

BREAST-FEEDING AND MALNUTRITION IN RURAL AREAS OF NORTHEAST BRAZIL¹

Clara Lúcia de Freitas,² Sylvia Romani,³ and Hugo Amigo²

INTRODUCTION

Before working out food and nutrition policies, it is essential to identify the main factors contributing to nutritional problems among different age groups, especially among infants and young children. Some of these factors—including maternal literacy, breast-feeding patterns, and bottle-feeding practices during infancy and early childhood—are the subject of the work reported here, which was carried out in rural portions of Brazil's Pernambuco State in 1983.

There has been a trend away from breast-feeding in Brazil in recent years, with children being weaned at progressively younger ages. Data from studies carried out among low-income groups in São Paulo indicated that 38% of the children under one year old were breast-fed up to six months of age as of 1974. As of 1978, however, only 29% of the children under one year old were

breast-fed up to six months of age (1). And as of 1980 (2), only 9% of the mothers who reported their occupation as housewives and 11% of those who worked outside the home were found to breast-feed their babies up to six months of age.

The situation in Northeast Brazil is complex and does not appear directly comparable to that in São Paulo. It is worth noting, for example, that a 1981 survey of children in São Paulo and the northeast city of Recife found that only 20% of the Recife children were being breast-fed at one month of age (3).

The aims of the research described here were as follows:

1) to assess the nutritional status of survey area infants relative to parental land ownership and maternal literacy;

2) to determine how long infants were being exclusively breast-fed, to learn the ages at which partial bottle-feeding was being introduced, and to establish the principal motives for prevailing breast-feeding and weaning practices; and

3) to correlate the duration of breast-feeding with patterns of parental land ownership and also with the study infants' nutritional status.

¹ The work reported here was part of a project financed by a Ford Foundation grant. This article will also be published in Spanish in the *Boletín de la Oficina Sanitaria Panamericana*, 1987.

² Assistant Professor, Department of Nutrition, Health Science Center, Federal University of Pernambuco, Recife, Brazil.

³ Associate Professor, Department of Nutrition, Health Science Center, Federal University of Pernambuco, Recife, Brazil.

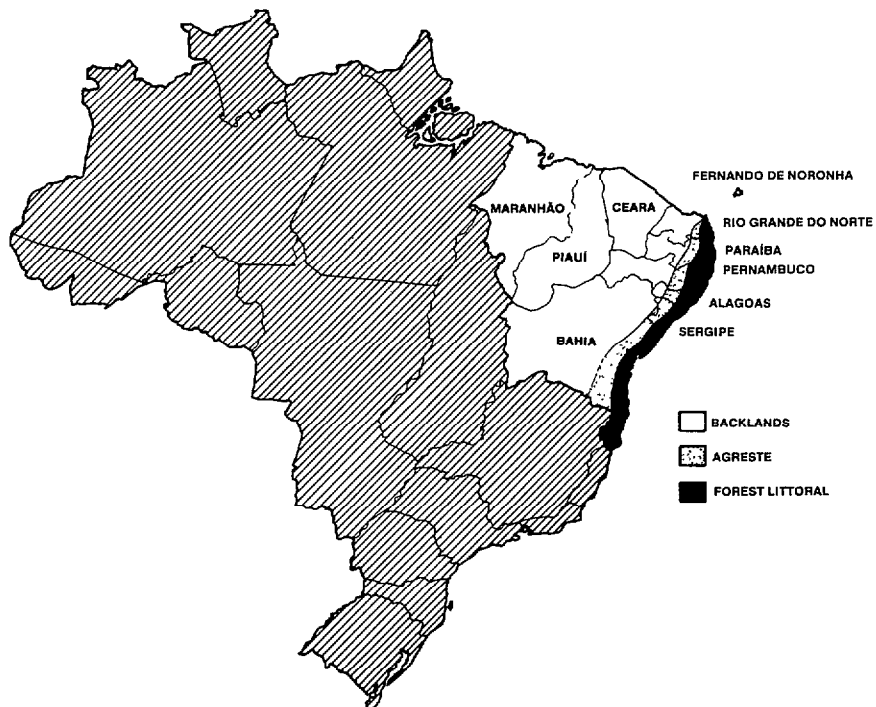
METHODOLOGY

The “*agreste*,” a zone of typically bare and rocky soil in Northeast Brazil, cuts from southwest to northeast across six states (see Figure 1). Our survey included rural communities in four villages (Belo Jardim, Bezerros, Limoeiro, and São Bento do Una) representative of the *agreste* area in Pernambuco State. This region tends to be extensively subdivided into small holdings devoted principally to subsistence farming, mixed-crop farming, and (increasingly) cattle-raising.

Visits were made to 689 families in the four villages for the purpose of conducting interviews. These families were selected at random using information recorded by the National Institute of Settlement and Agrarian Reform (Instituto Nacional de Colonização e Reforma Agrária—INCRA). They were then stratified according to four categories of land ownership, and all of the families found to have one or more children under five years old were retained in the survey sample.

Socioeconomic, cultural, and dietary information was collected from each family by means of a questionnaire interview. After the interview, by agreement, each family member was sent to an outpatient health facility for clinical, biochemical, and anthropometric examinations. The clinical examinations were

FIGURE 1. A map of Brazil showing Pernambuco, other northeast states, and the *agreste* region.



RESULTS

directed at detecting clinical signs of malnutrition; the biochemical examinations consisted of blood analysis for detection of hypovitaminosis A and iron deficiency anemia; and the anthropometric examinations were conducted to obtain weight-for-age and height-for-age data.

Only data on infants (children less than one year old) are considered in this presentation. The study sample included a total of 225 families with infants, and these were distributed into the following four categories: non-landowners; small landowners (those with up to 10 hectares); intermediate landowners (with more than 10 but not over 50 hectares); and large landowners (with over 50 hectares). These last two categories were subsequently lumped together into one because previous studies had yielded very similar results for the two groups and because very few (39) survey families had large landholdings.

The Gómez weight-for-age and weight-for-height ratios (4) were used to assess the infants' nutritional status. The standard accepted as normal was that recommended by WHO (5). Because birth-weights of the study infants were generally not known, only those infants between three months and one year old were assessed this way in order to avoid errors caused by interference of this birth-weight variable.

In addition, the infants' mothers were classified according to whether they were literate (able to read and write) or not.

The Chi square test was used for statistical analysis of the data.

Table 1 shows the composition of the 225-family study sample by land ownership categories and the ages of the study infants.

The categories in Table 2 were established according to the Gómez weight-for-age criteria. The data shown indicate that in terms of these criteria, 50.3% of the study infants over 3 months old were malnourished and 17.9% of the study infant population had grade II or grade III malnutrition.

With regard to land ownership, it was found that the incidence of infant malnutrition tended to be highest among landless families, lower among families with up to 10 hectares, and even lower among families with larger holdings. This trend was particularly pronounced with respect to the more extreme forms of malnutrition. Overall, a significant inverse correlation was found between landholdings and malnutrition ($p < 0.05$).

Table 3 shows the study infants' nutritional status with respect to maternal literacy. In all, 49.2% of the infants with illiterate mothers were found to be malnourished, as compared to 51.1% of those with literate mothers. The difference was not found to be statistically significant. In this vein, it is worth noting that most of the study mothers (75.3%) were classified as illiterate, and the maternal illiteracy rate appeared high (61.0%), even among the families with over 10 hectares of land (Table 4). However, on the basis of the data shown in Table 4, a significant correlation was found between maternal literacy and land ownership.

At the time of the survey, 51 of the 225 study infants were being breast-fed, 65 had never been breast-fed, and 109 had been weaned (Table 5). The

TABLE 1. Distribution of the 225 study families by landholding status and the ages of the study infants.

Infant age (in months)	No. of infants	Parental landholdings					
		No land		Up to 10 hectares		Over 10 hectares	
		No.	%	No.	%	No.	%
0-3	53	28	52.8	16	30.2	9	17.0
3-6	60	20	33.3	27	45.0	13	21.7
6-9	66	22	33.3	33	50.0	11	16.7
9-12	46	15	32.6	23	50.0	8	17.4
Total	225	85	37.8	99	44.0	41	18.2

TABLE 2. The nutritional status, according to the Gómez weight-for-age classification, of the 173 study infants over three months old, by parental land ownership category.

Land owned by parents	No. of infants	Infants' nutritional status (Gómez classification)					
		Normal		Grade I malnutrition		Grade II or III malnutrition	
		No.	%	No.	%	No.	%
No land ^a	58	22	37.9	21	36.2	15	25.9
Up to 10 hectares ^a	84	44	52.4	26	30.9	14	16.7
Over 10 hectares ^a	31	20	64.5	9	29.0	2	6.5
Total	173	86	49.7	56	32.4	31	17.9

^a $\chi^2 = 10.12$ ($p < 0.05$).

TABLE 3. The nutritional status of 171 study infants over three months old, grouped according to maternal literacy.

Maternal literacy	No. of infants	Infants' nutritional status (Gómez classification)					
		Normal		Grade I malnutrition		Grade II or III malnutrition	
		No.	%	No.	%	No.	%
Illiterate ^a	128	65	50.8	38	29.7	25	19.5
Literate ^a	43	21	48.9	17	39.5	5	11.6
Total	171 ^b	86	50.3	55	32.2	30	17.5

^a $\chi^2 = 2.14$ ($p > 0.05$, not statistically significant).

^b Literacy data were not collected from two mothers.

TABLE 4. A comparison between maternal literacy and parental land ownership in 223 of the study families.

Land owned	No. of families	Maternal literacy			
		Illiterate		Literate	
		No.	%	No.	%
No land ^a	84	71	84.5	13	15.5
Up to 10 hectares ^a	98	72	73.5	26	26.5
Over 10 hectares ^a	41	25	61.0	16	39.0
Total	223 ^b	168	75.3	55	24.7

^a $\chi^2 = 8.54$ ($p < 0.05$).

^b No literacy data were collected from two mothers

reasons given for weaning are listed in Table 6. The reasons most commonly stated were "mother's milk dried up" (44.3%) and "child refused breast" (19.5%).

Besides indicating the duration of breast-feeding, Table 5 also provides data comparing the duration of breast-feeding to parental land ownership. No statistically significant correlation was found between land ownership and the duration of breast-feeding. As may be seen, however, 52% of the in-

TABLE 6. Reasons stated for weaning the 174 study infants who had been weaned at the time of the survey.

Reason given for weaning	Weaned infants	
	No.	%
Mother's milk dried up	77	44.3
Child refused breast	34	19.5
Mother's and child's health	22	12.6
No milk	16	9.2
Other	9	5.2
No information	16	9.2
Total	174 ^a	100.0

^a Fifty-one infants were being breast-fed at the time of the survey.

fants weaned at the time of the survey had received breast-milk for less than 30 days, 71% had received it for less than 60 days, and 93% had received it for less than 120 days. The median weaning age of all the weaned or exclusively bottle-fed infants was estimated at 15 days.

Table 7 compares the nutritional status of the study infants being breast-fed at the time of the survey with

TABLE 5. A comparison between the duration of breast-feeding among 173 study infants who were weaned and parental land ownership.

Duration of breast-feeding (in days)	Parental landholdings							
	Weaned infants		No land		Up to 10 hectares		Over 10 hectares	
	No.	%	No.	%	No.	%	No.	%
Never received breast milk ^a	65	37.6	21	33.9	28	36.9	16	45.7
< 30 days ^a	25	14.4	10	16.1	12	15.8	3	8.6
30-59 days ^a	33	19.1	16	25.8	12	15.8	5	14.3
60-89 days ^a	27	15.6	7	11.3	14	18.4	6	17.2
90-119 days ^a	11	6.4	5	8.1	3	3.9	3	8.6
≥ 120 days ^a	12	6.9	3	4.8	7	9.2	2	5.6
Total	173 ^b	100	62	100	76	100	35	100

^a $\chi^2 = 7.7$ ($p > 0.05$, not significant).

^b Fifty-one infants were being breast-fed at the time of the survey, data were not available for one other.

TABLE 7. A comparison between the nutritional status of two groups of study infants over three months old—those 25 who were being breast-fed at the time of the survey and those 37 who had never been breast-fed.

Nutritional status (Gómez classification) ^a	No. of infants	Infants being breast-fed at time of survey		Infants that were never breast-fed	
		No.	%	No.	%
Normal	36	20	80	16	43
Grade I malnutrition	15	5	20	10	27
Grades II and III malnutrition	11	—	—	11	30
Total	62	25	100	37	100

^a For normal versus malnourished children, $\chi^2 = 6.92$ ($p < 0.05$).

the nutritional status of those who had never been breast-fed. About 80% of the breast-fed infants appeared normal, and no cases of grade II or grade III malnutrition were detected in this group. In contrast, only 43% of the bottle-fed infants appeared normal, and 30% showed grade II or grade III malnutrition. The difference between the percentages of malnourished infants in the exclusively breast-fed and exclusively bottle-fed groups was found to be statistically significant ($p < 0.05$).

DISCUSSION AND CONCLUSIONS

Overall, the data obtained indicate that malnutrition has been posing a serious problem in the survey area, a finding similar to ones obtained from surveys made in other underdeveloped regions of Brazil—especially surveys employing weight-for-height ratios (6,7).

Regarding land ownership, the correlation observed between this variable and nutritional status suggests that land ownership patterns could be having a highly specific impact on nutri-

tion. (A similar correlation was also found among the preschool children included in the survey—8.) All of this provides a warning about the possible effects of the agricultural structure in Northeast Brazil upon the nutritional status of infants and young children. It also suggests that modification of the existing agricultural structure could prove essential to the success of almost any public health program in this region, and that consideration of such modification should certainly be included in framing food and nutrition policies.

No correlation was found between the study infants' nutritional status and maternal literacy, but a high incidence of illiteracy was found, even among the mothers from higher-income groups. It is also worth noting that 89% of the literate mothers had not completed primary school.

A previous survey carried out in Northeast Brazil found a close correlation between nutritional status and literacy (9). However, that survey did not deal with the same rural areas covered in

our work or with the same age groups studied by our project. The correlation had also been found in 1976 by a survey of children from rural communities of the Federal District who were in the same age group as those included in our survey (6); this Federal District survey also found a high incidence of malnutrition (38.4%) among the children of literate mothers.

In our own survey, the very short observed duration of infant breast-feeding is striking. Indeed, although a similar situation had been found in Recife (3), it had been expected that the duration of breast-feeding in rural areas would be longer. The findings reported here reveal a much more serious situation than that reported by previous studies and suggest that the malnutrition problem in the rural areas bears more similarity than had been thought to the problem in urban areas.

In sum, the data collected revealed a correlation between the nutritional status of the study infants and land ownership, and also a correlation between nutritional status and breast-feeding (when infants breast-fed three months or more were compared to those who had never been breast-fed). However, no statistically significant correlation was found between the duration of breast-feeding and land ownership.

Regarding the causes of weaning found in our study, physiopathologic factors appeared far less important than social and cultural ones. Previous research data reported by Thomson (10) and Bauzá et al. (11) likewise indicated that "mothers' milk dried up" was the reason most commonly given for early weaning. However, Barudi et al. (12) have indicated that health professionals

who were effectively promoting breast-feeding found this cause of weaning could be disregarded if appropriate encouragement and guidance was given to the mother. Hence, there appears to be an urgent need for food and nutrition policies directed toward newborns and infants, not only for purposes of increasing food availability to the family and improving environmental conditions, but also for the purpose of encouraging breast-feeding.

With UNICEF support, Brazil's National Institute of Food and Nutrition (Instituto Nacional de Alimentação e Nutrição—INAN) has been implementing a program to promote breast-feeding using the techniques of mass communication. It appears important that this program be integrated as soon as possible into Brazil's routine health service programs providing primary health care.

More generally, it appears important to implement well-planned policies directed at the needs of infants and young children, especially disadvantaged ones, and to include within those policies specific provisions for supervising the activities of those responsible for preparing and promoting artificial human milk substitutes.

Unfortunately, as in most developing countries, Brazil's health services do not provide sufficient coverage to reach all those in need. Therefore, new plans of action are also needed, plans that take into consideration the experiences of other countries seeking to expand primary health care coverage and to stress active community participation. Within this context, the findings reported here merely serve to reinforce the conclusion drawn by many others—that both the primary health care and community participation strategies should prominently feature as a key element the need for proper infant breast-feeding.

SUMMARY

A nutritional survey of infants and young children was conducted in four rural villages of the northeast Brazilian state of Pernambuco. That survey sought information relating, among other things, to the nutritional status of young children, parental land ownership, maternal literacy, and the duration of breast-feeding. This article treats data collected during the survey that relate to the nutritional status of infants within the survey population.

In all, 225 of the 689 families surveyed were found to have children less than one year old within the household. In terms of the Gómez weight-for-age classification, 50.3% of the infants over three months old were found to be malnourished, with 17.9% exhibiting grade II or grade III malnutrition.

A correlation was also found between these infants' nutritional status and parental land ownership. In addition, a statistically significant difference was found between the nutritional status of infants who were never breast-fed and those who were being breast-fed at the time of the survey. However, no significant correlation was found between parental land ownership and the duration of breast-feeding. Similarly, no significant association was found between the duration of breast-feeding and maternal literacy, perhaps partly because maternal illiteracy was very pervasive at all socioeconomic levels within the study population.

The principal reasons given for weaning infants within the study population were "mother's milk dried up" (in 44% of the cases) and "child refused breast" (in 20%). About 37.6% of the infants never received breast milk, and the median age of weaning (for those that had been weaned or had never

received breast milk) was estimated at 15 days. Overall, these findings appear to demonstrate an urgent need for food and nutrition policies directed toward infants, not only for purposes of making more food available to the family and improving environmental conditions, but also for the purpose of encouraging breast-feeding.

REFERENCES

- 1 Sigulem, D., E. Tudesco, N. de J. Manuel, P. Goldemberg, and S. Gaihanan. *Influências das práticas alimentares no estado nutricional do lactante e da criança pré-escolar*. Escola Paulista de Medicina. Unidade de Nutrição; São Paulo, 1980.
- 2 International Union of Nutrition Scientists. Results and Policy Implications of the Cross-National Investigation: Rethinking Infant Nutrition Policies Under Changing Socio-economic Conditions: Project Report. Oslo, 1982, 97 pp.
- 3 Weiss, J., and P. Marin. *Programa Nacional de Aleitamento Materno: Estudo do aleitamento materno na Grande São Paulo e na Grande Recife em 1981*. INAN/UNICEF, Brasília, 1981, 41 pp.
- 4 Gómez, F. Desnutrición. *Bol Méd Hosp Infant Mex* 3(4):543-551, 1946.
- 5 World Health Organization. *Measuring Change in Nutritional Status: Guidelines for Assessing the Impact of Supplementary Feeding Programs for Vulnerable Groups*. Geneva, 1983, 101 pp.
- 6 Almeida, J. S. de, et al. Estado nutricional de crianças no primeiro ano de vida em comunidades rurais de Planaltina, Brasil, em 1976. *Bol Of Sanit Panam* 89(6):546-551, 1980.
- 7 Costa, E., S. de A. M. Romani, M. Batista Filho, and A. N. da Rocha. Desnutrição recente, crônica e progressiva em quatro localidades do Estado de Pernambuco, Brasil. *Revista de Saúde Pública* 15:211-220, 1981.

- 8 Amigo, H. C., et al. *Pesquisa multidisciplinar de nutrição em área rural do Agreste Pernambucano*. (Relatório Parcial.) Universidade Federal de Pernambuco, Departamento de Nutrição, Recife, 1981, 87 pp.
- 9 Coêlho, H. A. L. *Estado nutricional e condições sócio-econômicas*. (Thesis.) Universidade Federal de Pernambuco, Recife, 1975, 62 pp.
- 10 Thomson, Z. Fatores associados ao desmame em um grupo populacional, Londrina, PR. *Jornal de Pediatria* 46(2):93-98, 1979.
- 11 Bauzá, C. A., et al. Estudio epidemiológico sobre prácticas de lactancia materna. *Archivos de Pediatría del Uruguay* 51(2):89-99, 1980.
- 12 Barudi, L. C., A. M. Bengoechea, B. X. Basso, and S. T. Oppliger. Lactancia natural. *Bol Méd Hosp Infant Mex* 36(4):757-767, 1979.