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Food practices of health university students according to the recommendations of the Dietary Guidelines for the Brazilian Population

Práticas alimentares de estudantes universitários da área da saúde, de acordo com as recomendações do Guia Alimentar para a População Brasileira

Abstract

Introduction: Dietary practices are influenced by the environment. When entering higher education, university students may change their eating habits by developing new behaviors and social relationships in this new phase of life. **Objective:** To evaluate the dietary practices of first-semester university students enrolled health sciences courses at a federal institution of higher education, according to the recommendations of the *Guia Alimentar para a População Brasileira* [Dietary Guidelines for the Brazilian population]. **Methods:** Cross-sectional study with university students from health sciences courses of a public institution of higher education. Dietary practices were assessed using the scale developed and validated by Gabe and Jaime (2019). Sociodemographic characteristics, lifestyle and health status were assessed. Data analysis comprised frequency distribution and bivariate analysis. **Results:** In total, 148 students were interviewed, of whom 58.1% were women, and 61.5% were 20 years of age or younger, with ages ranging from 18 to 31 years. Inadequate dietary practices were observed in 23.7% students, 52.0% showed risky practices and 24.3% adequate practices. The sum of the risk and inadequacy categories was represented by 75.7% students. Men had a higher frequency of risky dietary practices (64.5%), and women had a higher frequency of inadequate dietary practices (29.1%) ($p = 0.033$). **Conclusion:** A high frequency (75.7%) of inadequate dietary practices was observed in the university students. The comparison between explanatory variables and dietary practices showed a positive association between the sex and dietary practices of the students.

Keywords: Diet. Health Occupations Students. Feeding Behavior. Food Guide.

Resumo

Introdução: As práticas alimentares dos indivíduos são influenciadas pelo ambiente em que eles estão inseridos. Estudantes universitários, ao ingressarem no ensino superior, podem modificar seus hábitos alimentares em função de novos comportamentos e relações sociais que se estabelecem nesta nova fase da vida. **Objetivo:** Avaliar as práticas alimentares de estudantes universitários ingressantes no 1º semestre dos cursos da área da saúde de uma instituição federal de ensino superior, de acordo com as recomendações do *Guia Alimentar para a População Brasileira*. **Métodos:** Estudo transversal com estudantes universitários dos cursos de graduação da área da saúde de uma instituição pública do ensino superior. As práticas alimentares foram obtidas através da escala desenvolvida e validada por Gabe e Jaime (2019). Foram avaliadas as características sociodemográficas, hábitos de vida e condições de saúde. A análise dos dados compreendeu distribuição de frequência e

análise bivariada. **Resultados:** Foram entrevistados 148 estudantes, dos quais 58,1% eram mulheres, 61,5% tinham 20 anos ou menos, com idade variando de 18 a 31 anos. Práticas alimentares inadequadas foram observadas em 23,7% dos estudantes, 52,0% mostraram práticas de risco e 24,3%, adequadas. O somatório das categorias de risco e inadequação foi representado por 75,7% dos estudantes. Homens apresentaram maior frequência de práticas alimentares de risco (64,5%) e mulheres, maior frequência de práticas alimentares inadequadas (29,1%) ($p=0,033$). **Conclusão:** Observou-se alta frequência (75,7%) de práticas alimentares inadequadas no público estudado. Ao comparar as variáveis explicativas com as práticas alimentares, observou-se associação positiva entre o sexo e as práticas alimentares dos estudantes.

Palavras-chave: Alimentação. Estudantes de Ciências da Saúde. Práticas Alimentares Saudáveis. Guias Alimentares.

INTRODUCTION

In recent decades, Brazil has experienced demographic, epidemiological, and nutritional transitions characterized by changes in the aging, disease, and mortality profile, in addition to the dietary patterns of the population.¹

Changes in the dietary pattern and lifestyle of the Brazilian population are primarily characterized by the increased consumption of ultra-processed foods and decreased consumption of fresh and minimally processed foods and by the increased rates of physical inactivity, directly contributing to the increased prevalence of overweight and obesity and, consequently, to the development of chronic non-communicable diseases.²

When studying the behavior of the general population, the group of university students stands out for their high susceptibility to specific health risk behaviors – for example, tobacco smoking, illicit drug use, binge drinking, sedentary lifestyle and adoption of inadequate dietary practices.^{1,3} These negative behaviors can be related to several factors, such as entering university and establishing new behaviors and social relationships.⁴

Studies assessing the eating habits of university students underscore the findings of food consumption in the general population, with a low prevalence of healthy eating, increased intake of processed foods and decreased intake of fruits and vegetables.^{5,6} Therefore, initiatives promoting adequate dietary practices must be implemented in university settings.^{7,8}

Considering the importance of an adequate and healthy diet, the lack of studies on the eating habits of university students and the need to understand this subject, this study aims to evaluate the dietary practices of university students according to the recommendations of the second edition of the *Guia Alimentar para a População Brasileira* [Dietary Guidelines for the Brazilian population], published by the Ministry of Health (*Ministério da Saúde* – MS) in 2014, which is a key instrument for supporting and encouraging initiatives promoting adequate and healthy dietary practices, both individually and collectively.^{9,10}

METHODS

This cross-sectional study was conducted with university students enrolled in face-to-face undergraduate programs in the field of health sciences, in the first semester of 2019, at the Federal University of Ouro Preto (*Universidade Federal de Ouro Preto* – UFOP). This research is part of a major study entitled "*Sintomas de ansiedade e depressão entre estudantes universitários de Minas Gerais: estudo longitudinal*" [Anxiety and depression symptoms among university students from Minas Gerais: a longitudinal study], wherein data will be collected in three periods (T0 – in the first semester of the undergraduate course; T1 – after attending the course for two years; T2 – after attending the course for four years). The study aims to assess the occurrence of anxiety and depression symptoms among university students and their associated factors, as well as behavioral changes observed during academic life. The present study used T0 data from the longitudinal study.

The study population consisted of all students enrolled in face-to-face undergraduate programs in Physical Education, Pharmacy, Medicine and Nutrition in the first semester of 2019, based on a roster provided by the department of education, UFOP.

Being a student, either male or female, enrolled in one of the four face-to-face undergraduate programs evaluated in this study was considered the inclusion criterion. Students younger than 18 years were excluded

because their guardians would have to authorize their participation in the study, and they were not the target audience of the scale used in the study (18-60 years).

Data collection was preceded by a pilot study conducted with students enrolled in the second semester of the senior year of the course in Nutrition, in 2019/1, and who, therefore, were not included in the sample. The pilot study aimed to test the field survey logistics, to assess its consistency, clarity, relevance, and suitability for the study objectives and to train the team responsible for the data collection.

To collect the data, a professor of each course was invited by e-mail (except for the professor of Nutrition, who was contacted in person), informing the professors about the research and asking them a time (around 50 minutes) during their lessons to administer the questionnaires. This time was estimated based on the average time spent by students to answer the questionnaire in the pilot study conducted during the research planning phase. Data were collected in the classroom, after scheduling with the professor responsible for the course.

The research and its objectives were presented to the students, who were also informed about the importance of participating in the study and its risks and benefits. The students were invited to voluntarily participate in the research.

The participants signed an Informed Consent Form (*Termo de Consentimento Livre e Esclarecido* – TCLE), consisting of a clarification page about the research and request for authorization to use the data. The data were collected only after clarifying doubts about the research proposal.

The students who agreed to participate in the study and who signed the informed consent form answered a self-administered and confidential questionnaire, handed out by the researchers. The questionnaire addressed questions about general and socioeconomic characteristics, lifestyle, health status, violence, academic experiences, social support, quality of life, and resilience. The participants also received a frequently asked questions sheet, designed to clarify doubts about some items of the questionnaire.

Outcome variable

The outcome variable of the study was “dietary practices”, assessed using the scale developed and validated by Gabe & Jaime¹¹ for adults. This scale consists of statements (items) prepared based on the recommendations of the second edition of the *Guia Alimentar para a População Brasileira* [Dietary Guidelines for the Brazilian population]. The response options for these items were through a 4-point Likert scale – “strongly agree”, “agree”, “disagree”, and “strongly disagree” –, aiming towards encouraging the interviewees to carefully analyze the sentence.

The items were grouped into four dimensions: food choices, eating modes, domestic organization, and planning. Subsequently, these dimensions were characterized as positive (planning and domestic organization) and negative (eating modes and food choices). This classification was proposed because the dimensions eating modes and food choices measured constructions opposite to the recommendations of the Guide.⁹ Thus, the scores assigned to the responses to each item in the dimensions food choices and ways of eating were inverted to ensure that the total score was properly calculated, as shown in Table 1.

Table 1. Instructions for the sum of individual scores for each answer on the scale of dietary practices. Ouro Preto, 2019.

Response option of the Likert scale	Items /score	
	1-13	14-24
Strongly disagree	0	3
Disagree	1	2
Agree	2	1
Strongly agree	3	0

Source: Adapted from GABE, Kamila Tiemann; JAIME, Patricia Constante. Development and testing of a scale to evaluate diet according to the recommendations of the Dietary Guidelines for the Brazilian Population. *Public health nutrition*, p. 1-12, 2019.

The sum of the individual scores attributed to the responses to each item was classified as “great”, when lower than 31 points; “keep it up”, when ranging from 31 to 41 points; and “watch out”, when higher than 41 points. Accordingly, to classify the dietary practices based on the total scores, the responses “great”, “keep it up”, and “watch out” were classified as “adequate”, “risky”, and “inadequate”, as proposed by the authors of the scale (Table 2). Subsequently, for the present study, the dietary practices were categorized as “adequate” and “inadequate” (risky and inadequate).

Table 2. Categories related to eating practices from the scores. Ouro Preto, 2019.

Dietary practices	Points/score
Inadequate	< 31
Risky	31-41
Adequate	> 41

Source: Adapted from BRASIL. Ministério da Saúde. Secretaria de atenção primária à saúde. Departamento de Atenção Básica. Teste "Como está a sua alimentação?". Brasília: Ministério da Saúde, 2018b. Available in: http://189.28.128.100/dab/docs/portaldab/publicacoes/guiadebolso_folder.pdf. Accessed in: June 21, 2019.

According to the *Guia Alimentar para a População Brasileira* [Dietary Guidelines for the Brazilian population] pocketbook, the individuals who scored up to 31 points need to change their eating habits to have a healthy and pleasurable diet and are considered individuals with inadequate dietary practices. The individuals whose scores ranged from 31 to 41 points are halfway to a healthy diet but need to improve some aspects related to their diet and are classified as individuals with risky dietary practices. Lastly, the individuals whose scores were higher than 41 points appear to have a healthy diet in several aspects and are classified as individuals with adequate dietary practices.¹²

Explanatory variables

The explanatory/ independent variables comprised three domains, namely:

1. Sociodemographic characteristics

The following characteristics were evaluated: sex (male and female), age (20 years or younger and older than 20 years), course (Nutrition, Medicine, Physical Education and Pharmacy), race (white and other – yellow, brown, mulatto or black), sexual identity (cisgender or transgender/ transsexual), sexual orientation (heterosexual or other – homosexual, bisexual, and asexual), marital status (single and other – married, cohabiting, widowed, divorced), total monthly family income (less than three minimum wages or three or more minimum wages), work (yes or no), receives financial aid from the university (yes or no), housing

(pension/ hotel/ hostel/ inn/ family home or house sharing/ fraternity or sorority) and religious beliefs (yes or no).

2. Lifestyle

This domain consisted of the following variables: physical activity (yes or no), use of leisure time (watching movies and television series, practicing physical activity, reading books; studying and others; using social media), tobacco smoking (yes or no), consumption of alcoholic beverages (yes or no).

3. Health status

The health status domain consisted of the variables “self-rated health” and “anthropometric profile”. Self-rated health was assessed using the question “In general, how would you rate your health?” and classified into “good” (very good and good) and bad (moderate, bad and very bad).

The anthropometric profile included the assessment of weight and height self-reported by the participants. Then, the body mass index (BMI) was calculated and classified by age group and according to the reference values for adolescents and adults recommended by the World Health Organization. BMI was calculated by dividing the weight in kilograms (kg) by the square of the height in meters (m²).

For students aged from 18 to 19 years and 11 months, the classification of adolescent was used,¹³ considering those below the 3rd percentile underweight; from percentiles 3 to 85, normal weight; from percentiles 85 to 97, overweight; and above percentile 97, obese. Age in months was used for this classification, adopting the same values for 19 full years to evaluate individuals aged from 19 years and 1 month to 19 years and 11 months.

For adult students (older than 20 years), BMI lower than 18.5 kg/m² was considered underweight; from 18.5 to 25 kg/m², normal weight; from 25 kg/m² to 30 kg/m², overweight; and higher than 30 kg/m², obesity. Then, the variable “overweight” was created, wherein individuals classified as overweight and obese were grouped into the category “overweight”; and the others in the category “non-overweight”.

Data analysis

The data were tabulated by double typing, using the tool Google Forms and the software Microsoft Office Excel 2013, to ensure consistency between data sources and reliability in their input.

The statistical software STATA, version 9.0, was used for data analysis. Categorical variables were analyzed descriptively through frequency distribution. For comparison between the outcome and the other independent variables, bivariate analysis was performed using chi-squared test. The significance level was settled at $p \leq 0.05$. In the bivariate analyses, the score was reclassified into adequate and inadequate (risky + inadequate).

Ethical issues

This study was approved by the Research Ethics Committee of the Federal University of Ouro Preto (*Universidade Federal de Ouro Preto – UFOP*), under opinion number 85839418.8.1001.5150.

RESULTS

Of the 148 students who answered the questionnaire, 58.1% (n=86) were women and 93.9% (n=139) were single. Age ranged from 18 to 31 years, and 61.5% (n=91) students were 20 years of age or younger. Regarding the distribution by course, 32.4% (n=48) students were studying Pharmacy, 28.4% (n=42) Medicine, 21.6% (n=32) Physical Education, and 17.6% (n=26) Nutrition (Table 3).

Regarding the race/color of the students, 52.7% (n=78) declared themselves as non-white (including yellow, brown, mulatto or black). Most (99.3%) students identified themselves as cisgender. Among the students interviewed, 147 answered the question about sexual orientation, and 86.4% (n=127) students considered themselves heterosexual (Table 3).

Based on family income, 60.8% (n=90) students had a family income at least three minimum wages. Regarding paid work, 94.6% (n=140) students declared that they did not work, and of the 139 respondents, 96.4% (n=134) declared that they did not receive financial aid from the Federal University of Ouro Preto (*Universidade Federal de Ouro Preto – UFOP*) (Table 3).

Most (64.2%) students lived with other people or in fraternities and sororities, and 72.3% (n=107) reported some type of religious belief (Table 3).

Regarding students' lifestyle, 66.2% (n=98) reported practicing some type of physical activity, 40.5% (n=60) mentioned studying for their courses during their leisure time or did other activities, 88.5% (n=131) denied smoking, and 68.9% (n=102) reported drinking alcohol (Table 3).

Regarding self-rated health, 60.8% (n=90) students evaluated their health as good. Regarding the anthropometric profile, 81.8% (n=121) students were not overweight (Table 3).

When comparing the explanatory variables with the dietary practices of the students, no significant differences were found (Table 3).

Table 3. Sociodemographic characteristics, lifestyle, and health conditions of first-semester university students enrolled in health sciences courses according to type of eating practices, Federal University of Ouro Preto, 2019 (n=148)

Variables	n	%	Dietary practices - Score Gabe. 2019		p-value
			Inadequate (%)	Adequado (%)	
Sex					0.232
Female	86	58.1	72.1	27.9	
Male	62	41.9	80.7	19.3	
Age					0.128
≤ 20 years	91	61.5	71.4	28.6	
> 20 years	57	38.5	82.5	17.5	
Course					0.862
Nutrition	26	17.6	80.8	19.2	
Medicine	42	28.4	73.8	26.2	
Physical Education	32	21.6	78.1	21.9	
Pharmacy	48	32.4	72.9	27.1	
Skin color					0.433
White	70	47.3	78.6	21.4	
Other (yellow, brown, mulatto, or black)	78	52.7	73.1	26.9	
Sexual identity					0.569
Cisgender	147	99.3	75.5	24.5	
Transgender and/or transsexual	1	0.7	100.0	0.0	

Table 3. Sociodemographic characteristics, lifestyle, and health conditions of first-semester university students enrolled in health sciences courses according to type of eating practices. Federal University of Ouro Preto, 2019 (n=148). (Continues)

Sexual orientation (n=147)					0.615
Heterosexual	127	86.4	74.8	25.2	
Other (homosexual, bisexual and asexual)	20	13.6	80.0	20.0	
Marital status					0.340
Single	139	93.9	74.8	25.2	
Other (married, cohabiting, widowed, divorced)	9	6.1	88.9	11.1	
Total family income (MW* = R\$998.00)					0.726
<3 minimum wages	58	39.2	74.1	25.9	
≥ 3 minimum wages	90	60.8	76.7	23.3	
Work					0.963
No	140	94.6	75.7	24.3	
Yes	8	5.4	75.0	25.0	
Financial assistance (n=139)					0.870
Not receive	134	96.4	76.8	23.1	
Receive	5	3.6	80.0	20.0	
Housing					0.051
Family or pension/hostel	53	35.8	84.9	15.1	
Friends or republics	95	64.2	70.5	29.5	
Religious belief					0.398
No	41	27.7	80.5	19.5	
Yes	107	72.3	73.8	26.2	
Practices physical activity					0.457
No	50	33.8	72.0	28.0	
Yes	98	66.2	77.6	22.5	
Use of free time					0.434
Watch movies and series + PA* + Read books	58	39.2	77.6	22.4	
Studying and others	60	40.5	78.3	21.7	
Social networks	30	20.3	66.7	33.3	
Tobacco smoking					0.935
No	131	88.5	75.6	24.4	
Yes	17	11.5	76.5	23.5	
Alcohol consumption					0.365
No	46	31.1	80.4	19.6	
Yes	102	68.9	73.5	26.5	
Self-rated health					0.127
Good	90	60.8	80.0	20.0	
Bad	58	39.2	69.0	31.0	
Anthropometric profile					0.477
Non-overweight	121	81.8	76.9	23.1	
Overweight	27	18.2	70.4	29.6	

Dietary practices of the university students according to the four dimensions proposed by the authors Gabe and Jaime (2019)

Planning

Of the 148 undergraduate students who participated in this study, 52.7% did not eat fruit at breakfast, 70.3% did not consume whole wheat flour often, 89.2% did not replace beans by peas, lentils or chickpeas, and 55.4% of students did not plan their meals daily (Table 4).

In total, 63.3% students reported usually carrying food with them in case they feel hungry during the day; 49.3% students preferred eating organic fruit and vegetables. However, approximately 61.0% students reported not having a preference for consumption of locally produced foods (Table 4).

In this study, 67.6% students did not usually snack fruits and nuts, and 60.8% of the students reported eating calmly (Table 4).

Domestic organization

Among the participants, 64.6% students do not usually buy food in open-air or street markets. In total, 54.7% students shared domestic chores involved in preparing meals and shared meals, and 76.3% reported participating in food preparation at home (Table 4).

Eating modes

The results showed that 81.6% students usually had sit-down meals; 61.5% skipped at least one of the main meals (lunch and dinner); and 65.5% did not usually have (a) sit-down meal(s) on the sofa in the living room, on the bed, or at the desk. Most students (79.8%) did not skip the meal to solve other issues during the mealtime (Table 4).

Food choices

In addition, 76.4% students usually add sugar when preparing/ drinking coffee or tea; 54.0% students usually drink sodas; and 62.1% students drink processed juices from a juice box, bottle or can or prepared from powder (Table 4).

Approximately 58.0% students did not have sandwiches, snacks or pizza for lunch or dinner, and 52.0% students did not eat at fast food restaurants or snack bars. In addition, 69.0% students usually snacked between meals, and 81.1% students chew gum and eat chocolates and other sweets (Table 4).

Table 4. Description of the questions on the scale of dietary practices of first-semester university students enrolled in health sciences courses at the Federal University of Ouro Preto, 2019 (n = 148)

Alternatives	Dietary practices N=148 (%)			
	Strongly agree	Agree	Strongly agree	Strongly disagree
I usually eat fruit at breakfast	13.5	33.8	32.4	20.3
We commonly use whole-meal wheat flour at home	9.4	20.3	33.1	37.2
I usually vary the consumption of beans among peas, lentils and chickpeas	4.0	6.8	29.7	59.5
I usually plan my daily meals	16.9	27.7	24.3	31.1
I usually carry some food with me in case I get hungry during the day	30.6	32.7	17.0	19.7
When I choose fruits and vegetables, I prefer those that are organic	11.5	37.8	33.1	17.6

Table 4. Description of the questions on the scale of dietary practices of first-semester university students enrolled in health sciences courses at the Federal University of Ouro Preto, 2019 (n = 148) (Continues)

Alternatives	Dietary practices N=148 (%)			
	Strongly agree	Agree	Strongly agree	Strongly disagree
When I choose fruits and vegetables, I prefer those that come from local farmers	8.1	31.1	39.2	21.6
When I eat small meals during the day, I usually have fruits or nuts	7.4	25.0	35.8	31.8
I try to eat slowly	16.9	43.9	26.4	12.8
I usually buy foods at street market	5.5	29.9	37.4	27.2
We share tasks which involve the preparation and consumption of foods at home	17.6	37.1	27.7	17.6
I usually engage in meal preparation at home	35.1	41.2	16.9	6.8
I usually eat breakfast/lunch/dinner at the table	41.5	40.1	12.9	5.5
I usually skip at least one of the main meals (lunch or dinner)	12.2	26.3	24.3	37.2
I usually eat breakfast/lunch/dinner seated on the couch in the living room or in bed	10.8	23.7	38.5	27.0
I usually eat breakfast/lunch/dinner at my work's or study's desk	14.2	20.3	31.1	34.4
I deal with personal issues during meal time, and therefore I usually end up not eating anything	8.1	12.1	34.5	45.3
When I drink coffee or tea, I usually add sugar	42.6	33.8	4.7	18.9
I usually take sandwiches, savoury snacks or pizza for lunch or dinner instead of freshly prepared dishes	8.8	33.1	29.7	28.4
I usually drink soft drinks	16.2	37.8	22.3	23.7
I often snack between meals	25.7	43.3	15.5	15.5
I usually go to fast-food restaurants or snack bars	9.5	38.5	30.4	21.6
I usually drink industrialized juices, such as those which are powdered or the ones that are packed in boxes, bottles or tins	20.2	41.9	20.3	17.6
I usually eat candies, chocolates and other sweets	37.2	43.9	14.2	4.7

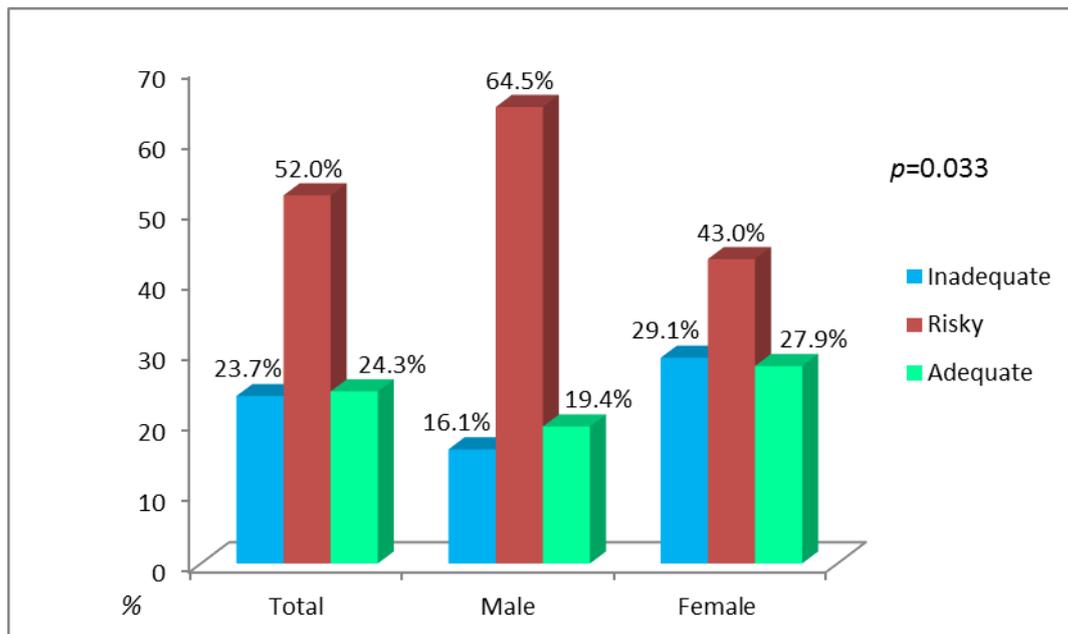
Dietary practices of the university students by sex

Regarding dietary practices, 23.7% (n=35) students show inadequate dietary practices; 52.0% (n=77) demonstrate risky dietary practices; and 24.3% (n=36) show adequate dietary practices (Figure 1).

Regarding dietary practices by sex, 16.1% (n=10) male students show inadequate dietary practices; 64.5% (n=40), risky practices; and 19.4% (n=12), adequate practices, Regarding the female students, 29.1% (n=25) show inadequate dietary practices; 43.0% (n=37), risky practices; and 27.9% (n=24), adequate practices. The comparison between dietary practices and the sex of the students shows a significant difference between the outcome variable and the sex variable (Figure 1).

The male students showed a higher prevalence of risky dietary practices than the female students. In turn, the latter showed higher frequencies of inadequate dietary practices (Figure 1).

Figure 1. Distribution of dietary practices among first-semester university students enrolled in health science courses at the Federal University of Ouro Preto. 2019 (n=148)



DISCUSSION

This study aimed to evaluate the dietary practices of university students aged from 18 to 31 years, enrolled in courses in the field of health sciences at the Federal University of Ouro Preto (*Universidade Federal de Ouro Preto* – UFOP), in Minas Gerais, Brazil, aiming that this information can be used for further research on the subject.

The sample of this study had a higher number of female students, corroborating the findings of other studies with university students.^{3,4,8,14} This result is also in line with the results from the *Censo da Educação Superior de 2017* [2017 Higher Education Census], which shows that, of a total of 3,226,249 students enrolled in undergraduate courses in 2017, 55.2% are female and 44.8% are male.¹⁵

The findings in the present study showed that sociodemographic (except for the “sex” variable), lifestyle, and health status variables had no effect on the dietary practices in this population.

Regarding the socioeconomic level, the students predominantly had a family income at least three minimum wages, thus corroborating a study conducted with university students of the course in Nutrition at UFOP, which found a family income predominantly ranging from 4 to 6 minimum wages.¹⁶

The dietary practices of students with family income at least three minimum wages were more inadequate. However, no significant differences were found between the family income and dietary practices of the students. These results differ from the findings of the study by Costa and colleagues (2018), conducted at a public university of the interior of Minas Gerais, who noted that the higher the family socioeconomic level was, the more inadequate the dietary habits would be.⁴

With regard to housing, the tendency to develop inadequate dietary practices ($p = 0.051$) was greater when students had left their parents’ homes to live with relatives, friends, in a fraternity or sorority or in a pension/ inn, In line with the findings of the present study, the research conducted by Bernardo et al.⁷ showed that, when leaving their parents’ homes to go to university, students may change their eating habits

throughout their undergraduate. Similar results were found in a study conducted by Bagordo et al.¹⁷ with university students who lived away or who were far from home. The authors observed that 79.0% university students living far from their families had changed their eating habits since going to college.¹⁷

These findings can be explained, above all, by the new behaviors acquired when entering university and by the overlapping activities and responsibilities in personal and academic life.¹

As for the evaluation of the anthropometric profile, the present study found no significant differences between the BMI and dietary practices of the students. However, the results showed that the prevalence of students without overweight was high (81.8%), as shown in the studies by Silva et al.¹⁶ who noted that, of the 175 participants, 82.1% had normal weight, and by Carvalho et al., who found that, among the 587 university students who participated in the research, approximately 77.5% had normal weight, in agreement with the data from the present study.¹⁸

Regarding dietary practices, no studies have used the scale developed by Gabe & Jaime¹¹ yet, as reported in the present study, thereby limiting the comparison between the present findings and those of other studies on dietary practices.

Among the studies that evaluate the eating habits of individuals, the study by Machado et al. assessed that 55.0% participants reported the habit of “snacking” between meals.¹⁹ Although these findings are in line with the results from the present study, the studies have different age ranges of the study populations.

The analysis of some characteristics of the dietary practices of the students highlights the consumption of sodas, processed juices, and treats, in addition to the habit of replacing the main meals by sandwiches, salty snacks or pizza. These findings corroborate those of Perez et al.⁸ in their study with students from a Brazilian public university, which showed the recurrent practice of replacing dinner by a snack and the high consumption of ultra-processed foods, particularly sugary drinks, treats and cookies and/ or packaged snacks.

According to the *Pesquisa de Orçamentos Familiares (POF) de 2008-2009* [2008-2009 Family Budget Survey], the high intake of ultra-processed foods, rich in sugars and fat, may cause a decrease in and/or replacement of the consumption of fresh and minimally processed foods, which are essential for an adequate and healthy diet.²⁰ Furthermore, Louzada et al, noted in their study, that ultra-processed foods tend to favor a nutritionally unbalanced diet, due to their unfavorable nutritional profile.²¹

According to the recommendations of the *Guia Alimentar para a População Brasileira* [Dietary Guidelines for the Brazilian population], ultra-processed foods should be avoided for several reasons, especially for their nutritionally unbalanced composition and for replacing the consumption of fresh or minimally processed foods. Ultra-processed foods favor excessive calorie consumption and adversely affect culture, social life, and the environment. Thus, based on the golden rule that translates the four main recommendations for an adequate and healthy diet, the Guide advises the population to “always prefer fresh or minimally processed foods and culinary preparations to ultra-processed foods”.⁹

The relationship between the dietary practices of students and the variable “sex” ($p=0.033$) also stands out because the prevalence of risky dietary practices is higher in male students (64.5%) than in female students (43.0%). Similar results were found in a study with university students, which showed significant differences ($p=0.001$) between eating attitudes and the variable “sex”, with male individuals displaying inadequate dietary practices, confirming the findings of this study.¹⁸ However, such results differ from those observed in a study with undergraduate students in the field of health sciences, which found no significant differences ($p=0.09$) in eating attitudes between men and women.⁴

Hence, the dietary practices of university students assessed in this study contradict the recommendations from the *Guia Alimentar para a População Brasileira* [Dietary Guidelines for the Brazilian population] for a healthy diet, confirming the need for promoting health and for further encouraging adequate and healthy nutrition among university students.

This study is innovative because it uses the scale developed by Gabe & Jaime for adults,¹¹ a new instrument developed based on recommendations from the current *Guia Alimentar para a População Brasileira* [Dietary Guidelines for the Brazilian population].⁹

Because this is the first study to use this scale, the comparison of the results with those from other studies is limited due to the different means used to assess dietary practices and to the lack of comparability of the scale used in this study with instruments used in other research studies.

Lastly, another limitation is the study sample, which consisted of freshman enrolled in their first semester, who may not have yet changed their eating habits considering their recent transition into academic life. However, entering college tends to favor the adoption of new dietary practices.

Thus, despite its limitations, this study is relevant in suggesting that dietary practices are directly associated with students' sex. Thus, a different approach must be used to implement health- and adequate and healthy eating-promoting actions for university settings.

CONCLUSION

The findings of this study allow us to conclude that the dietary practices of university students are positively correlated with the "sex" variable and that university students have a high percentage of risky (52.0%) and inadequate (75.7%) dietary practices. Male and female students showed different eating habits. Men had a higher frequency of risky dietary practices; in turn, women had a higher frequency of inadequate dietary practices.

Therefore, health- and healthy eating-promoting public policies and programs must be developed to help university students practice proper and healthy eating because many of the dietary habits that they acquire are maintained afterwards. Accordingly, the dietary practices of students must be known according to the new *Guia Alimentar para a População Brasileira* [Dietary Guidelines for the Brazilian population].

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REFERENCES

1. Duarte FM, Almeida SDS, Martins KA. Alimentação fora do domicílio de universitários de alguns cursos da área da saúde de uma instituição privada. *O Mundo da Saúde* 2013;37(3):288-298.
2. Azevedo ECC, Diniz AS, Monteiro JS, Cabral PC. Padrão alimentar de risco para as doenças crônicas não transmissíveis e sua associação com a gordura corporal - uma revisão sistemática. *Ciência & Saúde Coletiva* 2014;19(5):1447-58. DOI: <https://doi.org/10.1590/1413-81232014195.14572013>.
3. Sousa TF, Mororó JHP, Barbosa AR. Condutas negativas à saúde em estudantes universitários brasileiros. *Ciência & Saúde Coletiva* 2018;18(12):3563-75. DOI: <https://doi.org/10.1590/S1413-81232013001200013>.

4. Costa DG, Carleto CT, Santos VS, Hass VJ, Gonçalves RMDA, Pedrosa LAK. Qualidade de vida e atitudes alimentares de graduandos da área da saúde. *Revista Brasileira de Enfermagem* 2018;71(4):1642-9. DOI: <http://dx.doi.org/10.1590/0034-7167-2017-0224>.
5. Mendes MLM, Silva FR, Messia CMBO, Carvalho PGS, Silva TGA. Hábitos alimentares e atividade física de universitários da área de saúde do município de Petrolina-PE. *Tempus Actas de Saúde Coletiva* 2016;10(2):205-17. DOI: <http://dx.doi.org/10.18569/tempus.v10i2.1669>.
6. Ramalho AA, Dalamaria T, Souza OF. Consumo regular de frutas e hortaliças por estudantes universitários em Rio Branco, Acre, Brasil: prevalência e fatores associados. *Cadernos de Saúde Pública* 2012;28(7):1405-13. DOI: <https://doi.org/10.1590/S0102-311X2012000700018>.
7. Bernardo GL, Jomori MM, Fernandes AC, Proença RPC. Food intake of university students. *Revista de Nutrição* 2017;20(6):847-65. DOI: <https://doi.org/10.1590/1678-98652017000600016>.
8. Perez PMP, Castro IRR, Franco AS, Bandoni DH, Wolkoff DB. Práticas alimentares de estudantes cotistas e não cotistas de uma universidade pública brasileira. *Ciência & Saúde Coletiva* 2016;21(2):531-42. DOI: <https://doi.org/10.1590/1413-81232015212.01732015>.
9. Brasil. Ministério da Saúde. Secretaria de Atenção à Saúde. Departamento de Atenção Básica. Guia alimentar para a população brasileira. 2. ed.. Brasília: Ministério da Saúde. 2014.
10. Oliveira NRF, Jaime PC. O encontro entre o desenvolvimento rural sustentável e a promoção da saúde no Guia Alimentar para a População Brasileira. *Saúde e Sociedade* 2016;25(4):1108-21. DOI: <https://doi.org/10.1590/s0104-12902016158424>.
11. Gabe KT, Jaime PC. Development and testing of a scale to evaluate diet according to the recommendations of the Dietary Guidelines for the Brazilian Population. *Public Health Nutrition* 2019;22(5):785-96. DOI: <https://doi.org/10.1017/S1368980018004123>.
12. Brasil. Ministério da Saúde. Secretaria de Atenção Primária à Saúde. Departamento de Atenção Básica. Teste "Como está a sua alimentação?". Brasília: Ministério da Saúde. 2018b.
13. de Onis M, Onyango AW, Borghi E, Siyam A, Nishida C, Siekmann J. Development of a WHO growth reference for school-aged children and adolescents. *Bull World Health Organ* 2007;85:660-7.
14. Marcondelli P, Costa THM, Schmitz BAS. Nível de atividade física e hábitos alimentares de universitários do 3º ao 5º semestres da área da saúde. *Revista de Nutrição* 2008;21(1):39-47. DOI: <https://doi.org/10.1590/S1415-52732008000100005>.
15. Brasil. Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira. Censo da educação superior: 2017 – Divulgação dos principais resultados. Brasília: Ministério da Educação. 2017.
16. Silva JD, Silva ABJ, Oliveira AVK, Nemer ASA. Influência do estado nutricional no risco para transtornos alimentares em estudantes de nutrição. *Ciência&SaúdeColetiva* 2012;17(12): 3399-406. DOI: <https://doi.org/10.1590/S1413-81232012001200024>.
17. Bagordo F, Grazi T, Serio F, Idolo A. Dietary habits and health among university students living at or away from home in southern Italy. *Journal of Food & Nutrition Research* 2013;52(3):164-171.
18. Carvalho PHB, Filgueiras JF, Neves CM, Coelho FD, Ferreira MEC. Checagem corporal, atitude alimentar inadequada e insatisfação com a imagem corporal de jovens universitários. *Jornal Brasileiro de Psiquiatria* 2013;62(2):108-14. DOI: <https://doi.org/10.1590/S0047-20852013000200003>.
19. Machado CH, Carmo AS, Horta PM, Lopes ACS, Santos LC. Efetividade de uma intervenção nutricional associada à prática de atividade física. *Cadernos Saúde Coletiva* 2013;21(2):148-53. DOI: <https://doi.org/10.1590/S1414-462X2013000200008>.
20. Instituto Brasileiro de Geografia e Estatística. Pesquisa de Orçamentos Familiares 2008-2009: Avaliação nutricional da disponibilidade domiciliar de alimentos no Brasil. Rio de Janeiro: IBGE; 2010b.
21. Louzada MLC, Martins APB, Canella DS, Baraldil LG, Levy RB, Claro RM et al. Alimentos ultraprocessados e perfil nutricional da dieta no Brasil. *Revista de Saúde Pública* 2015;49(38):1-11. DOI: <https://doi.org/10.1590/S0034-8910.2015049006132>.

Contributors

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