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Estimates about food patterns observed in Nutrition students of a state university in Rio de Janeiro, Brazil

Estimativa do padrão alimentar de estudantes de Nutrição de uma universidade estadual do Rio de Janeiro, Brasil

Abstract

Objective: Verifying the dietary pattern of a specific group of Nutrition students according to recommendations to healthy eating. ***Methods:*** Documentary analysis applied to food records of Nutrition students from 1994 to 2009. Data were collected and subjected to Shapiro-Wilk test to estimate energy contribution. Tables of nutritional composition and food labels were used to determine energy value. Food/beverages were classified in descending order based on 75th, 50th and 25th percentiles. Food pattern was supported by NOVA's classification. ***Results:*** In total, 1342 food records of 671 students, who declared 240 food/beverages, were used in the experiment. Most food portions did not present Gaussian behavior. Median represented the amount of food consumed by the partcipants. Food pattern was described through food/beverage estimates according to energy contribution rate (≥ P75, 0.0588%), which showed 62 food products. ***Conclusion:*** Food intake was represented by *in natura* and minimally processed foods. There was lack of vegetables

consumption, and it opened room for the consumption of processed and ultra-processed foods.

Keywords: Food consumption. Healthy diet. Energy intake.

Resumo

Objetivo: verificar o padrão alimentar de um grupo específico de acadêmicas de Nutrição pautado nos pressupostos de uma alimentação saudável. ***Métodos:*** Análise documental utilizando registros alimentares de acadêmicos de Nutrição, período 1994-2009. Mineração dos dados e aplicação do método para estimativa da contribuição energética. A normalidade foi testada por Shapiro-Wilk. A determinação do valor energético foi realizada utilizando tabelas de composição nutricional e rotulagem de alimentos. Classificação dos alimentos/bebidas foi determinada em ordem decrescente nos percentis 75, 50 e 25. O padrão alimentar foi sustentado pela classificação da NOVA. ***Resultados:*** Participaram 671 acadêmicas, totalizando 1.342 registros, tendo sido declarados 240 alimentos/bebidas. A maioria das porções alimentares não apresentou comportamento gaussiano. A mediana representou a quantidade consumida. Padrão alimentar desenhado com alimentos/bebidas estimados por contribuição energética percentual (P 75, 0,0588%), captando-se 62 no total. ***Conclusão:*** O consumo alimentar das acadêmicas de Nutrição está centrado em alimentos ***in natura***/minimamente processados, à exceção da ausência de hortaliças, sem deixar de abrir espaço para o consumo de processados e ultraprocessados.

Palavras-chave: Consumo de alimentos. Dieta saudável. Ingestão de energia.

INTRODUCTION

Food pattern studies are part of research fields focused on knowing behaviors whose aim is to classify objects within a number of categories and classes. When it comes to eating habits, the objects of study are food and food products of vegetal and animal origin.

Food patterns must represent the regular diet of a group of interest, so that results can have a valid interpretation. On the other hand, food products representing this group cannot form a long list.[1] As for the particular case of food records, it is necessary generating the food pattern based on selected food, which provides the best energy and nutrition contributions.[2] Finally, the procedure must be easy to be carried out, but it cannot neglect the complexity of food patterns, given their possibility to encompass countless food types. By setting the list of food products that will form the food pattern, it is worth including food that is part of eating consumption habits and food that can pose risk to health. Food pattern projects must unfold the diet of some groups of interest; therefore, researchers in this field must take into account the food and nutritional features of these groups.

Recommendations of the Good Guidelines for the Brazilian Population have been changed since 2014.[3] Pillars of healthy eating centered in Dietetics have been replaced by other concepts, which are substantiated by the Food Science and Technology fields. The eating guidelines suggest food categories that are divided according to their technological processing, namely: ***in natura*** or minimally processed food, processed food and ultra-processed food. However, in 2016, NOVA included one more group in these categories, the so-called “processed culinary ingredients”.[4] in nutritional epidemiology

Nowadays NOVA’s purpose is to promote a healthy diet within the Brazilian context and to encourage the consumption of “real food”, i.e., a context in which food is presented in its natural state or as the product of processes that minimally change its structure. This approach is a new strategy for future interventions[4,5] in nutritional epidemiology.

Brazilian food-consumption trends were described by Martins et al.,[6] who assessed the domestic consumption of food items in Brazil from 1987 to 2009, by taking into consideration their energetic contribution, which increased from 20.8% to 25.4% in comparison to the total energetic value of the diet. These findings were initially evidenced in metropolitan areas, and spread countrywide in the early 2000s. These authors state that the increased energy consumption participation observed in all social classes in metropolitan areas is linked to ultra-processed products and to the reduced consumption of ***in natura*** or minimally processed food and of processed culinary ingredients.

Accordingly, the question is whether health professionals, mainly the ones in the Nutrition field, are familiar with losses caused by unhealthy diets and whether they guide their food patterns based on the theoretical bases of healthy eating.

It is essential assessing the food consumption of Nutrition students in order to check whether it is bonded to the difficulty in gathering information capable of helping to draw the eating profile of these students, since only few studies in the literature focus on this group of interest. One cannot deny that these students are aware of eating requirements, and it can end up distorting the consumption profile listed in their reports and records. By having in mind that dieticians have to reveal the food and nutrition conditions of individuals and communities, they must have access to consistent methodologies capable of capturing undesirable consumptions based on healthy eating concepts.

The present study provides knowledge about an attractive methodological approach. Research about the food consumption of Nutrition students must be repeated under different socio-cultural conditions, once eating trends often go through changes; consequently, the collective imaginary can become more demanding due to dieticians' conduct.

Therefore, the aim of the present study was to assess the food pattern of a group of Nutrition students based on recommendations for healthy eating.

METHODOLOGY

The current research regards the secondary analysis of previously collected data; it used 1342 food records (observation unit) of Nutrition students enrolled in the ***Instituto de Nutrição da Universidade Estadual do Rio de Janeiro*** (Nutrition Institute of Rio de Janeiro State University), located in Rio de Janeiro County, Rio de Janeiro State. Food record fulfilment is seen as a practical activity of the discipline known as ***"Nutrição e Dietética I"*** (Nutrition and Dietetics I), taught in the 4th semester of the course. Records filled between 1994 to 2009 were used in the study.

Inclusion criterion lied on the establishment of two food consumption records of two food types per week. Only the energetic contribution (Kcal) of the food/beverage ingested within 24 hours (in and outside their homes) was taken into consideration; students should also report the snacks they had throughout the day. Food records of male students were excluded, given their small number, which was not statistically relevant. Records of female students who did not have 2-day records were also excluded from the research, as well as records presenting mistakes in food portions and in food preparation.

Two professors (responsible for this discipline) and one assistant instructed participants about how to properly fill in the food records.[7] They emphasized the need of recording the amount of consumed food (in home portions).[8]

The methodological procedure started a database formation. After all data were available, the relative energetic contribution (Kcal) was calculated based on the proposition by Block et al.[2,9]

The option made for adopting this method is justified by the construction of food consumption instruments of epidemiological impact. Food lists set to be assessed through these instruments demand the separation of several nutrients or the inclusion of new nutrients in order to be of interest to further research. The advantage of this method lies on its relative energy contribution or nutrients. This process results in the inclusion of few food products that are often times neglected, although they are potentially important according to nutrition aspects. It can also result in the exclusion of other nutrients or of energy, given their low consumption frequency, insufficient nutrition value or portion size.

Relative contribution estimates are given by:

$$\frac{\sum_{j=1}^{n\,record} dij \sum_{k=0}^{Sij} energy\ ijk\ \times\ \omega_j}{\sum_{j=1}^{n\,record} \sum_{i=1}^{n\,item} dij\ \sum_{k=0}^{Sij} energy\ ijk\ \times\ \omega_j} \times 100$$

Wherein:

j = students' number of food records

i = food items (1,2,3, ...n)

k = amount of food (g) for each food record (0,1, 2, ...S_{ij})

S_{ij} = number of times the I^{th} food is consumed is highlighted by the J^{th} food record

d_{ij} = 1 if I^{th} food is required; dj = 0 if it is not required

$Energy_{ijk}$ = amount of energy in the amount of k of food i in the record of j

ω = weight of the sample in this record

The Shapiro-Wilk test was used to assess the distribution behavior of food portions listed in the food records. The energetic value contribution rate of each consumed food/beverage (g/ml) was calculated. Next, the food/beverages were organized in descending order of energetic contribution rate and classified into quartiles. Food pattern was drawn by locating the food/beverages in the fourth quartile (P ≥ 75). NOVA's classification[4] was applied to this group of food/beverages in order to classify them into the following categories: ***in natura*** or minimally processed food, processed food, ultra-processed food and culinary ingredients.

The energetic value of the assessed food/beverages was assessed based on ***Tabela Brasileira de Composição de Alimentos –TACO***[10] (Table of Brazilian Food Composition) and on ***Tabela de Composição de Alimentos do Estudo Nacional da Despesa Familiar-1985***[11] (Table of Food Composition of the National Research on Family Expense-1985). Food products and culinary ingredients were separated based on ***Tabela para Avaliação de Consumo Alimentar em Medidas Caseiras***[8] (Table for the Evaluation of Food Consumption in Home Portions) when these tables did not present food chemical composition and preparation. Products that were referenced in the tables were classified based on ***Regulamento Técnico de Porções de Alimentos Embalados para Fins de Rotulagem Nutricional - RDC 359/2003*** (Technical Regulation for Food Portions Packed for Nutrition Labeling Purposes).[12]

Secondary data from a research approved by the Comitê Ético em Pesquisa do Hospital Universitário Pedro Hernesto (Ethics Research Committee of University Hospital Pedro Ernesto) - protocol n. 1046-CEP/HUPE -, under the title "Análise do hábito alimentar de universitárias" (Analysis on the eating habits of female college students) were used in the current study.

Either the database or the estimates of relative energy contribution were carried out in the Microsoft Excel software in order to assess the normality of consumption variables (GraphPad Prism 4).

RESULTS

The herein gathered database included 1342 food records of 671 college students enrolled in the fourth semester of the Nutrition Course from 1994 to 2009. These files comprised a list of 240 consumed food/beverages. The mean age of students participating in the experiment was 21.46 years (IC95%=0.007).

The normality test applied to the 240 food/beverages pointed out that 94.17% of portion/energy (Kcal) did not present Gaussian behavior. Based on this outcome, the median, rather than the means, was used to represent the records of food/beverages (g/ml).

Table 1 presents the distribution of estimates on the contribution of food/beverages energy consumption listed in food records of Nutrition students.

Table 1. Distribution of energetic-contribution estimate rates of food/beverages consumed by Nutrition students from 1994 to 2009, based on the cut-off points in percentiles.

≥ P75	(n=62) %	<P75 e ≥ P50	(n=59) %
Rice (2)	2.0704	Homemade vegetable soup	0.0580
French bread	1.8444	Pork sausage	0.0575
Chicken chest without skin (1)	1.0427	Maize starch	0.0570
Lean beef	0.9804	Mandarin	0.0539
Black beans (2)	0.9597	Sugary Coffee	0.0530
Pasta	0.9586	Vegetal Oil	0.0520
Whole Milk	0.8487	Honey	0.0506
"Maisena" cookies	0.7569	Cheese bread	0.0498
Fat beef	0.6144	Canned corn	0.0494
Cracker	0.5899	Mozzarella Pizza	0.0492
Refined sugar	0.5788	Cassava (2)	0.0490
Powdered chocolate	0.5658	Pineapple	0.0484
"Minas" cheese	0.5161	Pork rack	0.0470
Fruit juice (3)	0.4205	Chickpeas	0.0469
Soda (4)	0.3908	Lean ham	0.0445
Flatbread	0.3610	Wheat flour	0.0443
Creamy cheese	0.3585	Guava paste	0.0416
Natural fruit	0.3503	Cassava flour	0.0406
Skimmed milk	0.3321	Sustagen®	0.0404
Fish fillet (2)	0.3227	Parmesan cheese	0.0394
Apple	0.3074	"Minas" Cheese	0.0390

Table 1 continued

≥ P75	(n=62) %	<P75 e ≥ P50	(n=59) %
Silver banana	0.2982	Ricotta	0.0382
Margarine	0.2911	Tomatoes	0.0378
Strawberry flavored yogurt	0.2906	Bread flour	0.0365
Milk chocolate	0.2783	'Palmer' mango	0.0364
Noodles	0.2626	Canned peas	0.0364
Potatoes (2)	0.2622	Khaki	0.0361
French bread toast	0.2542	Milk flour ®	0.0349
Eggs (2)	0.2319	Red guava	0.0347
"Prato" cheese	0.2257	Sweet Creamy Milk	0.0343
Mozzarella cheese	0.1922	Nuggets®	0.0339
Butter	0.1891	Water melon	0.0323
Skim powdered milk	0.1868	'Manteiga' kale	0.0323
Chicken upper leg without skin(1)	0.1845	Chocolate pudding	0.0314
Extra virgin olive oil	0.1752	Pastry dough	0.0299
Soy oil	0.1713	Mortadella	0.0289
Beef liver (1)	0.1702	Lentil (2)	0.0284
Papaya	0.1638	Canned tuna	0.0279
Cake mix	0.1561	Chicken hamburger	0.0276
Ice cream	0.1536	Soy drink	0.0273
Vegetable souffle	0.1503	Mustard sauce	0.0271
Powdered gelatin	0.1490	Fried Kibe	0.0249
Hamburger	0.1437	Avocado	0.0244

Table 1 continued

≥ P75	(n=62) %	<P75 e ≥ P50	(n=59) %
Chocolate milk	0.1062	Milk cream	0.0241
Pear	0.1052	Granola	0.0239
Cereal (corn)	0.1027	Cereal Bar	0.0235
Whole wheat bread	0.0974	Lettuce	0.0228
Chocolate bar	0.0884	Beet	0.0227
Semi-skimmed milk	0.0839	Salty popcorn	0.0226
Guarana drink	0.0804	Pumpkin seed	0.0210
Potato chips	0.0798	Squirt Jelly	0.0208
Whole milk powder	0.0778	Pilsen beer	0.0207
Pear Orange	0.0765	Spinach	0.0202
Oat	0.0697	Melon	0.0199
Industrial Mayonnaise	0.0683	Fruit popsicle	0.0195
Carrots (2)	0.0681	Quinoa in Flakes	0.0194
"Farofa", seasoned manioc	0.0665	Yerba mate Iced Tea ®	0.0191
Fruit shake	0.0663	Sweet potatoes	0.0190
Tapioca	0.0658	Moganga Pumpkin	0.0185
Sweet bread	0.0615		
Pork leg (1)	0.0594		
Wheat germ	0.0589		

Table 1 continued

< P50 and ≥ P25	(n=60) %	< P25	(n=43) %
Coconut water	0.0185	Sfiha	0.0048
Condensed milk	0.0184	Coconut candy bar	0.0044
Lasagna	0.0173	Chicken heart	0.0043
Candy	0.0173	Little French bread	0.0043
'Itália' grape	0.0173	Raisin	0,0042
Banana candy bar	0.0173	Tuckey chest cream	0.0042
Sausage	0.0163	Papaya candy bar	0.0041
Scarlet eggplant	0.0159	Chicken fried snack	0.0040
Cauliflower	0.0155	hominy	0.0036
Shake	0.0154	Neston®	0.0035
Roasted peanuts	0.0153	Isotonic drink	0.0035
Salami	0.0150	Brazilian Chicken Salad	0.0031
Pancake	0.0138	Potato Gnocchi	0.0030
Chicken sausage	0.0132	Beef croquettes	0.0029
Salad dressing (3)	0.0129	Star fruit	0.0029
Pizza dough	0.0127	*Cheddar cheese*	0.0029
Canned palmetto	0.0124	Croissant	0.0029
Strawberry	0.0124	Turkey meat (1)	0.0027
Chayote	0.0120	Shrimp	0.0027
Count fruit	0.0119	Acerola	0.0027
Corn cake	0.0118	Chester chest	0.0026
Purple cabbage	0.0117	Corn cream	0.0024

Table 1 continued

< P50 and ≥ P25	(n=60) %	< P25	(n=43) %
Provolone cheese	0.0117	steamed pumpkin	0.0023
Turkey ham	0.0113	Anchovy (1)	0.0023
Broccoli	0.0107	Plum	0.0023
Soy extract	0.0107	Cress	0.0022
Peanut candy bar	0.0102	Cane broth	0.0022
Peanut 'Paçoca'	0.0102	Fig	0.0019
Fermented milk	0.0102	Mayonnaise salad	0.0017
Meat pie	0.0098	Chicken risotto	0.0017
'Quindim'	0.0097	Ricotta cream	0.0017
Peach	0.0096	Bean sprouts	0.0011
Cottage cheese	0.0095	Kani Kama	0.0011
Yam	0.0091	Jam	0.0011
Onion	0.0084	Coconut	0.0010
Flax seed	0.0083	'Brigadeiro'	0.0007
Eggplant	0.0079	Barley grain	0.0005
Tomato sauce (3)	0.0079	Chicory	0.0005
Chocolate mousse	0.0079	'Bertalha'	0.0004
Kiwi	0.0076	Radish	0.0002
Barbecue sauce	0.0076	Turnip	0.0002
Pumpkin candy bar	0.0075	Arugula	0.0001
Chicken pie	0.0075	Chard	0.0001
Okra	0.0074		

Table 1 continued

< P50 and ≥ P25	(n=60) %	< P25	(n=43) %
Passion fruit	0.0069		
Pod	0.0063		
White bean	0.0062		
Sweet sprinkle crackers	0.0061		
Frosty bean (2)	0.0061		
Catchup	0.0060		
Acai pulp	0.0058		
Corn flour	0.0057		
'Baroa'	0.0056		
Green olives	0.0055		
Brazil nuts	0.0054		
Wine	0.0054		
Cucumber	0.0051		
Corn couscous	0.0051		
Lard	0.0050		
Zucchini	0.0049		

P, percentile; Percentile 75 = 0.0588, P50 = 0.0185, percentile 25 = 0.0050

(1) roasted/grilled; (2) baked; (3) industrialized; (4) sugary. Food products, Bacon, Tomato Extract, Sweetener, Lemon, Green Bell Pepper, Celery, Black Tea Infusion 5%, mushroom, shoyu sauce, garlic, herbal tea 5% infusion, parsley, caper, baking powder, mint tea 5% infusion, vinegar, were not included in the consumption profile because they were categorized as culinary ingredients used to season food.

Food pattern was drawn based on food/beverages whose energy contribution was found in estimates whose cut-off point was equal to, or higher than, percentile 75 (0.0588%). The other percentiles recorded the following values: percentile 50 = 0.0185% and percentile 25 = 0.0050% (Table 1). Food/beverages were distributed according to categories in ***Guia Alimentar para a População Brasileira*** (Food Guidelines for the Brazilian Population).

Cooked rice, chicken chest without the skin, lean beef, black beans, pasta and whole milk recorded the highest representativeness, since they were in the percentile that has defined the food pattern of Nutrition students (Table 2). Their energy contribution indices ranged from 2.0704% to 0.8487%, and these numbers depict regional food habits. By comparing the energetic contribution rate of cocked rice (2.0704%) to that of other food in the list, this rate is two times the one recorded for the second food in the ranking (chicken chest without skin – 1.0427%).

Yet, in Table 2, apples and bananas stand out among the other fruits with mean index 0.30%. They were followed by papaya, with 0.1638%; pear, with 0.1052%; and pear orange, with 0.0765%, which presented much more discreet contribution rate indices. With regard to vegetables, only carrots (0.0681%) were mentioned in the records, and this vegetable was in an insignificant contribution percentile (≥75). Natural juice index was significant in this group; it recorded 0.3503% energy and was classified in a better position than the other mentioned fruits. It is worth highlighting that there was no leafy food in the food pattern, based on consumption data.

Table 2. Classification of food/beverage recorded energetic percentiles ≥ P75 (n=62), consumed by Nutrition students from 1994 to 2009, based on recommendation in the Food Guidelines for the Brazilian Population, Rio de Janeiro - RJ, Brazil

In natura* or Minimally *processed food	%	Processed	%
Rice (2)	2.0704	French bread	1.8444
Chicken chest without skin (1)	1.0427	"Minas" cheese	0.5161
Lean beef	0.9804	Flat bread	0.3610
Black beans (2)	0.9597	Cream cheese	0.3585
Pasta	0.9586	Condensed milk	0.3321
Whole milk	0.8487	French bread toast	0.2542
Fatty beef	0.6144	"Prato" cheese	0.2257
Natural juice	0.3503	Mozzarella cheese	0.1922
Fish filet (2)	0.3227	Skim powdered milk	0.1868
Apple	0.3074	Semi-skimmed milk	0.0839

Table 2 continued

In natura or Minimally *processed food*	%	Processed	%
"Prata" banana	0.2982		
Potatoes (2)	0.2622		
Eggs (2)	0.2319		
Chicken rolls without skin (1)	0.1845		
Vegetables souffle	0.1713		
Beef liver (1)	0.1702		
Papaya	0.1638		
Pear	0.1052		
Whole milk	0.0778		
Pear orange	0.0765		
Oat flakes	0.0697		
Carrots (2)	0.0681		
Fruit shake	0.0663		
Tapioca and butter	0.0658		
Pork leg	0.0594		
Wheat gem	0.0589		

Ultra-processed	%	Culinary ingredients	%
"Maisena" cookies	0.7569	Refined sugar	0.5788
Crackers	0.5899	Margarine	0.2911
Powdered chocolate	0.5658	Butter	0.1891
Fruit juice (3)	0.4205	Extra virgin olive oil	0.1752
Soda (4)	0.3908	Soy oil	0.1713

Table 2 continued

Ultra-processed	%	Culinary ingredients	%
Strawberry flavored yogurt	0.2906		
Chocolate milk	0.2783		
Noodle	0.2626		
Cake mix	0.1561		
Ice cream	0.1536		
Powdered gelatin	0.149		
Hamburger	0.1437		
Chocolate drink	0.1062		
Cereal (corn)	0.1027		
Whole wheat bread	0.0974		
Chocolate candy bar	0.0884		
Guarana drink	0.0804		
Potato chips	0.0798		
Industrial Mayonnaise	0.0683		
"Farofa" seasoned cassava	0.0665		
Sweet bread	0.0615		

(1) roasted / grilled; (2) cooked; (3) industrialized; (4) sugary

Among processed food/beverages, French bread (1.8444%) recorded energetic contribution values three times higher than the second food in the ranking, namely: "Minas" cheese (0.5161) (Table 2).

It is possible concluding that this category of ultra-processed food/beverages represented low energetic contribution to the diet of these students. However, they did not stop contributing to their diets, since this category also encompassed 'Maisena' cookies (0.7569%), crackers (0.5899%) and powdered chocolate (0.5658%). Beverages such as in-

dustrialized fruit juices, and sugary drinks such as Coke, were almost in the same position in this ranking, they recorded 0.4205% and 0.3908%, respectively.

Food rich in sodium, in appetite stimulants, in saturated fat and in trans-fat such as noodles, cake mix, ice cream, hamburger, chocolate candy bars, Guarana drinks and potato chips, also had some energetic contribution to the consumption profile of these college students, although in discreet rates.

Refined sugar stands out among processed culinary ingredients, with energetic contribution rate of 0.5788%.

DISCUSSION

The food pattern of Nutrition students was drawn based on the estimates of relative energetic contribution proposed by Block et al;[2,9] consumption was categorized according to NOVA's classification.[4]

Although Block et al.[2] have used mean portion values to calculate the energetic contribution rates of food in a list, we herein used the median values to do so, since most food products did not show normal distribution. The aforementioned authors believed in the reasonable reliability of the food list, which represented more than 90% of their total energetic contribution. As for the current study, the inclusion of food (up to percentile 75) allowed drawing the food pattern by including more food products to the list.

Monteiro et al.[13] used the food classification based on the extension and means of industrial processing in order to assess the eating habits described through data about the family budget evaluation conducted in 2000/2003. They reported that the energy calculated from food purchase had short representativeness in more than 40% of the minimally processed food, mainly in rice, beans, meat and milk. Similar to their results, the highest energetic contribution rates identified in the current study were recorded for the food products listed above.

By comparing results in the present research - which resulted from records filled from 1994 to 2009 - to the study by Monteiro et al.[13] and to ***Pesquisa de Orçamento Familiar 2008-2009*** (Family Budget Research 2008-2009)11 – in the same period -, it is possible concluding that the food pattern of these Nutrition students is centered in the consumption of ***in natura*** or minimally processed food, and that it is similar to the food pattern of overall Brazilians. It is noteworthy that, POF information about food purchase, and information in the present study, show that estimates on the energy of consumed food/beverages take into account two records of typical weekdays.

Martins et al.6 assessed the amount bought of each food and converted it into energy; their study was carried out from 2002/2003 and from 2008/2009. They found similar results for minimally processed food, except for natural yogurt, which was in the group of minimally processed food in their study. This food (yogurt) was added with strawberry flavor, and it forced yogurt to be placed in the group of ultra-processed food.

The energetic contribution rate of leafy food and vegetables observed in consumption habits, either in the current study or in the study by Martins et al.,[6] may have resulted from their low energetic value. Consequently, they recorded low relative energetic contribution rates - given the amount of Kcal inherent to them -, because the method adopted in both studies privileged the energy rates. On the other hand, the study conducted by Aquino et al.[14] with college students enrolled in ***Curso de Nutrição de Montes Claros*** (Nutrition Course of Montes Claros), Minas Gerais State, assessed the frequency of weekly consumed food and pointed out the daily intake of lettuce and tomatoes (> 50%) and the drastic drop in the ingestion of kale, cabbage, cauliflower and zucchini (<30%).

With regard to the present study, fruits belonging to Brazilians' eating habits are also the ones easier to find in the market (banana, apple, orange, papaya and pear), regardless of the season. Therefore, this fact has contributed to their energetic rates, which were higher than percentile 75. Overall, some authors have shown[15-20] inappropriate fruit and vegetable consumption by college students, including the ones enrolled in nutrition courses. These findings resulted from answers in ***Questionário de Frequência Alimentar*** (Food Frequency Questionnaire) and based on ***"Dez passos para uma alimentação adequada e saudável"*** (Ten steps for a proper and healthy eating) recommended by the Ministry of Health.

It is essential informing that the World Health Organization[21] recommends the least consumption of 400 g/day of fruits and vegetables, except for potatoes and other tubers and roots. POF 2008-2009[11] highlights that this amount is unreachable, even in this populations' percentile 90; this finding corresponds to outcomes found in the present study.

With respect to negative health food markers such as ultra-processed products, Nutrition students participating in the present study did not stop eating crackers, cake, ice cream, powdered chocolate, chocolate candy bars, sugary carbonated drinks (such as Coke), cereal, mayonnaise, noodles, hamburger and potato chips. Some authors[6,16,17,22,23] evidenced food patterns that corroborate these findings and also included sausages/cured food in their list.

The campus restaurant in the herein assessed institution was launched after the period selected for the present study (1994-2009). Based on such restricted scenario, campus restaurants could contribute to changes in eating behaviors, because they adopt menus in compliance with health food recommendations. Perez et al.[24] assessed the eating practices

of college students (low monthly Family income) with scholarship, or not. They observed that most students with scholarships eat beans and cookies or chips on a regular basis, whereas most of those who do not have a scholarship use to often eat raw vegetables, fruits and sugary drinks – statistical differences between these two groups were significant. Although the present study did not split the group of interest in two (with scholarship and without scholarship), it was possible observing that Nutrition students eat food *in natura* or minimally processed food, but they do not stop eating ultra-processed food, mainly extruded cookies, powdered chocolate and soda. Martins et al.[6] reported that the increased energetic participation of 'ready for consumption' food (ultra-processed) was observed in all economic classes (family income quintiles 2002-2003 and 2008-2009). Lower income families tended to consume more of these ultra-processed food.

Leftover were not taken into account in the present study, and it can be seen as one of its limitations, since it can overestimate the energetic contribution of each food.[25] However, assumingly, such barrier did not substantially change the results.

The food pattern presented by the herein assessed Nutrition students, which evidenced low ultra-processed food consumption, has a bias, since these students were taught about healthy eating, even in different disciplines.

CONCLUSION

Results in the current study allowed concluding that Nutrition students prefer *in natura* or minimally processed food, but they neglect vegetables and leafy food, which evidenced a monotonous food scenario. With regards to fruits, they are eaten by these students, but only the cheapest and most accessible ones; consequently, they just eat fruits that are in compliance with their family income.

The food pattern of Nutrition students showed that they choose food in the *in natura* or minimally processed group. However, one cannot deny that they also eat ultra-processed products.

It is impossible denying the methodological impairments to assess the food consumption profile of Nutrition students, given its possible biases. It was quite difficult to elaborate their food records and to find out how much knowledge about food and nutrition they accumulate throughout their under-graduation period.

The present study can be seen as an alert for the adoption of qualification strategies focused on Dieticians. The idea is to help these professionals to balance the demands of modern life and the recommendations for healthy eating in a realistic way. The fact that students will soon be professionals in the market can have positive influence on the adoption of adequate behaviors, mainly for themselves and for others.

It is worth highlighting the advantage of the herein used relative energetic contribution method, given its easy application, since estimates will allow assessing the food scenarios of groups of interest and their relation to healthy eating recommendations.

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Contributors

Lanzillotti HS and Barros ME participated in all stages of the study, from its conception until the final version of the manuscript. Jesus LS participated in the database elaboration, and in data analysis and interpretation. Marchitto RR participated in data interpretation. Soares EA participated in the review of the final manuscript.

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