

**132 - BODY COMPOSITION OF ADULTS IN MARINGÁ, PARANÁ – BRAZIL**

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**INTRODUCTION**

The body composition is considered as one of the physical fitness components focused on health, because through it is possible determine the quantity of fat and lean body mass (GUEDES e GUEDES, 2006; HEYWARD, 2004). Due, mainly, its association among the body fat level and metabolic changes, that can promote health disorders. Studies has been demonstrate that high body fat levels and its distribution are associated to elevates values of blood pressure, dyslipidemias, diabetes and sleep disorders (GIGANTE, MOURA, SARDINHA, 2009).

Nowadays, the body composition evaluation shows many methodological proceedings that vary in relation a higher or lower validity and facility of application. This form, the evaluation method choice depends on the desired precision and purpose to which it is propose (PITANGA, 2005; FREITAS, 2004; GUEDES e GUEDES, 2006; HEYWARD, 2004).

According WHO (1995) one of the main utilized methods to evaluate body composition, when a population profile is portrayed is the Body Mass Index (BMI). It is presented as an fast and practical evaluation indicator, however, it is important to highlight that your referred categories to adults not differ in gender relation, besides covering a wide age range (20 to 59 years). But, this method has an limited application due it is enable to provide related to body composition, which can super estimate or underestimate the fat levels.

In another way to BMI, bioimpedance is an more sensitive evaluation method. It is classified as an doubly indirect method, and it is based on the differences of the biological tissues conductivity exposed to one or more current frequencies, to provide a estimative of total body water quantity, fat free mass and body fat (LEE e GALLAGHER, 2008). International researches results has demonstrate good agreement among a gold standard method and multifrequential eightpolar bioimpedance for body composition analysis, defining this equipment as efficient in epidemiological studies and in studies with obese populations (SARTONIO, et al, 2005; THOMAS, et al, 2001).

Based on these assumptions the present study has the mean of evaluate the body composition profile of adults among 18 and 59 years old in the city of Maringá – PR, Brazil.

**METHODS**

This is characterized as cross-sectional descriptive study (THOMAS et al., 2007), conducted in the city of Maringá – PR, with 709 individuals, being 544 (76,73%) women and 165 (23,27%) men. The data were collected at the Multiprofessional Core of Studies of Obesity in the department of physical education from State University of Maringá. The evaluations were conducted by professionals properly trained to minimize the measurement error. As a criterion for inclusion in the study, the individuals should present age among 18 and 59 years old. Were included at the study the following variables: weight, stature, BMI, fat percentage (% BF), intracellular water, extracellular water, lean body mass, fat free mass and bone mineral content.

The stature was measured using a stadiometer attached to a scale model Welmy 300®, with precision of 0,1 cm. All the other variables were results of the evaluation using the multifrequential eightpolar bioimpedance machine of the brand Biospace®, model Inbody 520, with capacity of 250kg and precision of 100g, correctly calibrated and validated by Malavolti et al. (2003).

The multifrequential eightpolar bioimpedance machine has eight electrodes and get the body composition analyses through different frequencies (5, 50 and 500 kHz), which enables estimate, beyond the body composition, the quantity of total liquids, intra and extracellular (KYLE et al., 2004).

The BMI calculation occurred from the equation ( $BMI = \text{body weight}/\text{height}^2$ ). The BMI were divided in 4 categories: Under Weight (below 18,5 kg/m<sup>2</sup>); Normal weight (18,5 – 24,9 kg/m<sup>2</sup>); Overweight (25 – 29,9 kg/m<sup>2</sup>) and Obesity (above 30 kg/m<sup>2</sup>). The body fat percentage were classified using the criterion established by Lohman (1992) according which gender.

The data were organized in electronic spreadsheet of Microsoft Excel 2007® and analyzed in the SPSS® program for Windows® version 15.0. The descriptive analyses involved measures of central tendencies and dispersion (mean and standard deviation for parametric data and median and interquartile range for non-parametric data), beyond the absolute frequency and relative of the variables.

Were utilized the Kolmogorov-Sminov test for verification of the normality of the data.

The inferential analyses were done using the Chi-square test ( $X^2$ ), at the comparison of the body fat and BMI classifications in which gender and the tendency Chi-square test at the comparison among the classifications using gender as a factor. The Mann-Whitney test were utilized in the comparison among gender and the other variables. The statistical significance were pre-established in  $p < 0,05$  for all tests.

The participants were informed of the research's objectives and was a volunteer participation, based in the recommendations of the 196/96 resolution of CNS.

**RESULTS AND DISCUSSION**

The table 1 present the anthropometrics characteristics and the body composition of each gender, and the whole group. The most variables don't presented normality according the Kolmogorov-Sminov test, being these presented in median and interquartile range. The Mann-Whitney test pointed differences among groups in all analyzed variables.

**Table 1.** Sample characterization and Mann-Whitney test result.

	Female (n 544)	Male (n165)	Total	p
Age (years)	24 (21 - 39)*	27 (22 - 38)*	25 (22 - 39)*	0,033**
Height (cm)	163 (158 - 167)*	175,75 (8,32)	164 (159 - 171)*	0,00**
Weight (Kg)	61,35 (54,3 - 71,7)*	76,6 (69,65 - 85,95)*	64 (55,7 - 78,1)*	0,00**
BMI (Kg/m <sup>2</sup> )	22,7 (20,4 - 27,55)*	24,9 (22,05 - 28,2)*	23,2 (20,7 - 35,5)*	0,00**
%BF	30,65 (25,8 - 37,2)*	20,8 (14,55 - 28,5)*	29,2 (22,7 - 35,5)*	0,00**
BF (Kg)	18,75 (14,42 - 25,57)*	15,5 (10,35 - 23,2)*	17,8 (13,4 - 25)*	0,00**
Intracel.Water (l)	19,1 (17,7 - 21,2)*	28,00 (3,83)	20,4 (18,1 - 24,5)*	0,00**
Extracel.Water(l)	11,85 (10,92 - 13,2)*	16,9 (15,3 - 18)*	12,5 (11,2 - 15,1)*	0,00**
LBM (Kg)	39,6 (36,8 - 44,1)*	57,62 (7,36)	43,2 (37,8 - 50,75)*	0,00**
FFM (Kg)	42,1(39,1 - 46,9)*	61,06 (8,44)	44,9 (40,15 - 53,75)*	0,00**
BMC (g/cm <sup>3</sup> )	2,52 (2,31 - 2,77)*	3,43 (0,51)	2,62(2,33 - 3,05)*	0,00**

\* non-parametric variables, data presented in median and interquartile range; \*\* significant results Mann-Whitney test.

The table 2 presents the men and women distribution according the classification of BMI. It was verified that most of women (46,88%) and men (45,45%) are at normality zone. While 18,93% of women and 14,55% of men are included at obesity categories. Were verified significant difference in the categories distribution when analyzed each gender proportion and in the total sample. However, when gender were utilized as comparison factor among proportions, the tendency Chi-square test revealed that there is no difference among groups.

These findings when compared to another studies performed in other Brazilian regions obtained similar indexes of overweight and obesity in male and female populations (BASSAN et al., 2007; VELÁSQUEZ-MELÉNDEZ, 2004). According Family Budgets Survey conducted by IBGE, 41% of men and 39,2% of women of Brazilian population as a whole presented an overweight state (IBGE, 2004). In other countries it is possible to find out an obesity prevalence of until 28% among male and 34% in female (WHO, 2000; CDC, 2003).

**Table 2.** BMI classification and one factor Chi-square test result.

	Female		Male		Total	
	n	%	n	%	N	%
Underweight	109	20,04	10	6,06	119	16,78
Normal	255	46,88	75	45,45	330	46,54
Overweight	77	14,15	56	33,94	133	18,76
Obesity	103	18,93	24	14,55	127	17,91
Total	544	100,00	165	100	709	100,00
p (X <sup>2</sup> )		0,00*		0,00*		0,00*

\* significant difference pointed by Chi-square test in BMI comparison.

The table 3 present the male and female distribution according the %BF classification. Verified that most of women has a body fat considered "very high" (45,03%) and most of evaluated men has values classified as "above mean" (37,57%). Was verified difference at categories distribution when analyzed isolated each gender proportions and at the total sample. It was maintained the difference when was utilized gender as a tendency Chi-square test factor.

**Table 3.** %BF classification and one factor Chi-square test result.

	Female		Male		Total	
	n	%	n	%	n	%
Below Mean	67	12,32	36	21,82	103	14,53
Mean	31	5,70	15	9,09	46	6,49
Above Mean	201	36,95	62	37,57	263	37,09
Very High	245	45,03	52	31,52	297	41,89
Total	544	100	165	100	709	100
p (X <sup>2</sup> )		0,00*		0,00*		0,00*

\* significant difference pointed by Chi-square test in %BF comparison.

Being the %BF an important index to identify risks to health, associated to very low or excessive body fat or intra-abdominal fat content (HEYWARD e STOLARCZYK, 2000). It were possible to verify with the analyses of obtained data a higher incidence of overweight and obesity in the studied population. The most elevated values were found in the female population, in view of the typical characteristics of body composition in female subjects (McARDLE et al., 1998).

### FINAL CONSIDERATIONS

The findings of this study showed that the prevalence of excess body fat is greater than the resulting prevalence of BMI, a fact evidenced when portrayed relationship between the genders, since women had the highest values.

Excess body fat targeted by the method of multifrequency bioimpedance reminds us of the importance of using an instrument for assessing body composition to provide low cost, easily applicable, reproducible, thus making it possible to conduct research to population groups.

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#### **BODY COMPOSITION OF ADULTS IN MARINGÁ, PARANÁ – BRAZIL.**

Body composition is considered one of the components of physical fitness because of its association with the level of body fat and metabolic changes. Thus, the most common way to assess nutritional status and its association with body fat is through BMI and Fat Percentage. The objective of this study was to evaluate the body composition profile of adults in the city of Maringá. The research was a descriptive study conducted in the city of Maringá-PR, which evaluated 709 adults, 544 women and 165 men. The statistical analyses involved the Chi-square ( $X^2$ ) and Man – Whitney tests. It was found that most women (46.88%) and men (45.45%) are in normal ranges. While 18.93% and 14.55% of women men fall into the category obesity. These findings when compared to studies in other Brazilian regions had similar rates of overweight and obesity in male and female populations. It was also found that most women find themselves with the fat percentage "very high" (45.03%) and most men are evaluated with values described as "above average" (37.57%). The results indicate the importance of using bioimpedance in population studies for diagnosis of obesity.

**KEYWORDS:** Obesity, Overweight and Bioimpedance.

#### **COMPOSITION CORPORELLE DES ADULTES DE MARINGÁ, PARANÁ – BRÉSIL.**

La composition corporelle est considérée comme l'une des composantes de la condition physique en raison de sa liaison avec le niveau des changements de graisse corporelle et du métabolisme. Ainsi, la façon la plus commune pour évaluer l'état nutritionnel et de son association avec la graisse corporelle se fait par l'IMC et le pourcentage de graisse. Le but de cette étude était d'évaluer le profil de la composition corporelle des adultes dans la ville de Maringá. La recherche a été une étude descriptive réalisée dans la ville de Maringá-PR, qui a évalué 709 adultes, 544 femmes et 165 hommes. L'analyse statistique en cause le chi-carré ( $X^2$ ) et test de Mann - Whitney. Il a été constaté que la plupart des femmes (46,88%) et les hommes (45,45%) sont dans les plages normales. Alors que 18,93% et 14,55% des hommes, femmes tombent dans la catégorie obésité. Ces résultats par rapport aux études dans d'autres régions du Brésil avaient des taux similaires de surpoids et d'obésité dans la population masculine et féminine. Il a également été constaté que la plupart des femmes se retrouvent avec le pourcentage de graisse "très élevé" (45,03%) et la plupart des hommes sont évalués avec des valeurs décrit comme «supérieur à la moyenne» (37,57%). Les résultats indiquent l'importance de l'utilisation de bio-impédancemétrie dans les études de population pour le diagnostic de l'obésité.

**MOTS-CLÉS :** Obésité, Surpoids et Impédance.

**COMPOSIÇÃO CORPORAL DE ADULTOS EM MARINGÁ, PARANÁ - BRASIL.**

La composición corporal es considerado uno de los componentes de la aptitud física debido a su asociación con el nivel de los cambios de grasa corporal y metabólico. Por lo tanto, la forma más común para evaluar el estado nutricional y su asociación con la grasa corporal es a través de IMC y porcentaje de grasa. El objetivo de este estudio fue evaluar el perfil de la composición corporal de los adultos en la ciudad de Maringá. La investigación fue un estudio descriptivo, realizado en la ciudad de Maringá-PR, que evaluó a 709 adultos, 544 mujeres y los hombres 165. El análisis estadístico implicó la chi-cuadrado ( $X^2$ ) y Man - Whitney. Se encontró que la mayoría de las mujeres (46,88%) y hombres (45,45%) se encuentran en rangos normales. Mientras que 18,93% y 14,55% de las mujeres los hombres caen en la categoría de obesidad. Estos resultados en comparación con estudios realizados en otras regiones del país mostraron tasas de sobrepeso y obesidad en la población masculina y femenina. También se constató que la mayoría de las mujeres se encuentran con el porcentaje de grasa "muy alto" (45,03%) y la mayoría de los hombres se evalúan con los valores descritos como "superior a la media" (37,57%). Los resultados indican la importancia del uso de la bioimpedancia en estudios de población para el diagnóstico de la obesidad.

**PALABRAS CLAVE:** Obesidad, Sobrepeso y Bioimpedancia.

**COMPOSIÇÃO CORPORAL DE ADULTOS DA CIDADE DE MARINGÁ, PARANÁ – BRASIL.**

A composição corporal é considerada um dos componentes da aptidão física com o nível de gordura corporal e as alterações metabólicas. Assim, a forma mais comum de avaliar o estado nutricional e sua associação com a gordura corporal é por meio do IMC e Percentual de gordura. O objetivo do estudo foi avaliar o perfil de composição corporal de adultos da cidade de Maringá. O delineamento da pesquisa foi descritivo de corte transversal, realizado na cidade de Maringá-PR, em que foram avaliados 709 adultos, sendo 544 mulheres e 165 homens. A análise estatística envolveu os testes de Qui-quadrado ( $X^2$ ) e Mann – Whitney. Verificou-se que a maioria das mulheres (46,88%) e dos homens (45,45%) encontram-se na faixa de normalidade. Enquanto 18,93% das mulheres e 14,55% dos homens se enquadram na categoria obesidade. Esses achados quando comparados aos de estudos realizados em outras regiões brasileiras obtiveram índices semelhantes de sobrepeso e obesidade na população masculina e feminina. Verificou-se também, que a maioria das mulheres se encontra com o percentual de gordura "muito alto" (45,03%) e a maioria dos homens avaliados se encontram com valores classificados como "acima da média" (37,57%). Os resultados indicam a importância da utilização da bioimpedância em estudos populacionais para diagnóstico da obesidade.

**PALAVRAS CHAVE:** Obesidade, sobrepeso e Bioimpedância.