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Characterization of culinary preparations served in south Brazilian buffet restaurants: potential for healthier food choices

Caracterização das preparações culinárias oferecidas em bufês de redes de restaurantes no Sul do Brasil: potencial de escolhas alimentares mais saudáveis

Abstract

Introduction: The global trend of eating out seems to be associated with the consumption of culinary preparations of lower nutritional quality. However, commercial self-service buffet restaurants, where pricing is based on weight, seem to promote healthier eating. *Objective*: To characterize and analyze food preparations served in commercial self-service buffet restaurants in a southern Brazilian capital. *Methods*: An observational survey was conducted in 11 self-service buffet restaurants selected by convenience. The results are presented as absolute and relative frequencies. Culinary preparations were classified according to their base ingredients and method of preparation. Data were analyzed by category using measures of central tendency. *Results*: Buffet options included on average 13.9 varieties of salads, rice and beans were served daily in all restaurants, a higher offering of sweets (average of 2.8 preparations) compared to fruits as desserts, and frequent availability of fatty meats or those prepared with fatty sauces (average of 3.4 preparations) as well as one preparation based on fish and seafood. Salads were generally positioned at the beginning of the buffets (n = 10). *Conclusion*: The restaurants offer healthy culinary preparations daily, such as salads, rice, and beans. Despite this, a greater offering of sweets as desserts instead of fruits was observed, along with limited fish options compared to other animal protein sources.

Keywords: Lunch. Nutrition. Healthy Diet. Restaurant. Food Service. Menu.

Resumo

Introdução: A tendência mundial de realizar refeições fora de casa parece estar associada ao consumo de preparações de menor qualidade nutricional. Entretanto, restaurantes do tipo bufê por peso parecem ser promotores de alimentação mais saudável. *Objetivo*: Caracterizar e analisar preparações culinárias saudáveis oferecidas em restaurantes comerciais de rede tipo bufê de autosserviço em uma capital do sul do Brasil. *Métodos*: Pesquisa observacional realizada em 11 restaurantes comerciais de rede tipo bufê de autosserviço selecionados por conveniência. Os resultados foram apresentados por meio de frequência absoluta e relativa. As preparações

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culinárias foram classificadas conforme o tipo e o modo de preparo, e os dados foram analisados por categoria, por meio de medidas de tendência central. *Resultados*: Verificou-se média diária de 13,9 variedades oferecidas de saladas, presença diária de arroz e feijão, oferta maior de doces (média de 2,8 preparações) comparada com frutas como sobremesas, e a oferta frequente de carnes gordurosas ou preparadas com molhos gordurosos (média de 3,4 preparações) e de uma preparação à base de peixes e frutos do mar. Observou-se saladas dispostas geralmente no início dos bufês (n = 10). *Conclusões*: Os restaurantes oferecem diariamente preparações culinárias saudáveis, como saladas, arroz e feijão. Apesar disso, foi observada a oferta maior de doces como sobremesa em vez de frutas, além de poucas opções de peixes, em comparação com outras fontes de proteína animal.

Palavras-chave: Almoço. Nutrição. Alimentação Saudável. Restaurante. Serviços de Alimentação. Cardápio

INTRODUCTION

The rise in the consumption of out-of-home meals is associated with an increased consumption of foods and culinary preparations of lower nutritional quality.[1-3] Studies also suggest a potential association between the consumption and/or frequency of consumption of out-of-home foods with weight gain or increased body mass index.[3-7] Thus, the out-of-home food sector represents a valuable environment for initiatives aimed at promoting healthy eating.[8-10]

The Global Strategy on Diet, Physical Activity and Health[11] includes the private food sector among those responsible for fostering healthy eating habits. Researchers found that commercial restaurants represent the second largest source of out-of-home foods and argued that these establishments could play a crucial role in the development of public policies aimed at promoting healthy eating.[12] One interesting strategy for encouraging the choice of healthier culinary preparations in restaurants involves the use of "nudges".[13] Nudges are defined as minor changes in the microenvironment that reshape the architecture of choices to facilitate healthy behavior,[14,15] leading to changes in choices made with minimal to no deliberation.[16] Examples of nudges in restaurants include providing nutrition information on culinary preparations[17,18] and placing healthier dishes at the beginning of the buffet or in high-visibility areas.[19] It should be noted that a prerequisite for implementing a nudge strategy is the availability of healthy culinary preparations.

Self-service buffet restaurants are a type of foodservice found all over the world.[20] In Brazil, there are two main forms of pricing, namely all-you-can-eat and pay-by-weight. In pay-by-weight buffets, diners serve themselves at the buffet, weigh their plate on a scale, and pay according to the price per kilogram of food.[20] In all-you-can-eat buffets, diners pay a fixed price and can eat as much as they desire.[21] A Brazilian study[22] conducted in a self-service buffet restaurant examined diners' choices of rice and beans (a culturally important lunch combination in the country),[23] colorful salads, and portion sizes. The authors concluded that self-service buffet restaurants are conducive to healthy food choices.[22] Researchers examined food choices at two different types of restaurants (fixed-price buffet and à la carte) and found that diners consumed more fruits and vegetables at buffet restaurants.[24] The diversity of dishes available in buffet restaurants and the possibility of choosing portion sizes are potential contributors to healthier food choices.[22] Another study also attributed such choices to the greater autonomy provided by buffet establishments with respect to food variety and portion size as compared to à la carte restaurants.[25]

As can be seen from these investigations, most studies available on the literature have focused on examining food choices made by diners at self-service buffet restaurants. However, there is a lack of studies performing a comprehensive assessment of culinary preparations offered in self-service buffet restaurants. In view of the foregoing, this study aimed to characterize culinary preparations served in Brazilian self-service buffet restaurants, focusing on the elements of menu planning and food display that promote healthier food choices.

METHODS

This is an observational, cross-sectional, and descriptive study conducted in a capital city in southern Brazil. Data were collected by direct observation using a collection form and by interviews with employees of the analyzed restaurants. The information about the characterization of the restaurants was the sole data requested from the staff during the interviews. The study population consisted of all commercial restaurants operating as self-service buffets with multiple units in the study city and offering lunch service. Restaurant chains were identified through a search on the websites of the Brazilian Association of Bars and Restaurants (ABRASEL), the State Health Surveillance Agency, the State Department of Tourism, and the City Hall. A search

was also performed on Google Maps. The sampling method was non-probabilistic convenience sampling. The sample included one unit from each restaurant chain that met the inclusion criteria and agreed to participate in the research.

Data were collected by the main researcher from August to November 2019. Observations were made in one day per restaurant between 10 a.m. and 2 p.m. During this period, it was possible to perform direct observations of culinary preparations displayed on the buffet and collect information from employees before the beginning or after the end of the lunch service). All data were recorded on a structured form. For sample characterization, information was collected on the type of service, number and characteristics of diners, number of employees and their shifts, presence of a nutritionist as technical manager, frequency of menu planning, and employees responsible for menu planning, food purchase, quality assurance, and layout planning. For characterization of culinary preparations, information was collected on the number of items offered on the buffet, their groups, and characteristics.

The data collection form was developed and improved in a consensus workshop with five researchers specialized in nutrition in food service. Previously, there was no existing instrument for evaluation, and the development of this prototype represents a potential aspect of the study. However, no validity or reproducibility studies were conducted prior to its application in the restaurants. The instrument contained two sections. The first referred to characteristics of the restaurant, such as the set of displayed culinary preparations and characteristics of the food display site. The second referred to the characteristics of the culinary preparations available in the buffet, which was the focus of this study. The second section was based on the instrument previously developed[26] and adapted.[27] The following information about culinary preparations was obtained: number of dishes, order in which they are presented on the buffet, preparation technique, and main ingredients. Preparations were classified into 58 items divided into groups, subgroups, and characteristics, using the first section of the instrument, shown in Table 1. During data collection, the columns for 'order' and 'number' were filled in, referring to the order in which the preparation groups were arranged on the buffet and the quantity of each type of preparation offered. The columns for 'group', 'subgroup', and 'description' are used to characterize the preparations and facilitate their identification on the buffet.

Table 1. Data collection form for assessment of the characteristics of culinary preparations served in buffet restaurants. Florianópolis, Santa Catarina, Brazil, 2019.

Order	Group	Subgroup	Description	Number
	Salads	Raw	Leafy vegetables	
			Non-leafy vegetables	
			Fruits	
		Boiled or steamed		
		Compound or mixed	With mayonnaise	
			With natural yogurt	
			Without mayonnaise/yogurt	
	Salad dressings	Mayonnaise-based		
		Yogurt-based		
		Vinaigrette		
	Cold side dishes[a]	Potato, pasta, and cold pies	With mayonnaise	
			Without mayonnaise	
		Cereals and legumes		
		Protein-based sides and sausages		
		Pickled foods		
		Sushi	With fish	
			Without fish	
	Hot side dishes	Legumes, vegetables, and fruits	Boiled, sautéed, baked	
			Soufflés, grilled, legumes with animal protein	
			Sweets	
			Soups and cream soups	
		Potato, cassava, and corn (does not include fried preparations)		
		Rice	With meat, white sauce, and/or cheese	
			Without meat	
		Beans	With meat	
			Without meat	
		Pastries and fried preparations	Fried	
			Breaded or battered	
		Protein-based sides		
		Pies and tarts		
		Pasta		

Table 1. Data collection form for assessment of the characteristics of culinary preparations served in buffet restaurants. Florianópolis, Santa Catarina, Brazil, 2019.(Continues)

Order	Group	Subgroup	Description	Number
	Protein sources	Fatty meats[b] or meats prepared in large amounts of fat	Without sauces or gravy	
			With sauces or gravy	
		Other meats	Without sauces or gravy	
			With sauces or gravy	
		Deep-fried preparations		
		Seafood		
		Eggs, omelet, and cheese		
		Plant-based preparations		
	Desserts	Sweets[c]		
		Fresh fruits		

[a] Cold side dishes include cold preparations containing beans, pasta, bread, processed meat, and starchy vegetables (potato, corn, and cassava).[26]

[b] Fatty meats include meats containing ingredients high in fat, sodium, and sugar, such as sausages and other processed meats.[26,77]

[c] All sugar-added desserts were classified as sweets.

Sample characterization was performed using descriptive statistics (absolute and relative frequencies). Culinary preparations were characterized using measures of central tendency. Analyses were carried out using Microsoft Excel software.

The research was not submitted to the Ethics Committee for Research Involving Human Beings, as no potential risks or discomforts were identified in responding to questions solely about the number of diners served per day and if the restaurants had technical preparation forms (TPF) for culinary preparations. Before the data collection began, a letter was presented to the staff member who received the researcher, explaining the motivations for conducting the study, the steps that would be followed, as well as the option to decline participation in the research.

RESULTS

Sample characterization

Of the 17 restaurant chains identified in the studied city, 11 agreed to participate in this research. The characteristics of the foodservice establishments are described in Table 2. The mean number of diners served daily was 306, with a minimum of 150 and a maximum of 550. The mean number of employees per unit (kitchen and lounge) was 14, with a minimum of 6 and a maximum of 35.

Table 2. Description of the sample of commercial buffet restaurants in Florianópolis, Santa Catarina, Brazil, 2019.

Item	*n* (%)
Total number of restaurants	11 (100%)
Information availability	
Menu on display for customers	8 (73%)
Culinary preparations with specifications/differentiated for intolerances or allergies	4 (36%)
Preparations with technical preparation sheet (minimum 1)	7 (64%)
Identification plate (name) for buffet preparations (minimum 1)	9 (82%)
Description of the ingredients of buffet preparations (minimum 1)	3 (27%)
Buffet characteristics	
Sneeze guards on thermal buffet station	11 (100%)
All preparations are served on the thermal buffet station	8 (73%)
Dedicated space for identification and nutrition information plates on the thermal buffet station	9 (82%)
The buffet layout allows for easy viewing of food preparations	9 (82%)
Layout	
Linear	10 (91%)
L-shaped	1 (9%)
The same preparations are available on both sides of the buffet	3 (27%)
Dedicated island for grilled/barbecued foods	5 (45%)
Desserts available on the buffet	5 (45%)
Beverages arranged next to the buffet	2 (18%)

The majority (n = 7) of restaurants had TPF for some culinary preparations, but no establishment had TPFs for all preparations. The standardization of culinary preparations through the use of TPFs is recommended as a management tool for restaurants. TPFs contribute not only to the assessment of costs and yields but also to the control of nutritional quality in each production cycle.[28]

Characterization of culinary preparations

In 11 restaurants, culinary preparations were served in the following order: salads, cold side dishes, hot side dishes, protein sources, and desserts. In only one restaurant, cold side dishes were laid out on the buffet before salads. Data on culinary preparations are shown in Table 3.

Table 3. Culinary preparations served by commercial buffet restaurants in Florianópolis, Santa Catarina, Brazil, 2019.

Culinary preparation	Minimum (CL)	Maximum (CL)	Mean (CL)	SD (CL)
Salads	8	21	13.9	1.8
Raw	3	13	8.3	1.6
Leafy vegetables	2	6	3.4	1.3
Non-leafy vegetables	0	6	2.6	1.7
Fruits	1	5	2.3	1.5
Boiled or steamed	0	7	3.4	1.7
Compound or mixed	0	5	2.2	1
With mayonnaise	0	4	1.4	1.1
With natural yogurt	0	2	0.5	0.7
Without mayonnaise/yogurt	0	2	0.2	0.6
Salad dressings	0	3	1	0.5
Mayonnaise-based	0	1	0.2	0.4
Yogurt-based	0	1	0.2	0.4
Vinaigrette	0	1	0.6	0.5
Cold side dishes	1	8	4.5	0.7
Potato, pasta, and cold pies	0	3	1.5	0.7
With mayonnaise	0	2	1.2	0.7
Without mayonnaise	0	1	0.5	0.5
Cereals and legumes	1	2	1.2	0.4
Protein-based sides and sausages	0	2	0.4	0.7
Pickled foods	0	2	0.5	0.8
Sushi	0	5	0.6	0.8
With fish	0	2	0.4	0.7
Without fish	0	3	0.3	0.9
Hot side dishes	10	18	14	1
Legumes, vegetables, and fruits	2	6	3.3	1.1
Boiled, sautéed, baked	0	5	1.7	1.5
Soufflés, grilled, legumes with animal protein	0	3	1.2	0.9
Sweets	0	1	0.2	0.4
Soups and cream soups	0	1	0.2	0.4
Potato, cassava, and corn (excluding fried preparations)	0	2	1.3	0.6
Rice	2	3	2.4	1.1
With meat, white sauce, and/or cheese	0	1	0.2	0.4
Without meat, white sauce, and/or cheese	2	3	2.3	0.5
Beans	1	3	1.7	0.6
With meat	0	2	0.6	0.7
Without meat	1	2	1	0.3
Pastries and fried preparations	0	4	1.9	0.9
Fried	0	3	1.2	1
Breaded or battered	0	2	0.7	0.7
Protein-based sides	0	4	0.7	1.3
Pies and tarts	0	5	1.2	1.5
Pasta	1	3	1.4	0.7

Table 3. Culinary preparations served by commercial buffet restaurants in Florianópolis, Santa Catarina, Brazil, 2019.(continues).

Culinary preparation	Minimum (CL)	Maximum (CL)	Mean (CL)	SD (CL)
Protein sources	4	13	7.3	0.8
Other meats	1	4	2.5	0.8
Without sauces or gravy	0	2	1.3	0.6
With sauces or gravy	0	3	1.3	0.9
Fatty meats or meats prepared in large amounts of fat	0	6	2.8	0.9
Without sauces or gravy	0	2	1	0.8
With sauces or gravy	0	3	1	1
Deep-fried preparations	0	2	0.8	0.7
Seafood	0	1	0.9	0.3
Eggs, omelet, and cheese	0	3	0.9	0.6
Plant-based preparations	0	1	0	0.3
Desserts	0	11	3.9	2.6
Sweets	0	10	3.4	3
Fresh fruits	0	1	0.4	0.5

SD, standard deviation. CL, culinary preparations.

Salads (raw, boiled/steamed, and compound/mixed) were the culinary preparations with the greatest quantity of dishes, as shown in Table 3. The second most frequent dishes were desserts (sweets or fresh fruits). The maximum number of fresh fruit dishes was 1 and that of sweets was 10. In some restaurants, desserts were portioned and charged separately, whereas, in others, desserts were included in the value of the meal or portioned by diners. Only one restaurant did not serve desserts but offered packaged sweets for sale at the checkout.

All restaurants offered salad dressings and seasonings, such as olive oil, vinegar, and industrialized sauces. All restaurants offered at least two culinary preparations with non-starchy vegetables. Fried foods were offered as hot side dishes in 10 restaurants, and all restaurants offered rice and beans without meat. There were more options of fatty meats or meats prepared in large amounts of added fat than low-fat meats and meat dishes.

Of the 11 restaurants, one did not serve dishes based on fish or seafood and the others (n = 10) served only one option.

DISCUSSION

Buffet restaurants have the possibility of changing the order of presentation of dishes, giving preference to the healthiest preparations, such as fruits and vegetables.[29] Although food choice is a multi-faceted process,[30-33] the order of arrangement of culinary preparations on a buffet can interfere with this process.[19] In a systematic review with meta-analysis, researchers found that nudging increased the choice of fruits and vegetables (culinary preparations were placed at the beginning of the buffet).[19] Thus, diners attending the studied restaurants might be inclined to choose more salad options, as these dishes are usually placed in a prominent position at the beginning of the buffet.

All restaurants offered at least two culinary preparations with non-starchy vegetables. Such preparations may provide health benefits to diners. Meta-analyses of prospective studies reported an inverse association

between the consumption of fruits, vegetables, whole grains, and oilseeds and the risk of cancer, cardiovascular diseases, and all-cause mortality.[34,35] A literature review, found that most young adults consume fewer vegetables than recommended by the World Health Organization (WHO).[36] Thus, offering salads and hot side dishes based on non-starchy vegetables may increase the likelihood that diners will choose these foods.[37]

The offer of sweets as desserts in commercial restaurants may contribute to exceeding the maximum intake limit of free sugars recommended by WHO, which is 10% of the total energy value.[38] Consumption of free sugars might be associated with increased triglycerides, total cholesterol, blood pressure, and risk markers for the development of cardiovascular diseases.[39-41] Offering fruit as a dessert is an alternative to reduce the consumption of added sugars. The availability of fried foods and sweet culinary preparations as dessert might be related to their greater ease of preparation and short preparation time, in addition to low cost.[42]

Industrialized dressings were classified as ultra-processed, according to the NOVA classification.[43] Consumption of ultra-processed foods has been linked to a higher risk of developing diabetes mellitus,[44] overweight, obesity, high blood pressure, and metabolic syndrome.[45] Studies analyzing the labels of salad dressings, as the ones offered by the restaurants, concluded that more than half of the products contained trans fats,[46] large amounts of sodium,[47] and added sugars.[48] The consumption of trans fats, sodium, and sugar is a risk factor for the development of several chronic non-communicable diseases,[49-54] such as obesity,[51,53-58] metabolic syndrome,[56] arterial hypertension,[56,59] cardiovascular diseases,[56,59] type 2 diabetes mellitus,[56,60] and all-cause mortality.[53,54,57,61] Such effects may be due to the large amounts of sugar[62-64] and sodium[63-65] in salad dressings. Industrialized dressings could be replaced by dressings prepared on site using raw or minimally processed ingredients, natural seasonings, and small amounts of salt.

Regarding the dishes with fish and seafood and considering that the study was conducted in a Brazilian capital located on an island, it was expected that restaurants would have more options of culinary preparations based on fish and seafood. Nevertheless, the average consumption of fresh fish in Southern Brazil was 7.4 g/day in 2018, representing a small proportion (1.1%) of the total energy intake of the population.[66]

All restaurants offered rice and beans without meat, a plant-based combination that provides all essential amino acids[67] and is part of the traditional Brazilian diet.[68] Rice and bean consumption is inversely associated with overweight and obesity[69,70] and other markers of cardiovascular risk.[71-73]. Although rice and beans are one of the bases of the Brazilian diet,[23] their consumption has decreased in recent years. In the past 15 years, the mean annual per capita consumption of beans fell from 12.4 kg[74] to 5.9 kg;[66] rice consumption fell from 31.6 kg[74] to 19.8 kg[66] per year. Therefore, the daily supply of rice and beans in buffet restaurants may increase the possibility of their consumption by diners. Other than rice and beans, there were few or no plant-based protein options, despite the current increase in the consumption of vegetarian meals among vegetarian and non-vegetarian populations in Brazil and worldwide.[75,76]

A Brazilian study[22] also conducted in a self-service buffet restaurant examined diners' choices, colorful salads and portion sizes, and concluded that self-services buffet restaurants are conducive to healthy food choices. The diversity of dishes available in buffet restaurants and the possibility of choosing portion sizes are potential contributors to healthier food choices.[22] Another study also attributed such healthier choices to the greater autonomy provided by buffet establishments with respect to food variety and portion size as compared to à la carte restaurants.[25]

A limitation of this study is its regionality. The research was conducted with restaurant chains located in the capital of a southern Brazilian state. If conducted in other states, the study might have found different results. Another limitation of the present study is the use of an unvalidated form for data collection, which was

specifically developed for the purpose of this study. The convenience sample is a limitation of the study. The restaurants included in the study may not be representative of all restaurants across the Southern region of Brazil. However, it is important to note that all identified restaurants were approached to participate in the research. Furthermore, cross-sectional analysis was performed on the basis of culinary preparations available on a single weekday, not the full weekly menu. This analysis does not allow the complete evaluation of culinary preparations planned and offered habitually in restaurants. A direct observation of the food preparation methods was not carried out, which could have provided more insight into the culinary preparations available in restaurants. However, the objective of the collection instrument was to characterize culinary preparations displayed on the buffet, as made available to diners. The findings may contribute to identifying possibilities for improvements and assist in the selection of commercial restaurants for future interventions with this purpose.

Although most establishments displayed menus and minimally identified the preparations, opportunities for improvement were observed. For example, more detailed information about preparations should be provided, including a list of ingredients. The strategic placement of salads at the beginning of the buffet may be an incentive for healthier food choices by diners.

CONCLUSION

Restaurants offered some healthy culinary preparations on a daily basis, such as leafy greens, rice, and beans. Salads constituted the category with the greatest number of items offered and were positioned at the beginning of the buffet in nearly all of the restaurants analyzed. However, there was a greater supply of sweets than fresh fruits as dessert and few options of fish and seafood compared with other animal protein sources. Furthermore, the restaurants generally provided only a simple identification of the dishes, with a brief name, without listing ingredients or other forms of menu labeling.

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Contributors

Volpato L is responsible for developing the instrument, conducting the pilot test, analyzing the data and writing the manuscript; Fernandes AC was responsible for planning the research, developing and coordinating the study; Proença RPC and de Oliveira RC assisted in planning the research and developing the methodology; Bernardo GL was responsible for co-supervision. Fogolari N, Uggioni PL and all other authors assisted in interpreting, analyzing, and discussing the data, as well as writing and revising the final manuscript.

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