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Are the culinary skills of those in charge of preparing meals in the household associated with markers of food consumption in children aged 2 to 6 years?

As habilidades culinárias do responsável pelas refeições na residência estão associadas com marcadores de consumo alimentar de crianças de 2 a 6 anos?

Abstract

Objective: To investigate the culinary skills of those in charge of preparing meals in the household and their association with markers of food quality consumption by children aged 2 to 6 years. *Methods:* Cross-sectional study conducted in Botucatu, SP, with students from public schools (n=115). A validated scale was applied to assess the interviewee's confidence in their culinary skills, generating an index ranging from 0 to 100 points. Markers of the child's food consumption were investigated and grouped to create a score for healthy consumption (fruits, vegetables, beans) and unhealthy consumption (sweetened beverages, sweets/treats, instant noodles, processed meats). The associations were investigated by linear regression and Poisson regression. *Results:* The mean culinary skills score of the person in charge of preparing the food was 80.11. Regarding the healthy consumption score, the mean was 13.50 and the mean unhealthy food consumption score was 10.35. Each additional point in the culinary skill score reduced the unhealthy consumption score by an average of 0.28 points. There was no association between the culinary skill score and the markers of healthy consumption. By multiple Poisson regression analysis, children whose guardians were in the lowest tertile of the culinary skill score were more likely to consume instant noodles four or more times per week (PR = 3.56; 95% CI = 1.01-12.50), compared to those with less frequent consumption. *Conclusions:* Children whose guardians were less confident in their culinary skills revealed a higher unhealthy food consumption score and were more likely to consume more frequently a food that is a marker of unhealthy food consumption such as instant noodles.

Keywords: Children's nutrition. Ultra-processed foods. Food consumption.

Resumo

Objetivo: Investigar as habilidades culinárias do responsável pelas refeições na residência e sua associação com marcadores da qualidade do consumo alimentar de crianças de 2 a 6 anos. *Métodos:* Estudo transversal realizado em

Botucatu – SP, com alunos de escolas públicas (n=115). Foi aplicada escala validada que avalia a confiança do entrevistado em suas habilidades culinárias, gerando índice variando de 0 a 100 pontos. Marcadores do consumo alimentar da criança foram investigados e agrupados para criar um escore de consumo saudável (frutas, hortaliças, feijão) e de consumo não saudável (bebidas adoçadas, doces/guloseimas, macarrão instantâneo, embutidos). As associações foram investigadas por regressão linear e regressão de Poisson. *Resultados:* A média do escore de habilidades culinárias do responsável foi 80,11. Quanto ao escore de consumo saudável, a média foi 13,50 e o escore de consumo não saudável médio foi 10,35. Cada ponto a mais no escore de habilidades reduziu em média 0,28 ponto o escore de consumo não saudável. Não houve associação entre o escore de habilidades e marcadores do consumo saudável. Pela análise de regressão de Poisson múltipla, crianças com responsáveis no menor tercil do escore de habilidades culinárias tiveram mais chance de consumir macarrão instantâneo 4 ou mais vezes por semana (RP = 3,56; IC95% = 1,01-12.50), em comparação com aquelas com consumo menos frequente. *Conclusões:* Crianças cujos responsáveis eram menos confiantes em suas habilidades culinárias apresentaram escore de consumo não saudável maior e maiores chances de consumirem mais frequentemente um alimento marcador de consumo não saudável, o macarrão instantâneo.

Palavras-chave: Alimentação infantil. Alimentos ultraprocessados. Consumo alimentar.

INTRODUCTION

The skills related to the selection, preparation, seasoning, cooking, combination and presentation of food are known as culinary skills (CSs). These skillswhich are developed in each society, are refined and passed on over generations and are fundamental to determining the flavor, aroma, texture and appearance of natural or minimally processed foods, influencing how much they will be appreciated by consumers.[1] The reduction of CSs from generation to generation favors the consumption of ultra-processed foods. Unlike ultra-processed foods, fresh or minimally processed foods generally need to be selected, initially prepared, seasoned, cooked, combined with other foods and served on plates for consumption.[1]

According to the *Food Guide for the Brazilian Population*[1] and the *Food Guide for Brazilian Children Under 2 Years Old*,[2] preparing food at home gives both individuals and families the opportunity to exercise control over their diet, as they are free to choose the ingredients and preparation methods. Preparing food at home not only promotes health and strengthens family ties, but also preserves cultural traditions and contributes to the protection of the environment. It is important to set aside time for cooking activities in the daily routine, involving all family members, to divide household chores and lighten the burden on one person.[1]

Developing culinary skills and sharing them with children and young people are extremely important aspects. Encouraging the practice of all hands cooking is part of social habits, promoting the experience of group eating and strengthening bonds among people. In addition, cooking provides autonomy in choosing healthier foods, allowing individuals to have control over what they are consuming. This active participation in meal preparation also helps to avoid rush eating, increasing the pleasure of enjoying a carefully prepared food recipe.[2]

In Brazil, the 2017-2018 Household Budget Survey (HBS) showed a decrease in the consumption of fresh and minimally processed foods that make up markers of healthy food consumption, such as beans, fruits and vegetables; at the same time, it was observed that there was an increase in the consumption of foods that are part of markers of unhealthy food consumption, such as instant noodles, soft drinks, cookies, among others.[3] Brazilian studies gathered in a narrative review pointed out the high participation of ultra-processed foods in the total energy consumed by children and adolescents.[4] The lack of culinary skills may play an important role in this situation, as the habit of cooking has been considered to be associated with a healthier diet.[5]

Studies with adults have shown a positive relationship between culinary skills and healthier eating habits. An Australian study investigated 1,059 adults' confidence in their CSs and classified such confidence into three groups: slightly confident, moderately confident and highly confident. Highly confident people, compared to less confident people, exhibited a lower Body Mass Index (BMI), placed more importance on including fresh foods and vegetables in their meals and valued more information about food products, meal planning and the overall quality of the food.[6] Similar results were obtained in a study with Canadian adults.[7]

The parents' or guardians' CSs influence on their children's diet has been studied more recently. Studies in the United States, Japan and in the United Kingdom have identified that high parental culinary skills are associated with better quality of children's diet.[8-10]

This association has also been identified in Brazil. A study with Brazilian children aged 2 to 9 years, conducted in the state of São Paulo during the Covid-19 pandemic, showed that the better the parents' CSs, the greater the consumption of natural foods, especially raw salads, vegetables or legumes.[11] Martins et al.,[12] evaluating 657 children aged between 6 and 9 years together with their relevant parents, identified that an increase of 10 points in the CSs score determined a decrease of 1.5 percentage points in the participation of ultra-processed foods in the dinner composition. When investigating parents'CSs of children aged between 7 and 10 years in the state of Espírito Santo, it was found that 32.0% were low parents' CSs, a fact associated with obesity and overweight of the relevant children.[13]

Research on the relationship between parents' or guardians' CSs and the quality of children's diets aged 2 to 6 years is still scarce. This information is essential for the development of effective interventions targeted at this population. Therefore, the present study sought to investigate whether there is a relationship between parents' or guardians' culinary skills and the quality of children's diets, and how this relationship influences markers of healthy and unhealthy food consumption.

METHODS

This is a cross-sectional study involving children aged 2 to 6 years enrolled in three public preschools located in the city of Botucatu, São Paulo. A subsample from an initial study was used to assess the children's nutritional status. The sample selection began with a prior contact with the municipal Department of Education, which notified all preschools in the municipality. Three of these preschools agreed to participate in the study. All guardians of children in the age group of interest enrolled in the three preschools were invited to participate, yielding 217 children willing to participate.

The first contact with the guardians occurred at a parents' meeting, when the objectives and methodology of the investigation were explained, and the invitation to participate was made. After the briefing, parents who agreed to participate received an envelope containing the self-administered questionnaire and the Free and Informed Consent Form (FICF). Parents who did not attend the meeting were sent this envelope, along with the student's school diary.

The questionnaire covered sociodemographic data, information about the child since birth, including type of delivery, birth weight, breastfeeding, prematurity and potential illnesses, as well as the family's current eating habits.

Anthropometric measurements of weight, height and waist circumference were collected and taken in duplicate at the schools by a nutritionist and seven nutrition students, all previously trained. Waist circumference was measured only in children aged three years or older, due to the lack of reference parameters for children under three years of age.[14] Training included techniques standardization, initially performed on pediatric patients treated at a pediatric outpatient clinic. Supervision was performed by a professional experienced in child nutritional assessment; such professional also took the initial reference measurements and corrected any techniques, ensuring the quality of the data collected.

For nutritional diagnosis, the WHO Anthro and AnthroPlus softwares were used; these softwares use the growth curves and cutoff points recommended by the WHO-2006.[15] The overall nutritional status of children aged 2 to 6 years was classified according to the BMI z-score for age and sex and the waist circumference classified according to Taylor et al.,[14] in accordance with the recommendation of the Brazilian Society of Pediatrics, in 2009.[16]

Regarding parents, based on self-reported body weight and height, we assessed the presence of obesity, defining it as BMI>30. These variables were also used to describe the samples and assess their potential relationship with the child's food consumption markers.

After this first part of the data collection, all participants were approached by telephone for the second stage of the survey, which included the assessment of the CSsof 115 participants. Subsequently, the telephone interviews were performed; initially it was asked who was in charge of preparing meals in the house; in the sequence a questionnaire called: "Culinary Skills Index" (CSI)[17] was applied to assess the degree of confidence in performing 10 culinary skills: 01- sautéing a food; 02- baking a food in the oven; 03- seasoning a meat using only natural seasonings (without ready-made seasoning such as Sazón); 04- following a simple recipe for a savory dish; 05- making a homemade tomato sauce, only with tomatoes and natural ingredients; 06- preparing a homemade soup; 07- cooking beans in a pressure cooker; 08- grilling a meat; 09- preparing a simple cake, without using ready-made dough; 10- preparing lunch or dinner by combining foods and ingredients available at home without the help of a recipe. The interviewee responded about their level of self-confidence in relation to each item, grading as follows: 0-not at all confident, 1-somewhat confident, 2-confident and 3-very confident. The sum of the points assigned generated a score ranging from 0 to 30, which was later transformed into a 0-100 points

scale, in which the higher the score, the greater the degree of confidence in culinary skills.[17] The CSI was the main exposure variable, used in continuous form and categorized into tertiles.

The CSI was developed by Brazilian researchers, using Social Cognitive Theory and the concept of self-efficacy as a reference.[18] During the development process, it underwent expert assessment (face validation), adaptation, pilot study and test-retest evaluation, to assess its reproducibility and reliability.[17]

The child's usual food consumption was assessed using markers of healthy and unhealthy food consumption adopted by the *Sistema de Vigilância Alimentar e Nutricional* (SISVAN, Brazilian Food and Nutrition Surveillance System).[19] The number of days per week (0-7) in which each of the following foods were consumed by the child was investigated: processed meats, sweet drinks, instant noodles and sweets (markers of unhealthy food consumption) and fruits, vegetables and beans (markers of healthy food consumption). Based on the responses, an unhealthy food consumption score was generated, ranging from 0 to 28, with a higher score indicating more frequent weekly consumption of unhealthy food. A healthy food consumption score was also created, ranging from 0 to 21, formed by adding the weekly frequency of fruits, vegetables and beans consumption. These scores were the two main outcomes assessed. Secondarily, each marker of unhealthy consumption was considered as an outcome.

Univariate and multiple linear regression analyses were performed separately between the culinary skills score (exposure variable) and the two main outcomes: healthy and unhealthy food consumption score. To identify potential confounding variables, covariates that reached p-value <0.20 in univariate analysis related to the two outcomes under study were inserted into multiple models.

Using the univariate Poisson regression analysis, we investigated the association between the tertiles of the culinary skills score (exposure) and each marker of unhealthy consumption (secondary outcomes), dichotomized as: consumption 0 to 3 times a week and 4 or more times a week. As there was a significant association (p=0.048) in the univariate analysis only with instant noodles, a multiple analysis was then performed only for this marker, adjusted for possible covariates that reached p<0.20.

All the statistical analyses were performed using the SPSS 16.0 software, and statistical significance for acceptance of the association was set at p<0.05.

The research in which this study is inserted was approved by the Research Ethics Committee of the Botucatu School of Medicine – UNESP, under number 3.318.017. All national and international procedures and guidelines for research with humans were adopted in conducting this project.

RESULTS

Among the children (n=115), none met the exclusion criteria; a total of 53.9% were girls; 63.2% were born by cesarean section; 42.6% of the children were born in a public maternity hospital; 10.6% with low birth weight and 13% were premature; only 3.5% of the children were not breastfed. Regarding the individual/sin charge of preparing meals in the household, 96.5% were the mothers. Regarding the child's current eating habits, 35.7% ate meals in front of a screen 5 to 6 times a week. Regarding the education of the person in charge of preparing the meals in the child's household, 28.3% completed higher education, 67.3% only completed high school and 4.4% completed elementary school; 10.4% of the families were beneficiaries at the time of the income allowance program, called *Bolsa Família*. Regarding lifestyle habits, 6.1% of mothers and 19.1% of fathers were smokers, and regarding nutritional status, 30.4% of mothers and 25% of fathers were obese, according to BMI measurements. Regarding children, 16.2% were diagnosed as overweight and 4.8% as obese (Table 1).

Table 1. Socioeconomic, demographic and nutritional characteristics of children and their guardians. Botucatu-SP, 2021. (n=115).

Variables	N	%
Gender		
Male	53	46.1
Female	62	53.9
Birth route		
Vaginal	42	36.8
Caesarean section	72	63.2
Place of birth		
SUS Hospital	49	42.6
Privatehospital	66	57.4
Region of the school the child attends		
Downtown	26	22.6
Other	89	74.4
Low birth weight		
Yes	12	10.6
No	101	89.4
Prematurity		
Yes	15	13.0
No	100	87.0
Breastfed child		
Yes	4	3.5
No	111	96.5
In charge of meals in the residence		
Mother	111	96.5
Others	4	3.5
Respondent's completed education		
Higher	32	28.3
Medium	76	67.3
Elementary	5	4.4
Bolsa família		
Yes	12	89.6
No	103	10.4
Smoking mother		
Yes	7	6.1
No	107	93.9
Smoking father		
Yes	22	19.2
No	92	80.8
Maternal obesity		
Yes	34	30.4
No	78	69.6
Paternal obesity		
Yes	25	25.0
No	75	75.0
Screen meals		
Never	19	16.5
1 to 2 times/week	32	27.8
3 to 4 times/week	23	20.0
5 to 6 times/week	41	35.7
Nutritional status of children		
Low weight		
Yes	1	1.0
No	104	99.0
Eutrophy		
Yes	17	16.2
No	88	83.8

Table 1. Socioeconomic, demographic and nutritional characteristics of children and their guardians. Botucatu-SP, 2021. (n=115).

Variables	N	%
Overweight		
Yes	17	16.2
No	88	83.8
Obesity		
Yes	100	95.2
No	5	4.8
Excess adiposity according Waist circumference		
Yes	41	44.1
No	52	55.9

Source: Authors' elaboration.

The mean score for culinary skills of the person in charge of preparation of the child's meals was 80.11 points, standard deviation 14.93; minimum 33.3 and maximum 100.0; the median was 83.3. Regarding the score for healthy consumption markers, the mean was 13.50, standard deviation 5.025; minimum 0 and maximum 21; and median 14.0. For the unhealthy consumption score, the mean was 10.35; standard deviation 6.34; minimum 0 and maximum 25; median 10.0. The frequency of consumption of unhealthy markers on four or more days of the week was high: 62.6% consumed soft drinks/sweetened beverages, 34.7% sweets/treats, 14.7% instant noodles, and 16.5% processed meats. The proportion of children who consumed vegetables on four or more days of the week was below 60%; fruits and beans were consumed by 70.4% and 84.3%, respectively.

The results of the investigations regarding the association between the culinary skills scores and the children's food consumption scores are shown in Table 2. Regarding healthy food consumption, the crude and adjusted analyses showed no statistically significant association between these variables: p=0.06 and p=0.11, respectively. For the unhealthy food score, a negative association was identified with the culinary skills score, both in the univariate and multiple analyses. Each additional point in the culinary skills score reduced the unhealthy food score by an average of 0.2894 points (95% CI = -0.538 to -0.050, p=0.018).

Some covariates were also related to the diet quality scores. The habit of eating meals in front of a screen 3 to 4 times a week, compared to never, increased the healthy food consumption score. Maternal education was associated with the unhealthy food score: The unhealthy food score was higher among children whose guardians had only a high school education compared to those whose guardians had a college education. Parity had a similar effect: a greater number of children increased the unhealthy food score. Low birth weight was also directly associated with unhealthy food score (Table 2).

Table 2. Results of crude and adjusted linear regression analyses between the culinary skills score of the person in charge of preparing meals in the household, covariates and the healthy and unhealthy food consumption scores of children aged 2 to 6 years. Botucatu-SP, 2021.

Variables	Healthy score (0-21)				Unhealthy score (0-28)			
	Univariate		Multiple		Univariate		Multiple	
	b	95% CI	b	95% CI	b	95% CI	b	95% CI
Skills score (continuous)	0.19	-0.01-0.40	0.16	-0.03–0.36	-0.29	-0.54--0.03	-0.29	0.58--0.05
P-value		0.06		0.11		0.02		0.02
Screen meal								
3 to 5 times a week	1.12	-1.54-3.79	1.3	-1.23-3.84	1.18	-2.05-4.43	-	-
P-value		0.41		0.31		0.47		-
3 to 4 times a week	3.14	0.16-6.11	3.3	0.50-6.22	1.54	-2.07-5.17	-	-
P-value		0.04		0.02		0.4		-
1 to 2 times a week	1.89	-0.88-4.67	2	-0.64-4.64	-2.13	-5.52-1.24	-	-
P-value		0.18		0.14		0.22		-
Never	1	-	1	-	1	-	-	-
P-value		-		-		-		-
Female gender reference=male	0.11	-1.94-1.72	-	-	0.2	-2.04-2.46	-	-
P-value		0.9		_		0.86		_
Overweight reference = no	1.11	-1.39-3.62	-	-	-1.15	-3.24-2.93	-	-
P-value		0.38		_		0.92		_
Low birth weight reference=no	2.04	-0.92-5.01	-	-	3.17	-0.45-6.80	3.88	0.36-7.39
P-value		0.18		-		0.09		0.03
Birth weight	0	0-0	_	_	0	0	_	_
P-value		0.81		_		0.68		_
Cesarean section (reference=vaginal)	0.15	-1.74-2.05	-	-	0.721	-1.60-3.05	-	-
P-value		0.87		-		0.54		-
Breastfeeding time (months)	0	0-0	-	-	0	0 - 0	-	-
P-value		0.6		-		0.83		-
Maternal parity	0.5	-0.43-1.45	-	-	1.031	-0.12-2.18	1.11	0-2.22
P-value		0.29		_		0.08		0.05
Maternal obesity (reference=no)	0.39	-1.57-2.36	-	-	0.09	-2.33-2.51	-	-
P-value		0.69		_		0.94		_
Paternal obesity (reference=no)	0.33	-2.46-1.79	-	-	0.086	-2.70-2.53	-	-
P-value		0.76		-		0.94		-
Respondent's completed education								
Elementary education	0.55	-3.99-5.10	1.06	-3.34-5.47	-1.58	-7.35-4.18	-	-
P-value		0.81		0.64		0.59		-
High school	-2.63	-4.60-0.65	2.39	-4.31-0.47	-0.71	-3.21-1.79	-	-
P-value		0.01		0.01		0.58		-
Higher education	1	-	1	-	1	-	-	-
P-value		-		-		-		-
Bolsa Familia allowance (reference=no)	1.3	-4.28-1.67	-	-	-2.13	-5.78-1.52	-	-
P-value		-		-		-		-

Source: Authors' elaboration.

The results of the crude Poisson regression models on the association of the culinary skill score, categorized into tertiles, and each of the markers of unhealthy food consumption are shown in Table 3. There was no statistically significant association between the skill tertiles and the markers of unhealthy consumption; in the crude analyses, it is worth mentioning that the relationship was on the threshold of significance in the case of instant noodles. The multiple analysis confirmed that the lowest culinary skill score (1st tertile versus 3rd tertile) was associated with more frequent consumption of instant noodles (PR = 3.56; 95% CI = 1.01-12.50; p = 0.048). This result is adjusted for the presence of low birth weight (Table 4).

Table 3. Results of crude Poisson Regression models between the culinary skills score of the person in charge of preparing meals in the homes of children aged 2 to 6 years and the unhealthy food consumption markers in 4 or more days of the week. Botucatu-SP, 2021.

Variables	Sausages		Sweetened drink		Instant Noodles		Candy	
	PR	95% CI	PR	95% CI	PR	95% CI	PR	95% CI
Skills score								
1st Tertile	1.9	0.67-5.39	1.25	0.73-2.14	3.43	0.98-12.0	1.1	0.54-2.24
P-value		0.22		0.39		0.05		0.8
2ndTertile	0.52	0.10-2.70	0.89	0.46-1.72	0.43	0.04-4.19	0.91	0.39-2.12
P-value		0.44		0.73		0.47		0.82
3rdTertile	1	-	1		1	-	1	-
P-value		-		-		-		-
Screen meal								
3 to 5 times a week	1.16	0.22-5.97	1.15	0.59-2.26	0.77	0.18-3.23	1.26	0.53-2.99
P-value		0.86		0.66		0.72		0.6
3 to 4 times a week	3.72	0.80-17.20	1.17	0.55-2.45	1.1	0.24-4.92	0.94	0.34-2.60
P-value		0.09		0.66		0.89		0.91
1 to 2 times a week	0.89	0.15-5.33	0.64	0.29- 1.41	0.99	0.23-4.14	0.51	0.17-1.51
P-value		0.89		0.27		0.98		0.22
Never	1	-	1	-	1	-	1	-
P-value		-		-		-		-
Femalegender (reference=no)	1.47	0.58-3.72	0.95	0.60-1.51	1.22	0.46-3.20	0.94	0.51-1.76
P-value		0.42		0.84		0.68		0.08
Overweight (reference=no)	0.3	0.04-2.24	1.3	0.72-2.33	0.33	0.04-2.54	0.77	0.30-1.96
P-value		0.24		0.37		0.29		0.58
Low birth weight (reference=no)	2.29	0.76-6.90	1.22	0.61-2.46	2.64	0.86-8.10	1.82	0.81-4.12
P-value		0.14		0.56		0.08		0.15
Birth weight	1	1-1	1	1-1	1	0.99-1	1	1.00-1.00
P-value		0.34		0.95		0.54		0.96

Table 3. Results of crude Poisson Regression models between the culinary skills score of the person in charge of preparing meals in the homes of children aged 2 to 6 years and the unhealthy food consumption markers in 4 or more days of the week. Botucatu-SP, 2021.

Variables	Sausages		Sweetened drink		Instant Noodles		Candy	
	PR	95% CI	PR	95% CI	PR	95% CI	PR	95% CI
Caesarean section (reference=vaginal)	0.99	0.39-2.51	1.08	0.66-1.75	1.05	0.39-2.85	1.34	0.68-2.64
P-value		0.97		0.75		0.91		0.39
Breastfeeding time (months)	1	1.00-1.00	0.99	0.99-1.00	1	0.99-1	-	-
P-value		0.63		0.32		0.74		-
Maternal parity	1.54	1.08-2.22	1.08	0.86-1.36	1.08	0.86-1.36	1	1.00-1.00
P-value		0.01		0.5		0.5		0.32
Maternal obesity (reference=no)	1.01	0.38-2.66	1.16	0.71-1.89	0.67	0.220-2.071	0.94	0.48-1.85
P-value		0.97		0.53		0.49		0.85
Paternal obesity (reference=no)	1.11	0.40-3.08	0.96	0.55-1.65	0.95	0.31-2.93	0.9	0.43-1.89
P-value		0.84		0.88		0.93		0.78
Respondent's completed education								
Elementary education	1.65	0.18-14.76	0.66	0.15-2.82	1.29	-	0.88	0.20-3.85
P-value		0.65		0.57		-		0.86
High school	1.5	0.49-4.56	1.07	0.63-1.80	2	0.57-6.95	0.66	0.34-1.26
P-value		0.47		0.79		0.27		0.2
Higher education	1	-	1	-	-	-	1	-
P-value		-		-		-		-
Bolsa Familia Allowance (reference=no)	0.06	3.57	0.92	0.42-2.01	1.14	0.29-5.00	0.95	0.34-2.68
P-value		0.47		0.84		0.85		0.92

Source: Authors' elaboration.

Table 4. Result of the Poisson regression model between tertiles of the culinary skills score of the person in charge of preparing meals in the homes of children aged 2 to 6 years and the consumption of instant noodles on 4 or more days of the week. Botucatu-SP, 2021.

	Adjusted		
Variables	PR	95% CI	P-value
Culinary Skills Score			
1st tertile	3.56	1.01 – 12.50	0.048
2ndtertile	0.48	0.05 – 4.59	0.521
3thtertile	1	-	-
Low birth weight	2.58	0.84 – 7.92	0.098

Source: Authors' elaboration.

DISCUSSION

We can observe that the guardians responsible for the children had a high level of confidence in their culinary skills, with an average score of 80.11 on the Culinary Skills Index, on a scale ranging from 0 to 100. However, even with parents with high culinary skills, frequent weekly consumption of foods that are markers of unhealthy food consumption and lower than desirable levels of consumption of healthy food markers were identified.

Food consumption is influenced by a complex network of factors,[1] so that a single factor will always have a limited effect or may not have its effect detected. Thus, even with good culinary skills, the lack of time of the person in charge of preparing meals in the house or the lack of resources to access healthier foods may reduce the quality of the children's diet.

Traditionally, the role of feeding the family is ascribed to the woman/mother, as observed in this study. With the increasing insertion of women in the workforce and the long daily working hours, the time available to prepare meals usingfresh or minimally processed foods has been decreasing.[20] Without more available time and support for women, it is possible that simply expanding mothers' culinary skills will not be sufficient to reduce the consumption of ultra-processed foods in the families.

Furthermore, even with the help of a Government income allowance program, a portion of the population may not have access to healthy foods, which constitutes another limitation of the CSs influence on meals preparations.[21]

Nevertheless, in line with the hypothesis raised, a negative association was found between the culinary skills score, both in the univariate and multiple analyses, and the unhealthy food consumption score, composed of ultra-processed foods. Additionally, it was detected that the culinary skills score of the children's guardian was inversely associated with the consumption of instant noodles, but not with the other markers of unhealthy food consumption, an outcome that is difficult to explain with the data available. When the guardian had a lower culinary skills score (1st tertile), the prevalence of children who habitually consumed instant noodles on four or more days a week more than tripled, compared to children whose guardians had greater culinary skills (3rd tertile). The identification of such an association suggests that the frequency of instant noodle consumption may be, in isolation, a marker of more or less healthy eating habits of young

children. It also allows us to raise the hypothesis that interventions focused on expanding the culinary skills of parents may reduce the consumption of instant noodles and positively influence children's health, since there are several possible negative repercussions of the frequent consumption of such food.

The consumption of one serving or one packet of instant noodles is equivalent to the daily amount of salt intake recommended by the World Health Organization (WHO), which is <5g/day.[22] In other words, regular consumers of this product probably far exceed the salt intake considered safe and protective against high blood pressure. In Malaysia, a study conducted in 2017 showed that 10% of instant noodles available on the local market exceeded the WHO recommendations for daily salt intake.[23] In addition to the excess salt, there is also excess fat. Very frequent consumption of instant noodles was associated, in a study in Korea, with a higher prevalence of hypertriglyceridemia in university students.[24] There could also be adverse effects that are still poorly understood, such as those reported in a Korean study, which found a negative association and a dose-response effect between the consumption of instant noodles and school performance in children.[25] It is also worth mentioning a Nigerian study that warned about the risk of heavy metal intoxication with the frequent consumption of certain local brands of instant noodles, in which levels of lead and chromium above those considered tolerable by the WHO were detected.[26] Researchers from Pakistan also warned about the risk of chromium poisoning with the frequent consumption of local brands of instant noodles.[27] We did not find any studies that measured heavy metals in brands of instant noodles sold in Brazil; however, in Rio de Janeiro, a study carried out with children aged 6 to 59 months showed that instant noodles are one of the most consumed foods by this group of children; they have a high energy value and high levels of total fat, saturated fat, trans fat and sodium, in addition to having an excess of critical nutrients such as sweeteners.[28]

The regular consumption of instant noodles by children does not appear to be a problem restricted to the location where that study was conducted. Other studies in Brazil have shown that noodles have been introduced into the children's diets at an increasingly early age. In Minas Gerais, instant noodles were present excessively frequently in the diets of children assessed in their first twelve months of life.[29] In Cuiabá, the capital of the state of Mato Grosso, a study on the introduction of this food in low-birth-weight babies' dietrevealed that this food was introduced before the age of six months.[30]

Secondary findings of the present study deserve some comments. Regarding the association between low birth weight and unhealthy food scores, the hypothesis can be stated that the high palatability of unhealthy foods may be attractive to parents of children born with low birth weight, in the sense of ensuring good child's acceptance and rapid weight gain, but this possibility can only be evidenced or not with qualitative studies. Two other factors associated with markers of unhealthy food consumption (parity and education of the guardian) also deserve to be investigated in future studies, as well as the association, in the positive case, between the habit of eating meals in front of the screen 3 to 4 times a week and the healthy food consumption score.

Finally, we point out some limitations of this study. The cross-sectional design does not allow us to know the temporality of the variables, nor to establish causality between the culinary skills of those in charge of preparing food at home and the food consumption markers. It is also worth mentioning that the small sample size reduced the precision of the effect estimates, a fact indicated by the large confidence intervals obtained.

Finally, there are uninvestigated factors that may play a role in modifying the relationship between culinary skills and children's food consumption, such as the time available to cook, the literacy of those in charge of preparing the meals regarding the Brazilian recommendations for healthy eating, and the characteristics of the food environment where the population under study dwells. We suggest that In future

studies with a larger sample, such factors be investigated and considered as potential intervening factors in the relationship addressed in our study.

CONCLUSIONS

The culinary skills score of the person in charge for preparing meals in the household was not associated with the healthy food consumption score, but was negatively associated with the unhealthy food consumption score, in line with the hypothesis of the present study. When we investigated the association between the tertiles of the culinary skill score and each food marker of unhealthy food consumption, only the association with the frequency of instant noodle consumption was confirmed. Taken together, the results obtained add to the literature evidence of the negative relationship between culinary skills, in the case of parents, and the frequency of consumption of markers of unhealthy food consumption by schoolchildren.

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Torres TM research conception, study design and data collection, data analysis and interpretation, preparation of the text and tables; Silva MA drafting of the text; collaboration in the conception and collection and analysis of data; correction of the manuscript. Nunes HRC drafting, interpretation and correction of data analyses; Carvalhaes MABL correction of all data, correction of the text, assistance in writing the text, analysis and interpretation of data, review and approval of the final version of the text.

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