to skip breakfast. A combination of factors contribute to this habit of not eating breakfast. These include lack of a positive attitude on the part of

TABLE 15: ADEQUACY OF PROTEIN INTAKE OF CHILDREN STUDIED WITH AND WITHOUT FOOD SUPPLEMENT

	Sepang		Temerloh	
	Mean Intake (g)	% RDA*	Mean Intake (g)	% RDA*
Total in a day with food supplement	33	84	31	89
Total in a day with no food supplement	28	80	26	. 75
Intake for each meal				
Breakfast	4	11	3	9
Lunch	10	29	8	23
Dinner	12	34	13	37
Snacks	2	. 5	2	6

*RDA = 35 gram

TABLE 16: PERCENTAGE FREQUENCY OF PARTICIPATION IN MEALS

	Breakfast			Lunch			Dinner		
	E	S	N	E	S	N	E	S	N
Feeding	85.0	2.5	14.0	71.0	4.2	23.8	95.0	1.0	4.0
Control	81.0	6.0	13.0	90.0	3.1	6.9	98.0	2.0	0

E = Everyday   S = Sometimes   N = Never

the parents towards eating breakfast, as they thought that the child could eat at school. Some parents said that the children did not feel hungry at breakfast, in addition, nearly 24% of the children in the feeding group did not have lunch on returning home. Thus, it appears that the school feeding programme can be a substitute for lunch, at least in a few cases. Majority of the students in both the groups did not skip dinner.

Parents' Attitude Towards the Feeding Programme

Findings with regards to the attitude of the parents towards the feeding programme are summarised in Table 17. Majority of the parents appear to be aware of the existence and content in terms of the menu of the feeding programme in their child's school. However, about half of the mothers who responded seem to be ignorant of the purpose of providing free meals for their children. Acceptance rate for the cooked meal is high for both parents and children. As for the benefits that the child will derive from the feeding programme, about half (41%) of the parents responded that the child would not go hungry while at school, while 21% stated that it was good for their child's health. Other reasons stated were: child had something to eat when no pocket money was given, or, that it was good for children who did not have breakfast. As to the manner by which parents benefitted from the programme, majority of them (42%) said that they could reduce the amount of pocket money given to the child. Twenty-six percent of them also said that they were not required to send packed foods from home while 12% said that they did not prepare lunch in time as the child would have already eaten at school.

Role of the School in Changing Food Habits

The role of the schools was examined in relation to some of the objectives of the feeding programme i.e. development of nutritious food and health habits through nutrition and health edu-

TABLE 17: PARENTS' ATTITUDE TOWARDS THE FEEDING PROGRAMME

	Knowledge about programmes			Acceptability		Benefit	
	Existence	Content	Purpose	By child	By parents	To child	To Respondent
Mothers (N=125)	92	92	44	85	92	92	85
Fathers (N=37)	95	94	65	83	95	90	85

cation. It was observed that in all selected schools, with the exception of one, nutrition and health education activities were lacking.

Simple hygienic habits, like washing of hands before eating were also lacking in many children. They even threw away pieces of vegetables and meat from their plates. There was generally, a lack of supervision by teachers while the children took their meals; some children did not finish their meals and there was a substantial amount of sharing, as well as, plate waste.

Vegetable gardenings, which could provide an opportunity for training the children to grow vegetables, were practically non-existent in the schools studied. These activities could also be useful in impressing upon children the importance of nutritious foods.

Observations on Some Constraints of the Feeding Programme

1. The standardized menu of the supplement was designed to provide about 350—400 Calories and 11g of protein. Laboratory analysis of samples of meat portions showed a slightly lower level of these nutrients; an average of 290 Calories and 6g of protein were obtained.

2. The portions of food served to all the children in the schools were the same irrespective of their age.

3. Teachers too were served the same meal during their mid-day break.

4. Ideally the meal is to be served before classes begin in all selected schools, except in one, where the free meal was served between 10.00 to 10.30 in the morning.

5. In a few schools, the canteens were observed to be rather unhygienic. One of the reasons given for the difficulty in cleaning the premises was the frequent lack of water supply.

6. Nearly all schools studied had a defined space for cooking the meal. However, only two of them were found to cook the meals in the school kitchen and the food was served hot to the students. In others, provision of meals was contracted out to some members of the local community. Food was cooked in their homes and brought in large containers to the schools for serving.

PROBLEMS IN IMPLEMENTATION OF PROJECT

There were no outstanding problems that interfered with the logistics of the project. Project activities were carried out as scheduled. Cooperations from headmasters, teachers and parents, were at all times satisfactory. At the end of 1986, six regular measurements on the nutritional indicators had been carried out at the scheduled dates. Additional visits were made to the areas studied so as to to collect data related to the dietary habits, implementation and acceptance of gramme.

Problems that were encountered are as follows:-

1. Children who were absent or transfered out into non-participating schools, reduced the final number of available children.

2. Lack of cooperation — A few children out of fear sometimes refused to be pricked for blood specimens; some even refused to give urine specimens.

3. Insufficient volume of blood and urine samples for biochemical estimations.

4. Difficulty in locating homes of students to conduct interviews with parents.

CONCLUSION

It would be difficult at this juncture to draw any firm conclusions regarding the impact of the feeding programme, since data have been fully analysed only for the first year of evaluation. Nevertheless, available data seem to indicate that the feeding programme is not able to improve the nutritional status of the children. While some reduction in the prevalence of malnutrition has been observed, especially in the more malnourished group, it has not made a significant impact on the nutritional indicators studied.

Findings obtained also indicate that for some schools, the programme may not achieve its other objectives, such as, teaching health and nutrition to the children. During visits to these schools, it has been observed that little or no health and nutrition education activities are carried out in conjunction with the feeding programme. Since school children are an important and captive target for the transfer of knowledge in nutrition and health, it is important that these aspects be given further emphasis to enable the programme to have some impact on the food and nutrition habits of children, thereby improving their nutritional status. It should be borne in mind that provision of a meal alone is certainly not enough to create an impact on health and nutritional status. On a long term basis, it is vital that a systematic and committed approach to impart health and nutrition education to the school children be undertaken as part and parcel of this programme.

Further visits to these schools for the year 1987 have been planned, to collect final data on nutritional status, as well as more background information, especially on social aspects. Interviews with regards to these aspects will be carried out with headmasters, teachers, parents, food caterers and students. It is hoped that more light will be thrown on the feeding programme through these interviews.

ACKNOWLEDGEMENTS

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DISCUSSION

Roestamsjah	:	What is the percentage contribution to the daily needs of the school children?
Kandiah	:	Analysis have been done on similar foods served in the school supplementary feeding programme. The caloric energy value per serving is 169 – 290 Cal., which is less than one-third of the RDA.
Florentino	:	At what time of the day is the supplementary of foods served to the school children?
Kandiah	:	The guideline given by the Ministry of Education is that it should be served before the children enter classes i.e. at 7.30 a.m., but there are schools that serve food during the morning break i.e. 10.00 – 10.30 a.m.
Florentino	:	Serving at 7.30 a.m. is better (like breakfast) since the foods in the menu are quite heavy. During the recess break (10.00–10.30 a.m.), the foods usually taken (according to the usual food habits) are light snack-type of foods rather than heavy meal.
Barba	:	From the results, it can be said that the supplementary foods have become substitutions either for breakfast or lunch by the students. That is why there is no difference in calorie intake between the subjects and that of the controls.

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Theng   :   The number of children going to school without breakfast is also
                        quite high in Singapore. I am interested to know what is the RDA
                        used in this study based on?

Kandiah   :   The RDA for Cal. (2 190 Cal.) used, is based on WHO recommenda-
                        tion, adjusted to the Malaysian population by Dr. Teo (University
                        of Malaya, Medical Faculty) and adopted by the Ministry of
                        Education.

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19 - 21 March, 1987

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ASEAN Sub-Committee on Protein :
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1988