Anthropometric characterization, level of physical activity and healthy lifestyles in the teaching, administrative and service personnel of the Faculty of Chemical Sciences and Pharmacy of the University of San Carlos de Guatemala

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Abstract

In the Faculty of Chemical Sciences and Pharmacy of the University Sanm Carlos of Guatemala (USAC) it has been observed that teaching, administrative, and service personnel have a high risk of suffering from chronic diseases. This a public health problem, that has increased worldwide, is associated with sedentary lifestyle, inadequate diets, smoking, consumption of alcohol and drugs; for which the study sought to carry out the anthropometric characterization, level of physical activity and healthy lifestyles of the Faculty personnel. This transversal descriptive study was doneto69 teachers and 56 administrative and service staff. The questionnaires applied were the Abbreviated
International Physical Activity Questionnaire (IPAQ), an evaluation of healthy lifestyles, a body mass index (BMI), a percentage of fat, and a waist circumference measurement. The average BMI for both groups results in overweight, obtaining for teaching staff 25.4 CI 95% [24.3, 26.4], and for administrative and service staff 27.0 CI 95% [26.1, 27.9], with a percentage of healthy average fat according to age and sex, and a waist circumference within the parameters. Regarding the eating habits, more than 90% of the sample performs three times of meals Also, there is a low consumption of fruits, vegetables, and water according to the recommendations. From the consumption of alcohol and tobacco, a low frequency of consumption is observed. According to IPAQ, 58% of the teaching staff and 66% of the administrative and service staff studied are inactive. It is necessary to increase the facilities of the personnel to carry out physical activity and to orient towards the change of alimentary habits to promote healthy lifestyles.

Keywords: sedentary lifestyle, overweight, eating habits, nutritional status.

Introduction

The World Health Organization (WHO) defines health as a complete state of well-being and not merely the absence of disease or infirmity. The factors that influence the health-disease balance are related to behavior and lifestyle (Camacho, Echeverría, & Reynoso, 2010). Lifestyle involves daily activities related to beliefs about healthy, risky, and disease practices. Among the elements that constitute there are: food, physical activity, alcohol and tobacco consumption, self-care activities, etc. (García et al., 2009).

Healthy lifestyles have been associated with a lower risk of chronic diseases such as type 2 diabetes mellitus, cardiovascular diseases and some types of cancer (Robles, Llimaico, & Villamar, 2014). Scientific evidence suggests that there are behaviors that promote health, such as exercising, balanced diet, not smoking and drinking small amounts of alcohol (Martins, de Castro, de Santana & Oliveira, 2008). On the contrary, the combination of an unhealthy diet, physical inactivity, tobacco consumption and excessive alcohol intake has a cumulative, and even synergistic, effect that favors a higher incidence of chronic diseases (Cerecero, Hernández, Aguirre, Valdés , & Huitrón, 2009).

According to the National Center for Epidemiology (CNE) of the Ministry of Public Health and Social Assistance (MSPAS), Guatemala already shows a frank predominance of general mortality due to chronic non-communicable diseases related to overweight, obesity, sedentary lifestyle and other lifestyles, the distribution of deaths for 2013 being as follows: from external causes 15.7%, from infectious diseases 15.7% and from chronic non-communicable diseases 68.6% (MSPAS, 2015).

Physical activity can be defined as any voluntary body movement produced by skeletal muscles that produces an energy expenditure above the basal metabolic rate (Vidarte, Vélez, Sandoval, & Alfonso, 2011). Regular physical activity has a positive effect on health; conversely, low levels of physical activity and sedentary lifestyle are correlated with a marked increase in most causes of mortality (Peña, Colina, & Vásquez, 2009).

In addition to unhealthy lifestyles, overweight and obesity are two serious problems of worldwide malnutrition, as they constitute a risk factor for chronic diseases (Robles, Llimaico, & Villamar, 2014). Obesity, considered the most frequent metabolic disorder all over the world, affects quality of life and decreases life expectancy in 5 to 10 years (Ratner, Sabal, Hernández, Romero, & Atalah, 2008; Salazar, Feu , Vizuete, & de la Cruz-Sánchez, 2013).

At the Latin American level, the prevalence of overweight and obesity is over 20% in 17 of the 20 countries and is significantly higher in women (Braguinsky, 2002). According to national data, the VI National Survey of Maternal and Child Health 2014-2015 reflects that more than half of women (52%) are overweight and obese, 32% being overweight and 20% obesity (MSPAS, Instituto Nacional de Estadística [INE], & International Coach Federation [ICF], 2017).
The Faculty of Chemical Sciences and Pharmacy of the San Carlos de Guatemala University, being an institution related to the field of health and employing about 264 people, that tend to be sedentary by their trade, is a focus of risk for the development of chronic diseases, taking into account that this population can be part of the prevalence of overweight and obesity and the distribution of annual deaths caused by chronic non-communicable diseases reported nationwide. Programs to promote healthy lifestyles seem to have great potential to promote health, but the first step in the design of actions and decision-making is the establishment of baselines the physical activity index (IAF) (Mantilla & Gómez-Conesa, 2007).

that allow characterizing behaviors in the population (Hernández- Escolar, Herazo-Beltrán, & Valero, 2010), so the objective of the research was to establish the starting point for future interventions through anthropometric characterization, level of physical activity and healthy lifestyles of teaching and administrative staff. and service; this with the taking of anthropometric measurements and the analysis of data collected with a questionnaire on lifestyle and physical activity of a sample of workers, during the second half of 2016.

Materials and methods

Type of study. Quantitative descriptive cross-sectional study. Population and sample.

A population of 160 teachers and 104 workers in the administrative and service area with a working relationship with the Faculty in 2016. The sample was estimated at 69 teachers and 56 administrative and service personnel; with 95% confidence, expected standard deviation of 1.6 and precision of 0.285 with respect to the design variable that was BMI.

Inclusion criteria. Teaching, administrative and service personnel linked labor-law with the Faculty in 2016, who have agreed to participate voluntarily by signing an informed consent.

Exclusion criteria. Teaching, administrative and service staff of the Faculty who did not wish to participate in the study and / or who did not sign the informed consent.

Instruments. These instruments were coded to protect the confidentiality of the information provided by the participants, they are presented below:

Short IPAQ physical activity questionnaire. Instrument structured in seven items that allows registering the values of weekly physical activity, based on the calculation of

Healthy lifestyle evaluation questionnaire. It was designed ad hoc to collect information on lifestyle behaviors related to consumption of alcohol, tobacco, pure water and eating habits. A pilot test was carried out to validate both questionnaires.

Anthropometric characterization form. Record of anthropometric measurements of weight (kg), height (m), abdominal circumference (cm) and percentage of employee fat.

Methods The procedures followed to collect the data were:

Selection of the sample. It was carried out assuming randomness by willingness to participate when making a call, meeting the inclusion and exclusion criteria, until completing the sample number.

Anthropometric information. The collection was carried out with the support of previously standardized nutrition students in taking anthropometric measurements. To obtain the measurements of body mass, a scale made by Tanita Model BF-522W was used. To measure height, a Seca Model 217 brand height rod was used. Waist circumference data was collected using a Seca Model 203 brand flexible (non-elastic) tape measure.

Information on physical activity and healthy lifestyles. Each employee was asked to respond autonomously to the instruments: abbreviated IPAQ and healthy lifestyle evaluation questionnaire.

Analysis of data. Descriptive statistics of frequency distribution, percentages, average, standard deviation and 95% confidence intervals were used to estimate the BMI of each population, using the Microsoft EXCEL program. Information on the data analysis for each parameter is detailed below.
Anthropometric characterization. The BMI was calculated and in a complementary way, it was classified according to the WHO

Physical activity. The categories of physical activity levels were: inactive, individuals with no reported activity or not included in the regularly active and highly active levels. Regularly active, they met one of the following criteria: 3 or more days of intense activity of at least 20 min per day; 5 or more days of moderate activity and / or a walk of at least 30 min; o 5 or more days of walking, moderate or intense, reaching 600 metabolic equivalents per minute (METs-min) per week. Very active, those categorized in one of the following two criteria: intense activity 3 days accumulating 1,500 METs-min per week; o 7 or more days of moderate or intense walking, accumulating 3,000 METs-min per week (Mantilla & Gómez-Conesa, 2007).

in low weight (<18.5), normal (18.5-24.9), overweight (25.0-29.9) and obesity (> 30.0) (World Health Organization [WHO], 2004) . The percentage of fat was classified according to the parameters in Chart 1.

Chart 1 Nutritional status classification parameters according to fat percentage value

Age (years)	Women			
	Low percentage of body fat	Healthy	High percentage of body fat	Obese
18 - 39	0 -20%	21 - 32%	33 - 39%	>39%
40 - 59	0 - 22%	23 - 33%	34 - 40%	>40%
60 - 99	0- 23%	24 - 36%	37 - 42%	>42%
Age (years)	Men			
	Low percentage of body fat	Healthy	High percentage of body fat	Obese
18 - 39	0 - 7%	8 - 19%	20 - 25%	> 25%
40 - 59	0 - 10%	11 - 21%	22 - 28%	> 28%
60 - 99	0 - 12%	13 - 24%	25 -30%	>30%

Source: Adapted from TANITA Corporation (2009). Body Fat Percentage Classification based on INS / WHO BMI guidelines and reports by Gallagher et al. (2000) from the New York Center for Obesity Research.

Waist circumference was considered as an indicator of abdominal obesity and risk of cardiometabolic diseases above 102 cm for men and 88 cm for women (Moreno, 2010).

Assessment of healthy lifestyles. The comparison standards for eating habits and pure water consumption were established in the Dietary Guidelines for Guatemala (National Program for the Prevention of Chronic Non-communicable Diseases and Cancer, 2012). For the interpretation of tobacco consumption, the categories established by the World Health Organization (WHO) were used: Daily smoker, person who smokes a minimum of one cigarette a day during the last six months; occasional smoker, person who has smoked less than one cigarette a day; and non-smoker, a person who has never smoked (WHO, 2015). For the consumption of alcohol the WHO categories were used: Teetotaler, person who doesn't drink alcoholic drinks; moderate drinker, person who regularly consumes alcohol in an amount less than the risk limit; and a drinker at risk, a person who consumes alcohol weekly more than the risk limit (30 g of alcohol in men and 20 g in women) in a single day more than once a month (Pan American Health Organization [PAHO], 2008).

Ethical considerations. The investigation was carried out in accordance with the principles of the Declaration of Helsinki, being of minimal risk. The integrity of the participants was respected through informed consent and the results obtained were not used for purposes other than research.

Results

The general and anthropometric characteristics are presented in Table 2. The BMI in the group of teaching staff was found in 25.4 95% CI [24.3, 26.4], and in the group of administrative and service personnel in 27.0 95% CI [26.1, 27.9]. In the percentage of fat, the male teaching group shows 19.9% 95% CI [15.3, 24.6], and administrative and service 22.9% 95% CI [18.0, 27.8]; the female teaching group shows 31.1% 95% CI [29.0, 33.2], and administrative and service 32.7% 95% CI [30.8, 34.5].

Chart 2. Anthropometric evaluation of the teaching and administrative staff / service of the Faculty of Chemical Sciences and Pharmacy of the University of San Carlos de Guatemala according to BMI, percentage of fat and waist circumference, September 2016.

Employment	**teachers Council**	**administration/services**
Gender	**n (%)**	**n (%)**
Female	52 (75)	38 (68)
Male	17 (25)	18 (32)
	General average (DE) [IC 95%]	**General average (DE) [IC 95%]**
Age	42 (13) [39,45]	43 (12) [40, 46]
Weight (kg)	65.6 (13.2) [62.4, 68.7]	66.4 (10.8) [63.5, 69.3]
height (cm)	160.7 (9.3) [158.4, 162.9]	156.6 (8.0) [154.5, 158.8]
BMI (kg/m2)	25.4 (4.4) [24.3, 26.4]	27.0 (3.5) [26.1, 27.9]

average of fat (%)		
Male	19.9 (9.1) [15.3, 24.6]	22.9 (8.2) [18.0, 27.8]
Female	31.1 (7.5) [29.0, 33.2]	32.7 (5.5) [30.8, 34.5]
Waist circumference (cm)		
Male	90.4 (11.1) [84.7, 96.1]	94.4 (10.5) [88.0, 100.8]
Female	82.9 (10.0) [80.1, 85.7]	85.8 (6.5) [83.6, 87.9]

According to BMI, around half of teaching staff and 68% of administrative and service staff are overweight or obese (Figure 1).

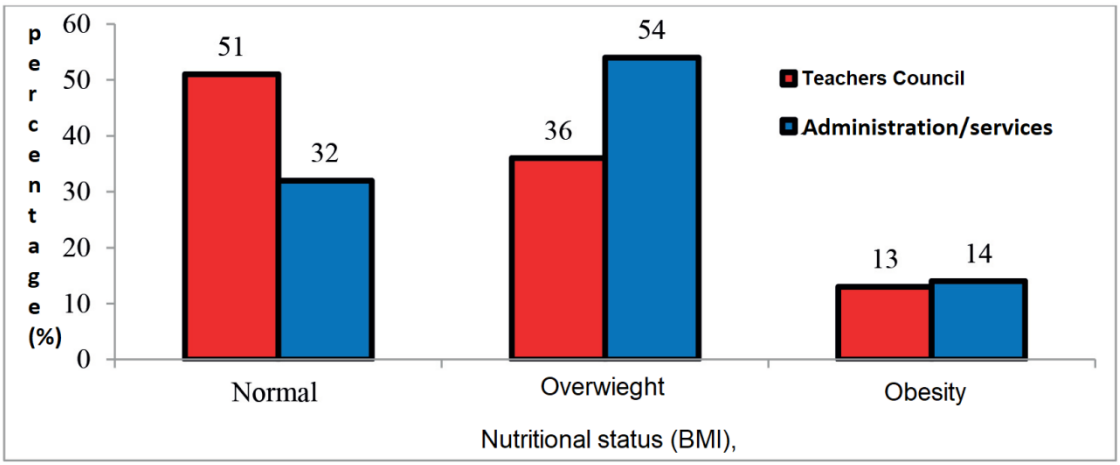

Figure 1. Distribution of the nutritional status of the teaching and administrative staff / service of the Faculty of Chemical Sciences and Pharmacy of the University of San Carlos de Guatemala according to IMC, September 2016.

Fat percentage measurements show that 42% of teaching staff and 55% of administrative and service staff show an excess in the fat percentage (Figure 2).

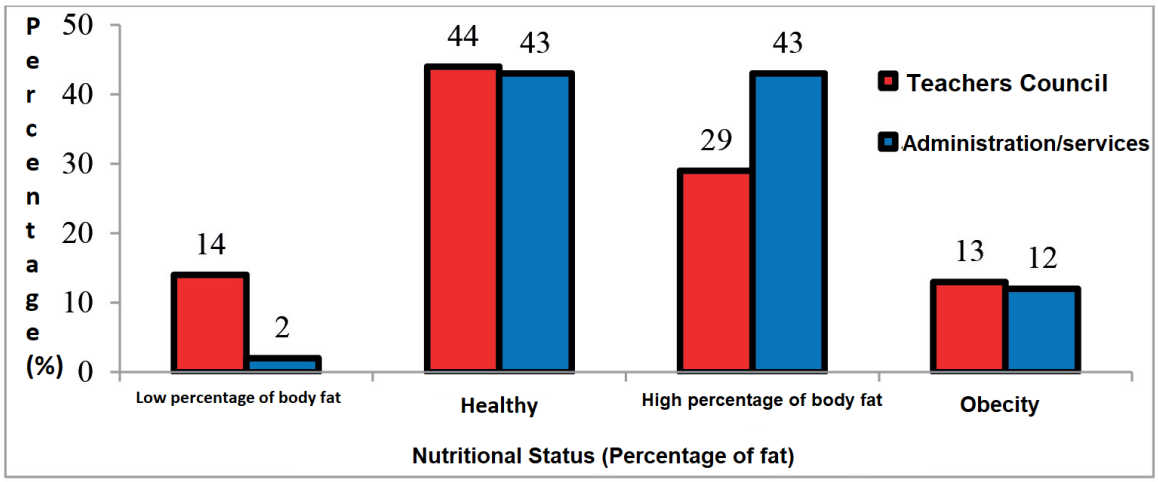

Figure 2. Distribution of the nutritional status of the teaching and administrative staff / service of the Faculty of Chemical Sciences and Pharmacy of the University of San Carlos de Guatemala according to fat percentage, September 2016.

Table 3 shows that the frequency of consumption of fruits and vegetables is mostly one to two servings for both groups.

Furthermore, it is shown that less than 20% of the population in both groups consumes eight glasses of pure water a day.

Chart 3. Eating habits of the teaching and administrative staff / service of the Faculty of Chemical Sciences and Pharmacy of the University of San Carlos de Guatemala, September 2016.

Characteristics		**Teachers Council (N=69)n (%)**	**Administration/Services (N=56) n (%)**
Mealtimes			
Breakfast		66 (96)	48 (86)
Morning snack		34 (49)	35 (63)
Lunch		68 (99)	52 (93)
Afternoon snack		31 (45)	14 (25)
Dinner		65 (94)	51 (91)
Fruit intake			
Daily intake	Yes	51 (74)	31 (55)
	No	18 (26)	25 (45)
Portions per day	1 -2	48 (69)	47 (84)
	3 - 4	20 (29)	9 (16)
	> 5	1 (2)	0 (0)
Vegtables intake			
Daily intake	Yes	53 (77)	23 (41)
	No	16 (23)	33 (59)
Portions per day	1 -2	52(76)	49 (87)
	3 - 4	14 (20)	7 (13)
	> 5	3(4)	0(0)
Water consumption			
Daily intake	Yes	65 (94)	52(93)
	No 4	(6)	4(7)
Glasses a day	1 -2	7(11)	2(4)
	3 -4	28(40)	17 (31)
	5 -6	10(15)	17 (31)
	7 -8	12(17)	11 (19)
	>8 1	2 (17)	9 (15)

In Chart 4 on alcohol consumption, it is observed that around 20% of the subjects in both groups are drinkers at risk and about a third are moderate drinkers.

Table 4. Alcohol consumption of the teaching and administrative staff / service of the Faculty of Chemical Sciences and Pharmacy of the University of San Carlos de Guatemala, September 2016.

Characteristics	Teachers Council (N=69)n (%)	Administration/Services (N=56) n (%)
Intake		
Yes	41 (59)	28(50)
No	28 (41)	28(50)
Categories		
Abstinence	28 (41)	28(50)
moderate inebriate	24 (35)	17(30)
Drinker at risk	17(24)	11(20)

Daily tobacco use in both groups is less than 16%, 55% of teaching staff, and 60% of administrative and service staff are non-smokers (Table 5).

Chart 5. Tobacco consumption of the teaching and administrative staff / service of the Faculty of Chemical Sciences and Pharmacy of the University of San Carlos de Guatemala, September 2016.

Characteristics	Teachers Council (N=69)n (%)	Administration/Services (N=56) n (%)
Smoked once		
Yes	31 (45)	22(40)
No	38 (5)	34(60)
Smokes daily		
Yes	11 (16)	2(4)
No	58(84)	20(36)
Category		
Daily smoker	3(4)	2(4)
Occasional smoker	28(41)	20(36)
Non smoker	38 (55)	34(60)

Regarding the level of physical activity (Figure 3) in both groups, it is observed that the majority of the population is inactive.

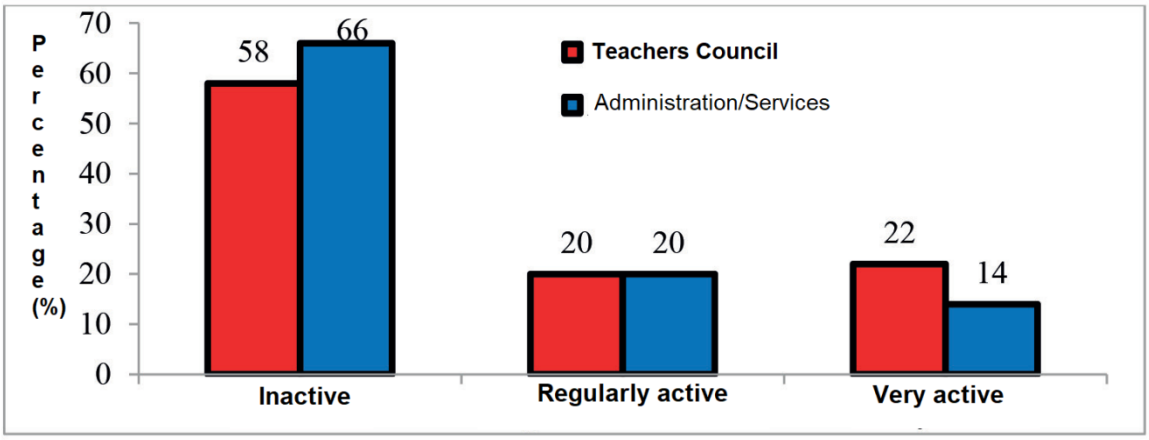

Figure 3. Distribution of the level of physical activity of the teaching and administrative staff / service of the Faculty of Chemical Sciences and Pharmacy of the University of San Carlos de Guatemala, according to IPAQ, September 2016.

Discussion

Overweight and obesity have become a public health problem, being the fifth risk factor for death worldwide (Salazar et al., 2013). The results obtained reflect that the BMI in the group of teaching staff was found in 25.4 95% CI [24.3, 26.4], and in the group of administrative and service personnel in 27.0 95% CI [26.1, 27.9], obtaining both groups a WHO classification of overweight; various epidemiological studies support that being overweight is a risk factor that induces the appearance of metabolic syndrome, cardiovascular diseases, diabetes, osteoarticular diseases, some types of cancer, depression and alteration of cognitive function, in addition to the effects on body image (Morales et al., 2017). About
half of the teaching staff (49%) and more than two thirds of the administrative and service staff (68%) are overweight or obese, data well above those collected in a study at the UNEMI Faculty of Health Sciences in Ecuador, in which only 37% of the sample showed overweight or obesity (Robles et al., 2014). The same trend of excess occurs with the percentage of fat, where the male and female teaching staff show 19.9% 95% CI [15.3, 24.6] and 31.1% 95% CI [29.0, 33.2] respectively, and administrative and male and female service 22.9% 95% CI [18.0, 27.8] and 32.7% 95% CI [30.8, 34.5] respectively; having 42% of the teaching staff and 55% of the administrative and service staff with excess fat. Both anthropometric indicators reflect an increase in body fat that results in a risk situation for high blood pressure, diabetes mellitus, cancer and metabolic syndrome (Robles et al., 2014). The information on food consumption shows that most of the personnel carry out the three main meal times as a healthy practice, an opposite result to that found in the study by Ratner et al. (2008), where the majority only do two meal times; on the

fruits and vegetables showed in both groups, a low consumption with one to two servings a day.

Alcohol consumption is related to the person's behavior, and depending on the frequency, quantity consumed and the foods that accompany it, it can cause weight gain and obesity (Casanueva, Pérez, & Kaufer, 2008). In a study carried out with university workers in Sonora, Mexico, it was found that more than 50% of the population consumes alcohol (Camacho, Echeverría, & Reynoso, 2010). In the case of the sample studied, a lower consumption is observed, 24% of the teaching staff and 20% of the administrative and service staff are drinkers at risk; in contrast to 41% of teaching staff and 50% of administrative and service staff who do not consume alcohol, concluding that alcohol consumption in the population is not a risk factor for the development of chronic non-communicable diseases.

Tobacco use is the most frequent exogenous cause of lung cancer and is a significant risk factor for cardiovascular disease (Murphy, 1996). Low tobacco consumption was found in the studied staff, since only 4% of the sample uses it daily in both groups, and 55% of the teaching staff and 60% of the administrative and service staff are non-smokers. A similar result is observed in the study by García et al. (2009), where only six people reported smoking.

The assessment of physical activity through the IPAQ is used in numerous international studies (Hernández-Escolar et al., 2010; Mantilla-Toloza, Gómez-Conesa, & Hidalgo-Montesinos, 2011), however most of these Studies focus on college students, and there are few studies on teaching, administrative, and service personnel. The results of the research carried out at the Caldas University in Colombia, showed that 37.2% of the administrative staff are sedentary and 51.3% are sufficiently active; Comparing with the results of the administrative and service staff of the Faculty, it was found that the percentage of sedentary is almost twice as high (66%) and that of regularly active is much lower (20%). However, in a study carried out at the Technological University of Pereira in Colombia, 42.2% of the surveyed administrators are sedentary and 37.5% are irregularly active (Zapata, Martínez, & Nieto, 2010).

contrary, in the same study the consumption of

In the case of teaching staff and the level of physical activity, we found that 58% are sedentary and 42% are active, being the percentage of sedentary lifestyle higher than that found in the study of the University of Pereira in Colombia, where the percentage of sedentary teachers was 19.7% (Zapata et al., 2010). In an investigation carried out with university workers from the State of Mexico, it was concluded that only 32.8% of workers perform the recommended amount of exercise (Cerecero et al., 2009). Therefore, it can be concluded that most of the faculty, administrative and service staff of the Faculty do not carry out sufficient physical activity to obtain benefits for their health. The sedentary lifestyle figures obtained are essential for structuring physical activity programs on the university campus.

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