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BODY MASS INDEX IN MEDICINE STUDENTS: RELATIONSHIP WITH STRESS, EATING HABITS AND PHYSICAL ACTIVITY

ÍNDICE DE MASA CORPORAL EN ESTUDIANTES DE MEDICINA: RELACIÓN CON ESTRÉS, HÁBITOS ALIMENTICIOS Y ACTIVIDAD FÍSICA

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ABSTRACT

Introduction: The changes in styles life predisposes university students to face constant stressful situations and to modify their eating habits and physical activity, with possible alterations in the body mass index. **Objective:** To evaluate the relationship between the body mass index and stress, physical activity, and eating habits in medical students. **Methods:** Cross-sectional descriptive observational study. Sample made up of 306 medical students from first to the sixth year: 153 with normal weight, 121 with overweight and 32 with obesity, average age 22 years. The body mass index was considered and the questionnaires were applied: Scale of Global Perception of Stress for University Students (Adapted in Peruvian university students), International Questionnaire of Physical Activity, and the modified Food Frequency Questionnaire of Reyes, using Google software Forms. **Results:** The proportion of normal weight was 50%, overweight 39.5%, and obese 10.5%. According to eating habits, people with body mass index increased had significantly higher consumption of soft drinks (p = 0.030), meat (p = 0.017) and alcohol (p = 0.005), more frequent breakfast (p = 0.037) and lower consumption of legumes (p = 0.049). The levels of distress were lower in the obese (p = 0.055); there was no significant difference in physical activity. **Conclusions:** The elevation of the body mass index in medical students was associated with inappropriate eating habits. Low levels of distress and physical activity were more frequent in obese patients, although without significant difference.

Keywords: Body Mass Index; Stress; Eating Habits; Physical Activity. (Source: MeSH NLM).

RESUMEN

Introducción: Los cambios en los estilos de vida predisponen a los estudiantes universitarios a enfrentar constantes situaciones de estrés y a modificar sus hábitos alimenticios y actividad física, con posibles alteraciones en el índice de masa corporal. **Objetivo:** Evaluar la relación que existe entre el índice de masa corporal con el estrés, actividad física y hábitos alimenticios en estudiantes de medicina. **Métodos:** Estudio observacional descriptivo transversal. Muestra conformada por 306 estudiantes de medicina de primero a sexto año: 153 con normopeso, 121 con sobrepeso y 32 con obesidad, edad promedio 22 años. Se consideró el índice de masa corporal y se aplicaron los cuestionarios: Escala de Percepción Global de Estrés para Universitarios (Adaptado en estudiantes universitarios peruanos), Cuestionario Internacional de Actividad Física y el Cuestionario de Frecuencia de alimentos modificada de Reyes, mediante el software de Google Forms. **Resultados:** La proporción de normopeso fue 50 %, sobrepeso 39,5 % y obesos 10,5 %. Según los hábitos alimenticios, las personas con índice de masa corporal aumentado tuvieron significativamente mayor consumo de bebidas gaseosas (p=0,030), carne (p=0,017) y alcohol (p=0,005), mayor frecuencia de desayuno (p=0,037) y menor consumo de legumbres (p=0,049). Los niveles de distrés fueron menores en los obesos (p=0,055); no hubo diferencia significativa en la actividad física. **Conclusiones:** La elevación del índice de masa corporal en estudiantes de medicina se asoció a hábitos alimenticios inadecuados. Los niveles bajos de distrés y de actividad física fueron más frecuentes en obesos, aunque sin diferencia significativa.

Palabras claves: Índice de Masa Corporal; Estrés; Hábitos Alimenticios; Actividad Física. (Fuente: DeCS BIREME).

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INTRODUCTION

The beginning of university life is a critical stage for young people since changes in learning methods and the search for better academic results generate emotional conflicts that can affect the feeling of hunger, appetite, and satiety, influencing their state nutritional[1]. Indeed, anthropometric alterations occur that can be reflected in an increased or decreased body mass index (BMI).

Until 2016, according to the World Health Organization (WHO), 1.9 billion adults were overweight or obesed[2], the latter constituting an increasing health problem in Peru[3], where approximately 60.2% of the population adult is overweight[4]. Among its consequences is the development of non-communicable diseases (NCDs) such as diabetes mellitus, arterial hypertension, metabolic syndrome, and polycystic ovary[3].

On the other hand, stress, a process in which physiological, emotional, and behavioral responses are generated from a stimulus[5], causes manifestations of a cardiac nature, muscle tension, alterations in breathing and digestive problems; in addition to impaired performance, sleep disorders, increased or decreased appetite, and anxiety[6].

According to the WHO, physical activity (PA) refers to any body movement that requires energy consumption[7]. FA prevents the appearance of overweight, obesity, and ENT, it also has advantages in the psychological and cognitive states. However, physical inactivity constitutes an important risk factor for mortality worldwide[8].

A sedentary lifestyle predisposes you to weight gain. In this regard, an association has been found between the former, nutritional status and moderate academic performance[9]; as well as a high frequency of overweight and obesity in medical students[10]. In these university students, the prevalence of a sedentary lifestyle is reported to be 46% in the US, 50% in Colombia, 70% in Chile, and 79% in Peru[11,12].

The disadvantages to performing PA, the low motivation to exercise, the low or no vegetable intake, and the tendency to consume fast food, energy drinks, and soft drinks as substitutes for breakfast or lunch, despite the knowledge of healthy eating patterns[13,14]; In addition to increasing academic stress, they increase the risk to your health. Faced with such a problem, the present study evaluated the relationship between BMI, stress, physical activity, and eating habits in medical students.

METHODS

Design and study area

A cross-sectional descriptive observational study was developed, carried out with medical students from the National University of Trujillo (UNT) who attended the University Welfare Service (SBU) in the 2020 period.

Population And Sample

The population consisted of 619 students in grades one through six. A convenience sampling was carried out, obtaining a sample of 306 students (153 normal weight, 121 overweight, 32 obesity). The inclusion criteria were: medical students enrolled in the 2020 period, whose medical records presented complete data on BMI; the exclusion criteria were: students with a disease that affects the BMI, with physical disabilities, pregnant women.

Variables and instruments

The qualitative variables were evaluated: nutritional status, physical activity, stress, and eating habits. The nutritional status was determined from the BMI and the sample was classified as normal weight, overweight, and obesity. Physical activity was categorized as low, moderate, and high, using the International Physical Activity Questionnaire (IPAQ)[15]. Stress was classified into distress and eustress using the Global Stress Perception Scale for University Students (adapted and validated in Peruvian university students by Guzmán-Yacaman)[16]. Eating habits were recorded through the modified ReyesFood Frequency Questionnaire[17].

Access was obtained to the medical records of the students treated at the Servicio de Bienestar Universitario (SBU) in the period December 2019 - March 2020. The weight and height data, previously taken by SBU staff, were reviewed using a scale Seca Model 700 mechanical brand, with a sensitivity of 50 grams; and height rod Seca 220, properly calibrated.

Procedures

From the information obtained from the clinical records belonging to the SBU, the BMI was calculated and the students were classified in the categories described, through a data collection sheet.

Subsequently, to fill out the questionnaires, a virtual call was made among the students who presented complete data in the SBU. Those who agreed to participate in the study were asked to fill out informed consent and a questionnaire to rule out possible chronic diseases that could distort weight or height or both at the same time. It was verified that the students meet the inclusion and exclusion criteria.

One week prior to the start of the virtual classes, the study participants were applied, through Google Forms, the referred questionnaires to evaluate the variables physical activity, stress, and eating habits.

Statistical Analysis

The information was recorded and ordered using the Microsoft Excel 2016 program. The results of the anthropometric measures, stress, physical activity, and eating habits of the sample were organized in tables and prevalence figures. The Chi-square test (X was applied2)to evaluate the statistical association of categorical variables, using a significance level of 0.05 to determine whether or not there was a relationship between the study variables; the confidence level was 95%.

Ethical Aspects

The project was approved by the Research Ethics Committee of the Faculty of Medicine of the National University of Trujillo. The International Ethical Guidelines for Health-related Research with Human Beings developed by the Council for International Organizations of Medical Sciences (CIOMS) in collaboration with WHO for the collection, storage, and use of data in research related to health, complying with the coding, confidentiality, and anonymity of the participants[18]. The provisions of the Code of Ethics of the Medical College of Peru complied with[19].

RESULTS

The sample consisted of 306 first to sixth-year medical students: 195 men (63.7%) and 111 women (36.3%). There were 153 students with normal weight (50%), 121 with overweight (39.5%), and 32 with obesity (10.5%). The average age was 22 years. Table 1

Table 1. Studied population of medical students

Year	Number		Average age of the total	BMI			
	Men	Women		Normal	Overweight	Obesity	Total
First	16	18	19,91 ± 1,83	17	15	2	34
Second	50	28	20,55 ± 1,51	39	29	10	78
Third	41	19	21,53 ± 1,81	30	25	5	60
Fourth	36	14	22,98 ± 2,27	25	21	4	50
Fifth	27	15	23,05 ± 1,61	21	16	5	42
Sixth	25	17	24,45 ± 1,19	21	15	6	42
Total	195	111	21,95 ± 2,27	153	121	32	306

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Table 2. Eating habits according to the BMI of medical students

	Frequency	Normal weight (%)	Overweight (%)	Obesity (%)	Total (%)
Soft drinks	Never / almost never	82.89	73.77	68.75	77.78
	Occasional	15.14	15.57	21.88	16.01
	Frequent	1.97	10.66	9.38	6.21
	Never / almost Never	7.19	7.44	9.38	7.52
	Occasional	16.34	20.66	18.75	18.30
	Frequent	76.47	71.90	71.87	74.18
Legumes	Never / almost never	1.31	6.61	0.00	3.27
	Occasional	19.61	23.14	31.25	22.22
	Frequent	79.08	70.25	68.75	74.51
	Never / almost never	1.31	7.44	0.00	3.59
	Occasional	10.46	16.53	9.38	12.75
	Common	88.23	76.03	90.62	83.66
Alcohol	Never / almost never	86.77	86.78	65.62	84.97
	Occasional	10.46	6.61	25.00	10.46
	Frequent	1.96	6.61	9.38	4.57

Significancia estadística, valor p: Legumbres p=0,049; carnes p=0,017; bebidas gaseosas p=0,030; alcohol p=0,005.

Regarding the frequency of eating habits in students according to BMI, Table 2 a significant difference was found in the consumption of soft drinks (p = 0.030), legumes (p = 0.049), meat (p = 0.017) and alcohol (p = 0.005). People with increased BMI reported higher consumption of soft drinks, meat and alcohol, while lower intake of legumes. In relation to the foods of the categories pastry, sweets, fruits, and fast food, no significant association was found.

In addition, it was observed that the frequency of breakfast had a significant difference in relation to BMI (p = 0.037). Table 3

Table 3. Frequency of breakfast according to BMI in medical students

	Normal weight (%)	Overweight (%)	Obesity (%)	Total (%)
Daily	98.69	92.56	93.75	95.75
Occasional	1.31	7.44	6.25	4.25
	100	100	100	100

Statistical significance, p-value = 0.037

finding a lower frequency of its occasional consumption in students with normal weight (1.31%) when compared with those who were overweight (7.44%) and obesity (6.25%). The other variables studied (fasting, mid-morning, lunch, snack, and dinner) did not have a significant difference.

When evaluating the relationship between stress and BMI, it was observed that the levels of distress presented an association close to significance (p = 0.055); being, such levels, lower in students with obesity (figure 1).

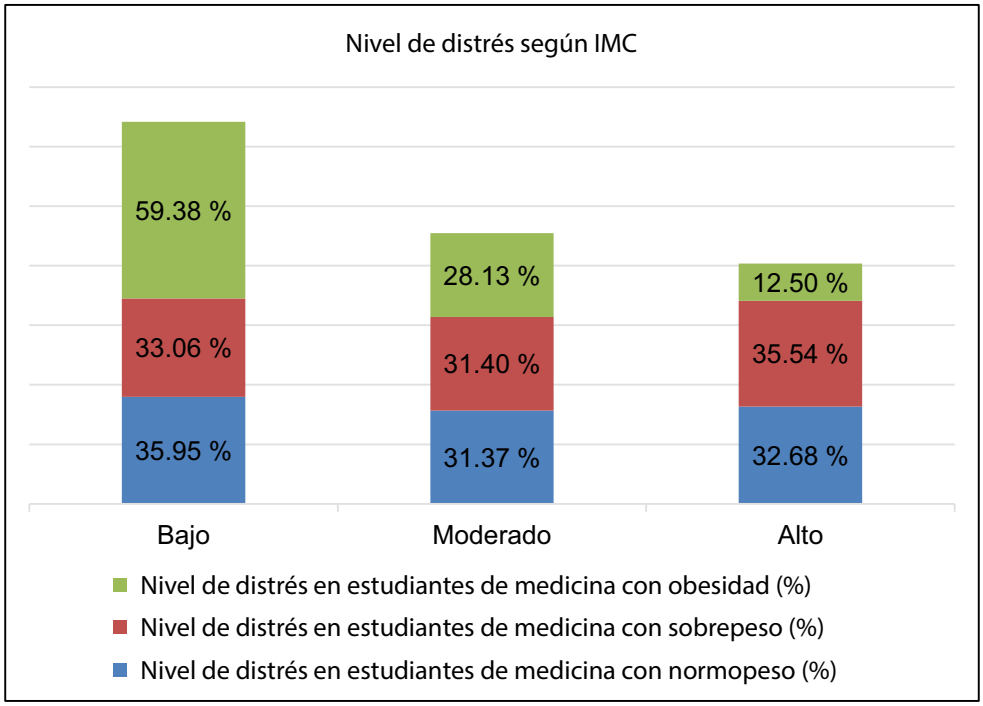

Figure 1. Level of distress in medical students according to body mass index. Statistical significance, p value = 0.055

Regarding the PA of the participants according to BMI, no significant difference was found. Low physical activity was 36.6% in students with normal BMI, 42.2% in overweight students, and 43.8% in obese students. Table 4

Table 4. Level of physical activity according to BMI in medical students

Level	Normal weight (%)	Overweight (%)	Obesity (%)	Total (%)
Low	36.60	42.15	43.75	39.54
Moderate	23.53	17.36	21.88	20.92
High	39.87	40.50	34.38	39.54
Total	100	100	100	100

Statistical significance, p-value = 0.703

DISCUSSION

There are various factors that contribute to the quality of life of health sciences university students, among them, eating patterns stand out, which added to the practice of regular PA determine their nutritional status, which at the same time is indirectly related to the stress level of the individual since low physical activity is associated with its increase. Therefore, it is postulated that an imbalance between these components will be reflected in the decrease or increase of the student's BMI and implies a greater risk of disease20. In this regard, in a study carried out by Urbanetto et al. In nursing students, a weight increase was evidenced in 52.6%, as well as high-stress levels in 29.5% and very high in 36.8%. Furthermore, overweight and obesity were associated with physical inactivity, increased frequency of meals in stressful situations, and unhealthy food intake[21].

Nutritional habits, such as eating fast food, sweets, soft drinks, and, in some cases, alcohol, are related to an increase in BMI. In the present work, the students with increased BMI indicated a higher consumption of soft drinks, meat, and alcohol; as well as a lower intake of legumes. In relation to the nutritional status according to eating habits, according to an investigation carried out by Reyes et al.[22], Malnutrition due to excess or deficiency is more frequent in university students with inadequate eating habits.

Thus, Becerra-Bulla et al., When evaluating the relationship between eating habits and changes in the nutritional status of medical students, whose BMI showed an increasing trend while the students passed through the race. Found a high consumption of dairy products , meats, and fruit; regular intake of vegetables; packaged foods and fried foods; and occasional fast food and soda[23]. Torres-Mallma et al[14]. After comparing the consumption of fast food and soft drinks, among first and sixth year medical students, found an increase in their consumption in the last group, a significant difference was also found in terms of alcohol intake, being more frequent in older students[14]. In contrast to previous studies, at present, no significant difference was shown for pastry, candy, vegetables, or fast food.

The regular eating pattern includes breakfast, lunch, and dinner; Eliminating one of these main meals in the long term has negative health effects[24].

According to the literature, the importance of breakfast is that it provides the greatest amount of energy for daily activities; therefore, its omission negatively affects the performance and health of the student. Likewise, it has been shown that eating a breakfast rich in fiber and fruits reduces the risk of overweight and reduces the appearance of chronic non-communicable diseases[20]. Torres-Mallma et al. found, in Peruvian medical students, that 51.30% of the participants always ate breakfast, which they attributed to factors such as class hours, study overload, sleep quality, and socioeconomic aspects[14]. In a cohort conducted by Wennberg et al[24]. It was found that irregular food intake, mainly poor breakfast consumption during adolescence, predicted the appearance of metabolic syndrome in adulthood[18].

In contrast, in the present investigation, it was found that young people consume breakfast daily by 95.75%. Despite this, it is still necessary to reinforce education in habits and food consumption that must be carried out as a plan of nutritional programs included in university education.

On the other hand, stress has been divided into positive or "eustress" and negative or "distress". Especially, the latter, if it persists and becomes chronic, keeps the body in constant overstimulation, which predisposes to the development of various pathologies[25]. In the current study, the levels of distress according to the BMI showed a difference close to significance, with the lowest levels in obese students. In this regard, in a study carried out by Jalca-Ávila et al.[26], In which the role of stress as a trigger for the increase in BMI in Clinical Laboratory students was evaluated, despite not finding an association with obesity, neverthelessit, it was observed between being overweight and low and medium stress levels[26].

Various factors related to the increase in BMI in medical students were studied. It was found that PA classified as low, according to the IPAQ questionnaire, represents a sedentary lifestyle. It is pointed out that the decrease in physical activity due to sedentary lifestyle is a risk factor for increasing overweight and obesity[27], but it was not

corroborated in the present study; however, the percentage of sedentary lifestyle was 39.5%, being higher in the population with a high BMI. Santillán et al. [28] measure the level of PA in medical and business administration students and found that the former are more sedentary (66%)[28]. Unlike the present work, Choque et al. In 200 first-year medical students they only found a 23% prevalence of sedentary lifestyle, but they had a lower frequency of being overweight 17% and obesity 1%.

The findings of this research can be extrapolated to medical students with characteristics similar to those described. The intervention of factors such as geographic area, cultural differences, socioeconomic condition, and academic requirement must be taken into account.

In addition, it is recommended to establish a program of nutritional guidance, anti-stress therapy, and physical activity throughout the race to reduce the increase in BMI. It is also suggested to carry out similar investigations taking into account the control of other variables such as age, gender, and year of study, comparing the groups; study the effect of the COVID-19 pandemic on stress level, PA, BMI, and eating behaviors in medical students; as well as to follow up the students by applying the questionnaires immediately after completing the evaluations.

The COVID-19 pandemic limited the development of the research, as well as the call for the target sample; in addition, it prevented the performance of subsequent anthropometric controls.

CONCLUSIONS

The rise in BMI in medical students was associated with inappropriate eating habits such as higher intake of alcoholic beverages, meats, soft drinks, and lower consumption of legumes, as well as a higher frequency of occasional breakfast consumption. Low levels of distress and physical activity were more frequent in obese patients, although without significant association.

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