Characteristics related to overweight and obesity in students of Universidad de Panamá Medical School in december 2018

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ABSTRACT

Objective: To describe risk factors related to the development of overweight and obesity in university students of the Faculty of Medicine of the University of Panama.

Methods: Analytical cross-sectional study. The universe corresponds to the totality of medical students of the University of Panama, currently 1159 students. A simple random sampling was done. The sample calculation is 289 students. We studied the risk factors related to obesity that students present: diet, smoking, alcoholism, history of hypertension and history of diabetes.

Results: The sample consists of a total of 289 students, whose distribution according to the BMI range is: Low Weight 18 (6.23%), normal weight 162 (56.06%), Overweight 83 (28.72) and Obesity 23 (9.00%). The evaluated variables are distributed in 64% male, 36% female; 65.1% have physical activity, 35% have no physical activity, 63% have an acceptable diet, 37% have a deficient diet; 82% have no alcoholism, 18% have alcoholism, 98% have no smoking, 2% have smoking; 46% have no history of DM2, 54% have a history of DM2; 16% had no history of arterial hypertension and 84% had a history of arterial hypertension.

Conclusion: Diet quality and physical inactivity are the most important factors for developing overweight or obesity in medical students. There is a significant percentage of students with alcoholism.

Keywords: Overweight; Obesity; Students, Medical; Schools, Medical

INTRODUCTION

It is known that obesity predisposes to develop diseases, including high blood pressure, diabetes, and other chronic diseases (1). College students, usually between 18 and 30 years, have common sociodemographic and lifestyle characteristics that may influence the development of risky behaviors related to overweight and obesity (2) (4).

In Panama, obesity has increased mainly in women and in both, rural and urban areas (5). Therefore, the prevalence of obesity in this country during 2008 was 16.9% in men and 23.8% in women; however, in 2007 the perception of national obesity was only 4% in men and 6.7% in women (6). There are few studies in Latin America that describe the prevalence of overweight and obesity in students; yet, one of the most important studies because of the number of students surveyed was conducted by Aguilar-Ye et al. in 2010, from the Universidad Veracruzana of México, with a sample of 5071 students, under the age of 25. In this study, men reported overweight and obesity in 33.1% and 9.5%, compared to 26.4% and 7.2% in women, respectively (7).

Likewise, Benjamin Trujillo Hernández, in 2010, also showed that men have a higher prevalence of overweight and obesity (8).

Many of these studies on college students, do not describe the characteristics in terms of lifestyles and students’ activities, making it difficult to conduct more effective programs aimed to decrease overweight and obesity.

The lack of information that exists regarding the condition of weight and nutritional quality in college students in Panama leads to the objective of describing the risk factors related to the development of overweight and obesity in medical students.

METHODS

Design: An analytical cross-sectional study was designed to describe the relationship between students with overweight and obesity, and the factors related to these conditions, and of those who do not present them, in students of the Medical School of the Universidad de Panamá, in December 2018.

Study population: The universe corresponds to medical students of the Universidad de Panamá, which is formed by 1159 students. The calculated sample is 289 students, at a 95% confidence level and a 5% margin of error, selected from simple random sampling. Factors evaluated in this study include physical activity, diet, smoking, alcoholism, history of high blood pressure and history of diabetes.
**Inclusion and exclusion criteria:** The criteria for inclusion is to be a medical student of the Universidad de Panamá in December 2018. The exclusion criteria apply to students who have been diagnosed with an eating disorder, whether genetic or hormonal, before the age of 18.

**DATA COLLECTION INSTRUMENT**

The data collection instrument is a questionnaire prepared by the working group, composed by closed questions, which evaluate the variables exercise, smoking, alcoholism, history of diabetes mellitus II, history of high blood pressure, according to whether they meet (present) or not, with the variables (absent).

The measurement of the smoking variable is determined with the modified CAGE score (9), the measurement of alcoholism with the AUDIT-C score (10) and the dietary quality is measured with the “Diet Quality Index” (DQI) (11). The questionnaire was validated internally with a pilot test and externally by the Bioethics Committee of the Vice-Rector’s Office of Research and Graduate Studies of the Universidad de Panamá. The measurement of the weight variable was performed according to the BMI (underweight less than 18.5, normal 18.5 to 24.9, overweight 25.0 to 29.9, obesity if equal or greater than 30.0). The sex variable is expressed as male or female. The diet variable was measured according to the DQI-I, and four grades were obtained: bad, if it is 60 or less; mediocre, if it is from 61 to 70; good, if it goes from 71 up to 80 and excellent, if it is between 91 and 100. On the other hand, if it is less than 61, it will be deficient and if it is greater than 61, acceptable.

The variable exercise, of 3 or more hours per week is considered present; if it is not fulfilled, it is considered as absent. In terms of smoking, according to the modified CAGE score, if at least two answers are “yes” on the score, it qualifies as present, and if not, as absent. For the alcoholism variable, according to the AUDIT-C score: for men, 3 or fewer points is adequate consumption (absent), while 4 or more points is inadequate consumption (present); for women: 2 or fewer points is adequate consumption (absent), while 3 or more points is inadequate consumption (present). In terms of type 2 Diabetes Mellitus and arterial hypertension, at least one first degree patient or two second degree patients diagnosed with the above-mentioned conditions are considered present, and if not, absent.

**Data processing and analysis**

Data were collected through a questionnaire applied by the research group. The questionnaire was implemented through a template designed in Google Forms, where the information was collected (the Google Forms template allows the respondent to fill it out only once and maintains the respondent’s anonymity, although a confirmation email is received when the questionnaire is filled out). Also, the Google Forms template is closed as soon as the number of students in the sample is completed. The modified CAGE score, the AUDIT-C score and the DQI-I score are implemented in the Google Forms template allowing to determine the grade for each scale.

For statistical analysis, the strength of association is measured using the Odds Ratio with the confidence intervals for each variable: physical activity, poor diet quality, alcoholism, smoking, history of high blood pressure, history of diabetes mellitus. The data was processed using EpiInfo 7.2. To measure the strength of association, the Odds Ratio was used with confidence intervals. Subsequently, tables and figures were generated in Excel 2016 from the information obtained, allowing for a better visual representation of the prevalence.

**Ethical aspects**

This study has been reviewed and approved by the Bioethics Committee of the Vice-Rector’s Office for Research and Graduate Studies of the Universidad de Panamá. The work follows the rules of the committee, therefore, the subjects who carried

**RESULTS**

**Description of the frequencies and percentages in medical students**

The frequency and percentage of each variable in the whole sample are presented as the main results; the average BMI of the total sample is 24.53 ± 2.03. This represents that the medical students of the Universidad de Panamá, are in the limit between a normal BMI and an overweight.

**Distribution of related factors in medical students**

The distribution of factors in the sample is presented as secondary results, describing each variable in relation to the BMI.

Figure 1 shows the distribution of BMI in the student population. The students were distributed as 56% in normal weight, 29% in overweight, 9% in obesity and 6% in underweight.
Table 1. Frequency and percentages of variables in medical students at the Universidad de Panamá in 2018

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>105</td>
<td>36.33%</td>
</tr>
<tr>
<td>Female</td>
<td>184</td>
<td>63.67%</td>
</tr>
<tr>
<td><strong>Physical activity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absent</td>
<td>188</td>
<td>65.05%</td>
</tr>
<tr>
<td>Present</td>
<td>101</td>
<td>34.95%</td>
</tr>
<tr>
<td><strong>Diet quality</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acceptable</td>
<td>180</td>
<td>62.28%</td>
</tr>
<tr>
<td>Deficient</td>
<td>109</td>
<td>37.72%</td>
</tr>
<tr>
<td><strong>Alcoholism</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absent</td>
<td>239</td>
<td>82.70%</td>
</tr>
<tr>
<td>Present</td>
<td>50</td>
<td>17.30%</td>
</tr>
<tr>
<td><strong>Smoking</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absent</td>
<td>282</td>
<td>97.58%</td>
</tr>
<tr>
<td>Present</td>
<td>7</td>
<td>2.42%</td>
</tr>
<tr>
<td><strong>Type 2 Diabetes Mellitus History</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absent</td>
<td>132</td>
<td>45.67%</td>
</tr>
<tr>
<td>Present</td>
<td>157</td>
<td>54.33%</td>
</tr>
<tr>
<td><strong>Arterial Hypertension History</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absent</td>
<td>46</td>
<td>16.37%</td>
</tr>
<tr>
<td>Present</td>
<td>235</td>
<td>83.63%</td>
</tr>
</tbody>
</table>

Figure 1. - Percentage distribution of BMI in medical students at the Universidad de Panamá in 2018.

Figure 2 shows the distribution of the students’ BMI, according to their dietary quality. As a main result, it can be highlighted that the students presented a mediocre quality of diet: 8% in underweight, 59% in normal weight, 29% in overweight and 5% in obesity. While, those who presented a poor-quality diet were distributed in 7% in underweight, 49% in normal weight, 34% in overweight and 10% in obesity.

DISCUSSION

In a study conducted on college students in Chile, Panamá, and Guatemala, by Durán Agüero et al, in 2014, he found that 33.6% of students in Panama present overweight and 18.3% suffer from obesity (12) (13). While, in our study, the percentage of students who showed overweight is 29% and obesity is 9%. There is a close relationship between the percentages of overweight, but it is two-fold compared to the study by Duran Agüero et al.

The related measure for the development of overweight/obesity, according to this study, is physical activity with an OR of 0.47 (0.3-0.8), which acts as a protective factor and is also present in a higher percentage in students without overweight or obesity.

Association between variables

Comparing the prevalence of overweight and obesity, in other Hispanic American studies, such as the study by Cutillas et al., in the Universidad de Murcia with a sample of 223 students (53% women and 47% men), where the percentage of underweight was 5.9%, for normal weight was 75.4%, as for overweight this was 16.2% and obesity was 2.5%, which...
A sample of 620 university students. Out of this sample, one third have overweight or obesity (32%), while the university students in our study are even higher with 38% overweight and obesity (16). A study with results of overweight and obesity, greater than ours, was conducted by Lorenzini et al. of the Universidad Autónoma de Yucatán, in which the results indicated 37% overweight and 11% obesity (17).

Finally, in the study by Mollinedo et al. carried out on 563 students at the Universidad Autónoma de Zacatecas, 21.5% presented overweight and more than 10%, obesity, which is related to the other Latin American studies mentioned as they presented at least 20% overweight and around 10% obesity (18).

In the Colombian study conducted by Caballero et al. at the Universidad de Bucaramanga, with a sample of 306 students, 5.56% were underweight, 67.97% were normal weight, 20.26% were overweight and 6.21% were obese. These results are closer to the percentage presented in this study (overweight 29% and obesity 9%) (15).

An even more similar percentage was observed in the study by Sandoval et al. of the Universidad de Guadalajara, with a sample size similar to our study; the difference between the percentage of overweight and obesity compared to normal weight is greater in university students from Panama (14).

Table 3. Distribution of risk or protective factors in medical students at the Universidad de Panamá, 2018.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Present in Normal Weight/Underweight</th>
<th>Present in Overweight/Obesity</th>
<th>Odds Ratio</th>
<th>IC</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical activity</td>
<td>73.27%</td>
<td>26.73%</td>
<td>0.47</td>
<td>(0.28-0.80)</td>
<td>0.004</td>
</tr>
<tr>
<td>Poor-quality diet</td>
<td>56.25%</td>
<td>43.75%</td>
<td>1.52</td>
<td>(0.93-2.47)</td>
<td>0.09</td>
</tr>
<tr>
<td>Alcoholism</td>
<td>54%</td>
<td>46%</td>
<td>1.52</td>
<td>(0.82-2.80)</td>
<td>0.2</td>
</tr>
<tr>
<td>Smoking</td>
<td>42.86%</td>
<td>57.15%</td>
<td>2.25</td>
<td>(0.49-10.24)</td>
<td>0.3</td>
</tr>
<tr>
<td>Type 2 Diabetes Mellitus Hist.</td>
<td>60.51%</td>
<td>39.49%</td>
<td>1.18</td>
<td>(0.73-1.90)</td>
<td>0.5</td>
</tr>
<tr>
<td>Arterial Hypertension Hist.</td>
<td>60.85%</td>
<td>39.15%</td>
<td>1.33</td>
<td>(0.68-2.60)</td>
<td>0.4</td>
</tr>
</tbody>
</table>
In the study by Aguilar-Ye et al. from the total sample, the highest BMI average was 23.9 and the lowest was 23.5, which compared to our study, the average BMI of the total sample is 24.53 ± 2.03. This is related to the BMI of students from Panama that is close to the Mexican ones (7).

Comparing our study carried out at the Universidad de Panamá and the Mexican study by Benjamín Trujillo Hernández et al., it is worth to emphasize that the frequency was higher in men than in women (42.5% and 22.2%); while in our study it was quite the opposite, where the higher frequency of overweight and obesity was presented by women over men (20% and 17%). In relation to the family history of type 2 diabetes mellitus, it is present in 56.1% of the students in the Mexican study like 54.5% of the students in Panama (8).

When assessing the quality of the diet and its relationship to BMI, Sparling et al. found that poor dietary quality and physical activity led to 3 out of 10 college students being overweight (19). In Spain, Izaga et al. and Cutillas et al. describe that caloric intake in overweight and obese students is related to an excessive caloric imbalance in proteins and lipids, where there is a relationship of high c-LDL and low c-HDL levels (14) (20). In the present study, only 62.3% of students in Panama have an acceptable diet and 37.7% have a deficient diet, which corresponds to a higher percentage of overweight students with 29% and obesity with 9%, compared to Spanish university students by Izaga et al. (16, 17).

In the same way, it has been shown that BMI is better in people who do regular physical activity. In the study by Caballero et al, 26% were overweight (overweight and obese) and 50% had a low level of physical activity (15).

Mollinedo et al., in 2013, described that only 41% of the students practiced at least one sport. Compared to the results from this study, 73% of students who engage in physical activity are underweight or normal weight, as opposed to 27% of students who engage in physical activity are overweight or obese. These results indicate that regular physical activity is a protective factor in the development of overweight and obesity (18).

The results of this study could be considered generalizable to the medical student population of the Universidad de Panamá, although not in the same way for other careers at this university, due to the demographic change of students per career, which may vary either in their average age or in sex distribution.

The study is limited, mainly, by the collection instrument, in addition, it is rigid in its options, so a respondent may discard it because of fatigue during its execution. In this way, 8 entries were lost in the evaluation of the arterial hypertension history variable and 1 entry in the diabetes mellitus history variable, leaving only 281 and 288 respondents, respectively.

Another limitation is the disparity between the number of women compared to men in the sample, which is not nearly equal. Finally, the Google Form instrument is limited by the fact that, in order to verify compliance with the inclusion and exclusion criteria, the e-mail accounts of medical students from the Universidad de Panamá were checked.

In conclusion, the quality of the diet influences in a very relevant way the development of overweight and obesity. Similarly, physical inactivity is a risk factor for the development of overweight and obesity. Likewise, there is a relevant percentage of students with unhealthy practices such as alcoholism; therefore, it is necessary to monitor and determine the different risk factors that may lead medical students to develop overweight and obesity in the long term.

It is recommended that further studies be conducted with a larger population of medical students in Panama and that biological data such as glycemia and lipid panel can be measured to better determine the quality of the diet.

Acknowledgements: To my medical school colleagues: Yoelis Antioco, Aarón Calderón, Gabriel Calderón, Davil González, Xiomara Orrego, Jusely Salamanda and Ana Serracin, for their collaboration in the collection of data.

Conflict of interest: The author declare not having any conflict of interest.

Source of funding: Self-financed

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