Complementary feeding of children in the second year of life

Alimentação complementar em crianças no segundo ano de vida

Alimentación complementar en niños en el segundo año de vida

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ABSTRACT

Objective: To study the eating habits of children in their second year of life, comparing these habits in children that received complementary breastfed to the ones who weaned before 12 months of life.

Methods: Cross-sectional study involving children aged 12 to 24 months in a primary health care service in Belo Horizonte, in the state of Minas Gerais, Southeast Brazil. Mothers were interviewed about the feeding practices of their children. The eating habits of complementary breastfed children were compared to those who weaned before 12 months of life by the chi-square, Fisher, Student's *t*, and Kruskal-Wallis tests, with a significance level of 5%.

Results: 118 children were included with a mean age of 16.8±4.0 months. About 35% of them were still breastfed and only 15.3% kept exclusive breastfeeding for six months. In breastfed children the median duration of exclusive breastfeeding was four months and, for the weaned ones, two months (p=0.13). In both groups there was early introduction of complementary food, high intake of processed food, high daily consumption of oils and fats (90.7%), and low consumption of fruits (38.1%).

Conclusions: The results point out the existence of inadequate feeding practices in infants regardless of the recommended intake of breast milk, therefore indicating the need for improvement and integration of actions to promote breastfeeding and healthy diets in primary attention services.

Key-words: breastfeeding; supplementary feeding; weaning; food habits; infant nutrition.

RESUMO

Objetivo: Estudar as práticas alimentares de crianças no segundo ano de vida, comparando as que estão em aleitamento materno complementado com aquelas desmamadas antes dos 12 meses de vida.

Métodos: Estudo transversal envolvendo crianças de 12 a 24 meses da área de abrangência de um serviço de atenção primária de Belo Horizonte, Minas Gerais. As mães foram entrevistadas sobre as práticas de alimentação de seus filhos. Foram comparadas as práticas alimentares das crianças em aleitamento materno complementado com aquelas desmamadas antes dos 12 meses de vida por meio dos testes qui-quadrado ou exato de Fisher, *t* de Student e Kruskal-Wallis, com nível de significância de 5%.

Resultados: Foram avaliadas 118 crianças com idade média de 16,8±4,0 meses, sendo que 35% delas ainda eram amamentadas e 15,3% mantiveram aleitamento exclusivo por seis meses. Nas crianças amamentadas, a duração mediana do aleitamento exclusivo foi de quatro meses e, nas desmamadas, dois meses (p=0,13). Em ambos os grupos houve introdução precoce de alimentos complementares, elevado consumo de alimentos industrializados, alta prevalência de consumo diário de óleos ou gorduras (90,7%) e baixo consumo de frutas (38,1%).

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Conclusões: Os resultados sinalizam práticas alimentares inadequadas nos lactentes, independentemente do consumo recomendado de leite materno, denotando a necessidade de aprimoramento e integração das ações de promoção do aleitamento materno e alimentação saudável nos serviços de atenção primária à saúde.

Palavras-chave: aleitamento materno; alimentação complementar; desmame; hábitos alimentares; nutrição do lactente.

RESUMEN

Objetivo: Estudiar las prácticas alimentares de niños en el segundo año de vida, comparando los que están en lactancia materna complementada (LMC) con aquellos destetados antes de los 12 meses de vida (SLM).

Métodos: Estudio transversal implicando a niños entre 12 y 24 meses de edad en el área de alcance de un servicio de atención primaria de Belo Horizonte/Minas Gerais (Brasil). Las madres fueron entrevistadas sobre las prácticas de alimentación de sus hijos. Se compararon las prácticas alimentares de los niños en LMC con aquellos SLM por medio de las pruebas chi cuadrado o exacto de Fisher, t de Student y Kruskal-Wallis, con un nivel de significancia de 5%.

Resultados: Fueron evaluados 118 niños con promedio de edad de 16,8±4,0 meses, siendo que el 35% de ellos todavía eran amamantadas y el 15,3% mantuvieron lactancia exclusiva por seis meses. En los niños amamantados, la duración mediana de la lactancia exclusiva fue de cuatro meses y, en los destetados, dos meses (p=0,13). En ambos grupos, hubo introducción temprana de alimentos complementares, elevado consumo de alimentos industrializados, alta prevalencia de consumo diario de aceites/grasas (90,7%) y bajo consumo de frutas (38,1%).

Conclusión: Los resultados apuntan prácticas alimentares inadecuadas en los lactantes, independiente de la recomendación de consumo de leche materna, denotando la necesidad de perfeccionamiento e integración de las acciones de promoción de la lactancia materna y alimentación sana en los servicios de atención primaria a la salud.

Palabras clave: Lactancia materna; alimentación complementar; destete; hábitos alimentares; nutrición del lactante.

Introduction

Exclusive breastfeeding (EB) in the first 6 months of life and continuation of breastfeeding with complementary foods (CMB) for 2 years or more are recommended practices by the World Health organization (WHO) and by the Brazilian Ministry of Health (MH)[1,2]. Nevertheless, in Brazil, studies identified inadequacies, such as low prevalence of exclusive breastfeeding (EBF) and early introduction of food in infants' diets[3-6].

The National Demographic Health Survey (NDHS), conducted in 2006, found that 62% of breastfed children in Brazil already consumed complementary foods in the 4th and 5th months of life[6]. Data from the Second Survey on Prevalence of Breastfeeding in Brazilian capitals and the federal District (2009) showed introduction of water, teas and other milks in the first month of life in 13.8, 15.3 and 17.8% of children, respectively[3]. It was also verified that 25% of infants between 3 and 6 months old consumed salty food and fruits, showing that, despite the progress made since the implementation of the National Policy to Encourage breastfeeding, Brazil is below the goals proposed by the WHO and the MH[3].

It is noteworthy that the early introduction of foods may be associated with increased infant morbidity and mortality, due to risk of inadequate food hygiene, occurrence of allergic reactions, decreased absorption of nutrients and lack of intake of the protective factors present in breast milk (BM)[1]. On the other hand, the late introduction of the complementary foods is also unfavorable due to the possibility of reducing infant growth and, therefore, increasing malnutrition and micronutrient deficiencies, particularly from iron, zinc and vitamin A[2,7,8].

Despite the importance of complementary feeding and food supply at an appropriate age, studies on the process of introduction of foods and dietary practices in infants are scarce, compared to the number of publications on EBF[9,10]. This study aimed to study the eating habits of children in the 2nd year of life, in Belo Horizonte (MG), comparing those receiving CBF with those who had been weaned before 12 months of life (WBF), besides investigating the association of BM consumption for longer than 1 year with sociodemographic, economic, behavior, and health care variables.

Method

The present study was a cross-sectional analysis involving children from 12 to 24 months old, living in the area of a Basic Health Unit (BHU) in Belo Horizonte, state of Minas Gerais, who present medium to high risk of illness and death, according to the Health Vulnerability Risk (HVR), developed by the Municipality of Belo Horizonte[11].

Children aged 12-24 months were considered eligible for the study. Based on the register of community health agents (CHA), it was estimated that there were approximately 200 children in this age group in the beginning of 2009. Mothers were invited to

participate in the study through home visits and interviews at the BHU from February to April 2009. We evaluated 118 children, representing 59% of all children identified. Sixteen mothers refused to participate and the remaining could not be contacted after the printed invitations, home visits, and telephone contacts.

Interviews were performed by students attending their final year in the Nutrition graduate program of Universidade Federal de Minas Gerais (UFMG), through a structured questionnaire previously tested in a pilot study. The instrument consisted on 73 questions, addressing sociodemographic and economic aspects of the mother (age, education, occupation, participation in stable union (marital status), and per capita income) and of the infant (sex and age), obstetric history (type of delivery, parity and number of children), use of health services for health control, and number of visits in the last year, as well as questions on the access of information about infant feeding, breastfeeding (BF) patterns, frequency of consumption of foods, and about the process of introduction of complementary foods.

The patterns of BF were assessed according to criteria proposed by the WHO[1]. The length of EBF was regarded as the period in which the children received only breast milk (BM) without any intake of other liquid or solid, except for vitamins and minerals and/or medicine. CBF was considered as the period in which children received BM associated with any kind of supplement: liquid, semi-solid, solid, or other milks[1].

Dietary intake was assessed with a qualitative food frequency questionnaire, designed specifically for the study, in which the mother had to report the frequency of the infant's consumption by food groups: "breads, cereals and tubers"; "fruits and vegetables"; "milk and dairy products"; "meat, poultry, and eggs"; "legume"; "oils and fats"; and "sugar and sweets".

To evaluate the process of introduction of complementary foods we used information regarding the age of introduction of foods such as porridge vegetables, juices, fruits, meats, eggs, snacks, processed foods, teas, milks, and sweets. The obtained data were evaluated according to the Brazilian Ministry of Health[2].

Data were analyzed with SPSS version 12.0[12]. We conducted a descriptive analysis and applied the chi-square or Fisher exact, Student *t* and *Kruskal-Wallis* tests, considering 5% as level of significance[13].

Children were distributed in two groups: Those in CBF and those not receiving maternal milk (WBF). We tested the association between consumption of BM for over 1 year with sociodemographic, economic, behavioral, and health care variables.

The study was approved by the Research Ethics Committee of the Municipal Secretary of Health of Belo Horizonte (CAE 0010.0.410.203-09A). Mothers received information on the objectives and procedures of the study and signed an informed consent, as required by resolution 196 of the National Health Institute.

Results

The 118 children had, in average, 16.8±4.0 months of age, 50.8% were female, and 44% were only children (Table 1). Mothers had, on average, 28±6.4 years, and 6% were teenagers; 68% had studied for more than 8 years, and less than half worked outside home at the time.

Table 1 - Sociodemographic characteristics of mothers and children from 12 to 24 months at a primary healthcare service, Belo Horizonte, 2009

Characteristics	n (118)	%
Child's age (16.8±4 months)*		
12–15 months	52	44.1
16–18 months	23	19.5
19–24 months	43	36.4
Mothers age (28.0±6.4 years)*		
<20 years	7	5.9
20–30 years	73	61.9
31–44 years	38	32.2
Mother's education (9.6±2.8 years)*		
≤8 years of study	38	32.2
>8 years of study	80	67.8
Mother works and/or studies		
Yes	53	44.9
No	65	55.1
Stable Union		
Yes	92	78.0
No	26	22.0
Per capita income (R$ 300.00±221.00)*		
<½ minimum-wage	55	50.9
≥½ minimum-wage	53	49.1
Kind of delivery		
Natural	65	55.1
Cesarean	49	41.5
Forceps	4	3.4
Number of children (1.9±1 child)		
Only child	52	44.1
More than 1 child	66	55.9
Place where the child has "health control"		
Basic Health Unit	83	70.7
Others	35	29.3
Visits to "health control" in the last years		
1–6	19	15.3
7–12	69	58.5
>12	31	26.3

*Median values±standard deviation

The per capita income of 51% of families was below the minimum wage/month (Table 1).

Most children were monitored routinely at the BHU and almost 85% of them went through seven or more consultations in the last 12 months preceding the interview (Table1). When asked about routine consultations at the BHU, it was verified that 90.7% of mothers received guidance about breastfeeding, introduction of foods, and supplementary feeding during control visits; and 89% reported having had the opportunity to answer their questions during these visits.

About 35% of children still received BM, corresponding to the group of children in CBF. Among these, 36.6% received BM on demand and 63.4% received it at pre-determined times. The median duration of breastfeeding in the case of children already weaned was of 7 months.

Only 15.3% of children kept EBF until 6 months of age. In children on CBF, the median duration of EBF was 4 months and in those weaned, 2 months (p=0.13, Kruskal-Wallis).

Table 2 presents minimal and maximum (range) ages and the median age at which foods were introduced comparing the CBF group and the WBF group. There was statistical difference between the medians of age of introduction of water (p=0.032), teas (p=0.046), natural juices (p=0.002) and other milks (p=0.007), the latter introduced later in the group under CBF, when compared to the WBF group. Considering the general behavior of both groups, practically

Table 2 - Comparative analysis of median age of introduction of complementary foods in children from 12 to 24 months of age according to consumption of breast milk, at a primary healthcare service, Belo Horizonte, 2009

Complementary foods	Children in CBF		Weaned children		*p*-value
	Age Range*	Median*	Age Range*	Median*	
Water	0–8	4.5	0–8	3.0	0.032
Tea	0–12	4.0	0–7	3.0	0.046
Natural juices	2–14	6.0	2–9	4.0	0.002
Other milks	0–17	7.0	0–19	4.0	0.007
Fruits	3–13	6.0	2–9	5.0	0.115
Salty baby food 1	3–10	6.0	2–12	5.5	0.152
Salty baby food 2	4–12	7.0	3–15	6.0	0.448
Meats	4–12	7.0	3–14	6.0	0.171
Whole egg	5–12	8.0	3–15	8.0	0.394
Family food	5–12	12.0	3–22	11.0	0.101
Snacks	1–18	12.0	3–20	12.0	0.636
Soda and artificial juices	6–18	12.0	3–20	12.0	0.987
Coffee	7–17	12.0	5–24	12.0	0.222
Sweets	4–24	12.0	4–20	12.0	0.118

*Range of age of introduction of foods (in months); CBF: consumption of breast milk

Table 3 - Frequency of consumption of food groups among chilren aged 12 to 24 months at a primary healthcare service, Belo Horizonte, 2009

Foods	1 or more times/day		5 to 7 times/week		1 to 4 times/week		Occasional Use		No information	
	n	%	n	%	n	%	n	%	n	%
Breads/Tuber/cereals	113	95.8	2	1.7	3	2.5	0	–	0	–
Fruit	45	38.1	42	35.6	31	26.3	0	–	0	–
Vegetables	82	69.5	19	16.1	15	12.7	2	1.7	0	–
Milk/dairy products	102	86.4	13	11.0	0	–	0	–	3	2.5
Meat and poultry	66	55.9	30	25.4	16	13.6	6	5.1	0	–
Eggs	0	–	0	–	63	53.4	52	44.1	3	2.5
Legumes	103	87.3	13	11.0	0	–	0	–	2	1.7
Oils/fats	107	90.7	9	7.6	0	–	0	–	2	1.7
Sugar/Sweets	80	67.8	22	18.6	11	9.3	5	4.2	0	–

all kinds of foods studied (except for coffee and snacks such as chips) were offered at least to one child before six months of age. The study highlights the frequent introduction of foods like soft drinks, snacks and sweets before 12 months of age.

Table 3 shows the frequency of consumption from the food groups by the children assessed. It appears that the food groups with the highest daily consumption were the "bread, cereals and tubers" (95.8%), followed by the groups of "oils and fats" (90.7%), and "dairy products" (86.4%), which contrasts with the low daily intake of "fruits" (38.1%), "meat and poultry", (55.9%) and "vegetables" (69.5%). Furthermore, 44% of children consumed "eggs" only occasionally, 25.4% had meat once or fewer times per day (5 to 7 times a week) and 26.3% had fruit only 1 to 4 times a week.

The analysis of the association between explanatory variables and the children's feeding patterns is presented in Table 4. There was no statistically significant difference between the groups regarding the number of offspring, education, maternal working condition and/or education, and per capita income. No association between the CBF with the reaction of the child to the introduction of new foods was demonstrated (p=0.710). It was found that the group of breastfed children had higher frequency of daily consumption of legumes than those weaned (p=0.03). The consumption of other kinds of milk was higher among weaned children (p=0.01). Both groups of children showed similar results regarding the consumption of other types of food.

Discussion

The present study identified an inappropriate dietary pattern in children, with short duration of EBF, early introduction of complementary foods and consumption of an unbalanced diet. This occurred despite the mothers having received counseling from health professionals on various aspects of infant feeding and their children having been assisted regularly during the first year of life. Studies conducted in São Paulo with children younger than 2 years found similar results with low duration of EBF and consumption of inadequate foods for the age[14,15].

Table 4 - Analysis of the association between explicative variables and the dietary patterns of children aged from 12 to 24 months at a primary healthcare service, Belo Horizonte, 2009

Explicative Variables	Complemented breastfeeding				*p*-value
	Yes		No		
	n	%	n	%	
Maternal education (n=118)					
8 years or less of study	13	32.0	25	32.5	0.93
More than 8 years od study	28	68.0	52	67.5	
Work and/or study (n=118)					
Yes	14	34.1	39	50.6	0.09
No	27	65.9	38	49.4	
Per capita income (n=108)					
≤½ salary	16	44.4	39	54.2	0.34
>½ salary	20	55.6	33	45.8	
Number of children (n=118)					
Only child	16	39.0	36	47.0	0.42
More than 1 child	25	61.0	41	53.0	
Reaction to the introduction of new foods (n=115)					
Child accepted well	23	60.5	53	69.0	
Child accepted with difficulty	10	26.3	18	23.4	0.71
Child refused	5	13.2	6	7.6	
Grain Legumes Consumption (n=116)					
More than once daily	39	97.5	64	84.2	0.03
5 to 7 times per week	1	2.5	12	15.8	
Consumption of other kinds of milk (n=115)					
More than once daily	31	77.5	71	95.0	0.01
5 to 7 times per week	9	22.5	4	5.0	

The percentage of children who received EBF until 6 months old was well below the recommended by the WHO. The median duration of EBF in the group of children who were still being breastfed was twice that observed in the group of weaned children. The values presented for Brazil and Belo Horizonte in 2009 by the national research[3], around 1.8 months of EBF, are close to those found in the present study for weaned children. The longer duration of EBF in the group of breastfed children indicates a higher appreciation of BF by these mothers, which led them to continue breastfeeding for 12 months or more.

The median duration estimated for Brazil and Belo Horizonte, in 2009, was, respectively, 11.2 and 10 months[3]. A study conducted in the same community between 1980 and 2004 reveled that the median duration of breastfeeding increased from 5 to 11 months between the first and the last survey ($p<0.001$)[16]. These values are higher than those found in the study for children already weaned. Just over one third of children still received BM in the 2nd year of life, which shows that the situation of BF is still far from the recommended by the WHO, despite the advances made in recent decades.

Many authors have studied the factors that may interfere on the duration and patterns of BF and concluded that this practice is influenced by social, cultural, and health care issues, among others[16-20]. A survey that monitored 151 children in Porto Alegre, state of Rio Grande do Sul, pointed out as factors associated to breastfeeding for 2 years or more: the mother's stay at home in the child's first 6 months of life, not offering the soother, postponing the offer of water/tea and other milks, and not living with a partner[21]. The same was not observed in the present study, probably due to the socio-cultural homogeneity of the population studied.

Studies that examined the practice of breastfeeding in other age groups showed shorter duration and prevalence of the different patterns of BF when mothers have low education, are adolescents or primiparous[17]. The interference of other factors such as: the initial difficulties to breastfeeding, the concept of ideal duration of BF, and the opinion of the father were also identified in the literature as determining factors on the duration of breastfeeding[16].

Caetano *et al* found that decisions on introduction of food taken by mothers were based on their own experience of life or their family's, and that the pediatrician and the media had a less significant influence[22]. Monteiro *et al* conducted a study with 231 nursing mothers, and approximately 30% of them believed to produce "weak" milk, which would influence on the introduction of foods inappropriately[23].

These data may assist in understanding the results of this study, considering that almost all the mothers interviewed reported having received guidance on breastfeeding and complementary feeding during routine monitoring of their children at the BHU and still adopted inadequate feeding practices. Moreover, a meta-analysis of studies addressing the impact of educational practices with mothers of infants showed the effectiveness of this approach to BF continuity, better availability of complementary feeding, and use of healthy foods available in the local culture[24].

According to the WHO, mothers should not offer water or teas to children before 6 months old[1]. Other studies performed in Brazil also identified the introduction of these foods before the appropriate time[7,15, 22, 25].

This study demonstrated that the introduction of water, teas, natural juices and milk other than breast milk occurred before the 6th month of life in both groups, but earlier in the group of children weaned before 12 months old. Apparently, the reaction of the children to new foods was good, which suggests that there were no difficulties in this process.

We highlight the shortage of studies involving children breastfed for more than 1 year to better understand the dietary pattern known as CBF. The contradiction observed between the practices of prolonged BF and the early introduction of complementary foods shows that, in part, mothers are aware of the benefits of breastfeeding, but presented conflicting attitudes regarding recommendations on the provision of food to their children. This becomes especially worrisome due to the fact that most mothers take their children routinely to the BHU and reported having been instructed by health care professionals regarding breastfeeding and infant feeding. It is noteworthy that the dietary patterns of the two groups of children (CBF and WBF) have been identified as practically identical, from the qualitative point of view. Cultural and socio-economic questions may be determining in this process.

The interference of the early introduction of foods in the increased risk of developing allergies, diabetes, obesity, and cardiovascular disease has already been demonstrated in several studies[26-29,32]. This practice, despite increasing the share of energy, does not always provide all the nutrients the child needs, which may interfere with nutritional status and child development[27,30-32].

Other authors, in a research conducted with children from 24 to 72 months of age, in Minas Gerais, also showed that the most consumed food groups were cereals, legumes, dairy products, sweets and fats[32]. It was also observed that most children do not have food intake as recommended by the Ministry of Health[2]. The low frequency of egg consumption may be related to food taboos that it would be inappropriate for consumption in childhood, rising blood cholesterol levels. The report of consumption of sweets, snacks, fried foods, and industrialized foods was common, even before the first year of life, which is a diet of low nutritional value. We emphasize the need to discourage the consumption of these kinds of food and encourage the consumption of fruits and vegetables.

Although a large difference in food groups consumption was not observed between breastfed children and the others, it is possible that those mothers still breastfeeding are better informed or aware of the importance of certain foods in the diet of their children, such as legumes, regarded as important sources of vitamins and minerals.

This study draws the attention to the importance of interventions aimed at improving the nutrition of infants. Santos *et al* conducted an educational intervention based on the training of professionals for advice on feeding according to the guidelines of the Integrated Management for Childhood Illnesses (IMCI), and observed quantitative and qualitative improvement of feeding practices of mothers of malnourished children from 2 months to 5 years old. The training also increased the knowledge of trained professionals who became more skilled in making infant feeding counseling[33]. Caldeira *et al* showed that the training of Family Health Teams was effective in increasing the prevalence of EBF[34].

This study had as a limitation the fact that it was performed within only one Basic Health Unit in Belo Horizonte and assessed only 59% of eligible children. It is noteworthy, therefore, the need for prospective studies with larger numbers of participants, addressing perceptions, feelings, and conceptions of mothers to better understand the process of introduction of complementary foods to breastfeeding in our area. The results do not exhaust the subject, but they fill gaps and lead to the reorganization of actions to encourage the practice of BF and strategies to promote healthy eating at the appropriate time, incorporating, thus, the guidelines from the National Policy for Food and Nutrition[34], at all levels of health care and within the community.

It can be concluded that the practice of breastfeeding for more than 12 months was not accompanied by satisfactory complementary feeding when the process of introducing these foods and the nutritional quality of the diet of these children was analyzed. These findings suggest that mothers are not sufficiently instructed yet regarding the offer of complementary foods or have not yet incorporated important concepts for the practice of a healthy diet for their children.

Health care professionals should be aware of this fact and be able to adapt promotion actions to the socio-demographic and cultural context of the population assisted in order to provide mothers with opportunities to acquire knowledge and skills on infant feeding. It is hoped, therefore, that this study can contribute to the reorientation of the actions of nutrition education in health services, besides strengthen families in positive attitudes and habits to ensure a healthier infant feeding.

It should also be emphasized the need for improvement and integration of actions that promote breastfeeding and healthy eating in the services of primary health care, in order to prevent nutritional abnormalities, such as micronutrient deficiency, malnutrition, and obesity.

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