Maternal and child characteristics correlated with frequency of consuming ultra-processed food by children aged 6 to 24 months old

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Abstract

Objectives: to verify the correlation between the consumption of ultra-processed food among mothers and children under two years of age and the main characteristics related to this consumption.

Methods: cross-sectional study conducted in public health services. Three 24-hour recalls were applied to assess food intake. The ultra-processed food was grouped into: sugary drinks; meat; sauces and creams; dairy products; snacks; pastas; and mucilage. Themother's body mass index and waist/hip ratio, and the child's weight/height, height/age, weight/age and body mass index/age were calculated. The children's ultra-process frequency as correlated with: anthropometric dyadic variables; ultra-process frequency on breastfeeding. The children's average ultra-process intake was compared to pacifier, bottle, breastfeeding and socioeconomic status. Linear regression models were conducted.

Results: 172 pairs were evaluated. Similarity was found in the mothers and children's consumption of ultra-processed products. The higher frequency of ultra-processed products was correlated with older child and the higher body mass/age index and weight/age index. Of the 39 ultra-processed food present in the mothers' diet, 22 were correlated to child's

Conclusion: the consumption of ultra-processed food by children is similar to their mothers and correlates with higher z-score values of weight/age and body mass/age index.

Key words *Ultra-processed food, Nutritional status, Children, Mothers*

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Introduction

Over the first two years of life infant feeding, is characterized by progressive changes depending on the child's development. At six months of age, the introduction of other food in addition to breast milk is recommended and, the first year of life onwards, the diet has already progressed in terms of food consistency and presents similar characteristics to the family's diet.[1] During this period, the child's eating experiences, in addition to impacting health[2], will also influence the development of their eating habits.[3,4]

At childhood, for the growth and development, the consumption of food rich in sugar and sodium, canned food, fried food, soft drinks, snacks and sweets are not recommended, as they are considered unhealthy food and compete with nutritious ones. However, the presence of these food in children under two years old's diet has been verified.[1] The United Nations Children's Fund (UNICEF) report on the World's Children's situation indicating that infant feeding reflects the global "nutritional transition", due to the substitution of *in natura* food for high level processed food.[5]

According to UNICEF report, 44% of the children aged 6 to 23 months old in the world do not receive fruit or vegetables in their diet and only 29% have a diversified consumption of food groups. [5] That is, from the first years of life, children are consuming little variety of healthy food and being exposed to ultra-processed food.[1] Often they are weaned before six months of age and receive ultra-processed food earlier.[6,7] A study with children aged four to 24 months old found that 56.5% received some type of ultra-processed food before six months.[5] Children and adolescents are more vulnerable in consuming these products due to their intense flavor, practicality and low cost.[8]

The poor quality of infant feeding has contributed to the increased risk of malnutrition and hidden hunger.[5] Several factors are related to feeding practices, including socioeconomic and demographic conditions and parental behavior,[3] with emphasis on the maternal figure, since in most cases they are responsible for the selection and offering of food in this age group. In addition to these factors, we also call attention to the use of pacifiers and baby bottles, since such behaviors impair breastfeeding.[7,9]

Based on the above considerations, we sought to verify the mothers and children under two years old correlation between the consumption of ultra-processed food and the main characteristics related to this consumption.

Methods

A cross-sectional study, conducted in 2016 and 2017, with mothers and their children under two years of age treated in the public health network in the city of Viçosa (MG). The city has 18 Basic Health Units (UBS) and a Polyclinic. The collection was conducted at the Polyclinic, on vaccination days, and at five UBS, however the others did not develop puericulture activities and/or did not accept to participate in the research. All mothers with their children under 24 months of age who were attended at these collection sites were recruited. The inclusion criterion adopted was being a mother of a child up to two years of age. Pregnant mothers and those with gluten and lactose intolerance were excluded from the study, since such conditions imply changes in the diet. Data were collected by three previously trained researchers.

Sampling was by convenience and totaled 203 pairs, 15 of which were excluded because they did not respond to all food recalls and 17 mothers and/or children were due to the existence of food allergies. Therefore, we assessed 171 pairs. We used the OpenEpi online software to calculate the sample power and we considered the children's exposure to UPP food, the prevalence of overweight according to BMI/age (BMI/A) and a significance level of 5%.

We used questionnaires containing the following variables to obtain the data: socioeconomic (classified by the criteria of the *Associação Brasileira de Empresas de Pesquisa* – ABEP-2016(Association on Research Companies); demographic (age and sex); behavioral conditions (children using pacifier and baby bottle, mothers' use of tobacco and alcohol); health (presence of chronic diseases and postpartum depression); gestational weight gain; birth weight and length. These data were self-reported by the guardians and/or obtained from the child's health card.

We also assessed the dyad's nutritional status. In mothers, we measured the weight, height and waist and hip circumference. We measured weight in kilograms, using a *Kratos*® electronic scale, with a maximum capacity of 150 kilograms (kg). We measured the height in centimeters using an *Altura Exata*® stadiometer. We measured the waist circumference at the midpoint between the lower margin of the last rib and the iliac crest. We calculated the Body Mass Index (BMI) by dividing the weight by the height squared, and the waist-hip ratio (WHR) by dividing the waist circumference by the hip circumference. Both BMI and WHR were classified according to the recommendations of the World Health Organization (WHO).[10] In children, we measured weight and length., We used a pediatric scale, with a maximum capacity of 16 kg to measure weight. For children weighing more than this capacity, we used the same scale for mothers. We measured the children's length in centimeters using a children's anthropometer. We assessed nutritional status using the WHO Anthro 2011 version 3.2.2 program, using the WHO recommendations as a reference standard.[11] We assessed the weight/age (W/A), weight/height (W/H), height/age (H/A) and BMI/age (BMI/A), in Z-score, according to the curves proposed by WHO.

We assessed the dyad's eating habits using the 24-hour reminiscent (R24HR). The mothers answered three R24HRs regarding their own diet and their children's, on non-consecutive days, one referring to the weekend or holiday. The first R24HR was applied at the collection site, after applying the questionnaire, anthropometric measurements were taken. We conducted home visits to obtain the remaining R24h. At the end of each R24HR collection, we verified the presence of processed and ultra-processed food, and if found, we questioned the brands and types of the product for further analysis and checked the ingredients on the labels. We verified the practice of breastfeeding,[12] identifying in the R24HR the offer of other food or formulas along with breast milk. The food present in the R24HR were classified according to the level of processing as: in natura or minimally processed, processed and ultra-processed (UPP). For this classification, we considered Monteiro *et al.*[13] proposal and when there was doubt about its classification, we consulted the list of ingredients presented on the product label to classify them correctly. Infant formulas, despite being considered UPP, were not counted in this study, as they are indicated to substitute breast milk.

UPP food s were identified in the reminiscent collected. Initially, we identified the presence of UPP food on each day. Subsequently, we calculated the mean consumption of UPP present in the three food surveys. For the analysis, we calculated the sum of the frequency of each food belonging to the assessed groups, according to the classification below:

- Sugary drinks (soda, juice powder, juice and industrialized coconut water);
- Ultra-processed meats (pepperoni, frankfurter, sirloin, hamburger, bologna, salami, ham, nugget, sausage);
- Sauces and creams (margarine, mayonnaise, tomato sauce, sour cream);
- Dairy products (fruit yogurt/fermented milk, cream cheese);
- Snacks (cream-filled cookies, powder, cornstarch cookie/saltycracker, chips, cake mix, gelatin, popsicle, ice cream/milk-shake, chocolate, candies/sweets, cereal bar);
- Pasta (instant noodles, loaf of bread, pizza);
- Mucilage (chocolate milk, powdered milk).

We used Stata software version 13.0 for statistical analysis. We verified the normality of the variables by the Shapiro-Wilk test and asymmetry coefficient. We used Pearson's correlation test to assess the correlation of the frequency of UPP food in the children's diet with: the frequency of UPP in the mother's diet, the anthropometric and sociodemographic variables of the dyad. We used Student's t-test to compare the frequency of UPP in children's diet with: presence of husband/partner; use of baby bottle; use of pacifier; presence of breastfeeding; urban residence (yes/no); and socioeconomic condition (A, B or C, D and E).

We made bivariate analysis using a simple linear regression model, considering the frequency of UPP in children's diet as an outcome. We conducted multiple regression based on the explanatory anthropometric, behavioral, obstetric, breastfeeding, socioeconomic and demographic variables of the dyad and referring to the UPP present in the mothers' diet. We identified potential confounders based on data and literature. A directed acyclic graph (DAG) was constructed in the DAGitty program to assist in the selection of the covariates included in the analyses. This approach allowed to identify a minimal set of covariates sufficient to control the confounding situation. The variables identified as confounders were: ABEP economic classification, breastfeeding, mother's age, depression, and mothers' use of alcohol and tobacco; use of baby bottle. We assessed the adjusted quality of the model by the analysis of residuals, as well as by the analysis of multicollinearity among the variables included in the model. We adopted a significance level of 5%.

The study was approved by the Ethics Committee of the *Universidade Federal de Viçosa* (UFV), under registration number 1,833,627.

Results

A total of 171 pairs were assessed, a sample that obtained a statistical power of 96.6%. The children's mean age was 12 (±8.2) months old and the mothers' mean age was 27 (±6.7) years old. Approximately half of the children were male (53.8%) and the majority (59.1%) of the mothers had concluded high school or higher education. Table 1 shows the description of the sample and it 91.8% of the children had an adequate weight for their age and 64.3% had an adequate body mass index for their age. As for the mothers' nutritional status, 59.1% were eutrophic. Approximately half of the mothers (49.7%) had waist circumference with values indicating increased risk for cardiometabolic diseases (Table 1).

Figure 1 (a) shows that 73.1% of children consume UPP food and among those younger than six months of age this percentage was 32.8%. The percentage of children with at least one UPP food in their diet increased with age, approaching the maternal profile of 6 to 12 months age groups (83.3%) and in those aged over 12 months (97.6%). UPP food were present in children under 6 months' diet represented by: fruit yogurt and fermented milk drink (15.5%), mucilage (13.8%), cornstarch cookie, salty cracker and cookies (12.1%), tomato sauce (6.9%), cake

Table 1

Mothers' and children's sociodemographic, nutritional and behavioral characteristics. Viçosa, MG. 2016-2017 (N=171).

Characteristics	N	%
Child's variables		
Birth weight (g)		
≤ 2500g	13	7.6
> 2500 e < 3999	151	88.3
≥ 4000	7	4.1
Child's age		
< 6 months	58	33.9
6 months to 1 year	29	16.9
1 to 2 years	84	49.2
Breastfeeding		
Yes	88	51.5
Exclusive	22	12.9
Mixed	5	2.9
Complemented	61	35.7
No	83	48.5
Child's behavioral habits		
Pacifier		
Yes	2	1.7
Baby bottle		
Yes	88	51.5
Children's nutritional status		
L/A		
Very low and low	12	7.0
Adequate	159	93.0
W/A		
Very low and low	6	3.5
Adequate	157	91.8
High	8	4.7
W/L		
Excessive thinness or thinness	9	5.3
Eutrophy	107	62.5
Overweight	55	32.2
IMC/I		
Excessive thinness or thinness	6	3.5
Eutrophy	110	64.3
Overweight	55	32.2
Maternal variables		
Socioeconomic condition*		
A and B	45	26.3
C, D and E	126	73.7
Maternal schooling		
Incomplete elementary/high school	70	40.9
Completed high school/higher education	101	59.1
Co-habitation		
Husband/ partner	128	74.8
Alone	43	25.2
Maternal clinical variables		
Disease during pregnancy		
Yes	41	24.0
Depression		
Yes	9	5.3
Maternal behavioral habits		
Smoking		
Yes	21	21.8
Alcohol consome		
Yes	53	31.0
Mothers' nutritional status		
Mothers' BMI		
Low weight	5	2.9
Eutrophic	101	59.1
Overweight	65	38.0
WC		
Increased	85	49.7

L/A = Length for age; W/A = Weight for age; W/L = Weight for length; BMI/A = Body Mass Index by age; BMI = Body Mass Index; WC = Waist Circumference.

*Socioeconomic condition according to the Brazilian Association in Research Companies (ABEP).

mixes (1.7%), candies and sweets (1.7%), dairy compound (1, 7%), heavy cream (1.7%) and soft drink (1.7%).

As shown in Figure 1(b), the children's diet contained food belonging to all the groups present in the maternal diet, revealing a diversified consumption of these food and a food profile similar to the maternal one. In all age groups, there was the presence of at least one UPP food from each assessed group, except for children under 6 months of age, where there was no presence of pasta and ultra-processed meats. Among the UPP food present in the children's diet, the dairy and mucilage group were the most frequent for those younger than six months old (15.5% in both groups) and snacks were the most frequent for children in the age groups of 6 to 12 months old (72.4%) and over 12 months (94.1%).

Of the 39 UPP food found in the maternal diet, 22 showed a positive correlation with food present in the children's diet (Table 2). Positive and significant agreements were found between the total frequency of UPP in the children's diet and the child's age, weight/age and BMI/age (Table 3).

The total frequency of UPP food present in the children's diet did not differ in terms of the presence of a husband/partner, type of urban residence (yes/no), use of pacifiers and socioeconomic condition (A and B or C, D and E). However, there was an increase in the frequency of UPP food in the children's diet who received preparations through a baby bottle (p=0.033) and who were not breastfed (p<0.001)

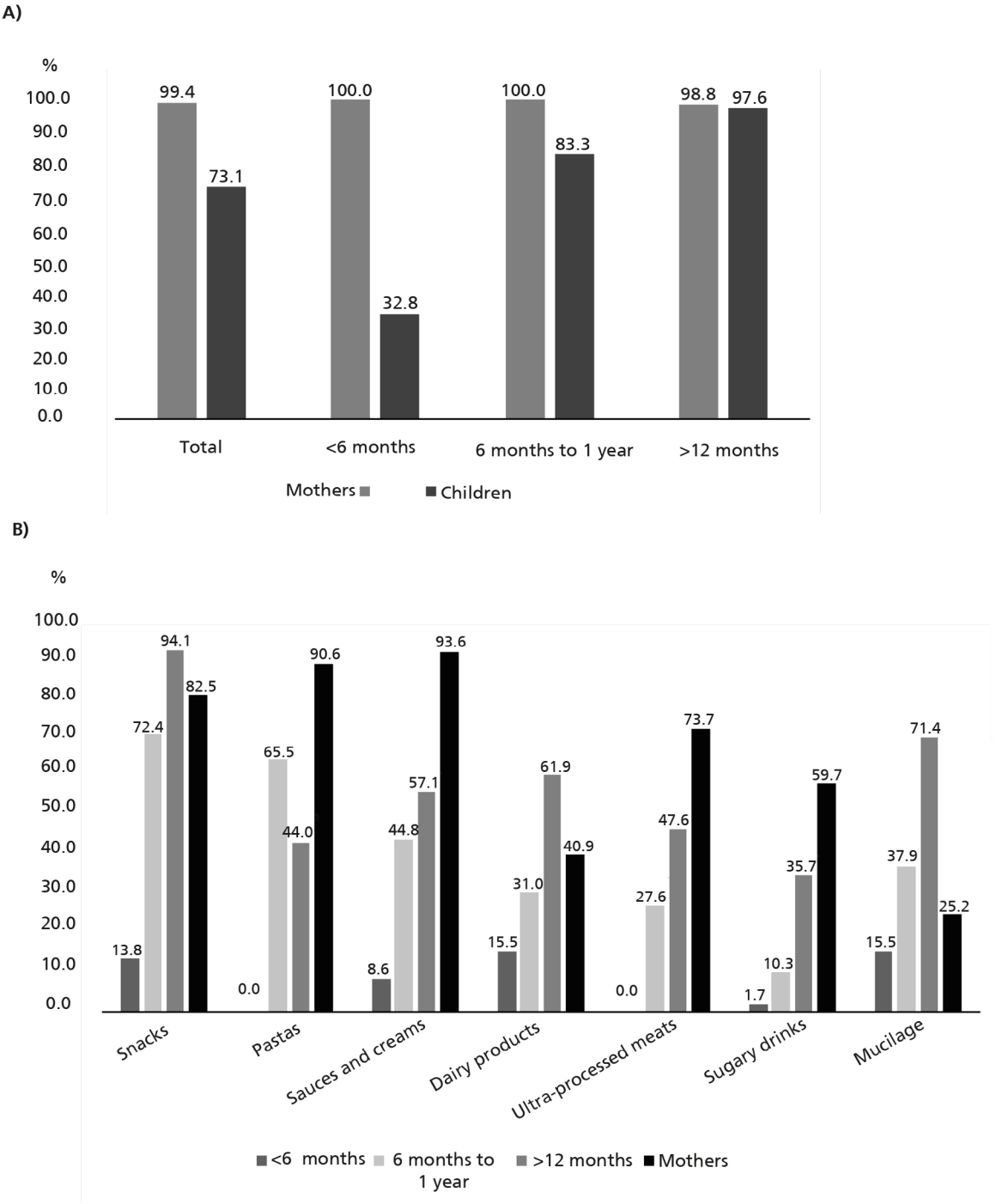
In the bivariate analysis, was found that the frequency of UPP in the children's diet was positively associated with the children's weight, length, W/A, BMI/A and age, so the higher frequency of UPPwas accompanied by higher values of the referred parameters and indications. In addition, there was na association between the consumption of UPP with the presence of sugary drinks in the mother's diet, alcohol consumption, breastfeeding and the use of the baby bottle. In the gross regression analysis, there was na association between the UPP frequency in the children's diet, only with the child's age and consumption of sugary drinks were by mothers. After adjusting for confounding variables identified by the DAG, both associations were maintained (Table 4).

Discussion

As far as we know, this is one of the first studies that assesses the relation between the presence of ultra-processed food in the mothers' diet and their children's first years of life. In it, we identified a similarity consumption of UPP food in the mother-child dyad diet, with a great diversity of UPP food in the dyad's diet. In addition, the study found that children consume this type of food even

Figure 1

Frequency of mothers and children who had at least one ultra-processed food in their diet, according to age group (a) and groups assessed (b). Viçosa, MG, 2016-2017 (n=171).



in the first six months, and that the consumption of these food is associated with an increase in the values of the W/A and BMI/A indices.

According to Martins *et al*.[14] there was a significant increase in the presence of industrialized food in the Brazilian population's diet, especially ultra-processed food Studies conducted in other countries have also verified this trend in food consumption.[15,16] The presence of UPP food implies a reduction in the consumption of in natura or minimally processed food and culinary ingredients,[2,14] which should form the basis of the diet. Thus, both in the context of healthy eating and in public health, the increasing household consumption of industrially processed products has become a concern,[8,14] since it represents a risk for deficiency and chronic non-communicable diseases.[17] In the present study, reveals in the found condition the mother not only includes UPP food in her diet, but also introduces it into her child's diet.

Table 2

Correlation coefficient between the frequency of ultra-processed food in the dyad's diet, Viçosa, MG, 2016-2017 (n=171).

Foods	r	*p*
Cream filled cookie	0.161	0.036
Sprinkle Biscuit	0.194	0.011
Chips	0.736	<0.001
Ice cream	0.600	<0.001
Chocolate	0.293	<0.001
Candy/lollipop	0.326	<0.001
Instant noodles	0.496	<0.001
Loaf of bread	0.154	0.045
Pizza	0.253	0.001
Yogurt / fermented milk	0.190	0.013
Cream cheese	0.280	<0.001
Mayonnaise	0.355	<0.001
Tomato Sauce	0.377	<0.001
Heavy cream	0.384	<0.001
Soft drink	0.281	<0.001
Powder Juice	0.257	0.001
Juice/ coconut water (box)	0.174	0.023
Pepperoni	1.00	<0.001
Frankfurter	0.589	<0.001
Hamburger	0.275	<0.001
Ham	0.359	<0.001
Sausage	0.318	<0.001

Pearson's correlation coefficient; $p<0.05$.

The frequency of UPP food in children's diet who were breastfeeding was lower when compared to other children. Relvas *et al*.,[9] identified that infants who were not breastfed had a higher frequency of ultra-processed food in their diet compared to those who were breastfed.

Table 3

Correlation of the frequency of ultra-processed food in children's diet and dyad's anthropometric variables, Viçosa, MG, 2016-2017 (n=171).

Children's variables	Children UPP	*p*
Age	0.75	<0.001
W/L	0.11	0.164
W/A	0.20	0.010
BMI/A	0.17	0.026
L/A	0.09	0.262
Maternal variables		
Age	-0.04	0.613
BMI	0.01	0.922
WC	-0.07	0.335
WHR	-0.04	0.624

UPP = Ultra-processed food; W/L = Weight for length; W/A = Weight for age; BMI/A = Body Mass Index for age; L/A = Length for age; BMI = Body Mass Index; WC = Waist Circumference; WHR= Waist-hip ratio; Pearson's correlation coefficient; $p<0.05$.

This result emphasizes the importance of the practice of exclusive breastfeeding, mainly because the harmful effects of the early offer of food to the child[18] are added to the risks of consuming UPP food. In addition, consumption of UPP food early in life can predispose children to the development of unhealthy eating patterns, which can also result in the development of chronic non-communicable diseases at childhood or adulthood.[17,19]

When analyzing the UPP food groups, we found that pasta was not consumed by children younger than six months old. However, Longo-Silva *et al*.[20] found that 21.5% of the mothers offered instant noodles to their children before six months of age and, in the second study, 23% of children younger than 4 months also consumed this kind of food. In addition to noodles, Spinelli *et al*.[21] found consumption of hot dog bread in 37.9% of children under one year of age.

Table 4

Linear regression coefficients (gross and adjusted), respective confidence intervals and p-value for the association between the frequency of ultra-processed food in children's diet according to the final variables presented in the model, Viçosa, MG, 2016-2017 (n=171).

Variables	UPP								
	Bivariate			Gross model			Adjusted model*		
	β	CI95%	*p*	β	CI95%	*p*	β	CI95%	*p*
Child's age	0.45	0.39; 0.51	<0.001	0.31	0.12; 0.49	0.001	0.45	0.39; 0.51	<0.001
Mothers' sugary drinks	0.68	0.04; 1.33	0.038	0.66	0.22; 1.09	0.004	0.65	0.21; 1.09	0.004
Child's weight	1.12	0.95; 1.29	<0.001						
Child's length	0.28	0.24; 0.33	<0.001						
W/A	0.84	0.20; 1.47	0.010						
BMI/A	0.61	0.07; 1.15	0.026						
W/L	0.18	-0.05; 0.41	0.164						
Child's baby bottle	-1.62	-3.08; -0.16	0.030						
ABEP	0.41	-0.17; 0.99	0.161						
Alcohol consome	-2.30	-4.17; -0.54	0.010						
Breastfeeding	-1.13	-1.12; -0.47	<0.001						

UPP = Ultraprocessed; β = Correlation coefficient; 95%CI = 95% confidence interval; Child length = Child length; W/A = Weight for age; BMI/A = Body Mass Index by age; W/E = Weight for height; E/I = Height for age; ABEP = Socioeconomic status classified according to the Brazilian Association of Research Companies.

*Model adjusted for ABEP economic classification, breastfeeding, mother's age, depression, and mothers' alcohol and tobacco use; baby bottle use.

The consumption of cornstarch cookies, cream-filled cookies and salty crackers, and candies and sweets stood out in children's diet under six months of age. Longo-Silva *et al.*[20] also verified the consumption of food such as cream-filled cookies, chocolate and ice cream. Freiberg *et al*.[22] found 50% of the children aged between four and six months of age consuming thickeners together with milk in the baby bottle. This result is in line with the present study, since the frequency of UPP food in children's diet who were under six months of age was higher among those who used baby bottle. We believe that this relation is due to the fact that children are weaned before the recommended and early exposure to this type of food.[9]

A study conducted with children under 24 months of age found that about 31% of the children consumed artificial juice and 30% already consumed sugar and chocolate milk.[23] Considering that the child is born with a predilection for the sweet taste, the offer of sugary food can get them used to the high consumption of sugars, with consequences for their current and future health.[24]

The frequency of UPP food increased with advancing age, similar to what was observed in the two studies.[2,25] From six months onwards, there was a greater similarity between the dyad regarding the presence of UPP food in the diet. This can be explained by the fact that complementary feeding favors the approximation of children to the family's eating habits,[3,4] which currently means a greater possibility of consuming UPP food.[14,15]

We found a relationship between maternal eating habits on the child's food profile by verifying a positive association between 22 UPP food present in the mother's and child's diet. Other studies have also found that family influence on children's food consumption, such as Araújo[26] when verifying that maternal consumption is a predictor factor for the consumption of healthy food at childhood and Jaime *et al*.,[3] who found this association between children and adults.

The higher frequency of UPP food in children's diet was accompanied by higher values of weight, length and W/A and BMI/A indices. Considering that there was a relationship between the frequency of UPP and the child's age, this justifies its association with length, since at this stage of life growth occurs with advancing age. A study conducted with children aged from 4 to 7 years old found a positive association between the "Unhealthy" dietary pattern (artificial juice and soda, fried food, snacks and canned food, sweets, and cream-filled cookies) with indicators of total adiposity (BMI and total body fat) and central (WHtR and central fat).[27]

Positive associations between consumption of UPP food and body fat during childhood and adolescence[27,28] and obesity in adults and adolescents[16,29] have been verified. Canella *et al*.[30] found an association between overweight and the greater availability of these kinds of food in Brazilian households. This condition is due to the inadequate nutritional characteristics of these food, which contribute to the excess consumption of energy, total and saturated fat.[20,29] Other characteristics also contribute, such as the fact that they are hyperpalatable and easy to transport,[8] which encourages the mother to include them in the children's diet and, sometimes, in an early and ascending way, which contributes to weight gain.

In the present study, there was no association between the frequency of UPP food in the children's diet with income and place of residence. This may be due to the fact that the entire population, regardless of their socioeconomic class, has UPP food in their diet. Martins *et al*.[7]corroborates this statement, as they found an increase in the consumption of UPP products in all economic strata.

Among the limitations of this study, we highlight those referring to the food survey used, such as the memory bias during the report of consumption referring to the previous day. Also, a study that considers the caloric contribution of these food could increase knowledge about their influence on the dyad's nutritional status. However, this is apparently the first study that assesses the relationship between the presence of ultra-processed food in the mothers' diet and their children in the first two years of life and that correlates the presence with the nutritional status.

We concluded that the presence of ultra-processed food in children's diet is similar to their mothers, so that mothers who included UPP food in their diet also introduced this kind of food to their child's diet, even before six months of life. The consumption of UPP food seems to have an impact on the child's nutritional condition, given its correlation with higher z-score values of the W/A and BMI/A anthropometric indices. Considering these findings, we emphasize the urgency of actions to take place to clarify and promote the awareness of parents and family members about the risks of introducing ultra-processed food s in children's diet under two years of age.

Authors' contribution

Soares MM and Araújo RMA contributed to the conception and design of the study, analysis and interpretation of data, writing and critical review of the manuscript's content. Ribeiro AQ, Pereira PF and Franceschini SCC contributed to the analysis and interpretation of data and critical review of the manuscript's content. All authors approved the final version of the article and declare no conflict of interest.

References

1. Ministry of Health (BR). Secretaria de Atenção Primária à Saúde. Departamento de Promoção da Saúde. Guia alimentar para crianças menores de 2 anos [Internet]. Brasília (DF): Ministry of Health; 2019; [access in 2020

Jan 03]. Available from: http://189.28.128.100/dab/docs/portaldab/publicacoes/guia_da_crianca_2019.pdf

2. Karnopp EVN, Vaz JS, Schafer AA, Muniz LC, Souza RDLV, Santos I, *et al*. Food consumption of children younger than 6 years according to the degree of food processing. J Pediatr (Rio J). 2017 Jan/Feb; 93 (1): 70-78.

3. Jaime PC, Prado RR, Malta DC. Influência familiar no consumo de bebidas açucaradas em crianças menores de dois anos. Rev Saúde Pública. 2017; 51 (Suppl 1): 13S.

4. Cantalice ASC, Santos NCCB, Silva DCM, Collet N, Reichert APS, Medeiros CCM. Estado nutricional materno e o excesso de peso em crianças e adolescents. Rev Bras Nutr Clin. 2015; 30 (1): 39-44.

5. Fundo das Nações Unidas para a Infância (UNICEF). The State of the World's Children 2019. Children, food and nutrition: growing well in a changing world [Internet]. New York: UNICEF; 2019; [access in 2020 Jan 03]. Available from: https://www.unicef.org/brazil/media/5581/file/SOWC2019_relatorio_completo_em_ingles.pdf

6. Giesta JM, Zoche E, Correa RS, Bosa VL. Fatores associados à introdução precoce de alimentos ultraprocessados na alimentação de crianças menores de dois anos. Ciênc Saúde Colet. 2019 Jul; 24 (7): 2387-97.

7. Bielemann RM, Santos LP, Costa CS, Matijasevich A. Early feeding practices and consumption of ultraprocessed foods at 6 y of age: Findings from the 2004 Pelotas (Brazil) Birth Cohort Study. Nutrition. 2018 Mar; 47: 27-32.

8. Monteiro CA, Levy RB, Claro RM, Castro IR, Cannon G. Increasing consumption of ultra-processed foods and likely impact on human health: evidence from Brazil. Public Health Nutr. 2011 Jan; 14 (1): 5-13.

9. Relvas GRB, Buccini GDS, Venancio SI. Ultra-processed food consumption among infants in primary health care in a city of the metropolitan region of Sao Paulo, Brazil. J Pediatr (Rio J). 2019 Sep/Oct; 95 (5): 584-92.

10. World Health Organization (WHO). Obesity: preventing and managing the global epidemic: report of a WHO consultation [Internet]. Geneva: WHO; 2000; [access in 2020 Jan 03]. Available from: https://apps.who.int/iris/handle/10665/42330

11. World Health Organization (WHO). The WHO Multicentre Growth l Reference Study (MGRS). Child growth standard. Geneva: WHO; 2010.

12. World Health Organization (WHO). Indicators for assessing infant and young child feeding practices. Part I: definition. Geneva: WHO; 2008.

13. Monteiro CA, Cannon G, Levy RB, Moubarac JC, Jaime P, Martins AP, *et al*. NOVA. A estrela brilha. Classificação dos alimentos. Saúde Pública. World Nutrition. 2016 Jan/Mar; 7: 28-40.

14. Martins AP, Levy RB, Claro RM, Moubarac JC, Monteiro CA. Increased contribution of ultra-processed food products in the Brazilian diet (1987-2009). Rev Saúde Pública. 2013 Aug; 47 (4): 656-65.

15. Moubarac JC, Batal M, Martins APB, Claro RM, Levy RB, Cannon G, *et al*. Time trends in the consumption of processed and ultra-processed food and drink products between 1938 and 2011 in Canada. Can J Diet Pract Res. 2014; 75 (1): 15-21.

16. Mendonça RD, Pimenta AM, Gea A, Fuente-Arrillaga C, Martinez-Gonzalez MA, Lopes ACS, *et al.* Ultraprocessed food consumption and risk of overweight and obesity: the University of Navarra follow-up (SUN) cohort study 1, 2. Am J Clin Nutr. 2016 Nov; 104 (5): 1433-40.

17. Fardet A. Characterization of the degree of food processing in relation with its health potential and effects. Adv Foods Nutr Res. 2018; 85: 79-129.

18. Ministry of Health (BR). Departamento de Atenção Básica. Cadernos de Atenção Básica, nº 23. Saúde da criança: aleitamento materno e alimentação complementar. 2ª ed. Brasília (DF): Ministry of Health; 2015.

19. Tagliettir RL, Lazarotto K, Pinto SLB, Teo CRPA. Práticas alimentares nos dois primeiros anos de vida: presença de vulnerabilidade em saúde. Sci Med. 2014; 24 (1): 39-45.

20. Longo-Silva G, Toloni MHDA, Menezes RCED, Asakura L, Oliveira MAA, Taddei JADAC. Ultra-processed foods: consumption among children at day-care centers and their classification according to traffic light labelling system. Rev Nutr. 2015 Oct; 28 (5): 543-53.

21. Spinelli MGN, Souza SB, Souza JMP. Consumo, por crianças menores de um ano de idade, de alimentos industrializados considerados supérfluos. Pediatr Mod. 2001; 37 (12): 666-72.

22. Freiberg CK, Phillippi ST, Leal GVS, Martinez MF, Silva MEW. Avaliação do consumo alimentar de crianças menores de dois anos institucionalizadas em creches no município de São Paulo. Rev Assoc Bras Nutr. 2012; 4 (1): 17-21.

23. Lopes WC, Marques FKS, Oliveira CF, Rodrigues JA, Silveira MF, Caldeira AP, *et al*. Alimentação de crianças nos primeiros dois anos de vida. Rev Paul Pediatr. 2018 Apr/Jun; 36 (2): 164-70.

24. World Health Organization (WHO). Diet, nutrition and the prevention of chronic diseases. Report of a joint WHO/FAO expert consultation. Geneva: WHO; 2015.

25. Sparrenberger K, Friedrich RR, Schiffner MD, Schuch I, Wagner MB. Ultra-processed food consumption in children from a Basic Health Unit. J Pediatr (Rio J). 2015 Nov/Dec; 91 (6): 535-42.

26. Araújo GS. Práticas parentais alimentares e sua relação com o consumo de alimentos na infância [dissertation]. Brasília (DF): Universidade de Brasília (UnB); 2015.

27. Vieira-Ribeiro SA, Andreoli CS, Fonseca PCA, Hermsdorff HHM, Pereira PF, Ribeiro AQ, *et al*. Dietary patterns and body adiposity in children in Brazil: a cross-sectional study. Public Health Nutr. 2019 Jan; 166: 140-7.

28. Costa SC, Del-Ponte B, Assunção MCF, Santos IS. Consumption of ultra-processed foods and body fat during childhood and adolescence: a systematic review. Public Health Nutr. 2018 Jan; 21 (1): 148-59.

29. Louzada MLC, Baraldi LG, Steele EM, Martins APB, Canella DS, Moubarac JC, *et al*. Consumption of ultra-processed foods and obesity in Brazilian adolescents and adults. Prev Med. 2015 Dec; 81: 9-15.

30. Canella DS, Levy RB, Martins APB, Claro RM, Moubarac JC, Baraldi LG, *et al*. Ultra-processed food products and obesity in Brazilian households (2008-2009). PLoS One. 2014 Mar; 9 (3): e92752.

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