134 - COMPARISON OF VARIABLES RELATED TO ANTHROPOMETRIC BMI AND WHR ADULTS IN DIFFERENT AGE GROUPS

CEZAR GRONTOWSKI RIBEIRO,
ERVINO ROTHERMEL,
ALIANE DE SOUZA CASTILHO,
MARCOS ANTÔNIO CEZAR,
JAQUELINE PERCISI MARGREITER
Instituto Federal do Paraná – IFPR, Palmas/PR – Brasil.
cezar.ribeiro@ifpr.edu.br

The constitution, composition and body size are critical for maintenance of functional abilities, and are largely predetermined by genes inherited from the parents. However, body composition can be substantially altered by lifestyle habits such as sedentary lifestyle, diet and exercise type.

The Body Mass Index (BMI) and waist to hip ratio (WHR) are frequently used and shown to be reliable for assessing the nutritional status and risk of morbidity and mortality from cardiovascular diseases (WHO, 1997). It is recommended by WHO as a reliable predictor of body fat, being used on a large scale, especially in regard to population studies, since it has low cost and easy to interpret (GROSSL; LIMA; KARASIAK , 2010).

The concentration of abdominal fat seems to have consequences both with regard to how to vascular metabolic disorders (KANNEL, et al. 2002). Thus, indirect and non-invasive methods are commonly used to value close to the actual terms of body fat (HO; LAM; JANUS, 2003). Various indicators have been proposed with the aim of diagnosing health risks derived from increased body fat, and is still used as the Body Mass Index (BMI).

However, the restrictions that this measure has the World Health Organization - WHO (2010) recommends the association of this variable with other measures, like waist circumference (WC). This is considered to assist in obtaining more reliable results.

WC measurement explains that subjects with abdominal and pelvic region that have high values significantly increase the likelihood of sudden death, stroke and atherosclerosis (POWERS; HOWLEY, 2000). Therefore, studies often use the association between BMI and WHR as an indicator of the possibility of developing diseases and obesity, especially the ease of application , low cost and simplified interpretation (NEVES, 2008; RIPKA et al., 2009).

It is intended to discuss the fact that in all stages of development, and thus also in adulthood changes in body composition that may directly affect the risk of developing lifestyle-related diseases occur.

Therefore, the aim of this study was to compare the levels of BMI and WHR in adults of different ages.

METHODS

The study was characterized as a descriptive and cross-sectional exploratory research conducted between the months of May and June 2013.

The sample consisted of 48 students from the Federal Institute of Paraná (IFPR) - Campus Palmas, 11 male and 37 female. Evaluation of resting heart ratebody weight, height, waist circumference (WC), hip circumference (HC), BMI and WHR was performed and tests conducted according to the protocols described by Fernandes Filho (2003). The subjects were divided into three age groups: Aged up to 25 years (G1, n = 9), 26-35 years (G2, n = 20) and, 36 years or older (G3, n = 19).

To measure heart rate (HR) at rest was left the subject standing for three minutes in order to stabilize the FC. The evaluator used the index and middle fingers to press the carotid artery in the neck, until you feel the blood flow. With a stopwatch, 15 seconds were counted pulsations resulting from blood flow, with the value found multiplied by four, thereby obtaining the resting HR per minute. Anthropometric measurements, for measurements of weight and height, we used mechanical scale Filizola (capacity of 150kg and 100g division) and stadiometer (200cm) of Sanny brand, respectively. BMI was calculated by dividing the weight of the body mass by the square of height. The WHR was calculated by dividing the waist and hip circumferences, measured by means of an anthropometric tape Sanny brand that has a resolution of 150 cm.

Applicators collection of measurements were academics IFPR Campus Palmas – PR, previously trained to administer the instruments used.

All subjects were informed about the objectives and procedures of the study and signed a consent form agreeing to take part of it. The study is part of Project "Improving the Health and Quality of Life IFPR Campus Palmas", approved by the Ethics Committee in Research of IFPR (Opinion 0058 / 2011).

Data were analyzed using descriptive statistics of mean and dispersion and is attested by the significance test ($p < 0.05$) t -test for independent samples with post hoc Tukey test. The Association between variables was assessed by the Pearson correlation test. SPSS ® version 20.0 was used for these statistical procedures.

RESULTS

The aim of this study was to compare the anthropometric variables related to BMI and WHR of adults in different age groups.

Data analysis (Figure 01) showed no significant differences ($p <0.05$) between the groups analyzed for resting HR.

For variables: body weight, BMI, WC, HC and WHR, subjects of G2 and G3 showed significantly higher values ($p <0.05$) than the G1. The height was significantly lower in G3 G2.

Age was significantly correlated ($p <0.05$) with WC, HC, WHR and BMI ($r = 0.528$, 0.437, and 0.537, 0.435, respectively). WC was associated with a high BMI and WHR ($r = 0.880$ and 0.850, respectively).

Until 25 years none of studied subjects were obese based on BMI. You G2 and G3, 25% and 47.37% of the subjects were classified in that category, with 10.53 and 5.26% of subjects over 35 years in the categories of level II obesity and morbid obesity, respectively.

VARIABLES	Until 25 years		From 26 to 35		36 or more	
	Mean	sd	Mean	sd	Mean	sd
FC	64,33	4,21	65,75	6,59	65,74	3,38
Body Mass	57,78	7,56	74,75*	14,09	75,53*	12,15
Height	1,61	0,06	1,66	0,10	1,59#	0,08
BMI	22,38	2,90	26,93*	3,21	29,85*	5,08
Hip circumference	74,00	4,90	87,20*	10,66	91,95*	9,96
Waist circumference	95,00	7,40	102,65*	5,71	105,47*	6,84
WHR	0,78	0,04	0,85*	0,08	0,87*	0,07

* Different group 01 (p<0,05)
# Different group 01 (p<0,05)

DISCUSSION

The resting HR did not change between age groups. It is important to report that a high resting HR and / or increased basal blood pressure levels are indicators for expanding the possibility of development of chronic degenerative diseases and the increased risk of mortality from cardiovascular causes as is any other cause (Chow et al. 2000). For this group, the resting HR indices showed satisfactory (averaging around 65 beats per minute), which allows us to say that for this variable, researched subjects at low risk for developing illnesses or death.

Body weight showed a significant difference in people younger than 25 years for others. It seems that with increasing age, the PC is a factor to be considered as worrisome as it has been reported in the literature that this expansion is suggestive of the possibility of increased incidence of diseases, especially cardiovascular. Amato and Amato (1997) reported that after 25 years individuals increase in average weight of 600g per year and reduce 200g muscles, mainly due to physical inactivity. This may be the factor that reflects the results found in the study group for this variable.

Going against the data found on the PC, CC and CQ, and WHR showed significant difference favorable to respondents under 25 years of age. Ley et al. (1992) and Trémollieres et al. (1996) have explanavam which can be found a progressive increase in WHR with advancing age, which is a result of increased abdominal fat. McArdle , Katch , and Katch (2003) already showed that excess body fat, especially in the abdominal region , is related to the emergence of numerous metabolic and functional disorders , making a current public health problem . The most recent studies have shown that the concentration of abdominal fat, regardless of overall body fat, can cause multiple cardiovascular and metabolic disorders (GOODPASTER et al., 2005; SILVA et al., 2006). In the case of the group studied , this presents data consistent with the literature , which should be observed as worrisome because it comes to people of working age, which may have several harmful consequences that appear to be primarily determined by the habits and lifestyle .

Just as the HCY when analyzed BMI, individuals aged less than 25 years remained within desirable patterns indicated by the literature. However, above that age groups showed high rates of obesity. Jansen et al. (2002) found similar results in their study. Individuals with higher BMI were also those who had a higher incidence of abdominal fat, which is consistent with the explanation provided by Mendonca and Pereira (2008). The result of the group seems to point that with advancing age, BMI is affected, resulting in a greater vulnerability of individuals to the development of diseases.

CONCLUSION

BMI is an excellent mechanism for diagnosing nutritional status, as well as the WHR is an important tool to suggest the risk of mortality. Increasing age appears to be crucial for the expansion of anthropometric dimensions and, consequently, the risk of mortality.

The increase in years of life seems to be a decisive factor for increases in CC, CQ, BMI and WHR.

From the age of 26, more than 65 % of reviews were overweight or obesity, which raises concern for future development options related to excess body weight disorders.

One limitation of the study highlight the cross-sectional nature, which does not allow to analyze the relations of cause and effect shown in the results, and suggested that further research be carried out accordingly.

Highlights the importance of the combination of BMI and WHR in the evaluation of adults, since abdominal obesity was also observed in those subjects who were not diagnosed as obese by BMI.

REFERENCES

AMATO, M.C.M.; AMATO, S.J.T.A. Mudança de hábito. São Paulo: Faculdade Ibero-Americana, 1997.

CHOW, W.H. et al. Obesity, hypertension, and the risk of kidney cancer in men. N Engl J Med. 2000; 343(18):1305-311.

FERNANDES Filho, J. A Prática da Avaliação Física. São Paulo: Shape, 2003.

GOODPASTER, B.H. et al. Obesity, regional body fat distribution, and the metabolic syndrome in older men and women. Archives of Internal Medicine. 2005, v.165, p.777-783.

GROSSL, T.; LIMA, L. R. A.; KARASIAK, F. C. Relação entre a gordura corporal e indicadores antropométricos em adultos frequentadores de academia. Motri, Portugal, 2010, v.6, n.2, p.35-45.

HO, S. Y.; LAM, T. H.; JANUS, E. D. Waist to stature ratio is more strongly associated with cardiovascular risk factors than other simple anthropometric indices. Ann Epidemiol., Estados Unidos, 2003, v.13, n.10, p.683-691.

KANNEL, W. B. et al. Risk stratification of obesity as a coronary risk factor. Am J Cardiol. 2002, v.90, n.7, p. 697-701.

LEY, C.J. et al. Sex and menopause associated changes in body fat distribution. Am. J. Clin, Nutr. 1992, v.55, p. 950.

McARDLE, W.D.; KATCH, F.I.; KATCH, V.L. Fisiologia do exercício energia, nutrição e desempenho humano. 5ª ed. Rio de Janeiro: Guanabara Koogan, 2003.

MENDONÇA, G.V.; PEREIRA, F.D. Medidas de composição corporal em adultos portadores de síndrome de down. Rev. Bras. Educ. Fís. Esp. 2008, v.22, n.3, p.201-10, jul./set.

NEVES, E. B. Prevalência de sobrepeso em militares do exercito brasileiro: associação com a hipertensão arterial. Ciência e Saúde Coletiva. Rio de Janeiro, 2008, v.13, n.5, p.1661-1668.

POWERS, S.K.; HOWLY, E.T. Fisiologia do exercício: teoria e aplicação ao condicionamento e desempenho. 3ª ed. São Paulo: Manole, 2000.

RIPKA, W.L. et al. Comparação entre gêneros na avaliação do componente morfológico de adultos no município de

Curitiba. Coleção Pesquisa em Educação Física. 2009, v. 8, p. 75-80.

SILVA, J.L.T. et al. Distribuição centrípeta da gordura corporal, sobrepeso e aptidão cardiorrespiratória: Associação com sensibilidade insulínica e alterações metabólicas. Arquivos Brasileiros de Endocrinologia & Metabologia. 2006, 50(6), 1034-1040.

WHO. World Health Organization. Obesity - preventing and managing the global epidemic. Geneva: WHO; 1997.

Endereço: Rodovia PRT 280 – Trevo da Codapar
Palmas – Paraná – Brasil
CEP 85555-000
E-mail: cezar.ribeiro@ifpr.edu.br

COMPARISON OF VARIABLES RELATED TO ANTHROPOMETRIC BMI AND WHR ADULTS IN DIFFERENT AGE GROUPS

ABSTRACT

Introduction: The Body Mass Index (BMI) and waist to hip ratio (WHR) are often used to assess the nutritional status and risk of morbidity and mortality from cardiovascular disease. Objective: To compare the rates of BMI and WHR in adults of different ages. Methodology: This was a descriptive cross-sectional study. The sample consisted of 48 subjects, 11 males and 37 females , both students IFPR Campus Palmas / PR, aged 17 to 58 years (mean = 34,02 ± 9,53). The evaluation was performed by anthropometry, and included HR, weight, height, abdomen, hip, BMI and WHR. Three age groups were established for analysis: Group 1 - 17 to 25 years (n = 9), Group 2 - 26 to 35 years (n = 20) and Group 3 - 36 or older (n = 19). Multiple comparisons were conducted between the variables, using the Student's t and as a post hoc Tukey test. Results: No significant difference ($p < 0,05$) between age groups in FC and height variables between any of the age groups. Likewise, no difference between groups 2 and 3 was observed in any variable. Group 1 showed a statistically significant difference compared to groups 2 and 3, the variables weight, abdomen, hip, BMI and WHR , as seen in Figure 01. A strong correlation between age, BMI and WHR, as seen in Figure 02. Conclusion: BMI is an excellent mechanism for diagnosing nutritional status, as well as the WHR is an important tool to suggest the risk of mortality. Increasing age appears to be crucial for the expansion of anthropometric dimensions and, consequently, the risk of mortality.

KEYWORDS: BMI. WHR. Indicators of body fat. Mortality risk.

RÉSUMÉ

Introduction: L'indice de masse corporelle (IMC) et rapport taille- hanche (RTH) sont souvent utilisés pour évaluer l'état nutritionnel et le risque de morbidité et de mortalité par maladie cardio-vasculaire . Objectif: comparer les taux de l'IMC et RTH chez les adultes de différents âges . Méthodologie: Il s'agit d'une étude descriptive transversale. L'échantillon était composé de 48 sujets, 11 hommes et 37 femmes, tous deux étudiants IFPR Campus Palmas / PR, âgés de 17 à 58 ans (moyenne = 34,02 ± 9,53). L'évaluation a été réalisée par l'anthropométri, et inclus RH, poids, taille, abdomen, la hanche, l'IMC et RTH. Trois groupes d'âge ont été établis pour l'analyse: Groupe 1 - 17 à 25 ans (n = 9), Groupe 2 - 26 à 35 ans (n = 20) et Groupe 3 - 36 ou plus (n = 19). Les comparaisons multiples a été menée entre les variables, à l'aide de t et de l'élève comme un test post hoc de Tukey. Résultats: Aucune différence significative ($p <0,05$) entre les groupes d'âge de FC et les variables de hauteur entre tous les groupes d'âge. De même, aucune différence entre les groupes 2 et 3 a été observée dans n'importe quelle variable. Groupe 1 a montré une différence statistiquement significative par rapport aux groupes 2 et 3 , le poids variables, l'abdomen, la hanche, l'IMC et WHR, comme on le voit sur la figure 01 . Une forte corrélation entre l'âge, l'IMC et WHR, comme on le voit sur la figure 02. Conclusion : L'IMC est un excellent mécanisme pour le diagnostic de l'état nutritionnel , ainsi que le WHR est un outil important pour suggérer le risque de mortalité. L'âge semble être cruciale pour l'expansion des dimensions anthropométriques et, par conséquent, le risque de mortalité.

MOTS-CLÉS: IMC. WHR. Indicateurs de la graisse corporelle. Le risque de mortalité.

RESUMEN

Introducción: El Índice de Masa Corporal (IMC) y el índice cintura- cadera (RCC) a menudo se utilizan para evaluar el estado nutricional y el riesgo de morbilidad y mortalidad por enfermedad cardiovascular. Objectivo: Comparar las tasas de IMC y la RCC en adultos de diferentes edades. Metodología: Se realizó un estudio descriptivo de corte transversal. La muestra estuvo conformada por 48 sujetos, 11 hombres y 37 mujeres, tanto a los estudiantes IFPR Campus Palmas / PR , con edades entre 17 y 58 años (media = 34,02 ± 9,53). La evaluación fue realizada por la antropometría, e incluyó HR , el peso, la altura , el abdomen, la cadera , el IMC y la RCC. Tres grupos de edad se establecieron para el análisis: Grupo 1 - 17 a 25 años (n = 9) , Grupo 2-26 a 35 años (n = 20) y Grupo 3 - 36 o más años (n = 19). Comparación múltiple se llevó a cabo entre las variables , mediante la t de Student y como un test post hoc de Tukey. Resultados: No hubo diferencias significativas ($p < 0,05$) entre los grupos de edad en FC y las variables altura de entre cualquiera de los grupos de edad. Asi mismo, no se observó ninguna diferencia entre los grupos 2 y 3 en cualquier variable. El grupo 1 mostró una diferencia estadísticamente significativa en comparación con los grupos 2 y 3, las variables peso, el abdomen, la cadera, el IMC y la RCC, como se ve en la figura 01. Una fuerte correlación entre la edad, el IMC y la RCC, como se ve en la figura 02. Conclusión: El IMC es un excelente mecanismo para diagnosticar el estado nutricional, así como la RHO es una herramienta importante para sugerir el riesgo de mortalidad. El aumento de la edad parece ser crucial para la expansión de las dimensiones antropométricas y, en consecuencia , el riesgo de mortalidad.

PALABRAS CLAVE: BMI. RHO. Los indicadores de grasa corporal. El riesgo de mortalidad.

COMPARAÇÃO DE VARIÁVEIS ANTROPOMÉTRICAS RELACIONADAS AO IMC E RCQ EM ADULTOS DE DIFERENTES FAIXAS ETÁRIAS

RESUMO

Introdução: O Índice de Massa Corporal (IMC) e a Relação Cintura Quadril (RCQ) são utilizados com frequência para avaliar o estado nutricional e risco de morbimortalidade por doenças cardiovasculares. Objetivo: Comparar os índices de IMC e a RCQ em adultos de diferentes faixas etárias. Metodologia: Trata-se de um estudo descritivo e transversal. A amostra foi composta por 48 sujeitos, sendo 11 do sexo masculino e 37 do sexo feminino, ambos estudantes do IFPR Câmpus Palmas/PR, com idade entre 17 e 58 anos (m=34,02±9,53). A avaliação foi efetuada pelo método antropométrico, e incluiu FC, peso, estatura, abdômen, quadril, IMC e RCQ. Foram estabelecidas três faixas de idade para análise: Grupo 1 - 17 a 25 anos (n=9); Grupo 2 - 26 a 35 anos (n=20); Grupo 3 - 36 anos ou mais (n=19). Foi efetuada comparação múltipla entre as variáveis, usando-se o teste t de Student e como post hoc o teste de Tukey. Resultados: Não houve diferença significativa ($p<0,05$) entre as faixas

etárias nas variáveis FC e estatura, entre nenhuma das faixas etárias. Da mesma maneira, não se observou diferença entre os grupos 2 e 3 em nenhuma variável. O grupo 1 apresentou diferença estatisticamente significante em relação aos grupos 2 e 3, nas variáveis peso, abdômen, quadril, IMC e RCQ, como se verifica na figura 01. Observou-se forte correlação entre a idade, o IMC e o RCQ, como se verifica na Figura 02. Conclusão: O IMC é um excelente mecanismo para diagnóstico do estado nutricional, assim como o RCQ é uma ferramenta importante para sugerir o risco de mortalidade. O aumento da idade parece ser fator determinante para ampliação das dimensões antropométricas e, consequentemente, do risco de mortalidade.

PALAVRAS-CHAVE: IMC. RCQ. Indicadores de gordura corporal. Risco de mortalidade.