



Nutritional status and eating habits of university students in a public institution in Brazil

Estado nutricional e hábito alimentar de estudantes universitários em instituição pública do Brasil

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ABSTRACT

This article aims to evaluate the eating habits and nutritional status of students who eat at the university restaurant (UR) of a public university in the south of Brazil, with the intention that, through a continuous process of nutritional surveillance, promotion of health strategies can be focused on the main needs of this population. A cross-sectional study evaluated 290 university students, through anthropometry with BMI and Waist Circumference, electrical bioimpedance to estimate body fat percentage and eating habits questionnaire. The sample was divided in three groups of consumption frequency in the UR, 31.7 % being daily consumers, 40.3% frequent consumers and 27.9% being casual consumers. Men corresponded to 57.6% of sampling and the mean age was 23.8 ± 5.64 . It was found that 37.6% of the participants had inadequate fat percentage. It was observed sedentary lifestyle and traditionally Brazilian eating habits composed of characteristics recommended by the Ministry of Health, possibly influenced by their access to the UR.

Keywords: Food and Nutrition Education. Nutritional Status. Health Promotion.

RESUMO

O objetivo desse artigo é avaliar o hábito alimentar e estado nutricional dos alunos que consomem no restaurante universitário (RU) de uma universidade pública do sul do Brasil, permitindo que um processo contínuo de vigilância nutricional fomente estratégias de promoção de saúde voltadas às principais necessidades dessa população. Estudo transversal avaliou 290 estudantes universitários, através de antropometria com IMC, perímetros, bioimpedância elétrica para estimativa de composição corporal e questionário de hábitos alimentares. A amostra foi dividida em três grupos de frequência de consumo no RU, sendo 31,7% consumidores diários, 40,3% frequentes e 27,9% eventuais; 57,6% dos avaliados eram homens, e a média de idade foi de $23,8 \pm 5,64$. Constatou-se que 37,6% do total dos participantes estavam com o percentual de gordura inadequado. Foi observado sedentarismo e hábitos alimentares com padrão tradicional brasileiro composto por características preconizadas pelo Ministério da Saúde, possivelmente influenciados pelo acesso ao RU.

Palavras-chave: Educação alimentar e nutricional. Estado nutricional. Promoção da saúde.

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INTRODUCTION

The current national scenario shows changes in behavior related to habits and, consequently, health in young adults, the age group in which most of the university students are found. This is explained by the tendency to have a less healthy lifestyle, confirmed by a significant panorama of stress, sedentarism and diet, which is frequently inadequate¹⁻⁸. Health promotion can be achieved through the prevention of some morbidities that are responsible for this scenario, reducing the prevalence of factors associated with lifestyles that are subject to change⁹.

Several reasons might justify the negative change regarding the eating habits of students in higher education. Most of them living away from their families face the financial issue, in addition to the stress caused by the university activities, lack of time to better dedicate to their own diet, lack of cooking skills and knowledge of nutrition in order to make healthier choices are some of them^{10,11}.

One of the perspectives of changing this scenario is the one that recognizes collective spaces, inserted in different social sectors, as potential health promoters. In this sense, university restaurants can be important throughout this process. Adequate diet is one of the key aspects, being encouraged with policies and guidelines aiming to improve health and food conditions in Brazil. The National Food and Nutrition Policy (PNAN)¹² exemplifies it, reinforcing the nutritional surveillance and the control of factors that predispose to food related disorders, also corroborated by programs such as the School Health Program¹³ and the Brazilian National School Feeding Program (PNAE)^{14,15}.

Although higher school does not take part in the PNAE, the project of Health Promoting Schools/Universities (EPS)¹⁶⁻¹⁸ is committed to view these spaces aiming to provide health in any collective teaching environment (basic or higher), formal or not, acknowledging them as privileged in order to foster strategies of health education, such as food and nutrition education (EAN). This would result in the modification of these environments, thus building a nucleus for

the promotion of local collective health, corroborated both by the National Health Promotion Policy¹⁹ and by the Reference Framework for Food and Nutrition Education for Public Policies²⁰. This initiative advocates public intersectoral actions and indicates university restaurants as a public tool for this purpose, consolidating the EAN and food and nutrition surveillance as strategies to fight the epidemic of metabolic diseases in Brazil²¹.

Most Brazilian studies on nutritional status and consumption habits in teaching environments portray the context of basic education. However, since there is a growing emphasis on policies that encourage the promotion of nutritional food education in collective spaces of higher education, given the emerging situation of health problems in the university students age group, in relation to eating habits, it is necessary to better understand the epidemiological and nutritional characteristics of the students who make up these spaces, as a tool for new strategies to promote healthy eating.

One of the highlights of this context was the institution of the decree 7.234/2010, which created the National Student Assistance Program (PNAES). From it, federal higher education institutions (IFES) started to have financial resources to subsidize students in socially and economically vulnerable situations. Among the PNAES attributions are student housing, food, transportation, health, culture and other benefits, which must be monitored and administered by the IFES²². Most universities use this program resources to maintain the university restaurants with free and subsidized access for all students of the institution. As a result, management seeks to associate not only the financial subsidy as the main action that guarantees the Human Right to Adequate Food, one of the guiding principles of the program, but also proposes to develop actions of nutritional surveillance in favor of the full reach of food and nutritional security recommended by it.

This study aimed to evaluate the eating habits, as well as the nutritional status of students who eat in the main restaurant of a public university in southern Brazil. It is expected that, through a continuous

process of food and nutrition surveillance, it will be possible to include health promotion strategies aimed at the main needs observed.

METHODOLOGY

Cross-sectional and descriptive study, in which 290 higher education students (Undergraduate and Graduate Studies), consumers of the main university restaurant (UR) of a public university in southern Brazil, were evaluated, according to the sample size calculation, where nutritional health adequacy values were considered, based on the findings of BMI and body composition for this population. Data were collected from July to September 2016, when body composition was assessed and the questionnaire "How is your diet?" suggested in the Food Guide for the Brazilian population²³ was carried out.

This study included students, on demand, who were regularly enrolled in the institution and who went to the restaurant at least once a week, excluding those who were unable to perform electrical bioimpedance (people with pacemakers, amputees and pregnant women). The researchers stayed in a specific room located at the restaurant entrance, where evaluations took place. The students were invited to participate through posters, e-mail, posts on the website and official social medias of the university. Those who expressed interest were instructed about the protocol for the examination and scheduled for evaluation according to availability. They were stratified by consumption frequency at the UR and placed in one of the three groups: casual consumers (1 to 3 meals per week in the unit); frequent consumers (more than 3 meals per week in the unit) and daily consumers.

Anthropometric data on nutritional assessment (weight, height, waist circumference and hip circumference) were measured in duplicate, using the average of the values observed as a result. The electrical bioimpedance test was used to assess body fat percentage, phase angle and basal metabolic rate, as a protocol, being applied only once.

For anthropometric measurement of body weight, height and circumferences, light clothing and calibrated equipment were used. Welmy adult digital platform scale 100g sensitivity and maximum load of 200Kg, Sanny vertically fixed stadiometer with 1mm accuracy and Cescorf inelastic measuring tape.

Body composition was carried out using the model Electrical Bioimpedance Biodynamics 450 version 5.1 (Biodynamics®, Corp. Seattle, WA, USA). Through the passage of an alternating current of low frequency and high voltage (800 mA and 50 kHz), this bioimpedance model provides the following body parameters: resistance, reactance, phase angle, cell mass, extracellular mass, lean mass, fat mass, body mass index (BMI), basal metabolic rate (BMR), total body water, intracellular and extracellular water. The evaluation was performed with the participant lying with their legs and arms parallel to the body and away from the trunk. The electrodes were placed in recommended locations (an electrode on the dorsal surface of the right wrist, an electrode on the third metacarpal, an electrode on the anterior surface of the right ankle between the prominent portions of the bones and a fourth electrode placed on the dorsal surface of the third metatarsus²⁴), the fasting protocol of two hours or more was also respected, absence of physical activity in the last 24 hours, empty bladder, and for women, absence of menstruation. After physical assessment the participants answered a questionnaire about their diet habits: "How is your diet?" and a questionnaire about demographic and academic data. The evaluation took 20 minutes per participant, on average.

The study followed the ethical principles for research involving human beings, according to resolution 466/2012 and was approved by the Research Ethics Committee of the Federal University of Health Sciences of Porto Alegre, RS, under protocol No. 1,554,239. All evaluated participants signed the Free and Informed Consent Form (ICF).

STATISTICAL ANALYSIS

Categorical variables were expressed as absolute or relative frequencies and continuous variables,

such as mean and standard deviation, or median and interquartile range, as appropriate. The chi-square test was used to test the association between categorical variables; the *t*-Student test to compare the means. Data were analyzed using the *Statistical Package for the Social Sciences software* (version 18.8 SPSS Inc., Chicago, IL) and the results were considered significant when $p \leq 0.05$.

RESULTS

Among 290 students evaluated, 167 were male (57.6%) and 123 female (43.4%), the average age was 23.8 ± 5.64 years (Table 1). Regarding academic

characteristics, most participants (67.2%) were at the beginning of their undergraduate course (up to the 6th semester of the course) and only 11% were beneficiaries of the Student Assistance Program (PNAES) and residents of the university student home (CEU).

Regarding consumption habits at the university restaurant (UR), almost 70% of the participants ate more than 3 meals a week at the unit, 30% being daily consumers, with predominant male access (70%). The most consumed meal is lunch, with more than 90% of the reports and only 6.2% of the students had the three meals (breakfast, lunch and dinner) available in the unit. The evaluated data were not statistically different for men and women (Table 1).

Table 1. General characteristics of studied population (n=290)

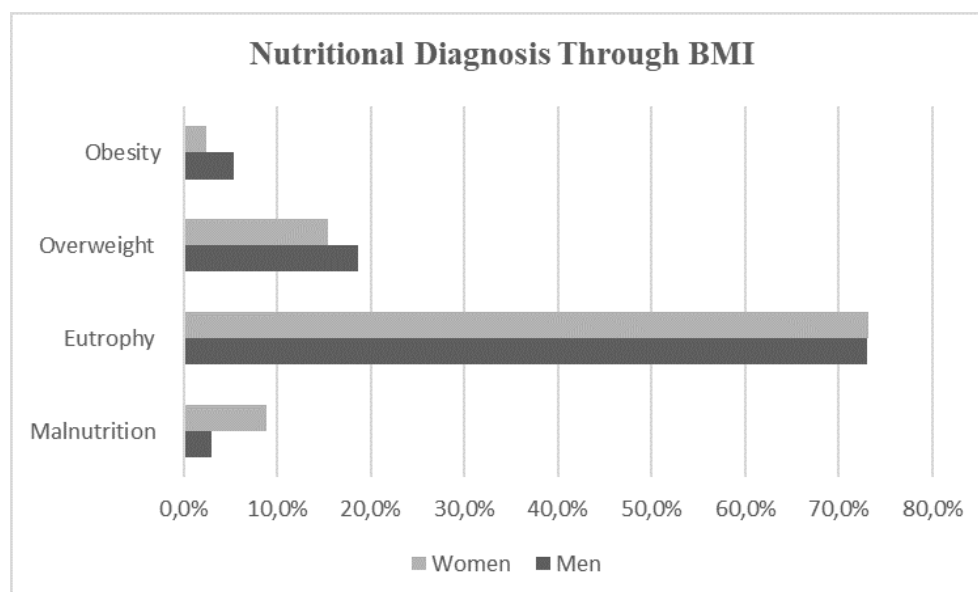
	TOTAL (n = 290)	FEM n = 123 (42,4%)	MALE n=167 (57,6%)	P
Age (years)	23,8 ± 5,64	24,3 ± 6,8	23,4 ± 4,5	0,153 ²
Semester (n/%)				0,116 ¹
Beginning of degree	195 (67,2%)	88 (45,1%)	107 (54,9%)	
End of degree	64 (22,1%)	20 (31,3%)	44 (68,8%)	
Post-Graduação degree	31 (10,7%)	15 (48,4%)	16 (51,6%)	
Residents of Student home	290 (100%)	00 (00%)	00 (00%)	0,492 ¹
No	258 (89,0%)	110 (42,6)	148 (57,4%)	
Yes	32 (11,0%)	13 (40,6%)	19 (59,4%)	
Frequency of consumption in the UR				0,049 ¹
Casual Consumption	81(27,9%)	41(50,6%)	40(49,4%)	
Frequent Consumption	117(40,3%)	52(44,4%)	65(55,6%)	
Daily Consumption	92(31,7%)	30(32,6%)	62(67,4%)	
Meals at the UR				
All meals	18(6,2%)	6(33,3%)	12(66,7%)	0,291 ¹
Lunch and Dinner	118(40,7%)	43(36,4%)	75(63,6%)	0,052 ¹
Only Lunch	134(46,2%)	64(47,8%)	70(52,2%)	0,061 ¹
Only Dinner	18(6,2%)	10(55,6%)	8(44,4%)	0,179 ¹

Data presented as Mean ± SD or number of individuals for total students (%).

¹ Chi-Square; ² Student *t* test

The nutritional status of the studied population is described in **Table 2**, the found BMI average was $23,1 \pm 3,4$, kg/m², despite adequate, it was pos-

sible to note that 17,8% of women and 24% of men were overweight according to what is shown in **Graph 1**.



Graph 1. Nutritional Diagnosis Through BMI

Table 2. Anthropometric and body composition characteristics of the evaluated students

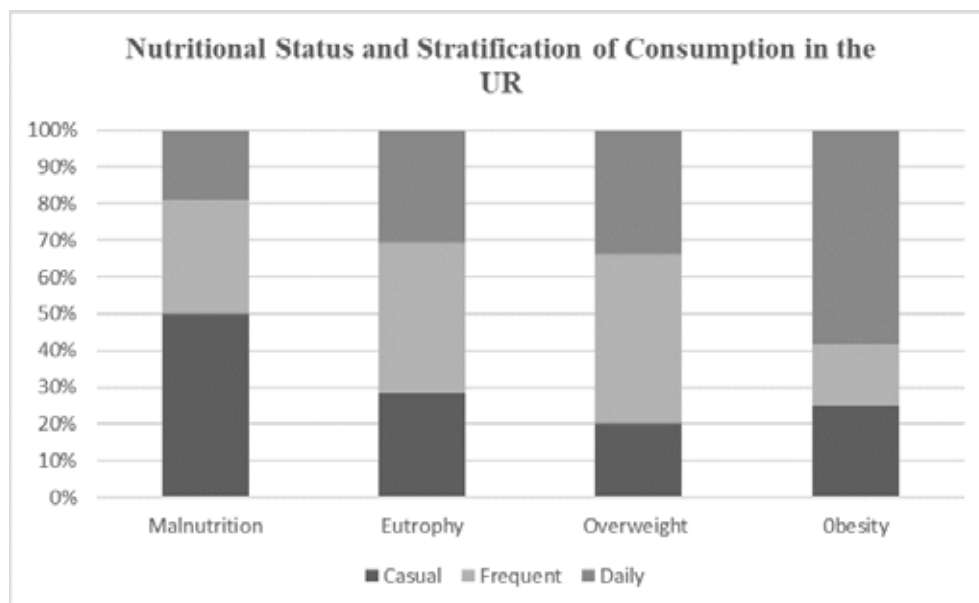
	TOTAL (n = 290)	FEMALE n = 123 (42,4%)	MALE n=167 (57,6%)	P
Anthropometric Data				
Weight (kg)	68,2 ± 12,6	60,3 ± 9,5	74,0 ± 11,3	0,000 ²
Height (m)	1,71 ± 0,1	1,64 ± 0,1	1,77 ± 0,01	0,000 ²
BMI (Kg/m ²)	23,1 ± 3,4	22,3 ± 3,3	23,8 ± 3,2	0,000 ²
WC (cm)	82,3 ± 9,8	78,4 ± 9,6	85,1 ± 9,0	0,000 ²
HC (cm)	98,8 ± 10,2	97,6 ± 8,8	99,7 ± 11,0	0,075 ²
WHR				0,000 ¹
Adequacy	273(94,1%)	107(39,2%)	166(60,8%)	
Inadequacy	17(5,9%)	16(94,1%)	1(5,9%)	
BIA				
%BF	20,4 ± 7,1	25,7 ± 5,3	16,5 ± 5,5	0,000 ²
Adequacy	181(62,4%)	70(38,7%)	111(61,3%)	0,124 ¹
Inadequacy	109(37,6%)	53(48,6%)	56(51,4%)	
PA°	7,4 ± 0,9	6,7 ± 0,6	7,9 ± 0,6	0,000 ²
BMR	1694,1 ± 338,4	1385,9 ± 184,2	1921,1 ± 228,5	0,000 ²

Data presented as Mean ± SD or number of individuals for total students (%).

¹ Chi-Square; ² Student t test

In Graph 2 it is noted that, when the participants were stratified by frequency of consumption in the UR, among those diagnosed with obesity, 58% present daily consumption in the unit, and 46% among those being overweight present frequent consumption. Showing that half of the overweight population has a well-established relationship and consumption

with this space. And it is also possible to observe that 50% of the students who are in the lowest stratum of consumption in the unit (occasional consumers) were diagnosed with malnutrition. Although there is no statistical finding, a tendency to put on weight can be observed as the frequency of consumption in the UR increased.

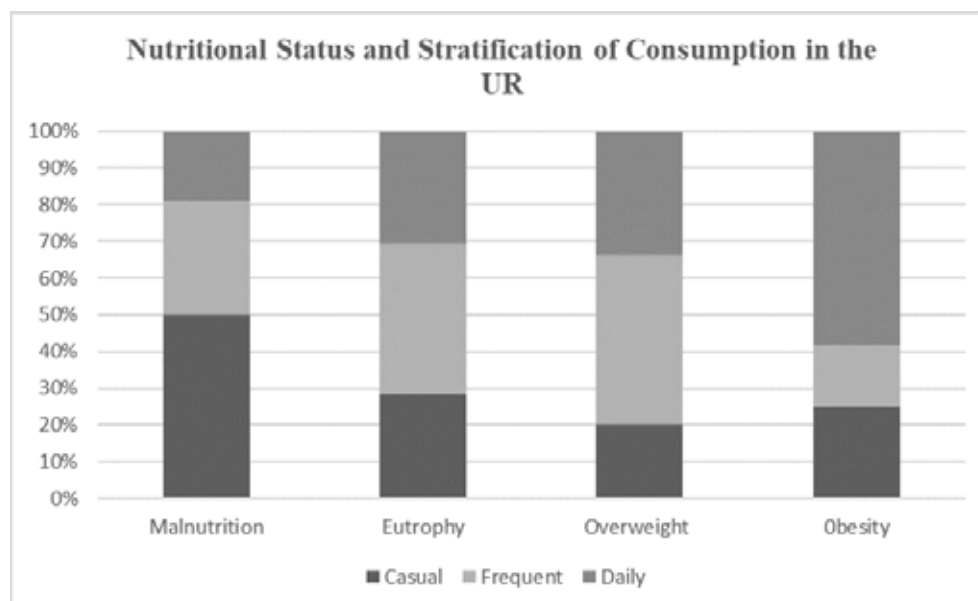


Graph 2. Nutritional Status and Stratification of Consumption in the UR

The mean waist circumference was adequate for both sexes, 78.4 ± 9.6 cm and 85.1 ± 9.0 cm for women and men respectively, however with regard to body composition, the data suggest greater inadequacy and metabolic risk in women. It was observed 37.6% of excess body fat in the participants, with an average of 25.7% in women and 16.5% in men. Among the assessed students, 6% had an inadequate waist-to-hip ratio, a predominant finding in women (94.1%),

a characteristic that, associated with the findings of fat percentage, reinforces this greater inadequacy of body composition parameters in the female public.

Graph 3 shows the distribution of the adequacy of the percentage of stratified body fat also by consumption profile in the UR, indicating that those who have adiposity above the average are also the ones who eat in the UR more frequently.



Graph 3. Adiposity and stratification of consumption in the UR

The profile of the students' eating habits consuming in the UR is shown in Table 3. Regarding fruit consumption, only 80% of the participants reported not having daily consumption, an index below the recommendation made by the Ministry of Health. However, consumption of vegetables, legumes, meat, milk and dairy products is within the recommended range with more than 90% of the sample consuming vegetables daily; almost all participants ate legumes a few times a week (98%), 91.4% of students ate meat and/or eggs at least once a day, and 77% of them had two or more servings of milk every day. These findings may be related to the high adherence of students to the UR, which provides access to traditional Brazilian food on a regular basis and in sufficient quantities (the unit offers, from Monday to Friday, lunch and dinner always with a choice of meat, cereal, whole grain, legumes, garnish, two options of fresh salad and vegetables, and one of fruit, and for students living in CEU the first meal in the morning always offers one or two options of dairy, coffee, cereal and fruit). Although a significant difference between consumption findings and stratification by consumption frequency has not been observed, what this study seems to indicate is that, regardless of the number of times the student eats in the UR, the fact of eating there at least once a week impacts on access to this food and

the development of the habit of eating fresher and minimally processed food, in the proportion they are made available.

With regard to oilseeds, 41% of the study population reported not having the habit of eating them, as well as 33.1% of them reported not consuming fish. Approximately 10% of the participants considered themselves to be vegetarian and/or ovo-lacto-vegetarian.

It is important to highlight that 51.8% and 36.2% of sampling reported they regularly consumed (minimum weekly frequency) fried food and sweets, respectively. There was also a higher than expected consumption of ready-made seasoning (34.2%) and addition of extra salt to the ready-made food (19.3%).

Regarding the consumption of alcoholic beverages, almost 40% of the participants consume some type of alcoholic drink more than once a week and 40% do not practice regular physical activity, with no difference between genders. The study showed water consumption below the recommended level and a low interest in reading the labels of the processed and ultra-processed products consumed (46% of the participants almost never or never read the labels of what they usually consume).

Table 3. Profile of eating habits of students who eat at the central University Restaurant

(Continua)

<i>Questionnaire "How is your diet"</i>					
	General n=290	Casual Group n=81	Frequent Group n=17	Daily Group n=92	P
Average of daily meals	3,87+1,1	4,01+1,1	3,85+1,1	3,76+1,2	
Fruit					0,296
Do not eat	28 (9,7%)	7 (25%)	8 (28,6%)	13 (46,4%)	
Casual Consumption (A few times a week)	203 (70%)	57 (28,1%)	81 (39,9%)	65 (32%)	
Daily Consumption	59 (20,3%)	17 (28,8%)	28 (47,5%)	14 (23,7%)	
Vegetables					0,105
Irregular consumption	22 (7,5%)	6 (7,5%)	6 (5,2%)	10 (11%)	
Daily Consumption	268 (92,5%)	75 (92,5%)	111 (94,8%)	82 (89%)	
Legumes					0,284
Do not eat	6 (2%)	3 (50%)	3 (50%)	0 (0%)	
Casual Consumption (A few times a week)	158 (54,5%)	48 (30,4%)	63 (39,9%)	47 (29,7%)	
Every day	126 (43,5%)	30 (23,8%)	51 (40,5%)	45 (35,7%)	
Oilseeds					0,925
Do not eat	119 (41%)	33 (27,7%)	45 (37,8%)	41 (34,5%)	
Casual Consumption (A few times a month)	81 (28%)	22 (27,2%)	34 (42%)	25 (30,9%)	
Weekly / Daily	90 (31%)	26 (28,9%)	38 (42,2%)	26 (28,9%)	
Meat and Egg					0,193
Do not eat	25 (8,6%)	10 (40%)	9 (36%)	6 (24%)	
Daily Consumption	212 (73,4%)	61 (29%)	87 (41%)	64 (30%)	
> 3 portions a day	52 (18%)	9 (17,3%)	21 (40,4%)	22 (42,3%)	
Removal of apparent fat from animal protein					0,022
No	76 (26,4%)	15 (19,7%)	26 (34,2%)	35 (46,1%)	
Yes	182 (63,2%)	53 (29,1%)	78 (42,9%)	51 (28%)	
NA	30 (10,4%)	12 (40%)	12 (40%)	6 (20%)	
Ovolactovegetarians/Vegetarians	30 (10,4%)	12 (40%)	12 (40%)	6 (20%)	
Fish					0,370
Do not eat	96 (33,1%)	25 (26%)	42 (43,8%)	29 (30,2%)	
A few times a year	80 (27,5%)	21 (26,3%)	27 (33,8%)	32 (40%)	
Monthly / Weekly	114 (39,3%)	35 (30,7%)	48 (42,1%)	31 (27,2%)	
Milk and dairy					0,110
Do not eat	33 (11,4%)	4 (12,1%)	13 (39,4%)	8 (24,2%)	
Daily	33 (11,4%)	12 (36,4%)	13 (39,4%)	8 (24,2%)	
> 2 portions / day	224 (77,2%)	65 (29%)	91 (40,6%)	68 (30,4%)	
Type of Milk					0,139

(Conclusão)

Whole Milk	162 (63,3%)	49 (30,2%)	59 (36,4%)	54 (33,3%)	
Lowfat Milk	94 (36,7%)	27 (28,7%)	45 (47,9%)	22 (23,4%)	
Fried Food					0,526
Hardly ever / Never	62 (21,4%)	19 (30,6%)	26 (41,9%)	17 (27,4%)	
Casual Consumption (A few times a month)	78 (26,9%)	22 (28,2%)	26 (33,3%)	30 (38,5%)	
Weekly / Daily	150 (51,8%)	40 (26,7%)	65 (43,3%)	45 (30%)	
Sweets					0,810
Hardly ever / Never	39 (13,5%)	11 (28,2%)	17 (43,6%)	11 (28,2%)	
Casual Consumption (A few times a month)	146 (50,3%)	42 (28,8%)	61 (41,8%)	43 (29,5%)	
Weekly / Daily	105 (36,2%)	28 (26,7%)	39 (37,1%)	38 (36,2%)	
Type of oil used in food preparations					
Vegetable oil	274 (95%)	75 (27,4%)	110 (40,1%)	89 (32,5%)	0,472
Lard / Butter	13 (4,5%)	4 (30,8%)	6 (46,2%)	3 (23,1%)	0,789
Margarine	17 (5,9%)	4 (23,5%)	8 (47,8%)	5 (29,4%)	0,836
Ready-made Seasoning					0,593
No	181 (62,6%)	52 (28,7%)	76 (42%)	53 (29,3%)	
Yes	99 (34,2%)	25 (25,3%)	38 (38,4%)	36 (36,4%)	
Do not know	9 (3,2%)	4 (44,4%)	2 (22,2%)	3 (33,3%)	
Extra salt on Meals					0,243
No	234 (80,7%)	67 (28,6%)	98 (41,9%)	69 (29,5%)	
Yes	56 (19,3%)	14 (25%)	19 (33,9%)	23 (41,1%)	
Water					0,142
Less than 4 glasses	101 (34,8%)	36 (35,6%)	38 (37,6%)	27 (26,7%)	
4 to 8 glasses	139 (48%)	34 (24,5%)	54 (38,8%)	51 (36,7%)	
More than 8 glasses	50 (17,2%)	11 (22%)	25 (50%)	14 (28%)	
Alcohol beverages					0,819
Hardly ever / Never	54 (18,6%)	13 (24,1%)	24 (44,4%)	17 (31,5%)	
Casual Consumption (A few times a month)	121 (41,7%)	38 (31,4%)	45 (37,2%)	38 (31,4%)	
Weekly / Daily	115 (39,7%)	30 (26,1%)	48 (41,7%)	37 (32,2%)	
Regular Physical Activity					0,614
No	117 (40,3%)	32 (27,4%)	51 (43,6%)	34 (29,1%)	
Yes	173 (59,7%)	49 (28,3%)	66 (38,2%)	58 (33,5%)	
Label Reading					0,026
Hardly ever / Never	132 (46%)	42 (38,8%)	44 (33,3%)	46 (34,8%)	
Casual Reading A few times / A few products	97 (33,8%)	28 (28,9%)	38 (39,2%)	31 (32%)	
Almost always / Always	58 (20,2%)	10 (17,2%)	34 (58,6%)	14 (24,1%)	

Data presented as number of individuals for total students (%).

¹ Chi-Square;

DISCUSSION

The increase of consumers in university restaurants reflects the economic and political moment in Brazil; with instability and reduction of purchasing power of families, the students who do not take part in PNAES also start to depend on the benefit offered to keep their studies. This fact reflects 70% of the participants in this study who are frequent consumers in the UR and 30% who have all meals in the unity, although we only have 11% of the sample of students who are beneficiaries included in the program. These numbers positively impact on the performance of nutritional surveillance in this population, more heterogeneous, enabling more democratic and comprehensive health promotion strategies.

In this study, it was observed that, although the majority of students have adequate nutritional status, 37.6% of participants were observed with excess body fat. This is corroborated by another study carried out with 112 university students in a private institution also in southern Brazil, where approximately 30% of women²⁵ were overweight and had increased waist circumference, as well as what was observed in our findings, a greater metabolic risk also occurred in females, among the participants who had altered waist-to-hip ratio, 94.1% were women.

In a study carried out in a public higher education institution in the northeast, with 253 freshmen students, the rates of overweight found were lower, not exceeding 10%, although the general assessment of health habits was negative²⁶. Lifestyle inadequacies were also observed in students from Brasília in the study by Marcondelli et al. (2008), who evaluated 281 university students and identified high rates of sedentary lifestyle and inadequate diet²⁷. It is noticed that the nutritional status pattern of university students is regionally similar to that of other age groups, according to the VIGITEL 2018 survey (Surveillance system for risk and protection factors for chronic diseases by telephone survey) and the POF 2008-2009 (Family Budget Survey), which suggests that children and adults in the southern region of the country still have more inadequate nutritional indicators and greater

risk for the development of diseases resulting from this condition, even though surveys showing a trend in recent years towards greater homogeneity of these findings^{28,29}.

The results of this study were also superior to those observed in other countries with a less processed food consumption pattern, with diets composed of more fresh foods, as in Spain, where the culture of the Mediterranean diet is widely shared. Varella et al. (2011) observed in a Spanish study similar to this one, average body fat percentage of 14% in men and 17% in women³⁰, and in this study, percentages of 16% were observed in men and 25% in women, both on average higher, totaling 36% of inadequacy in our population.

The discussion of Brazilian data for this life stage is important since in a study developed to assess metabolic and cardiovascular risk among university students in Recife, Petribu et. al (2009)³¹ observed that 40% among 250 students evaluated were sedentary and 50% of men were overweight, corroborating our findings. In addition, there was also a high prevalence of cases of early death caused by cardiovascular disease in direct family members and a high inadequacy of energy consumption, saturated fat and cholesterol³¹.

In this study, assessing the students' eating habits, we can observe adequate frequency of consumption of some food groups, such as vegetables, legumes, milk and protein sources such as meat and eggs. These findings bring our population close to a traditional Brazilian food consumption pattern, which does not consume so much processed foods and is in line with the Dietary Guidelines for the Brazilian Population. This adequacy of consumption can also be related to the high students' adherence to the university restaurant, since the predominance of the food offered in this space has these characteristics; remembering that more than 70% of the sample frequently eats in the unit. Nevertheless, it is important to discuss what leads this population to inadequate nutritional status, if the profile of offered foods provide access to what is recommended.

Thus, although it has been observed the adequacy of consumption of foods that are the basis for healthy eating, it was also identified that 40% of the

participants do not practice regular physical activity; as well as showing little interest in checking the labeling of the processed foods they consume; they do not drink enough water, only 17% reported drinking more than 1.5 liters per day; in addition to the high consumption of ready-made spices and alcoholic beverages. Findings also reported by Varella et al. (2011), in which 55% of the sample declared frequent alcohol consumption and similar results of nutritional profile³⁰, and by Madureira et al. (2009), in which a high prevalence of physical inactivity was also observed in university students³⁶. A study developed in Chile³⁷ in 2013, with 799 university students also identified similar characteristics related to the practice of physical activity and lack of interest in reading labels³⁷.

In addition, this research also found fruit consumption below the recommended by the Ministry of Health (MS)²³ as well as low consumption of oilseeds and fish, where 41% and 33% of participants reported not consuming, respectively. The recommendation of moderate sugar consumption (10% of the total energy value ingested on the day) and restriction of fried food consumption by the MS²³ were also discrepant in our population, where 51.8% of the participants said they consume fried foods and 36.6% sweets almost daily. The recommendation of moderate sugar consumption (10% of the total energy value ingested in a day) and restriction of fried food consumption by the MS²³ were also discrepant in our population, where 51.8% of the participants said they consume fried foods and 36.6% eat sweets almost daily.

It is known that being overweight, at the population level, is related not only to the profile of the foods consumed at meals, since a large part of Brazilians still have a diet composed of traditional foods, but it is also related to the amounts of consumption, composition of meals, foods eaten outside main meals, degree of knowledge of nutrition as a tool for healthier choices and other lifestyle factors^{23,32}.

Even though higher education is not a formal part of the PNAE, its guidelines are used to guide the purchasing actions and menu planning of the URs: these guidelines recommend that at least 30% of the individual nutritional needs be provided per student

per meal and even 70% in the case of consumption of the three meals offered by the institution³³.

Currently, the Federal University of Rio Grande do Sul (UFRGS), the institution where this study was developed, acquires 30% to 50% of food from family farming and the consumption of organic products is expanding. The institution believes that the qualification of the offered menus, result of the improvement of the acquired food and balance of different food groups in the preparations, associated with the adequacy of the amount of consumption by the students, due to the continuous EAN strategies, can contribute to the improvement of the standard nutritional status of this population. In a study by Fausto et al. (2011) in São Paulo, with 403 university restaurant users, with the same age (18 - 25 years) and nutritional profile (approximately 12% being overweight) of the participants in this study, an inadequacy in the proportion of the offered macronutrients was observed on the menus, showing that the restaurant was serving excessive protein and calories³⁴.

Similar results were also found in a study by Oliveira et al. (2005), where, after evaluating 186 students who also consumed in the UR, they observed the same proportions of overweight individuals and inadequate food consumption³⁵. Even though the present study did not propose to evaluate the institution's menus, the results show that, among the overweight and obese participants, approximately half had frequent consumption in the UR, 46% and 58% respectively. Thus suggesting this imbalance of consumption also in the studied environment. Currently, the UFRGS UR offers access to food on demand, except for the 130g portion of meat that is previously established.

These characteristics are close to the fact that the modifications currently proposed by the institution, such as nutritional surveillance actions, EAN and improvements in the Food Acquisition Program can help in the construction of a new pattern of food consumption, consequently improving health indicators in this population.

The findings of this study, corroborated by similar research carried out with this same population,

especially from public institutions, allow us to infer that the scenario observed in the southern region of Brazil is shared by higher education students in other regions of the country and the world. Even with policies that guarantee access to healthy food, in accordance with the recommendations of the Dietary Guidelines for the Brazilian Population, successful health promotion actions are still necessary, such as those proposed by Health Promoting Universities and reported in countries such as Canada, the United States United, Colombia and Asian countries^{16,17,18}, associated with the strengthening of public policies that now promote food and nutrition security in the country to effectively modify the scenario of metabolic diseases in Brazil³⁸.

This article was intended not only to discuss the findings of this nutritional surveillance strategy, developed to support new actions in food and nutrition education, making this a perennial institutional practice, but also to share a broader discussion about the food scenario in the subsidized spaces of universities, and the multiple aspects that need to be considered to promote health in these spaces. The fact that the menu offered at the institution has not been objectively evaluated and the food environment on campus has not yet been fully studied, including spaces not subsidized by the university are noticed as weaknesses or limitations of the study.

CONCLUSION

Population surveys, which include anthropometric and food consumption findings, are important for assessing and monitoring health conditions. Food and nutrition surveillance allows an adequate support so that food and nutrition education strategies can be developed aiming to transform collective environments into health promoting spaces. The guarantee of the human right to adequate and healthy food occurs through the development of a field of permanent, multidisciplinary and intersectoral practices that aims to promote autonomy and respect for the singularities and needs of each one.

From the point of view of practical applicability, this study was characterized as the first step for the intervention plans that were implemented in the institution, based on the findings of observed nutritional status, physical activity and consumption habits. Two years after its development, a new department was created at UFRGS that works exclusively with the practice of health promotion in university restaurant spaces. This department, called the Nutritional Assistance Center (DAL), is part of the Food Division (DAL) and the Dean of Student Assistance (PRAE) of the university. Considering the epidemiological similarity of lifestyle findings in university spaces, it is possible that this is also a support for strategies in other public or private institutions that aim to achieve the purposes of Health Promoting Universities.

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REFERENCES

1. Vasconcelos MM, Coelho PC, Grande IKA. Estado nutricional, consumo alimentar e risco cardiovascular: um estudo em universitários. *Rev de Nutr.* 2009; 22(6):837-46.
2. Chourdakis M, Tzellos T, Papazisis G, Toulis K, Kouvelas D. Eating habits, health attitudes and obesity indices among medical students in northern Greece. *Appetite.* 2010; 55(3):722-5.
3. El Ansari W, Stock C, Snelgrove S, Hu X, Parke S, Davies S et al. Feeling healthy? A survey of physical and psychological wellbeing of students from seven universities in the UK. *Int J Environ Res Public Health.* 2011; 8(5):1308-23.
4. Greene GW, Schembre SM, White AA, Hoerr SL, Lohse B, Shoff S et al. Identifying clusters of college students at elevated health risk based on eating and exercise behaviors and psychosocial

- determinants of body weight. *J Am Diet Assoc.* 2011; 111(3):394-400.
5. Neville MM, Geppert J, Min Y, Grimble G, Crawford MA, Ghebremeskel K. Dietary fat intake, body composition and blood lipids of university men and women. *Nutr Health.* 2012; 21(3):173-85.
 6. Cooke R, Papadaki A. Nutrition label use mediates the positive relationship between nutrition knowledge and attitudes towards healthy eating with dietary quality among university students in the UK. *Appetite.* 2014;83:297-303.
 7. Oliveira NRCD, Paulo UFDS, Padovani RDC et al. Saúde do estudante universitário: uma questão para reflexão. *Ciênc saúde colet.* 2014; 19(3):995-6.
 8. Tavolacci MP, Grigioni S, Richard L, Meyrignac G, Dechelotte P, Ladner J. Eating Disorders and Associated Health Risks Among University Students. *J Nutr Educ Behav.* 2015; 47(5):412-20.
 9. Saúde MD. Plano de Ações Estratégicas para o enfrentamento das Doenças Crônicas não Transmissíveis (DCNT) no Brasil 2011 - 2022. Brasília; 2011. 148p. Mi J, Mi M, Casermeiro MA, Sr G, Guanca R, Bustos MM et al. Evaluación de intervenciones educativas en el conocimiento y opinión de la comunidad universitaria sobre alimentos funcionales. *Diaeta.* 2010; 28(132):23-8.
 10. Abbot JM. Development and evaluation of a university campus-based food safety media campaign for young adults. *J Food Prot.* 2012; 75(6):1117-24.
 11. Saúde Md. PNAN Política Nacional de Alimentação e Nutrição. Brasília:2013. http://bvsm.sau.gov.br/bvs/publicacoes/politica_nacional_alimentacao_nutricao.pdf Acesso em 14/06/2017.
 12. Saúde MD. Caderno do Gestor do PSE. Brasília: 2015. http://bvsm.sau.gov.br/bvs/publicacoes/caderno_gestor_pse.pdf Acesso em 14/06/2017
 13. Brasil. Ministério da educação. Fundo nacional de desenvolvimento da educação. Ministério da educação. Resolução/CD/FNDE N° 38, de 19 de julho de 2009. Dispõe sobre o atendimento da alimentação escolar aos alunos da educação básica no Programa Nacional de Alimentação Escolar - PNAE.
 14. Guedes FAV, Garcia CG, Mantovani TCS, Gonçalves LC. Reflexões sobre a atuação do nutricionista no Programa Nacional de Alimentação Escolar no Brasil. *Ciência & Saúde Coletiva.* 2013; 18(4):917-26.
 15. Gomes JP. As Escolas Promotoras de Saúde: uma via para promover a saúde e a educação para a saúde da comunidade escolar. *Educação.* 2009; 32(1):84-91.
 16. Cardoso V, Ielusc J, Reis APD, Iervolino SA. Escolas promotoras de saúde. *Rev bras crescimento desenvolv hum.* 2008; 18(2):107-15.
 17. Loureiro I. A importância da educação alimentar: o papel das escolas promotoras de saúde. *Revista Portuguesa de Saúde Pública.* 2004;22(2):43-55.
 18. Saúde Md. Política Nacional de Promoção de Saúde. Brasília; 2010. 60p.
 19. Desenvolvimento Social e Combate a Fome Md. Marco de referência de educação alimentar e nutricional para as políticas públicas. Brasília: Secretaria Nacional de segurança Alimentar e Nutricional; 2012a. 68p.
 20. Amparo-Aantos L. Avanços e desdobramentos do marco de referência da educação alimentar e nutricional para políticas públicas no âmbito da universidade e para os aspectos culturais da alimentação. *Rev de Nutr.* 2013; 26:595-600.
 21. Brasil. Decreto número 7234 de 19 de julho de 2010. Dispõe sobre o Programa Nacional de Assistência Estudantil.
 22. Saúde Md. Guia Alimentar para População Brasileira: promovendo a alimentação saudável. Brasília: 2014. 210p. http://189.28.128.100/dab/docs/portaldab/publicacoes/guia_alimentar_populacao_brasileira.pdf acesso em 14/06/2017.
 23. Baumgartner RN, Chumlea WC, Roche AF, Bioelectric Impedance phase angle and body

- composition. *The American Journal of Clinical Nutrition*, 1988; 48:16-23.
24. Gasparetto RM, Costa e Silva RC. Perfil antropométrico dos universitários dos cursos de nutrição, enfermagem, fisioterapia e educação física do Centro Universitário La Salle, Canoas/RS. *Rev. Assoc. Bras. Nutr.* 2012;4(5):29-33.
25. Paixão LA, Dias RMR, Prado WL. Estilo de vida e estado nutricional de universitários ingressantes em cursos da área da saúde do recife/PE. *Rev. Bras. At Física e Saúde.* 2010;15(3):145-50.
26. Marcondelli P, Costa THM, Schmitz BAS. Nível de atividade física e hábitos alimentares de universitários do 3º a 5º semestres da área da saúde. *Rev. Nutr.* 2008; 21(1):39-47.
27. Brasil. Ministério da Saúde (MS). Secretaria de Vigilância em Saúde. VIGITEL. Brasil 2018: Vigilância de fatores de risco e proteção para doenças crônicas por inquérito telefônico. Brasília: MS; 2019.
28. Instituto Brasileiro de Geografia e Estatística (IBGE). Pesquisa de Orçamento Familiares 2008-2009: Análise do consumo alimentar pessoal no Brasil. Rio de Janeiro: IBGE; 2011.
29. Ledo-Varela T, Román AL, Gonzalez-Sagrado M et al. Características Nutricionales y estilo de vida em universitários. *Nutrición Hospitalaria.* 2011; 26:814-18.
30. Petribú MMV, Cabral PC, Arruda IKG. Estado nutricional, consumo alimentar e risco cardiovascular: um estudo em universitários. *Rer Nutr.* 2009; 22(6): 839-46.
31. Berbigier MC, Magalhaes CR. Educação nutricional em universitários e estratégias para promoção de saúde institucional: revisão integrativa. *Rev Bras Promoç Saúde.* 2017; 30(2):264-74, 2017
32. Brasil. Resolução número 26, de 17 de Junho de 2013. Dispõe sobre o atendimento da alimentação escolar aos alunos da educação básica no âmbito do Programa Nacional de Alimentação e Nutrição – PNAE.
33. Fausto MA, Ansaloni JA, Silva ME et al. Determinação do perfil dos usuários e da composição química e nutricional da alimentação oferecida no restaurante universitário da Universidade Estadual Paulista, Araraquara, Brasil. *Rer Nutr.* 2011; 14(3):171-6.
34. Oliveira RB, Guaglianoni DG, Demonte A. Perfil do usuário, composição e adequação nutricional do cardápio oferecido em um restaurante universitário. *Alim e Nutr.* 2005; 16(4):397-401.
35. Madureira AS, Corseuil HX, Pelegrini A et al. Associação entre estágios de mudança de comportamento relacionados a atividade física e estado nutricional em universitários. *Cad. Saúde Pública.* 2009; 25(10):2139-46.
36. Rodriguez FR, Ximen Palma L, Romo AB et al. Hábitos alimentarios, actividad física, y nivel socioeconómico em estudiantes universitários de Chile. *Nutrición Hospitalaria.* 2013; 28(2):447-55.
37. Burlandy L. A construçao da política de segurança alimentar e nutricional no Brasil: estratégias e desafios para a promoco da intersetorialidade no ambito federal de governo. (Report). *Ciencia & Saude Coletiva.* 2009:851.