

Food intake by children aged six to twelve months and maternal sociodemographic profile

Consumo alimentar de crianças de seis a doze meses e perfil sociodemográfico materno

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Abstract

Objective: To evaluate food intake of children aged six to twelve months and its relationship with maternal sociodemographic variables in the town of Arvorezinha, state of Rio Grande do Sul, Brazil. *Method:* It is a cross-sectional study that analyzed children's food intake on the day before data collection, through data from the Food and Nutrition Surveillance System (SISVAN) in 2008 and 2015, and maternal variables evaluated through a form completed by the respondents and interviews with the participating mothers. *Results:* There was high frequency of intake of savory food (95.31%), cereals (90.48%), fruits (87.30%) and vegetables (70.31%), and low frequency of intake of porridge with milk (32.81%), leafy vegetables (15.64%), sausages (7.94%) and liver (4.76%). The maternal variables age, right to maternity leave, receiving an allowance from the Bolsa Familia cash transfer program were associated with children's food intake. *Discussion:* The results are similar to those of other published studies and are strongly related to the recommendations for healthy food intake by two-year-olds. *Conclusion:* the children in the present study have healthy food intake, especially at nine months, and maternal sociodemographic profile was related to children's food intake.

Keywords: Food Consumption. Child Nutrition. Nutrition Policy.

Resumo

Objetivo: avaliar o consumo alimentar de crianças de 6 a 12 meses de idade e sua relação com variáveis sociodemográficas maternas, do município de Arvorezinha, RS. *Método:* estudo transversal com crianças que avaliou consumo alimentar no dia anterior por meio dos formulários do Sistema de Vigilância Alimentar e Nutricional (SISVAN) de 2008 e 2015 e variáveis maternas aferidas através de formulário desenvolvido pelos pesquisados, sendo as mães as entrevistadas. *Resultados:* verificou-se alta frequência na ingestão de comida de sal (95,31%), cereais (90,48%), fruta (87,30%) e legumes (70,31%), e baixa frequência na ingestão de mingau com leite (31,81%), verdura de folha (15,64%), embutidos (7,94%) e fígado (4,76%). As variáveis maternas idade, direito à licença-maternidade, a escolaridade, a renda e ser beneficiário do programa Bolsa Família tiveram associação com consumo alimentar dos filhos. *Discussão:* os resultados encontrados são semelhantes a demais estudos publicados e têm forte relação com recomendações de uma Alimentação Saudável para Menores de Dois Anos. *Conclusão:* as crianças apresentaram consumo alimentar saudável, principalmente aos 9 meses, e o perfil sociodemográfico materno demonstrou relação com a alimentação dos filhos.

Palavras-chave: Consumo de Alimentos. Nutrição da Criança. Política Nutricional.

Introduction

With the purpose of improving food intake, nutrition and health conditions of the Brazilian population, the Food and Nutrition Surveillance System (SISVAN) was created by the Ministério da Saúde (Ministry of Health) in the 1970s in order to assess and monitor food intake and nutrition habits thereby detecting risk factors that can aggravate people's health.¹ However, the system was only implemented at the national level in the 1990s,^{1,2} but it has been operative to date. The system has protocols to verify and characterize food intake and nutritional status in certain age groups in an effective and representative manner.²

A proper diet in the first months of life is crucial for children's growth and healthy development.³ The World Health Organization (WHO) recommends exclusive breastfeeding as essential until 6 months of age, because breast milk is enough for children's nutritional demand. After this period, new foods, known as complementary foods, need to be introduced and provided together with breast milk until 2 years of age in order to meet children's nutritional needs.⁴

Complementary feeding is characterized by the slow and gradual introduction of any food other than breast milk.^{3,5} However, it is important to respect the right moment to introduce new foods, because early introduction (before 6 months) is one of the factors for the occurrence of diarrhea,⁶ infections, malnutrition⁴ and chronic diseases in the future.⁷

Mothers have strong influence upon determining the diet of children in this age group. The reason lies in the fact that they are mostly responsible for selecting, purchasing, preparing and supplying food for their children. In addition, within the family, they are the major reference to their children as far as food is concerned.^{8,9}

Therefore, one should identify maternal characteristics that might have a negative influence on children's nutritional status and health, so that intervention strategies can be designed to modify negative food intake habits,¹⁰ because children are quite susceptible to the development of nutritional deficiencies.^{3,7} Moreover, children's current food intake habits have to be mapped out so that data can be used as input to formulate public policies in order to maintain or promote children's health.

In this sense, the present study was aimed at evaluating food intake by children aged 6 to 12 months and its relationship with maternal sociodemographic variables, in the town of Arvorezinha, state of Rio Grande do Sul (RS), in southern Brazil.

Method

This is a cross-sectional study conducted with children aged 6 to 12 months and their respective mothers in the urban and rural area of the town of Arvorezinha, located in the state of Rio Grande do Sul (RS), with 10,595 inhabitants.¹¹ The sample was composed of children in either one of the two following situations: those who had received the *Bacillus Calmette-Guerin* (BCG) vaccine in Basic Health Units (UBS) of Arvorezinha, between September 2014 and May 2015, and children who were taken to a local UBS on a regular basis for childcare follow-up and whose data were probably recorded by Community Health Workers of Arvorezinha.

The study included all mothers who could possibly answer the researchers' questions and agreed to participate voluntarily upon signing an Informed Consent Form (ICF), whereby they also authorized their children's participation. The study excluded children who did not live with their mothers, children whose mother was not found and hence could not answer the questionnaire (because the mother was supposed to answer the questionnaire), and children who were older than 12 months of age during the period of data collection.

After the exclusion criteria were applied to the initial sample of 75 children, there were 64 remaining children, covering 85.33% of the municipality. Data were collected between September and December 2015 through home visits by community health workers and an undergraduate student of nutrition (from Arvorezinha). They all received training before applying the questionnaire to mothers.

The following child sociodemographic variables were measured: children's age in months, sex, level of education (whether or not they attended early childhood schools), time spent with the mother (in hours per day) and food intake. Maternal sociodemographic variables were age, level of education, employment, duration of the right to maternity leave, monthly income (in minimum wages), area of origin (urban or rural), whether or not they received an allowance from the Bolsa Família Program (BPBF) and food preparation.

Food intake was analyzed by means of forms about food intake markers for children under the age of two, available through the Food and Nutrition Surveillance System (SISVAN),^{2,12}. The questions in the form referred to food intake on the previous day. Food intake was assessed by ingestion of breast milk and cow's milk, porridge with milk, fruit, yogurt, family meal, legumes, vegetables or orange-colored fruit or green leafy vegetables, leafy vegetables, cereals and tubers, meat, liver, beans, sausages, hamburgers, sugar or honey, sugar-sweetened beverages, sandwich cookies, sweets and treats, instant noodles, processed snack foods or salty cookies.

Classification of food intake as 'adequate' or 'not adequate' was based on the recommendations of the dietary guidelines *Dez Passos para Alimentação Saudável para Menores de Dois Anos* ("Ten steps to a healthy diet for children under two years old"), proposed by the Ministério da Saúde (Ministry of Health).¹³ To analyze the intake of breast milk and cow's milk, the introduction of complementary foods and the intake of processed foods, the following steps were used: step 2 (at 6 months, introduce other foods slowly and gradually, while keeping breastfeeding until 2 years of age or older); step 3 (at 6 months, give complementary foods such as cereals, tubers, meat, legumes, fruits and vegetables three times a day, if the child is breastfeeding); and step 8 (avoid sugar, coffee, canned foods, fried foods, sodas, candies, processed snack foods and other treats, during the first years of life. Use salt moderately). Food intake was considered as inadequate when it was not consistent with the steps mentioned above.

To assess the duration of breastfeeding, the questionnaire had a question which asked if the child had been breastfed on the day before. For those who were, median age was calculated through the days of life until the moment of the interview. When the mothers reported that their children were weaned, they were instructed to answer a question about how long they had breastfed them (number of days), and the median of days was finally calculated.

The data were entered twice and analyzed in the software *Statistical Package for Social Sciences* (SPSS), version 18.0. Tables were designed to describe simple frequency. For comparison of means, Student's t-test was used; categorical variables were compared with the Chi-square test, considering the significance level of 5%.

This research was approved by the Research Ethics Committee at the Universidade Federal de Santa Maria (Federal University of Santa Maria) (UFSM). It followed the ethical standards established by the Standards and Regulatory Guidelines for Research Involving Human Subjects - CNS Resolution 466/2012, and was registered as CAAE 48289115.9.0000.5346. The research was also authorized by the Health Department of the Town of Arvorezinha (RS), Brazil.

Results

Of the 64 children assessed, 40.6% (n=26) were females and 59.4% (n=38) were males. Mean age was 9.09 ± 2.11 months, with predominance of children aged 12 months (21.87%), followed by 8-month children (20.31%). Of the total sample, only 3.2% (n=2) of children attended early education schools. Mean daily time spent with their mother was 17.91 ± 8.32 hours.

As for maternal characteristics, mean age was 29.45 ± 7.11 years. Most mothers lived in the urban area (74.6%). The most frequent level of education was high school graduate (30.2%), followed by elementary school drop-out (23.8%). A quarter of them received an allowance from the Bolsa Família Cash Transfer Program (27.4%). Half of the participants in the sample reported having a job (55.2%); however, when they were asked about type of employment relationship, 51.8% reported being a housewife and 45.9% reported not having a monthly income. All mothers who had the right to maternity leave (n=75.9%) were on leave for a period of four months, and most of them reported to be responsible for preparing the meals at home (78.1%). When mothers were not responsible for meal preparation, grandmothers were (73.3%), as described in Table 1.

TABLE 1

Table 1. Sociodemographic characteristics of mothers of children aged 6 months to 1 year in the town of Arvorezinha (RS) (n=64, 2015).

MATERNAL CHARACTERISTICS		
	n	%
<i>Origin</i>		
Urban area	47	74.6
Rural area	16	25.4
<i>Schooling</i>		
Did not attend school	2	3.2
Elementary School Dropout	15	23.8
Elementary School Graduate	9	14.3
High School Dropout	5	7.9
High School Graduate	19	30.2
College Dropout	2	3.2
College Graduate	11	17.5
<i>Recipient of the Bolsa Família Program</i>		
Yes	17	27.4
No	45	72.6
<i>Monthly income</i>		
None	28	45.9
< 1 Minimum Wage	6	9.8
1 - 3 Minimum Wages	24	39.4
> 3 Minimum Wages	3	4.9
<i>Regular Job</i>		
Yes	32	55.2
No	26	44.8

to be continued

MATERNAL CHARACTERISTICS		
	n	%
<i>Employment relationship</i>		
Formal work contract	16	28.6
Self-employment	6	10.7
Self-employed cleaner	1	1.8
Housewife	29	51.8
Civil servant	3	5.4
Retired	1	1.8
<i>Entitled to maternity leave</i>		
Yes	41	75.9
No	13	24.1
<i>Preparation of meals</i>		
Child's mother	50	78.1
Someone else	14	21.9
<i>Who prepares meals (someone else)</i>		
Grandmother	11	73.3
Nanny/Caregiver	1	6.7
Husband	2	13.3
Wife and husband	1	6.7

Table 2 shows food intake of children on the day prior to the collection of data, relative to children's mean age.

Table 2. Percentage of food intake on the day before data collection, according to children's mean age in months in the town of Arvorezinha (RS) (n= 64, 2015).

Food intake	Percentage (%) of intake	Children's mean age in months	p
<i>Porridge and milk</i>			
Yes	32.81	9.62±2.13	0.165
No	67.19	8.84±2.06	
<i>Whole fruit/mashed fruit/piece</i>			
Yes	87.30	9.09±2.08	0.845
No	12.70	9.25±2.49	
<i>Yogurt</i>			
Yes	54.1	9.58±2.10	0.036
No	45.90	8.46±1.89	
<i>Savory food</i>			
Yes	95.31	9.23±2.06	0.001
No	4.69	6.33±0.57	
<i>Legumes</i>			
Yes	70.31	9.13±1.94	0.837
No	29.69	9.0±2.49	
<i>Vegetable or orange-colored fruit or green leafy vegetables</i>			
Yes	57.81	9.19±1.94	0.675
No	42.19	8.96±2.34	
<i>Leafy vegetables</i>			
Yes	15.64	10.10±2.02	0.100
No	84.36	8.91±2.08	
<i>Meat</i>			
Yes	71.88	9.70±1.96	0.000
No	28.12	7.56±1.65	
<i>Liver</i>			
Yes	4.76	10.67±2.30	0.195
No	95.24	9.03±2.09	
<i>Beans</i>			
Yes	57.38	9.11±2.08	0.946
No	42.62	9.08±2.17	

to be continued

Food intake	Percentage (%) of intake	Children's mean age in months	P
<i>Rice/potatoes/yam/cassava/flour/pasta</i>			
Yes	90.48	9.30±2.02	0.029
No	9.52	7.33±2.33	
<i>Hamburgers or sausages</i>			
Yes	7.94	9.40±2.40	0.765
No	92.06	9.10±2.10	
<i>Sugar-sweetened beverages</i>			
Yes	38.1	9.50±2.12	0.200
No	61.9	8.79±2.08	
<i>Sandwich cookies/candies/treats</i>			
Yes	29.69	9.21±2.17	0.776
No	70.31	9.04±2.09	
<i>Instant noodles/processed snack foods/salty cookies</i>			
Yes	17.46	10±1.84	0.127
No	82.54	8.92±2.14	

P* for t-test comparing children's mean age with food intake or lack of it.

Table 2 shows that, when food intake was associated with child's age, intake on the previous day of yogurt ($p=0.036$), savory food ($p=0.001$), meat ($p=0.000$) and rice or potatoes or yam or cassava or flour or pasta ($p = 0.029$) was higher among children with higher age in months, when compared with children who had not eaten these foods the day before.

It can also be seen that 37 children (57.81%) were being breastfed regularly, because they had been breastfed on the previous day, with mean age of 8.92 ± 2.10 months. The children who were not fed breast milk on the previous day were already weaned at the time of data collection, and the median of breastfeeding days for such children was 135 days. It was found that 17.19% of the children had been fed honey or molasses or sugar or *rapadura* (a type of sugar cane candy) before 6 months of age.

Table 3 compares the percentage of food intake of children on the day before data collection with maternal variables of interest in the study.

Table 3. Comparison of children's food intake on the day before data collection according to the maternal variables right to maternity leave, receiving an allowance from the Bolsa Família Program, level of education, and socioeconomic status, in the town of Arvorezinha (RS) (n=64, 2015).

Children's Food Intake	Entitled to maternity leave (%)		Bolsa Família (%)		Level of education (%)				Income (%)			
	Yes	No	Yes	No	Up to ES	Up to HS	Up to HE	Up to I MW	Up to > I MW	P*		
		P*		P*						P*		
Porridge												
Intake	76.5	23.5	1.0	61.9	38.1	50	35	15	0.587	60	40	0.785
No intake	75.7	24.3		78	22	37.2	39.5	23.3		53.7	46.3	
Fruit												
Intake	74.5	25.5	1.0	71.7	28.3	37	40.7	22.2	0.122	52.8	47.2	0.126
No intake	83.3	16.7		75	25	75	12.5	12.5		85.7	14.3	
Yogurt												
Intake	76.9	23.1	1.0	67.7	32.3	53.1	34.4	12.5	0.086	61.3	38.7	0.292
No intake	80	20		78.6	21.4	28.6	39.3	32.1		44.4	55.6	
Savory food												
Intake	74.5	25.5	1.0	72.9	27.1	40	38.3	21.7	0.560	55.9	44.1	1.0
No intake	100	0		66.7	33.3	66.7	33.3	0		50	50	
Legumes												
Intake	79.5	20.5	0.478	79.1	20.9	37.8	35.6	26.7	0.173	47.7	52.3	0.050
No intake	66.7	33.3		57.9	42.1	50	44.4	5.6		76.5	23.5	

to be continued

Children's Food Intake	Entitled to maternity leave (%)		Bolsa Familia (%)		Level of education (%)			Income (%)					
	Yes	No	P*	Yes	No	P*	Up to ES	Up to HS	Up to HE	Up to I MW	> I MW	P*	
Vegetables or orange-colored fruit/green leafy vegetables													
Intake	87.5	12.5	0.024	17.1	82.9	0.049	27	43.2	29.7	0.013	43.2	56.8	0.019
No intake	59.1	40.9		40.7	59.3		61.5	30.8	7.7		75	25	
Leafy vegetables													
Intake	75	25	1.0	20	80	0.713	40	30	30	0.700	44.4	55.6	0.492
No intake	76.1	23.9		28.8	71.2		41.5	39.6	18.9		57.7	42.3	
Meat													
Intake	70	30	0.146	28.9	71.1	0.759	42.2	33.3	24.4	0.353	52.3	47.7	0.408
No intake	92.9	7.1		23.5	76.5		38.9	50	11.1		64.7	35.3	
Liver													
Intake	33.3	66.7	0.145	66.7	33.3	0.166	66.7	0	33.3	0.369	66.7	33.3	1.0
No intake	78	22		24.1	75.9		39	40.7	20.3		54.4	45.6	
Beans													
Intake	67.9	32.1	0.208	31.4	68.6	0.510	52.9	35.3	11.8	0.101	66.7	33.3	0.071
No intake	87.5	12.5		20	80		26.9	38.5	34.6		40	60	
Rice/potato/yam/cassava/pasta													
Intake	72.9	27.1	0.343	27.3	72.7	0.785	41.1	37.5	21.4	0.765	56.4	43.6	0.521
No intake	100	0		33.3	66.7		50	33.3	16.7		60	40	

to be continued

Children's Food Intake	Entitled to maternity leave (%)		Bolsa Familia (%)		Level of education (%)			Income (%)					
	Yes	No	Yes	No	Up to ES	Up to HS	Up to HE	Up to I MW	> I MW				
Hamburgers or sausages													
Intake	33.3	66.7	0.140	40	0.122	40	40	20	0.990	80	20	0.367	
No intake	78.4	21.6		75.4		42.1	36.8	21.1		52.7	47.3		
Sugar-sweetened beverages													
Intake	68.4	31.6	0.311	41.7	58.3	0.038	56.5	34.8	8.7	0.076	56.5	43.5	1.0
No intake	82.4	17.6		16.2	83.8		30.8	41	28.2		54.1	45.9	
Sandwich cookies/candies/treats													
Intake	62.5	37.5	0.170	31.6	68.4	0.759	36.8	52.6	10.5	0.225	73.7	26.3	0.094
No intake	81.6	18.4		25.6	74.4		43.2	31.8	25		47.6	52.4	
Instant Noodles/processed snack foods/savory cookies													
Intake	50	50	0.036	63.6	36.4	0.007	54.5	36.4	9.1	0.494	72.7	27.3	0.315
No intake	83.7	16.3		20	80		39.2	37.3	23.5		51	49	
Honey/molasses/sugar/rapadura <6 months													
Intake	44.4	55.6	0.028	36.4	63.6	0.475	36.4	54.5	9.1	0.390	63.6	36.4	0.740
No intake	82.2	17.8		25.5	74.5		42.3	34.6	23.1		54	46	

ES: Elementary School; HS: High School; HE: Higher Education; MW: Minimum Wage; Chi-square p* value.

The comparison between the children's food intake and their mothers' characteristics showed that the children of mothers who had the right to maternity leave ate fruit ($p=0.024$), did not have instant noodles, processed snack foods or salty cookies ($p=0.036$) nor honey, molasses, sugar or *rapadura* before 6 months of age ($p = 0.028$).

The children of mothers who did not receive an allowance from the Bolsa Família Program ate more vegetables or orange-colored fruit or green leafy vegetables than the others ($p=0.049$). However, there was greater intake of instant noodles, processed snack foods or salty cookies and sugar-sweetened beverages ($p=0.038$) among the children of mothers who were receiving an allowance from the cash transfer program.

Moreover, the children whose mothers were high school graduates ate more vegetables or orange-colored fruit or green leafy vegetables ($p= 0.013$), and the children whose mothers received more than one minimum monthly wage ate more legumes ($p=0.050$) and vegetables or orange-colored fruit or green leafy vegetables ($p=0.019$).

Finally, the study also showed that the children of mothers with mean age of 27 years had more yogurt ($p = 0.006$); with mean age of 25 years, more leafy vegetables ($p = 0.034$); and with mean age of 28 years, more beans ($p=0.019$), respectively. These data were not shown in the Tables.

Discussion

Knowledge of food intake patterns of the population is crucial to develop health care initiatives. The protocols for assessment of children's food intake that have been made available by SISVAN contained questions about food intake on the previous day, which allows for a reduction of errors by recall bias. They are instruments that simplify the collection and analysis of data; in addition, they are easy and quick to use, and any health care professional can use and evaluate children's food intake on a regular basis.¹²

The present study showed that the mean age of the children who used to have yogurt, meat, savory food, rice or potatoes or yam or cassava, flour or noodles (but not instant noodles) was higher than the mean age of the children who did not eat these foods; greater intake occurred around 9 months of age. Furthermore, participant children presented high-frequency intake of fruits, savory food, legumes, rice or potatoes or yams or cassava, and flour or pasta (but not instant noodles), and low-frequency intake of porridge with milk, leafy vegetables, liver, hamburgers or sausages, sweet cookies, sandwich cookies and treats, instant noodles, processed snack foods and salty cookies.

The association between children's food intake and maternal sociodemographic profile showed statistically significant differences between the variables age, right to maternity leave, receiving an allowance from the Bolsa Família Program, being a high school graduate and having a monthly income above one minimum wage.

The results showed the food intake situation of children aged 6 months to 1 year of age in Arvorezinha, in southern Brazil. Therefore, the present study was groundbreaking in the town and in the State of Rio Grande do Sul. It was the first to use the update of the protocol by SISVAN¹² for children under the age of one year, to date.

Food intake of children is often discussed in the current literature through data collected with 24-hour Dietary Recalls and Food Frequency Questionnaires. Only the study of Coelho et. al.,¹⁰ held in the city of Diadema, state of São Paulo, with 350 children under the age of 24 months, used the protocol by SISVAN² to perform data collection, and it is the only published one. They found that foods such as sugar, honey or molasses, savory baby food and cow's milk are offered before children are 6 months of age, hence the latter are not provided with exclusive breastfeeding anymore. Also, they have insufficient intake of fruits, legumes and vegetables, meat and beans between 6 and 23 months, because they were not offered such foods at the frequency recommended by the *Guia Alimentar para Crianças Menores de Dois Anos* ("Dietary Guidelines for Children Under Two Years Old").¹³

Our study shows similar results for intake of sugar, honey or molasses before 6 months of age and infrequent intake of fruit, legumes, vegetables, meat and beans, which contradicts the third step of the guide.¹³

Foods with the highest frequency of intake by children younger than 1 year old were fruit, legumes, cereals, savory food and meat. There are two possible reasons for this result: cultural habits of the population, namely a taste for intake of fresh food in early childhood, because fresh food can be easily purchased from farmers, as well as recommendations of health professionals in primary care, who encourage breastfeeding and complementary feeding according to the recommendations of the Ministério da Saúde (Ministry of Health).¹³

The eighth step of the *Dietary Guidelines for Children Under Two Years Old*¹³ recommends avoiding sugar, coffee, canned foods, fried foods, sodas, candies, processed snack foods and other treats, during the first years of life, as well as moderate use of salt. Our study identified the intake of these foods in the process of complementary feeding before 1 year of age. Sugar-sweetened beverages, yogurt, candies, treats or sweet cookies are the most common foods offered to children, although not so frequently.

As regards breast feeding, the mean age of the children who had been breastfed on the previous day was 270 days, which may be related to higher prevalence of children with 9 months of age in the study (9.09 ± 2.11 months). Mean age of the children who were already weaned was 128.62 ± 96.36 days. Both ages were below the average in Brazil, which corresponds to 341.6 days,¹⁴ and they did not meet the recommendations of the second step of the *Dietary Guidelines for Children Under Two Years Old*.¹³ In line with our study, the research by Saldiva et al.¹⁵ conducted in São Paulo found that only 50% of children aged 6 to 12 months were breastfed on the day prior to data collection.

Maternal variables also showed associations in children's food intake. Molina et al.¹⁶ found that mothers' low level of education resulted in children's low-quality food intake and Campagnolo et al.¹⁷ identified that mothers' higher level of education has positively influenced intake of legumes or vegetables and meat among breastfeeding infants. In our study, there was an association in the intake of vegetables or orange-colored fruit or green leafy vegetables by children whose mothers were high school graduates, which is justified by the level of education and advice.

Another important factor to be considered when seeking to identify influences on children's food intake is income. Our study corroborates the results of the study of Drewnowski & Specter,¹⁸ but family income was associated with intake of fruit, vegetables or green leafy vegetables, because low-income children had these foods in smaller quantities. The high cost of fruits and vegetables or green leafy vegetables and the difficult access to these foods may be factors that do not allow families to have them with meals on a daily basis.

Côrrea et al.¹⁹ found that mothers' monthly income below the minimum wage is associated with higher intake of meat, sweets and bread by children under two years of age. The study by Silva et al.²⁰ showed that, as family income increased, there was increased intake of processed foods, which are rich in fat and sugar. Our study showed no significant difference in the relationship between income and intake of processed food. However, the intake of sugar-sweetened beverages showed an association with mothers who did not receive an allowance from the Bolsa Família Program; it was indirectly related to income.

In the present study, there was low frequency of intake of fruits, vegetables and green leafy vegetables by children whose mothers receive an allowance from the Bolsa Família Program, and increased intake of processed foods, such as instant noodles, processed snack foods, savory cookies and hamburgers or sausages, which are not considered to be adequate food for this age group.¹³ These results corroborate those found by Saldiva et al.²¹ However, they are cheaper food and the recipients of the Bolsa Família Program are people with lower purchasing power, which influences the purchase of food according to income. The percentage of recipients was below 50% and there were few published studies^{10,20} on food intake and participation in the program.

Our study also indicated an association between maternal age and right to maternity leave and children's food intake. Children whose mothers were less than 28 years old had yogurt, green leafy vegetables and beans more often. Coelho et al.¹⁰ reported higher intake of breast milk when mothers were older and Saldiva et al.,¹⁵ higher intake of family meals when mothers were less than 20 years old. There were no publications that showed associations similar to those reported in the present paper, although several authors^{7,9,19,22} have researched maternal age and children's food intake.

As far as the right to maternity leave is concerned, all mothers had been on leave for a period of four months, and there was a greater intake of vegetables, orange-colored fruit or green leafy vegetables, and lower intake of instant noodles, savory cookies or processed snack foods and lower

intake of honey, molasses, sugar or *rapadura* before 6 months of age. These data show that when mothers stayed at home with their children, they provided the latter with a healthier and more adequate diet. It should be noted that the questionnaire had one single question that referred to intake of vegetables, orange-colored fruit or green leafy vegetables. Therefore, given the duration of maternity leave and, consequently, the child's age, it can be concluded that intake was mostly of fruit.

Viera et al.²² claimed that the introduction of complementary foods usually occurs after the end of maternity leave. Currently, previous studies^{16,23,24} have shown associations between the practice of breastfeeding and the right to maternity leave, with no association with complementary feeding. Nevertheless, research on complementary feeding is necessary, because it is often seen to start prematurely.

However, according to the data of a study by Dame et al.,²⁵ there is low coverage in completion of the data in SISVAN in the state of Rio Grande do Sul (61.3% of municipalities) because public authorities do not always use the system and materials available, e.g. the protocols^{2,12} used in this research. Other studies that used SISVAN²⁶⁻²⁸ found information only on nutritional status (through anthropometric analysis) or on breast feeding. In the case of the municipality of Arvorezinha (RS), SISVAN is used only to evaluate the weight and height of the beneficiaries of the Bolsa Família Program.

There were two limitations of the present study: the fact that some home addresses registered in the system were not updated and, thus, possible interviewees could not be found; and the possible recall bias of mothers. Moreover, some mothers gave contradictory reports and omitted information on introduction and frequency of intake of some foods. However, the study was important because it identified which foods were and were not being introduced in the process of complementary feeding, which should encourage health policy makers to seek effective measures to change this situation. Yet, in order to encourage adherence to the use of protocols, training and awareness-raising of health professionals are required.

The results lead to the conclusion that children's food intake in this age group is based on fresh food, but mothers do not follow the recommendations of the Ministry of Health³ regarding the introduction of new foods and regular breastfeeding until 2 years of age. Therefore, breastfeeding and complementary feeding should be strongly encouraged since women's pregnancy, according to those recommendations. In addition, the variables maternal age, right to maternity leave, Bolsa Família, level of education and income affect children's food intake.

Contributors

Coradi FB, Bottaro SM and Kirsten VR worked at all stages, from the design of the study to the revision of the final version of the manuscript.

Conflict of interest: The authors declare no conflict of interest.

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Received: March 27, 2017

Revised: July 13, 2017

Accepted: August 25, 2017