

# Quality of kids' meals in fast-food restaurants: the nutritional content is not enough for an informed choice

## *Qualidade das refeições infantis em restaurantes de fast-food: a informação nutricional não é suficiente para uma escolha informada*

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### ABSTRACT

#### Objective

Eating out in restaurants is a common family behavior, but it has been persistently associated with unbalanced nutrient intakes, contributing to create and reinforce unhealthy food habits among children. The purpose of this study was to evaluate the kids' meals from three common well-known restaurant chains in Portugal.

#### Methods

The nutritional composition (total fat, carbohydrates, protein, and sodium content) of the menus was analyzed bromatologically, and food portions were also examined. The assessment was carried out according to the European Food Safety Authority recommendations.

#### Results

Analyses of the menus from the two points of view revealed that the evaluations for macronutrients and food portions may return contradictory results. Protein, carbohydrates, and fats are compliant with the requirements for most of the meals. The analysis from the food portion perspective exceeds the requirements for the meat, fish, and eggs groups, as well as for fats and oils. Fruits, vegetables, and pulses are not present in the menus. Despite the balance associated with the macronutrients, the salt content exceeds the recommendations for most of the meals.

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## Conclusion

Popular fast-food chain restaurants have already adapted to comply with nutritional recommendations, whilst neglecting important recommended foods such as fruit, pulses, and vegetables. This study points not only to the need of investing in the improvement of the offerings, but also to the importance of fighting the tendency to reduce the perception of food quality to its nutritional content, leading consumers to believe that the meals offered are balanced when they are not.

**Keywords:** Child nutrition. Food composition. Menu planning. Nutritive Value.

## RESUMO

### Objetivo

*Comer fora de casa tem se tornado um comportamento cada vez mais frequente entre as famílias, fato que tem sido persistentemente associado à ingestão desequilibrada de nutrientes e contribuído para reforçar hábitos alimentares infantis pouco saudáveis. Este estudo avaliou menus infantis de três redes de restaurantes bem conhecidas em Portugal.*

### Métodos

*A composição nutricional (gordura total, carboidratos, proteína e sódio) dos cardápios foi analisada bromatologicamente, assim como as porções dos alimentos fornecidas. A avaliação foi realizada de acordo com as recomendações da Autoridade Europeia para a Segurança dos Alimentos.*

### Resultados

*A análise dos cardápios, na perspectiva da composição em macronutrientes e das porções alimentares, apresentou resultados contraditórios. Os teores de proteínas, carboidratos e gorduras cumprem os requisitos na maioria das refeições. A análise das porções alimentares excede as recomendações para os grupos da carne, peixe e ovos, bem como para gorduras e óleos. No entanto, frutas, hortícolas e leguminosas não estão presentes nos menus. Apesar do equilíbrio associado aos macronutrientes, o teor de sal supera as recomendações na maioria das refeições.*

### Conclusão

*As redes de fast-food mais populares já adaptaram a sua oferta às recomendações nutricionais. No entanto, verifica-se que negligenciaram algumas recomendações alimentares importantes, como incluir frutas, leguminosas e hortícolas nas refeições. Este estudo aponta para a necessidade de investir não só na melhoria da oferta, como também para a importância de combater a tendência crescente dos consumidores se focarem nos nutrientes e se esquecerem dos alimentos, o que os leva a acreditar que as refeições oferecidas são equilibradas, quando não o são.*

**Palavras-chave:** Nutrição da criança. Composição de alimentos. Planeamento de cardápios. Valor nutritivo.

## INTRODUCTION

In the last decade, researchers have observed important changes in patterns of food intake, with an increase in out-of-home food consumption. Consumers spend approximately half of their food budget on meals away from home [1]. Eating out in restaurants is a common family behavior, but it has been persistently associated with unbalanced nutrient intakes [2,3]. Kids' meals in restaurants have been reported to be poor in quality, contributing to a higher energy intake when compared to home-cooked meals. These meals have also been evaluated as lower in several nutrients, namely vitamin A and C, calcium, iron, and fibers, while providing a higher intake of saturated fat, sodium, and sugar, corresponding to high-energy density and low-nutrient density meals [2,4]. From the food intake point of view, these meals are poor in fruits, vegetables, and whole grains.

Apart from the fact that these meals might contribute to an already existing problem, children obesity, they also contribute to creating and reinforcing unhealthy food habits among children [5,6].

Reversing trends in childhood obesity prevalence is a public health priority, but it is more important to consider the development of proper food habits that will endure through adulthood and affect health during the life cycle [7].

Most of the studies focus on the evaluation of the nutritional quality of meals and their compliance with nutritional recommendations, leading to a situation in which restaurants try to adapt their products to meet these guidelines [1,2,8-12]. Nevertheless, food is more than the nutrients it provides. It is thus essential to look beyond the nutrients and understand the foods that are being supplied and how they fulfill the recommended food portions.

This study aims to evaluate the kids' meals from three common well-known restaurant chains in Portugal, analyzing the meals in terms of macronutrient composition, total energy, and sodium content, and comparing the food items in the meals to the recommended food portions from the Portuguese food wheel guide.

## METHODS

This study was designed after a previous research, in which the authors performed a qualitative analysis of the food supply in fast-food restaurants located in malls and shopping centers. Results from this research pointed to a nutritionally poor food supply, low diversity of the available options, characterized by a low supply of vegetables and fruits, excess of juices, sugary drinks, and sweet desserts [13].

Supported by this research, three popular fast food restaurant chains were selected, each from a different typology (hamburgers, fried chicken, and pizza). Taking into account that the meals from these fast-food chains are highly standardised and also due to budget constraints, only one sample of each meal was evaluated. For each restaurant, three different menus for children were purchased, from which three replicates were prepared, thus obtaining a total of 27 samples. The selected menus were the most advertised in each establishment. Menus were collected in December 2019.

Using a Selecline 394496® scale (Auchan Retail Portugal: Lisboa, Portugal, 2019), accurate to 1g, the various components of the meals were weighed and divided according to the Portuguese Food Guide groups: grains and starchy vegetables, non-starchy vegetables; fruits; dairy products; meat, fish, and eggs; pulses; fats and oils [14].

For the bromatological analysis, the meals were crushed with a food processor, obtaining homogeneous samples which were later stored in aseptic 60mL containers and frozen. Two samples of each meal were used, and two replicates were made for each sample, thus obtaining a total of four samples per meal. The analyses of humidity, ash, total fat, carbohydrates, protein, and sodium were carried out in a certified laboratory. To determine the moisture content, the sample was subjected to an oven drying process at  $103\pm 2^{\circ}\text{C}$ , until it reached a constant mass. To determine the ash content, the sample was incinerated by being gradually heated to  $500^{\circ}\text{C}$ , until white ashes were obtained, and the determination was calculated by the difference in mass before and after the incineration process.

The fat content was determined by the Soxhlet method, the protein content was measured using the Kjeldahl method, and carbohydrates were calculated with an indirect method, through the following equation ( $\% \text{Carbohydrates} = 100\% - (\% \text{Fat} + \% \text{Protein} + \% \text{Moisture} + \% \text{Ash})$ ). The determination of the sodium content was performed by a flame photometry analysis at the *Faculdade de Ciências da Nutrição e Alimentação, Universidade do Porto*.

For food portions, the authors used the Portuguese Food Guide recommendations for children between 6 to 10 years old, corresponding to 1.62 portions of cereals and starchy vegetables, 1.7 portion of non-starchy vegetables, 1 portion of fruit, 1.05 portions of meat, fish, and eggs, 0.9 portions of pulses, and 0.56 portions of fats and oils [14,15]. Since our country lacks nutritional recommendations for children and adolescents, the authors used the nutritional recommendations established by the European Food Safety Authority (EFSA)/European Commission (EC), as they are aimed at the European population and are constantly updated [16]. The nutritional composition of the meals was carried out considering that lunch should contribute to 30% of the daily energy value [15]. Data was analysed using Microsoft Excel, version 16, to calculate the descriptive statistics.

## RESULTS

The results for the macronutrient evaluation are presented on Table 1. Protein is the nutrient with the highest compliance in most of the menus, exceptions for Menu R12 and R32, with values falling below requirements.

For carbohydrates, there is a moderate level of compliance, with three menus falling below the requirements (R12, R21, R22) and only one of them classifying above (R31). No menu is below the requirements for lipids, with most of the menus falling within the range, three menus above the requirements (R13, R22, R31), and two below the requirements (R21 and R22). For each of the restaurants, there is one menu falling within the requirements for all the macronutrients (R11, R13, R33). As globally most of the nutrients fall within the range of recommendations, the same happens for energy values. Only two meals are above the limit (R13 and R31) (Table 1).

Table 2 allows us to observe that options that include hamburgers or chicken complemented with potatoes and bread are compliant with the recommendations for cereals and non-starchy vegetables, while pizza and just potatoes only allow for fifty percent of the recommendations. None of the options supply the required amount of vegetables nor provide any pulses. For meat, fish, and eggs, most of the menus exceed largely the recommendations as well as for fats and oils.

Table 3 presents the values for sodium and salt per hundred grams and per meal. From the nine meals evaluated, only two (R1 and R12) comply with the recommendations for children (1.28g of salt, 30% of the daily value). There is one meal that has more than twice the recommended value (R31).

**Table 1** – Macronutrient content of kids' menus and compliance with recommendations.

Sample	Lipids		Carbohydrates*		Protein		Energy	
	g	L <sub>i</sub> =11.3 U <sub>i</sub> =19.8	g	L <sub>i</sub> =57.4 U <sub>i</sub> =76.5	g	L <sub>i</sub> =12.8 U <sub>i</sub> =19.5	Kcal	L <sub>i</sub> =383 U <sub>i</sub> =562
R11	17.3	Within range	67.9	Within range	14.2	Within range	484	Within range
R12	16.8	Within range	47.0	Below	12.3	Below	388	Within range
R13	23.4	Above	75.5	Within range	18.7	Within range	587	Above
R21	17.3	Within range	39.6	Below	15.8	Within range	377	Within range
R22	20.3	Above	44.0	Below	14.0	Within range	415	Within range
R23	17.5	Within range	66.6	Within range	14.9	Within range	484	Within range
R31	25.0	Above	81.0	Above	17.1	Within range	617	Above
R32	16.5	Within range	58.5	Within range	7.0	Below	411	Within range
R33	13.1	Within range	58.6	Within range	17.0	Within range	420	Within range

Note: \*Including fiber. L<sub>i</sub>: Lower Limit; U<sub>i</sub>: Upper Limit.

Source: European Food Safety Authority [16].

**Table 2** – Number of food portions of meals for each food group in the collected samples of kids' menus.

Sample	Food groups	Grains and starchy vegetables			Non starchy vegetables	Fruit	Dairy	Meat, fish, and eggs	Pulses	Fats and oils
R11	Food component	Potatoes	Bread	Total	Cucumber			Hamburger		Oil
	Amount in g	67.50	55.00		2.00	–		32.00		7.50
	Number of food portions	0.54	1.10	1.64	0.01			1.28		0.75
R12	Food component	Potatoes						Nuggets		Oil
	Amount in g	63.00				–		63.90		14.10
	Number of food portions	0.50						2.56		1.41
R13	Food component	Potatoes	Bread	Total	Cucumber		Cheese	Hamburguer		Oil
	Amount in g	79.20	53.00		2.00		15.00	30.00		8.80
	Number of food portions	0.63	1.06	1.69	0.01		0.38	1.20		0.88
R21	Food component	Potatoes						Chicken		Oil
	Amount in g	61.20						51.30		12.50
	Number of food portions	0.49						2.05		1.25
R22	Food component	Potatoes						Crispy strips		Oil
	Amount in g	78.30						51.30		14.40
	Number of food portions	0.63						2.05		1.44
R23	Food component	Potatoes	Bread	Total	Lettuce		Cheese	Chicken		Oil
	Amount in g	64.80	50.00		5.00		8.00	36.00		11.20
	Number of food portions	0.52	1.00	1.52	0.03		0.20	1.44		1.12
R31	Food component	Pizza dough			Tomato, pepper		Cheese	Hamburguer		*
	Amount in g	118.00			6.00		60.00	29.00		
	Number of food portions	2.18			0.03		1.50	1.16		
R32	Food component	Pizza dough			Tomato, pepper		Cheese	Chicken		*
	Amount in g	97.00			6.00		43.00	2.00		
	Number of food portions	2.16			0.03		1.08	0.08		
R33	Food component	Potatoes						Nuggets		Oil
	Amount in g	117.90						72.00		21.10
	Number of food portions	0.94						2.88		2.11

Note: \*It was not possible to separate this group in this menu.

**Table 3** – Sodium and salt content of the collected samples of kids' menus – Average and standard deviation.

Sample	Na (g/100g)	Na (g/meal)	Salt (g/100g)	Salt (g/meal)
R11	0.289±0.012	0.498±0.015	0.7±0.031	1.2±0.037
R12	0.352±0.005	0.497±0.006	0.9±0.014	1.2±0.014
R13	0.412±0.001	0.839±0.001	1.0±0.002	2.1±0.004
R21	0.411±0.015	0.514±0.017	1.0±0.047	1.3±0.042
R22	0.429±0.002	0.618±0.007	1.1±0.018	1.5±0.018
R23	0.295±0.009	0.304±0.018	0.7±0.003	0.8±0.003
R31	0.714±0.009	1.479±0.021	1.8±0.037	3.7±0.054
R32	0.536±0.007	0.793±0.002	1.3±0.006	2.0±0.006
R33	0.306±0.001	0.646±0.000	0.7±0.022	1.6±0.033

Note: Na: Sodium.

## DISCUSSION

Analyses of the menus from the two points of view, compliance for macronutrients and food portions, may return contradictory results. For protein, most of the menus are compliant with the requirements. On the other hand, from the food portion perspective, the protein comes from animal sources (meat, fish, and eggs food group), exceeding the requirements.

For carbohydrates, some of the menus are below the requirements, associated with the supply of low portions of potatoes and/or bread, but also affected by the absence of the pulses food group, that would not only allow the provision of carbohydrates, as well as vegetable protein, to replace the excessive animal protein.

Although only three menus exceed the recommendations for lipids, most of them, while falling within recommendations, are very close to the upper limit. From the food portions point of view, they all exceed the recommendations for fats and oils.

Despite the balance associated with the macronutrients, the salt content exceeds the recommendations for most of the meals, representing a high risk for children health, as these meals may significantly contribute to overcoming the tolerable upper intake level (4,75g – children from 4 to 8 years old – to 5,5g – children from 9 to 13 years old).

A study conducted in the United States evaluated the sodium content of children meals, concluding that more than 75% had more than 210mg/100g, a value that is below the ones obtained in this study [17]. In Portugal, researchers evaluated 100 children meals from popular fast food and pizza restaurant chains, reporting that, for pizza, the average sodium content was 1.53g/100g, and for fast food, it was 2.1g/100g, values similar to the ones found in our study (1.2g in 100g) [18].

Children have lower recommendations for sodium than adults, and a diet low in salt diet from the childhood onwards is known to lessen the rise in blood pressure with age, helping to prevent the development of high blood pressure and cardiovascular disease later in life [16,19]. Strategies to reduce the salt content of children's menus should be a priority for public health.

These results point to a necessary effort on the part of the food service addressed to children in order to comply with nutritional recommendations, in which macronutrient agreement results and the total energy falling within the recommended values. It is common knowledge that the public perception and concern about nutrition focuses on specific nutrients, such as protein and energy content [1]. Nevertheless, food should not be analysed only from the nutrient composition perspective, since a more detailed and qualitative analysis may reveal that these menus are based on fried food options, meat and, consequently, saturated fat and low availability of vegetables, fruits, and pulses. Beyond the nutritional point of view, this type of offer modulates children's food taste and preferences, contributing to unhealthy food habits.

A group of researchers developed the Healthy Menu Index that has been used to evaluate the quality of Diets and Menus in the United States [20]. While this index contemplates quantitative data related to calorie intake from solids fats, alcoholic beverages, and added sugars, as well as sodium, it also includes qualitative data, such as whole-fruit, vegetables, whole-grains, milk, meat, and beans, for the global analysis, allowing for a more adequate approach to the food that is eaten or offered [20,21].

The nutritional information addressed to consumers focuses only on nutritional values, such as those of protein, lipids, saturated fat, carbohydrates, sugars, salt, and calories. In our study, it was possible to observe that popular fast-food chain restaurants have already adapted to comply with nutritional recommendations, whilst neglecting important food recommendations, such as including fruit, pulses, and vegetables, which may lead to micronutrient deficiency.

Food acceptance patterns are developed early in life, and childhood is a time of particular sensitivity for developing food preferences. In general, children choose to eat foods that they are served more frequently and tend to choose foods readily available at home [22-26]. Other research has demonstrated the importance of not only availability, but also the accessibility of healthier foods [27,28]. Shifting foods offered and consumed by children in restaurants has the potential of improving diet quality, avoiding excess energy intake, and help shaping healthy habits [6,23,24].

This study has some limitations, namely the fact that sugary drinks, sweet desserts, and sauces, also available in children's menus, were not included in the quantification of the nutritional value, which underestimates the meals' energetic value. The results of this study point out the need for a more simplified and explicit visual scale/score of meal quality, to be read and understood by consumers, that goes beyond the nutritional content [29]. This could allow consumers and parents in particular to make more informed decisions. Also, these food chains often grant a collectable toy with children's menus in order to promote their consumption, thus stimulating the intake of unbalanced meals. This marketing strategy should be avoided or associated with healthier options on the menu.

## CONCLUSION

Popular fast-food chain restaurants have already adapted to comply with nutritional recommendations, whilst neglecting important food recommendations such as the inclusion of fruit, pulses, and vegetables. Our study points out the need to invest in the improvement of the offer, but also highlights the importance of fighting the tendency of reducing the food quality perception to its nutrient content, leading consumers to believe that the meals offered are balanced when they are not.

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## CONTRIBUTORS

DC PINTO was responsible for conducting the study, retrieving and analyzing samples and data. AMCN ROCHA and CACL VIEGAS supervised the study and wrote the paper.

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