

## THE INTEGRATION OF NUTRITION INTO THE HEALTH SERVICES OF NORTHEAST BRAZIL: SUPERVISED SUPPLEMENTARY FEEDING

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A model for supplementary feeding of preschool children was designed, employing the following principles:

- Selection of beneficiaries based on the epidemiology of malnutrition, not charity;
- distribution of the supplement limited to 4 months;
- the supplement to cover one-third of protein and calorie needs;
- strict control of use of supplement;
- automatic medical care to beneficiaries when needed;
- nutrition education of the mothers.

The purpose was to protect contacts and extend nutritional recuperation beyond the action of the rehabilitation centers.

A total of 428 children were admitted to the program between June 1969 and September 1970. Sixty-eight percent completed the 4 month period. Average weight gain was more than expected for age (less than one year: 1,218 g; and one-to-four years old: 872 g). Attendance rate was 95 percent. The cost was 8 times less than that of the rehabilitation center.

### INTRODUCTION

The importance of the family characteristics of protein-calorie malnutrition has already been described (Batista & Beghin, 1970). The siblings of a malnourished child are very often themselves malnourished, or, at the very least, they are exposed to an increased risk of becoming victims of malnutrition since they are exposed to the same epidemiological factors. One may then use terms such as *the affected family* (Eisler, 1966) or *the risk-mother* (Severyns, 1967). We have already suggested the term *contacts* to be used when referring to siblings, aged five years or less, of a malnourished child (Beghin, Batista & Chaves, 1970).

The mother of the family is considered to be the key element by the nutrition programs that

function as part of the Northeast Brazil health services (Beghin, Batista & Chaves, 1970). She receives instruction at the same Nutritional Education and Rehabilitation Center (Batista *et al.*, 1970), where her malnourished children recuperate. It became necessary for the Nutritional Education and Rehabilitation Center to extend its activities to the other members of the family so that the contacts would also be protected. The Institute of Nutrition of the Federal University of Pernambuco was thus induced to consider a food distribution program.

A review by the Institute of Nutrition of Recife revealed that many existing supplementary feeding programs had undesirable features. The principal defects related to the selection of recipients, the type of supplement, the method of distribution, the lack of educational value, the frequent absence of medical assistance, lack of evaluation, and above all, the sense of social dependence which supplementary feeding developed. Table I compares the general characteristics of actual programs with those of the proposed program *Supervised Supplementary Feeding* which is the subject of discussion in this paper.

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TABLE I  
Characteristics of programs for distribution of food supplements

	Existing programs	Proposed program
Selection of beneficiaries	Characterized by few selection criteria: do not have effect on group most exposed to risk;  do not necessarily have effect upon those within the group who are of major priority;  pastor, social worker, etc. do the selection;  no systematic protection of the contacts;  philanthropic basis of selection	Selection based on medical criteria: most vulnerable group: children of pre-school age;  only malnourished children (and their contacts);  selection made only by a doctor or his assistant;  contacts are automatically included in the program;  selection is based upon epidemiology
Nature of supplementation	supplementation does not always correspond to nutritional needs;  supplement is frequently viewed as charity;  supplementation is often done with foods not available on the retail market	supplement satisfies nutritional needs;  supplement is viewed as a treatment and as an educational vehicle;  supplementation is based upon foods sold locally
Distribution	variable duration of supplementation, often indefinite;  lack of regular utilization;  supplementation often uncoordinated with other health activities	supplementation over a strictly limited time-period;  rigorous control of utilization (weighings; required attendance by the mothers; imperative participation by the mothers; automatic health care to children who do not improve);  supplementation is always part of a health program
Educational aspects	nonexistent, or limited merely to the preparation of the supplement	use of supplementation as a vehicle for nutrition education
Evaluation	evaluation is rarely made; when made it rarely demonstrates nutritional improvement	evaluation is a part of the program: nutritional improvement ought to be achieved
Social aspects	often create dependency;  palliative, resolve nothing	does not create dependency;  more than merely palliative; it has an educational role

CHARACTERISTICS OF THE NEW PROGRAM

*Supervised Supplementary Feeding* seeks to correct and modify existing programs in two of their major aspects. The first is the integration of these programs into Health Services such as Health Centers, Child Care Posts. The second is the

representation of a program which is essentially of an educational nature. *Rather than a distribution program with some education included, it is a nutrition education program with some supplementation included.* The specific objectives of the program are to educate the mother and to re-establish or maintain the normal rate of growth of her children. The program is based upon

earlier experimental work done within Brazil, notably by the Fundação Serviço Especial de Saúde (FSESP)<sup>†</sup> and the Pernambuco State Child Bureau, and also on information from the Institute of Nutrition of Central America and Panama (Scrimshaw *et al.*, 1968), Colombia (Rueda-Williamson, 1970), Chile (Santa María, 1966), Venezuela (1964), and Panama (Sogandares, 1955).

Under the program, the contacts of children having second or third degree malnutrition are the recipients. These are the siblings of five years

## THE NATURE AND LEVEL OF SUPPLEMENTATION

The supplement constitutes both a method of treatment and of protection, as well as providing an educational instrument.

It should first of all satisfy a definite proportion of the nutritional requirements of children of pre-school age. The supplement, which the Institute of Nutrition distributes to each child daily, consists of 30 g of nonfat dry milk fortified with vitamins A and D, and 50 g of corn meal enriched

TABLE II  
Composition of DIACONIA supplement

Nutrient	Quantity in 30 g of milk <sup>a</sup>	50 g of corn meal <sup>b</sup>	Total	Recommended daily allowance <sup>c</sup>	Proportion of recommended allowance (%)
Calories (kJ)	109 (456)	182 (761)	291 (1217)	1500 (6274)	19 <sup>d</sup>
Protein, g	10.8	4.0	14.8	34	44
Iron, mg	0.18	1.5	1.7	9	19
Calcium, mg	392	3	395	450 <sup>e</sup>	88
Vitamin A, IU	1500	220	1770	2250	79
Thiamine, mg	0.11	0.22	0.33	0.7	47
Riboflavin, mg	0.54	0.13	0.67	0.9	74
Niacin, mg	0.27	1.75	2.02	10.0	20
Vitamin C, mg	2.1	0	2.1	40.0	5

<sup>a</sup> Nonfat dry milk, enriched with vitamins A and D, donated by USAID.

<sup>b</sup> Corn meal, enriched with vitamins A, B<sub>1</sub>, B<sub>2</sub>, niacin and iron, donated by USAID.

<sup>c</sup> Quantities recommended for Colombia (Ariza, 1967).

<sup>d</sup> Sugar used in the preparation not included.

<sup>e</sup> Calcium, as recommended by WHO/FAO (1962).

of age or less, whether they themselves are malnourished or not. This criterion, based as it is upon the risk factor, is epidemiological, not philanthropic.

Maternal education is an integral part of the program which, in order to avoid the establishment of social dependence, is strictly limited to a duration of 4 months. The supervision of the utilization of the supplement and the weight gains of the recipient children is described in detail later. It is rigorous and may include home visits. It is this double characteristic of limited duration and supervision which gives the program its name.

with vitamins and mineral salts. The supplement is donated by the "Food for Development" Program of the United States Agency for International Development (USAID) through a private organization, *DIACONIA*. This diet satisfies  $\frac{1}{4}$  to  $\frac{1}{3}$  of the calorie and protein requirements of children (see Table II). The vitamin and mineral supplements constitute a significant proportion of a child's nutritional requirements.

The supplement should also possess an educational value; it should be available at the local market, be in general use within the community, and be low in price. It should also be easily accepted by the children. The milk-cereal combination which was adopted responded to all these conditions.

<sup>†</sup> Public Health Service of the Federal Government.

Products such as CSM or WSB†, widely distributed by Food for Development, could not be used by the *Supervised Supplementary Feeding Program* since they did not fulfill these criteria.

Nonfat milk alone is not a satisfactory supplement in Northeast Brazil and should never be distributed without a caloric supplement. Malnutrition, as it affects the child in this area, is as much of caloric origin as it is of protein origin. In general, every protein supplement should be accompanied by an adequate calorie supplement.

Table III describes the characteristics of certain supplements used by other programs. From Table II it can be seen that the quantity of calories

nutritionist. The instruments used are weighing-scales of the type regularly used by the health-services, they are devoid of springs and easy to calibrate. Weights are noted in grams both on a card (Figure 1) and on a *weight for age* chart (for each sex), designed for local use. On the same day, usually in the afternoon, the mother attends a short class. She is obliged to attend ten such sessions. The supplement is distributed immediately after class at which time each mother receives sufficient milk and flour to supplement the family's food supplies for 15 days. The records are kept on a single card. While bureaucratic procedures are kept to a minimum, the card nevertheless facilitates

TABLE III  
Characteristics of supplements used in other feeding programs

Reference	Nature of supplement	Quantity	Protein g per day	Calories (kJ) per day
Autret (1964)	Cereal, mixtures of cereals and legumes, with or without milk, or protein concentrate	500 g per week	10-12	250 (1045)
Santa María (1966)	Milk with 12% fat	50 g per day	15.6	225 (941)
Venezuela (1964)	Milk products	60 g per day	16.2	213 (890)
Scrimshaw, <i>et al.</i> (1968)	Incaparina, 18.5 g	66 g per day	15.9	236 (987)
	Nonfat dry milk, 30 g			
	Sugar, 17.5 g			
FSESP <sup>a</sup> /UNICEF	Nonfat dry milk	60 g per day	21.5	218 (911)
Present program	Nonfat dry milk	30 g per day	14	289 (1208)
	Corn meal	50 g per day		

<sup>a</sup> FSESP: Fundação Serviço Especial de Saúde Pública.  
Federal Health Agency of Brazil.

furnished in the diet used by the Institute of Nutrition's program is greater than any other, and that it approximates the quantity recommended by Autret (1964).

THE PROGRAM IN PRACTICE

The Health Center or Recuperation Center is the focus of the program which includes distribution of food, education of the mother and surveillance of weight. Every 15 days, during the morning, the mother brings her children to be weighed. The child is weighed without clothes, by auxiliary personnel who have been properly trained; they are constantly supervised by a professional

record keeping and at the same time prevents the family from receiving a supplement for more than four months.

The home is visited for two principal reasons. First, if the mother is absent from class, and second, if the child is considered to be not gaining weight satisfactorily. Weight gain is considered satisfactory if the growth rate is higher than expected for initial weight and age. While this criteria may not be satisfactory for assessing recuperation, the authors felt it would meet the requirements of the project, whose main purpose was protection of contacts. The success of the program rests upon its educational value, strict adherence to its operational rules and guidelines, and home visits. In a well run program, the number of home visits should not surpass 5 or 6 per class. Any child with a health problem is immediately taken to the doctor. The mothers who do not comply with their obligations or who exceed a

† CSM and WSB are cereal-soybean blends, fortified with vitamins and minerals, and specially designed and produced as high-protein foods of good biological value for use by the U.S. Agency for International Development.



## SUPERVISED SUPPLEMENTARY FEEDING

Name of the mother Joana Maria da Conceição  
 Family SAP 15 Starts on 18-06-69  
 Address Rua Silveira Lessa Ends on 22-10-69

Child	Code	Age	Weights									
			18/6	2/7	16/7	30/7	13/8	27/8	10/9	24/9	8/10	22/10
Jose Candido	529	8m	5.000	5.600	A	6.000	6.600	6.200	7.800	7.900	8.100	8.300
M <sup>re</sup> Fatima	530	2a	9.000	8.700	9.000	9.300	9.400	9.300	9.600	9.800	9.600	9.800

Ration: Corn meal 1.500 g Milk 900 g

Incap 72-320

FIGURE 1 Form for control of attendance and weight.

The first three lines are for identification of the family. Columns correspond respectively to: (1) name of each child in the family; (2) a code number for identification; (3) age at start; (4) weight at 14 days intervals. The last line refers to the amount of corn meal and milk to be delivered to the family every second week.

maximum of three absences are excluded from the program thereafter.

## RESULTS†

Data were obtained from observations made in six localities on 263 families. Information was collected on 428 children between June 1969 and September 1970 (See Table IV). The average number of children per family was 1.6; however this excluded those children in the families who were admitted to the Rehabilitation Center. Of the 428 children, 290 or 69 percent completed the full 4 months of the program; their average age was 2 years 8 months. Fifty children were less than one year old, 234 were between one and four years of age, and 6 were five years old or more.

The total number of days absence for the 290 children who completed the program was only

151. This represents an actual successful frequency of attendance of 95 percent and is an indication of the efficacy of supervision. It demonstrates also that good attendance can be obtained if, beyond providing basic motivations, operational rules are established; and if those who do not wish to comply with them are removed from the program. For various reasons, the program in Gameleira (Table IV) was badly executed and supervised. The results obtained in the location, which are clearly inferior, constitute an additional (negative) indication of the importance of supervision.

For the reasons cited in Table IV, 32 percent of the children did not complete the 4 month period. This proportion included those who stopped attending, those who were dismissed from the program, deaths, and those families absent more than 3 times. Excluding those who were transferred to a Nutritional Education and Rehabilitation Center and those who moved from the location, the total number of failures amounted to 66 children, or 19 percent of the total. Although this record is commendable, efforts should be made to reduce this number even further. The experience

† A summary of these results was presented by one of the authors at the Western Hemisphere Nutrition Congress III, Bal Harbour Florida, August 30–September 2, 1971. (Beghin 1972).

TABLE IV  
Supervised supplementary feeding: Results by location

	Agua Preta	Ribeirao	Gameleira	Primavera	Belém de María	Ilha Sta. Terezinha	Total
Period	6-18-69/ 8-31-70	6-12-69/ 8-13-70	12-3-69/ 8-31-70	1-29-70/ 9-4-70	1-30-70/ 9-8-70	3-4-70/ 7-21-70	Jun-1969/ Sept-1970
Number of families	104	66	22	28	14	29	263
Number of children	163	119	41	31	20	54	428
Completed 4 months	113	77	25	28	17	30	290
Transferred to NRC	19	4	1	0	0	5	29
Moved	12	11	1	1	1	17	43
Dismissed	9	20	0	0	0	0	29
More than 3 absences	5	6	9	0	0	0	20
Stopped attending	5	0	5	1	1	1	13
Deaths	0	1	0	1	1	1	4
% of failure	14.4	25.9	35.9	6.5	11.1	6.1	18.6
% of those who finished	69.3	64.7	61.0	90.3	85.0	55.7	67.8
Frequency of those who finished, %	97.8	91.8	88.4	97.1	100.0	90.4	94.8
Average age at start:							
Total	2-4 mo.	2-8 mo.	2-9 mo.	2-8 mo.	2-4 mo.	3-1 mo.	2-8 mo.
1 year	5 mo.	7 mo.	7 mo.	6 mo.	6 mo.	7 mo.	6 mo.
1-4 years	3-0 mo.	3-0 mo.	3-4 mo.	3-4 mo.	2-7 mo.	3-6 mo.	3-2 mo.
Average weight gain in 4 months (g) <sup>a</sup>							
Total	1067	900	332	931	1106	875	933
Age <1 year	1681	1093	268	814	725	393	1218
Age 1-4 years	884	892	348	970	1160	955	872

<sup>a</sup> Six children aged over 5 years are not included.

both in Belém de María and in Primavera shows that high success rates are possible.

The average weight gain for each child over the four month period was 1218 g in children between 7 and 12 months of age. For those children aged between one and four years, the average weight gain was 872 g. Unfortunately we omitted to record the average weight gain for each year of age but the age distribution of the children was approximately the same for each yearly age group between one year and four years of age. In general, normal growth was maintained, many children who were initially malnourished were able to recuperate while participating in the program.

The maternal level of education was not evaluated since, in this preliminary stage, the Institute's main concern was to demonstrate the validity of the supplement for the recuperation of the malnourished and the protection of the contacts. However, it was observed that the attitude of the mothers was extremely favorable. *Supervised Supplementary Feeding* was also well received by those physicians who had an opportunity to place their patients in the program.

The cost of the program is estimated at Cr\$ 0.25 per child/day, or Cr\$ 30.00 per child for the 4 month period (Table V). This represents approximately one eighth of the cost of a Rehabilitation Center, or one fiftieth of the cost of hospitalization. It should be remembered that, in practice, the supplements are donated by *DIACONIA*, and that personnel involved are the personnel of the Health Center or of the Nutrition Education and Rehabilitation Center.

## CONCLUSION

This project represents an attempt to rehabilitate the classic methods for the distribution of food supplements as an activity of public health. The results obtained by the Institute of Nutrition of the Federal University of Pernambuco, while still preliminary, seem to confirm the validity of such a project. Firm supervision and competent distribution and utilization of the supplement earn the mother's assistance, an indispensable condition both for education and for protecting

TABLE V  
Supervised supplementary feeding

	Costs <sup>a</sup>		
	Per child, per day	Per child, for 4-months	Per family, for 4-months
Foodstuffs:			
Flour	0.05	6.00	9.60
Milk	0.18	21.60	34.56
Total	0.23	27.60	44.16
Personnel	0.02	2.40	3.84
Total	0.25	30.00	48.00

<sup>a</sup> Costs expressed in cruzeiros at prices current in September, 1970.  
(4.62 cruzeiros = US \$1.00).

children from malnutrition. It does not establish social dependence.

*Supervised Supplementary Feeding* complements the activities of the Nutritional Education and Rehabilitation Centers and extends those activities to the rest of the family (Figure 2). Supplementary feeding of this nature prolongs the period of instruction to the mother and of surveillance of recuperation of the malnourished child; it reduces the contacts risks of malnutrition. It

responds to an epidemiological definition and is integrated into the health services. As such, the project deserves to be attempted in other states and regions of the country and, to this end, detailed guides have been published by the Institute of Nutrition.

Finally, the most important safeguard of the program must not be forgotten. Limitation of the period of distribution, home supervision, and the elimination of non-participants are indispensable conditions for the success of the program.

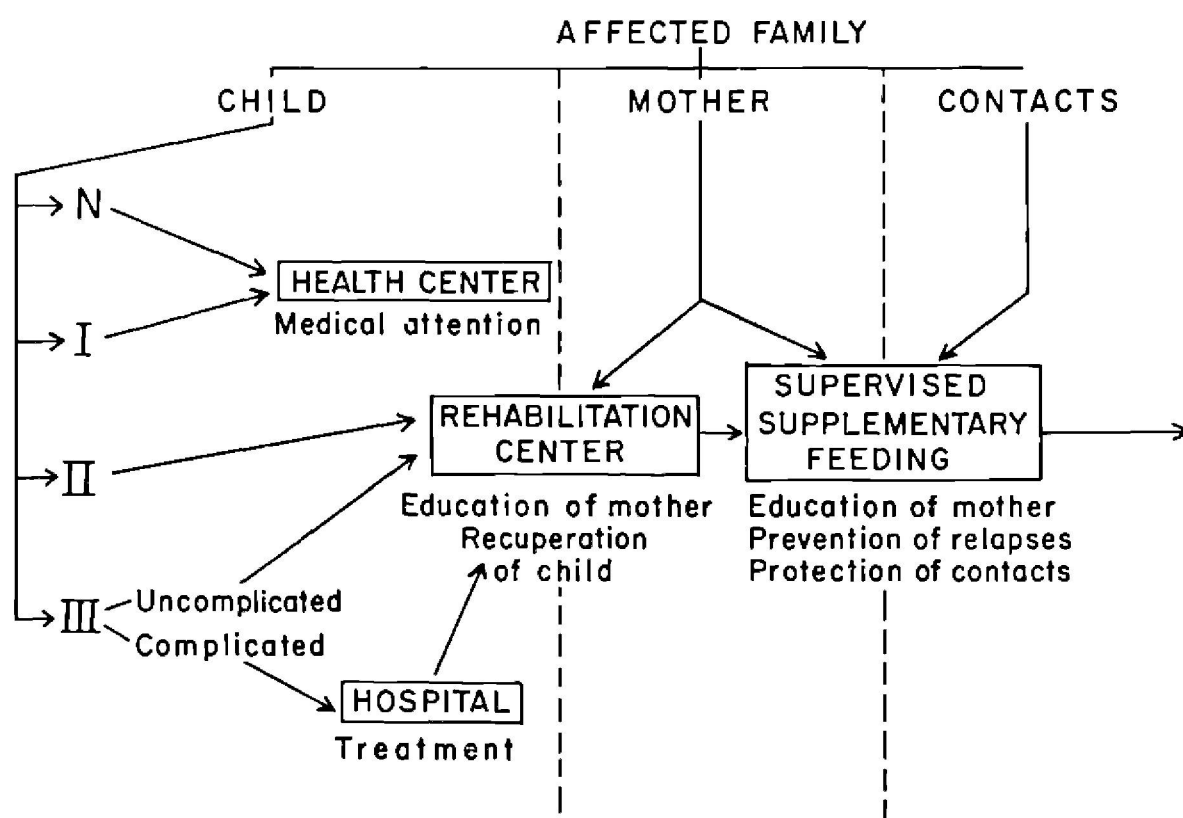


FIGURE 2 Role of supervised supplementary feeding in a comprehensive nutritional rehabilitation and education program.

Source: Beghin, I. (1971). *Proceedings of Western Hemisphere Nutrition Congress III, Bal Harbour, Miami Beach, Florida, August 30–September 2*. Reproduced with permission.

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