26 - PREVALENCE OF OVERWEIGHT AND OBESITY IN STUDENTS AND PROFESSIONALS FROM HEALTH CARE ACCORDING TO DIFFERENT INDICATORS

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INTRODUCTION

Obesity is a multifactorial problem of public health, reaching children, adolescents, adults and elderly people worldwide (WHO, 2000, KRUGER, 2009, CDC, 2009) and overweight is characterized by the higher deviation in body weight generally considered normal standard (ACSM, 2006). In general, the prevalence of overweight in Brazil reaches alarming levels in individuals older than 15 years, counting considerable risks to health, following the same trend the overweight prevalence appeared over 10% in brazilian main capitals (BRASIL, 2003, GIGANTE et al., 1997, VEDANA et al., 2008, BRASIL, 2009).

Population studies use the Body Mass Index (BMI) to diagnose the nutritional status of individuals, to verify the incidence or frequency of excess or lack of body weight (WHO, 1995 and ELLIS, 2001). The BMI might not represent the body composition, but is widely used its proper correlation with total body fat and because of its easy of application, once the individual be overweight to his age, the BMI values will be too. Still, there are signs that the sex, age and ethnicity must be considered (NORGAN, 1994, GALLAGHER et al. 1996 and GUEDES, 2009).

However, low levels of BMI might not characterize high levels of body fat, individuals that are in risk of developing obesity-related diseases can not be precisely identified just by BMI. (OCKER and MELROSE, 2008). Furthermore, BMI values may not reflect an increase of body fat, when the individuals has an increase in its fat-free mass (GUEDES, 2009). Thus, the measurements of skin folds thicknesses are a very important form in the body composition assessment, predicting the amount of total body fat of an individual, either by percentage or total mass obtained from the folds (GUEDES, 2009).

For this, the body composition by skin fold thickness need some techniques to be performed accurately, and possess the technical and biological variability, the second can be considered the highest incidence of errors. Of this, a way to mitigate the error would be the intensive training of the evaluator (PERINI et al, 2005).

Currently there is a eight polar bioimpedance(BIA)(Inbody, BioSpace) that according Malavolti et al. (2003) is notable for three aspects: 1) the use of tactile electrodes is really practical in the evaluation target for multiple frequencies, 2) no need to standardize the position of individuals to the BIA and 3) the speed of measurement of BIA octapolar. Another advantage of this equipment is the use of different electrical frequencies to analyze body composition instead of estimates based on equations. Some authors have defined eightpolar bioimpedance as a very efficient method in epidemiological studies (BEDOGNI et al., 2002, SARTORIO et al., 2004, BAUMGARTNER, 1996).

Although, eight polar bioelectrical impedance has already been validated, it is perceived that its use in Brazil is still uncommon. Thus, this study sought to assess the prevalence of overweight and obesity among in health care students and verify the sensitivity of different methods of anthropometric measurements used.

METHODS

This study is characterized as a descriptive cross-sectional (THOMAS & NELSON, 2002), were assessed 333 participants of a health care congress in Maringa-PR. The age of participants ranged from 17 to 57 years, being 48 men and 285 women.

Were included in this study the following variables: weight, height, BMI, fat percentage (% BF), fat mass, waist-hip ratio and total body water. The weight was obtained by eight polar bioelectric impedance with capacity to 250 kg and precision of 100g. the height was verified by stadiometer with accuracy of 1 cm. Body weight and height were used to calculate BMI, using the equation (BMI = body weight/height²). The assessment of body composition was performed by Multifrequency bioelectric impedance Biospace brand, Inbody 520 model, validated by Malavolti et al. (2003).

The multifrequency bioelectric impedance has eight tactile electrodes, making the analysis of body composition by using different frequencies (5, 50 and 500 kHz), making it possible to estimate, as well as body composition, the amount of total liquid extra and intracellular (KYLE et al., 2004). In addition to provide a relatively easy transport.

Data analysis involved descriptive and inferential statistics. The descriptive statistics included measures of central tendency and dispersion (mean and standard deviation), absolute and relative frequency. To analyse of the inferential statistics we use the Pearson correlation coefficient, Student's t test. Were also calculated specificity, sensitivity and positive predictive value (PPV) and negative predictive values (NPV) of BMI, having the gold standard % BF. measured by eightpolar bioimpedance. Participants were informed of the research objectives and participation was voluntary, based on the recommendations of the Resolution 196/96 of the CNS.

RESULTS AND DISCUSSION

The sample consisted of 48 (14.41%) men and 285 (85.59%) women, which had a mean age of 26.42 (± 8.39) and 25.31 (± 8.31), respectively and an mean total of 25.47 (± 8.32) years. Table 1 shows the anthropometric characteristics of the population according to sex, as well as the comparison between them.

Table 1 . General characteristics of the sample according to sex.

Variable	Men	Women	Total
Weight*	75,84 (±10,23)	58,29 (±8,18)	60,82 (±10,50)
Height*	176,87 (±7,21)	163,67 (±5,86)	165,57 (±7,63)
BMI*	24,24 (±3,14)	21,76 (±2,89)	22,12 (±3,05)
% BF.*	19,46 (±6,64)	28,71 (±6,32)	27,38 (±7,14)
Total body water*	44,50 (±4,91)	30,19 (±3,11)	32,25 (±6,09)
WHR*	0,86 (±0,04)	0,81 (±0,05)	0,81 (±0,05)
LBM*	57,27 (±6,32)	38,74 (±4,00)	41,41 (±7,86)
FFM*	60,68 (±6,71)	41,20 (±4,25)	44,01 (±8,29)

BMI = Body Mass Index; WHR = Waist-hip ratio, LBM = Lean Body Mass; FFM = Fat Free Mass * Significant difference between men and women (p <0.000).

The values found statistically significant differences between genders in all variables (p <0.000), the female subjects, compared to males, had lower mean weight, height, BMI, total body water, WHR, LBM and FFM, however there was superior value for the %BF. The values of WHR greater for men can be explained by the fact of having greater abdominal fat, increasing values of waist circumference. Already the women %BF. is because they have such a distribution of fat in the hip region and upper limbs more than men proper the action of estrogen (MCARDLE et al., 1998).

The nutritional classification status of the subjects according to BMI are shown in Table 2. There was a prevalence of overweight is 12.9% and 1.5% of obesity, and men had a higher prevalence of overweight and obesity, when compared to women. However, BMI classified as normal 78.1% of the sample. The prevalence of overweight in this study is much lower than that reported in the literature (GIGANTE et al., 1997, BRASIL, 2009), it can be explained by the high school, more women (85.6%) (BRASIL, 2009), and low participation of obese individuals than the fact that the sample was made up of students and professionals of the health care.

Table 2. Sample distribution according to BMI and sex.

Variable*	Men		Women		Total	
	n (48)	%	n (285)	%	n (333)	%
Low Weight	2	4,2	23	8,1	25	7,5
Eutrophic	30	62,5	230	80,7	260	78,1
Overweight	13	27,1	30	10,5	43	12,9
Obese	3	6,2	2	0,7	5	1,5

*WHO,1995

In table 3 the present data indicate the values of %BF. according to the categories proposed by Heyward and Stolarczyk (1996). These results were obtained from the assessment by the eightpolar BIA machine and reveal a proportion of individuals much higher adiposity excess.

In contrast to the data of BMI, the %BF. presented in Table 3 revealed that 89 (31.23%) women and 8 (16.67%) men were diagnosed with very high %BF, which represents increased risk for diseases and disorders associated with obesity (HEYWARD AND STOLARCZYK, 1996).

Table 3. Sample distribution according to the% of fat and sex.

Variável*	Men		Women		Total	
	n (48)	%	n (285)	%	n (333)	%
Very low	0	0	0	0	0	0
Below average	15	31,25	57	20,0	72	21,62
Average	2	4,16	9	3,16	11	3,30
Above average	23	47,92	130	45,61	153	45,95
Very high	8	16,67	89	31,23	97	29,13

*
Adapted from Heyward e Stolarczyk (1996)

Figure 1 shows the correlation plots between the data obtained by the eightpolar impedance between percentage of fat, total fat mass, fat-free mass and lean mass to total body water. The data showed high correlation ($R^2 = 0.9998$) of total body water with the variables referring to the amount of muscle mass of individuals, it is explained by the fact that muscle mass have more water than fat (MCARDLE et al., 1998). Thus, the low correlation of total water with the values of the percentage of fat and total fat mass ($R^2 = 0.142$ and $R^2 = 0.0042$, respectively).

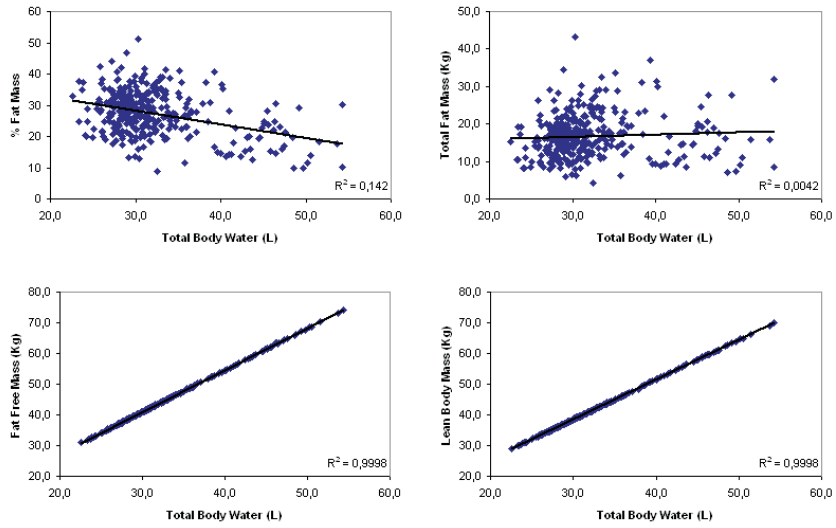

Figure 1. Chart A = correlation between the amount of total body water (L) with % Body Fat; Chart B = correlation between the amount of total body water (L) with the total quantity of body fat (kg), Chart C = the amount of total body water (L) with the quantity of fat-free mass (kg), Chart D = Correlation between the amount of total body water (L) with the amount of lean mass (kg). R^2 = Coefficient of determination.

Although we found significant correlation between BMI and %BF. (r = 0.55, p <0.001), BMI had high specificity (100%) but low sensitivity (51%). Indicating that the BMI does not incorrectly classified as obese any individual, however no longer categorized as obese a large number of subjects. These findings corroborate other studies (CHIARA et al., 2003, PEIXOTO, et al., 2005, REILLY et al., 2000), saved the methodological peculiarities of each study.

Given the discrepancy between the results of anthropometric versus BIA the strong evidence of validity of the machine used, which has been compared with several reference methods such as DEXA (dual energy X-ray absorptiometry), Hydrometric, MRI reaching high correlation levels and low technical error of measurement (MALAVOLTI et al. 2003; BEDOGNI et al., 2002, SARTORIO et al., 2004, CHA et al., 1997, THOMAS et al., 2001) it appears the prevalence of overweight may actually be much higher than usually estimated. This evidences are corroborated by a recent population study in the United States in which was revealed that the% G medium, measured by DEXA in adults (> 20 years), males was higher than 25% female and more than 35% (CDC, 2009).

FINAL CONSIDERATION

The findings of this study indicate that the prevalence of excess body fat is much higher than the prevalence from the IMC. Thus, it is possible that the prevalence rates of overweight are underestimating the real scale of the problem. In this sense, it seems appropriate to adopt the method of eightpolar impedance in population studies

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PREVALENCE OF OVERWEIGHT AND OBESITY IN STUDENTS AND PROFESSIONALS FROM HEALTH CARE ACCORDING TO DIFFERENT INDICATORS

The object of this study was to determinate the overweight prevalence based in two indicators (BMI and %BF) and calculated the BMI sensibility and specificity related to the %BF calculated by eight polar bioelectric impedance. Therefore, we evaluated 333 subjects participating in a congress of health care in the city of Maringa-PR. The measurement of weight and height were used to calculate BMI and% BF was obtained by eight polar BIA. Data analysis involved descriptive and inferential statistics. The prevalence of obesity observed was 14.4% by BMI, while the percentage of fat showed 29.13% of high level of adiposity. These findings that is necessary certain caution in the epidemiological dates interpretation related to the obesity prevalence, once that it was found low sensitivity and high specificity of BMI. The results indicate that it seems appropriate to adopt the method of eight polar impedance in population studies.

KEYWORDS: Obesity, Overweight and bioimpedance

PRÉVALENCE DE L'OBÉSITÉ CHEZ LES ÉLÈVES ET PROFESSIONNELS DE LA SANTÉ SOINS EN FONCTION DE DIFFÉRENTS INDICATEURS

Cette étude visait à déterminer la prévalence de l'obésité repose sur deux indicateurs (l'IMC et %CG.), calculer la sensibilité et la spécificité de l'IMC par rapport à %CG. calculé par octapolar impédance bioélectrique. Pour cela, nous avons évalué 333 sujets participant à un congrès des soins de santé dans la ville de Maringa-PR. La mesure du poids et la taille ont été utilisées pour calculer l'IMC et %CG a été obtenue par octapolar LFI. Analyse des données comprenait des statistiques descriptives et inférentielles. La prévalence de l'obésité a été observée chez 14,4% par l'IMC, tandis que le %CG. a montré 29,13% de haut niveau de l'adiposité. Ces résultats démontrent la nécessité d'une certaine prudence dans l'interprétation des données épidémiologiques sur la prévalence de l'obésité, car il a été constaté une faible sensibilité et une spécificité élevées de l'IMC. Les résultats indiquent qu'il semble approprié d'adopter la méthode de octapolar impédance d'études démographiques.

MOTS-CLÉS : Obésité, Surpoids et Impédance

PREVALENCIA DE SOBREPESO Y OBESIDAD EN ESTUDIANTES Y PROFESIONALES DEL ÁREA DE LA SALUD DE ACUERDO CON DIFERENTES INDICADORES.

El presente estudio tiene como objetivo determinar la prevalencia de exceso de peso con base en dos indicadores (IMC y %G), calcular la sensibilidad y especificidad del IMC en relación al %G calculado por el bioimpedanciometro octopolar. Con este fin, fueron analizados 333 participantes en un congreso del área de la salud realizado en la ciudad de Maringá-PR. La medida de peso y altura fue utilizada para el cálculo del IMC y el %G fue obtenido por la BIA octopolar. El análisis de los datos envolvió una estadística descriptiva e inferencial. La prevalencia de obesidad observada fue de 14.4% por el IMC mientras que el porcentaje de grasa revelado 29,13% con un alto nivel de adiposidad. Éstos resultados demuestran que es necesaria cierta cautela en la interpretación de los datos epidemiológicos relativos y prevalencia de la obesidad, ya que fue verificada la baja sensibilidad y la alta especificidad del IMC. Los resultados indican que parece apropiada la adopción del método de bioimpedancia octopolar en estudios poblacionales.

PALABRAS CLAVE: Obesidad, Sobrepeso y Bioimpedancia

PREVALÊNCIA DE SOBREPESO E OBESIDADE EM ESTUDANTES E PROFISSIONAIS DA ÁREA DA SAÚDE DE ACORDO COM DIFERENTES INDICADORES

O presente estudo teve como objetivo determinar a prevalência de excesso de peso com base em dois indicadores (IMC e %G), calcular a sensibilidade e especificidade do IMC em relação ao %G calculado pelo bioimpedanciometro octapolar. Para tanto, foram avaliados 333 sujeitos participantes de um congresso da área da saúde realizado na cidade de Maringá-PR. A mensuração do peso e altura foi utilizada para o cálculo do IMC e o %G foi obtido pela BIA octapolar. A análise dos dados envolveu estatística descritiva e inferencial. A prevalência de obesidade observada foi de 14.4% pelo IMC enquanto que o %G revelou 29,13% de alto nível de adiposidade. Esses achados demonstram que é necessária certa cautela na interpretação dos dados epidemiológicos relativos à prevalência da obesidade, uma vez que foi verificada baixa sensibilidade e alta especificidade do IMC. Os resultados indicam que parece apropriada a adoção do método de bioimpedância octapolar em estudos populacionais.

PALAVRAS CHAVE: Obesidade, Sobrepeso e Bioimpedância

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