

RELATIONSHIP OF CARBOHYDRATE INTAKE WITH STATE NUTRITION OF ESPOCH UNIVERSITY STUDENTS 2020

Mayra Alexandra Logroño Veloz¹

<http://orcid.org/0000-0003-4792-606>; mlogrono@esepoch.edu.ec

Martha Cecilia Ávalos²

<https://orcid.org/0000-0003-2519-3067>; m_avalos@esepoch.edu.ec

Lisette Alejandra Segovia Tello³

<https://orcid.org/0009-0000-9231-862X>, lissegoviatello@hotmail.com

Carlos Andrés Guevara Andocilla³

<https://orcid.org/0009-0006-7449-1772>, carlosandresgue21@gmail.com

Andrea Verónica Delgado Ramos⁴

<https://orcid.org/0009-0001-4819-5105>, av.delgado@uta.edu.ec

Isabel Cristina López Villacis⁵

<https://orcid.org/0000-0003-4325-568X>, ic.lopez@uta.edu.ec

1. Escuela Superior Politécnica de Chimborazo, Facultad de Salud Pública, Carrera de Nutrición y Dietética. Centro Politécnico de Investigación de alimentos para el desarrollo CEPIAD.
2. Escuela Superior Politécnica de Chimborazo, Facultad de Salud Pública, Carrera de Gastronomía. Centro Politécnico de Investigación de alimentos para el desarrollo CEPIAD.
3. Investigador Independiente.
4. Facultad de Ciencia en Ingeniería en Alimentos y Biotecnología. Universidad Técnica de Ambato. Los Chasquis y Río Payamino.
5. Facultad de Ciencias Agropecuarias. Universidad Técnica de Ambato. Querochaca.

*Correspondencia: Dra. Mayra Logroño, Carrera de Nutrición y Dietética, Facultad de Salud Pública, Escuela Superior Politécnica de Chimborazo, Riobamba ECO60155, Ecuador, E-mail: mlogrono@esepoch.edu.ec

SUMMARY

Introduction: Adequate and balanced carbohydrate intake is important to maintain a healthy nutritional status. Attention should be paid to the quantity and quality of carbohydrates consumed to avoid health problems and promote a balanced diet. **Objectives:** to determine the consumption habits of carbohydrates that include bread, rice, potatoes, sugary drinks and sweets in young

university students of the ESPOCH, to identify relevant aspects of nutritional status. **Methodology:** This qualitative cross-sectional descriptive study used direct observation techniques and semi-structured survey to investigate the consumption of cereals, tubers, sugary drinks and sweets in relation to the nutritional status of 485 ESPOCH students in Ecuador. Random sampling was used and responses were analyzed in frequencies, position measures and chi-square tests. Statistical analysis was performed with the Jamovi 2.3 package. **Results:** 49% were men and 51% women aged between 18 and 29 years. The average weight of men was 66.93 ± 9.67 kg and of women 57.35 ± 8.12 kg, being greater than the appropriate weight for the Ecuadorian population in that age range. The distribution of ages and sizes was normal in both sexes, while weight and BMI were not normal in the group of women, but in the group of men. Normal nutritional diagnosis was the most common in both sexes. Daily bread consumption was higher in women and more than three daily servings was more common in men. No statistically significant relationships were found between rice or potato consumption and sex **Conclusions:** there is a variability in the consumption of food sources of carbohydrates studied, among university students. It is important to highlight the need to promote a balanced diet and moderate the consumption of carbohydrate-rich foods that can have a negative impact on health, especially when consumed in excess or in the form of sugary drinks and sweets with low nutritional value.

KEY WORDS - carbohydrate consumption- -nutritional status- -university students-

ABSTRAC

Introduction: Adequate and balanced carbohydrate consumption is important for maintaining a healthy nutritional state. Attention must be paid to the quantity and quality of carbohydrates consumed to avoid health problems and promote a balanced diet. **Objectives:** To determine the carbohydrate consumption habits, including bread, rice, potatoes, sugary beverages, and sweets, among university students from ESPOCH, to identify relevant aspects of nutritional status. **Methodology:** This descriptive cross-sectional qualitative study utilized direct observation and semi-structured surveys to investigate the consumption of cereals, tubers, sugary beverages, and sweets in relation to the nutritional status of 485 students from ESPOCH in Ecuador. Random sampling was employed, and the responses were analyzed in terms of frequencies, measures of position, and chi-square tests. Statistical analysis was performed using the Jamovi 2.3 package. **Results:** 49% were male and 51% were female, with ages ranging from 18 to 29 years. The average weight for males was 66.93 ± 9.67 kg, and for females, it was 57.35 ± 8.12 kg, which was higher than the appropriate weight for the Ecuadorian population in that age range. The distribution of ages and heights was normal in both sexes, while weight and BMI were not normal in the female group but were in the male group. The normal nutritional diagnosis was the most common in both sexes. Daily bread consumption was higher in females, and the consumption of more than three servings per day was more common in males. No statistically significant relationships were found between rice or potato consumption and sex. **Conclusions:** There is variability in the consumption of the carbohydrate sources studied among university students. It is important to highlight the need to promote a balanced diet and moderate the consumption of carbohydrate-rich foods that can have

a negative impact on health, especially when consumed excessively or in the form of sugary beverages and low-nutritional-value sweets.

KEY WORDS -carbohydrate consumption- -nutritional status- -university students-

1. INTRODUCTION

During university studies the person is in a stage full of anxiety and restlessness, which together with stress, the inability to eat at home, frequent consumption of foods rich in refined carbohydrates and saturated fats, sedentary lifestyle, as well as the degree of difficulty that mean the studies of a university career, contribute to a progressive increase in weight that would lead to overweight and even obesity. In this period the student assumes responsibility for their food, and their eating habits change in which they can consolidate the eating habits initiated in childhood and adolescence or introduce important changes that will persist in adulthood when inserted into the university world, it is a critical stage to maintain or for the development of dietary habits, which will have a great influence on the future health of the individual. (1)(2)

There is growing scientific evidence that nutrition has both a positive and negative influence on health throughout life. Several authors have highlighted that the university population is a particularly vulnerable group from the nutritional point of view since it is characterized by skipping meals frequently and making small intakes repeatedly between main meals. (3)

The nutritional status of a person is the result between the nutritional contribution he receives and the energy needs of his organism, which allow the use of acquired nutrients to maintain reserves and compensate for energy losses. To determine in numerical values the nutritional status of a person, parameters such as nutrient intake, structure and body composition must first be established, in addition to evaluating the biochemical and clinical nutritional status. (4)

BMI provides the most useful measure of overweight and obesity and even for determining malnutrition in the study population, since it is the same for both sexes and for adults of all ages. However, some people may have BMI greater than 25 this may be from extra muscle tissue. (5)

Man, to live and carry out all his functions, needs a continuous supply of energy: for the functioning of the heart, the nervous system, to perform muscle work, develop physical activity and carry out biosynthetic processes related to growth, reproduction and repair of tissues and also to maintain body temperature. (6), In this context the main source of energy that the human body needs, comes from 40 to 60% of the daily intake of carbohydrates that includes sugars, starches and dietary fiber, where 1 gram of carbohydrates provides 4Kcal and is found mostly in foods containing refined sugar as well as cereals such as rice, oats, Semolina, flour, bakery products, pastries, breads, pasta, tubers and legumes. (7)

On the other hand, the high consumption of sugars is associated with various pathologies such as overweight, obesity, liver disorders, diabetes, hyperlipidemia, fatty liver, some types of cancer and dental caries. (8)

According to the World Health Organization (WHO), in the world excess weight has multiplied, some data from 2014 showed that more than 1900 million people over 18 years of age were overweight, and of them 600 million were obese. (9)

Obesity is a multicausal problem that is associated with nutritional excesses or deficiencies during the first thousand days of life, genetics, eating habits, physical activity and lately the consumption of sugary drinks, sweets and sugars added to different preparations. (10)(11)

The objective of this research was to determine the consumption habits of carbohydrates that include bread, rice, potatoes, sugary drinks and sweets in young university students of ESPOCH, to identify relevant aspects of nutritional status. The expectation of the information collected will serve as a basis for the implementation and prevention actions aimed at the study population obtaining healthy habits in food consumption.

2. METHODOLOGY

The study was of qualitative cross-sectional descriptive type, handling research techniques of direct observation and semi-structured survey, validated by the research team of the Polytechnic Center for Research of Food for Development, of the Nutrition and Dietetics Career, of the Polytechnic School of Chimborazo CEPIAD, taking into account qualitative variables such as frequency and preferences of consumption of cereals such as breads, Rice, in addition to a tuber such as potato, on the other hand also considered the consumption of sugary drinks, and sweets correlated with quantitative measures such as nutritional status.

The sampling technique used was random and applied to 485 students from the Escuela Superior Politécnica de Chimborazo (ESPOCH) – Ecuador. It was applied with the voluntary participation and informed consent of students.

The analysis of the response variables was qualitative expressed in frequencies, position measures, maximum and minimum limits, as well as contingency tables with chi-square tests regarding the relationship of carbohydrate consumption with the nutritional status of the students.

The statistical analysis of the data was performed with the statistical package of free version 2.3 Jamovi project 2022.

3. RESULTS

3.1 Description of the nutritional status of university students

485 students from different careers were interviewed, of which 49% were male aged between 18 and 29 years, the average age was 21.86 ± 2.38 and 51% female with an average age of 21.02 ± 2.49 . The average weight of the male sex corresponds to 66.93 ± 9.67 and of women to 57.35 ± 8.12 , exhibit a higher value with respect to the adequate weight for the Ecuadorian population included in the age range between 18 to 29 years that corresponds to 57.87 Kg for men and 49.48 Kg for women. (12) Also, the p-value is less than 0,05 and therefore the data do not follow a normal distribution.

Table 1. Descriptive statistics of anthropometric measures by age and sex of ESPOCH students.

Variable	SEX	N	Media	±OF	Minimal	Maximum	Shapiro-Wilk	
							In	p-value
AGE (years)	M	248	21.02	2.49	18	37	0.86	4.5E-14
	H	237	21.86	2.38	18	29	0.96	1.8e0-6
WEIGHT (kg)	M	248	57.35	8.12	35	93	0.93	3.1e0-9
	H	237	66.93	9.67	40	96	0.99	0.028059
SIZE (m)	M	248	1.57	0.06	1.42	1.75	0.98	9.9e0-4
	H	237	1.69	0.07	1.36	1.88	0.98	0.001354
IMC (Kg/m ²)	M	248	23.29	3.36	14.20	42.81	0.88	7.02e-13
	H	237	23.39	3.25	13.06	33.80	0.98	0.002234

H=man, M=woman, N=number, D. E.=standard deviation . Source : Logroño et-al (2022) (13)

The distribution of ages according to sex, indicates in the case of women, a normal distribution, with a very low p-value (4.5e-14), which shows strong evidence of normality. In the case of men, a normal distribution also follows with a very low p-value (1.8e0-6), also showing normality.

Regarding weight, women show non-normality, with a very low p-value (3.1e0-9), while with men, the weight distribution follows a normal distribution with a very low p-value (0.028059), which indicates strong evidence of normality.

The height distribution, with men, follows a normal distribution with a significant p-value (0.001354), but relatively high compared to other cases. For women, it also presents a normal distribution with a very low p-value (9.9e0-4), showing strong evidence of normality.

With BMI, in the case of women, the distribution does not follow a normal distribution with a very low p-value (7.02e-13), indicating significant evidence of non-normality. In contrast, the BMI distribution in men follows a normal distribution with a very low p-value (0.002234), indicating strong evidence of normality.

In summary, the results suggest that the variables of AGE and HEIGHT follow a normal distribution in both sexes. However, the variables of WEIGHT and BMI do not, in the group of women, while in the group of men follow a normal distribution. It is important to note that these results are based on the sample size and assumptions of the normality test used.

3.2 Nutritional Diagnosis of ESPOCH students.

With regard to the nutritional status of young university students, the majority, that is, 72% are in a normal range, 20% are overweight of which 24% are men, 4% underweight and 4% obese. (14)(Table 1.

Frequencies of Nutritional Diagnosis by sex

DIAGNOSTIC	SEX			
	Woman		Man	
	N	%	N	%
Normal	191	77	159	67
Overweight	39	16	56	24
Obesity	9	4	10	4
Low	9	4	12	5
TOTAL	248		237	

The results show that normal nutritional diagnosis is the most common in both sexes, with 77% of women and 67% of men in this category. Overweight is the second most common, with 16% of women and 24% of men. Obesity and underweight are the least common in both sexes, with percentages less than 5%.

It is important to note that this table only provides information on the distribution of nutritional diagnoses in this specific sample and cannot be generalized to the general population.

3.3 Relationship of the consumption of bread, rice and potatoes with the sex and nutritional status of ESPOCH students.

Table 3. Consumption of bread, rice and potatoes with respect to sex of university students

SEX	Bread Consumption					Total	χ^2 test
	3 servings per day	1 serving per day	I don't eat bread every day	2 servings per day	More than 3 servings daily		
Woman	11	116	71	47	1	246	p -value
Man	16	95	49	68	8	236	0.002852
Total	27	211	120	115	9	482	

SEX	Rice Consumption					Total	χ^2 test
	2 servings per day	3 servings per day	1 serving per day	I don't eat rice on a daily basis	More than 3 servings daily		
Woman	80	35	100	27	5	247	p -value
Man	87	37	84	19	10	237	0.3316

Total	167	72	184	46	15	484	
Consumption of potatoes							
SEX	1 serving per day	2 servings per day	I don't eat potatoes daily	3 servings per day	More than 3 servings daily	Total	χ^2 test
Woman	108	57	72	10	1	248	p-value
Man	118	51	50	16	2	237	0.1837
Total	226	108	122	26	3	485	

Se presents the distribution of frequencies of consumption of different foods (bread, rice and potatoes) according to sex and the number of daily servings consumed.

With regard to bread consumption, it is observed that both women and men consume mainly one portion a day. Daily bread consumption however is higher in women (116) than in men (95), while consumption of more than three daily servings is more common in men (8) than in women (1). The Chi-square test indicates that there is a statistically significant relationship between bread consumption and sex (p-value= 0.002852).

As for rice consumption, both women and men consume mainly one and two servings a day. The Chi-square test indicates that there is no statistically significant relationship between rice consumption and sex (p-value=0.3316).

It is observed in the consumption of potatoes that both women and men eat mainly one serving a day. Daily potato consumption is higher in women (108) than in men (118), while consumption of more than three daily servings is more common in men (2) than in women (1). The Chi-square test indicates that there is no statistically significant relationship between potato consumption and sex (p-value=0.1837).

Table 4. Consumption of bread, rice and potatoes with respect to the nutritional diagnosis of university students of ESPOCH.

Bread Consumption							
DIAGNOSTIC	3 servings per day	1 serving per day	I don't eat bread every day	2 servings per day	More than 3 servings daily	Total	χ^2 test
Normal	19	140	96	86	6	347	p -value
Overweight	5	50	18	21	1	95	0.2501
Obesity	0	10	3	5	1	19	
Low	3	11	3	3	1	21	
Total	27	211	120	115	9	482	

DIAGNOSTIC	Rice Consumption					Total	χ^2 test
	2 servings per day	3 servings per day	1 serving per day	I don't eat rice on a daily basis	More than 3 servings daily		
Normal	123	53	130	34	9	349	p -value
Overweight	33	11	39	9	3	95	0.8333
Obesity	6	3	8	1	1	19	
Low	5	5	7	2	2	21	
Total	167	72	184	46	15	484	

DIAGNOSTIC	Consumption of potatoes					Total	χ^2 test
	1 serving per day	2 servings per day	I don't eat potatoes daily	3 servings per day	More than 3 servings daily		
Normal	155	82	90	21	2	350	p -value
Overweight	49	20	23	2	1	95	0.6797
Obesity	13	1	4	1	0	19	
Low	9	5	5	2	0	21	
Total	226	108	122	26	3	485	

With regard to bread consumption, it is observed that most people with normal nutritional diagnosis consume one serving a day or do not consume bread daily. For overweight people, it is also common to consume one serving a day or 2 servings of bread a day. There is no clear pattern of bread consumption in relation to nutritional diagnosis. The Chi-square test indicates that there is no statistically significant relationship between bread consumption and nutritional diagnosis (p-value=0.2501).

The Chi-square test also indicates that there is no statistically significant relationship between rice consumption and nutritional diagnosis (p-value=0.8333), the same is observed with potato consumption (p-value=0.6797).

3.4 Relationship of the consumption of sweets and sugary drinks with the sex and nutritional status of ESPOCH students.

Table 5. Consumption of sugary drinks and sweets with respect to sex of university students of ESPOCH.

Consumption of sugary drinks							
SEX	I don't eat sweets a daily basis	2 servings per day	1 serving per day	3 servings per day	More than 3 servings per day	Total	χ^2 test
Woman	62	47	123	15	1	248	p -value
Man	43	48	113	27	6	237	0.03107
Total	105	95	236	42	7	485	

CONSUMPTION OF SWEETS							
SEX	I don't eat sweets a daily basis	2 servings per day	3 servings per day	More than 3 servings daily	Total	χ^2 test	
Woman	103	92	30	18	5	248	p -value
Man	90	100	35	12	0	237	0.1096
Total	193	192	65	30	5	485	

In total, 485 people were surveyed, with 248 women and 237 men.

Both women and men consume mainly one serving a day of sugary drinks. The highest number of women and men are in the "1 serving per day" category (123 and 113). The Chi-square test indicates that there is a statistically significant relationship between the consumption of sugary drinks and sex (p-value=0.03107).

Most people surveyed consume sweets daily, either one serving a day (193 people) or more (30 people).

Women surveyed have a more even distribution in terms of the amount of sweets they consume, while men surveyed have a higher proportion of those who do not consume sweets on a daily basis. The chi-square test indicates that there is no statistically significant difference in sweet consumption between men and women (p-value = 0.1096).

Table 6. Consumption of sugary drinks and sweets with respect to the nutritional diagnosis of university students of ESPOCH.

Consumption of sugary drinks							
DIAGNOSTIC	I don't eat sweets	2 servings per day	1 serving per day	3 servings per day	More than 3	Total	χ^2 test

	on a daily basis		servings per day				
Normal	84	68	161	33	4	350	p -value
Overweight	15	14	59	6	1	95	0.002852
Obesity	2	5	10	1	1	19	
Low	4	8	6	2	1	21	
Total	105	95	236	42	7	485	

Consumption of sweets

DIAGNOSTIC	I don't eat sweets on a daily basis		2 servings per day	3 servings per day	More than 3 servings per day	Total	χ^2 test
	1 serving per day	3 servings per day					
Normal	136	136	51	22	5	350	p -value
Overweight	39	44	7	5	0	95	0.002852
Obesity	11	6	2	0	0	19	
Low	7	6	5	3	0	21	
Total	193	192	65	30	5	485	

The Chi-square test indicates that there is a statistically significant relationship between nutritional diagnosis and the amount of sugary drinks consumed daily (p-value = 0.002852), suggesting that consumption of sugary drinks may be related to overweight.

The same phenomenon is observed with the consumption of sweets, that is, the Chi-square test indicates that there is a statistically significant relationship between the nutritional diagnosis and the consumption of sweets (p-value = 0.002852). People with normal diagnosis have a higher consumption of sweets compared to the other groups. Most of them consume one serving a day (136).

Overweight individuals have a more balanced proportion in terms of sweet consumption, not people who consume more than three servings a day.

The people researched with obesity and low weight have a generally low consumption of sweets, and even most of them do not consume sweets on a daily basis.

These results suggest that a person's nutritional diagnosis may influence their consumption of sweets. Overweight and obese people tend to have a more moderate or low consumption of sweets, while people with normal diagnosis have a more frequent consumption of sweets

4. DISCUSSION

Young university students need to consolidate good eating habits based on an adequate selection of foods, which are a factor of fundamental importance to maintain a good state of health and prevent diseases. (2)

In relation to diet, some studies do not find differences in the energy intake of obese or overweight individuals, with respect to those of lower weight, but point out that the former present greater imbalance of the caloric profile due to a higher consumption of fat and lower contribution of carbohydrates than individuals of lower weight. (15)

In general, the female sex consumes more carbohydrates than the male sex. This is because women in the luteal phase crave more carbohydrates and involves levels of serotonin, a neurotransmitter in the central nervous system, which contributes to an overall state of well-being and happiness. Scientists have observed that women tend to eat more when estrogen levels are low and progesterone levels are high, such as during the luteal phase. According to the data obtained, it can be said that there is a higher intake of carbohydrates in the female sex than in the male. This is also because in stages of studies they must consume enough to compensate for energy expenditure, otherwise, they may suffer weight loss, reductions in performance, among others. (16)

Added sugar provides energy and not other essential nutrients. There is a growing concern about the high consumption of sugars and the development of chronic non-communicable diseases, possible decrease in micronutrients, among other consequences that affect the integral health of man. (17)

In an investigation carried out in the city of Ibarra – Ecuador they mention that the university population mostly consume carbohydrates on a daily frequency and the foods are rice, bread, potatoes, silk bananas, tomatoes, milk and yogurt, natural juices and caffeinated drinks with added sugar, soft drinks, white sugar, cookies or filled, chocolates, candies and gummies. (18)

As age increases, women have greater increases than men in weight and height, associated with the fact that the female gender begins its changes first and for a few years are taller than men of the same age; Then they accelerate their development, their increase in size is more intense and sustained and generally exceed the size of women. (19)

CONCLUSIONS

72% of the students were in the normal range, 20% were overweight (24% male, 16% female), 4% underweight and 4% obese.

In relation to food consumption, both men and women consumed mainly one serving of bread and potatoes a day. Daily consumption of sugary drinks was higher in women, while consumption of more than three servings a day of sugary drinks was more common in men. No significant relationships were found between rice consumption and nutritional diagnosis.

Regarding the consumption of sweets, people with normal diagnosis had a higher consumption, mainly one serving a day, while people with overweight and obesity had a more moderate or low

consumption of sweets. No significant differences were observed between men and women in terms of sweet consumption.

The results suggest that college students' nutritional status may be related to their consumption of foods, such as sugary drinks and sweets. Overweight and obese people tend to have a more moderate or low consumption of sweets, while people with normal diagnosis have a more frequent consumption of sweets.

Conflict of interest

The authors declare that there is no conflict of interest.

REFERENCES

1. Vargas-Zárate M, F B-B, E P-S. Anthropometric Evaluation of University Students in Bogotá Colombia. *Rev Public Health*. 2008;10(3):433–42.
2. De Piero A, Bassett N, Rossi A, Sammán N. Trend in food consumption of university students. *Nutr Hosp*. 2015;31(4):1824–31.
3. Pi RA, Vidal PD, Brassesco BR, Viola L, Aballay LR. Nutritional status in university students: Its relationship with the number of daily food intakes and macronutrient intake. *Nutr Hosp*. 2015;31(4):1748–56.
4. CHOQUEHUANCA CRASH, MARY DANITZA DURAN CC. Comparative study of overweight and obesity using body mass index in students of the Manuel Vicente Ballivian School and adults from 20 to 32 years old. *CsFarm and Bioq* [Internet]. 2015;4(2):93–104. Available from: http://www.scielo.org.bo/scielo.php?script=sci_arttext&pid=S2310-02652016000200009&lng=es&nrm=iso%3E. accessed 13 Jun. 2022
5. García Almeida JM, García García C, Bellido Castañeda V, Bellido Guerrero D. New approach to nutrition. Assessment of the patient's nutritional status: function and body composition. *Nutr Hosp*. 2018;35(3):1–14.
6. Azcona ÁC. Manual of Nutrition and Dietetics. Dep Nutr Fac Farm Univ Complut Madrid [Internet]. 2018;1–28. Available from: <https://www.ucm.es/nutricioncarbajal/>
7. Cervera P. Nutritional needs. *Rev Enferm* [Internet]. 1983;6(54):8–9. Available from: 10.31403/rpgo.v4i1i1758
8. Cmapos C, Medina R, Castro M, De la Cruz I. Sugar consumption in adolescents. *Context Odontológico* [Internet]. 2020;10(20):33–43. Available from: <https://revistas.uaz.edu.mx/index.php/contextodontologico/article/download/1071/978/>
9. World Health Organization. Press center. Obesity and overweight. Note Descr 311 [Internet]. 2016; Available from: <http://www.who.int/mediacentre/factsheets/fs311/es/>.
10. Adolescent AA of C&. Obesity in Children and Teens. 2017;(79).
11. J A, P B, F C, H. A. Intake of non-alcoholic sugary drinks and body mass index in Chilean schoolchildren. *Salud Publica Mex* [Internet]. 2015;57(2):128–34. Available from: doi: 10.21149/spm.v57i2.7408.
12. Ministry of Public Health and National Institute of Statistics and Censuses Quito - Ecuador. Food-based dietary guidelines. Quito - Ecuador; 2018.

13. Logroño Veloz MA, Betancourt Ortiz SL, Fonseca Jiménez JG. Dairy consumption and its relationship with nutritional status in university students of the epoch riobamba 2020. Polo del Conoc Rev científico - Prof ISSN-e 2550-682X, Vol 6, N° 9, 2021 (Issue Dedicated to SEPTEMBER 2021), pp. 639-655 [Internet]. 2021;6(9):639-55. Available from: <https://dialnet.unirioja.es/servlet/articulo?codigo=8094552&info=resumen&idioma=SPA> %0Ahttps://dialnet.unirioja.es/servlet/articulo?codigo=8094552
14. Logroño Veloz MA, Betancourt Ortiz SL, Fonseca Jiménez JG. Relationship of the consumption of meat and derivatives with the nutritional status of university women of the epoch riobamba 2020. Polo del Conoc Rev científico - Prof ISSN-e 2550-682X, Vol 6, N° 9, 2021 (Issue Dedicated to SEPTEMBER 2021), pp. 639-655 [Internet]. 2021;6(9):639-55. Available from: <https://polodelconocimiento.com/ojs/index.php/es/article/view/3069/html%0Ahttps://polodelconocimiento.com/ojs/index.php/es/article/view/3069/xml%0Ahttps://polodelconocimiento.com/ojs/index.php/es/article/view/3069%0Ahttps://dialnet.unirioja.es/servlet/art>
15. Mena MC, Faci M, Ruch AL, Aparicio A, Lozano Estevan MC, Ortega Anta RM. Differences in eating habits and knowledge, regarding the characteristics of a balanced diet, in young people with different body mass index. Rev Esp Nutr Community. 2002;8(1-2):19-23.
16. Laura Bernad Asencio MRGG. Energy and macronutrient intake in female athletes. CODEN [Internet]. 2015; Available from: <https://scielo.isciii.es/pdf/nh/v32n5/09revision07.pdf>.
17. De Nutrición E, Castro A., Giamberardino V, Rodríguez C, Director G, Ryan :, et al. NATIONAL UNIVERSITY OF CÓRDOBA FACULTY OF MEDICAL SCIENCES "Added sugars: consumption habits in university youth." 2015;
18. Revelo JG. Carbohydrate Consumption in University Students of the Barrio de Olivo in the City of Ibarra. Encephale [Internet]. 2018;53(1):59-65 <https://scielo.isciii.es/pdf/nh/v26n1/articul>. Available from: <http://dx.doi.org/10.1016/j.encep.2012.03.001>
19. MARIA FERNANDA GARAVITO JUNCO. FOOD CONSUMPTION AND NUTRITIONAL STATUS IN ADOLESCENTS FROM THREE PUBLIC EDUCATIONAL INSTITUTIONS IN BOGOTA, COLOMBIA. Energies [Internet]. 2018;6(1):1-8. Available from: <http://journals.sagepub.com/doi/10.1177/1120700020921110%0Ahttps://doi.org/10.1016/j.reuma.2018.06.001%0Ahttps://doi.org/10.1016/j.arth.2018.03.044%0Ahttps://reader.elsevier.com/reader/sd/pii/S1063458420300078?token=C039B8B13922A2079230DC9AF11A333E295FCD8>