



## INFANT FEEDING AND FACTORS RELATED TO BREASTFEEDING

### ALIMENTAÇÃO DOS LACTENTES E FATORES RELACIONADOS AO ALEITAMENTO MATERNO

### ALIMENTACIÓN DE LOS LACTANTES Y FACTORES RELACIONADOS CON LA LACTANCIA MATERNA

Nileide Lima Araújo<sup>1</sup>, Luisa Helena de Oliveira Lima<sup>2</sup>, Edina Araújo Rodrigues Oliveira<sup>3</sup>, Elaine de Sousa Carvalho<sup>4</sup>, Felipe Tavares Duailibe<sup>5</sup>, Laura Maria Feitosa Formiga<sup>6</sup>

This study aimed to investigate the feeding and the factors related to breastfeeding of infants in the city of Picos-PI, Brazil. This is a descriptive cross-sectional study conducted in four Family Health Units, in April-May 2011, with 90 children under 12 months, whose mothers attended the units to vaccinate them. We used a form to obtain socioeconomic data of the family and the child and data on the food offered. The rates of exclusive breastfeeding and predominant breastfeeding were 57.8% and 47.8% respectively, and exclusive breastfeeding had a median duration of 1 month. The duration of exclusive breastfeeding presented a statistically significant ( $p < 0.05$ ) and positive association with: having been breastfed in the first hour of birth, maternal age, and mother's level of education. We concluded that the feeding practices studied were inappropriate for children under one year.

**Descriptors:** Feeding; Infant; Nursing; Breast Feeding.

Objetivou-se investigar a alimentação e os fatores relacionados ao aleitamento materno dos lactentes do município de Picos-PI. Estudo descritivo e transversal realizado com 90 crianças menores de 12 meses de idade, cujas mães compareceram às Unidades de Saúde da Família, para vaciná-las, em abril e maio de 2011. Utilizou-se formulário para dados socioeconômicos da família e da criança, e sobre a alimentação oferecida. A taxa de aleitamento materno exclusivo e o aleitamento materno predominante foram de 57,8% e 47,8% respectivamente, sendo que o aleitamento materno exclusivo teve a duração mediana de 1 mês. Apresentaram relação estatisticamente significativa ( $p < 0,05$ ) e positiva com a duração do aleitamento materno exclusivo: ter sido amamentada na primeira hora de vida, idade materna e o grau de instrução da mãe. Concluiu-se que as práticas alimentares eram inadequadas para as crianças menores de um ano.

**Descritores:** Alimentação; Lactente; Enfermagem; Aleitamento Materno.

El objetivo fue investigar la alimentación y los factores relacionados con la lactancia materna de lactantes en Picos-PI, Brasil. Estudio descriptivo y transversal, llevado a cabo con 90 niños menores de 12 meses de edad, cuyas madres comparecieron a las Unidades de Salud de la Familia para vacunarlos, en abril y mayo 2011. Se utilizó encuesta para recolectar datos socioeconómicos de la familia y del niño, y acerca de la comida que ofrecida. La tasa de lactancia materna exclusiva y la lactancia materna predominante fueron 57,8% y 47,8% respectivamente, siendo que la lactancia materna exclusiva tuvo duración media de 1 mes. Presentaron relación estadísticamente significativa ( $p < 0,05$ ) y positiva con la duración de la lactancia materna exclusiva: haber sido amamantado en la primera hora después del parto, edad materna y nivel de educación de la madre. Las prácticas alimentarias fueron inadecuadas para niños menores de un año.

**Descritores:** Alimentación; Lactante; Enfermería; Lactancia Materna.

<sup>1</sup>Nurse, Universidade Federal do Piauí. Picos, PI, Brazil. E-mail: nileidelimaraujo@hotmail.com

<sup>2</sup>Nurse, PhD, Assistant Professor, School of Nursing, Universidade Federal do Piauí. Picos, PI, Brazil. E-mail: luisahelena\_lima@yahoo.com.br

<sup>3</sup>Nurse, Master student in Nursing, Assistant Professor, School of Nursing, Universidade Federal do Piauí. Picos, PI, Brazil E-mail: edinasam@yahoo.com.br

<sup>4</sup>Undergraduate student in Nutrition, Universidade Federal do Piauí. Picos, PI, Brazil. E-mail: elaine.sc@bol.com.br

<sup>5</sup>Nurse, Specialist in Public Health, Fundação Municipal de Saúde de Teresina. Teresina, PI, Brazil. E-mail: felipetduailibe@hotmail.com

<sup>6</sup>Nurse, Master in Clinical Pharmacology, Assistant Professor, School of Nursing, Universidade Federal do Piauí. Picos, PI, Brazil. E-mail: laurafeitosafomiga@hotmail.com

## INTRODUCTION

Healthy eating for infants can provide them a proper growth and development. Breast milk is the appropriate food for children under six months, for it offers protection against many common diseases in the first year of life and meets all the nutritional needs of the child. After six months, other foods should be offered to infants and is recommended to maintain breastfeeding up to two years of age.

Breastfeeding is the ideal food for the growth and development of children and recommended as exclusive food until the sixth month of life, being complemented with the introduction of other foods over time up to two years of age or older. With that, we meet the nutritional, immunological and psychological needs of the newborn, being extremely important for child survival<sup>(1)</sup>.

According to the Pan American Health Organization (PAHO), exclusive breastfeeding (EBF) reduces infant mortality caused by common childhood illnesses such as diarrhea and pneumonia, besides helping their recovery. Children breastfed have a satisfactory weight gain from birth to six months of life. Additionally, breast milk has no cost and does not offer any risk of contamination by bacteria, such as may occur in bottle feeding and formula milk<sup>(1)</sup>.

According to the World Health Organization (WHO), in 2010, only 34.8% of children up to six months of life worldwide were exclusively breastfed<sup>(2)</sup>. As reported by a study conducted by the Ministry of Health (MH), 41% of children under six months were exclusively breastfed, and among the regions of Brazil, the Northeast presented the worst situation in exclusive breastfeeding (37.0%). From 1999 to 2008, the prevalence of breastfeeding in children aged from 9 to 12 months went from 39.3% to 59.1% in the Northeast, representing a significant increase, however still well below the recommended<sup>(3)</sup>.

With regard to complementary feeding (CF), it consists of the feeding when other foods or liquids are

offered to the child, in addition to breast milk<sup>(4)</sup>. Complementary foods consist of any food other than breast milk offered to the breastfed child<sup>(5)</sup>. Many are the benefits of timely introducing complementary feeding, which ideally should not begin before six months of life, since early introduction of such foods can negatively affect the infant's health, such as risk for obesity and future cardiovascular diseases<sup>(6)</sup>.

Therefore, we highlight the nursing professional who participates in the promotion of healthy eating for infants, since they are responsible for teaching mothers about the importance of breastfeeding, from prenatal to postpartum, as well as inform about the correct introduction of complementary foods during childcare.

The relevance of this study lies on the need to know the factors that contribute to early weaning and the food given to infants. The results are important for establishing strategies to encourage healthy eating for children under one year and reduce rates of early weaning.

This study aimed to investigate the eating and factors related to breastfeeding of infants in the city of Picos-PI, Brazil.

## METHOD

A descriptive cross-sectional study conducted in four Family Health Units (FHU) in the city of Picos-PI, Brazil, located in the districts of Junco, São Vicente, Malvinas and Centro. These units have vaccination room, which justifies a greater flow of infants.

To calculate the sample size, we used the formula for cross-sectional studies with finite population<sup>(7)</sup>. As parameters, we established the confidence coefficient of 95% (1.96), the sampling error of 10%, and a population of 1,231 children living in the city of Picos in 2009<sup>(8)</sup>. The proportion of the phenomenon considered was 50%, since we did not find a study that presented proportion related to the topic under study ( $p=0.5$ ). Based on the formula, we found 90 children, which we

divided equally between those units that have vaccination room and selected consecutively with mothers who attended FHUs during the period of data collection. As inclusion criteria, we used children under 12 months accompanied by their mothers at the time of vaccination.

Data collection happened from April to May 2011 in the FHUs in pre-scheduled times by contacting the staff of the Family Health Strategy (FHS) and using the form for information on infant feeding. The instrument, with 27 items, contained information about the type of delivery, number of prenatal consultations, child's gender, age of mother and child, anthropometric data, and food offered to the child since birth, besides socioeconomic data of the child's family.

To construct the database, we used the Excel for Windows and, for statistical analysis, the SPSS version 17.0. Data analysis happened through descriptive and inferential statistics. We calculated the Kolmogorov-Smirnov test to assess the normality of the data. To correlate the categorical variables with the numerical, we used the Mann-Whitney test. To verify the correlation between two numerical variables, we calculated the Spearman's Rho correlation coefficient test, since data showed an asymmetric distribution. In all tests, we applied the statistical significance value of  $p < 0.05$ .

The Research Ethics Committee of the Universidade Federal do Piauí, in accordance with the precepts of Resolution 196/96 of the National Health Council (NHC)<sup>(9)</sup>, approved the research project under protocol No. 0468.0.045.000-11. For children of mothers under 18 years old, the person responsible signed the consent form.

## RESULTS

Initially, we present the results on the socio-demographic characteristics of children and their mothers, and then data on infant feeding.

**Table 1** - Distribution of personal and demographic data of mothers and children. Picos, PI, Brazil, 2011

Variables	n	%		
Occupation				
Paid activity	18			20.0
Housewife	72			80.0
Type of delivery				
Vaginal	21			23.3
Caesarean section	69			76.7
Prenatal consultations				
Less than six	16			17.8
Six or more	74			82.2
Mother's guidance				
Importance of breastfeeding	84			93.3
Importance of complementary feeding	65			72.2
Child's gender				
Female	49			54.4
Male	41			45.6
	KS (p value)	Mean	Standard Deviation	Median
Mother's age	0.328	24.76	6.2158	24.00
Mother's years of education	0.072	10.13	3.335	11.00
Family income (US\$)	0.000	369.08	231.91*	231.91**
Child's age (months)	0.069	5.67	3.559	5.00
Current weight (gr)	0.817	7,580.83	2,359.240	7,800.00
Current height (cm)	0.365	63.80	8.400	65.00
Birth weight (gr)	0.069	3,285.05	438.322	3,400.00
Height at birth (cm)	0.029	49.10	3.3*	49.00

KS - Kolmogorov-Smirnov test. \*Interquartile range (IQR). \*\*R\$545.00 (US\$ 1.00 = R\$ 2.35) n=90

In Table 1, there was a prevalence of homemaker mothers, with cesarean section, who performed six prenatal consultations, and received guidance from a health professional about the importance of breastfeeding and complementary feeding.

The mean age of mothers was 24.7 years ( $\pm 6.2$ ) with 10.13 years of education ( $\pm 3.3$ ). There was prevalence of female children, average age of 5.7 months ( $\pm 3.55$ ), with values ranging from 1 to 12 months. The current average weight was 7,580g ( $\pm 2,359.24$ ) and height of 63.8cm ( $\pm 8.40$ ). The average birth weight was 3,285g ( $\pm 438.32$ ) and average height at birth was 49 cm ( $\pm 2.98$ ).

**Table 2** - Characteristics of the sample according to breastfeeding and complementary feeding. Picos, PI, Brazil, 2011

Variáveis	n	%
Exclusive breastfeeding		
Yes	52	57.8
No	38	42.2
Predominant breastfeeding		
Yes	43	47.8
No	47	52.2
Use of pacifier, bottle, nipple		
Yes	55	61.1
No	35	38.9
Age at beginning of complementary feeding		
Under four months	28	31.1
Four months	11	12.2
Five months	10	11.1
Duration of EBF (months)	KS (p value) 0.000	Mean 1717
		IQR* 3
		Median 1.000

KS – Kolmogorov-Smirnov test. \*Interquartile range (IQR). n=90

According to Table 2, the majority of children were exclusively breastfed and almost half were predominantly breastfed. EBF had an average duration of 1 month. Regarding the use of pacifiers, feeding

bottles and nipples, most mothers said their children had used at least one of them. As regards to the beginning of complementary feeding, it was prevalent with less than four months of age.

**Table 3** - Association between duration of exclusive breastfeeding and age at introduction of complementary feeding with the variables of the first day of the child's life. Picos, PI, Brazil, 2011

Variables	Breastfed in the first hour of life	n	Average posts	P value*
Duration of EBF	Yes	73	48.09	0.043
	No	17	34.38	
Age at CF**	Yes	73	46.55	0.423
	No	17	41.00	
Variables	Water in the first day of life	n	Average posts	P value
Duration of EBF	Yes	4	19.00	0.035
	No	86	46.73	
Age at CF	Yes	4	52.75	0.590
	No	86	45.16	

\*Mann-Whitney test; \*\*Age at CF: age at beginning of complementary feeding. n=90

There was an 81.1% prevalence of children breastfed in the first hour of life. On the first day of life, mothers offered liquids such as tea, water and non-maternal milk. We verified a statistically significant association ( $p=0.043$ ) between children breastfed in the

first hour of life and time of EBF, showing that this group had longer duration of EBF (Table 3). Children who received water on the first day of life presented shorter duration of EBF ( $p=0.035$ ).

**Table 4** - Association between duration of exclusive breastfeeding and age at introduction of complementary feeding with maternal variables and the first day of the child's life. Picos, PI, Brazil. 2011

Variables		Duration of EBF	Age at CF
Mother's age	Correlation coefficient*	0.208	Mother's age
	P value	0.049	
Mother's level of education	Correlation coefficient*	0.257	Mother's level of education
	P value	0.014	
Family income	Correlation coefficient*	-0.015	Family income
	P value	0.888	
Child's current weight	Correlation coefficient*	0.177	Child's current weight
	P value	0.096	
Child's current height	Correlation coefficient*	0.161	Child's current height
	P value	0.129	

\*Spearman's Rho test. n=90

According to Table 4, we found a positive and significant association, that the higher the mother's age and education level, the greater duration of EBF. Furthermore, there was a significant positive association between age of introduction of complementary foods and current weight and height of children.

Table 5 lists the foods given to children before and after six months of age. Before six months, the most consumed liquid foods were water, tea, and milk formula. With regard to bland foods, the most consumed were gruel, homemade porridge, and industrialized porridge. The most consumed solid foods were fruits, biscuits, followed by snacks, rice, instant noodles (ramen noodles kind), and noodles. Some children under six months consumed honey.

Regarding the food offered to children from six months of age, the sample size consisted of only 36 children. The most consumed liquid foods were water, fruit juice, and tea. The bland foods were gruel, homemade porridge, and industrialized porridge. The solid foods were fruits, rice and biscuit.

**Table 5** - Sample distribution according to the food offered to the child. Picos, PI, Brazil, 2011\*

Variables	Before**		After**	
	f	%	f	%
Water	63	70.0	36	100.0
Tea	44	48.9	27	75.0
Infant formula	31	34.4	8	22.2
Gruel	23	25.6	26	72.2
Fruit juice	21	23.3	31	86.1
Industrialized milk	17	18.9	20	55.5
Porridges	16	17.8	26	72.2
Fruits	16	17.8	31	86.1
Biscuit	12	13.3	28	77.7
Yogurt	11	12.2	24	66.6
Porridges (artificial)	10	11.1	13	36.1
Broth	9	10.0	24	66.6
Bean broth	8	8.9	23	63.8
Snacks	7	7.8	13	36.1
Rice	7	7.8	29	80.5
Instant noodle	7	7.8	20	55.5
Noodle	7	7.8	26	72.2
Meat	6	6.7	18	50.0
Bread	6	6.7	20	55.5
Honey	5	5.6	6	16.6
Other	5	5.6	6	16.6
Soft drinks	4	4.4	7	19.4
Bean	3	3.3	24	66.6
Cow's milk	2	2.2	7	19.4
Fermented milk	2	2.2	3	8.3
Eggs	2	2.2	13	36.1
Fish	1	1.1	8	22.2
Chocolate milk	1	1.1	4	11.1
Coffee	1	1.1	5	13.8
Artificial juice	-	-	4	11.1

\*Multiple choice question. n=90; \*\*6 months of age

There was correlation between duration of EBF, the age of introduction of complementary feeding, and other variables such as type of delivery, use of pacifiers, nipples or bottle feeding, consumption of non-maternal milk or tea on the first day of life, gender, working mother, and height and weight at birth. Nevertheless, we did not find any statistically significant associations.

## DISCUSSION

The results enabled to draw a profile of infant feeding in the city of Picos-PI. In the present study, we observed that 57.8% of infants were exclusively breastfed, and this percentage was above the average of Brazil and of Teresina, Piauí's capital, with 41.0% and 43.7%, respectively, among children under six months according to the National Survey conducted by the Ministry of Health in 2008. Additionally, we found that the average duration of exclusive breastfeeding was one month, therefore much lower than recommended by the MH<sup>(3)</sup>.

The values found are similar to a study conducted in Araçatuba-SP, Brazil, where indicators of EBF were also lower than recommended. From 0 to 30 days of life, 75.5% infants were exclusively breastfed, in the fourth month this proportion falls to 45.1%, and in the sixth month to only 22.2%<sup>(10)</sup>. The increase of obesity in infants results from early and incorrect weaning caused by dietary errors during the first year of life, especially in urban populations that stop breastfeeding and replace it with excessive supply of carbohydrates in quantities greater than necessary for their growth and development<sup>(11)</sup>.

Data from this study showed that health professionals guided the majority of mothers (93.3%) about the importance of breastfeeding and yet the rates of exclusive breastfeeding and duration are lower than expected.

The median monthly family income of the interviewees was US\$ 231.91 (US\$ 1.00 = R\$ 2.35), the

minimum wage in the period. This value was below the national average monthly income of US\$ 470.64 and below the average monthly income of Piauí, of US\$ 268.08<sup>(12)</sup>. In this research, we did not find any statistically significant association between this indicator and the duration of EBF and age at beginning of complementary feeding.

Nonetheless, a research conducted in Votuporanga-SP showed that the average duration of EBF was 3.9 months among infants whose families earned less than one minimum wage and 5.3 months in families with incomes greater than ten minimum wages<sup>(10)</sup>, and usually mothers with higher incomes have higher schooling. A study conducted in São José dos Calves-SP found different results, where the rate of early weaning was 37.9% among children whose mothers earned less than one minimum wage and 57.1% among those who earned more than two minimum wages<sup>(13)</sup>. EBF is essential especially for low-income families, since breast milk does not bring any additional cost to the family budget, as well as provides greater immunity to infants, preventing diseases and avoiding potential costs of hospitalization and medication.

Studies show that the use of pacifiers and bottles can negatively influence breastfeeding, as well as offer contamination risks to infants<sup>(11,13)</sup>. The results of this study showed that the majority of children (61.1%) had used at least one of these items. A study related the use of pacifiers to early weaning and concluded that there was no association between these variables, since 52.4% of children in early weaning did not use pacifiers and 47.6% were using them<sup>(11)</sup>.

Most mothers (72.2%) reported receiving guidance on complementary feeding, and yet we still observed inadequate feeding practices. Regarding the age at onset of complementary feeding, a small share of the children (13.3%) started this practice at six months of age, however 54.4% of the children started complementary feeding before six months.

Mother's age and level of education are characteristics often associated with early weaning and for this reason deserve increased attention. The average age of mothers was 24.76 years, ranging from 15 to 41, and the higher the mother's age, longer the duration of EBF. The literature shows that, although there was no significant association between maternal age and type of infant feeding in the fourth month of life ( $p=0.6272$ ), no child of mothers under 20 years old was in EBF<sup>(14)</sup>. According to a study conducted in Volta Redonda-RJ, among the infants over six months, the breast milk offer to the children of adolescent mothers was significantly lower than among children of adult women, 49.2% and 66.0%, respectively. Also according to the study, there was an increased use of pacifier among children of adolescent mothers<sup>(15)</sup>.

Regarding the mother's level of education, they had on average 10.13 years ( $\pm 3.3359$ ) of education, which corresponds to incomplete high school, with a significant correlation ( $p=0.014$ ) between this indicator and the duration of EBF, the greater the level of maternal education, the longer the duration of EBF. With respect to this variable, another study found that mothers with higher schooling are more likely to exclusively breastfeed their children<sup>(16)</sup>. Thus corroborating the findings of this study.

We noticed that liquid foods were offered to infants on their first day of life, especially tea (11.1%), water (4.4%) and non-maternal milk (3.3%). An investigation in Cuiabá-MT observed a consumption greater than 20% of water and teas right after birth<sup>(6)</sup>. The study also showed that children who receive these liquids on the first day of life have a lower duration of EBF. Scientific findings suggest that early weaning probably happens, among other reasons, due to the introduction of water, milk powder, and teas<sup>(17)</sup>.

Furthermore, we identified that many foods were offered to infants under six months, including sugary food like chocolate milk, yogurt, biscuit and honey.

Instant noodles were also offered, which besides the low nutritional value contains too much salt, not being recommended for infants. According to the results of a research conducted in Guarapuava-PR, in the first month of life of breastfed children, 2.9% received water, 20% sugar water, 8.6% tea, 1.4% fruit juice, and 15.7% artificial milk<sup>(18)</sup>.

A research conducted in Campinas-SP observed that the introduction of complementary foods was inadequate, because they offered treats and other inappropriate foods to the children's diet. The study results show that infants were already receiving liquids, especially water and tea, in the first month of life. Treats with sugar and honey were introduced before 10 months of life, while snacks, sweets and candies were introduced at one year of age<sup>(17)</sup>.

The results of this study showed that the most frequent food consumed by six month old infants or older, were water (100%), fruit juice (86.1%), fruits (86.1%), rice (80.5%), biscuit (77.7%), tea (75.0%), gruel (72.2%), homemade porridge (72.2%) and noodles (72.2%). Many of the foods offered to infants should be avoided, such as instant noodles (55.5%), snacks (36.1%), soft drinks (19.4%), honey (16.6%) and coffee (13.8%). The Ministry of Health recommends not offering sugar, sweets, chocolates, soft drinks and fries to children under ten months<sup>(19)</sup>.

One element that is often present in the context of ineffective breastfeeding and relates to excessive weight gain in infants is the use of artificial milk formulas. Early cessation of breastfeeding at the expense of adopting artificial feeding increases the energy consumption in children by 15% to 20% when compared to that of exclusively breastfed children<sup>(20)</sup>.

## CONCLUSION

This study enabled us to investigate the infant feeding and the factors related to breastfeeding in the city of Picos-PI. The results of this research showed

inadequate feeding practices in children under one year, among them: early offering of complementary feeding, offering food supply of low nutritional value and unfit for their age. Furthermore, there was unsatisfactory duration of EBF in the children surveyed.

Another important fact was that most mothers reported receiving guidance from a health professional about the importance of breastfeeding and complementary feeding, and yet we observed many inadequate practices related to infant feeding, especially early offering of complementary foods. Based on the data obtained in this study, it is necessary that health professionals review the way to advise mothers about breastfeeding and complementary feeding.

#### COLLABORATIONS

Araújo NL contributed to conception of the study, data collection, analysis and interpretation, and writing of the article. Lima LHO contributed to conception of the study, analysis and interpretation of data, writing of the article and final approval of the version to be published. Oliveira EAR, Duailibe FT and Formiga LMF contributed to the writing of the article and final approval of the version to be published. Carvalho ES contributed to data collection, analysis and interpretation, and writing of the article.

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