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Early cow's milk consumption among Brazilian children: results of a national survey☆

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Abstract
Objective: to assess the intake, frequency, and type of milk consumed by Brazilian children younger than 60 months of age.
Methods: this was a cross-sectional study, which used secondary data from the National Demographic and Health Survey of 2006-2007. Data from 4,817 children under the age of 60 months were used. All analyses were performed with expanded samples. The dietetic survey assessed the previous day's consumption, and estimates were made through univariate analysis, presented as a percentage.
Results: on the day prior to the survey, breast milk was consumed by 91% of the children younger than six months of age, by 61.5% of the children aged 6 to 12 months, and by 34.8% of the children aged 13 to 24 months. Among the children who had received other types of milk, cow's milk was consumed by 62.4% of the children younger than six months, by 74.6% of the children aged 6 to 12 months, and by approximately 80% of the children older than 12 months. Infant formulas were consumed by 23% of the children younger than six months of age, by 9.8% of the children aged 6 to 12 months, and by less than 1% of the older children. Soy milk consumption varied from 14.6% to 20% among the investigated ages. Non-breast milk consumption before the age of six months was more frequent in children living in the Northeastern and Southern regions.
Conclusion: the results of the present study demonstrated that most children received cow's milk prematurely as a substitute for breast milk, highlighting the importance of the development of public policies to promote, protect, and support breastfeeding in all regions of Brazil, aiming at reversing the observed scenario.

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PALAVRAS-CHAVE
Substitutos do leite humano;
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Consumo precoce de leite de vaca entre crianças brasileiras: resultados de uma pesquisa nacional

Resumo

Objetivo: avaliar o consumo, frequência e tipo de leite ingerido por crianças brasileiras menores de 60 meses.

Métodos: estudo transversal baseado em dados secundários da Pesquisa Nacional de Demografia e Saúde de 2006/7. Foram utilizados dados de 4.718 crianças menores de 60 meses. Todas as análises foram realizadas com amostra expandida. O inquérito dietético representou o consumo do dia anterior e foi estimado por meio de análise univariada apresentada em percentual.

Resultados: consumiram leite materno no dia anterior à investigação 91% das crianças menores de seis meses e 34,8% das crianças de 13 a 24 meses. Entre as crianças que receberam outros leites, o leite de vaca foi consumido por 62,4% das crianças menores de seis meses, por 74,6% das crianças de 6 a 12 meses e por aproximadamente 80% das crianças maiores de doze meses. O consumo de fórmulas infantis foi de 23% em crianças menores de seis meses, 9,8% na idade de 6 a 12 meses e menor 1% nas demais idades. O consumo de leite de soja variou de 14,6% a 20% nas idades investigadas. O consumo de leite não materno antes de seis meses de idade foi mais frequente em crianças residentes nas Regiões Nordeste e Sul.

Conclusão: os resultados deste estudo mostram que a maior parte das crianças recebeu leite de vaca em substituição ao leite materno. Enfatiza-se a importância do fomento às políticas públicas de promoção, proteção e apoio ao Aleitamento Materno em todas as regiões brasileiras para reversão do cenário observado.

Introduction

Inadequate feeding practices in early life contribute to the fact that millions of children do not reach their full development potential, maintaining the intergenerational cycle of poverty.[1] The Brazilian Ministry of Health recommends that children should be exclusively breastfed until six months of age, and the introduction of complementary foods should start from this age onward, while maintaining breast milk consumption until age two years or older.[2]

According to the latest national survey on breastfeeding in Brazil, 41% of children younger than six months living in capital cities and in the Federal District were exclusively breastfed and 58.7% of children aged between nine and 12 months were breastfed.[3] The early consumption of food and other liquids other than breast milk before children had completed six months of life was observed in all capitals of the country.[4]

Approximately 50% of Brazilian children living in the capital cities had received breast milk substitutes at ages four to six months. Non-breast milk was the most common type food consumed, at greater frequency in the capitals of the Northeast and Southeast regions; however, the type of milk offered was not specified.[3,4] At the national level, the types of milk used as a breast milk substitutes for children aged up to two years are unknown. The aim of this study was to evaluate the intake, frequency, and type of non-breast milk used in the early years of life based on a national survey of a representative sample of the Brazilian population.

Methods

This was a descriptive study that used secondary data derived from the National Demographic and Health Survey (Pesquisa Nacional de Demografia e Saúde - PNDS) 2006/7.[5,6] The PNDS is a cross-sectional study that had as target population all women of reproductive age, defined as those between 15 and 49 years old, residing in the selected households. Their children younger five years of age at the time of the survey were also investigated. Complex sampling procedures were used, involving stratification of all census sectors in the country, random selection of clusters of sectors within the strata, and random selection of households within sectors.

The research has national representation for the five macro-regions and for urban and rural areas. A total of 14,617 households, 15,575 women, and 4,858 children younger than five years who were alive at the time of the interview were studied. Data were obtained through questionnaires applied in person with the women. The sampling procedures and data collection have been described in detail elsewhere.[5,6]

The child health status questionnaire included the assessment of food frequency to evaluate consumption of the following in the previous 24 hours: breast milk, cow's milk, infant formula, soy milk; as well as the number of times that the child had received a meal that included milk products other than breast milk on the day before. The types of preparations used to offer other types of milks were not investigated.

The household food security status was assessed by the Brazilian Food Insecurity Scale (Escala Brasileira de Insegurança Alimentar - EBIA) and classified as mild, moderate, or severe food insecurity.[6]

Data analyses were performed using the Statistical Package for Social Sciences (SPSS), release 20.0. The analyses were performed using the complex samples module. The analysis plan considered the sample weight for the children, stratum, and household clusters. All analyses were

performed with the expanded sample and, therefore, results are shown as percentages only. A total of 140 children who did not live with their mothers were excluded, resulting in a final database consisting of 4,718 children younger than 60 months who lived with their mothers. The frequency of consumption was investigated by means of univariate analysis.

The original study was approved by the Research Ethics Committee of the Center for Reference and Training in sexually transmitted diseases/acquired immunodeficiency syndrome (STD/AIDS) of the State Health Secretariat of São Paulo.

Results

Approximately 40% of the heads of the household had up to four years of schooling, and 26.6% of the families had family income below the Brazilian minimum wage (R$ 350.00 in 2006); 24.1% of the studied families participated in the Brazilian income transference program. 46.6% of the children lived in households with some degree of food insecurity (Table 1).

A total of 91.8% of children younger than six months and 61.5% of children aged 6-12 months were breastfed. A total of 40.1% of those younger than six months, and 77.1% of those aged six to 12 months consumed other types of milk than breast milk. Among the children who received other types of milk, cow's milk was consumed by 62.4% of those younger than six months, and by 74.6% of those aged between six and 12 months. Approximately 60% of children aged six to 24 months had consumed more than two meals containing products other than breast milk on the day before. The consumption of infant formulas was 23% in children younger than six months, and 9.8% in those aged six to 12 months. Consumption of soy milk ranged from 14.6% to 20% at the age ranges studied. Breastfed children showed high frequency of consumption of other types of milk in all age groups studied (Table 2).

Among those younger than six months, children living in the Northeastern (48.7%) and Southern regions (45%) presented the highest prevalence of consumption of milk other than breast milk on the previous day. Among children aged six to 12 months, those from the Southern and Midwestern regions had most frequently consumed more than two meals including products other than breast milk on the day before: approximately 70%. For children younger than 24 months, consumption of cow's milk was more prevalent in children living in the Northern and Northeastern regions, whereas the consumption of infant formula was higher in the Southern and Southeastern regions (Table 3).

Table 1 Characteristics of the household, family, mothers and children younger than 59 months. Brazil, 2006-2007.

	% (95% CI)
Stratum of household	
Urban	80.9 (77.6-83.8)
Rural	19.1 (16.2-22.4)
Number of people in the household	
2 to 3	31.0 (28.4-33.7)
4 to 5	50.5 (47.6-53.4)
≥ 6	18.5 (16.5-20.7)
Level of schooling of head of the family (years)	
≥ 12	6.5 (5.1-8.3)
9 to 11	27.0 (24.5-29.7)
5 to 8	30.3 (27.3-33.5)
0 to 4	36.1 (33.2-39.2)
Participant in an income transference program	
Yes	24.1 (21.5-27.0)
No	75.9 (73.0-78.5)
Family income (Brazilian Reais)	
≤ 350.00	26.6 (23.8-29.6)
> 350.00 - 540.00	11.7 (9.9-13.9)
> 540 - 1000.00	23.2 (20.9-25.7)
> 1,000.00	38.4 (35.0-42.0)
Level of food security/insecurity	
Food security	53.4 (50.0-56.9)
Mild food insecurity	27.0 (24.4-29.8)
Moderate food insecurity	11.6 (9.8-13.7)
Severe food insecurity	7.9 (6.6-9.4)
Mother's civil status	
No partner	13.8 (11.6-16.2)
With partner	86.2 (83.8-88.4)
Mother's age (years)	
< 20	10.6 (8.8-12.7)
≥ 20	89.4 (87.3-91.2)
Prenatal consultations	
< six	17.4 (15.4-19.6)
≥ six	82.6 (80.4-84.6)
Child's gender	
Male	52.3 (49.9-54.7)
Female	47.7 (45.3-50.1)
Child's age (months)	
< six	11.1 (9.5-13.1)
six to 12	11.9 (10.5-13.5)
13 to 24	19.0 (17.3-20.9)
25 to 59	57.9 (55.5-60.3)

CI, confidence interval.
All analyses were performed with expanded sample, considering the sample weight for children, stratum, and conglomerate. The non-expanded sample size n was 4,718.

Discussion

The results of this study demonstrate a high frequency of consumption of milk types other than breast milk at very early ages; cow's milk is the most consumed type, whether or not replacing breast milk. Thus, the results of this study demonstrate that food habits of Brazilian children fall short of the recommendations for a healthy diet.[2] The interruption of exclusive breastfeeding before six months of age and the discontinuation of breastfeeding in children older than six months are associated with increased morbidity and mortality in children.[7,8]

It is noteworthy that there are rare situations in which children cannot be breastfed;[9] in such cases, health professionals have an important role in counseling mothers about

Table 2 Prevalence of breastfeeding and consumption of breast milk substitutes in children younger than 59 months. Brazil, 2006-2007.

Description of milk consumption[a]	0 to 5 months %	6 to 12 months %	13 to 24 months %	25 to 59 months %
Was receiving breast milk				
Yes	91.8	61.5	34.8	8.0
No	8.2	38.5	65.2	92.0
Consumption of breast milk substitutes on the previous day				
Yes	40.1	77.1	85.5	83.7
No	59.9	22.9	14.5	16.3
Number of meals containing milk products on the previous day				
≤ 2	48.6	40.7	34.5	55.2
> 2	51.4	59.3	65.5	44.8
Type of milk consumed				
Cow's milk	62.4	74.6	79.6	83.1
Infant formula	23	9.8	0.4	0.1
Soy milk	14.6	15.6	20	16.8
Breastfed children				
Consumed other types of milk	33.4	64.3	67.9	70.5
Did not consume other types of milk	66.6	35.7	32.1	29.5

[a] All analyses were performed with expanded sample, considering the sample weight for children, stratum, and conglomerate. The non-expanded sample size n was 4,718.

infant feeding. The theoretical recommendations highlight that, when breastfeeding is impossible and all possibilities of relactation have been exhausted, children should receive infant formula; cow's milk is not recommended before one year of age.[2,10] However, this study demonstrates the excessive consumption of cow's milk in infants and shows an actual conflict between the technical recommendations and the reality observed in the country.

The frequency of consumption of other milks in this study is similar to that observed in the II Survey on Maternal Breastfeeding, which indicated that children younger than six months living in the Northeastern and Southeastern regions consume non-breast milk more frequently.[4] In the present study, the consumption of other types of milk was also high among children younger than six months living in the Southern Region. The present study contributes the data that cow's milk is the milk most often offered.

It has been demonstrated that early introduction of cow's milk is associated with low maternal education and low family socioeconomic status.[11] The results of this study confirmed this evidence, as cow's milk is most often consumed by children older than 12 months living in the Northern and Northeastern regions. Food and nutrition insecurity is commonly due to lack of financial resources to acquire food; the highest levels are found in the Northern and Northeastern regions.[12] Thus, in a situation of food insecurity, where there are restrictions to the amount of food available in the household, breast milk should be prioritized, as it will prevent an unnecessary expense for the purchase of other types of milk.[13]

In addition to social issues, other factors, such as the presence of maternal grandmothers, lack of support from the partners, teenager mother, having had fewer than six prenatal consultations, and the use of baby bottles/pacifiers also contribute to the non-continuity of breastfeeding and thus, the introduction of other types of food.[14–16]

A study carried out in the state of Pernambuco has shown that the food most consumed by children younger than six months was cow's milk (69.3%), followed by breast milk (60.0%), and sugar (52.9%).[17] Another study showed that 50.3% of children younger than six months living in Curitiba, São Paulo, and Recife were no longer breastfed, and that only 12.0% of those received infant formulas. In addition to the low frequency of infant formula use, only 23.8% received properly diluted formula, which is a risk for the children's health.[18] The present study did not evaluate the dilution, the type of preparation used to supply the meal, and type of milk used (liquid or powder).

According to the Brazilian Society of Pediatrics, cow's milk is not recommended for children younger than one year.[10] Cow's milk has a high amount of protein; an inadequate proportion between casein and whey proteins; high levels of sodium, chlorides, potassium, and phosphorus; and insufficient amounts of carbohydrates, essential fatty acids, vitamins, and minerals for this age group.[19] In addition to nutritional inadequacy, cow's milk is very allergenic for children, and its consumption has been associated with the development of atopy.[20]

Within the public health scenario, the high frequency of cow's milk consumption at all ages can contribute to the maintenance of high levels of anemia observed in the country.[6] The consumption of cow's milk at an early age and during childhood increases the risk of anemia.[21–23] The early introduction of cow's milk has a negative impact on children's iron stores due to the low quantity and bioavailability of iron present in this food. Additionally, it can cause microgastrointestinal bleeding due to the immaturity of the gastrointestinal tract, resulting in blood loss.[19]

Table 3 Prevalence of consumption of other types of milk in children younger than 59 months according to region of residence. Brazil, 2006-2007.

Description of milk consumption[a]	North (%)	Northeast (%)	Midwest (%)	Southeast (%)	South (%)
Had consumed other types of milk on the previous day					
Zero to five months	40.2	48.7	19.6	35.8	45.0
Six to 12 months	69.6	81.9	62.9	81.0	72.4
13 to 24 months	76.7	79.8	84.6	91.2	86.4
25 to 59 months	75.6	79.4	88.5	86.1	88.4
Had more than two meals containing milk products on the previous day					
Zero to five months	53.9	47.3	63.2	42.7	84.0
Six to 12 months	40.0	62.9	68.1	56.5	71.3
13 to 24 months	49.5	42.9	58.3	79.5	73.4
25 to 59 months	30.3	32.4	46.4	51.2	56.4
Type of milk consumed					
Children aged 0 to five months					
Cow's milk	76.7	70.3	47.7	59.5	40.8
Infant formula	17.9	12.2	17.7	32.6	34.1
Soy milk	5.4	17.5	34.6	7.9	25.0
Children aged six to 12 months					
Cow's milk	87.8	83.0	68.6	68.6	70.1
Infant formula	2.9	5.3	2.3	16.9	5.5
Soy milk	9.3	11.7	29.1	14.6	24.4
Children aged 13 to 24 months					
Cow's milk	80.0	84.8	71.9	78.5	78.0
Infant formula	1.7	0	0	0.6	0.0
Soy milk	18.2	15.2	28.1	20.9	22.0
Children aged 25 to 59 months					
Cow's milk	79.7	81.1	69.7	89.3	79.6
Infant formula	0.3	0	0.4	0	0.3
Soy milk	20.0	18.8	34.9	10.7	20.0

[a] All analyses were performed with expanded sample, considering the sample weight for children, stratum, and conglomerate. The non-expanded sample size n was 4,718.

It can also be observed that most children in all age groups who were still breastfed also received non-breast milk. Breastfed children do not need other types of milk or other dairy products, as the calcium from breast milk meets their requirements at this age.[2] Health professionals have an important role in counseling families, reinforcing the superiority of breast milk, and discouraging the introduction of other types of milk.

The practice of exclusive breastfeeding until six months of life, and of breastfeeding supplemented by other types of food up to two years of age or more, should be encouraged. Offering other types of milk to children in unnecessary situations should be prevented. Such behavior results in several benefits to the health of children and mothers, and it is a low-cost practice. When breastfeeding is impossible, cow's milk is not recommended for young children, and infant formula is expensive for most Brazilian families. Thus, it is extremely important to stimulate public policies that promote, protect, and support breastfeeding in all Brazilian regions to reverse the observed scenario.

Conflicts of interest

The authors declare no conflicts of interest.

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