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Original/*Otros*

Pharmacology and biochemistry undergraduate students' concern for a healthy diet and nutrition knowledge

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Abstract

Objective: **To estimate the concern for a healthy diet and the nutrition knowledge of undergraduate students of a pharmacology and biochemistry program and their associations with the variables of interest.**

Methods: **This cross-sectional study administered the Nutrition Knowledge Scale and the How is your diet? questionnaire to 381 students. The associations between concern for a healthy diet and nutrition knowledge and between these two factors and the demographic variables were measured by the chi-square test (χ^2) or Fisher's exact test. The significance level was set at 5%.**

Results: **The mean age of the students was 20.6 (standard deviation [SD] = 2.7) years; 78.2% were female students; their mean body mass index was 22.6 (SD = 3.7) kg/m²; and 73.5% had an appropriate body mass index–related nutritional status. Most students fell within the category "pay attention to your diet" (77.1%) and "moderate nutrition knowledge" (79.7%). Concern for a healthy diet was significantly associated with program year (p = 0.024), socioeconomic class (p = 0.012), and physical activity (p <0.001). Nutrition knowledge was associated only with program year (p < 0.001). Concern for a healthy diet was not associated with nutrition knowledge (p = 0.808).**

Conclusion: **Physically inactive, first-year students from socioeconomic class B (US$ 1,046 – 1,872) were less concerned with a healthy diet. Such concern was not related to the students' nutrition knowledge.**

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PREOCUPACIÓN POR UNA ALIMENTACIÓN SANA Y EL CONOCIMIENTO DE LA NUTRICIÓN DE LOS ESTUDIANTES DE UN TÍTULO DE GRADO EN FARMACIA Y BIOQUÍMICA

Resumen

Objetivo: **Estimar la preocupación por una alimentación sana y el conocimiento de la nutrición de los estudiantes de un título de grado en Farmacia y Bioquímica y su asociación con variables de interés.**

Métodos: **Este estudio transversal. Participaron 381 estudiantes. Fue utilizado como instrumentos de medición a "Escala El conocimiento nutricional" y "¿Cómo está la comida?". Se realizó un estúdio asociación entre la preocupación por una alimentación sana y el conocimiento nutricional y aquellos con las variables demográficas mediante el uso de la prueba de chi-cuadrado (χ^2) o Fisher. Hemos adoptado un nivel de significación del 5%.**

Resultados: **La edad promedio de los estudiantes fue de 20,6 (SD = 2,7) años, el 78,2% eran varones femenina. El índice de masa corporal (IMC) fue de 22,6 (SD = 3,7) kg/m2 y 73,5% se presentaron con un estado nutricional adecuado para este indicador. La mayoría de los alumnos evaluados fueron categorizados como "estad atentos con la comida" (77,1%) y "el conocimiento nutricional moderado" (79,7%). Se han observado asociaciones significativas entre la preocupación por una alimentación sana y año del curso (p = 0,024), la classe económica (p = 0,012) y la actividad física (p < 0,001). El conocimientos nutricionales sólo se asoció con el año del curso (p < 0,001). No se encontró asociación significativa entre la preocupación por una alimentación saludable y conocimientos sobre nutrición (p = 0,808).**

Conclusión: **Los estudiantes de primer año por supuesto, pertenecen a la clase económica B y no físicamente activos mostraron una menor preocupación por una alimentación saludable. Esta preocupación no se estaba relacionado con el conocimiento nutricional presentado por los estudiantes.**

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Palabras clave: *Estudiantes de Bioquímica. Comportamientos Saludables. Los alimentos saludables. Conocimientos de Nutrición. Estudiantes Farmacia.*

Abbreviations

UNESP: São Paulo's State University "Júlio de Mesquita Filho".

BMI: Body Mass Index.

CNCDs: Chronic Noncommunicable Diseases.

Introduction

Measuring a group's or an individual's concern for a healthy diet and nutrition knowledge is challenging because food practices and behaviors are permeated by the characteristics of one's social and cultural life[1]. The range and inaccuracy of the population's idea of what is considered a healthy diet can be explained by the fact that food choices are a complex process. A healthy diet involves 3 concepts: food variety as a source of nutrients, energy balance related to individual requirements, and moderation in the consumption of energy-dense foods high in fats and simple sugars[2, 3].

In Brazil, data from the 2008-2009 Family Budget Survey[4] show a slight increase in the consumption of fruits, but the consumption of nonstarchy vegetables stagnated below the recommended amounts[4]. Abuse of energy-dense foods, such as foods naturally high in fat, starch, and sugar, can compromise health and/or nutritional status[5] in the long run. Therefore, professionals in this area have reason for concern. Studies on the relationship between concern for a healthy diet and nutrition knowledge can provide data for educational and/or preventive practices to help people acquire healthier habits. The literature has reported that nutrition knowledge is significantly related to education level and healthy food choices[6, 7].

Despite the existence of evidence that supports the relationship between the concern for a healthy diet and nutrition knowledge[7-11], studies that explored this association in university students are limited. University students can be considered vulnerable to poor eating habits because they are young, have achieved responsibility, and are subject to various social pressures. The high load of academic activities and significant autonomy often interfere with the daily activities of students, including their food habits.

Hence, students' lifestyles may result in the consumption of processed foods, having meals at unusual times, not having breakfast, and preferring quick meals[11,12]. Gutiérrez-Salmeán et al.[13] warn that this dietary pattern may pose a health risk, especially if followed for long periods. Therefore, the objective of this study was to estimate the concern for a healthy diet and the nutrition knowledge of students in an undergraduate pharmacology and biochemistry program and the associations between these factors and the variables of interest.

Sample and Methods

Study design and sampling method

This cross-sectional study used a nonprobabilistic sampling method. A total of 430 students enrolled in the pharmacology and biochemistry program of the School of Pharmaceutical Sciences of São Paulo's State University (Júlio de Mesquita Filho, UNESP) during 2013-2014 were invited to participate in the study. The inclusion criteria were male and female students at least 18 years of age who agreed to participate and signed an informed consent form. Sample size was determined by considering $\alpha = 5\%$ and $\beta = 20\%$ and the number of items in the instruments. We followed the suggestion of Hair et al. (2005)[14] to include 5-10 subjects per item to maintain representativeness and allow for the assessment of data validity and reliability.

Study variables and measurement instruments

Personal data (gender, age in years, employment status, number of people in the household, socioeconomic class, education level of the family head, physical activity status, alcohol intake, and family history of chronic diseases), data on concern for a healthy diet, and nutrition knowledge were collected. The variables of employment status, physical activity status, alcohol intake, and family history of chronic diseases were considered absolute (yes/no). If the individual had a family history of chronic diseases, the individual was asked to provide which family member (mother, father, grandfather, etc.) and what disease (obesity, heart disease, diabetes, hypertension, hepatic diseases, kidney diseases, osteoporosis, gastrointestinal diseases, and neoplasms). The education level of the family head and the socioeconomic class were classified by the Brazilian Association of Survey Companies' *Critério Brasil*[15]. Self-reported height (m) and weight (kg) were also collected for calculating body mass index (BMI) and classifying nutritional status. BMI was calculated by dividing the weight by the square of the height (kg/m^2). Nutritional status was classified as recommended by the World Health Organization[16] for individuals aged ≥20 years and as recommended by Onis et al. (2007)[17] for adolescents aged 18-20 years.

Concern for a healthy diet and nutrition knowledge were measured using the Brazilian Ministry of Health's Healthy Diet of the National Food and Nutrition Policy and the Nutrition Knowledge Scale[18], respectively. A general score was computed using the calculator available at the Brazilian Ministry of Health's website (http://nutricao.saude.gov.br/teste_alimentacao.php) to measure individual concern for a healthy diet. The participants were classified into 3 categories as follows: "unhealthy eating habits" (total score ≤28 points), "pay attention to your diet" (29 ≤ total score ≤ 42 points), and "healthy diet" (total score ≥43 points).

The proposal made by Scagliusi et al.[18], who took into account the number of questions answered correctly and family history of chronic diseases, was used for classifying the nutrition knowledge of the students. Nutrition knowledge was classified as follows: low, when the number of correct answers was up to 6; moderate, when the number of correct answers ranged 7-10; and high, when the number of correct answers >10.

The Nutrition Knowledge Scale was used with the author's permission[18]. However, permission to use the instrument "How is your diet?" questionnaire was not necessary because it is in the public domain[5]. The questionnaires were self-administered in a classroom at the usual class time after scheduling the activity with the professor.

Ethical aspects

This study was approved by the Human Research Ethics Committee of the School of Pharmaceutical Sciences of UNESP Araraquara (São Paulo) under protocol number CAAE: 20136913.0.0000.5426. All questionnaires were answered anonymously. The students were identified by a number code given to the participant along with the instrument.

Statistical analysis

Descriptive analyses were performed using IBM SPSS Statistics software, version 22 (IBM, Chicago, IL). The associations of interest were estimated by the chi-square test (c^2) or Fisher's exact test. The significance level was set at 5%.

Results

A total of 381 students participated in the study, representing a response rate of 89%. The participants' mean age was 20.63 (standard deviation [SD] = 2.66) years. The mean number of people who lived in the same household as the participant was 4.79 (SD = 3.90). Table I shows the characteristics of the sample.

Table II shows the frequency distributions of the answers given to the "How is your diet?" questionnaire. A considerable percentage of the sample does not consume fruits, natural fruit juices, and/or nonstarchy vegetables daily. In addition, seafood intake is low and preferences for deep-fried foods (homemade or store-bought), salted meats, patty, and ham are high. Regarding eating habits, a significant percentage of the sample reported not having breakfast or snacks between meals. The students also do not consume the recommended amount of water but consume alcohol 1-6 times per week. Furthermore, the students do not have the habit of reading the nutrition facts on processed foods before buying them.

Table I
Undergraduate pharmacology and biochemistry student demographic characteristics

Characteristic	*n*	*%*
Program hours		
Full-time	257	67.6
Evening	123	32.4
Program year		
First	174	46.8
Second	36	9.7
Third	34	9.1
Fourth	54	14.5
Fifth and sixth	74	19.9
Nutritional status		
Underweight	23	6.2
Normal weight	274	73.5
Pre-obese	65	17.4
Obese	11	2.9
Socioeconomic class		
A	108	28.4
B	231	60.8
C, D, and E	41	10.8
Employed		
No	330	88.7
Yes	42	11.3
Physically active		
No	179	47.4
Yes	199	52.6
Alcohol intake		
No	115	30.4
Yes	263	69.6
Family history of CNCDs		
No	130	34.5
Yes	247	65.5

CNCDs = chronic noncommunicable diseases.

Table III shows the associations between concern for a healthy diet and the study demographic variables. Concern for a healthy diet is significantly associated with program year, socioeconomic class, and physical activity. Students in their first and fifth or sixth years are more likely to have healthy habits than all others. Higher socioeconomic class and participation in physical activity are also associated with healthier food habits.

Table II
The frequency distribution of answers given by pharmacology and biochemistry undergraduate students to the "How is your diet?" questionnaire

Item	*Answer*	*n*	*%*
It1 – On average, how much fruit do you eat a day? (units/ slices/ pieces/cup of natural juice)?	I do not eat fruits or drink natural fruit juices daily	68	18.0
	3 or more units/slices/pieces/cups of natural juice	44	11.6
	2 or more units/slices/pieces/cups of natural juice	115	30.4
	1 or more units/slices/pieces/cups of natural juice	151	39.9
It2 – On average, how much nonstarchy vegetables do you eat a day?	I do not eat nonstarchy vegetables daily	89	23.6
	3 or fewer tablespoons	122	32.4
	4–5 tablespoons	113	30.0
	6–7 tablespoons	33	8.8
	8 or more tablespoons	20	5.3
It3 – On average, how much do you eat a day of the following: any type of bean, lentil, pea, chickpea, soybean, broad bean, seeds, or nuts?	I do not eat any of those	27	7.2
	2 or more tablespoons a day	206	54.6
	Fewer than 5 times a week	93	24.7
	1 tablespoon or less a day	51	13.5
It4 – On average, how much do you eat a day of the following?	a) Rice, corn, and other grains (including breakfast cereals); cassava/ manioc/wahoo, yam; pasta; potato, sweet potato, arracacha, or manioc?		
	0–30 tablespoons	352	94.4
	More than 30 tablespoons	21	5.6
	b) Bread?		
	0–30 units/slices	367	98.9
	More than 30 units/slices	4	1.1
	c) Cake without frosting?		
	0–30 slices	364	98.6
	More than 30 slices	5	1.4
	d) Plain cookies or crackers?		
	0–30 units	363	98.4
	More than 30 units	6	1.6
It5 – On average, how much meat (beef, pork, seafood, poultry, egg, etc.) do you eat a day?	I do not eat meat	9	2.4
	1 steak/slice/tablespoon or 1 egg	121	32.1
	2 steaks/slices/tablespoons or 2 eggs	183	48.5
	More than 2 steaks/slices/tablespoons or more than 2 eggs	64	17.0
It6 – Do you remove the visible fat from meat or the skin from poultry?	Yes	313	83.2
	No	55	14.6
	I do not eat red meat or poultry	8	2.1
It7 – How often do you eat seafood?	I do not consume seafood	30	8.0
	Only a few times a year	107	28.4
	2 or more times a week	61	16.2
	1 to 4 times a month	179	47.5

Table II *(cont.)*
The frequency distribution of answers given by pharmacology and biochemistry undergraduate students to the "How is your diet?" questionnaire

Item	*Answer*	*n*	*%*
It8 – On average, how much milk and/or dairy products (yogurt, dairy beverages, curd, cream cheese, cheese, etc.) do you eat a day?	I do not consume milk or dairy products	11	2.9
	3 or more cups of milk or dairy product servings/pieces/slices	56	14.9
	2 cups of milk or dairy product servings/pieces/slices	173	45.9
	1 or less cups of milk or dairy product servings/pieces/slices	137	36.3
It9 – What type of milk and dairy products do you usually consume?	Whole	175	49.6
	Low fat (semi-skimmed, skimmed, or light)	178	50.4
It10 – Think about the following foods: homemade or store-bought deep-fried foods and salted meats (ham, sausage, mortadella, salami, hot dog, patty, etc.). How often do you eat them?	Rarely or never	51	13.5
	Daily	18	4.8
	2–3 times a week	143	37.9
	4–5 times a week	42	11.1
	Fewer than 2 times a week	123	32.6
It11 – Think about the following foods: any type of sweet, cake with frosting, sandwich cookies, soda, and store-bought juices. How often do you eat them?	Rarely or never	34	9.0
	Fewer than 2 times a week	123	32.5
	2–3 times a week	114	30.2
	4–5 times a week	58	15.3
	Every day	49	13.0
It12 – What type of fat is used at your home to cook foods?	Animal fat or butter	6	1.6
	Vegetable oil: soybean, sunflower, corn, cotton, or canola	350	92.8
	Margarine or vegetable fat	21	5.6
It13 – Do you usually add more table salt to your food?	Yes	48	12.8
	No	328	87.2
It14 – Think about your weekly routine: which meals do you usually have daily?	*Breakfast*		
	Yes	271	72.1
	No	105	27.9
	Morning snack		
	Yes	143	38.1
	No	232	61.9
	Lunch		
	Yes	375	99.2
	No	3	.8
	Afternoon snack		
	Yes	284	75.3
	No	93	24.7
	Supper or evening snack		
	Yes	350	92.8
	No	27	7.2
	Bedtime snack		
	Yes	115	31.3
	No	253	68.8

Table II *(cont.)*
The frequency distribution of answers given by pharmacology and biochemistry undergraduate students to the "How is your diet?" questionnaire

Item	*Answer*	*n*	*%*
It15 – How many cups of water to you have daily? Include natural fruit juices or tea (except coffee, black tea, and Paraguay tea).	Fewer than 4 cups	50	13.2
	8 cups or more	94	24.9
	4–5 cups	111	29.4
	6–8 cups	123	32.5
It16 – How often do you consume alcohol (whisky, rum, wine, beer, cognac, vodka, etc.)?	Daily	1	.3
	1–6 times a week	127	33.6
	Occasionally or rarely (fewer than 4 times a month)	162	42.9
	Never	88	23.3
It17 – Do you practice physical activities regularly, that is, at least 30 minutes daily in your free time?	No	161	42.6
	Yes	95	25.1
	2–4 times a week	122	32.3
It18 – Do you have the habit of reading the nutrition facts in processed foods before buying them?	Never	39	10.3
	Rarely	73	19.3
	Sometimes, for some products	175	46.3
	Always or almost always for all products	91	24.1

Table IV shows the frequency distribution of answers given on the Nutrition Knowledge Scale. Most students believe that some diseases could be related to what people eat and drink. Some of the cited diseases include diabetes, high blood pressure, obesity, heart disease, and neoplasms. The percentage of individuals who believe that certain foods can increase the likelihood of cancer is high. The number of affirmative responses given to item 5 (familiarity with fiber) is very high.

Table V shows the associations between nutrition knowledge and demographic variables. Nutrition knowledge is significantly associated with program year. Students in the first year are more likely to have low nutrition knowledge and those of the fourth year are more likely to have high nutrition knowledge compared with those of all other years. Table VI shows the association between concern for a healthy diet and nutrition knowledge, which is not significant.

Discussion

Although researchers believe nutrition knowledge is critical for people to eat in a healthy manner, this study found that nutrition knowledge was not associated with concern for a healthy diet among university students studying pharmacology and biochemistry. This study also identified factors associated with concern for a healthy diet and nutrition knowledge, which may contribute to the development of educational, preventive, and interventional strategies for this population.

The results show that the students rarely consume fruits, natural fruit juices, nonstarchy vegetables, or seafood. Literature findings confirm the low interest of this population in these foods[11,19,20], which may be attributed to limited time available, difficulty in their preparation, and their perishability. Thus, table II shows that ready-to-eat processed foods are generally the first choice of students because of their practicality.

The students' high intake and preference for deep-fried foods and sweets were also reported by Lopez-Azpiazu (2003)[12] and Arroyo et al. (2006)[11], which can be justified by these products' accessibility, practicality, and high palatability. Although this sample of undergraduate students has a high intake of processed foods, most do not seem to be concerned with reading the nutrition facts on their labels. This was also observed by Rodriguez et al. (2013)[7], who found that only 28% of university students from 4 traditional universities located in Chile's Fifth Region read the labels before buying processed foods. Hence, we warn about the importance of the nutrition facts and the need to teach this population about nutrition because reading the nutrition facts requires skill for the correct and safe qualitative and quantitative interpretation of the list of nutrients.

A considerable percentage of the students do not drink enough fluids with high water content, but drink alcohol frequently (Table II). Agüero et al. (2012)[10] also reported high alcohol intake in students 18-40 years of age in at least their first year of college and who had completed all assessments. Gutiérrez-Salmeán et al.[13] conducted a study in Mexico with univer-

Table III
The distribution of concern for a healthy diet and the demographic variables of interest among pharmacology and biochemistry undergraduate students

	How is your diet? (n)					
Characteristic	*Unhealthy food habits*	*Pay attention to your diet*	*Healthy diet*	*Total*	χ^2	*p*
Gender						
Male	9	50	11	70		
Female	23	196	30	249	1.661	0.436
Program hours						
Full-time	19	168	25	212		
Evening	13	78	16	107	1.644	0.439
Year						
First	14	112	17	143		
Second	4	26	-	30		
Third	7	20	4	31		
Fourth	1	35	7	43		
Fifth and sixth	5	46	13	64	16.813	0.024#
Nutritional status						
Underweight	3	15	2	20		
Normal weight	21	175	32	228		
Pre-obese	6	43	4	53		
Obese	2	6	3	11	5.485	0.483
Employed						
No	28	215	35	278		
Yes	4	25	5	34	0.248	0.884
Socioeconomic class						
A	14	64	18	96		
B	13	156	18	187		
C, D, and E	5	25	5	35	19.667	0.012
Physical activity						
No	20	121	6	147		
Yes	12	122	35	169	21.087	<0.001
Alcohol intake						
No	11	74	12	97		
Yes	21	170	28	219	0.228	0.892
Family history of CNCDs*						
No	12	87	12	111		
Yes	20	157	29	206	0.726	0.696

* CNCDs = chronic noncommunicable diseases.; # Fisher's Exact Test

Table IV
The frequency distribution of the answers given by pharmacology and biochemistry undergraduate students to the Nutrition Knowledge Scale

Item	*Answer**	*n*	*%*
It1 – Read the two sentences. Please tell me, with which one do you agree more:	What people eat or drink has little influence on the development of the main NCDs.	6	1.6
	By eating the right types of food, people can reduce their likelihood of developing NCDs.*	361	98.1
	I do not know.	1	.3
It2 – In your opinion, which diseases may be related to what people eat and drink?	Diabetes	298	25.8
	High blood pressure	279	24.2
	Obesity	186	16.0
	Heart disease	85	7.4
	Neoplasms	72	6.2
	Other	224	19.4
	Did not answer	11	1.0
It3 – Do you think cancer may be related to what people eat and drink?	Yes	206	54.2
	No	14	3.7
	Probably	117	30.8
	I do not know.	43	11.3
It4 – Which of these attitudes would help if someone wanted to reduce his chances of having certain types of cancer (check as many as you like):	Eat more fibers	14	3.7
	Eat less fat	18	4.8
	Eat more fruits and nonstarchy vegetables	59	15.6
	Change intake of other foods/nutrients (for example, table salt and sugar)	26	6.9
	Association between the two choices above	56	14.8
	Association between the three choices above	45	11.9
	All of them are beneficial	82	21.7
	None of these changes would help	10	2.6
	I do not know.	68	18,0
It5 – Some foods have fiber. Have you heard about fibers?	Yes	377	99.7
	No	-	-
	I do not know.	1	.3
It6 – Which of these has more fibers: a bowl of wheat bran or a bowl of breakfast cereal?	Wheat bran	160	42.1
	Breakfast cereal	73	19.2
	Both	39	10.3
	I do not know/I am not sure.	108	28.4
It7 – Which of these has more fibers: one cup of lettuce or one cup of carrots?	Lettuce	162	42.6
	Carrot	86	22.6
	Both	33	8.7
	I do not know/I am not sure.	99	26.1
It8 – Which of these has more fibers: one cup of spaghetti with meatballs or one cup of beans?	Spaghetti with meatballs	26	6.9
	Beans	256	67.5
	Both	6	1.6
	I do not know/I am not sure.	91	24.0

Table IV *(cont.)*
The frequency distribution of the answers given by pharmacology and biochemistry undergraduate students to the Nutrition Knowledge Scale

Item	*Answer**	*n*	*%*
It9 – Which of these has more fat: potato chips or tapioca cookies?	Potato chips	290	76.3
	Tapioca cookies	25	6.6
	Both	38	10.0
	I do not know/I am not sure.	27	7.1
It10 – Which of these has more fat: 1 cup of soda or 1 cup of milk?	Soda	83	21.8
	Whole milk	233	61.3
	Both	26	6.8
	I do not know/I am not sure.	38	10.0
It11 – Which of these has more fat: one small piece of cake without frosting or one slice of whole bread?	Cake without frosting	302	79.5
	Whole bread	14	3.7
	Both	11	2.9
	I do not know/I am not sure.	53	13.9
It12 – How many servings of fruits and nonstarchy vegetables do you think someone should eat a day for good health?	<3 servings	70	18.4
	3 to 5 servings	248	65.3
	>5 servings	49	12.9
		14	3.7

* The correct answer is underlined; CNCDs = chronic noncommunicable diseases..

sity students from the medical and biological areas (n = 5,745) and also reported high alcohol intake; 44.4% of the students ingested alcohol regularly and only 6-10 students consumed water more than once a day. These results indicate the university students' need for effective guidance on hydration and alcohol use.

A significant percentage of our sample does not have breakfast and only rarely has snacks between meals. The habit of skipping these meals and snacks has been reported by other studies[12,19]. Low adherence to breakfast may be explained by the autonomy gained by the youth who need to adapt to a new routine of activities that do not involve their parents. Niemeier et al. (2006)[21] claim that not having breakfast may generate cognitive problems, reduce memory and reasoning, and promote the development of risk factors for chronic noncommunicable diseases (CNCDs). On the other hand, Burriel et al. (2013)[19] studied Spanish university students and found that nearly all (98%) had breakfast and more than 75% had at least 4 meals a day.

In this study, the variables of program year, socioeconomic class, and physical activity are associated with concern for a healthy diet among pharmacology and biochemistry undergraduate students. Students in their first and fifth or sixth years are more likely to have healthy habits than those in the other years. These students are in the first or last years of university, so one may speculate that those in the first year still practice the eating habits they acquired at home. However, these good habits slowly fade over time but may return as the students become more mature.

Concern for a healthy diet is greater in students of higher socioeconomic classes. This fact may be attributed to better access to information and the routine acquisition of healthier foods. On the other hand, Rodríguez et al. (2013)[7] did not find a relationship between socioeconomic level and food behavior.

Physically active students were more concerned with acquiring healthy food habits, which may be a reflection of adhering to a healthier lifestyle. Although most students of this sample claimed to be physically active, an important percentage of the sample was inactive. Rodriguez et al. (2013)[7] reported that physical inactivity may be due to lack of time because of all the unyielding university demands, the absence of physical activity programs, and the fact that the students are involved in many other academic activities.

The significant association between nutrition knowledge and program year (Table V) may be related to the presence of the health and nutrition discipline in the fourth year of the pharmacology and biochemistry program, thereby educating the students about nutrition. However, the results show that the students do not use the nutrition knowledge they acquire during the course because nutrition knowledge was not associated with concern for a healthy diet. Hence, more impactful and encouraging education strategies are needed for the students to incorporate the classroom lectures and increase their concern for a healthy diet.

Table V
The distribution of pharmacology and biochemistry undergraduate students according to nutrition knowledge and the demographic variables of interest

	Nutrition knowledge (n)					
Characteristic	*Low*	*Moderate*	*High*	*Total*	χ^2	*p*
Gender						
Male	11	69	3	83		
Female	56	234	7	297	1.698	0.428
Program hours						
Full-time	47	200	10	257		
Evening	20	102	-	122	5.263	0.072
Year						
First	60	114	-	174		
Second	-	36	-	36		
Third	-	33	1	34		
Fourth	4	42	8	54		
Fifth and sixth	2	71	-	73	103.719	<0.001#
Nutritional status						
Underweight	1	21	-	22		
Normal weight	53	213	8	274		
Pre-obese	12	52	1	65		
Obese	1	10	-	11	5.261	0.511
Employed						
No	62	258	10	330		
Yes	5	36	-	41	2.546	0.280
Socioeconomic class						
A	21	86	1	108		
B	39	183	9	231		
C, D, and E	7	34	-	41	4.789	0.780
Physical activity						
No	28	145	6	179		
Yes	37	157	4	198	1.168	0.558
Alcohol intake						
No	23	88	4	115		
Yes	44	212	6	262	1.082	0.582
Family history of CNCDs*						
No	21	105	4	130		
Yes	46	194	6	246	0.478	0.787

* CNCDs = chronic noncommunicable diseases.; # Fisher's Exact Test

Table VI
The distribution of the pharmacology and biochemistry undergraduate students according to nutrition knowledge and concern for a healthy diet

	Nutrition knowledge (n)					
Characteristic	*Low*	*Moderate*	*High*	*Total*	χ^2	*p*
Unhealthy food habits	5	27	-	32		
Pay attention to your diet	37	199	9	245		
Healthy diet	5	35	1	41	1.603	0.808

Conclusion

The classification of the pharmacology and biochemistry students with respect to their concern for a healthy diet indicates that their health may be at risk. Concern for a healthy diet was associated with program year, socioeconomic class, and physical activity. The students at greatest risk of NCDs were those in the first year, those from socioeconomic class B (US$ 1,046 - 1,872), and those who did not practice physical activity. Concern for a healthy diet was not associated with nutrition knowledge.

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