Brazil

Breastfeeding and Diarrhea in Brazilian Children

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The Population Council

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Demographic and Health Surveys
Institute for Resource Development/Macro Systems, Inc.

BRAZIL

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PREFACE

The Demographic and Health Surveys (DHS) Program was initiated in September 1984 and designed as a follow-on to the World Fertility Survey (WFS) and Contraceptive Prevalence Surveys (CPS). The objectives of the program include the expansion of the intenational population and health data base in Africa, Asia, and Latin America to assist in policy formulation and implementation and the development of skills and resources in survey design and analysis among those working in the program.

With funding provided by the U.S. Agency for International Development, DHS is implemented by the Institute for Resource Development/Macro Systems, Inc. and the Population Council, a major subcontractor. The Population Council, an international nonprofit organization established in 1952, undertakes social and health science programs and research relevant to developing countries and conducts biomedical resarch to develop and improve contraceptive technology. The Council provides advice and technical assistance to governments, international agencies, and nongovernmental organizations, and it disseminates information on population issues through publications, conferences, seminars, and workshops.

The Population Council was responsible for the establishment, funding, and provision of technical assistance to as many as 25 further analysis studies, in countries where DHS surveys were conducted during the years 1986 and 1987. The studies focus on one or more of the topics covered in the DHS survey, such as fertility, contraception, maternal and child health, breastfeeding, marriage, and fertility preferences; their interrelationships, for example, the effects of the proximate determinants of fertility and the determinants of contraceptive use or child survival; and their correlation with background variables. Although the principal source of data is the DHS survey, comparisons with previous WFS, CPS, or other surveys in order to examine trends over time are included in some of the studies.

Information on the DHS Program can be obtained by writing to: DHS Program, IRD/Macro, 8850 Stanford Boulevard, Suite 4000, Columbia, Maryland 21045, USA (Telephone: 301-290-2800; Telex: 87775; Fax: 301-290-2999). For copies of the studies published in the DHS Further Analysis series, write to the DHS Program, The Population Council, One Dag Hammarskjold Plaza, New York, New York 10017, USA.

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CONTENTS

I. INTRODUCTION

A Demographic and Health Survey (DHS) was conducted in Brazil from May to August 1986, collecting information on a large number of variables concerning maternal and child health. The population studied was based on a sample of 8,519 households from eight regions. The study included rural and urban families, with the exception of Region 5, where only urban families were studied (Table 1).

This is the final report of the analysis of information on feeding patterns with special emphasis on breastfeeding and diarrhea, collected during the 1986 Brazil DHS survey, as part of a contract authorized between the Population Council and the Universidade Federal de Pelotas, Brazil.

II. METHODOLOGY

Creation of Files

A data set stored in diskettes and the samples weights were received from the Population Council. An SPSS/PC+ file was created, which included the information of interest on feeding habits, diarrhea, and explanatory variables for the last child born to each woman of reproductive age (15-44 years) (Nourussis, 1986). We have decided to restrict the analysis of feeding patterns and diarrhea to the last child born, since a previous Brazilian study has shown that the accuracy of recall of breastfeeding duration decreases as the child's age increases (S. R. Huttly, personal communication). Another reason for restricting the analysis of the duration of breastfeeding to the last child is that two children born to the same mother are not independent, and this would violate some of the underlying assumptions of the statistical tests being used. Likewise, the analysis of diarrhea was also restricted to the last child because this disease is particularly lethal among small children under the age of two years (Becker and Lechtig, 1986). The analysis, therefore, was restricted to the 2,512 children born from 1981 onwards and who were the last children of all of the women included in the study. Including up to the last four children born to each mother would imply having a large number of older children. The information for each region was weighted so that it is representative of the entire country of Brazil, excluding the rural areas of the Northern (Amazon) region. All analyses were performed using weighted data.

Analysis of Breastfeeding

Since many children had censored information on the duration of breastfeeding, as they had either died while being breastfed or were alive and still breastfeeding at the time of the interview, this variable was analyzed using survival analysis techniques. The Epilog (Epidemiology and Clinical Trials Statistics Package) software was employed for these analyses (EPILOG, 1987). The prevalence of breastfeeding at each month of age from birth to 24 months was calculated, as well as the median duration of breastfeeding. The following independent variables were included in the analysis: region of residence, whether the family lived in urban or rural areas, sex of the child, year of birth, type of delivery, water supply, sewage disposal, age of the mother, maternal education, smoking, and family income (in quartiles). In addition, a dichotomous variable--breastfeeding at six months of age--was used in a logistic regression model, and the odds ratios obtained were adjusted for the effect of family income. This analysis was carried out with the EGRET package (EGRET, 1988).

Analysis of Other Feeding Patterns

Information was obtained about the ingestion of water, juices, milk, and mashed/solid foods in the last 24 hours prior to the interview. We have analyzed the pattern of liquid and food ingestion of the children living in different regions of the country and also at different ages in the first year of life. Unfortunately, this information was collected only for children still being breastfed, whereas for those who were not breastfed the questions were skipped. Thus, the analysis applies only to the feeding patterns and habits of a select portion of Brazilian infants.

Analysis of Diarrhea and the Relationship between Breastfeeding and Diarrhea

Information was available about diarrhea in the last 24 hours and in the last two weeks. Frequencies of these two variables were obtained and then cross-tabulations were made between these variables and a list of relevant independent variables: region, whether the family lived in urban or rural areas, sex of the child, water supply, sewage disposal, age of the mother, maternal education, and family income (in quartiles).

The prevalence of diarrhea according to feeding mode at the time of the interview was obtained, and then the odds ratios for diarrhea prevalence were determined, according to breastfeeding status, before and after adjusting for the possible effect of confounding variables through logistic regression techniques.

III. RESULTS

Feeding Patterns

The following information was collected regarding breastfeeding for the last four children of every woman interviewed, provided they had been born from 1981 onwards: Did you breastfeed your child? Are you currently breastfeeding? For how many months did you breastfeed? How many times did you breastfeed from last night until this morning? How many times did you breastfeed yesterday from sunrise to sunset?

Feeding Patterns of Breastfed Children

Table 2 shows that the mean number of daily breast feeds per breastfed child was equal to 7.3 for the entire country, these being equally divided between day and night. There were only small regional variations in the number of breast feeds. It is also interesting to note that the mean number of breast feeds per day did not change for infants from 0 to 12 months of age (Table 3). It seems that the introduction of weaning foods did not lead mothers and babies to decrease the number of breast feeds. These findings suggest that in this maternal population, prolonged periods of amenorrhea should be expected, since this effect is mainly produced by the secretion of prolactin, which is dependent upon the number of breast feeds per day. However, short periods of amenorrhea have been found in this same population, and the reasons for this situation should be investigated. It is possible that the duration of breastfeeding episodes are not sufficient to maintain a high level of blood prolactin. On the other hand, important differences in the duration of amenorrhea among different socioeconomic groups are to expected, as have been described elsewhere (Vitzthum, 1989).

For children still breastfed at the time of the survey, information was collected on whether they received any of the following foods during the past 24 hours: water, fruit juice, formula, cow's milk, any other type of liquid, and mashed or solid food. Table 4 shows the proportions of breastfed children receiving different foods and liquids in all the regions studied. On the basis of the data in this table, it is difficult to establish a pattern of child feeding for the entire country, since it is based on a sample of children at different ages under five years. To overcome this difficulty, in Table 5 we describe the proportion of breastfed babies receiving other liquids and foods at different months in the first year of life. These results can also be seen in Figure 1. It is striking that under the age of two months, half of the children being breastfed were receiving water, 41 percent had other liquids, 23 percent received cow's milk, and the same proportion was receiving formula. This shows that exclusive breastfeeding is a rare situation, with supplementation with other liquids being the rule. In fact, Table 6 shows that only 6 percent of babies below the age of two months were exclusively breastfed (see also Figure 2). Given present knowledge that even the use of water or herbal teas increases the risk of diarrhea morbidity and mortality, this feeding pattern is a reason for concern (Brown et al., 1989; Victora et al., 1989). Mothers and health workers should have access to the information that babies being successfully breastfed do not require any other type of liquids and that keeping them exclusively breastfed is an important way of preventing serious infectious diseases and deaths.

FIGURE 1. FOODS CONSUMED BY BREASTFED INFANTS, ACCORDING TO AGE

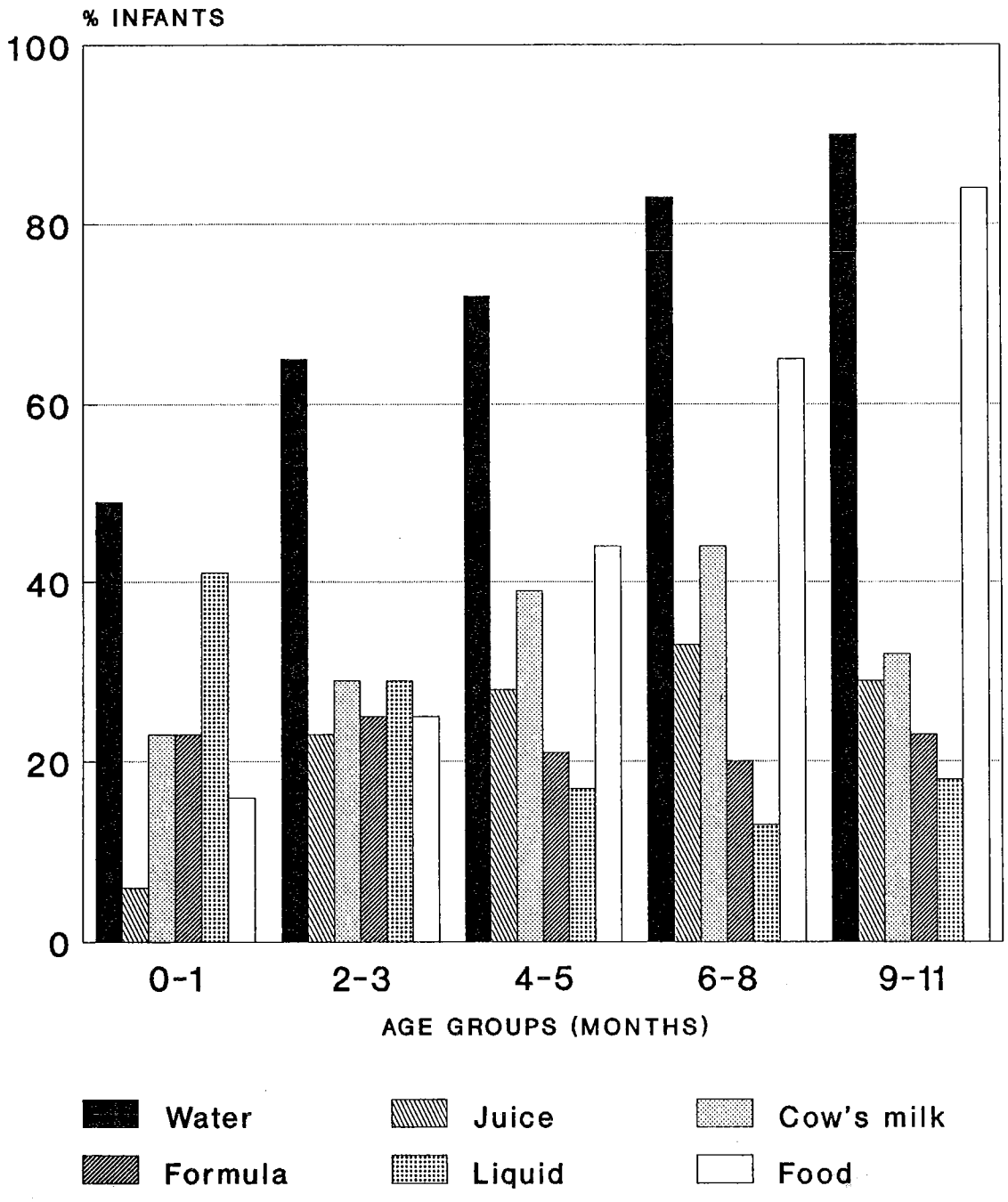

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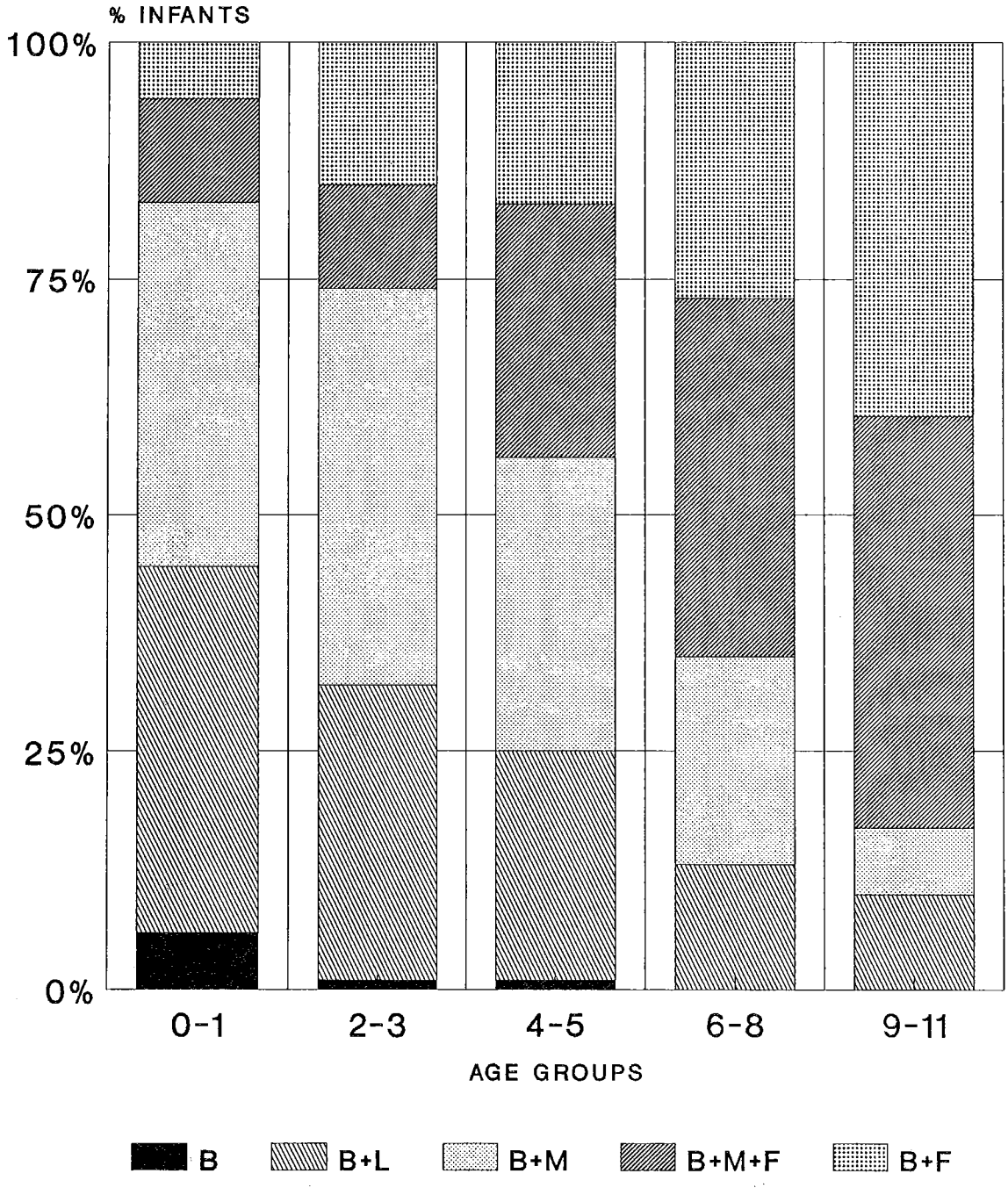
FIGURE 2. FEEDING MODE OF BREASTFED INFANTS BY AGE



B=BREAST M=OTHER MILK
L-LIQUIDS F=FAMILY FOOD

F2DMOBIBA

Another finding of interest relates to the early introduction of mashed or solid foods in the baby's diet. In the first two months of life, 16 percent of the babies were receiving these foods, and this proportion increased to 25 percent in the two- to three-month age group. Although the importance of appropriate weaning foods is a well known subject, there is general agreement that they should not be introduced before the age of four months.

Duration of Breastfeeding by Selected Variables

The discussion of breastfeeding patterns, according to different social, demographic, and biological variables is based on the results presented in Tables 7 to 11. The median duration of breastfeeding in Brazil in 1986 was equal to 90 days, an extremely short duration for a developing country. This estimate is shorter than previous reports based on the DHS data (Studies in Family Planning, 1988), but it should be noted that these have reported mean, rather than median durations. Since the duration of breastfeeding is positively skewed, the mean is greater than the median.

Area of Residence

The median duration of breastfeeding of rural children was well over that of urban ones--130 versus 84 days. Although the proportion of children who started breastfeeding was almost the same, by one month of age there were already some differences in the pattern of breastfeeding, with 76 percent of the rural babies being breastfed compared to 70 percent in the urban population.

The odds ratio for being breastfed at six months was significantly higher for rural, relative to urban infants. The odds ratio is approximately equal to the relative risk. For example, the odds ratio of 1.26 for rural children means that, at six months of age, they are approximately 1.26 times (or 26 percent) more likely to be breastfed than the baseline category, which is composed of urban children. Likewise, an odds ratio of 0.8 indicates a 20 percent reduction in the proportion of children breastfed. (In fact, the odds ratio slightly overestimates the relative risk if the condition under study is common, such as being breastfed at six months of age.)

The association between place of residence and breastfeeding at six months of age, however, was no longer significant after adjusting for family income. In other words, it seems that the urban-rural differential could be explained by differences in family income. However, as it is well known that family income is not a good indicator of socioeconomic status for rural populations, since many goods are directly produced and exchanged in these areas, it is also possible that the differences may be due to other socioeconomic variables, for which family income is a proxy. It appears that in 1986, rural Brazilian mothers living a more traditional life-style were, as a group, more likely to breastfeed, probably because they were less exposed to "modern" changes in feeding habits such as bottle feeding and also had more time to devote to their children.

Region

The Northern (Amazon) region was, by far, the area with the longest duration of breastfeeding--more than seven months (218 days). It should be remembered that in this region only urban children were studied, and it is possible that if rural families had been included, this duration could be even higher. The Central region comes next with a median duration of breastfeeding of more than four months (140 days). It is striking that the Northeast, the poorest region in the country, showed one of the lowest frequencies of breastfeeding, with a median duration of only 81 days. In a region where the babies are most in need of the protective effects of human milk against infectious diseases, less than half of the children were still being breastfed at three months of age.

Family Income

This variable was used as an indicator of socioeconomic status, although we have already discussed that in rural areas this is very often not the case, since families might sometimes have an adequate standard of living with a low monetary income, because they produce most of the goods they consume (Victora, 1983). However, for practical purposes and for a predominantly urban population, family income in Brazil is a good socioeconomic indicator. We have divided families in quartiles, and Table 7 shows that babies belonging to

the less privileged families--those in the two lowest quartiles--presented a median duration of breastfeeding of four months, whereas those in the highest quartiles had a median duration of less than three months. This is the traditional pattern of breastfeeding observed in most of the nonindustrialized countries, but it should be stressed that this is also changing in some urban areas of Southern Brazil, where the richest groups are now breastfeeding for longer periods than the poor groups (Barros et al., 1986b).

Maternal Education

Among babies whose mothers had never attended school, the median duration of breastfeeding was six months, being five months for the group with one to two years of schooling and less than three months for those whose mothers attended school for four or more years. It is interesting to note that the association between maternal education and breastfeeding remains exactly the same, even after adjusting for family income (Table 10). This means that although both maternal education and income can be regarded as proxies for socioeconomic status, the former variable has an independent influence on the prevalence and duration of breastfeeding. This finding might have important policy implications.

Year of Birth

In the analysis of this variable, children born in 1986, the year of the survey, had to be excluded, since they were few in number and most of them had censored information. During the period 1982-86, a nationwide mass-media campaign of breastfeeding promotion was launched in Brazil, and it was expected that this would have had an impact on the patterns under study. In fact, it seems that the median duration did increase after 1982, and the proportion of babies still being breastfed at six months of age increased from 30 to 40 percent. This confirms the results of other studies conducted in the cities of São Paulo and Recife, which also show an increase in the prevalence and duration of breastfeeding after the start of the campaign (CEBRAP/FINEP/MS, 1988).

Smoking

Children whose mothers smoked were breastfed significantly less often than those of non-smokers--a median duration of 102 days and 80 days, respectively (Figure 3). The difference between the groups is still significant after adjusting for the possible confounding effect of family income. This finding has been described in other studies both in Brazil (Barros et al., 1986c) and in the United Kingdom (Lyon, 1983), but it remains to be known whether this is attributable to the direct effect of inhaled substances on breast milk production or if the most important effect is on birthweight, with small babies being less able to suckle properly and maintain the production of breast milk. It is also possible that smoking mothers may present higher levels of anxiety, which might render them less able to breastfeed for longer periods.

Type of Delivery

Babies delivered by cesarean section were breastfed for shorter periods than those delivered vaginally (Figure 4). This difference was still significant even after controlling the effect of family income, which is important in Brazil, where high-income women are at greater risk of having a cesarean section for non-medical reasons (Barros et al., 1986a). It is interesting to note that the difference in breastfeeding duration between the two groups is not likely to be attributed to early neonatal morbidity, as might be thought, since many of the cesarean sections could well be performed due to perinatal problems that would render babies less able to be placed at the breast soon after birth. Both groups are equally likely to initiate breastfeeding (88 percent and 87 percent), but by one month of life there is already a noticeable difference in prevalence (68 percent in the cesarean group against 74 percent). In the country with the highest proportion of surgical deliveries in the world, this finding is of importance and should be known by the health authorities and the general population.

FIGURE 3. BREASTFEEDING DURATION ACCORDING TO MATERNAL SMOKING

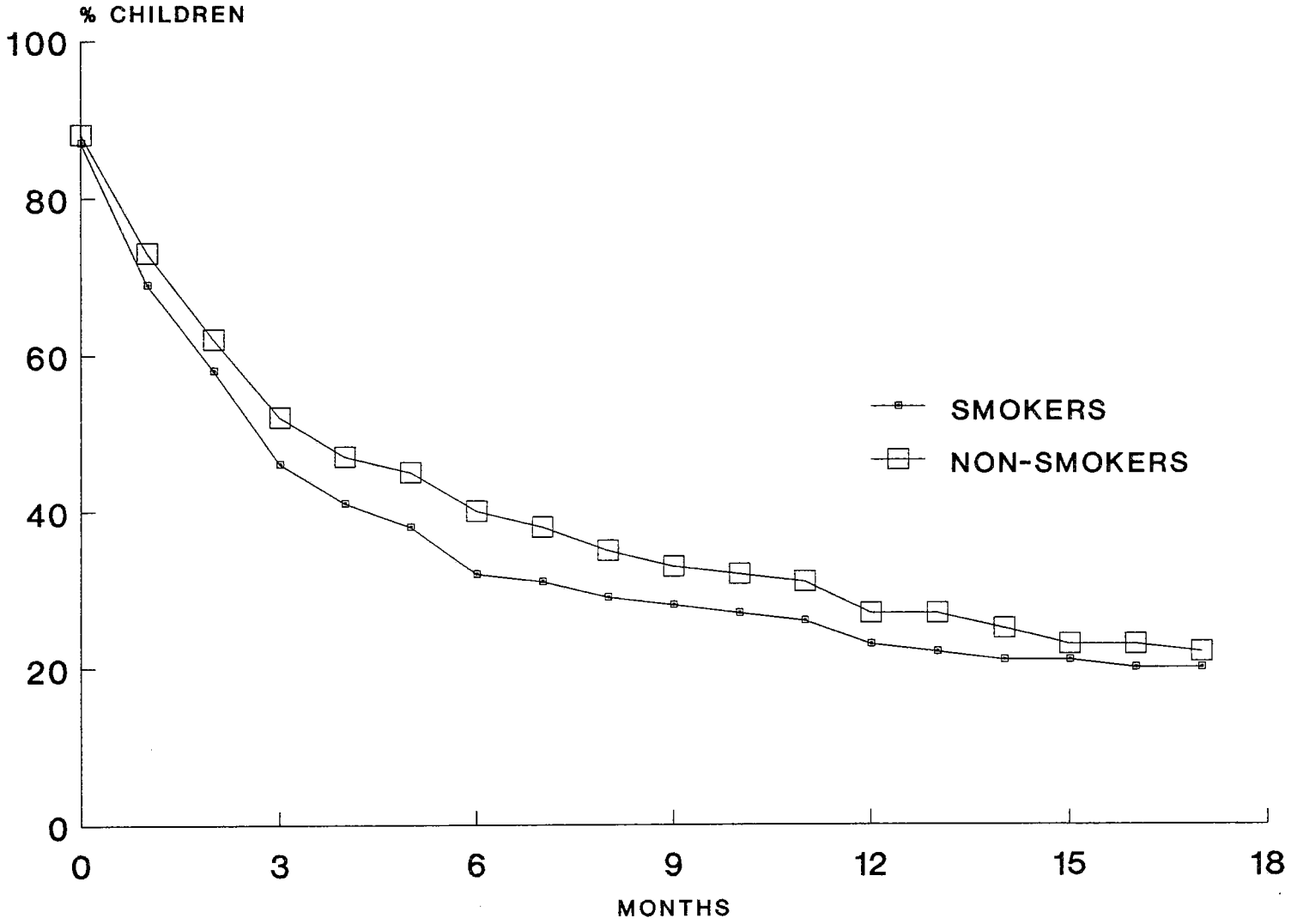


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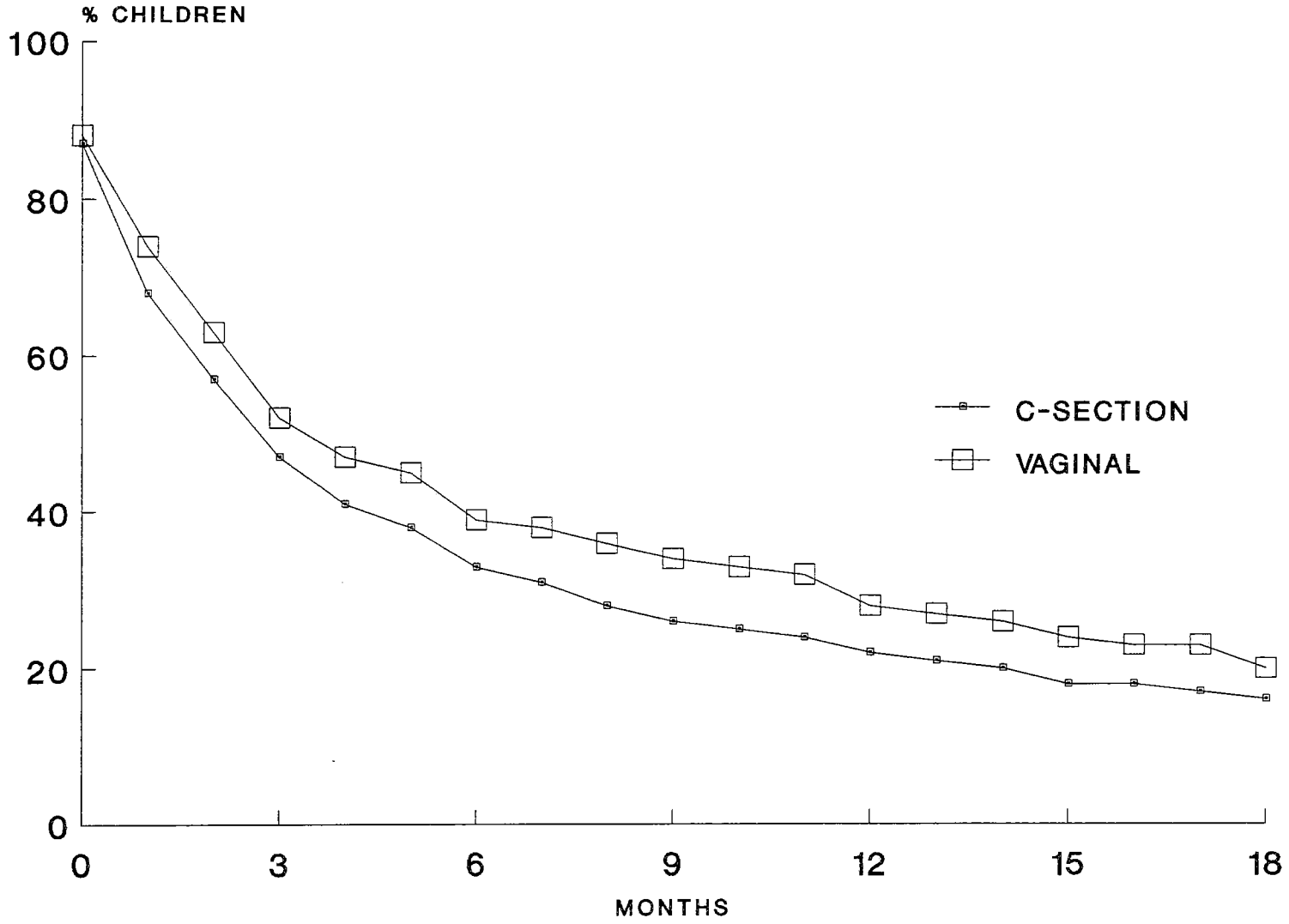
FIGURE 4. BREASTFEEDING DURATION ACCORDING TO TYPE OF DELIVERY



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Sex

Female babies were more likely to be breastfed for longer periods than males--96 and 87 days, respectively--a statistically significant difference. This is the opposite pattern of what has been described in many traditional societies, where families tend to overvalue male babies, since in the future they may be more active in providing parents with financial support. This sex difference was more marked in the first two months of life. By six months of age (Tables 8 and 9), the differences are no longer significant.

Maternal Age

Mothers aged 35 or more years were more likely to breastfeed for longer periods than younger women. It is possible that this might be linked to parity, with older mothers having had other children and a previous positive experience with breastfeeding. Another interesting finding was that adolescent mothers did not show any disadvantage regarding breastfeeding, in comparison with other age groups up to 35 years of age. In fact, the group that presented the poorest nursing performance were mothers between 20-24 years of age.

Diarrhea

For the entire country the proportion of children, who presented diarrhea in the two weeks preceding the interview was 19.7 percent, and 8.7 percent had diarrhea during the 24 hours prior to the interview (Table 12). These are very high prevalences, unlike those found in other Brazilian studies, especially if one takes into account that the field work was conducted between May and August, during the season of low diarrhea incidence (UNICEF/IPLANCE, 1989). In particular, the ratio between daily prevalence and two-week prevalence was very high, which suggests either that the mean duration of episodes was extremely long or there were problems in the collection of the data.

There were large variations in the prevalence of diarrhea in the different regions studied. As expected, the highest prevalences were observed in the poorest Northeast region, where one-fourth of the children had had diarrhea during the last two weeks. This figure contrasts with 16.1 percent and 11.1 percent observed in Rio de Janeiro and São Paulo, respectively. For urban children, the prevalence during the last two weeks was 16.8 percent, compared to 27.0 percent for rural children, reflecting the poor environmental and living situations of families living in rural areas.

There were striking variations in the prevalence of diarrhea in relation to socioeconomic variables, such as family income and maternal education. Regarding the first one, the prevalence of diarrhea in the last two weeks was twice as high in the lowest quartile of income (23.5 percent) compared to the highest (11.3 percent). In relation to maternal education, children whose mothers had never attended school had a two-weeks prevalence of 30.3 percent compared to 10.6 percent in the group with 12 or more years of schooling.

There were also marked variations in relation to environmental variables (water supply and sanitation). Children living in homes with piped water had experienced half of the prevalence of diarrhea in comparison to those without this facility (13 percent and 27 percent, respectively).

Regarding the year of birth, children born during the years 1984 and 1985 (ages between 6 and 32 months) presented the highest prevalences in the last two weeks (approximately 16 percent). Children born during the year of the research (1986), thus aged 0-8 months, showed a lower prevalence (11.1 percent) than the previously cited group. This is in agreement with the age distribution of diarrhea found in other Brazilian studies.

Diarrhea and Breastfeeding

Table 13 presents data on the prevalence of diarrhea during the last 24 hours and in the two weeks before the survey, according to breastfeeding status. Surprisingly, there were no significant differences in these prevalences between breastfed and non-breastfed children. In fact, there was a slight increase in the prevalence of diarrhea for breastfed children. This lack of association might have been due to the confounding effect of other variables. For example, low-income children are likely to be breastfed for longer periods and also to have more frequent diarrheal episodes. However, when the possible confounding effects of age, family income, and

more frequent diarrheal episodes. However, when the possible confounding effects of age, family income, and maternal education where controlled through logistic regression (Table 14), the differences between the groups remained non-significant.

This finding does not imply that breastfeeding is not an important factor protecting against intestinal infections, as this has been conclusively demonstrated (Victora et al., 1987). However, in the population under study it was impossible to show an impact of this protective effect on diarrhea prevalence, even after controlling for the confounding effect of some important variables, such as age, family income, and maternal education. The following hypotheses may be offered concerning the absence of an association:

a) Although the questionnaire and the instructions to the interviewers were clear, it is possible that errors occurred in data collection, particularly in the definition of diarrhea and in the mother's understanding of this term. As noted above, the possibility of errors is raised by the unbelievably high prevalences of diarrhea, particularly if one considers that the field work was conducted during the low-prevalence season.

b) The survey took place in the winter months, when viral diarrhea episodes predominate. It has been suggested that breastfeeding provides little or no protection against such episodes, unlike the protection it provides against summer (bacterial) diarrheas (Glass et al., 1986).

c) It is possible that other variables not included in the logistic regression might have accounted for the findings described.

d) Another likely explanation is that, as exclusive breastfeeding is such a rare event in Brazil, the protective effect of breastfeeding becomes somewhat diluted by the utilization of contaminated weaning foods soon after birth.

IV. CONCLUSIONS

The 1986 Brazil Demographic and Health Survey disclosed very important findings in maternal and child health that should be brought to the attention of Brazilian families, health workers, and health policymakers. Among the important findings of the present study, we would like to highlight the following.

Low Prevalence and Duration of Breastfeeding

Although the beneficial effects of breastfeeding for young children are widely known, it is striking how short the mean duration is among Brazilian children. There are suggestions in the present report that this duration has been increasing in recent years, perhaps as a result of the intensive promotion programs developed by the Ministry of Health. Unfortunately, the mass-media breastfeeding campaigns have been stopped, and this may result again in a decline in breastfeeding.

Considering the high protection conferred by human milk against infantile infections, besides its contraceptive and emotional advantages, a permanent educational campaign should be implemented, involving different segments of the health and lay community.

Besides some well-known risk factors for early weaning, such as higher educational and socioeconomic status and residence in an urban community, the study identified two other important variables related to decreased breastfeeding prevalence. One of them is cesarean delivery, and this is a very important factor in a country where at least one-third of the babies have surgical births. The other is smoking, although the precise route through which this affects breastfeeding is still not well established. Both smoking and cesarean sections can be reduced with the help of health education campaigns, involving both the lay community and the health care sector.

Early Introduction of Weaning Foods

It is surprising how early supplementary liquids and foods are introduced into infants' diets. Even among successfully breastfed babies, supplementation with water and herbal teas is the common rule in the country. These practices are promoted and encouraged by health workers, including doctors, even though it has been shown that they increase the risk of infectious diseases, especially diarrhea. Also, the early introduction of liquids and foods contributes to early weaning, as it reduces the frequency of breast feeds and the secretion of prolactin.

The Problem of Diarrhea

It has been shown that in poor areas of the country diarrhea is a highly common disease, and it is closely related to environmental and socioeconomic variables. Since diarrhea is responsible for one-third of the infant deaths in the Northeast region, the magnitude of this problem cannot be underestimated. It seems clear that profound political and social changes are needed to improve the living patterns of a large segment of the population and thereby decrease the burden of preventable infectious diseases, such as diarrhea (Becker and Lechtig, 1986). However, at the same time, it is necessary to improve case-management both at the domiciliary and health center level, giving special emphasis to oral rehydration therapy and maintenance of normal feeding during the diarrhea episode, particularly breastfeeding. It is also important to promote preventive measures, which are known to decrease the incidence and severity of diarrhea, such as the promotion of breastfeeding (even though this was not confirmed in the present analysis), weaning education, improvements in water supply and domestic hygiene, and measles immunization (Feachem, 1986).

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APPENDIX A: Tables

Table 1 Brazilian population by state enumerated in the PNAD and DHS regions

PNAD region	DHS region		States
I	1	Rio de Janeiro	Rio de Janeiro
II	2	São Paulo	São Paulo
III	3	South	Paraná, Santa Catarina, Rio Grande do Sul
IV	4	Central-East	Minas Gerais, Espírito Santo
VI	4	Distrito Federal	Distrito Federal
V	5	Northeast	Maranhão, Piauí, Ceará, Rio Grande do Norte, Paraíba, Pernambuco, Alagoas, Sergipe, Bahia
VII	6	North (urban only)	Amazonas, Pará
VIII	6	Central-West (urban only)	Goiás, Mato Grosso, Mato Grosso do Sul

Table 2 Number of feeds at the breast during the day and the night in different regions, Brazil, 1986

Region	Mean	SD	N
	Number of times breastfed during the day		
Rio de Janeiro	3.1	3.0	22
São Paulo	2.8	2.4	43
South	4.4	2.7	53
Central/Southeast	3.6	2.5	68
Northeast	4.0	3.5	142
North	3.7	2.5	56
Brazil	3.8	3.0	384
	Number of times breastfed during the night		
Rio de Janeiro	4.1	2.4	31
São Paulo	3.2	2.7	45
South	4.1	2.8	51
Central/Southeast	2.6	1.8	88
Northeast	3.9	3.0	147
North	3.3	1.6	70
Brazil	3.5	2.5	432

Table 3 Mean daily number of breast feeds, according to the child's age (excluding non-breastfed children)

Age (months)	Mean number of feeds	Standard deviation	Number of children
0	8.6	3.5	16
1	9.9	6.2	54
2	9.3	3.4	47
3	8.4	3.1	34
4	10.0	3.6	30
5	10.1	7.3	41
6	8.1	3.2	18
7	8.2	4.3	30
8	8.0	3.9	20
9	10.1	6.3	22
10	9.8	4.0	18
11	9.9	4.6	22
Total	9.0	4.8	533

Table 4 Proportion of breastfed children who received foods and liquids in the last 24 hours, according to region of residence

	Percent					
Region	Water	Fruit juice	Powdered milk	Cow's milk	Other liquid	Mashed/ solid
Rio de Janeiro	87	37	28	50	46	70
São Paulo	74	41	35	28	43	52
South	68	20	12	46	41	58
Central/Southeast	74	23	10	40	14	61
Northeast	78	15	24	35	10	60
North	75	32	38	24	27	53
Brazil	76	24	24	36	24	59

Table 5 Proportion of breastfed infants, who also received other types of food, according to age

Age (months)	Percent of breastfed infants also receiving						
	Water	Juice	Cow's milk	Formula	Other liquids	Mashed/ solids	Number of children
0-1	49	6	23	23	41	16	70
2-3	65	23	29	25	29	25	83
4-5	72	28	39	21	17	44	71
6-8	83	33	44	20	13	65	69
9-11	90	29	32	23	18	84	62

Table 6 Percentage of breastfed infants receiving different diets, according to age, Brazil, 1986

Feeding mode	Age groups (months)				
	0-1	2-3	4-5	6-8	9-11
Exclusive BF	6	1	2	0	0
BF + liquids	39	31	24	13	10
BF + other milk	39	42	31	22	7
BF + milk + food	11	11	27	38	44
BF + food	6	15	17	27	40

Table 7 Median duration of breastfeeding (in days), according to different variables

Variable	Median duration in days	Number of children	p
Area of residence			<.01
Urban	84	1777	
Rural	130	735	
Region			<.01
Rio de Janeiro	66	267	
São Paulo	94	310	
South	80	342	
Central/Southeast	140	410	
Northeast	81	898	
North	218	285	
Family income			<.01
Low	120	629	
Low-med	120	640	
Med	87	637	
High	77	606	
Year of birth			<.01
1981	75	274	
1982	69	337	
1983	100	420	
1984	90	481	
1985	102	627	
Sex			.03
Male	87	1287	
Female	96	1225	
Smoking			.01
Smoker	80	843	
Non-smoker	102	1669	
Type of delivery			<.01
Vaginal	102	1731	
Cesarean-section	81	781	
Maternal age			<.01
<20	90	143	
20-24	82	583	
25-29	95	677	
30-34	90	575	
35-39	112	349	
40+	114	185	
Maternal education (years of school)			<.01
0	180	306	
1-3	150	718	
4-5	87	659	
6-11	70	705	
12+	78	124	

Table 8 Percentage of children being breastfed at different ages, Brazil, 1986

	Age in months					
	0	**1**	**3**	**6**	**9**	**12**
Area of residence						
Urban	87	70	48	35	28	23
Rural	89	76	56	43	39	32
Region						
Rio de Janeiro	88	64	38	25	20	18
São Paulo	85	72	51	37	29	23
South	87	70	46	37	33	28
Central/Southeast	90	76	58	44	38	32
Northeast	86	70	47	32	28	22
North	92	83	54	54	44	38
Family income						
Low	88	73	55	42	37	31
Low-med	87	73	53	41	36	31
Med	87	71	49	36	29	24
High	88	70	44	29	23	18
Year of birth						
1981	86	69	42	31	27	24
1982	81	66	43	31	25	19
1983	90	72	52	36	29	24
1984	87	73	50	38	32	27
1985	88	73	52	40	35	29
Sex						
Male	86	70	49	37	30	25
Female	89	74	51	38	33	27
Smoking						
Smoker	87	69	46	32	28	23
Non-smoker	88	73	52	40	33	27
Type of delivery						
Vaginal	88	74	52	39	34	28
Cesarean-section	87	68	47	33	26	22
Maternal age						
<20	90	73	50	35	28	28
20-24	87	69	47	33	26	19
25-29	88	73	51	36	30	26
30-34	88	74	50	37	31	27
35-39	87	74	53	43	37	32
40+	85	73	54	45	40	32
Maternal education (years of school)						
0	84	73	61	50	47	38
1-3	89	75	55	46	40	33
4-5	86	73	49	34	28	24
6-11	88	67	43	28	21	17
12+	91	73	44	24	15	10

Table 9 Odds ratios for breastfeeding until six months, according to selected variables, Brazil, 1986

Variable	Odds ratios (95% CI) for breastfeeding until six months		Number of children
	Crude	Adjusted for income	
Family income			
Low	1.00		541
Low-med	0.95 (0.75-1.21)		543
Med	0.76 (0.60-0.96)		555
High	0.67 (0.52-0.85)		540
LRT	14.14 (p=0.003)		
trend	13.46 (p<0.001)		
Region			
Rio de Janeiro	1.00	1.00	234
São Paulo	1.46 (1.01-2.11)	1.55 (1.07-2.24)	276
South	1.51 (1.05-2.16)	1.55 (1.08-2.23)	303
Central/Southeast	1.95 (1.38-2.76)	1.93 (1.36-2.73)	358
Northeast	1.33 (0.97-1.82)	1.17 (0.85-1.61)	771
North (urban only)	2.87 (1.97-4.19)	2.90 (1.98-4.24)	237
LRT	41.71	49.38 (p<0.001)	
Place of residence			
Urban	1.00	1.00	1553
Rural	1.26 (1.04-1.52)	1.12 (0.91-1.37)	626
LRT	5.76 (p=0.02)	1.15 (p>0.1)	
Sex			
Male	1.00	1.00	1126
Female	1.03 (0.87-1.22)	1.03 (0.87-1.22)	1053
LRT	0.12 (p>0.1)	0.12 (p>0.1)	
Year of birth			
1981	1.00	1.00	274
1982	0.90 (0.64-1.25)	0.87 (0.63-1.22)	337
1983	1.28 (0.93-1.75)	1.25 (0.92-1.72)	420
1984	1.27 (0.94-1.73)	1.21 (0.89-1.65)	481
1985	1.35 (1.01-1.80)	1.28 (0.96-1.72)	624
1986	0.81 (0.41-1.61)	0.76 (0.38-1.51)	43
LRT	13.01 (p=0.02)	11.68 (p=0.04)	

Table 10 Odds ratios for breastfeeding until six months, according to maternal characteristics, Brazil, 1986

Variables	Odds ratios (95% CI) for breastfeeding until six months		Number of children
	Crude	Adjusted for income	
Maternal age			
<20	1.00	1.00	103
20-24	1.05 (0.67-1.62)	1.06 (0.68-1.65)	480
25-29	1.25 (0.81-1.93)	1.29 (0.84-2.00)	592
30-34	1.15 (0.74-1.78)	1.19 (0.77-1.85)	518
35-39	1.41 (0.89-2.23)	1.44 (0.91-2.29)	314
40+	1.42 (0.86-2.34)	1.42 (0.86-2.34)	172
LRT	6.74 (p>0.1)	6.73 (p>0.1)	
trend	4.72 (p=0.03)	4.60 (p=0.03)	
Maternal smoking			
Smoker	1.00	1.00	729
Non-smoker	1.35 (1.12-1.62)	1.35 (1.12-1.62)	1450
LRT	10.16 (p=0.001)	10.11 (p<0.001)	
Maternal reading ability			
Fluent	1.00	1.00	1381
With difficulty	1.60 (1.27-2.01)	1.51 (1.20-1.92)	378
Illiterate	1.63 (1.31-2.03)	1.51 (1.19-1.90)	420
LRT	28.42 (p<0.001)	18.14 (p<0.001)	
Maternal schooling			
0	1.00	1.00	269
1-3	0.77 (0.58-1.03)	0.78 (0.58-1.04)	615
4-5	0.53 (0.40-0.72)	0.55 (0.41-0.73)	585
6-11	0.44 (0.32-0.58)	0.45 (0.33-0.62)	602
12+	0.38 (0.23-0.60)	0.39 (0.24-0.65)	108
LRT	48.47 (p<0.001)	36.13 (p<0.001)	
trend	47.60 (p<0.001)	35.08 (p<0.001)	
Type of delivery			
Cesarean-section	1.00	1.00	680
Vaginal	1.36 (1.13-1.64)	1.27 (1.04-1.54)	1499
LRT	10.43 (p=0.001)	5.77 (p=0.02)	

Table 11 Odds ratios for breastfeeding until six months, according to environmental characteristics, Brazil, 1986

Variable	Odds ratios (95% CI) for breastfeeding until six months		Number of children
	Crude	Adjusted for income	
Water supply			
Inside the house	1.00	1.00	1247
Outside the house	1.91 (1.45-2.52)	1.83 (1.38-2.43)	244
Other	1.52 (1.25-1.84)	1.40 (1.14-1.73)	688
LRT	31.95 ($p<0.001$)	21.31 ($p<0.001$)	
Sewage disposal			
Flushing toilet	1.00	1.00	703
Pit latrine	1.08 (0.84-1.39)	1.08 (0.84-1.40)	416
Other	1.76 (1.44-2.14)	1.69 (1.35-2.11)	1060
LRT	37.77 ($p<0.001$)	25.08 ($p<0.001$)	

Table 12 Proportion of children with diarrhea in the last 24 hours and in the last two weeks, Brazil, 1986

Variables	Percent	
	Diarrhea last 24 hours	Diarrhea last two weeks
Region		
Rio de Janeiro	8.7	16.1
São Paulo	5.4	11.1
South	3.1	14.1
Central/Southeast	9.0	19.2
Northeast	11.1	25.3
North	11.8	22.9
Area		
Urban	7.9	16.8
Rural	10.8	27.0
Family income (quartile)		
Low	11.5	23.5
Low-med	10.3	25.7
Med	7.9	18.2
High	5.3	11.3
Year of birth		
1981	1.9	7.6
1982	3.2	8.0
1983	7.8	16.0
1984	11.7	27.5
1985	11.0	26.1
1986	12.4	22.8
Water supply		
Inside the house	5.6	13.6
Outside the house	12.2	27.0
Other	13.3	28.3
Sewage		
Flush toilet	5.7	11.7
Pit latrine	6.3	16.5
Other	11.8	26.4
Maternal age		
<20	11.5	24.4
20-24	10.4	24.0
25-29	7.3	16.8
30-34	8.5	18.8
35-39	10.2	20.7
40+	4.8	13.3

Table 12 Proportion of children with diarrhea in the last 24 hours and in the last two weeks, Brazil, 1986

Variables	Percent	
	Diarrhea last 24 hours	Diarrhea last two weeks
Maternal education (years of schooling)		
0	12.1	30.3
1-3	12.1	24.6
4-5	8.5	19.3
6-11	4.8	12.6
12+	6.5	10.6
Sex of the child		
Male	8.7	19.9
Female	8.8	19.4
All children	8.7	19.7

Table 13 Prevalence of diarrhea, according to current breastfeeding status, Brazil, 1986

Currently breastfed	Percent diarrhea last 24 hours	Percent diarrhea last two weeks	Number of children
Yes	13.6	25.3	538
No	7.3	17.8	1580

Table 14 Odds ratios for the presence of diarrhea in the previous 24 hours, according to current breastfeeding status, before and after adjustment for confounding variables, Brazil, 1986

	Crude		Adjusted for confounders (*)	
	Odds ratios	**95% CI**	**Odds ratios**	**95% CI**
Diarrhea in last 24 hours				
Breastfed	1.00		1.00	
Not breastfed	0.80	(0.56-1.14)	0.88	(0.59-1.32)

(*) Adjusted for age, family income, and maternal education through logistic regression.

The research project reported on in this issue is "Breastfeeding Patterns, Trends, and Determinants in Brazil." For further information on this work, write to the principal investigators, Fernando C. Barros, M.D., Ph.D. and Cesar G. Victora, M.D., Ph.D., Departamento de Medicina Social, Faculdade de Medicina, Universidade Federal de Pelotas, C.P. 464, 96001 Pelotas, RS, Brasil.

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