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Food consumption pattern and obesity in preschool children in *Feira de Santana, Bahia*, Brazil

Padrão de consumo alimentar e obesidade em pré-escolares, Feira de Santana, Bahia

Karina Emanuella Peixoto de Souza GOMES[1]
Maria Conceição Oliveira COSTA[1]
Tatiana de Oliveira VIEIRA[1]
Sheila Maria Alvim MATOS[2]
Graciete Oliveira VIEIRA[1]

ABSTRACT

Objective

To evaluate the association between food consumption patterns and obesity in preschool children in *Feira de Santana, Bahia*, Brazil.

Methods

Cross-sectional, population-based nested within a live-birth cohort study of 813 children, which has started in 2004 in *Feira de Santana, Bahia*. The anthropometric status among children under four years of age was evaluated based on their body mass index; obesity/severe obesity was defined as a Z-score >+2. The Food Frequency Questionnaire was used to identify dietary patterns using principal components analysis. The association between obesity and food consumption patterns was assessed using Pearson's Chi-squared test and logistic regression, adopting $p<0.05$ to denote statistical significance.

Results

Obesity was detected in 12.7% of the children investigated. Four food consumption patterns were identified: dietary pattern 1 (milk and other dairy products, vegetables and tubers, cereals, legumes, fruits, and fish); dietary

[1] Universidade Estadual de Feira de Santana, Departamento de Saúde, Programa de Pós-Graduação em Saúde Coletiva. Av. Transnordestina, s/n., Centro de Pós-Graduação em Saúde Coletiva. Av. dos Laboratórios, Módulo 6, Novo Horizonte, 44036-900, Feira de Santana, BA, Brasil. *Correspondência para*/Correspondence to: KEPS GOMES. E-mail: <souzakep@gmail.com>.
[2] Universidade Federal da Bahia, Instituto de Saúde Coletiva, Programa de Pós-Graduação em Saúde Coletiva. Salvador, BA, Brasil.

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pattern 2 (deep-fried or baked snacks, soft drinks/artificial fruit juices, oils and fats, sweets, and coffee/tea); dietary pattern 3 (encased meats, fast food, ketchup/mayonnaise, and eggs); and, dietary pattern 4 (chicken and red meats). Obesity was statistically associated with high adherence to the dietary pattern 3 (OR=1.92; 95%CI=1.01–3.66).

Conclusion

The results obtained showed that the high intake of energy-dense foods (dietary pattern 3) was a contributing factor to childhood obesity. These data reinforce the need for public policies and food education programs in health units and schools, aiming to change children's eating habits, significant predictors of nutritional problems.

Keywords: Child, preschool. Factor analysis, statistical. Feeding behavior. Obesity.

RESUMO

Objetivo

Avaliar a associação entre padrões de consumo alimentar e a obesidade de pré-escolares em Feira de Santana, Bahia.

Métodos

Análise transversal de 813 crianças de uma coorte de nascidos vivos de base populacional, iniciada em 2004 em Feira de Santana, Bahia. O estado antropométrico entre menores de quatro anos foi avaliado por meio do cálculo do índice de massa corporal, sendo a obesidade/obesidade grave definida em escore Z (>+2). O Questionário de Frequência Alimentar foi o instrumento utilizado para identificar os padrões alimentares por meio da análise fatorial de componentes principais. A associação entre a obesidade e os padrões de consumo alimentar foi avaliada mediante teste Qui-quadrado de Pearson e da regressão logística, tomando-se como critério de associação, valor de p<0,05.

Resultados

A obesidade para idade foi observada em 12,7% das crianças estudadas. Foram identificados quatro padrões alimentares: padrão alimentar 1 (leite e derivados, verduras e tubérculos, cereais, leguminosas, frutas e pescados); padrão alimentar 2 (salgadinhos, refrigerante/sucos artificiais, óleos e gorduras, doces e café/chá); padrão alimentar 3 (embutidos, fast-food*, catchup/maionese e ovos); e, padrão alimentar 4 (frango e carnes vermelhas). A obesidade mostrou-se estatisticamente associada à alta adesão ao padrão alimentar 3 (OR=1,92; IC95%=1,01–3,66).*

Conclusão

Os resultados da pesquisa mostraram que a elevada ingestão de alimentos altamente energéticos (padrão alimentar 3) foi fator contributivo para a ocorrência da obesidade na infância. Estes dados reforçam a necessidade de políticas públicas e programas de educação alimentar, nas unidades de saúde e escolas, para mudança dos hábitos alimentares das crianças, importante preditor de problemas nutricionais.

Palavras-chave: *Pré-escolar. Análise fatorial. Comportamento alimentar. Obesidade.*

INTRODUCTION

Obesity is considered a global epidemic. The risk of an obese child becoming an obese adult increases from 25% when this condition occurs during the first six years of life to 75% when it occurs during adolescence [1]. Genetic and environmental determinants are involved in obesity genesis. Eating habits is a major environmental factor contributing to obsesity [2,3].

Nutritional status assessments of individuals and populations often include anthropometric measurements (direct method), food consumption questionnaires (indirect method), and demographic, socioeconomic, and cultural factors [4]. However, recently, frequency of food consumption has been used to identify dietary patterns using Principal Component Analysis (PCA) as an alternative to studies that include the isolated assessment of food/nutrient consumption [5,6].

According to the World Health Organization (WHO), the identification of dietary patterns of a given population, *i.e.*, the variety of foods consumed by this population [7], is considered a more reliable method than nutrient consumption [8] since it represents the profile of food and nutrient intake, based on their usual intake [9].

The determination of the anthropometric profile and the food consumption pattern of a population is an important public health strategy that can contribute to therapeutic and educational actions, such as changing eating habits and increasing physical activities. The aim is to reduce the risk of morbidity due to nutrition-related diseases. This study aimed to evaluate the association between food consumption patterns and anthropometric status of pre-school children in *Feira de Santana* (BA), Brazil.

METHODS

This is a cross-sectional, population-based study nested within a live-birth cohort study carried out between April 2004 and March 2005 in the city of *Feira de Santana* (BA), whose objective was to evaluate the effects of breastfeeding, complementary feeding, and weaning on eating habits, growth, and health of children under six years of age.

The cohort consisted of a representative sample of live births (*Feira de Santana* residents) that were being treated in local hospitals. Live births were added to the cohort sample over the period of 12 months; two new hospitals were included every two months using the lottery method, except for two maternity wards that were included because they provided care to a greater number of women. In the present study, a total of 813 children younger than 4 years of age, who were followed-up in the cohort study were evaluated. More details on the cohort can be obtained in other publications [10,11].

Data were collected during home visits using direct interviews conducted by health professionals working in pairs and properly trained university students. The interview questions were concerned with maternal and child characteristics, and they were clear and objective and offered multiple-choice answers.

Food consumption was assessed using a Food Frequency Questionnaire (FFQ) concerning food consumption during the child's fourth year of life. It was administered to the children's mothers or guardians. The FFQ was composed of a list of 133 foods and options for reporting the frequency of intake including the following frequency categories: never/rarely; 1–3 times per month; 1 time per week; 2–4 times per week; 1 time per day; and 2 or more times per day. Food frequency data were transformed into daily servings in order to use only one unit of time. Thus, average intake frequency was calculated for each food by dividing the weekly consumption by seven or monthly consumption by thirty.

Children's body weight and height measurements were obtained using a digital scale with a maximum capacity of 150kg and an accuracy of 100g and a portable, folding stadiometer capable of measurements up to 2.16 meters and capable accuracy of 0.1cm. All measurements were made in triplicate, and the reference value used was the arithmetic mean of the triplicate results.

Obesity was classified based on the anthropometric status evaluated by the direct method, that is, by calculating the BMI-for-age, according to WHO [12] reference curves. The Anthro [13] software was used, adopting the Z-score cutoff point >+2, which includes obesity and severe obesity.

The children characteristics evaluated were: gender, birth weight (<2.500g, ≥2.500g), interruption of exclusive breastfeeding at 4 months, weaning at 2 years of age, bottle feeding, sleep feeding, and consumption of foods in liquid form. The maternal variables were: gestational age (preterm, full term), maternal age at childbirth (<20 years, ≥20 years), maternal

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skin color (white, black/brown), maternal level of education (incomplete elementary and middle school, high school/higher education), work outside the home, income (≤1 minimum wage, over the minimum wage), and maternal overweight/obesity.

The foods included in the FFQ were grouped using factor analysis. Thus, Food frequency data were transformed into a daily servings of each food and grouped into 17 food groups, based on nutritional characteristics and correlations obtained in the preliminary factor analysis. The following food groups were formed: group 1: milk and other dairy products (whole milk, skimmed milk, fermented milk, natural yogurt, petit suisse cheese, *queijo prato* (a Brazilian soft yellow cheese), mozzarella, *queijo minas* (a type of cheese produced in the Brazilian state of *Minas Gerais*), *requeijão* (a loose, ricotta-like cheese), porridge, smoothies (milk + fruit + chocolate milk powder mix; milk + chocolate milk powder mix; and milk + fresh fruits); group 2: ketchup/mayonnaise (mayonnaise, potato salad with mayonnaise, ketchup); group 3: encased meats (sausage and frankfurter sausage); group 4: fast foods (French fries, *acarajé* (a dish made from peeled beans formed into a ball and then deep-fried in palm oil), cheeseburger, sandwiches, *coxinha de galinha* (popular Brazilian food made with shredded chicken meat, covered in dough, battered and fried), cheese bread (traditional baked cheese roll), *sfiha* (meat pie [open-face or not], pizza, hot dogs); group 5: red meats – cooked meat, liver, fried steak, cooked lamb, fried lamb chops, pork, *maniçoba* (typical Brazilian dish made with leaves of the cassava plant and salted pork, dried meat, and smoked ingredients, such as bacon and sausage), *sarapatel* (a Portuguese dish made with offal and meats such as pork, lamb, or even beef), *mocofato* (traditional rich Brazilian dish made with beef [cow's feet], sausages, and bacon), rabada (a typical dish made with oxtail), *buchada* (Brazilian dish made with goat offal an bacon), and *feijoada* (a stew of beans with pork meat); group 6: vegetables and tubers – mashed potatoes, sweet potatoes, cooked yams, yams, lettuce, Chinese cabbage, pumpkin, watercress, cauliflower, beetroot, carrot, spinach, cucumber, tomato, vegetable soup, unstuffed or stuffed *beiju* (a typical dish made with *tapioca*), and flour; group 7: cereals – rice, noodles, instant noodles, pasta and pastries, cookies and crackers, French bread, breakfast cereal, *couscous*, corn, plain cake, popcorn, *canjica* (Southern Brazil) and/or *mungunzá* (Northern Brazil) – sweet dishes or porridge made with white de-germed whole maize kernels (*canjica*), cooked with milk, sugar and cinnamon until tender; group 8: legumes (peanuts, beans, green beans, soybeans, bean soup), *abará* (typical dish of *Bahia* state based on a paste made from mashed black-eyed peas wrapped into pancakes inside banana leaves and steamed); group 9: fruits – pineapple, avocado, *banana prata* (burro or chunky banana), *banana da terra* (plaintain or cooking banana), guava, orange, apple, papaya, melon, mango, strawberry, sugar apple, grape, sugar-sweetened fruit juice; Group 10: eggs (fried egg and quail egg); group 11: chicken (cooked chicken); group 12: fish (fried fish, shellfish, crab, and other foods used to prepare fish, especially coconut milk); group 13: packaged snacks (potato chips); group 14: soft drinks/artificial fruit juices (traditional soft drink, diet soft drink, artificial juices, artificial beverages); group 15: sweets (chocolate, ice cream, freeze pop, chocolate milk powder mix, candies, fruit preserves, desserts, jello, pudding, sugar); group 16: oils and fats (margarine, butter, olive oil, palm oil, vegetable oil); group 17: coffee/tea. Some foods were excluded from the analysis because their reported consumption among the participants was less than 5% (non-fat yogurt, pea soup, unsweetened juice, sweetener, natural or veggie sandwich, alcoholic beverages).

The daily servings from each food were grouped into a single value for each child by the sum of the servings of the foods from each food group. Therefore, it was possible to obtain a continuous variable that was standardized, according to Z-score of the standard normal

curve. It is the input variable in the principal component analysis used to identify the dietary patterns.

The dietary patterns were identified by exploratory factor analysis using PCA. Principal Component Analysis is a multivariate statistical analysis, which allows the combination of variables based on the degree (strength) of the relationship between them. Thus, the variables grouped in each factor are strongly correlated with each other [14,15].

Initially, the suitability of the sample for the application of for PCA was verified using the Kaiser-Meyer-Olkin test and the Bartlett's sphericity. Orthogonal rotation (Varimax) was used to determine the dietary patterns; this method provides nearly uncorrelated, distinct factors, improving the interpretability of the factor loadings.

The multivariate statistical approach of the exploratory factor analysis allowed the grouping of the food items in the FFQ according to the degree (strength) of correlation between them. The Kaiser's eigenvalue-greater-than-one rule and the Cattel's scree test were used to determine the number of factors to retain in the factor analysis. The foods or food groups that contributed to the characterization of each dietary pattern had factor loading ≥0.30, considering the highest saturation factor, significance level of 0.05, and power of 80%, as recommended by Hair Jr. *et al.* [15]. The dietary patterns obtained based on the PCA were categorized into tertiles of the individual consumption scores of these dietary patterns and were denominated as follows: 1st tertile (low adhesion to the dietary patterns), 2nd tertile (moderate adhesion to the dietary patterns), and 3rd tertile (high adhesion to the dietary patterns).

To evaluate the association between obesity and dietary pattern, four logistic regression models were constructed because each dietary patterns identified was considered a main independent variable.

Statistical analysis was carried out using the Software Statistical Package for Social Science (SPSS, Inc., Chicago, Illinois, United States) 9.0 version [16] for Windows and validated using the EpiData software (Atlanta, Georgia, United States) program. The R programming language [17] was also used in the data analysis. Initially, the frequencies of the child and maternal characteristics and the frequency of children's anthropometric status were calculated. In the bivariate analysis, the prevalence, Prevalence *Ratio* (PR), and their respective confidence intervals were calculated to determine the factors associated with obesity, considering 95% confidence interval as the threshold for statistical significance, according to the Chi-squared test.

In the bivariate analyses, the value of $p \leq 0.25$ was used for the inclusion of variables in the logistic regression model. To select the predictor variables that should remain in the model, variables with a p-≤ 0.20, obtained using the likelihood ratio test, were considered as candidate variables. A backward selection process and p-value ≤ 0.05 (statistically significant associations) criterion were used to select the variables in the final model.

The present study was approved by the Research Ethics Committee of the *Universidade Estadual de Feira de Santana* (Protocol nº 077/2006), in accordance with Resolution nº 196/96 on the ethical aspects passed by the Brazilian National Health Council [18]. The data of this research were used with the research coordinator's authorization.

RESULTS

The mean age of the 813 children evaluated was 31.65 months (standard deviation=4.06), ranging from 22.7 to 45.8 months. It was found that 96.3% (783/813) of these children were exclusively breastfed immediately after birth, but only 21.2% (172) were exclusively breastfed at 4 months of age,

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and 10.9% were breastfed up to 2 years of age. The most frequently consumed foods by the children were: porridge, margarine, vegetable oil, cooked rice, bread, sugar-sweetened fruit juice, *banana-da-prata*, sugar, and coffee.

As for the maternal BMI, 53.7% (324/603) were well-nourished, 27.4% (165) were overweight, 16.7% (101) were obese, and only 2.2% (3) were underweight. The other child and maternal characteristics are described in Table 1.

With regard to food consumption, the PCA identified four patterns, which explained 49.96% of the total data variance. Kaiser-Meyer-

Table 1. Characteristics of 813 children under 4 years old. *Feira de Santana* (BA), Brazil (2011).

Variables	n	%
Gender		
Male	420	51.7
Female	393	48.3
Birth weight		
<2500g	35	4.3
≥2500g	778	95.7
Child anthropometric status		
Excessively thin	-	-
Thin	4	0.5
Well-nourished	468	58.9
Overweight	221	27.8
Obese	73	9.2
Severely obese	28	3.5
Bottle feeding		
Yes	512	63.0
No	301	37.0
Consumption of foods in liquid form		
Yes	387	47.6
No	426	52.4
Gestational age		
Preterm	29	3.6
term	784	96.4
Maternal skin color		
Black/brown	667	82.0
White	146	18.0
Maternal level of education		
Elementary and Middle School (complete/incomplete)/Incomplete High School	273	33.6
High School/Higher Education	540	66.4
Work outside the home		
Yes	311	38.3
No	502	61.7
Maternal income		
≤1 minimum wage	396	48.7
Over the minimum wage	417	51.3

Olkin value of 0.807 indicated the applicability of the factor analysis; the Bartlett's test of sphericity was significant (p-value ≤0.001), indicating correlation between the variables.

The dietary pattern 1 was characterized by a predominance of milk and other dairy products, vegetables and tubers, cereals, legumes, fruits, and fish. In dietary pattern 2, there was a predominance of deep-fried or baked snacks, soft drinks/artificial fruit juices, sweets, oils and fats, and coffee/tea. Dietary pattern 3 was characterized by the predominance of encased meats, fast foods, ketchup/mayonnaise, and eggs. In dietary pattern 4, there was a predominance of chicken and red meats (Table 2).

The bivariate analyses showed that obesity was associated with: adequate birth weight (PR=2.35), higher maternal income (PR=1.30), maternal overweight/obesity (PR=1.82), interruption of breastfeeding (PR=1.53), not weaning at 2 years of age (PR=1.54), and bottle feeding (PR=1.47) (Table 3).

Obesity was not associated with any of the tertiles of dietary pattern (four) adherence in the crude (unadjusted) analysis (Table 4).

In the multivariate analysis, there was a statistically significant association between obesity and high adherence to dietary pattern 3 (OR=1.92) after adjustment for potential confounders (Table 5).

DISCUSSION

In the present study, there was a higher prevalence of obesity (12.7%) and lower prevalence of thinness (0.5%) among children younger than four years old. The increasing prevalence of obesity and decreasing prevalence

Table 2. Factor loading[a] of the four dietary patterns identified among children under 4 years old. *Feira de Santana* (BA), Brazil (2011).

Foods/food groups	Dietary patterns			
	1[b]	2[c]	3[d]	4[e]
Milk and other dairy products	0.465	-0.197	0.324	-0.007
Ketchup/mayonnaise	0.123	0.100	0.637	0.234
Encased meats	0.068	0.139	0.774	-0.092
Fast-food	0.286	0.051	0.682	-0.017
Red meats	0.194	-0.198	0.300	0.637
Vegetables and tubers	0.798	0.050	0.141	-0.048
Cereals	0.570	0.527	0.150	-0.090
Legumes	0.572	0.099	0.149	0.303
Fruits	0.711	0.254	0.124	-0.015
Eggs	0.350	0.018	0.495	-0.018
Chicken	-0.017	-0.040	-0.099	0.670
Fish	0.403	-0.135	0.203	0.208
Deep-fried or baked snacks	0.018	0.641	0.055	-0.008
Soft drinks/artificial fruit juices	0.241	0.485	0.187	0.037
Sweets	-0.069	0.610	0.028	0.496
Oils and fats	-0.115	0.539	0.106	-0.412
Coffee and tea	0.059	0.746	-0.084	-0.234

Note: [a]Factor loading ≥0.3 or ≤-0.3; [b]Dietary pattern 1 (milk and other dairy products, vegetables and tubers, cereals, legumes, fruits, and fish); [c]Dietary pattern 2 (deep-fried or baked snacks, soft drinks/artificial fruit juices, sweets, oils and fats, candies, and coffee/tea); [d]Dietary pattern 3 (encased meats, fast-food, ketchup/mayonnaise, and eggs); [e]Dietary pattern 4 (chicken and red meats).

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Table 3. Prevalence of obesity, Prevalence *Ratios* (PR), and 95% Confidence Intervals (95%CI), according to child and maternal covariables of 813 children under 4 years of age. *Feira de Santana* (BA), Brazil (2011).

Covariables	N	n	%	PR	95%IC
Birth weight					
<2500g	26	2	7.7	1.00	-
≥2500g	547	99	18.1	2.35	1.97-2.81*
Maternal income					
≤1 minimum wage	287	44	15.3	1.00	-
Over the minimum wage	286	57	19.9	1.30	1.03-1.64*
Maternal overweight/obesity					
Yes	176	42	23.9	1.82	1.40-2.36*
No	251	33	13.1	1.00	-
Interruption of EBF at 4 months of age					
Yes	445	85	19.1	1.53	1.26-1.85*
No	128	16	12.5	1.00	-
Weaning at 2 years of age					
Yes	67	8	11.9	1.00	-
No	506	93	18.4	1.54	1.28-1.85*
Bottle feeding					
Yes	353	71	20.1	1.47	1.20-1.82*
No	220	30	13.6	1.00	-

Note: *The associated values were statically significancy.
EBF: Exclusive Breastfeeding.

of malnutrition have been reported by other researchers in recent decades in Brazil [19], a fact that characterizes nutrition transition. Changes in eating habits with increased consumption of high-calorie foods may help explain this phenomenon.

The dietary patterns identified in the present study are similar to those reported by D'Innocenzo *et al.* [5] in the city of *Salvador* (BA).

The dietary patterns 2 and 3 identified in the present study show a global trend that has been observed over the last three decades, which reflects contemporary living habits, including preference for industrialized foods and increased caloric intake [20,21]. These two patterns were characterized by foods high in fat and sugars. Nobre *et al.* [9] reported similar findings in a study involving preschoolers in the city of *Diamantina* (MG). These authors identified dietary patterns denominated "snacks" and "unhealthy". Similarly, D'Innocenzo *et al.* [6] found a dietary pattern characterized by fried foods, packaged snacks, soft drinks/artificial fruit juices, and another one characterized by encased meats, eggs, and red meats.

In the present study, there was a positive association between obesity and high adherence to dietary pattern 3 (encased meats, fast-food. ketchup/mayonnaise and eggs). Increased energy intake and decreased fiber intake are major factors contributing to obesity [22]. These dietary habits can be modified through intervention measures on healthy eating awareness [22,23].

However, the present study showed some limitations such as the method used to obtain and analyze food consumption. Although the FFQ is the commonly used method to estimate individuals' usual frequency of food consumption, it has some limitations, such as it depends mostly on the memory of the subject

Table 4. Prevalence of obesity, Prevalence *Ratios* (PR), and 95% Confidence Intervals (95%CI), according to the dietary patterns of 813 children under 4 years old. *Feira de Santana* (BA), Brazil (2011).

Dietary pattern/Tertiles	Obesity				
	N	n	%	PR	95%CI
Dietary pattern 1[a]					
T1 (-2.74–<-0.43)	265	24	9.1	1.00	-
T2 (-0.43–<0.21)	260	37	14.2	1.57	0.97–2.55
T3 (0.21–4.73)	266	38	14.3	1.58	0.97–2.55
Dietary pattern 2[b]					
T1 (-2.80–<-0.54)	261	41	15.7	1.00	-
T2 (-0.54–<0.37)	266	29	10.9	0.69	0.45–1.08
T3 (0.37–5.10)	264	29	11.0	0.70	0.45–1.09
Dietary pattern 3[c]					
T1 (-1.89–<-0.43)	252	31	12.3	1.00	-
T2 (-0.43–<0.03)	276	41	14.9	1.21	0.78–1.86
T3 (0.03–7.18)	263	27	10.3	0.83	0.51–1.36
Dietary pattern 4[d]					
T1 (-2.44–<-0.56)	278	41	14.7	1.00	-
T2 (-0.56–<0.50)	252	32	12.7	0.86	0.56–1.32
T3 (0.50–4.33)	261	26	10.0	0.67	0.43–1.07

Note: [a]Dietary pattern 1 (milk and other dairy products, vegetables and tubers, cereals, legumes, fruits, and fish); [b]Dietary pattern 2 (deep-fried or baked snacks, soft drinks/artificial fruit juices, sweets, oils and fats, candies, and coffee/tea); [c]Dietary pattern 3 (encased meats, fast-food, ketchup/mayonnaise, and eggs); [d]Dietary pattern 4 (chicken and red meats).

being interviewed, presence of interview-related difficulties, and the fact it does not allow precise estimation of portion size of foods consumed. Moreover, the factor analysis carried out to identify the dietary patterns involved making arbitrary decisions regarding the number of factors that were not retained, the choice of orthogonal rotation, the determination of factor loading significance, and the identification and interpretation of the dietary patterns.

On the other hand, it is worth emphasizing the value and importance of the present study, which is a cross-sectional, population-based study nested within a cohort study that was carried out using factor analysis to identify patterns of food consumption, a more reliable method than the consumption of nutrients, in order to evaluate the eating habits of a specific group.

The internal consistency of the identified dietary patterns reinforce the pre-established scientific knowledge that the consumption of processed and high-calorie foods, such as encased meats, fast foods, ketchup, and eggs is a predictor of obesity in childhood [24,25].

Aiming to encourage the adoption of healthy eating habits among people, at the individual and population levels, and to prevent childhood overweight and obesity, public policies and food education programs are necessary [12], especially in health units and public and private schools to provide educators, parents, and caregivers with information about the nutritional quality of foods and the increased risk of obesity due to the consumption of some industrialized and high-calorie foods [7].

It is also necessary to warn the population that the prevention of obesity in adulthood starts at as early as the day a child is born with breastfeeding and healthy eating habits in the first years of life so that they can make informed

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Table 5. Association between dietary patterns and obesity among children under 4 years old, controlling for confounding with logistic regression. *Feira de Santana* (BA), Brazil (2011).

Covariables	*p*	OR	95%CI
Dietary pattern 1[a]			
T1 (-2.74–<-0.43)	0.257	1.00	-
T2 (-0.43–<0.21)	0.437	0.76	0.38–1.52
T3 (0.21–4.73)	0.334	1.35	0.73–2.50
Dietary pattern 2[b]			
T1 (-2.80–<-0.54)	0.166	1.00	-
T2 (-0.54–<0.37)	0.087	1.84	0.92–3.72
T3 (0.37–5.10)	0.767	1.11	0.56–2.21
Dietary pattern 3[c]			
T1 (-1.89–<-0.43)	0.141	1.00	-
T2 (-0.43–<0.03)	0.239	1.50	0.76–2.96
T3 (0.03–7.18)	0.048	1.92	1.01–3.66*
Dietary pattern 4[d]			
T1 (-2.44–<-0.56)	0.223	1.00	-
T2 (-0.56–<0.50)	0.146	1.79	0.82–3.92
T3 (0.50–4.33)	0.100	1.79	0.90–3.56

Note: *The associated values were statistically significant; [a]Dietary pattern 1 (milk and other dairy products, vegetables and tubers, cereals, legumes. fruits, and fish), *Odds Ratios* (OR) adjusted for birth weight, exclusive breastfeeding, consumption of foods in liquid form, maternal level of education, maternal income, maternal overweight, maternal work, dietary pattern 2, dietary pattern 3, and dietary pattern 4; [b]Dietary pattern 2 (deep-fried or baked snacks, soft drinks/artificial fruit juices, sweets, oils and fats, candies,and coffee/tea), OR adjusted for birth weight, exclusive breastfeeding, consumption of foods in liquid form, maternal level of education, maternal income, maternal overweight, maternal work, dietary pattern 1, dietary pattern 3, and dietary pattern 4; [c]Dietary pattern 3 (encased meats, fast-food, ketchup/mayonnaise, and eggs), OR adjusted for birth weight, exclusive breastfeeding, consumption of foods in liquid form, maternal level of education, maternal income, maternal overweight, maternal work, dietary pattern 1, dietary pattern 2, and dietary pattern 4; [d]Dietary pattern 4 (chicken and red meats), OR adjusted for birth weight, exclusive breastfeeding, consumption of foods in liquid form, maternal level of education, maternal income, maternal overweight, maternal work, dietary pattern 1, dietary pattern 2, and dietary pattern 3.
95%CI: 95% Confidence Intervals.

decisions due to globalization and changes in social structures that contribute the adoption of harmful eating habits with increased consumption of industrialized and energy-dense foods [5].

CONTRIBUTIONS

KEPS GOMES contributed to the conception and design of this study, data analysis and interpretation, and revision and approval of the final version. MCO COSTA contributed to the revision and approval of the final version. TO VIEIRA contributed to the revision and approval of the final version. SMA MATOS contributed to data analysis and interpretation and to the revision and approval of the final version. GO VIEIRA contributed to the conception and design of this study and to the revision and approval of the final version.

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