

FACTORS ASSOCIATED WITH EARLY USE OF WHOLE COW'S MILK BY INFANTS UNDER ONE YEAR OLD

Fatores associados ao consumo precoce de leite de vaca integral por crianças menores de um ano de idade

Factores asociados al consumo precoz de la leche de vaca integral por niños menores de un año

Original Article

ABSTRACT

Objective: To assess the frequency and factors associated with the use of whole cow's milk in children under one year old in the city of Fortaleza, Ceará. **Methods:** Cross-sectional analytical study conducted with 575 mothers of children under one year old living in the city of Fortaleza, Ceará. A semi-structured questionnaire was applied to collect sociodemographic data and information about the reproductive history of mothers, childbirth and the child. **Results:** The median age of mothers was 26.5 years, and 80.5% (n=463) of them had a household income of 1-5 minimum wages. The majority (83.2%, n=475) attended more than six prenatal consultations, but only 86.2% (n=494) said they had received information on breastfeeding. Among children who received other types of milk, 53.8% (n=191) consumed whole cow's milk; of these, 31.7% (n=113) reported having received orientation from the pediatrician. Cow's milk consumption was associated with maternal age (women under 18 years old ($p=0.015$)), income of less than five minimum wages ($p<0.001$), low education level ($p<0.001$), unemployment ($p<0.001$), reduced number of prenatal consultations ($p=0.019$), childbirth at public hospital ($p<0.001$), no breastfeeding before discharge from maternity hospital ($p<0.001$) and not having a health insurance ($p<0.001$). **Conclusion:** There was a high prevalence of early consumption of whole cow's milk by children under one year old, and it was influenced by factors such as income, education level and young maternal age. Therefore, it is necessary to raise awareness among health professionals about improving the quality of the guidelines provided during prenatal and postpartum consultations.

Descriptors: Breast Feeding; Infant; Breast-Milk Substitutes.

RESUMO

Objetivo: Avaliar a frequência e fatores associados ao uso do leite de vaca integral nas crianças menores de um ano na cidade de Fortaleza, Ceará. **Métodos:** Realizou-se estudo transversal e analítico envolvendo 575 mães de crianças menores de um ano de idade residentes em Fortaleza, Ceará. Aplicou-se questionário semiestruturado para coleta de dados sociodemográficos, história reprodutiva da mãe, dados referentes ao parto e à criança. **Resultados:** A mediana de idade das mães foi de 26,5 anos, tendo 80,5% (n=463) renda familiar de 1 a 5 salários mínimos. A maior parte (83,2%, n=475) realizou mais de seis consultas de pré-natal, mas apenas 86,2% (n=494) declararam ter recebido informações sobre aleitamento materno. Entre as crianças que receberam outro tipo de leite, 53,8% (n=191) consumiram leite de vaca integral, e destas, 31,7% (n=113) referem ter recebido orientação do pediatra. O consumo do leite de vaca foi relacionado à idade materna (menores de 18 anos de idade, ($p=0,015$), renda inferior a cinco salários mínimos ($p<0,001$), baixa escolaridade ($p<0,001$), mães que não trabalhavam ($p<0,001$), baixo número de consultas de pré-natal ($p=0,019$), ter nascido em hospital público ($p<0,001$), não ter amamentado antes de sair da maternidade ($p<0,001$) e não ter plano de saúde ($p<0,001$). **Conclusão:** O consumo precoce do leite de vaca integral por crianças menores de um ano apresentou alta prevalência e sofreu influência de fatores como renda, escolaridade e pouca idade da mãe. Portanto, é preciso sensibilizar os profissionais de saúde para que qualifiquem melhor as orientações prestadas durante as consultas de pré-natal e puerpério.

Descritores: Aleitamento Materno; Lactente; Substitutos do Leite Humano.

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RESUMEN

Objetivo: *Evaluar la frecuencia y los factores asociados al uso de la leche de la vaca integral en niños menores de un año de la ciudad de Fortaleza, Ceará. Métodos:* *Se realizó un estudio transversal y analítico con 575 madres de niños menores de un año de edad residentes en Fortaleza, Ceará. Se aplicó un cuestionario semiestructurado para la recogida de datos sociodemográficos, la historia de reproducción de la madre, los datos del parto y del niño. Resultados:* *La mediana de la edad de las madres fue de 26,5 años con renta familiar entre 1 y 5 sueldos mínimos mensuales para el 80,5% (n=463). La mayoría (83,2%, n=475) realizó más de seis consultas de prenatal pero solo el 86,2% (n=494) se declaró haber recibido informaciones de la lactancia materna. Entre los niños que recibieron otro tipo de leche, el 53,8% (n=191) consumieron la leche de vaca integral y de estos el 31,7% (n=113) refieren haber recibido orientación del pediatra. El consumo de la leche de vaca estuvo relacionado a la edad materna (menores de 18 años de edad, $p=0,015$), renta abajo de cinco sueldos mínimos ($p<0,001$), baja escolaridad ($p<0,001$), madres que no trabajaban ($p<0,001$), bajo número de consultas de prenatal ($p=0,019$), haber nacido en el hospital público ($p<0,001$), no haber amamantado antes de salir de la maternidad ($p<0,001$) y no tener seguro salud ($p<0,001$). Conclusión:* *El consumo precoz de la leche de la vaca integral por niños menores de un año presentó alta prevalencia y sufrió la influencia de los factores como la renta, la escolaridad y la baja edad de la madre. Por lo tanto, es necesario sensibilizar los profesionales de la salud para mejorar la calificación de las orientaciones durante las consultas de prenatal y puerperio.*

Descriptor: *Lactancia Materna; Lactante; Sustitutos de la Leche Humana.*

INTRODUCTION

The first years of life are characterized by intense growth and development and require a balanced and healthy diet according to the needs of each age group^(1,2).

The World Health Organization and Brazil's Ministry of Health recommend exclusive breastfeeding until six months of life, and after this age, infants can receive complementary foods with continued breastfeeding for up to two years^(3,4).

In Brazil, there is evidence pointing to an increase in exclusive breastfeeding rate since the 1980s; however, there is an important change in the age limit for exclusive breastfeeding, especially in relation to different regions of the country⁽⁵⁻⁸⁾. On the other hand, this advance has not been achieved with regards to the proper use of supplementary feeding⁽⁸⁾.

The consumption of whole cow's milk by children under one year old is nutritionally inadequate because it has limited amount of vitamins, carbohydrates, iron, zinc, calcium

and high amounts of protein with inadequate relationship between the casein and whey proteins^(9,10). Furthermore, regular consumption can lead to early sensitization of intestinal mucosa and induce hypersensitivity to cow's milk proteins, predisposing the onset of allergic diseases and minor bleeding in the intestinal mucosa, contributing to an increased iron deficiency and greater susceptibility to anemia^(11,12). Moreover, there is evidence that this consumption may predispose to the development of diseases like cancer, type I diabetes mellitus, gastroesophageal reflux disease and neurological disorders⁽¹³⁾.

Thus, the aim of this study was to assess the frequency and factors associated with the use of whole cow's milk in children under one year old in the city of Fortaleza, Ceará.

METHODS

This is a population-based cross-sectional analytical study on the prevalence of whole cow's milk consumption. Given the lack of previous studies on the prevalence of the use of whole cow's milk in children under one year of age, a pilot study (PRE-TEST) was initially carried out with 98 mothers in order to estimate the prevalence of consumption of whole cow's milk and enable the calculation of a significant sample for the study object.

The number of mothers to be interviewed was estimated based on the population of children under one year old in the city of Fortaleza, i.e., 33,316 children (DATASUS, 2010). The final sample was estimated to be at least 570 children.

Mothers were selected at random in public and private healthcare centers of the six *Secretarias Executivas Regionais – SER* (Regional Executive Secretariats) of the city of Fortaleza. Interviews were conducted between June and August during the 2013 Multivaccination Campaign.

A semi-structured questionnaire was administered to mothers of newborns and children aged up to 11 months and 29 days living in the city of Fortaleza who were healthy and agreed to participate by signing the Free Informed Consent Form. The interview for the application of the questionnaire was conducted by trained researchers and it only took place after obtaining the written consent of the mother. The questionnaire assessed sociodemographic characteristics (age, education, marital status, occupation, housing conditions and household income), the reproductive history of the mother (number of pregnancies, births and children, interval between the last two pregnancies, number of prenatal consultations and guidance on breastfeeding), and data relating to childbirth and child (sex, age, birth weight, place of birth, birth conditions such as preterm or full-term, breastfeeding, introduction of other types of milk in complementary feeding and access to health insurance).

For some of the variables assessed, the total number of responses differs from the sample size due to the lack of response in some questionnaires. Therefore, the analysis considered the total responses in the calculation of percentages and ratios. Regarding postpartum, variables such as the gestational period in which the children were born, classified as preterm (<37 weeks) or full-term (≥ 37 weeks), and birth weight, divided into low birth weight (<2.500 g) and normal weight (≥ 2.500 g) were analyzed.

Data were entered and analyzed using Epi Info for Windows version 3.5.1. The prevalence of cow's milk consumption was estimated along with its respective confidence interval. Qualitative or dichotomous variables

are described as absolute or percentage measures. Continuous variables are described as measures of central tendency and dispersion. Parametric tests (Student's t test), nonparametric test (Wilcoxon test) and Fisher's Exact Test were used for the analysis of variables, with a significance level of 5% ($p < 0.05$).

The research was approved by the Research Ethics Committee of the *Centro Universitário Christus* (Christus University Center) under Opinion No. 15851 (2013).

RESULTS

In all, 575 mothers who lived in the six administrative regions of Fortaleza were interviewed, and the number of

Table I - Sociodemographic characteristics of mothers living in the city of Fortaleza, Ceará, 2013.

Variables	n	%
Place of residence		
SER I	84	14.6
SER II	82	14.3
SER III	109	19.0
SER IV	107	18.6
SER V	95	16.5
SER VI	98	17.0
Mother's age		
≤ 18 years	64	11.1
> 18 years	510	88.9
Mother's education		
Illiterate	3	0.5
Incomplete primary education	106	18.4
Complete primary education	66	11.5
Incomplete high school	120	20.9
Complete high school	204	35.5
Incomplete higher education	29	5.0
Complete higher education	47	8.2
Household income per month		
< 1 minimum wage	65	11.3
1 to 5 minimum wages	463	80.5
6 to 10 minimum wages	30	5.2
> 10 minimum wages	17	3.0
Mother's occupation		
Unemployed	339	59.3
Employed	233	40.7
Place of work		
Home	38	16.3
Outside home	195	83.7
Time spent outside home		
Up to 8 hours	100	51.5
More than 8 hours	94	48.5
Entitlement to maternity leave		
Yes	169	66.0
No	87	34.0
Lives with the children's father		
Yes	458	79.7
No	117	20.3

interviewees ranged from 82 (14.3%) in Region II and 109 (19.0%) in Region III. A total of 463 (80.5%) households had an income of 1-5 minimum wages, 458 (79.7%) children lived with their parents, 301 (52.3%) owned a house, 540 (93.9%) had access to piped water supply, 574 (96.5%) had systematic waste collection and 479 (83.3%) had basic sanitation (Table I).

The median age of mothers was 26.5 years (13-45). With regard to education, 324 (56.3%) finished high school and 76 (13.2%) had a higher education degree. Among the 575 mothers, 339 (59.3%) were unemployed during the research period. Regarding those who worked, 195/233 (83.7%) worked outside the home, and of these, 94/195 (48.5%) spent more than eight hours away from home. Among mothers who were employed during pregnancy, 169 (66%) were on maternity leave, and 130 (76.9%) of them were entitled to a four-month leave.

The median number of pregnancies was 1.9 (1-9) and the median number of births was 1.7 (1-7). A total of 571 (99.3%) women attended prenatal consultations for the current child, with a median of seven consultations, and 475

(83.2%) attended six or more consultations. Among those who attended prenatal consultations, 494 (86.2%) reported having received information about breastfeeding.

As for the births and children included in the study, 306 (53.2%) were female, 491 (85.4%) were born full-term, 455 (79.1%) were born in public hospitals, 509 (88.5%) weighed more than 2,500 grams at birth and 364 (63.3%) did not have a health insurance.

With regard to breastfeeding, 523 (91%) children were breastfed while still in hospital. Complementary feeding with other types of milk was introduced in 356 (63.5%) children, being provided before six months of age to 308 (86.5%) children. Among those who received other types of milk before the first year of life, 191/356 (53.7%) consumed whole cow's milk and 164/356 (45.2%) consumed infant formula.

When mothers were asked about the guidance on the consumption whole cow's milk as complementary feeding, 113 (31.7%) reported having received orientation from a pediatrician (Table II).

Table II - Aspects related to prenatal, childbirth and children living in Fortaleza, Ceará, 2013.

Variables	n	%
Sex		
Female	306	53.2
Male	269	46.8
Place of birth		
Public hospital	455	79.1
Private hospital	120	20.9
Birth weight		
< 2500g	66	11.5
>= 2500g	509	88.5
Gestational age at birth		
Full-term	491	85.4
Preterm	84	14.6
Breastfeeding in the maternity ward		
Yes	544	94.8
No	30	5.2
Complementary feeding		
Yes	356	63.5
No	205	36.5
Type of complementary foods		
Infant formula	164	46.2
Whole cow's milk	191	53.8
Guidance on the introduction of milk		
Pediatrician	113	31.7
Other	243	68.3
Health insurance		
Yes	211	36.7
No	364	63.3

Table III – Risk factors related to the socioeconomic characteristics of mothers living in Fortaleza, Ceará, 2013.

Mothers' characteristics	Consumed cow's milk				PR	CI	p-value
	Yes		No				
	N	%	n	%			
Mother's age							
<= 18 years	25	73.5	9	26.5	1.42	1.14 – 1.79	0.015*
> 18 years	165	51.6	155	48.4			
Household income							
<= 5 minimum wages	187	57.9	136	42.1	4.63	1.84 – 11.64	0.000*
> 5 minimum wages	4	12.5	28	87.5			
Mother's education							
Up to high school	130	71.8	51	28.2	2.07	1.66 – 2.59	0.000*
At least high school	60	34.7	113	65.3			
Mother worked during pregnancy							
No	136	66.7	68	33.3	1.84	1.46 – 2.32	0.000*
Yes	54	36.2	95	63.8			
Time spent outside home							
More than 8 hours	21	33.3	42	66.7	1.10	0.66 – 1.85	0.701
Up to 8 hours	19	30.2	44	69.8			

*p<0.05; Fisher's Exact Test.

Table IV - Prevalence of the use of whole cow's milk and variables related to mothers, prenatal, childbirth and children living in Fortaleza, Ceará, 2013.

Aspects investigated	Consumed cow's milk				PR	CI	p-value
	Yes		No				
	n	%	N	%			
Type of hospital where the child was born							
Public	174	91.1	17	8.9	1.46	1.29 – 1.66	0.000*
Private	102	62.2	62	37.8			
Mother lives with the children's father							
No	42	56.0	33	44.0	1.05	0.83 – 1.32	0.667
Yes	149	53.2	131	46.8			
Health insurance							
No	144	66.7	72	33.3	1.97	1.53 – 2.53	0.000*
Yes	47	33.8	92	66.2			
Prenatal consultations							
No	3	75.0	1	25.0	1.40	0.79 – 2.49	0.267
Yes	188	53.6	163	46.4			
No. of prenatal consultations							
Up to 5 consultations	52	76.5	16	23.5	0.87	0.76 – 1.00	0.019*
Six or more consultations	248	87.6	35	12.4			
Child's birth weight							
< 2.500 grams	25	54.3	21	45.7	1.01	0.76 – 1.34	0.937
>= 2.500 grams	166	53.7	143	46.3			
Birth conditions							
Preterm	32	56.1	25	43.9	1.05	0.82 – 1.35	0.699
Full-term	159	53.4	139	46.6			
Breastfeeding before leaving the maternity ward							
No	9	30.0	21	70.0	0.32	0.19 – 0.56	0.000*
Yes	303	93.0	22	6.7			
Received orientation on breastfeeding							
No	29	55.8	23	44.2	1.04	0.80 – 1.36	0.760
Yes	161	53.5	140	46.5			

*p<0.05; Fisher's Exact Test.

Early consumption of whole cow's milk was 42% higher in mothers under 18 years of age (CI: 1.14-1.79; $p=0.015$), four times higher in families with income below five minimum wages (CI: 1.84-11.64; $p<0.001$), two times higher in mothers with lower education (CI: 1.66-2.59; $p<0.001$) and 84% higher among mothers who did not work (CI: 1.46-2.32, $p<0.001$) (Table III).

Some factors were significantly associated with early consumption of whole cow's milk, such as having attended less than six consultations ($p=0.019$), being born in a public hospital ($p<0.001$), not having breastfed before leaving the hospital ($p<0.001$) and not having a health insurance ($p<0.001$). On the other hand, living with parents ($p=0.667$), not attending prenatal consultations ($p=0.267$), low birth weight ($p=0.937$), birth conditions ($p=0.699$) and having received orientation about breastfeeding ($p=0.760$) were not associated with early use of whole cow's milk (Table IV).

DISCUSSION

In the present study, 53.8% of mothers introduced whole cow's milk in children under one year old. It is a worrying fact since this food has insufficient amounts of vitamins and nutrients needed for the development of children⁽¹⁰⁾. Moreover, its early use may cause hypersensitivity to cow's milk proteins, which predisposes these children to the onset of allergic diseases, minor bleeding in the intestinal mucosa and type 1 diabetes mellitus⁽¹⁴⁾. A previous study conducted in a poor area of Fortaleza in the past decade showed that the staple foods given to children under one year old were mainly cow's milk powder, sugar and starch⁽¹⁵⁾. This finding is supported by other authors⁽¹⁶⁾ who have shown that these food could be ingested as porridge, which helps to explain the fact that the amount of protein contained in the foods of these children is generally over 200% above the recommended amount⁽¹⁷⁾.

Young maternal age has been an important factor for the early introduction of whole cow's milk. In mothers under 18 years old, this introduction occurred in 73.5% of children, and in mothers aged over 18, the introduction occurred in 51.6% of children. This fact has been reported by young mothers and those who needed to leave their children in day care in São Paulo⁽¹⁸⁾. In addition, older mothers were at increased chances of succeeding in breastfeeding given the experience of previous pregnancies and greater maturity in relation to the nutritional care of their children⁽¹⁸⁾.

Education was another factor positively associated with the non-use of whole cow's milk to feed children. Among the mothers who reported early introduction of whole cow's milk, 71.8% had not finished high school while 34.7% had. A study conducted in São Paulo reported that women who

have studied for more than eight years are found to be more successful in breastfeeding⁽¹⁹⁾ – probably because they understand its importance to the health of babies.

Cow's milk is the most used alternative to breastmilk, even though it is not the most nutritionally adequate^(20,21). This is mainly due to the prices of infant formulas in Brazil⁽²⁾. A study carried out in 2004 showed that the expenditure of some families on the purchase of milk for children in the first six months could exceed the value of the minimum wage at the time⁽⁷⁾; in addition, there are indirect costs included in the purchase of baby bottles and any diseases, etc.⁽⁷⁾.

With regard to the entitlement to maternity leave, 66% of mothers had access to this right, and of these, 68.9% did not introduce whole cow's milk, showing that this benefit is closely linked to early weaning. This finding is in agreement with that of a study in Paraíba⁽²²⁾. In the aforementioned study, of all the 1,779 women who reported doing paid work, regardless of a formal contract, only 936 said they had been entitled to maternity leave. Thus, it is clear that exclusive breastfeeding was significantly higher among mothers who had this right assured.

Although the majority of mothers in the present study (79.7%) lived with the child's father, it was not statistically correlated to the introduction of whole cow's milk, which is supported by another study⁽²³⁾ which found that the rhythm of a couple's relationship does not seem to have a significant impact on a possible interruption of breastfeeding. However, it is positively associated with the paternal support to mother and baby. This aspect has not been observed in all Latin American countries⁽²⁴⁾, where the duration of exclusive breastfeeding increased when mothers had a partner living in the same house. In this case, one should consider regional aspects and peculiarities that can influence this interaction and also the definition of family.

The comparison of the variables of the week of birth and birth weight with the early introduction of cow's milk found no statistically significant difference. A study conducted in Salvador⁽²⁵⁾ reports these variables during the categorization of sociodemographic and environmental conditions of children and their families; however, they are not related to the dietary patterns of infants.

Another variable related to the use or non-use of whole cow's milk was breastfeeding of newborns before they leave the hospital. Among the interviewees, 63.5% breastfed during the period they were in hospital. This aspect is important because promoting breastfeeding in an oriented way while still in the maternity ward can influence the mother's decision to continue this practice throughout the next months and avoid the introduction of foods that are not adequate for the age of the child⁽²⁶⁾.

Other studies have found that children who had inadequate latch (only the nipple sucking) on the day of

hospital discharge were 10 times more likely to receive a baby bottle in the first month of life when compared to children with proper latch or who have had their latch corrected in the maternity ward. This confirms and reinforces the importance of supervised breastfeeding stimulus while still in the maternity ward⁽²⁷⁾.

Regarding guidance on breastfeeding, 86.2% of mothers received orientation during prenatal care. This finding is similar to that of a study conducted in Rio Grande do Sul⁽²⁸⁾, which showed that the majority of mothers (81%) generally received guidance on breastfeeding during prenatal care performed in primary health care facilities. This rate was much higher than the ones found in Rio de Janeiro and Minas Gerais and reported by hospital-based studies^(29,30).

The importance of healthcare professionals' participation in counseling correct feeding practices is essential⁽³¹⁻³³⁾. In the present study, the pediatrician was responsible for providing information on the introduction of whole cow's milk to 31.7% of the interviewees. A relevant fact was observed in the city of Conchas⁽³⁴⁾ when investigating who had provided information on the early introduction of liquids or foods. Mothers reported that the introduction of other types of milk was a choice of their own (60%) or medical advice (23.3%).

Thus, it is important to reinforce the role of health professionals in relation to the guidance that is provided during prenatal and postpartum⁽³⁵⁻³⁷⁾ on the possible losses arising from the early introduction of whole cow's milk for the child's growth and development. This improper practice could lead to problems in childhood and even in adulthood⁽³⁸⁾.

Therefore, it is essential to foster the encouragement of exclusive breastfeeding until six months of age and provide guidance on complementary foods that can be included up to the first year of life.

CONCLUSION

There was a high prevalence of early consumption of whole cow's milk by children under one year old showed and it was influenced by factors such as income, education and young maternal age. Therefore, it is necessary raise health professionals' awareness regarding the provision of better guidelines during consultations of prenatal and postpartum care.

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