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Original article

Frequency and characteristics of obesity in university medical science workers

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ABSTRACT

Obesity has become a global health problem due to its increasing prevalence and its association with high morbidity and mortality. In order to determine the frequency and identify the characteristics of obesity in university workers of medical sciences, a cross-sectional observational study was conducted with 123 workers from the Bayamo Faculty of Medical Sciences, in Granma province, from September 1, 2023 to May 31, 2024. A prevalence of obesity of 30.1 % (37 workers) was found. Grade I obesity (67.5%), android obesity (62.2%), and post-pubertal onset (81.1%) predominated. Of the obese individuals, 75.0% also exhibited abdominal obesity. Obese individuals presented significantly higher levels of blood glucose (p = 0.0000), cholesterol (p = 0.0000), triglycerides (p = 0.0002), and uric acid (p = 0.0384) than non-obese individuals. Inadequate eating habits (p = 0.0009) and macrosomia (p = 0.0337) were more frequent in obese individuals. It is concluded that the prevalence of obesity in workers at the Bayamo Faculty of Medical Sciences is high. Obese individuals have higher blood pressure, cholesterol, triglycerides, uric acid, and blood glucose levels than those without obesity.

Keywords: Obesity; Prevalence; Conditioning factors.

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Introduction

Obesity has become a global health problem due to its increasing incidence and prevalence, and because it is associated with high morbidity and mortality from the complications that arise during its course. (1)

According to the World Obesity Federation (WOF), (2) in 2020, 2.603 billion people aged 5 and over worldwide were overweight or obese (38% of the total population in that age group), and by 2035, it is projected that 4.005 billion (51% of the total population in that age group) will be living with this condition. The prevalence of obesity alone (body mass index ≥ 30 kg/m²) is anticipated to rise from 14% to 24% of the population during this same period, affecting approximately two billion adults, children, and adolescents by 2035.

Furthermore, obesity is associated with a lower quality of life and significant economic and social burdens due to increased healthcare costs for treatment and lost productivity. In this regard, the global economic impact of this disease in 2020 was $1.96 trillion and is estimated to increase to more than $4 trillion by 2035. (3)

Cuba is not immune to this problem, and according to the Third National Survey of Risk Factors, (4) the percentage of overweight and obese individuals was 44.8% (CI=43.4-46.3), with obesity representing 15.0% (CI=14.0-16.1). Similarly, WOF 2 projections for the country indicate an adult obesity prevalence of 42.0% by 2035, equivalent to an annual increase of 2.4% from 2020 to 2035.

The national literature consulted shows a scarcity of research on the prevalence of obesity in Granma province, particularly among healthcare workers. Therefore, this research aims to determine the frequency and identify the characteristics of obesity among university medical staff.

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Methods

A cross-sectional observational study was conducted with workers from the Faculty of Medical Sciences of Bayamo, in the province of Granma,fromfrom September 1, 2023 to May 31, 2024.

The study population consisted of the 323 employees of this institution during the aforementioned period.Sample was calculated using the statistical packageEPIDAT version 4.2 and the following parameters were set: expected frequency of obesity: 15% (set based on the results of the last National Health Survey in Cuba), confidence level: 95% and error: 5%.A number of 123 cases was obtained, which were chosen by simple random sampling.

Techniques and procedures for collecting information

Each of the selected cases had a medical history compiled that included the following variables: age, sex, origin, sedentary lifestyle, smoking,eating habits,family history of obesity, obese first-degree friends, history of macrosomia at birth, weight, height, waist and hip circumference, systolic blood pressure, diastolic blood pressure, diabetes mellitus, hypertension, ischemic heart disease, fatty liver, gout, fasting blood glucose levels, total cholesterol, triglycerides,uric acid.

To assess nutritional status, the body mass index (BMI) was used, calculated using the following formula: weight (kg)/height (m2). A patient was considered obese when the BMI was ≥ 30 kg/m2. Abdominal obesity was defined as a waist circumference ≥ 102 cm in men and ≥ 88 cm in women. (5)

Obesity was classified taking into accountthe following aspects:

Time of appearance: prepubertal and postpubertal

Grade: Grade I (BMI between 30 kg/m2 and 34.9 kg/m2), Grade II (BMI between 35 kg/m2 and 39.9 kg/m2) and Grade III (BMI ≥ 40 kg/m2)

Fat distribution: android (when the waist/hip ratio was greater than or equal to 1 in men and 0.9 in women) and gynoid (below these parameters).

A person was considered a smoker if they consumed cigarettes daily or almost daily, regardless of the number smoked, or if they reported quitting smoking six months before

being included in this study. Any individual with low physical activity, as determined by the International Physical Activity Questionnaire, was considered sedentary. (6)

Inadequate dietary habits were considered to be present when consumption by food group was excessive, according to the automated system for evaluating food consumption developed by the Institute of Nutrition and Food Hygiene of Cuba. (7) Macrosomia was considered to be present when birth weight was greater than or equal to 4 kg.

The criteria proposed by the Expert Committee of the American Diabetes Association were adopted for the diagnosis of diabetes. (8) For their part, all individuals undergoing treatment with antihypertensive drugs were considered hypertensive, regardless of blood pressure readings, or when systolic blood pressure levels ≥ 140 mmHg and/or diastolic blood pressure ≥ 90 mmHg were verified on 2 or more occasions. (9)

For the diagnosis of ischemic heart disease, gout, andFor fatty liver, consideration was given to the existence of diagnoses or argued medical notes that affirmed these entities.

Total cholesterol and triglyceride levels were determined by the colorimetric endpoint method. Elevated cholesterol levels were defined as ≥ 5.2 mmol/L (240 mg/dL) and triglyceride levels as ≥ 1.7 mmol/L (150 mg/dL). (10) Blood glucose levels were determined using the glucose oxidase method.

Statistical analysis

Frequency distributions (absolute numbers and percentages) were obtained for qualitative variables, and the mean and standard deviation for quantitative variables. Mean values for quantitative variables between the obese and non-obese groups were compared using Student's t-test, while for qualitative variables, the independent groups test of proportions was used. A significance level (p) < 0.05 was assumed for all analyses.

The statistical processing of the data obtained was carried out using the SPSS program in its version 25.0 for Windows.

Ethical regulations

In carrying out this study, the ethical principles recommended in the Declaration of Helsinki for conducting research in the clinical-epidemiological field were taken into consideration.

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Results

The prevalence of obesity was 30.1% (of the 123 workers studied, 37 of them were obese). Table 1 shows a predominance of grade I obesity (67.5%), android (62.2%) and post-pubertal onset (81.1%). The majority of obese individuals also exhibited abdominal obesity (75.6%).

Table 1. Obesity according to age of onset, degree and fat distribution.

Variables	Category	n=37	
		Number	%
Starting age	Prepubertal	7	18.9
	Post-pubertal	30	81.1
Degree of obesity	Grade I	25	67.5
	Grade II	8	21.6
	Grade III	4	10.8
Body fat distribution	Android	23	62.2
	Gynoid	14	37.8
Abdominal obesity	Yeah	28	75.6
	No	9	24.4

Table 2 shows some of the determining factors, according to the presence of obesity. It can be seen that the percentage of people with inadequate eating habits (0.0009) and macrosomia (0.0337) were significantly higher in the obese group compared to the non-obese group.

Table 2. Conditioning factors, according to the presence of obesity.

Variables	Obese n = 37		Not obese n = 86		Worth p
	No.	%	No.	%	
Inadequate eating habits	31	83.7	43	50.0	0.0009
Macrosomia	12	32.4	12	13.9	0.0337
Obese close friends	14	37.8	18	20.9	0.0825
Urban origin	35	94.5	75	87.2	0.3670
AF of obesity	16	43.2	24	27.9	0.1456
Sedentary lifestyle	20	54.0	34	39.5	0.1971
Smoking	5	13.5	8	9.3	0.7062

p: level of statistical significance;AF: family history.

As shown in Table 3, the percentages of people with hypercholesterolemia, hypertriglyceridemia, gout and fatty liver were significantly higher in obese people than in those without the disease.

Table 3. Clinical characteristics, according to the presence of obesity.

Qualitative variables	Obese n = 37		Not obese n = 86		Worth p
	No.	%	No.	%	
Male	16	43.2	40	46.5	0.7385
Female	21	56.8	46	53.5	
Hypercholesterolemia	24	64.8	26	30.2	0.0007
Hypertriglyceridemia	25	67.5	31	36.0	0.0025
Drop	7	18.9	3	3.4	0.0120
Fatty Liver	6	16.2	3	3.4	0.0350
Diabetes Mellitus	4	10.8	5	5.8	0.5495
High blood pressure	17	45.9	35	40.6	0.7328
Ischemic heart disease	2	5.4	6	6.9	0.9406

p: level of statistical significance

Table 4 shows some clinical characteristics according to the presence of obesity. It can be seen that obese individuals presented significantly higher mean values for blood glucose (p = 0.0000), total cholesterol (p = 0.0000), triglycerides (p = 0.0002), and uric acid (p = 0.0384) than non-obese individuals.

Table 4. Clinical characteristics, according to the presence of obesity.

Quantitative variables	Obese n = 37		Not obese n = 86		Worth p
	Average	OF*	Average	OF*	
Age	44.9	9.9	44.3	10.4	0.7665
Systolic blood pressure	123.9	13.4	119.2	12.3	0.0609
Diastolic blood pressure	81.8	8.8	78.3	8.6	0.0420
Blood glucose	5.01	1.04	4.2	0.5	0.0000
Total Cholesterol	5.5	1.03	4.6	1.02	0.0000
Triglycerides	1.8	0.58	1.5	0.3	0.0002
Uric acid	335.8	73.3	310.0	57.6	0.0384

p: level of statistical significance

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Discussion

The frequency of obesity observed in the workers of the Faculty of Medical Sciences of Bayamo is high, if the Lobstein and Jewell classification is taken into account. (11) Likewise, it is higher than the 15% reported by the III National Survey of Risk Factors of Non-Communicable Diseases and Preventive Activities, (4) carried out in Cuba in the year 2010-2011 (obese 13.7% and extremely obese 1.3%).

Similar results were observed by Agüero MR and other authors, (12) in a study conducted in the Marianao municipality, Havana. Of the 152 adults evaluated, 49 were obese, 32.2% (27.6% obese and 4.6% extremely obese). Likewise, Belaunde CA and others, (13) in a study with 237 adult women from the catchment area of the "Antonio Pulido Humarán" Teaching Polyclinic in the La Lisa municipality, Havana, found a 28.6% obesity rate.

In other parts of the world, the prevalence of obesity is also high. In MexicoThe information from 8 was analyzed563 participants in the 2022 National Health and Nutrition Examination Survey found a prevalence of obesity of 36.9% and abdominal obesity of 81.0%. (14) In the United States, it is reported that 38.0% of adults aged 20 and over are obese, of whom 8.0% are extremely obese. (15)

In this study, it is significant that three-quarters of the cases presented with abdominal obesity, with a clear predominance of obesity with android fat distribution. This may explain why obese individuals had significantly higher levels of blood pressure, glucose, lipids, and uric acid than those without this condition. It also justifies the higher frequency of fatty liver, gout, and hyperlipidemia in obese individuals.

The pathogenic role of abdominal obesity is closely related to insulin resistance, which is responsible for increased insulin production by the pancreas. This, combined with increased release of free fatty acids and pro-inflammatory cytokines from visceral adipocytes, produces pro-atherogenic dyslipidemia, hypertension, dysglycemia, chronic inflammation, and endothelial dysfunction, all of which precipitate atherosclerosis. (16)

Other studies have had similar findings to the present investigation. Such is the case of the study conducted by González TR et al. (17) with 2,902 patients treated at the Dr. Carlos J. Finlay Hospital in Havana, who found that blood glucose, cholesterol, triglyceride, and

glycated hemoglobin levels increased with nutritional status ($p<0.05$ in all cases). The relative risk for diabetes in obese patients was 2.23, and that for hyperlipoproteinemia was 1.50. Similarly, Vicente-Herrero MT et al. (18), in a study of 418,343 workers from different autonomous communities in Spain, found a significant association between visceral adiposity and dysfunctional adiposity indices.with the risk of developing non-alcoholic fatty liver disease (area under the ROC curve > 0.8).

This study has added to the existing evidence on the influence of poor eating habits on the increase in obesity. The results of the First National Survey of Food Consumption and Preferences (19) suggest that this problem is nationwide, since adequate consumption of dairy products, fruits, and vegetables was reported by only 11.0%, 16.0%, and 17.0% of respondents, respectively, and 32.0% revealed excessive sugar consumption.

David Barker's initial studies in Southampton led to the development of the theory of the impact of intrauterine living conditions on the onset of diseases in adulthood. (20) In this regard, a positive association has been observed between macrosomia and obesity in childhood and adulthood, which coincides with the results obtained in the research.

Conclusions

This research found a high prevalence of obesity among workers at the Faculty of Medical Sciences in Bayamo. Obese individuals had higher levels of blood pressure, cholesterol, triglycerides, uric acid, and blood glucose than those without obesity.

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Conflicts of interest:

The authors declare no conflicts of interest.

Authorship contribution

Melissa de la Caridad Borges Martínez:conceptualization, data curation, formal analysis, research, methodology, software, visualization, original draft writing, writing, revision and editing.

Eduardo René Valdés Ramos: Methodology, supervision, validation, drafting of the original draft, writing, revision and editing.

Gabriel Mendoza Gutiérrez: Methodology, drafting of the original version, writing, revision and editing.