

Comparison of eating habits between University students

Rafael Carreira Batista, Miguel Florentino Antonio, Pedro Gazotto Rodrigues da Silva, Yuuki Daniel Tahara Vilas Boas, Vinicius Hideki Hamasaki Uema, Kathleen Caroline de Oliveira Campos, Luis Matheus Leonel Borghette De Melo, Pedro Beraldo Borba, Sofia Goldbaum Calil Lopes, Adriano Nakamura, Patricia Cincotto dos Santos Bueno
 Universidade de Marília
 Universidade de Marília, Unimar
 Marília, Brasil

Abstract— Eating habits contribute strongly to promoting the health of the individual. Its devaluation, so present today, caused by the exchange of healthy foods for others with high caloric value brings with it an increase in the development of chronic diseases. In the case of university students, their eating habits are influenced by factors, such as admission to the university, exchange of their parents' house for university housing, anxiety and little time for preparing meals. The purpose of this study was to evaluate the eating habits of university students from three UNIMAR courses. 135 students of the Medicine, Nutrition and Agronomy courses were interviewed. The questionnaire "How is your food?" Was used. The most important findings of the total sample revealed an inadequate fruit consumption (71.8%), vegetables (84.4%), sweets (80.7%) and the high presence of alcohol use among university students (71.8%). In short, in the general context, the female gender had better eating habits in relation to the male and when separating the samples by course, a difference was observed between them, revealing the Nutrition course with the highest average of scores (41.16) when it comes to eating habits, followed by a medical course (35.37) and, finally, that of Agronomy (30.30).

Keywords— *University student; eating habits; health prevention.*

I. INTRODUCTION

Today's, the world has experienced a clear increase in weight in the world population, gradually over the past decades, with a predominance of females when compared to males in all age groups (1). According to data from the National Health Survey 2019, Brazil has this profile, with a prevalence of overweight of 60.3% and obesity of 25.9% among Brazilians (2). Such increase is influenced by economic, social and demographic changes, affecting the health profile of individuals (3). Population surveys revealed a continuous tendency to reduce malnutrition in the country, associated with an increase in excess weight at different stages of life (4, 5, 6). In addition to

overweight and obesity, the nutritional transition, characterized by increased consumption of high-calorie foods, is also responsible for the development of chronic non-communicable diseases, such as diabetes, cardiovascular diseases and systemic arterial hypertension life (4). These are among the leading causes of death in the world, according to estimates by the World Health Organization (WHO) in 2020.

Food is closely related to the health of individuals, which plays an important role not only in physical development and growth, but also in reproduction, physical and intellectual resilience. Macronutrients and the main micronutrients, when in prolonged lack, can affect the state of nutrition and growth. Knowing the nutritional status of different groups is extremely important to allow interventions on public health and measures ranging from nutritional education to measures of the political-food type (7). When it comes to the food-nutritional field, the eating habit corresponds to what is eaten regularly, which has been used in the field of Food and Nutrition when it comes to proposing solutions for health problems associated with eating practices (8).

With regard to university students, their eating habits can be influenced by a number of factors, for example: admission to university - since many exchange their parents home and family meals for university housing due to the location of the institution (3, 9, 10, 11, 12); the exchange of complete meals for practical and quick snacks with a high caloric value - the absence of time and the lack of company being the main causes for choosing such meals (6, 13). These factors, when added to alcoholism, smoking and physical inactivity, can influence morbidities, which are often confirmed late in aging, but which could be identified in youth (14, 15). This early identification enables means of prevention and even minimizes losses and promotes healthy habits (10).

Therefore, there must be interventions, among which can change eating habits among university students, which leads to weight control considered healthy, reducing the risk of overweight, obesity and other associated factors (16, 17, 18, 19). Indeed, the "Global Action Plan for the Prevention and Control of

Noncommunicable Diseases 2013–2020”, from WHO, which defines strategies that can be implemented to prevent the increase of obesity in the world (20). Based on these references, research concerns are aroused, since studies that report eating habits and the nutritional status of university students are limited (4). The need for a better understanding in order to address the concepts of eating habits is essential to know how and where to interfere to lead them to adopt a healthy diet.

The objective of the study was to evaluate and compare eating habits among students of Medicine, Agronomic Engineering and Nutrition courses at Universidad De Marília (UNIMAR) in order to know the nutritional status of these different groups and appreciate other variables related to the data obtained.

II. METHODS

For inclusion criteria, the present study sought students of both sexes, enrolled in any of the three courses already mentioned at the University of Marília and aged 18 years or over. Questionnaires from students who did not provide enough information for data analysis or did not fit the inclusion criteria were excluded, totaling a final sample of 135 students, 40 of which were medicine, 59 nutrition and 36 agronomic engineering.

The instrument used for data collection was an adaptation of the questionnaire on healthy eating proposed by the Ministry of Health "How is your diet?" (Ministry of Health - Brazil, 2014). It is a self-assessment instrument composed of 18 questions, in addition to the adapted items, being quantitative questions, which referred to the frequency of consumption of portions of fruits, vegetables, legumes and meats, and qualitative to eating behaviors, all of which are scored on a scale that varies from 0, less suitable, to 4 points, more suitable. The total score was calculated by adding the score obtained in each item, with a maximum score of 58 points (21).

From anthropometric data (self-reported weight and height), the Body Mass Index (BMI) was calculated and the nutritional status was classified according to the criteria adopted by the World Health Organization.

The consumption of daily portions of vegetables, fruits and meat or eggs was compared and classified according to the guidelines described in the "Food Guide for the Brazilian Population", of the Ministry of Health, together with the assessment of eating habits (21).

A. Statistical Analysis

The statistical treatment of quantitative and qualitative data was carried out with the support of the BioEstat 5.3 program. The probability of significance considered was 5% ($p < 0.05$) for operations performed. The absolute and relative frequencies of the responses were calculated and Pearson's chi-square test was applied to analyze the associations between the variables.

Eating habits were classified as adequate or inadequate and then their associations were tested according to gender. The total score of the questionnaire for each student was also calculated and divided into groups, such as course, gender, age group and BMI. Then, the means and variances of the groups were calculated and applying the ANOVA test together with the Tukey test and the t test to analyze the associations between the variables.

B. Research Design

The investigation plan was elaborated following an observational, cross-sectional, descriptive, retrospective and quantitative approach design.

C. Ethical Aspects

The present study started only after the approval and approval of the Research Ethics Committee at the University of Marília - Unimar. Individuals who met the inclusion criteria signed a Free and Informed Consent Form after receiving detailed information about it.

III. RESULTS

The sample consisted of 160 students, but 25 questionnaires were excluded. Of the total, 135 students from the University of Marília represented the final sample, 77 of whom were female (57%), with the minority (58) male (43%). In this research, self-reported weight and height were used to calculate BMI. It was observed that the majority of the sample (57%) was with the appropriate weight, 5.9% were underweight, 31.1% were overweight and 5.9% were obese. There was an even higher prevalence of overweight / obesity among men (58.6%) and an adequate weight among women (74%).

Table 1 illustrates the adoption of criteria from the Ministry of Health's "Food Guide for the Brazilian Population", to classify and allow the application of statistical tests for comparison between genders and suitability.

TABLE 1. EVALUATION CRITERIA ADOPTED TO CLASSIFY THE ADEQUACY OF FOOD CONSUMPTION

Groups	Servings / day	Criteria adopted for Adequacy
Vegetables and Vegetables *	At least 3	≥ 6 tablespoons / day
Water*	6 to 8 #	6 to 8 glasses / day
Fruits *	3 or more	≥ 3 servings / day
Meat and eggs*	2	2 servings / day

Food Guide for the Brazilian Population. *

Glasses of water

Table 2 elucidates the adequacy and inadequacy, as a percentage, of water consumption and some food groups. With regard to the consumption of fruits and vegetables, inadequacy due to the low intake of these food groups, regardless of gender, was identified among students.

TABLE 2. PERCENTAGE OF ADEQUACY AND INADEQUACY OF CONSUMPTION OF FOODS GROUPS IN UNIVERSITY STUDENTS. MARÍLIA (SP), 2020.

Food Groups	Total students with food				Gender with the highest% of Inadequacy (p <0.05) #
	Proper		Inadequate		
	n	%	n	%	
Vegetables and Legumes *	21	15.5	114	84.4	NS
Water*	82	60.7	53	39.2	NS
Fruits *	38	28.1	97	71.8	NS
Meat and eggs*	47	34.8	88	65.1	Men consume more

Food Guide for the Brazilian Population. *

Use of the chi-square test

NS - Not significant

The intake of meat and eggs resulted in inadequate consumption. Analyzing by gender, it was found that women had lower consumption in these two food groups. However, the male gender showed the greatest inadequacy for consuming such food groups in excess (p <0.05).

Regarding water intake among those surveyed, 60.7% of them drink the recommended amount, which represents a favorable factor in eating habits, with no difference in relation to genders (p > 0.05).

TABLE 3. CLASSIFICATION OF DIETARY PRACTICES AMONG UNIVERSITY STUDENTS. MARÍLIA (SP), 2020.

Variable	Classification				Gender with the highest% of Inadequacy (p <0.05) #
	Adequate		Inappropriate		
	n	%	n	%	
Type of fat for cooking food	103	76.2	32	23.7	NS
Usually puts more salt in the food	119	88.1	16	11.8	NS
Removes apparent fat from meat and / or chicken skin	90	66.6	45	33.3	Male
Sweets of any kind, filled cakes with icing, sweet cookies, soft drinks and industrialized juices	26	19.2	109	80.7	NS
Usually does not eat or exchange breakfast / lunch / dinner for a snack on the interval on each of these occasions	87	64.4	48	35.5	Male

Food Guide for the Brazilian Population. *

Use of the chi-square test

NS - Not significant

With regard to Table 3, referring to dietary practices among university students, there was a prevalence of an adequacy in almost all dietary behaviors evaluated, such as in the appropriate use of the type of fat to cook food (76.2%), not adding salt to meals (88.1%), removing the apparent fat from meat or chicken (66.6%) and eating at all essential meals (64.4%).

Comparing between genders, according to table 3, it was observed that men had inadequate eating habits (51.7%), for not having essential meals, especially breakfast (44.8%) or the exchange some of them by snack (p <0.05). On the other hand, among women, there was a relevant adequacy (76.6%) showing a greater consent in the case of essential meals (p <0.05).

Other subjects surveyed, such as those shown in table 4, were also instrumental in identifying the quality of life of students who relate to eating habits. Considering the practice of regular and daily physical activity for 30 minutes, such as the routine of walking, climbing stairs, cycling to work, domestic and leisure activities, in addition to the gym, the research showed that the majority (39, 2%) practice regular physical activity daily, another part (29.6%) reported practicing 2 to 4 times a week and the rest (31.1%) do not practice regular physical activity. In addition, another topic, such as alcohol consumption, revealed that of all the responses, the majority (79.1%) made use of alcoholic beverages. The rest (20.7%) do not consume.

TABLE 4. PHYSICAL ACTIVITY AND ALCOHOL CONSUMPTION AMONG UNIVERSITY STUDENTS.

Physical activity	Yes		2 to 4 times a week				Not	
	n	%	N		%		n	%
	53	39.2	40		29.6		42	31.1
Alcohol consumption	Daily		1 to 6 times a week		Eventually or rarely		Do not consume	
	n	%	n	%	N	%	n	%
	10	7.4	44	32.5	53	39.2	28	20.7

TABLE 5. RELATIONSHIP BETWEEN THE TOTAL SCORE OF THE QUESTIONNAIRE AND GENDER. AND CONCERN WITH READING FOOD LABELS IN EACH POPULATION.

	Male		Female	
Means ± Standard Deviation	34.58 ± 7.63		38.03 ± 6.15	
p-value #	p = 0.0021			
Concern with reading labels	Male		Female	
	Always or Sometimes		Always or Sometimes	
	n	%	n	%
	33	56.8	53	68.8

Employment of the t-test

Regarding the total score of the questionnaire answered by each volunteer, Table 5 shows a difference between the groups when separated by gender, which shows a higher average in the female gender, thus revealing a better eating habit compared to gender male (p <0.05). Furthermore, in this separation by gender, the female population, made up of 77 individuals, revealed more concerned with reading food labels (68.8%) when compared to the male population (56.8%), made up of 58 individuals.

TABLE 6. RELATIONSHIP BETWEEN THE TOTAL SCORE OF QUESTIONNAIRE ASSOCIATED WITH THE AGE GROUP.

	(18 to 19 years)	(20 to 21 years)	(22 to 42 years old)
Means ± Standard Deviation	34.59 ± 6.11	37.72 ± 6.99	39.25 ± 7.74
p-value #	p = 0.004		
Statistical test comparing age groups two to two			
Between age groups	(18 to 19 years old) and (20 to 21 years old)	(18 to 19 years old) and (22 to 42 years old)	(20 to 21 years old) and (22 to 42 years old)
p-value *	NS	<0.01	NS

Use of the ANOVA test

* Use of the Tukey test

NS - Not significant

Table 6 shows a difference only between the age groups (18 to 19 years old) and (22 to 42 years old), where it reveals a higher average of the scores in the age group (22 to 42 years old) and, therefore, a better eating habit among people of this age group (p <0.05).

In Table 7, there was no significance in separating the groups by BMI. This reveals that good or bad eating habits are not crucial or determining factors for the classification of BMI (p > 0.05).

TABLE 7. RELATIONSHIP BETWEEN THE TOTAL SCORE OF QUESTIONNAIRE AND BMI.

	Low weight (<18.5)	Adequate (≥ 18.5 and <25)	Overweight (≥ 25 and <30)	Obese (≥ 30)
Means ± Standard Deviation	38 ± 6.25	36.63 ± 7.13	37.02 ± 6.94	31.87 ± 6.17
p-value #	p = 0.2511			
	Low weight (<18.5)	Adequate (≥ 18.5 and <25)	Overweight (≥ 25 and <30)	Obese (≥ 30)
Means ± Standard Deviation	38 ± 6.25	36.63 ± 7.13	37.02 ± 6.94	31.87 ± 6.17
p-value #	p = 0.2511			

#Use of the ANOVA test

Finally, in Table 8, comparing the total scores of the questionnaires per course, there was a difference between the three groups analyzed. The Nutrition course had a higher average thus revealing a better eating habit compared to the other two courses. The Medical course is the second and Agronomic Engineering, with the lowest average and the worst eating habits among the three courses analyzed (p <0.05).

TABLE 8. RELATIONSHIP BETWEEN THE TOTAL SCORE OF THE QUESTIONNAIRE AND ENROLLED

	Medicine	Nutrition	Agronomic Engineering
Means ± Standard Deviation	35.37 ± 5.23	41.16 ± 5.38	30.30 ± 5.66
p-value #	p = <0.0001		
Statistical test comparing courses two by two			
Between courses	Medicine and Nutrition	Agricultural Medicine and Engineering	Nutrition and Agronomic Engineering
p-value *	<0.01	<0.01	<0.01

Use of the ANOVA test

* Use of the Tukey test

IV. DISCUSSION

The present study aimed to compare and evaluate eating habits among students of Medicine, Agronomic Engineering and Nutrition courses at Universidad de Marília (UNIMAR) in order to know and inform the nutritional status of different groups and lead them to adopt a healthy diet.

The inadequate consumption of fruits and vegetables was a considerable finding that helped to identify the negative factors of poor eating habits in all courses surveyed. However, this inadequacy was already foreseen, since other studies also showed this low consumption, regardless of gender (4, 6, 7, 22). However, a study contrasted with the present study, since a good part of the students consumed fruits and vegetables (23). This contrast is justified by the inclusion and exclusion criteria of a consumption considered adequate or not in the daily portions. Thus, such results make it necessary to emphasize the importance of including this group of foods within the eating habit (24, 25, 26).

Regarding the consumption of water, meat and eggs were also shown to be inadequate according to the adopted adequacy criteria that were based on the "Food Guide for the Brazilian Population" (21). Adequate water consumption revealed a gender independence and this highlighted a positive point since water is an essential nutrient that performs several functions directly influencing health status (27). Regarding the consumption of meat and eggs, the study revealed that the male gender presents the excessive consumption of this group of foods. In fact, other studies revealed a higher consumption of protein by the male gender (15, 23). Although meat is an item that should be present in a balanced diet, the high consumption of this food can lead to several factors, such as the development of chronic non-communicable diseases or even cancer. (28, 29, 30)

Our study also revealed innumerable behaviors appropriate to the eating habits of the university students surveyed. Table 3 informs that the great suitability when it comes to the type of fat used to cook food, consistent with the literature (6).

The absence of the habit of adding more salt to foods when already served, the removal of apparent fat from meat or chicken skin and the performance of essential meals, such as breakfast, lunch and dinner by most volunteers, are also factors observed in the table 3, which favor a healthy eating habit for health promotion. Thus, our results are compatible with other studies which demonstrate that most students consume, on average, adequate amounts of sodium. (6, 15) However, the inadequate consumption of sweets of any kind, cakes filled with icing, sweet cookies, soft drinks and industrialized juices reveals to be frequent and points out another negative factor among the researched population, proving the nutritional transition, characterized by the increase in the consumption of high caloric value (22). This excess

calorie is responsible for the development of chronic non-communicable diseases (NCDs), such as diabetes, cardiovascular diseases and systemic arterial hypertension. (4, 31) Regarding sweets, studies showed a higher consumption by women, but no significant difference between genders was identified in our results. (15, 23)

In this study, high consumption of alcoholic beverages was found, as some studies (6, 15, 16), but it was different from the results of another study (12). The use of alcohol is cultural, being allowed in almost all societies in the world, and the consequences of inappropriate use affect the population most at risk for consumption: adolescents and young adults (32). Thus, the WHO report "Global status report on alcohol and health 2018" showed that more than 1/4 of the population between 15 and 19 years old around the world consume alcohol, while the global peak of consumption reaches the age group between 20 and 24 years old (33).

Compared to men, women had a higher total score. This means that the female gender is more concerned with the quality of food and this can also be justified by the greater female tendency to check more frequently and carefully the nutritional information contained in food labels (68.8%) compared to men. (56.8%), due to a greater body concern (34). Studies also prove this result when comparing the quality of the diet between men and women (12, 23, 35). In addition, the present research revealed a difference between the scores when comparing distant age groups and identifying a better quality of food in older individuals in the researched group. In fact, in addition to education, age is one of the factors that influence diet (36).

Finally, the final finding and the main research topic (table 8) revealed a difference between the courses of Medicine, Nutrition and Agronomic Engineering. It is worth mentioning that the Nutrition course had the highest average score, however, as they are professionals who will work with health education and with the promotion of adequate and healthy food, inadequate eating habits were identified, such as low fruit consumption (44.0%). Of all respondents who properly consume vegetables and legumes, the vast majority (66.6%) are Nutrition students, however, considering all students surveyed in this course, the survey found low consumption of these food groups (76.2%). Meat and egg consumption was also inadequate among the vast majority (59.3%). Has a study that is consistent with the result of consumption of such food groups among nutrition undergraduates (37).

Also, medical students showed an even greater inadequacy in the categories already mentioned when compared to other courses, such as, for example, the lowest rate of low consumption of vegetables (92.5%), even related to health. On the other hand, the students of the agronomic engineering course showed the lowest average of the total score, which presented all these inadequacies, mainly in the consumption of fruits (11.1%), the lowest among the courses surveyed.

It is important to consider that in the university environment we are faced with the reality of excessive academic activities resulting in a lack of time, which hinders the realization of meals at home. The lack of company is also an important factor that ends up leaving the student often dependent on the commercial establishments that surround the university. All of this favors the exchange of complete meals for practical and quick snacks with a high caloric value (6).

This nutritional transition is responsible for the development of chronic non-communicable diseases (CDNT), such as diabetes, cardiovascular diseases and systemic arterial hypertension (4). Morbidities like these, which are often confirmed only in aging (10).

V. CONCLUSION

It is noteworthy that, in addition to men and women, the age groups and courses studied have different eating habits whose main factor in common is the low consumption of fruits and vegetables. However, it must also point out an inadequate consumption of meat and eggs. All of these become evident if we consider the guidelines of the "Food Guide for the Brazilian Population", which indicates all the nutritional values of a balanced diet (21).

Given the above, the need to address the concepts of eating habits in university environments is fundamental to lead them to adopt a healthy diet, enabling ways to prevent future diseases, such as educational programs, thus minimizing losses and promoting healthy habits.

Acknowledgment

The researchers would like to acknowledge the Medicine, Nutrition and Agronomic Engineering Course at the University of Marília (UNIMAR) for their contribution to the collection of research data.

Conflict of interest

The authors have declared no conflict of interest.

References

- [1] Dietz WH. Double-duty solutions for the double burden of malnutrition. *Lancet*. 2017;390(10113):2607–8.
- [2] Pesquisa Nacional de Saúde 2019: Atenção primária à saúde e informações antropométricas [Internet]. Brazil: IBGE. 2020. Available from: <https://biblioteca.ibge.gov.br/visualizacao/livros/liv101758.pdf>
- [3] Souza D, Vaz1 S, Bennemann2 RM. COMPORTAMENTO ALIMENTAR E HÁBITO ALIMENTAR: UMA REVISÃO EATING BEHAVIOR AND FOOD HABIT: A REVIEW. 2014;20(1):108–12. Available from: <http://www.mastereditora.com.br/review>
- [4] De Nazareth De Lima Carneiro M, Souza De Lima P, Marinho LM, Auxiliadora M, De Souza M. Estado nutricional de estudantes universitários associados aos hábitos alimentares. *Rev Soc Bras Clin Med*. 2016;14(2):84–8.
- [5] Coutinho JG, Gentil PC, Toral N. A desnutrição e obesidade no Brasil: O enfrentamento com base na

agenda única da nutrição [Internet]. Vol. 24, *Cadernos de Saude Publica*. 2008. p. s332–s340. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0102-311X2008001400018&lng=en&nrm=iso&tling=pt

[6] Feitosa EPS, Dantas C a O, Andrade-wartha ERS, Marcellini PS, Mendes-netto RS. Hábitos Alimentares De Estudantes De Uma Universidade Pública No Nordeste, Brasil. *Alim Nutr*. 2010;21(2):225–30.

[7] Oliveras López J, Nieto Guindo P, Aponte EA, Martínez Martínez F, López García De La Serrana H, López Martínez C. Evaluación nutricional de una población universitaria Correspondencia: Dra. Herminia López García de la Serrana. *Nutr Hosp*. 2006;21(2):179–83.

[8] Klotz-silva J, Prado SD, Seixas CM. Alimentação e Nutrição. 2017;1065–85.

[9] Beaudry KM, Ludwa IA, Thomas AM, Ward WE, Falk B, Josse AR. First-year university is associated with greater body weight, body composition and adverse dietary changes in males than females. *PLoS One*. 2019;14(7):e0218554.

[10] Costa DG, Carleto CT, Santos VS, Haas VJ, Gonçalves RMDA, Pedrosa LAK. Quality of life and eating attitudes of health care students. *Rev Bras Enferm* [online]. 2018 May;2471(4):1642-49. Available from: <https://doi.org/10.1590/0034-7167-2017-0224>

[11] Harrison ME, Norris ML, Obeid N, Fu M, Weinstangel H, Sampson M. Révision systématique des effets de la fréquence des repas en famille sur les résultats psychosociaux chez les jeunes [Internet]. Vol. 61, *Canadian Family Physician*. College of Family Physicians of Canada; 2015. p. e96–e118. Available from: www.cfp.ca

[12] Yahia N, Achkar A, Abdallah A, Rizk S. Eating habits and obesity among Lebanese university students. *Nutr J* [Internet]. 2008;7(1). Available from: <https://pubmed.ncbi.nlm.nih.gov/18973661/>

[13] Powell PK, Durham J, Lawler S. Food Choices of Young Adults in the United States of America: A Scoping Review. *Adv Nutr*. 2019 May;10(3):479–88.

[14] Arts J, Fernandez ML, Lofgren IE. Coronary heart disease risk factors in college students [Internet]. Vol. 5, *Advances in Nutrition*. American Society for Nutrition; 2014. p. 177–87. Available from: <https://pubmed.ncbi.nlm.nih.gov/24618758/>

[15] Chourdakis M, Tzellos T, Pourzitaki C, Toulis KA, Papazisis G, Kouvelas D. Evaluation of dietary habits and assessment of cardiovascular disease risk factors among Greek university students. *Appetite* [Internet]. 2011;57(2):377–83. Available from: <https://pubmed.ncbi.nlm.nih.gov/21651931/>

[16] National Research Council (US); Institute of Medicine (US), Woolf SH, Aron L, eds. *U.S. Health in International Perspective: Shorter Lives, Poorer Health*. Washington (DC): National Academies Press (US); 2013.

[16] Aldcroft SA, Taylor NF, Blackstock FC, O'Halloran PD. Psychoeducational rehabilitation for health behavior change in coronary artery disease: A systematic review of controlled trials [Internet]. Vol. 31, *Journal of Cardiopulmonary Rehabilitation and Prevention*. J Cardiopulm Rehabil Prev; 2011. p. 273–81. Available from: <https://pubmed.ncbi.nlm.nih.gov/21734590/>

- [17] Brace AM, De Andrade FCD, Finkelstein B. Assessing the effectiveness of nutrition interventions implemented among US college students to promote healthy behaviors: A systematic review. *Nutr Health* [Internet]. 2018 Jan;24(3):171–81. Available from: <https://pubmed.ncbi.nlm.nih.gov/30014743/>
- [18] Vasanth Rao VRB, Candasamy M, Bhattamisra SK. Obesity an overview: Genetic conditions and recent developments in therapeutic interventions. Vol. 13, *Diabetes and Metabolic Syndrome: Clinical Research and Reviews*. Elsevier Ltd; 2019. p. 2112–20.
- [19] Vieira RAL, de Freitas RN, Volp ACP. Moléculas de adhesión y quimiocinas; relación con variables antropométricas, de composición corporal, bioquímicas y dietéticas. *Nutr Hosp* [Internet]. 2014;30(2):223–36. Available from: <https://pubmed.ncbi.nlm.nih.gov/25208773/>
- [20] World Health Organization. WHO Global action plan for the prevention and control of noncommunicable disease 2013-2020 [Internet]. Geneva: World Health Organization; 2013. Available from: http://www.who.int/nmh/events/ncd_action_plan/en/
- [21] Guia alimentar para a população brasileira [internet]. Brazil: Ministry of Health. 2014. Available from: https://bvsms.saude.gov.br/bvs/publicacoes/guia_alimentar_populacao_brasileira_2ed.pdf
- [22] Pérusse-Lachance É, Tremblay A, Drapeau V. Lifestyle factors and other health measures in a Canadian university community. *Appl Physiol Nutr Metab* [Internet]. 2010;35(4):498–506. Available from: <https://pubmed.ncbi.nlm.nih.gov/20725116/>
- [23] Yahia N, Wang D, Rapley M, Dey R. Assessment of weight status, dietary habits and beliefs, physical activity, and nutritional knowledge among university students [Internet]. Vol. 136, *Perspectives in Public Health*. SAGE Publications Ltd; 2016. p. 231–44. Available from: <https://pubmed.ncbi.nlm.nih.gov/26475773/>
- [24] Mottaghi T, Amirabdollahian F, Haghightdoost F. Fruit and vegetable intake and cognitive impairment: a systematic review and meta-analysis of observational studies [Internet]. Vol. 72, *European Journal of Clinical Nutrition*. Nature Publishing Group; 2018. p. 1336–44. Available from: <https://pubmed.ncbi.nlm.nih.gov/29235561/>
- [25] Saghafian F, Malmir H, Saneei P, Milajerdi A, Larijani B, Esmailzadeh A. Fruit and vegetable consumption and risk of depression: Accumulative evidence from an updated systematic review and meta-Analysis of epidemiological studies [Internet]. Vol. 119, *British Journal of Nutrition*. Cambridge University Press; 2018. p. 1087–101. Available from: <https://pubmed.ncbi.nlm.nih.gov/29759102/>
- [26] Wu QJ, Wu L, Zheng LQ, Xu X, Ji C, Gong TT. Consumption of fruit and vegetables reduces risk of pancreatic cancer: Evidence from epidemiological studies. *Eur J Cancer Prev* [Internet]. 2016;25(3):196–205. Available from: <https://pubmed.ncbi.nlm.nih.gov/26075658/>
- [27] Zhang N, Du SM, Zhang JF, Ma GS. Effects of dehydration and rehydration on cognitive performance and mood among male college students in Cangzhou, China: A self-controlled trial. *Int J Environ Res Public Health*. 2019;16(11):1–13.
- [28] Bouvard V, Loomis D, Guyton KZ, Grosse Y, Ghissassi F El, Benbrahim-Tallaa L, et al. Carcinogenicity of consumption of red and processed meat [Internet]. Vol. 16, *The Lancet Oncology*. Lancet Publishing Group; 2015. p. 1599–600. Available from: <https://pubmed.ncbi.nlm.nih.gov/26514947/>
- [29] IARC Monographs evaluate consumption of red meat and processed meat [Internet]. 2015. Available from: http://www.iarc.fr/en/media-centre/iarcnews/pdf/Monographs-Q&A_Vol114.pdf
- [30] Galeno dos Santos L, Duarte Dominguez AG, Nogueira Cruvinel VR. Consumo frequente de carne vermelha e processada e sua associação com o desenvolvimento de doenças crônicas não transmissíveis: Hegemonia Rev Ciências Sociais. 2015;(16):47–67.
- [31] Bielemann RM, Santos Motta J V., Minten GC, Horta BL, Gigante DP. Consumption of ultra-processed foods and their impact on the diet of young adults. *Rev Saude Publica*. 2015;49.
- [32] de Souza DPO, Areco KN, da Silveria Filho DX. Alcohol and alcoholism among Brazilian adolescent public-school students. *Rev Saude Publica* [Internet]. 2005;39(4):585–92. Available from: www.fsp.usp.br/rsp
- [33] World Health Organization. Global status report on alcohol and health 2018 [internet]. 2018 Sep. Available from: <https://apps.who.int/iris/handle/10665/274603>
- [34] Christoph MJ, An R. Effect of nutrition labels on dietary quality among college students: A systematic review and meta-analysis. *Nutr Rev* [Internet]. 2018 Mar;76(3):187–203. Available from: <https://pubmed.ncbi.nlm.nih.gov/29373747/>
- [35] De Assumpção D, Domene SMA, Fisberg RM, Canesqui AM, Barros MB de A. Differences between men and women in the quality of their diet: a study conducted on a population in Campinas, São Paulo, Brazil. *Ciência & Saúde Coletiva* [online]. 2017 Feb;22(2): 347-58. Available from: <https://doi.org/10.1590/1413-81232017222.16962015>
- [36] De Assumpção D, Domene SMÁ, Fisberg RM, Barros MB de A. Social and demographic inequalities in diet quality in a population-based study. *Rev Nutr* [Internet]. 2016 Jan;29(2):151–62. Available from: <http://dx.doi.org/10.1590/1678-Selection>
- [37] Aquino JK, Pereira P, Reis VMCP. Hábito e consumo alimentar de estudantes do curso de nutrição das faculdades de Montes Claros - Minas Gerais. *Rev. Multitexto*. 2015;3(1):82-88. Available from: <http://www.ead.unimontes.br/multitexto/index.php/rmcea/d/article/view/111>