Nutritional Status, Lifestyle, and Risk Behaviors for Eating Disorders in Nutrition Students

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Abstract

Introduction

Health professionals have shown not only similar but actually higher cardiometabolic risk factors than those of their own patients. Moreover, health sciences undergraduate students have shown similar trends in eating behaviors and habits of physical activity and diet than general population. Nutrition students should be more aware of the importance of having a healthy lifestyle and have shown to have more dietary risk behaviors.

Objective

To assess body composition, lifestyle and dietary risk behaviors in Nutrition students.

Material and Methods

Body composition, physical activity, diet, body image perception, and dietary risk behaviors were assessed in a convenience sample of Nutrition students at a private University.

Results

90% of the students were within the normal BMI range; however, fat percentage of 50% of the students was above the cut-off point. The only criterion of an adequate diet that was fulfilled by 100% of the students was safety (i.e., innocuous); the least fulfilled criterion was macronutrient balance with only 40%. 78% of the sample met the WHO criteria of physical activity. 5% presented dietary risk behaviors and 40% show body dissatisfaction. Students exceed the DRI for protein, fat and fiber.

Conclusion

Although most of the students have a healthy BMI, 50% of the students have a high percentage of fat; this shows the impact of not having a proper diet. The percentage of fat and muscle mass is not consistent with the results of physical activity. The percentage of students that practice dietary risk behaviors was lower than the national average.

Keywords: Lifestyle; Body composition; Risk behaviors; Nutrition students

Introduction

Mexico currently faces historically high prevalence of overweight and obesity: 70 % of adults, 35% of adolescents, 26 % of scholars and almost 10% of children under 5 years [1]. Although recent reports are encouraging as they state that the increase in such prevalence has been contained, these epidemics are still the central challenge for the health sector [2], since the rate remains with a positive slope.

Concomitant to overweight and obesity, the current epidemiological situation is characterized by a high prevalence of chronic degenerative diseases such as components of the metabolic syndrome (e.g., obesity, atherogenic dyslipidemia, endothelial dysfunction and impaired glucose metabolism). In these pathologies, there´s certainly a genetic component (e.g., polymorphism found in the Mexican population resulting in alterations in the ABCA1 transporter [3] with consequent propensity to develop hypoalphalipoproteinemia); however, it has been established that the now called "exposoma" (diet, physical activity (PA), lifestyle , the use (and abuse) of drugs , pollution , exposure to chemicals , stress and all factors environment to which a person is exposed from birth) is a key factor in disease development [4].

Along with the overall population, health professionals are often immersed in this obesogenic environment and therefore have the same risk factors and develop the same diseases that their own patients [5]. This phenomenon becomes a vicious circle because it increases the probability of failure in the therapeutic treatment because patients don´t trust their physician. Worse, it has been found that these patterns start from the professional future of health is still a student [6].

Since the dietitian has the primary responsibility changing patient´s lifestyle, its role is particularly important. In this regard, several studies report that the nutritionist has a better health and nutrition as a result of improved food quality and increased energy expenditure at the expense of physical activity (PA), when compared to other professions. In contrast, some studies have reported that both the professional and the student of Nutrition showed a higher proportion of eating disorders and dietary risk behaviors [7,8].

Due to all the aforementioned, it is important to determine the body composition, dietary patterns, physical activity and risk behaviors among students in Nutrition. With this we could proceed to describe the epidemiologic and nutrition panorama and design interventional studies in the areas of opportunity found with this project.

Objective

To assess body composition, lifestyle and dietary risk behaviors in students of Nutrition at a private University in Mexico City.

Materials and Methods

We conducted a cross-sectional study, recruiting a sample of college students majoring in Nutrition. Nutritional status (using anthropometric indicators and bioimpedance methods) and lifestyle (diet and PA indicators) were evaluated after the volunteers signed an informed consent.

The following equipment and questionnaires were used:

For Body Composition:

Impedance with the equipment: Inbody® 230

• Bioelectric impedance analysis is a method that is based on the fact that the human body is conductive and electrically non-conductive component. Usually 50-70% of the human body consists of water having conductive features, while fat mass functions as nonconductive. The classical method of bioelectric impedance analysis measures the impedance of the whole body under the premise that the human body can be considered as a cylinder for the application of this model. If A is the cross-sectional area, and L is the length, the impedance of the cylinder can be expressed as follows (Figure 1):

If both sides are multiplied by L, we obtain a new expression as follows:

$$V = \rho \, \frac{L^2}{Z} (V(colume) = A \, (area) x \, L(length))$$

Figure 1: $Z = \rho \, \frac{L}{A}$ (where ρ is the resistence)
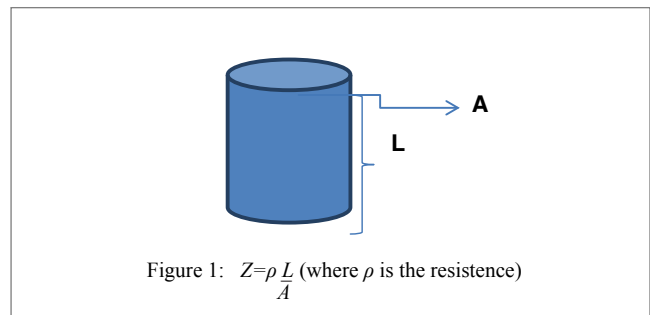
According to this expression, if we know L and the value of the impedance, we get the volume. That is, if the height of the human body (which acts as a conductor) is known, and we know the value of impedance, we can get the volume of the total body water. Here, the volume represents the height of the subject.

The principle of analysis of the composition is explained as follows; the volume of body water, an electrolyte, is first calculated with the measured impedance value. Then we can get the value of fat-free mass using the volume of body water. The fat mass is calculated by deducting the lean body mass weight obtained.

The height must be entered by the user. Weight can be measured directly in Inbody® 230 like any scale [9].

Waist, hip and arm circumferences with fiber-glass tape

• **Waist Circumference**: The person should wear minimal clothing when the measurement is performed, standing with his arms at his sides and feet together. The examiner sits beside the subject to observe the widest part of the buttocks. The examiner should not compress the tape [10].

• **Hip Circumference**: First you have to draw an imaginary line from the armpit to the iliac crest. Then, identify the midpoint between the last rib and the top of the iliac crest (hip). Place the measuring tape around the above mentioned spot and proceed to the measurement of the circumference, the individual must be standing. The examiners must avoid that their fingers get caught on the tape, interfering with the measurement [11].

• **Arm Circumference**: It is obtained by measuring with tape the upper arm, with reference of the length between the tip of the shoulder (acromion) and the radial head (olecranon). Once we identify the existing midpoint between the acromion bone protrusion and olecranon along the side of the non-dominant arm with the elbow flexed to 90° the subject lets the arm fall naturally, and the tape is placed horizontally around the point indicated [11].

Eating Habits

- 24-hour dietary recall
- The 24-hour dietary recall was analyzed with the Food Processor SQL v. 10.12.0® a software with an extensive database for nutrition analysis.

Body Image Satisfaction and Dietary Risk Behaviors

Silhouette questionnaire

• The Silhouette questionnaire (adapted from the Silhouette questionnaire of Bell, Kirkpatrick and Rinn, 1986) consists of 8 female and male figures that increase gradually the body shape related to an increase in weight. Questions such as "What figure represents your current weight?" and "What figure represents your ideal weight or how would you like to be?" are asked to the subjects. The first question can assess the distortion between real weight and perceived weight, TS-Distortion. The second question assesses the difference between the perceived weight and ideal weight, i.e., body dissatisfaction, TS- Dissatisfaction [12].

• In both cases, a score of zero or near zero indicates satisfaction with body image. Scores below or above zero indicate the extent to which the distortion occurs and body dissatisfaction [12].

PA

General Physical Activity Questioner:

• The Global Physical Activity Questionnaire was developed by WHO for physical activity surveillance in countries. It collects information on physical activity participation in three domains (activity at work, travel to and from places, recreational activities) as well as sedentary behavior, comprising 16 questions [13].

Data was analyzed with GraphPad Prism® v.5 software. Descriptive statistics are presented as frequencies (%). Z-tests were performed for differences among qualitative data, considering a $p<0.05$ as statistically significant.

## Results

86 students participated in the study, all women and aged 21 ±3 years.

Figure 2 presents the results for body composition. In brief, 90% of the students had a normal BMI (18.5-24.9 kg/m²) [14], only 5% are overweight or obese and 5% and underweight with this indicator. 50% of the students had a fat percentage above the cutoff point (28 %) [15] and 65% had high accumulation of fat in the abdominal area. The abdominal circumference of 60% of the students was within the accepted cutoff point for Mexican adult women (80 cm) [2,16]. We further plotted the previous indicators according to the academic semester, and found that during the first semesters the students fat mass decreases but after fourth semester it increases again although statistical differences were not found (Figure 3).
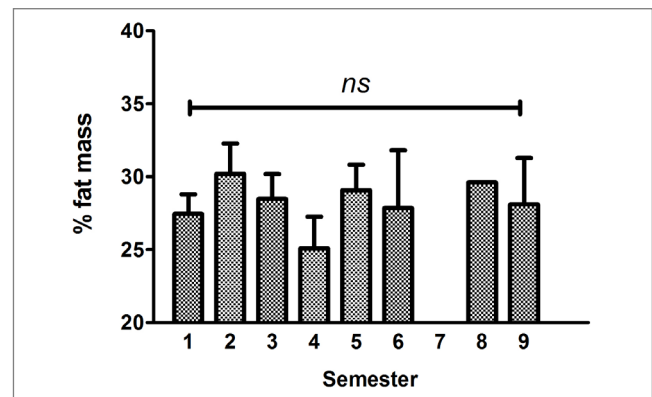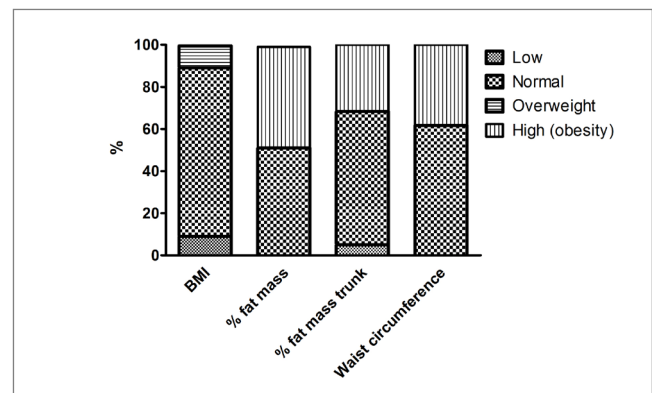
The results of the evaluation of dietary habits are presented in Figure 4. We analyzed the components of the adequate diet for the Mexican population (variety, complete, balanced, adequate, sufficient and innocuous) [17]. From these only one was fulfilled by 100% of the students, innocuous diet, variety was fulfilled by 70% of the sample, meanwhile the lowest percentage was held by balanced diet with only 40% of the students.
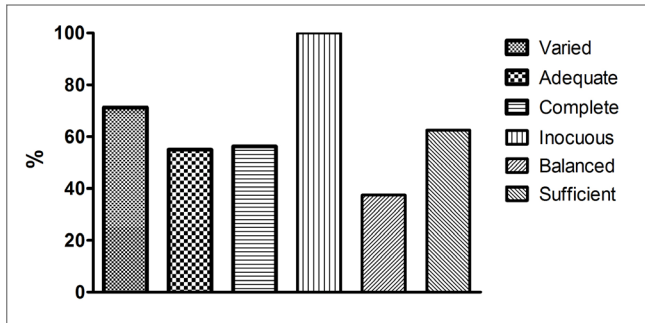
In the 24 hour-recall analysis, most of the students meet their total energy expenditure, the fat intake exceeds the DRI, the saturated fat intake meets the 100% of the DRI as well as the monounsaturated fat intake, the polyunsaturated fat intake barely exceeds the 50% of the DRI, the trans-fat intake is null, the cholesterol intake is close to meet the 100% of the DRI, the omega 3 and 6 intake is really low hardly reaching 50% of the DRI, the protein intake is just over 200% of the DRI which is disturbingly elevated consumption of protein, the carbohydrate intake is a little under 100% of the DRI but the fiber intake fulfills the DRI.

Regarding lifestyle and PA, 16% of the students reported to be active smokers and 32% are social drinkers. On the other hand 78% of the students practiced regular PA. 40% of the students have body dissatisfaction but only 5% present dietary risk behaviors.

Discussion

The present study shows that the association between BMI and BFP was not proportional since 90% have a normal BMI but 50% have a BFP above the cutoff, this shows that BMI- by itself- is not a specific health indicator for body composition [18,19]. The fact that the students have a healthy weight but their PBF is high in this case is more associated with the poor quality of the diet; which is typical to find in college students [20-22]. If we analyze the quality of the diet following the Mexican adequate diet criteria we can see that the quality of their diet is really poor. This would be contrary to our hypothesis since these students in particular know how to take better decisions regarding a healthy diet [23]. The decline in BMI in the first semesters could be a result of the awareness of the students towards the benefits of a healthy diet, but the rise of BMI in the next semesters could be more associated with the work load and stress [24]. The fact that 40% of the students´ abdominal circumference was above the cutoff, is really disturbing since this population should be healthier than general population.

A healthy diet is associated with a long-term reduction of risk of CVD, causing less endothelial dysfunction and less low-grade inflammation [25]. On the contrary, a long term high fat diet can promote CVD, a high fat diet can cause an increase in microvesicles which cause a significant increase in ROS (reactive oxygen species) and VCAM-1 (vascular cell addition molecule) which leads to a pro-inflammatory process and endothelial oxidative stress [26,27]. Meeting the DRI of Omega 3can lower plasma triglycerides, resting heart rate, and blood pressure, lower inflammation and improve vascular function, making it a protective factor [28]. The benefits of meeting the DRI for Omega 6 have not yet been established but the low intake of it in the students is worthy of being noticed [29]. Students reported a high intake of fat and low intake of Omega 3 and 6 which means they are a population with high risk of developing CVD in the long-term.

The intake of protein of the students is alarming; more than 200% of the DRI is excessive and can have many repercussions in the long-term. Dietary protein contributes to obesity treatments by acting on metabolic targets of satiety and energy expenditure in negative energy balance and could improve blood pressure, but the potential risks of a diet so high on protein and for long periods of time is yet to be studied and students should be aware of it [30-32]. On the other hand, the students met the DRI for fiber, which helps prevent constipation and regulate bowel movement, may decrease plasma total cholesterol, blood pressure, act as antioxidant, and reduce risk of obesity, type 2 Diabetes and CVD [33-35].

16% of the students are active smokers, which is lower than the national average of active smokers in Mexico (23.6%) and Mexico City (32.4%) [36]. 32% of the students are social drinkers which is lower than the average of social drinkers in Mexico (35%) and Mexico City (52.8%) [37]. Although eating habits were not a protective factor for these students, smoking habits and alcoholism were lower than those of the general population. Low rates of consumption of alcohol and tobacco will be reflected in the long term as a cardiovascular and cancer protective factor.

This also has an impact in their future profession, when patients perceive that their nutritionist or physician have a healthy lifestyle then the adherence to treatment is better [38-40].

78% of students meet the physical activity requirements established by the WHO [41]. It is incongruous that the students reported being physically active on a regular basis and their BFP was high. It´s because of this situation that it is concluded that it would be worth to do further investigation about what kind of PA is performed by the students and to analyze this situation in a more thorough manner [42]. It is also possible that the students felt the need, because of being students of nutrition, to answer in a more socially desirable manner resulting in over-reporting of PA [43,44].

40% of the students show body dissatisfaction which is very high compared to other studies that reported percentages around 13% [8]. 5% have dietary risk behaviors; this is lower than the percentage reported for general adolescent population in Mexico (19.7%) [2], this is similar to other studies that reported that 4.2% of dietetics and nutrition students have risk of developing eating disorders [45]. If a dietitian practices dietary risk behaviors it´s more likely that these practices will be recommended during consultation or will be more difficult for them to identify if the patient has these same behaviors.

Conflict of Interest: None declared.

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