

## Dietary practices of quota and non-quota students at a Brazilian public university

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**Abstract** *Abstract: Dietary practices of college students were described and examined according to the means by which they were admitted to the university (quota and non-quota students). A cross-sectional study was conducted with undergraduates (n = 1336) at a public university using a self-administered and identified questionnaire that inquired about their habits of eating breakfast and substituting lunch and/or dinner with snacks as well as the regular consumption ( $\geq 5$  times a week) of markers for healthy and unhealthy eating. Analysis of the association between means of admission to the university and dietary practices was done using univariate and multivariate logistic regression models. It was observed that significant proportions of the students did not eat breakfast; substituted dinner with snacks; had low fruit, vegetable and bean consumption; and frequently consumed sugary beverages, sweets, cookies and packaged salty snacks. The quota students were found to more frequently consume beans, cookies and packaged salty snacks and less frequently substitute dinner with snacks and consume vegetables and fruits. Quota and non-quota students had some similarities in their dietary practices that were unhealthy. The differences observed between the two groups were largely more unfavorable for the quota students, with the exception of bean consumption.*

**Key words** *Food consumption, Dietary habits, Students, Public policy*

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## Introduction

The promotion of healthy dietary practices is currently a priority on the public policy agenda for health, food and nutrition in Brazil<sup>1</sup>. The dietary practices of young adults (on which this study focuses) are influenced by the environment in which they are placed, as occurs with other population groups<sup>2</sup>. Promoting these practices in organizational settings is an action highlighted in the National Food and Nutrition Policy<sup>1</sup>, the National Health Promotion Policy<sup>3</sup>, affirmative action policies<sup>4</sup>, and the National Food and Nutrition Security System<sup>5</sup>, in accordance with policies proposed by the World Health Organization, which point to school, community and work settings as important places that are strategic to promoting healthy eating<sup>6</sup>.

The university setting merits particular attention, as many dietary habits that students acquire there continue into adult life, representing a unique opportunity to promote healthy eating<sup>7</sup>. For many students, attending a university represents the first occasion in which they need to take responsibility for their own housing, food and time and financial management. An inability to handle such tasks may result in skipping meals and eating snacks, thus leading to the nutritional inadequacy of the food consumed<sup>8</sup>. Studies focusing on university students are still scarce. However, various studies have suggested that such students exhibit inappropriate dietary patterns<sup>8-11</sup>.

In Brazil in recent years, the university setting has become even more strategic as a place to promote healthy eating and food and nutritional security<sup>4</sup>, as affirmative action measures have been implemented that provide university access to individuals who have historically been excluded<sup>12</sup>. This has been achieved through systems that prioritize admission according to various criteria: economic (income), racial (black people), schooling (having studied in public schools) and others. The most well-known practice is the system in which university spaces are reversed via quotas. Studies have shown that these policies have been successful in enabling admission to universities but that they have been less effective in ensuring that the students will remain in the institutions until graduation<sup>4,12</sup>. An effective policy to ensure that students admitted through the quota system remain enrolled presupposes a guarantee of access to permanence scholarships, meals (in a university restaurant), student housing, books and media in general, among other resources<sup>12</sup>.

In 2003, the State University of Rio de Janeiro – SURJ (the location of the present study) implemented a quota system for admissions via entrance exam. It was the first Brazilian public university to adopt this affirmative action measure. In 2011 (the year the present study was conducted), measures were developed to promote the permanence of quota students at the university, including the provision of books and the offering of permanence scholarships. Food provision measures such as opening a university restaurant were not considered.

Until the time of the present study, no study had been published about the dietary practices of the groups affected by this affirmative action measure in Brazil that could support measures aimed at ensuring food and nutritional security as an element of an effective permanence policy. The present study aimed to describe the dietary practices of SURJ students and examine them according to the means by which they were admitted to the university (through quotas or otherwise) with the objective of identifying whether or not there were differences in relation to these practices.

## Methods

### Study design and population

This is a cross-sectional study aimed at the environment of students who enrolled in the first semester of 2011 in 31 undergraduate disciplines among the 24 academic units located on the central SURJ campus and who took classes in the second period of the day at the time of data collection. These students were selected due to the fact that their academic activities were concentrated on campus at the beginning of their college studies. In addition, they were already accustomed to life at SURJ since they had experienced the university setting for at least six months and thus had adapted their dietary routines to this new stage in their lives.

### Data collection

Data were collected on 36 days between August and October 2011. This was preceded by meetings with a representative of the office of the SURJ Vice-Chancellor for Undergraduate Studies and the directors of the academic departments in order to inform them about the proposed study and the procedures to be conducted for its realization.

The lists of the students enrolled in the academic departments as well as the class days, times and locations for each major included in the study were accessed through the university's Undergraduate Academic System and with the assistance of the department coordinators.

At the beginning of each class, trained researchers gave self-applied questionnaires to the students who had agreed to participate and had signed the Free and Clear Consent Form. The students took between 10 and 15 minutes to complete the questionnaire. The classes were visited an average of 5.3 times in different departments and at different times in order to include as many students as possible.

### Questionnaire

The data collection instrument was a self-administered questionnaire that was developed based on the instruments used in surveillance systems for risk factors directed at the youth of other countries<sup>13,14</sup>, Brazilian adolescents<sup>15</sup>, and Brazilian adults<sup>16</sup>. It had previously been tested with nutrition students who were enrolled in the university in the second semester of 2010 (n = 21). Terms and/or words that were not clearly understood by the students were revised (e.g. the definitions of lunch, dinner and sweets). The final version of the questionnaire was comprised of 39 questions that inquired about the identification and characterization of the student and his/her dietary practices, including dietary routine and consumption of certain foods (including food groups or preparations) in the seven days preceding the data collection. The question's structure was: "In the last seven days, on how many days did you eat (type of food)?" The response options were: "It did not eat (type of food) in the last seven days", "On one day in the last seven days", "On two days in the last seven days", "On three days in the last seven days", "On four days in the last seven days",

"On five days in the last seven days", "On six days in the last seven days" and "Every day in the last seven days".

The dietary routines considered were: 1) eating each of the three meals and 2) substituting lunch and/or dinner with a snack. Eating each of the three meals was included as a study topic based on the Food Guide for the Brazilian Population in effect at the time, which recommended eating three meals per day, interspersed with small snacks<sup>17</sup>. Furthermore, there is evidence that eating breakfast frequently is associated with

a lower risk for overweight and obesity<sup>18</sup> and an improvement in scholastic performance<sup>19</sup>. The practice of substituting lunch and/or dinner with a snack was also examined because this practice has been shown to be associated with overweight and obesity<sup>10,20</sup>. The foods selected were those considered to be markers for healthy eating (HEM) and unhealthy eating (UHEM). This selection was based on nutritional recommendations for a healthy diet as well as evidence that suggests an association between these variables and risk factors for chronic disease<sup>6,21,22</sup>.

### Study variables and indicators

The following socio-demographic variables were studied: means of admission to the university (with or without a reserved space, in which two categories were adopted: quota students and non-quota students, assuming that the quota students had a lower socio-economic level in light of the criteria set for the space reservation policy previously described); sex; age (categorized as  $\leq 18$ ; 19; 20 - 22;  $> 22$  years old *a posteriori*, according to the age distribution observed for the group of students studied); domestic arrangement in regard to the sharing of housing (living alone, with family, with friend(s) or with partner); mother's schooling (none, did not complete elementary school, completed elementary school, did not complete high school, completed high school, did not complete college and completed college); and the presence of the following possessions and services: landline telephone, computer, home internet access and having a bathroom in the home. These possessions and services were selected due to their greater discriminatory power in relation to others (e.g. refrigerator, television and stove) as evidenced in the 2009 National School Health Study database, which serves as a basis for the risk factor and health protection monitoring system for adolescents and includes students in the last year of elementary school.

Dietary routines were measured by weekly frequency and the following occurrences were ascertained for the previous seven days: eating each of the recommended meals (breakfast, morning snack, lunch, afternoon snack and dinner) and substituting lunch and/or dinner with a snack. Lunch and dinner were considered to be meals that contained rice with beans and/or meat with salad and/or cooked vegetables; soup; and pasta, among others, excluding sandwiches. The habit of eating breakfast five or more days a week was

adopted as a healthy eating marker (HEM) while the habit of substituting lunch and/or dinner with a snack was adopted as an unhealthy eating marker (UHEM).

In regard to food consumption, 13 foods, food groups and preparations were analyzed for the seven days preceding the study inside and/or outside the academic environment: beans; vegetables in general (excluding roots and tubers); raw vegetables; cooked vegetables; fruits in their natural form; French fries and/or fried snacks; hamburger and/or sausage; packaged salty snacks; crackers; cookies; sweets (candy, chocolate, gum, lollipops, etc.); soft drinks; and sugary drinks, excluding drinks containing milk or yogurt and including soft drinks, juices, mate tea, natural guaraná, other teas, coffee, flavored waters, sports drinks and soy-based drinks. The first five foods were considered to be healthy eating markers (HEM) while the last eight foods were considered to be unhealthy eating markers (UHEM).

Based on the weekly frequency that each of the foods, food groups and/or selected preparations was consumed, two types of indicators were created: (1) percentage distribution of weekly frequency of consumption of each food and (2) proportion of the students who consumed each food more regularly (on at least five of the seven days preceding the data collection) and less regularly (on between zero and four of the preceding seven days)<sup>23</sup>. Similar indicators were developed for the dietary routines.

#### Data Analysis

The students' socio-economic conditions were characterized according to their means of admission to the university. The frequencies of food consumption and of the variables about the students' dietary routines were estimated for the total population and according to the means of university admission. The statistical significance of the differences between the quota students and the non-quota students in regard to their socio-demographic characteristics was assessed using the chi-square test. The critical level for identifying significant differences was 0.05.

Analysis of the association between means of university admission (independent variable) and each of the regular dietary practices ( $\geq 5$  days in the week) (dependent variable) was done using univariate and multivariate logistical regression models (the latter considered student sex and age group as co-variables), which generated gross

and adjusted odds ratios and their respective 95% confidence intervals.

Data entry was done by independent typists and was double-verified using Microsoft Excel® 2007. Data analysis was performed with the support of the Statistical Package for the Social Sciences (SPSS) v. 21.0.

#### Ethical aspects

The present study was approved by the Ethics Commission of the office of the SURJ Vice-Chancellor for Post-Graduate Studies and Research under Opinion No. 037/2011. Students who participated in the study agreed to do so and signed a Free and Clear Consent Form.

#### Results

Of the 1508 students who enrolled in the first semester of 2011 (according to official SURJ data), 1336 (88.6%) were studied. Reasons for non-participation in the study were an inability to locate a student ( $n = 138$ ) and refusal to participate ( $n = 34$ ). Of all the individuals studied, 38.8% were quota students and 61.2% were non-quota students. Their socio-demographic characteristics are presented in Table 1. Most of them were female (56.4%); lived with their families (88%); had a landline telephone, computer and internet access at home (more than 90%); had a mother who had at least completed high school (71.7%); and around half (50.6%) were aged 19 or less and had at least two bathrooms at home (50.3%).

With the exception of domestic arrangement in regard to the sharing of housing, the two studied groups differed in regard to all of the socio-demographic variables studied. The group of quota students had a greater proportion of females and a lesser proportion of individuals whose mothers had completed high school (56.9% of the quota students vs. 81.1% of the non-quota students), who had the possessions and services studied and who had at least two bathrooms at home. In addition, a greater proportion of the quota students were 20 years of age or older (Table 1). The mean age of this group was 21.61 (SD = 5.04) while the mean age of the non-quota students was 21.47 (SD = 6.00) – i.e. there was no significant statistical difference between the two groups.

Regarding the students' dietary routines, it can be observed that about half of them (52.2%) ate breakfast every day, a majority (66.5%) regularly ate lunch and a little more than one-third

**Table 1.** Socio-demographic characteristics of students who enrolled in the State University of Rio de Janeiro in the first semester of 2011, according to means of admission to the university. Rio de Janeiro, Brasil, 2012.

Socio-demographic characteristics	Total (%)	Quota Students (%)	Non-Quota Students (%)
Sex (n = 1336) <sup>b</sup>			
Male	43.6	39.4	46.2
Female	56.4	60.6	53.8
Age Group (in completed years) (n=1336) <sup>b</sup>			
≤ 18	25.7	17.8	30.7
19	24.9	23.6	25.7
20-22	26.7	33.8	22.2
> 22	22.8	24.9	21.4
Who they live with (n = 1328)			
Alone	4.1	3.9	4.2
With family	88.0	88.5	87.6
With partner	4.5	4.5	4.5
With friend(s)	3.5	3.1	3.7
Mother's schooling (n = 1316) <sup>b</sup>			
None or did not complete elementary school	14.4	24.2	8.3
Completed elementary school	13.9	19.1	10.7
Completed high school	38.3	42.6	35.6
Completed college	33.4	14.3	45.5
Possessions and services			
Landline telephone (n = 1334) <sup>b</sup>	90.3	86.8	92.4
Computer (n = 1333) <sup>b</sup>	97.4	95.6	98.7
Internet (n = 1333) <sup>b</sup>	95.5	92.5	97.4
Bathrooms: (n = 1334) <sup>b</sup>			
≤ 1 <sup>c</sup>	49.7	66.4	39.2
≥ 2	50.3	33.7	60.8

<sup>a</sup>Quota students – students admitted to the university by entrance exam through a system of reserving spaces according to quotas based on racial and social criteria. Non-quota students – students admitted to the university by entrance exam through the standard system. <sup>b</sup>p value for the chi-square of the difference between quota and non-quota students < 0.05. <sup>c</sup> Two students (both of whom were quota students) reported not having a bathroom with a shower in their homes.

(37.1%) ate dinner daily. It was also found that the practice of having an afternoon snack was more common than having a morning snack and that substituting dinner with a snack was more common than substituting lunch with a snack (Table 2).

In terms of food consumption, a lower daily consumption frequency was observed for the HEM foods (beans, vegetables and fruits). It merits highlighting the proportion of students who reported not eating any of these foods or eating them on only one or two days of the week (20.3%, 28.5% e 51.1%, respectively). On the other hand, the daily consumption of sugary drinks (46.2%), sweets (24.9%), and packaged salty snacks (17.9%) was found to be common (Table 2).

Eating breakfast, substituting lunch with a snack and substituting dinner with a snack on

at least five days of the week were recorded for 67.3%, 4.8% and 24.3% of the students, respectively. No statistically significant differences were observed between the quota and non-quota students in the univariate regression models. These results held up after adjustment, with the exception of substituting dinner with a snack, which was less common among the quota students (Table 3). The frequency of regularly eating (≥ 5 days/week) the HEM foods varied from 20.8% (cooked vegetables) to 55.7% (beans). The consumption frequency for the UHEM foods varied from 14.5% (French fries and/or fried snacks) to 63.2% (sugary drinks). A greater proportion of the quota students regularly ate beans and packaged salty snacks while a greater proportion of the non-quota students regularly ate raw vegetables, fruit and sugary drinks (showing statistically significant differences) (Table 4). These results

**Table 2.** Percentage distribution of the weekly frequency of dietary routines and consumption of marker foods for healthy and unhealthy eating in the previous seven days. Students who enrolled in the State University of Rio de Janeiro in the first semester of 2011. Rio de Janeiro, Brasil, 2012.

Dietary routines and consumption of marker foods for healthy and unhealthy eating	Weekly Frequency							
	0 days	1 day	2 days	3 days	4 days	5 days	6 days	7 days
<b>Routines</b>								
Ate breakfast (n = 1334)	9.8	3.1	5.9	6.8	7.0	9.7	5.5	52.2
Ate a morning snack (n = 1333)	32.7	5.4	9.8	11.2	9.4	8.6	2.8	20.1
Ate lunch a (n = 1335)	1.0	0.5	2.2	3.4	5.8	9.9	10.5	66.5
Ate an afternoon snack (n = 1333)	12.4	2.2	7.1	12.4	12.4	12.5	4.6	36.5
Ate dinner a (n = 1334)	16.3	2.7	5.8	6.7	9.9	13.5	8.0	37.1
Substituted lunch with a snack (n = 1335)	58.1	13.0	12.1	7.1	4.9	2.6	0.7	1.5
Substituted dinner with a snack (n = 1335)	32.7	8.8	14.5	10.8	8.8	6.6	3.1	14.7
<b>Consumption</b>								
Beans (n = 1335)	7.9	4.6	7.8	12.8	11.2	17.1	10.4	28.2
Vegetables b (n = 1336)	11.4	6.1	11.0	15.9	13.8	14.1	6.4	21.2
Raw vegetables (n = 1336)	28.4	11.2	12.4	13.4	9.7	9.5	4.0	11.5
Cooked vegetables b (n = 1336)	25.5	13.5	16.6	14.0	9.6	8.6	2.7	9.5
Fresh fruit (n = 1333)	23.4	13.1	14.6	14.6	10.4	8.0	3.8	12.3
French fries and/or fried snacks c (n = 1335)	23.1	21.9	15.7	14.6	10.3	8.5	1.8	4.3
Hamburger and/or sausage (n = 1335)	14.0	12.7	20.7	18.1	12.8	10.0	2.5	9.1
Packaged salty snacks d (n = 1332)	12.9	10.6	15.0	14.6	12.4	12.3	4.2	17.9
Crackers (n = 1332)	30.6	15.2	16.0	14.0	9.5	4.9	2.9	7.1
Cookies (n = 1333)	21.0	17.6	17.0	15.0	10.3	8.0	3.2	7.9
Sweets e (n = 1332)	9.4	11.9	16.4	14.3	10.1	8.3	4.7	24.9
Soft drinks (n = 1333)	18.1	10.4	17.6	14.2	10.8	8.9	4.6	15.5
Sugary drinks f (n = 1333)	6.1	3.8	6.8	9.6	10.6	11.0	6.1	46.2

<sup>a</sup> Meal containing rice with beans and/or meat and salad and/or cooked vegetables; soup; pasta, among others, excluding sandwiches. <sup>b</sup> Excluding potatoes, cassava and yams (roots and tubers). <sup>c</sup> Excluding packaged potato chips. <sup>d</sup> Including packaged potato chips. <sup>e</sup> Sweets, candies, gum, lollipops, chocolates, etc. <sup>f</sup> Soft drinks, juices, mate tea, natural guaraná, other teas, coffee, flavored waters, sports drinks and soy-based drinks, excluding drinks with milk and yogurt.

held up after adjusting for confounding factors, except for sugary drinks and cookies.

## Discussion

The following unhealthy practices were observed in significant proportions of the young adults studied: not eating breakfast; substituting dinner for a snack; low consumption of fruit, vegetables and beans; and frequent consumption of sugary drinks, sweets and packaged salty snacks. Quota students and non-quota students presented generally similar dietary practices. However, when differences did exist, they usually tended to be less favorable for the quota students. Although this group ate beans more frequently and substituted dinner with a snack less frequently, it was observed that they ate fruit and vegetables less frequently and ate packaged salty snacks and cookies more frequently.

The comparison of our findings for the group of individuals studied with those of other studies is limited due to differences in the socio-demographic characteristics of the groups studied, the questionnaire and the construction of the dietary and socio-economic indicators used. Even so, certain results merit highlighting. In general, our findings agree with those of the 2008-2009 Family Budget Survey<sup>24</sup>, which showed that the traditional Brazilian diet has been largely displaced by a diet rich in ultra-processed ready-to-consume products<sup>25,26</sup> in all population age groups and at different socio-economic levels.

Studies conducted with university students in relation to HEM foods have shown that the insufficient consumption of fruit and vegetables has also been recorded in various settings both in Brazil and in other countries<sup>8,9,11,27,28</sup>. Only one study (conducted in the Brazilian state of Sergipe)<sup>27</sup> analyzed the frequency of bean consumption among university students. Its results show

**Table 3.** Frequency (%) of regular healthy and unhealthy routines ( $\geq 5$  days in the week) according to means of admission to the university. Students who enrolled in the State University of Rio de Janeiro in the first semester of 2011. Rio Janeiro, Brasil, 2012.

Dietary Routines	Regular Practice ( $\geq 5$ days/week)				
	Total (%)	Quota Students (%)	Non-quota students (%)	Gross OR <sup>c</sup> (CI 95%)	Adjusted <sup>d</sup> OR <sup>c</sup> (CI 95%)
Ate breakfast (n = 1334)	67.3	65.2	68.7	0.85 [0.676-1.079]	0.83 [0.660-1.060]
Ate a morning snack (n = 1333)	31.5	29.0	33.1	0.82 [0.648-1.045]	0.85 [0.672-1.092]
Ate lunch <sup>b</sup> (n = 1335)	86.9	86.7	87.0	0.97 [0.701-1.343]	1.02 [0.738-1.430]
Ate an afternoon snack (n = 1333)	53.6	50.5	55.6	0.81 [0.652-1.014]	0.84 [0.672-1.051]
Ate dinner <sup>b</sup> (n = 1334)	58.6	60.0	57.8	1.09 [0.875-1.370]	1.20 [0.957-1.516]
Substituted lunch with a snack (n = 1335)	4.8	4.8	4.8	1.01 [0.605-1.692]	0.96 [0.572-1.621]
Substituted dinner with a snack (n = 1335)	24.3	22.1	25.8	0.81 [0.627-1.056]	0.72 [0.555-0.947]

<sup>a</sup> Quota students – students admitted to the university by entrance exam through a system of reserving spaces according to quotas based on racial and social criteria. Non-quota students – students admitted to the university by entrance exam through the standard system. <sup>b</sup> Meal containing rice with beans and/or meat and salad and/or cooked vegetables; soup; pasta, among others, excluding sandwiches. <sup>c</sup> Odds ratio. <sup>d</sup> Adjustment according to sex and age group, considering non-quota students as the base category.

that a greater proportion of students in Sergipe regularly consume this food compared with university students in Rio de Janeiro.

In regard to UHEM foods, our findings agree with other studies conducted with university students that report a high level of consumption for sweets/soft drinks<sup>8-11,27</sup>, cookies and other ultra-processed foods<sup>10</sup>.

The finding that about one-third (32.7%) of the individuals studied did not regularly eat breakfast was similar to those of other studies with university students conducted in Viçosa, MG and Campinas, SP, Brazil, between 1998 and 2004<sup>9,29</sup>. The finding that a significant portion of the group studied substituted dinner with a snack agrees with the findings of a study conducted with university students in the state of Minas Gerais, in which 49% of the students preferred to have a snack instead of eating dinner, even when this meal was offered to them at the university restaurant at a subsidized price<sup>9</sup>.

Studies have shown that the university environment and routine can make it difficult to have a healthy diet due to various factors (e.g. tight scheduling of activities, behavioral changes, inappropriate time management and economic

difficulties). These conditions lead to students opting for quick snacks to the detriment of healthy preparations, having meals at irregular times and skipping meals<sup>8,26,29,30</sup>.

Our findings also agree with those of Vigitel – a surveillance system of risk factors for and protection against chronic diseases aimed at adults in the Brazilian federal and state capitals<sup>16</sup>. To enhance the comparability of Vigitel's results with ours, we have extracted information from its 2010 database (available at: <http://tabnet.datasus.gov.br/cgi/dh.exe?vigitel/vigitel10.def>) about the regular consumption of four of the seven foods/food groups examined in our study [beans, fruits, vegetables and sugary drinks (soft drinks and artificial juices)] for young adults aged 18-24 and for young adults aged 18-24 with twelve or more years of schooling in Brazil as a whole and in the areas available on the system [region (in this case, the Southeast) and city (in this case, Rio de Janeiro)].

In general, the proportion of students who regularly consumed beans and vegetables was smaller than that of young adults aged 18-24 both in the Brazilian capitals and in the two areas examined. This difference may be partially

**Table 4.** Frequency (%) of regular consumption ( $\geq 5$  days in the week) of marker foods for healthy and unhealthy eating, according to means of admission to the university. Students who enrolled in the State University of Rio de Janeiro in the first semester of 2011. Rio Janeiro, Brasil, 2012.

Marker foods for healthy and unhealthy eating	Regular Consumption ( $\geq 5$ days/week)				
	Total (%)	Quota Students (%)	Non-quota Students (%)	Gross OR <sup>s</sup> (CI95%)	Adjusted <sup>h</sup> OR <sup>s</sup> (CI 95%)
Beans (n = 1335)	55.7	61,0	52.3	1.429 [1.142-1.787]	1.493 [1.187-1.878]
Vegetables <sup>b</sup> (n = 1336)	41.7	39,2	43.3	0.845 [0.675-1.057]	0.814 [0.648-1.022]
Raw vegetables (n = 1336)	25.0	21,4	27.3	0.728 [0.561-0.944]	0.718 [0.551-0.934]
Cooked vegetables <sup>b</sup> (n = 1336)	20.8	19,7	21.5	0.894 [0.680-1.176]	0.817 [0.619-1.080]
Fresh fruit (n = 1333)	24.0	20,7	26.1	0.742 [0.570-0.966]	0.713 [0.545-0.932]
French fries and/or fried snacks <sup>c</sup> (n = 1335)	14.5	15,3	14.1	1.099 [0.805-1.498]	1.187 [0.865-1.628]
Hamburger and/or sausage <sup>a</sup> (n = 1335)	21.7	20,1	22.8	0.852 [0.650-1.116]	0.895 [0.680-1.178]
Packaged salty snacks <sup>d</sup> (n = 1332)	34.5	38,1	32.2	1.294 [1.028-1.630]	1.323 [1.045-1.674]
Crackers (n = 1332)	14.9	17,1	13.5	1.320 [0.973-1.790]	1.328 [0.974-1.812]
Cookies (n = 1333)	19.1	21,7	17.4	1.318 [0.999-1.738]	1.424 [1.073-1.888]
Sweets <sup>e</sup> (n = 1332)	37.9	37,7	38.1	0.983 [0.783-1.234]	0.989 [0.783-1.249]
Soft drinks (n = 1333)	29.0	27,5	29.9	0.892 [0.698-1.139]	0.932 [0.727-1.196]
Sugary drinks <sup>f</sup> (n = 1333)	63.2	59,5	65.6	0.770 [0.613-0.967]	0.811 [0.643-1.022]

<sup>a</sup> Quota students – students admitted to the university by entrance exam through a system of reserving spaces according to quotas based on racial and social criteria. Non-quota students – students admitted to the university by entrance exam through the standard system. <sup>b</sup> Excluding potatoes, cassava and yams (roots and tubers). <sup>c</sup> Excluding packaged potato chips. <sup>d</sup> Including packaged potato chips. <sup>e</sup> Sweets, candies, gum, lollipops, chocolates, etc. <sup>f</sup> Soft drinks, juices, mate tea, natural guaraná, other teas, coffee, flavored waters, sports drinks and soy-based drinks, excluding drinks with milk and yogurt. <sup>s</sup> Odds ratio. <sup>h</sup> Adjustment according to sex and age group, considering non-quota students as the base category.

legenda está diferente do português... verificar e informar qual é o correto?

explained by the fact that the two groups do not necessarily have the same age distribution. In our study, for example, close to half of the students were under 20 years of age and may have had dietary practices that are more similar to those of adolescents than of young adults. The results of various national and international studies conducted with adolescents have conclusively shown that the dietary practices adopted by these young adults are characterized by diets rich in fat, sugar and sodium and a low consumption of fruit, vegetables, milk and dairy products compared to older adults<sup>31-33</sup>.

Also in regard to the dietary profile of the set of individuals studied, a deepening of the discussion about the consumption of sugary drinks (including soft drinks) is merited. The high frequency (63.2%) of sugary drink consumption found is in accordance with the findings of other national and international studies, which indicate that the majority of young adults consume excessive amounts of these products<sup>34,35</sup>.

Furthermore, it is noteworthy that our study found the regular consumption of sugary drinks to be nearly twice as frequent as that of soft drinks. These findings corroborate evidence that



soft drink consumption is being displaced by the consumption of other sugary drinks of low nutritional value<sup>34,36</sup>.

An examination of the results presented here according to the students' means of admission leads us to reflect on the relationship between socio-economic level and dietary practices. Notwithstanding the methodological differences between our study and others, we observe convergent results with studies conducted with youth and adults. Similarly to our study, other studies have shown that individuals (adolescents and/or adults) at higher socio-economic levels generally consume more fruits<sup>5,28,37,38</sup>, vegetables<sup>15,28,37,38</sup> and—to a lesser extent—beans<sup>15,37</sup> compared to those of lower socio-economic levels. On the other hand, we found controversial results in regard to the consumption of sweets. While our findings showed similar consumption patterns between the two groups, we identified a study that showed more frequent consumption among adolescents of higher socio-economic levels<sup>39</sup> and another study that indicated a more frequent consumption among those of lower socio-economic levels<sup>15</sup>. Furthermore, while we observed that the practice of eating breakfast was similar between the two groups, other studies have observed a direct association between socio-economic level and this practice among adolescents and adults<sup>15,38</sup>.

Another aspect that merits comment is the fact that our study found soft drink and sugary drink consumption to be similar between quota students and non-quota students while other studies have found a higher consumption of these products among individuals of higher socio-economic status<sup>15,37,39</sup>. In addition, we observed an inverse association between the regular consumption of cookies and socio-economic level while other studies have found a direct association between the two<sup>15,38</sup>.

In summary, our results converge with those of other studies in regard to the association between socio-economic level and the consumption of fruits and vegetables (direct) and of beans (inverse). This finding demonstrates the complexity of the relationship between socio-economic level and dietary practices as well as the influence that different life contexts and phases can exert on them. It also points to the importance of understanding how this association plays out in different realities.

With regard to this study's methodological aspects, it is worth mentioning the limitations and choice potentiality of a closed questionnaire covering specific foods to characterize the dietary

practices of the studied group. On one hand, it is a fact that such a questionnaire doesn't cover the entire dietary scope of the studied group. On the other hand, similar questionnaires that have focused on the consumption of healthy and unhealthy eating marker foods on the seven days preceding data collection have demonstrated great discriminatory power in characterizing dietary practices among adults<sup>16</sup> as well as dietary practices and patterns among adolescents<sup>40,41</sup>. Instruments structured as described above have been recently validated among adults<sup>42</sup> and adolescents<sup>43</sup>. In addition, the application of these questionnaires has operational advantages in the context of the study presented here—i.e. the use of a self-administered questionnaire together with a large number of individuals in a short period of time.

A positive aspect of this study is that it covered a significant proportion (88.6%) of the group to be studied. Another favorable aspect is that the proportionality between the quota students and the non-quota students in the study (38.8% vs. 61.2%) is similar to that of the entire university student body (35.7% vs. 64.3%)<sup>44</sup>, which suggests that there was no selective loss.

Nevertheless, it is worth commenting on the fact that this study was limited to the students attending courses offered at the university's central campus. Although this campus accounts for 75.0% of all students enrolled in the university, the present study did not consider those students who attend other campuses that are located in cities with different characteristics from those of Rio de Janeiro. These cities generally have a lower quality of life, as measured by the Municipal Human Development Index (MHDI), such as in the case of the cities of Duque de Caixas and São Gonçalo (which have MHDI scores of 0.711 and 0.739, respectively, compared with 0.799 for Rio de Janeiro)<sup>45</sup>, or are located in more outlying areas of the metropolitan region, as is the case for the cities of Nova Friburgo and Resende. Therefore, one cannot rule out the possibility that the students at these campuses have different dietary practices from those of the group studied.

It was observed that the dietary practices of the quota and non-quota students had some similarities and were generally unhealthy and that the differences between the two groups generally tended to be more unfavorable for the quota students who, as described above, had a lower socio-economic level compared with the non-quota students. These findings point to the need for implementing measures to promote healthy

eating and food and nutritional security for this population group. From this perspective, it is worth noting that, following the completion of this study, SURJ opened a university restaurant that offers meals at subsidized prices for all stu-

dents and even lower prices for quota students. A study is currently being conducted to assess the impact of this restaurant's existence on the diets of students according to their means of admission to the university.

### **Collaborations**

PMP Perez and IRR Castro contributed to designing the study, supervising the field work, analyzing the database and revising the manuscript. AS Franco participated in supervising the field work, analyzing the database and revising the manuscript. DH Bandoni participated in designing the study, analyzing the database and revising the manuscript. DB Wolkoff participated in designing the study, supervising the field work and revising the manuscript.

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