147 - BODY MASS INDEX IN STUDENTS OF PHYSICAL EDUCATION

MIRIELLY MARTOS
Salesiano Catholic University Center Auxilium - Araçatuba / SP, Brazil
ANA PAULA NASSIF TONDATO DA TRINDADE
Centro Universitário do Planalto de Araxá - Araxá / MG, Brazil
WASHINGTON RODRIGUES
Salesiano Catholic University Center Auxilium - Araçatuba / SP, Brazil
EDUARDO PAUL CHACUR
Federal University of Goiás - UFG - Catalão / GO, Brazil
LUÍS CARLOS NOBRE DE OLIVEIRA
Salesiano Catholic University Center Auxilium - Araçatuba / SP, Brazil
luiscarlos@unisalesiano.com.br

INTRODUCTION

The Body Mass Index (BMI) is the most widely used anthropometric measure to assess nutritional risk, because it is easy to apply and low cost (SOUZA et al., 2013). This form of evaluation was proposed by the Frenchman Lambert Adolphe Jacques Quételet between 1830 and 1850, in the 19th century, being a faster and easier method to identify individuals with undernourishment, overweight and obesity, as described in Table 1. Today is the measure most used by the World Health Organization (RICARDO; ARAÚJO, 2002).

To determine BMI, simply divide the weight of the individual (mass in kilograms) by its height (in meters) squared: BMI = mass / (height x height).

Table 1: Classification of the individual according to BMI

Classification	IMC rating
Below Weight Below	18.5
Normal Weight	18.5 24.9
Overweight	25-29.9
Obesity Grade I	30-34.9
Obesity Grade II	35-39.9
Obesity Degree III or Morb	Greater than or equal to 40

The prevalence of overweight and obesity has increased in all the countries of the world. In the United States, the proportion of obese adults practically doubled, from 12.8% to 22.5%, respectively, between the years 1960-62 and 1988-1994. In Brazil, according to the Brazilian Institute of Geography and Statistics (IBGE), the number of obese men increased, from 4.5% to 7%, between 1989 and 1997, demonstrating that adult males are more and more overweight, and unconcerned with physical exercise, or without time to practice (RICARDO; ARAÚJO, 2002).

The practice of physical exercises and obesity are important indicators for the health of a population (PEREIRA, SILVA, 2011).

Overweight and obesity, indicated by BMI, are risk factors for chronic-degenerative diseases, such as hypertension, dyslipidemia, diabetes melittus, coronary artery disease (CAD) among others with high health risk (RICARDO and ARAÚJO, 2002).

The literature indicates that there is an association between coronary artery disease and high serum levels of total cholesterol (TC) and LDL-cholesterol (low density lipoprotein, cholesterol) and also the relationship between CAD and serum HDL- cholesterol), (Carvalho et al., 2007).

Blood pressure is a linear variable that is associated with cardiovascular risk. Normal values are classified as adults whose blood pressure (BP) is less than 130/85 mmHg, and normal BP, whose values are equal to 120/80 mmHg. According to WHO, hypertensives are adults whose systolic blood pressure (SBP) is greater than or equal to 140 mmHg, and diastolic blood pressure (DBP) is greater than or equal to 90 mmHg. In Brazil, data on the prevalence of individuals with arterial hypertension were not included. It is considered a syndrome because it is associated with metabolic disorders, such as obesity, increased insulin resistance, diabetes mellitus, dyslipidemia, among others (ROSÁRIO et al., 2009).

Diabetes Melittus (DM), is considered a chronic degenerative syndrome, due to the difficulty of the pancreas to produce insulin, which is characterized by several metabolic alterations, mainly by hyperglycemia (FOSS et al., 2005). There are three types of diabetes: Diabetes Melittus type I (DM1), Diabetes Melittus type II (DM2), and Diabetes Melittus Gestational (SANTOS et al., 2016).

DM1, which is insulin dependent, means that the pancreas does not produce insulin, so the individual with DM1 needs to inject insulin doses, which are applied when the blood glucose is high. DM2 is one that does not depend on insulin, is caused by changes in metabolism, having a high rate of glucose in the blood, which is called hyperglycemia, causing the insulin not to be introduced into the bloodstream, due to the difficulty of the pancreas produce the insulin and transport to their receptors, they have the work of introducing insulin into the blood, which is an enzyme responsible for keeping the blood glucose level regulated, and DMG develops during pregnancy as the baby grows , the placenta produces more and more hormones, causing the glucose to become elevated, so that the pancreas cannot supply the insulin requirement of the organism and can progress to DM2 (SANTOS et al., 2016).

Health promotion activities such as awareness of regular physical exercise and lower values of BMI, implemented in a continuous and well-oriented way, can contribute greatly to the treatment of obesity and associated comorbidities (CHACUR et

al., 2017)

Therefore, the objective of the study was to analyze the Body Mass Index (BMI) and the regular practice of physical exercise among students of a Physical Education course in a higher education institution.

DEVELOPMENT

This study was submitted to the research ethics committee of the Auxilium Catholic University Center, with CAAE number: 56084316.9.0000.5379.

This is a cross-sectional descriptive study for a stratified and representative sample with 90% confidence and 5% error margin of the students of the Centro Universitário Auxiliário Católica Auxilium - UniSalesiano, in the city of Araçatuba / SP, the collection of occurred from June 12 to 16, 2017.

Therefore, the objective of the study was to analyze the Body Mass Index (BMI) and the regular practice of physical exercise among students of a Physical Education course in a higher education institution.

DEVELOPMENT

This study was submitted to the research ethics committee of the Auxilium Catholic University Center, with CAAE number: 56084316.9.0000.5379.

This is a cross-sectional descriptive study for a stratified and representative sample with 90% confidence and 5% error margin of the students of the Centro Universitário Auxiliário Católica Auxilium - UniSALESIANO, in the city of Araçatuba / SP, the collection of occurred from June 12 to 16, 2017.

The institution has 154 students in the physical education course, all of whom are invited to participate in the study. As an inclusion criterion, it was established, regularly enrolled and available to respond to the questionnaire specially prepared for the study. The exclusion criteria were: irregularity of enrollment in the course and unavailability to answer the questionnaire. The incorrectly answered questionnaires were also deleted.

Through the explanations of the procedures involved in the study, the participants signed the Free and Informed Consent Term in compliance with Resolution 466/12 of the National Health Council.

Before starting to collect data, the participants were oriented about the procedures to be performed, which were: filling a questionnaire containing questions related to socio-demographic data and practice or non-regular physical exercise, anthropometric data as weight and height for the calculation of BMI.

The participants' weight and height were measured using an anthropometric scale and a stadiometer at an appropriate location.

The data were tabulated through a Microsoft Excel® 2010 worksheet and analyzed in a descriptive way to obtain the mean and standard deviation of the IMC.

RESULTS

The study sample consisted of 102 students who answered the questionnaires proposed within the established standards for data collection.

Of the 102 students evaluated, n = 70 (68.6%) were males and n = 32 (31.4%) were females. This shows a significant predominance of the male gender over the female among the students of the physical education course of the higher education institution analyzed.

Regarding BMI, when analyzing the mean and standard deviation, it can be observed that the highest value was found among female students in the first, third and seventh terms, and the highest value in males in the fifth term, as shown by table1.

It can also be observed that, in general, part of the sample fits into values that characterize overweight in both genders and in all terms, and in the seventh term, the highest value already characterizes obesity index (Table 1).

It is also observed that the higher values increase as the course evolves its terms.

Table 1. BMI data separated by terms, absolute value and standard deviation.

Term	Both	Male	Female
1	22.9 ± 3.2	23.3 ± 2.9	22.7 ± 3.7
3	24.3 ± 2.8	24,1 ± 2,4	24,7 ± 3,3
5	25.5 ± 3.	25.6 ± 3.5	24.7 ± 3.3
7	25.4 ± 3.5	25.7 ± 3.0	25.5 ± 4.6
General	24.4 ± 3.3	24.4 ± 3.3	24.0 ± 3.9

BMI = Body Mass Index

When analyzing the practice of physical exercises, it can be observed that the students of the first and fifth term are all practitioners of physical activity in both genders. In the third term the participants of the female gender also practice physical exercise in its totality, but there is a considerable decrease in the percentage when the seventh term is analyzed, as shown in table 2.

In a general analysis, most of the sample is practicing physical exercise (table 2).

Table 2. Practitioners of physical exercise in percentage (%), separated by gender and term.

Term	General		Male		Female	
	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)
1	100	0	100	0	100	0
3	84,6	15,4	78,9	21,1	100	0
5	100	0	100	0	100	0
7	85,7	14,3	93,8	6,3	60	40

DISCUSSION

In a study carried out at Ponta Grossa State University (UEPG) in 2007, 294 students from both genders of the Physical Education and Bachelor's Degree courses were evaluated. The majority, 54% are female, aged between 17 and 45 years (RECH, ARAÚJO; VANAT, 2010). Already in a study of the University of Health Sciences of Alagoas - UNCISAL, it was found that 86.7% of the students were male and 13.3% were female, all of them between 18 and 22 years old (LESSA, MONTENEGRO, 2008).

In the present study, the age was similar ranging from 17 to 35 years, indicating that in both cases a predominantly young population was present. These data indicate that the young population seeks to improve themselves to build a professional career and improve or maintain the standard of living. The study carried out in Alagoas contradicts the consensus since it points out a much smaller number of women in the undergraduate program.

In the study carried out by LESSA; MONTENEGRO (2008), in the city of Alagoas with 35.58% of the students were regular physical exercise (two or more times per week), the lack of healthy eating was also a factor, so we have the reason for this great demand for overweight the prevalence of overweight among these students is 55.77%. The study carried out by the authors RECH; ARAÚJO; VANAT (2010), showed that students are physically active, with good nutrition and a very low overweight index, with only 3.7% of males and 6.3% of females being obese (BMI ≥ 30, 0) and 13.3% of college students of both genders are overweight.

In the present study, 100% of the students of the first and third term were ideal weight, 75% of the men were overweight and in the seventh term, 68% of the men and 32% of the women were overweight, both of them practicing moderate physical exercise.

Since 52% of men in the fifth and seventh term were overweight and 32% of women in the seventh term were also overweight, all aged between 17 and 35 years.

These data indicate that it is a population that seeks to practice continuous physical activity and that the change related to overweight may be due to an unhealthy diet.

Compared with other publics, a study carried out with military police officers of the 2nd Military Police Battalion of the Interior of the State of São Paulo (2ºBPM / I), this battalion is responsible for the municipality of Araçatuba - SP and 31 other municipalities in the region, the sample was composed of 262 policemen, 82.4% of males and 17.5% of females, all with an average age of 37.0 ± 7.1 years. the results of the general BMI were 27.6 ± 3.7, the male BMI was 27.8 ± 3.5 and the female BMI was 27.0 ± 5, demonstrating that the police of both genders are overweight, taking into account their active routine (OLIVEIRA; BURN, 2014).

In another study conducted only with women in the Hypertension League of a Public Health Institution where 90% were overweight and obese, only 10% had normal weight, all with ages between 40 and 69 years, obesity was predominant in women with age between 40 and 59 years. Compared with the present study, the 31.37% women who were assessed were not too far from overweight, in view of the age difference SANTOS; SILVA; BECKER, 2003.

The last two studies indicate the need to combine sports with a balanced diet in order not to increase BMI, especially in the case of an older population.

CONCLUSION

The study demonstrated that the great majority of students of both genders of the physical education course in the evaluated educational institution, practice regular physical exercises, nevertheless, it is observed high values of BMI, characterizing part of the sample with overweight and even obesity. It is important to follow up these students, with subsequent studies to better understand the factors related to high BMI values and related factors, for possible intervention strategies.

REFERENCES
CARVALHO, D. F.; PAIVA, A.A.; MELO, A. S. O.; RAMOS, A. T.; MEDEIROS, J. S.; MEDEIROS, C. C. M.; et. al. Lipid profile and nutritional status of adolescents. Rev Bras Epidemiol. v.10, n.4, p.492-498, 2007.

CHACUR, E.P.; LIMONGI, JE.; DINIZ, F.S.; FIGUEIREDO, G. A.; NEIVA, C.M. Obesity and Osteoarthritis of the Knees: Epidemiological profile of users of the single health system. Encyclopedia Biosphere. v. 14, n.25, p.1600-1612, 2017.

FOSS, N. T.; POLLON, D. P.; TAKADA, M. H.; FOSS-FREITAS. M.C.; FOSS, M. C. Dermatoses in patients with diabetes mellitus. Rev Saúde Pública. v. 39, n. 4, p. 677-582, 2005.

LESSA, S. S.; MONTENEGRO, A. C. Evaluation of the prevalence of overweight, nutritional profile and level of physical activity among medical students of the University of Health Sciences of Alagoas - UNCISAL. Rev Soc Bra Clin Med. 6, n. 3, p. 90-93, 2008.

OLIVEIRA, L. C. N.; QUEMELO, P. R. V. Quality of life of military police officers. Arq. Ciênc. Saúde. V. 21, n. 3, p. 72-75, 2014.

PEREIRA C.M., Silva A.L.Obesity and Healthy Lifestyles: Issues Relevant to Intervention.Psic., Health & Diseases [online]. 2011; 12 (2): 161-82.

PEREIRA C.M., Silva A.L. Obesity and Healthy Lifestyles: Issues Relevant to Intervention. Psic., Health & Diseases [online]. 2011; 12 (2): 161-82.

RECH, C.R.; ARAÚJO, E. D. S.; VANAT, J. R. Self-perception of body image in students of the physical education course. Rev. bras. Educ. Fís. Sport. v. 24, n.2, p. 285-292, 2010.

RICARDO, D. R.; ARAÚJO, C. G. S. Body Mass Index: An Evidence-Based Scientific Questioning. Arq Bras Cardiol. v.79, n.1, p.61-69, 2002.

ROSÁRIO, T. M.; SCALA, L. C. N.; FRANCE, G. V. A.; PEREIRA, M.R. G.; GARDIM, P. C. B. Prevalence, Control and Treatment of Systemic Arterial Hypertension in Nobles - MT. Arq Bras Cardiol. v. 93, n. 6, p. 672-678, 2009.

SANTOS, A. F.; BERNARDO, D. N. D.; OLIVEIRA, L. C.N.; FABRIZZI, F.; JOKURA, A.; MITIDIERO, J.M.; et. al. Effects of strength training in people with type 2 diabetes mellitus Rev. Odonto. v.37, n.1, p.33-40, 2016.

SANTOS, Z. M. A.; SILVA, R. M.; BECKER, S. L. M. Evaluation of body mass index (imc) in hypertensive women. v. 16, n. 1, p. 34-38, 2003.

SOUZA, R.; FRAGA, J. S.; GOTTSCHALL, C.B.A.; BUSNELLA, F. M .; RABITO, E.I. Anthropometric evaluation in the elderly: estimates of weight and height and agreement between BMI classifications. Rev. Bras. Geriatr. Gerontol. v.12, n.1, p.81-90, 2013.

Corresponding Author: LUIS CARLOS NOBRE DE OLIVEIRA
Street Francisco Braga, 1067 -apto: 24 Saudade Araçatuba / SP CEP: 16020-2

ABSTRACT

The objective of the study was to analyze the Body Mass Index (BMI) in the Physical Education course of a higher education institution. It is a stratified cross-sectional study, and a sociodemographic questionnaire was applied. We evaluated 102 students, of which 68.6% were male and 31.4% female. The study showed that on average, both genders of the first and third term are with normal weight, in the fifth term men are overweight and women with normal weight. Already in the seventh term both genders were overweight.

Key words: Students. Obesity. BMI.

SOMMAIRE
L'objectif de l'étude était d'analyser l'indice de masse corporelle (IMC) dans le cours d'éducation physique d'un établissement d'enseignement supérieur. C'est une étude transversale stratifiée, et un questionnaire sociodémographique a été appliqué. Nous avons évalué 102 étudiants, dont 68,6% d'hommes et 31,4% de femmes. L'étude a montré qu'en moyenne, les deux sexes du premier et du troisième terme ont un poids normal, au cinquième terme, les hommes sont en surpoids et les femmes ont un poids normal. Déjà au septième terme, les deux sexes étaient en surpoids.
Mots clés: étudiants. Obésité. IMC.

RESUMEN
El objetivo del estudio fue analizar el Índice de Masa Corporal (IMC) en el curso de Educación Física de una institución de enseñanza superior. Se trata de un estudio transversal estratificado, siendo aplicado un cuestionario sociodemográfico. Evaluamos 102 estudiantes, siendo que 68,6% son del género masculino y 31,4% del género femenino. El estudio mostró que en promedio, ambos géneros del primer y tercer término están con el peso normal, en el quinto término los hombres tienen sobrepeso y las mujeres con peso normal. En el séptimo término ambos géneros presentaron sobrepeso.
Palabras clave: Estudiantes. Obesidad. IMC.

RESUMO
O objetivo do estudo foi analisar o Índice de Massa Corporal (IMC) no curso de Educação Física de uma instituição de ensino superior. Trata-se de um estudo transversal estratificado, sendo aplicado um questionário sociodemográfico. Avaliamos 102 estudantes, sendo que 68,6% são do gênero masculino e 31,4% do gênero feminino. O estudo mostrou que em média, ambos os gêneros do primeiro e terceiro termo estão com o peso normal, no quinto termo os homens estão com sobrepeso e as mulheres com peso normal. Já no sétimo termo ambos os gêneros apresentaram sobrepeso.
Palavras-chave: Estudantes. Obesidade. IMC.