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Nutritional quality of menus planned for university restaurants in Brazilian federal universities

Qualidade nutricional de cardápios planejados para restaurantes universitários de universidades federais do Brasil

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Abstract

Objective: To evaluate the nutritional quality of menus planned for university restaurants of Federal Universities in Brazil. *Material and Methods*: Cross-sectional quantitative study, which a sample consisting of 22 university restaurant menus, divided into their respective regions, planned for the lunch meals during March 2015. For the analysis, we used the method Qualitative Evaluation of Menu Components – QEMC, the *Food Guide for the Brazilian Population*, and the publication of the Ministry of Health on *Brazilian Regional Food*. *Results and Discussion*: Through the QEMC, leaf vegetables, fatty meat and preserves were adequate in the five regions. On the other hand, color monotony and foods rich in sulfur had inadequate percentages, prompting an alert, since colorful menus become more visually appealing and consumption of sulfur-rich meals may cause abdominal discomfort. The offer of a vegetarian protein dish in the South and Southeast regions occurred in 50% and 88% of the analyzed menus, respectively. Regarding the presence of brown rice, 83% of the menus in the South region and 78% of the menus in the Southeast region planned the offer. It is worth mentioning that the planning of the two items was less frequent or not offered by the Central-West, North and Northeast regions. Most restaurants offers ultra-processed sweets, such as puddings, jellies and candy bars. Concerning the presence of regional fruits, the regions varied a little in their offer. *Conclusion*: Each region should adapt the planned menus for university restaurants in different aspects, being essential to consider nutritional and sensory issues to elaborate them.

Keywords: Food Services. Universities. Food Guide. Health Promotion. Menu Planning.

Resumo

Objetivo: Avaliar a qualidade nutricional de cardápios planejados para os restaurantes universitários das Universidades Federais no Brasil. *Material e Métodos*: Estudo transversal quantitativo, com cardápios de 22 restaurantes universitários, divididos em suas respectivas regiões, e planejados para o almoço do mês de março de 2015. Para a análise, utilizou-se o método da Avaliação Qualitativa das Preparações do Cardápio – AQPC, o *Guia Alimentar para a População Brasileira*, e a publicação do Ministério da Saúde sobre *Alimentos Regionais Brasileiros*. *Resultados e Discussão*: Pelo AQPC, a presença de folhosos, carne gordurosa e conservas apresentaram-se adequadas nas cinco regiões. Já a monotonia das cores e alimentos ricos em enxofre tiveram percentuais inadequados, despertando um alerta, pois cardápios coloridos tornam-se mais atraentes visualmente e o consumo de refeições ricas em enxofre pode causar desconforto abdominal. A oferta de prato proteico vegetariano nas regiões Sul e Sudeste ocorreu em 50% e 88% dos cardápios analisados, respectivamente. E quanto à presença de arroz integral, 83% dos cardápios da região Sul e 78% dos cardápios da região Sudeste planejaram a oferta. Vale ressaltar que o planejamento dos dois itens foi menos frequente ou não ofertado pelas regiões Centro-oeste, Norte e Nordeste. A maior parte dos restaurantes disponibiliza doces ultraprocessados, como pudins, gelatinas e doces em barra. Quanto à presença de frutas regionais, as regiões variaram pouco em sua oferta. *Conclusão*: Cada região deve adequar os cardápios planejados para os restaurantes universitários em diferentes aspectos, sendo essencial considerar questões nutricionais e sensoriais ao elaborá-los.

Palavras-chave: Serviços de Alimentação. Universidades. Promoção da Saúde. Guias Alimentares. Planejamento de Cardápio.

Introduction

Eating is encompassed in a wide variety of meanings, since it includes biological, psychological, social, cultural, economic, and religious issues that constitute an individual's life.[1]

In the last decades, the change in lifestyle and food consumption patterns is related to the increase in the incidence of Chronic Non-communicable Diseases (CNCD), such as obesity, diabetes, hypertension, among others.[2] These changes refer to the ingestion of foods with high energy density, saturated fat, refined carbohydrates, and low intake of fiber, fruits and vegetables.[3]

Due to the shorter availability of time to prepare and consume food, it is possible to observe that meals are more often taken outside the home environment.[4] Thus, Food and Nutrition Units (UAN) should aim to provide quality meals that are nutritionally appropriate, sensory, sanitary hygienic, and that meet the profile of their clients.[5] Brazil has a series of public policies that promote free or subsidized meals that encourage the provision of healthy meals in institutional spaces. Among them is the university restaurant policy, part of the National Student Assistance Plan.

In the 1950s, when the University of Brazil, in Rio de Janeiro, provided restaurants in some schools and colleges for staff and students, the first university restaurant was created.[6]

For most students, admission to university is marked by intense transformations. It is the time when they will have to take responsibility for housing, food, finance, and studies.[7] However, the difficulty of reconciling these tasks may influence the eating behavior, resulting in practices that in the future may pose health risks.[8]

The existence of the university restaurant may minimize the impact that the change from the family home entails and contribute to the maintenance of the health of the individual, with the offer of diverse and nutritious menus.[9]

It is known that the act of eating concerns the combination of olfactory, tactile, thermal and auditory sensations. Therefore, a meal adequate only in quantity and nutritional quality, disregarding the sensory aspects usually does not interest people in consuming it, once the individual ingests food and not nutrients.[10-13]

The offered meals allow the students the necessary physiological conditions to perform their activities. Hence, the university restaurant is considered an important space for the promotion of eating and nutrition education, since stimulating the adoption of healthy eating habits contributes to behavioral changes.[14]

Therefore, the objective of the study was to evaluate the nutritional quality of menus planned for university restaurants in Brazilian federal universities, in order that the results may subsidize the elaboration of intervention actions that aim at its improvement and, thus, the satisfaction of clients.

Material and Methods

This is a cross-sectional quantitative study, whose sample consists of menus planned for the university restaurants of 22 federal universities, which represent 44.89% of the institutions that have an installed restaurant in the country.

The menus were divided among the regions in which the university was located, namely: South (n=6), Southeast (n=9), Central-West (n=1), North (n=3) and Northeast (n=3).

The monthly menu of each university was evaluated, which was planned for the lunch meal of 22 working days, Monday to Friday, during March 2015. The analysis of the menu for a complete month occurred to control the random error of the dietary measure, which could be due to the presence of a day that is not characteristic of the planning pattern of the menu.

Data collection

For the sample selection, a preliminary online analysis of the number of federal universities in operation was carried out, and 57 institutions were identified, of which 49 had the university restaurant in operation.

After this moment, the first contact was made via e-mail with the restaurant managers in order to present the survey, request the March 2015 menu and the answer of five questions elaborated with the intention of identifying the profile of the restaurant.

These questions were related to the difference of menus among university campuses, the number of meals provided at lunch on each campus, the price of the meal (lunch), the professional responsible for the preparation of the menus, and the time of existence of the university restaurant on campus.

In addition, the Informed Consent Term (ICT) was sent to safeguard the rights of the participating institutions, which should be signed and sent to the researcher.

Upon receipt, the menus underwent an initial evaluation to verify possible lack of information that would be relevant during the analyses.

When the university did not respond to the first e-mail, two more contacts were made with sectors related to the university restaurant, such as the department of student affairs.

In this case, the sample was defined by convenience, only the institutions that responded in full to the requests made by e-mail would participate in the survey.

When the institution had different menus among the campuses, it was prioritized to collect the menu prepared for the restaurant of the university's headquarter campus.

Procedures for menu analysis

Qualitative Evaluation of Menu Components (QEMC)

The following criteria were evaluated through the method Qualitative Evaluation of Menu Components (QEMC) developed by Veiros,[15]: the presence of fresh fruits such as dessert, leaf vegetables, color monotony, foods rich in sulfur, fatty meat, fried foods, sweets, sweets and fries on the same day and preserves.

The menu presented monotony of colors when two preparations of similar color or only two-color repetition on the menu were present.[6,7] Rich in sulfur was considered when there were two or more preparations with one of the following foods: chard, celery, sweet potatoes, broccoli, Brussels sprouts, cauliflower, peas, lentils, turnip, eggs, radish, cabbage, garlic, onion, avocado, peanuts, nuts, ginger, guava, jackfruit, watermelon, apple, melon, grape, corn and mustard.[11,16]

The offer of fatty meat was evaluated on days when there was no fry as a meat preparation technique. Fatty meats are those in which the fat exceeds 50% of the total energy, such as flank, chunk, striploin, filet steak, ribs, flank steak, shoulder clod, neck, top sirloin cap, brisket, sausage, meat chop, hamburger and feijoada.[17,18]

It was analyzed the presence of fry alone and when associated with the offer of sweets, served as desserts, such as puddings, jellies, sago and ice cream.

The evaluation of each criterion was made by daily occurrence, then weekly, and last monthly, and the result was obtained in percentage, considering the total of 22 days. Then, a mean of the results obtained by region was made in each analyzed criterion.

The fruit and leaf vegetable offer was defined as positive aspect items, and from the percentage they were classified as follows: optimal, ≥ 90%; good, from 75% to 89%; regular, from 50% to 74%; bad, from 25% to 49%; terrible, <25%. On the other hand, the preparations with foods rich in sulfur, fatty meat, color monotony, fry, sweet, sweet and fried food on the same day and preserves were defined as items of negative aspects, and from the percentage they were classified as: optimal, ≤ 10%; good, from 11% to 25%; regular, from 26% to 50%; bad, from 51% to 75%; and terrible,> 75%. Criteria used by Prado, Nicoletti & Faria.[19]

Evaluation by the *Food Guide for the Brazilian Population*

The second edition of the *Food Guide for the Brazilian Population*[13] recommends, for a healthy diet, to compose meals with fresh or minimally processed foods and predominantly with food of plant origin; to limit the use of processed foods; and to avoid ultra-processed foods due to their high sodium and sugar content. Therefore, the presence of brown rice, vegetarian protein dish and the type of sweets planned in the desserts were verified in the menus.

For the analysis of the presence of brown rice and vegetarian protein dish, the percentage was calculated considering the number of restaurants that plan this component in the menu in relation to the total number of restaurants in each region. On the other hand, on the analysis for the type of sweets in the desserts, a survey of the number of restaurants that plan these preparations as dessert was performed. The distribution was then calculated in percentage according to the degree of processing (ultra-processed sweets, fruit-based sweets and fruit-based and ultra-processed sweets).

Evaluation by the presence of Brazilian regional foods

It was observed by the book *Brazilian Regional Foods* (*Alimentos Regionais Brasileiros)*, elaborated by the Ministério da Saúde (Ministry of Health),[20] the regional fruits planned for *in natura* offer as dessert in the menus of all the restaurants in their respective regions.

This reference brings as typical fruits of the South region the blackberry, banana, feijoa, fig, apple, strawberry, nectarine, peach, pine nut, mandarin and grape.

For the menus of the Southeast region, it was possible to observe the presence of avocado, brejaúva, persimmon, starfruit, guava, jabuticaba, jackfruit, jambolan, orange, mango, sugar-apple, sapucaia and sapoti.

In the Central-West region, pineapple, araticum, baru, cagaita, cashew, coco-babão, coco-cabeçudo, coco-indaiá, coroa-de-frade, curriola, guabiroba, abiu, jaracatiá, jatobá, jenipapo, wolf apple, macaúba, mama-cadela, passion fruit, marmelada-de-cachorro, pequi, pear, pitanga, and xixá were observed.

The typical fruits observed in the North region are: apricot, abiu, açaí, araçá, bacaba, bacuri, banana-pacova, biribá, buriti, cajarana, camu camu, Brazil nut, cocona, cupuaçu, cupuí, cutite, guarana, inajá, inga, jambo, mangaba, changunga, pequi, sumário, pupunha, sapota-do-solimões, sorva, taperebá, tucumã, umari and uxi.

The regional fruits of the Northeast are: acerola, banana-nanica, cooking banana, cacao, cajá, cajarana, jocote, coconut, dendê, breadfruit, soursop, juá, papaya, passion fruit, pitomba, sapoti, tamarind and umbu.

It is worth mentioning that the offer of these fruits by university restaurants depends on issues that permeate seasonality, cost, as well as its applicability in a UAN. The analysis was made considering all the menus of each region in relation to the days in which the typical fruit planning was carried out.

Statistical analysis

The data were tabulated by the Microsoft Excel® 2010 software, and for the statistical analysis, descriptive measures and frequency tables were used.

In order to compare the regions with the criteria of the QEMC method, the variance model with a fixed factor was used, and in this stage of the analysis the Central-West region was not considered, since it had only one sample unit contemplated.

Fisher's exact test was used to compare the regions for the *Food Guide*[21,22] recommendations. The level of significance considered for the analyses was 0.05.

Ethical aspects

The project was submitted to the Comitê de Ética em Pesquisa com Seres Humanos (Human Research Ethics Committee) of the Universidade Federal de São Paulo (Federal University of São Paulo) and approved under No. 859,348, on November 4, 2014.

Results and Discussion

Qualitative Evaluation of Menu Components (QEMC)

Table 1 shows the mean of the percentages and the standard deviation (SD) obtained in the QEMC method criteria, according to the sample of each region.

Table 1. Descriptive measures for the criteria of the method Qualitative Evaluation of Menu Components - QEMC, according to the regions. Brazil, 2015.

	Region									
	South		Southeast		Central-West		North		Northeast	
Criteria	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Fruits	65.15	31.45	77.78	33.05	100.0	-	50.0	12.03	81.82	27.65
Leaf vegetables	91.67	14.2	87.88	14.55	100.0	-	96.97	2.63	75.76	18.92
Color monotony	46.21	12.99	49.5	19.87	54.55	-	56.06	56.06	53.03	5.25
Rich in sulfur	34.09	14.87	42.93	15.1	63.64	-	34.85	18.92	63.64	15.75
Fatty meat	15.91	10.66	19.7	18.3	22.73	-	18.18	47.44	16.67	13.1
Sweets	36.37	29.6	35.86	38.9	0.0	-	50.0	1.,0	83.33	28.9
Fries	19.7	10.6	19.19	21.1	50.0	-	19.7	6.94	25.76	6.94
Sweets and fries	14.4	12.67	15.66	29.56	0.0	-	19.7	9.46	30.3	6.94
Preserves	4.55	4.98	15.66	10.69	9.09	-	9.09		15.15	5.45

The regions with the highest mean of fruit offer in the menus were the Southeast (77.78%), the Central-West (100%) and the Northeast (81.82%). The South (65.15%) and North (50.00%) regions have means classified as regular. The presence of leaf vegetables in the salads, in turn, was adequate for all regions, and the standard deviation of the Northeast region (18.92) suggests that there was a great variation of offer in the respective sample.

Offering fruits and vegetables daily in the menus is essential for the composition of a balanced diet, since they are food sources of vitamins, minerals, antioxidants and fibers, associated with several beneficial effects to health.[23-25]

The diet of 120 university students with an average age of 22 years in the municipality of São Paulo was evaluated by the Food Frequency Questionnaire (FFQ) and it was observed that less than half of the students (44.16%) consumed fruits less than five days a week, reinforcing the importance of the offer of these foods in the place of study.[26]

Cattafesta et al. conducted a survey of 208 federal public university students and showed that lunch in the university restaurant was the main meal of the day for 76% of students, and 86.1% reported using the university restaurant at least three times a week.[27] This datum suggests that the meals provided in these establishments have the potential to promote health and the formation of eating habits, since daily contact with fruits, vegetables and legumes encourages their consumption.

In relation to the criterion monotony of colors, it was possible to observe that there were no good percentages for any region, being white with light yellow the prevalent color, e.g., planning in the same menu boiled egg as protein dish, sautéed potatoes as side dish, melon as dessert and lemon juice to drink. The study performed at a UAN in Belo Horizonte, Minas Gerais, had similar results for the item, 69% of days with monotonous colored menus.[28]

The diversity of colors contributes to the visual presentation of the menu, which interferes with food choices and satisfaction of the diners. In addition, a colored dish indicates a greater variety of vitamins.[29]

Another criterion evaluated by the QEMC was the presence of foods rich in sulfur, except beans, because it is a typical Brazilian food. It was possible to observe that the five regions did not present adequate offer means, with emphasis on the Central-West and Northeast, which were classified as bad, 63.64%. It was also observed that foods with sulfur were mainly used in salads, and the most common were chard and cabbage, probably due to the lower correction factor and, consequently, better yield and cost.[30]

A study conducted in the municipality of São Paulo evaluated the lunch offered by a non-governmental organization for cancer patients and identified that 43% of the days offered foods rich in sulfur, and the excessive consumption in the same meal may cause abdominal discomfort and production of flatus.[5,17]

It is worth emphasizing the need for attention during the preparation of menus regarding the monotony of colors and excess of sulphurous compounds, since, for most university students, the lunch offered by the university restaurant is their main meal of the day.

The planning of fatty meat indicated good percentages of adequacy for all regions, with means of offer being less than 25% of the evaluated days.

Studies carried out in institutional UANs, in order to evaluate the presence of fatty meat, found percentages higher than the present analysis, 37.5%, 52.4% and 70.58% of the evaluated days, respectively.[1,28,31] Another analysis also carried out in this type of establishment observed the offer in only 7% of the period.[5]

The main fatty meats found on the menus were chunk, striploin, ribs, Tuscan sausage, Calabrian sausage, and preparations such as feijoadas and dobradinhas.

Although processed meats present practicality, low cost and good acceptance by the diners, studies show that consumption is associated with the risk of colorectal cancer, due to the presence of nitrous compounds.[32]

It has also been noted that some restaurants use ingredients such as cream, mayonnaise, bacon, ham, mozzarella cheese and potato sticks. Since their use increases the caloric value of preparations, it is important to evaluate the use and need of these ingredients for the recipe.

Regarding the presence of sweets as dessert, it is verified that only the Central-West region did not offer sweets during the study period, however, they offered fresh fruits. The Northeast region indicated the highest frequency of offer, with a mean of 83.33% on the evaluated days, however, it offered fresh fruits as an option to the students. The regions North (50%), South (36.37%), and Southeast (35.86%) presented average percentages classified as regular, and on these days did not offer fresh fruit as an option.

Two studies showed results similar to those obtained for the Northeast region, with the offer being 66.6% and 88.2% on the period, respectively.[3,31]

According to the *Food Guide for the Brazilian Population*,[13] oils, fats and sugar have high amounts of calories per gram, and sugar has five to ten times more calories per gram than most fruits.

The only analyzed menu in the Central-West region presented a high caloric content, since it was verified the use of fries by immersion in 50% of the days, as observed by other analyses whose percentages were 49.5% and 50.9%, respectively.[17,27] The other regions of the present study had indexes below 25%, which shows concern with the choice of cooking techniques.

Generally, fry is chosen by conferring pleasant sensory aspects and being quick, optimizing preparation time when any change is required. This cooking technique was used mainly in the protein dishes, when compared to the use in the side dishes, as observed in a similar study.[1]

In order to avoid the use of oil in the preparations, the restaurant may use methods of hot air cooking by means of combined ovens.[33] According to Araújo,[34] the use of fats in some methods is necessary, however, in most cases the use may be reduced or eliminated using only hot air.

The association of fried foods with sweets was adequate for the South (14.4%), Southeast (15.6%) and North (19.7%) regions. The Northeast region showed a higher frequency in 30.3% of the analyzed days, and the standard deviation of 6.94 suggests that there was little variation among the restaurants in the region.

As in our study, another study conducted at a UAN located in the city of Belo Horizonte, Minas Gerais, showed similarity to the obtained result, 35.7%.[28]

The last criterion evaluated was the presence of preserves in the menus, which showed excellent levels of suitability for all regions, inferior to 16%, being identified a greater presence of these foods in salads.

The descriptive study carried out at a UAN in the city of Vitória, Espirito Santo, observed that preserves were used in small quantities, however they were used in side dishes and protein dishes, with the purpose of decorating or finishing preparations.[31]

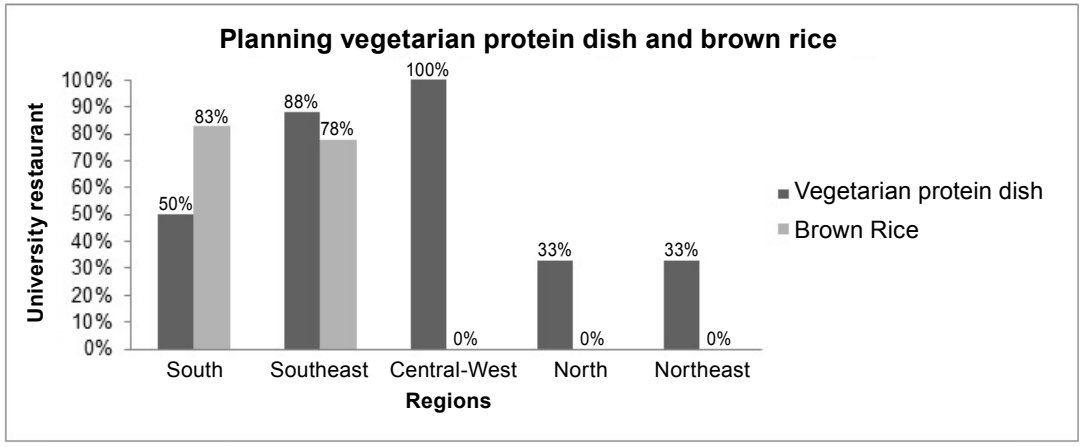
Limiting the consumption of processed foods, such as preserves, is necessary because of the large amount of sodium used to flavor and control the growth of microorganisms. Ingestion of excess sodium chloride increases blood pressure and the risk of heart disease.[13,35]

Among the criteria of the QEMC method, leaf vegetables, fatty meat and preserves were suitable for all regions, whereas color monotony and sulfur-rich foods had regular or inadequate means.

We may infer, in general, that the Southeast region was the most adequate by the method, however, there was no statistically significant difference among the regions ($p<0.05$).

Food Guide for the Brazilian Population

Regarding the planning of vegetarian protein dishes and brown rice, it was verified that 50%, 88% and 100% of the menus evaluated in the South, Southeast and Central-West regions, respectively, considered the item to be offered to students. In the North and Northeast regions, on average, 33% of the menus planned to offer this preparation. It is worth mentioning that in the Central-West region, the menu of only one university was evaluated. Through the statistical test, it is possible to infer that there was a significant difference for the offer of brown rice among the regions ($p=0.006$).



Fisher's exact test was used to compare the regions for the categorical variables, and the results allow to infer that there is a significant difference for the supply of brown rice, $p < 0.05$.

Figure 1. Planning vegetarian protein dish and brown rice at university restaurants, by region.

Foods of animal origin are considered good sources of protein, vitamins and minerals, however, they do not contain fibers and may still present a large amounts of calories because of saturated fats, which in excess favor the risk of obesity, cardiovascular diseases, among others. On the other hand, foods of plant origin are often sources of fiber, of various nutrients and are generally less caloric.[13]

A study that analyzed the cardiovascular risk of vegetarians and omnivores showed that blood pressure, fasting blood glucose, total cholesterol, LDL-cholesterol, and triglycerides were lower among vegetarians.[36]

Restrictive or unbalanced vegetarian diets may cause nutritional deficiencies, especially in situations of increased metabolic demand, however, when done in a balanced way, they bring health benefits.[37]

Regarding the presence of brown rice, it was found that 83% of the menus in the South region and 78% in the Southeast region offered daily this component in the analyzed period, whereas the Central-West, North and Northeast regions did not offer this food as an option to students.

Among the reasons that may justify the absence of this food in the menus are the cost, because it is higher when compared to polished rice, the food habit of the region and the lack of detail of meals in the public notice of the university restaurant for the outsourced company.

According to the *Food Guide*,[13] in some situations, minimal processing techniques, such as excessive polishing of grains, may reduce the amount of nutrients in foods. In these cases, less processed food, such as less refined wheat flour and brown rice, should be preferred.

By analyzing the types of sweets more common in desserts, it was found that from the total number of menus that offer this preparation (n=19), 79% (n=15) offer ultra-processed sweets such as puddings, jellies and candy bars, 16% (n=3) offer desserts prepared with fresh fruit and 5%, the equivalent of one university menu, interspersed between the offer of ultra-processed sweets and desserts made with fresh fruit.

It is known that the high consumption of ultra-processed products is related to a lower global quality of eating, in addition to being associated with overweight and the appearance of CNCD.[38]

The fact that universities opt for ultra-processed sweets instead of sweets made with fresh fruit may be related to factors such as cost, practicality, acceptance of university students, as well as storage and durability.[39]

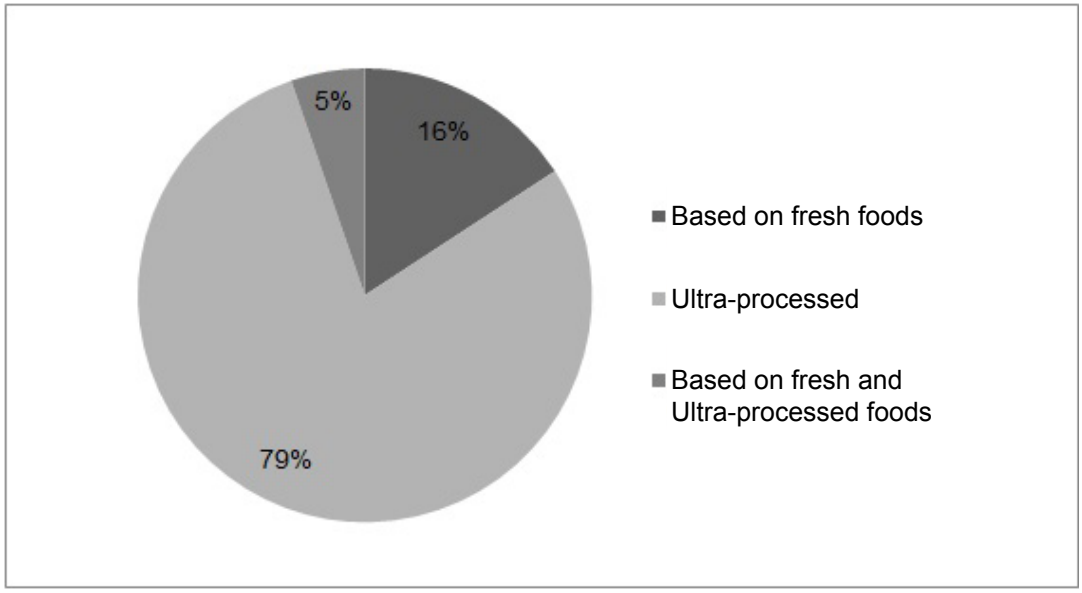


Figure 2. Distribution of the types of sweets planned on menus

A study carried out at the University of Brasília evaluated the food options available at 29 food sales points and found that the most frequent items were ready-to-drink beverages, soft drinks, chocolates, candies and chewing gum. Concerning the reasons reported for the sale of these products, the majority (n=19) reported that they were practical to prepare and sale, the demand of the students, the low cost, and that they are tasty and profitable products.[40]

Still based on the same study, it was observed that, although fresh vegetables were present in 62% (n=18) of the evaluated establishments, most of the time the offer was made in small portions that accompanied unhealthy options such as hamburgers.[40]

In the present study, it was noticed that only six menus offer fresh fruit as an option to the students when there is an offer of sweets in the desserts. A study carried out with university students showed a low frequency of daily food consumption, such as beans, vegetables and fruits, especially students who reported eating these foods in only one or two days a week. On the other hand, the results showed a greater recurrence for daily consumption of sweetened beverages (46.2%), tidbits (24.9%), and biscuits and/or chips (17.9%).[41]

Ultra-processed foods are industrial formulations whose ingredients make them rich in fats and/or sugars and have a high sodium content. In addition, these products are low in fiber, vitamins and minerals due to the absence or limited presence of fresh or minimally processed foods. Although each additive used during ultra-processing is tested and approved by health authorities, the long-term effects on health are unknown.[13]

The results obtained after the statistical analysis allow to affirm that the regions tend to differ with respect to the offer of brown rice ($p < 0.05$), however, the sample size is not sufficient for a desirable accuracy in the results.

Brazilian Regional Foods

The Brazilian cuisine incorporates the culture of different populations, such as indigenous, African, Portuguese, among others. Some foods are well known, such as cassava and guava, however, many have been forgotten over the years due to the urbanization process.[42]

Promoting healthy eating also means choosing foods related to the local culture, in order to stimulate the regional typical cuisine, thus contributing to the recovery of traditions.[20]

Eating is a symbol of identity for man, and in addition to referring to eating habits and behaviors, it serves to nourish the body and to demonstrate social belonging.[43] In this sense, food heritage involves multiple aspects, and the present study has evaluated only one of them, which is the typical fruit offer of the region, in view of the importance of valuing regional foods and contributing to local development.

The observation of the planning of regional fruits as desserts in the menus allowed to infer that the regions varied little in their offer. Furthermore, although some issues make the offer by restaurants unfeasible, such as the difficulty of composing the menu of a UAN with a large numbers of diners, practicality, cost and seasonality, this fact draws attention due to the richness and versatility that each region has regarding food production.

The menus of the North region, e.g., did not present typical fruits as dessert during the analyzed period. In the South region, banana, apple and peach were planned for the menus. Concerning the presence of typical fresh fruits in the menus of the Southeast region, there was orange, guava and mango, and oranges were more used in the menus when compared to the other fruits.

As regional fruits of the Northeast, we observed only banana-nanica and papaya in the university menus. The Central-West region, because it contained only one sample unit, was not analyzed for the criterion.

It is noteworthy that the present study analyzed the menu planned for university restaurants and not the real offer of the preparations in each of them.

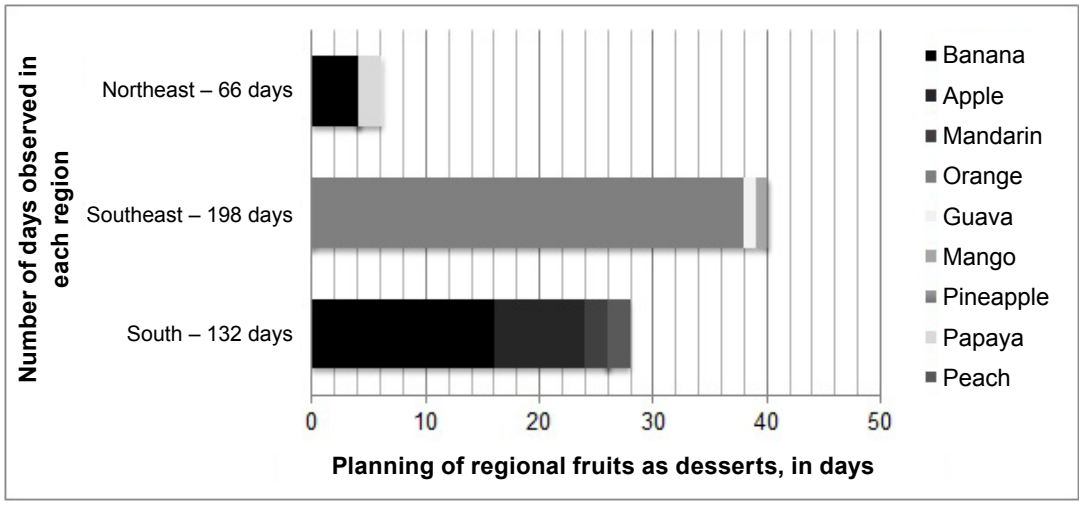


Figure 3. Planning of regional fruits on menus according to the number of days observed in each region.

Conclusion

Although the offer of leaf vegetables, fatty meat and preserves proved to be adequate, the menus had regular or inadequate means in different aspects, especially regarding the offer of foods rich in sulfur and color monotony.

Concerning the offer of vegetarian protein dish and brown rice, the Central-West, North and Northeast regions presented a low offer of these components in the menus when compared to the other regions.

It is necessary to reduce the offer of ultra-processed sweets, trying to value the regional fresh fruit in the desserts, in order to encourage local production, as well as the offer of essential items to the menu.

In addition, during the preparation of the menus it is important to consider nutritional and sensory aspects, prioritizing fresh and minimally processed foods, since the meals offered to students are vehicles to promote adequate and healthy eating.

Contributors

Benvindo JLS participated in the study design; carried out the collection, analysis and interpretation of the data; wrote the article and its final version. Pinto AMS guided all stages of the study, from its conception to the revision of the final version of the article. Bandoni DH guided the writing and review of the article version.

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