126 - RELATIONSHIP BETWEEN THE VO2 MAX AND INDICATORS ANTHROPOMETRIC OF BODY COMPOSITION IN PRACTITIONERS OF PHYSICAL EXERCISE IN ACADEMY GYM IN THE CITY OF SANTO ANTONIO DE JESUS – BA

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1-INTRODUCTION

According to the American College of Sports Medicine (ACSM, 2014) stratification of the risks associated with sedentary lifestyle becomes increasingly important as the prevalence of diseases associated increase in the population being evaluated.

Among the variables analyzed the ratio waist to hip ratio (WHR) best represents the distribution of weight and body fat, being recognized as an important predictor of risk of body fat increased health, but waist circumference alone is also an important risk indicator for health (SIMÕES, FERNANDES FILHO, 2013).

In the case of cardiopulmonary fitness, it relates to the ability to perform a dynamic exercise, moderate to high intensity, implemented by large muscle groups for prolonged period and reflects the functional heart capacity, blood vessels, blood, lungs and relevant muscles during various types of exercise demand, that is, the capacity that an individual can pick up oxygen and to transport the muscle tissue by cardiovascular system that can be used at the cellular level per unit time (ACSM, 2011) .

According to Guedes and Guedes (2003) the prediction of VO2max values are grounded in existing linear relationship between the ability to perform muscular work and changes in heart rate and oxygen consumption during physical stress.

A critical issue is aimed to discuss whether it was really necessary to increase oxygen consumption for an optimization of the use of fat as the predominant energy substrate during physical exercise thereby reducing the risks associated with inactivity.

The lungs provide oxygen to the blood, the heart pumps oxygen-rich blood to the muscles, the muscles use the oxygen-rich blood to burn fuel and produce ATP, finally the muscles get tone and can burn more fuel, especially fats during the exercise. The ventilation, circulation and metabolism are closely linked and all improved with increasing aerobic capacity (NIEMAN, 1999).

Research Bouchard (2003) states that the body fat components are linked and complement suffering reciprocal influences and suggests that it should increase energy expenditure rather than increasing cardiorespiratory fitness.

Based on these aspects, this research aimed to evaluate the relationship between VO2 max and anthropometric indicators of body composition through the body mass index (BMI) and waist circumference (WC) in healthy adults in Santo Antônio de Jesus-BA.

2-METHODS

Quantitative study, with descriptive and cross-sectional establishing a relationship between the variables studied where the subjects were evaluated at a single time (period August-September 2015), set at the interference of the researcher (THOMAS; NELSON; SILVERMAM 2012).

The definition of sampling error (5%) (THOMAS; NELSON; SILVERMAM, 2012), the sample was composed of 49 practitioners adults of aerobic exercise a minimum of six months intervals of at least three times a week, minimum per 50 minute session, intensity of at least 50% of Maximum Heart Rate, aged between 19-59 years and considered healthy (no previous history of disease).

Among the study participants, 33 subjects were female with an average age of age of 28.42 ± 2.34 years which corresponds to 67.35% of the total samples, 16 males with a mean age age 30.94 ± 10.26 years corresponding to 32.65% of the total sample.

Sample chosen for convenience and formed by those who agreed to participate and signed the Informed Consent and Informed (IC) and complied with all the regulations of research involving human subjects (Resolution 406/12 of the National Health Council).

Evaluations of anthropometric indicators followed standardized rules (LOHMAN; ROACHE; MARTORELL, 1992) being: body mass (kg) (MC), the measurement performed using an electronic scale Filizola (Industries Filizola SA, Sao Paulo - SP, Brazil) Line Personal Line 2000, platform type, with the individual barefoot and wearing minimal clothing.

Height (m) (EST) was measured with stadiometer Caprice Sanny® (American Medical of Brazil, BR) with maximum extent of 2.10m, with the individual barefoot and with minimal clothing, upright, leaning against a flat vertical surface pending arms with hands flat on the thighs, heels together and the tips of feet apart, forming an angle of 60º, knees contact, head adjusted to the Frankfurt plane and deep breath.

To measure the waist circumference (WC) (cm) was used tape measure with lock, metal, inelastic and flexible, 1 mm accuracy with Sanny® brand (American Medical of Brazil, BR). As measured on the horizontal level of the narrowest part of the trunk, the foot being evaluated (standing position) after complete exhalation.

For the BMI was calculated using the equation: BMI = body weight (kg) / height (m 2). Considered normal BMI between 18.5 and 24.9 kg \ m2, overweight BMI between 25 and 29.9 kg \ m2, obese BMI 30 to 34.9 kg \ m2, extremely obese BMI between 35 and 39.9 kg \ m2 and morbidly obese BMI greater than or equal to 40 (ALBERTI, 2009).

In a complementary manner, we used waist circumference (WC) in order to identify the pattern of distribution of fat mass, which besides being correlated with the mass of abdominal fat (subcutaneous and intra-abdominal) is considered indicator of the risk for cardiometabolic diseases (Klein, 2007). Being classified according to the cutoffs suggested by WHO (1998), as increased when greater than or equal to 80 cm for women and greater than or equal to 94 cm for men, and increased when greater than or equal to 88 cm for women and greater than or equal to 102 cm for men (MONTEIRO, FERNANDES FILHO, 2002).

The measurement of VO2 max was held following the American College of recommendations of Sports Medicine (ACSM, 2014), being carried out on a treadmill, air-conditioned room with ambient temperature between 20 ° C to 22 ° C, as the protocol used, it was performed 3 minutes in progressive stages velocities causing the individual to maximum effort by maximum

heart rate using the formula 220 - age and standard deviation ± 10 bpm, as a formula to predict VO2 max (ml.kg.min) was used 3,5+ equation VO2 max = (0.2 * speed) + (0.9 * speed *% of inclination of the treadmill), validated and completed the last stage to perform the calculation.

Physical fitness pre-testing guidelines following the ACSM's recommendations for reliable results were established as guidelines, not physical activity in a period that precede 24 hours of physical assessment, the individual should be rested, not caffeine intake , alcohol, or any kind of food three hours leading up to the physical assessment.

All statistical analyzes were performed using the Statistical Package for Social Sciences (SPSS) IBM software, version 20.0. The variables were initially presented using descriptive statistics and measures of dispersion (mean and standard deviation). The relationship between variables was investigated by Pearson correlation coefficient with significant level at $p < 0.05$.

3- RESULTS AND DISCUSSION

49 adult subjects were analyzed, 33 (67.35%) were females, aged 19 to 57 years and 16 (32.65%) were males aged between 22 and 59 as described in Table 01.

Table 01. Description of the sample, general and sex (mean and SD).

Group	Age	Weight	Height	BMI	WC	VO2 max.
General (n=49)	30,61±8,71	71,93±15,65	1,66±0,10	25,79±3,95	90,33±13,27	35,33±7,82
Women (n=33)	29,30±7,54	64,72±9,36	1,62±0,07	24,78±3,41	85,16±10,06	32,60±6,24
Man (n=16)	33,31±10,49	86,79±15,38	1,76±0,08	27,89±4,26	101,00±12,95	40,94±7,93

Source: research data (2015).

As for the collection of anthropometric indicators in women, 60% had the CC within the normal range, 57.57% were classified to the level of normal BMI, 39.39% had this index above the recommended and only 3.03% with BMI below the standards recommended by the World Health Organizations (WHO, 1998).

Regarding the result of body composition in male sample, 56.25% had CC within WHO standards, 81.25% had a BMI above the recommended values associated with an increased risk for developing diseases such as coronary, diabetes and some types of cancers (SILVA; JORGE; PEREIRA, 2008).

The lowest level of physical fitness was assessed on an individual female (23.59 ml.kg.min), and the highest level of physical fitness (VO2 max) evaluated in a male subject (52.20 ml.kg .min), confirming the trends observed in the Brazilian population (BLANCO; NUNES, 2007).

Table 02. Rating Physical Fitness Level gender (VO2 max).

%	Man	Women
Very Bad	0	30
Bad	18,75	15
Reasonable	31,25	37
Good	31,25	15
Great	18,75	1

Source: research data (ACSM classification, 2014).

When the correlation by sex, the group represented by women has a significant relationship between anthropometric indicators of waist circumference and BMI.

Table 03. Pearson correlation for the group of women.

N=33	BMI	WC	Vo2
BMI	1	,877	-,221
WC	,877	1	-,371
Vo2	-,221	-,371	1

Source: research data (2015).

When related anthropometric indicators and the maximum volume of oxygen to the male group, it identified a strong relationship between VO2 max and waist circumference.

Table 04. Pearson correlation for the group of men.

N=33	BMI	WC	Vo2
BMI	1	,432	-,141
WC	,432	1	,971
Vo2	-,141	,971	1

Source: research data (2015).

4-CONCLUSION

In summary, this study concludes that the analyzed sample composed of active adults with no previous history of disease, either alone or in aggregate form, low maximal oxygen uptake was associated in a significant way with recognized anthropometric indicators of body composition as a factor of risk. Where the prevalence of overweight and obesity in the sample studied followed the national trend.

The overweight and obesity percentages were higher in males and increased with age and with respect to the level of fitness we can see a significant association between VO2max and waist circumference in the male group.

REFERENCES

ACSM – American College of Sports Medicine. Recursos do ACSM para o personal trainer. 3. ed. Rio de Janeiro. Guanabara Koogan, 2011.

ACSM - American College of Sports Medicine. Diretrizes do ACSM para o teste de esforço e sua prescrição. 9. ed. Rio de Janeiro. Guanabara koogan, 2014.

ALBERTI, K. G. M. M. et al. Harmonizing the Metabolic Syndrome A Joint Interim Statement of the International

Diabetes Federation Task Force on Epidemiology and Prevention; National Heart, Lung, and Blood Institute; American Heart Association; World Heart Federation; International Atherosclerosis Society; and International Association for the Study of Obesity. Circulation, v. 120, n. 16, p. 1640-1645, 2009.

BLANCO, R. A.; NUNES, V. G. S. Alterações antropométricas, metabólicas e hemodinâmicas de homens, entre 25 e 35 anos, submetidos a um programa de treinamento de força muscular. FIEP Bulletin On-line, v. 77, n. 1, 2007.

FREITAS, A. V.; PRADO, R. L.; SILVA, R. J. S. Associação entre o percentual de gordura e o vo2 máximo na estimativa de fatores de riscos relacionados à saúde em policiais militares do município de Aracaju – Se. Revista Brasileira de Prescrição e Fisiologia do Exercício ISSN 1981-9900 versão eletrônica, São Paulo, v.1, n.1, p.87-95, jan./fev. 2007. ISSN 1981-9900. Disponível em: http://www.rbpfex.com.br/index.php/rbpfex/article/viewFile/9/9 . Acesso em: 10 out. 2015.

KLEIN, Samuel et al. Waist circumference and cardio metabolic risk: a consensus statement from shaping America's health: Association for Weight Management and Obesity Prevention; NAASO, the Obesity Society; the American Society for Nutrition; and the American Diabetes Association. Obesity, v. 15, n. 5, p. 1061-1067, 2007.

LOHMAN, T. J.; ROACHE, A. F.; MARTORELL, R. Anthropometric standardization reference manual. 1992.

MCARDLE, D. L.; KATCH, F. I.; KATCH, V. L. Fisiologia do exercício, energia, nutrição e desempenho humano, 7 edição, Rio de Janeiro, 2011.

MONTEIRO, A. B.; FERNANDES FILHO, J. Análise da composição corporal: uma revisão de métodos. Rev Bras Cineantropom Desempenho Hum, v. 4, n. 1, p. 80-92, 2002.

NIEMAN, D. C. Exercício e Saúde, teste e prescrição de exercícios. 6. ed. São Paulo, Editora Manole Ltda, 2006.

ORGANIZAÇÃO MUNDIAL DA SAÚDE. Division of Non communicable Diseases. Programme of Nutrition Family and Reproductive Health. Obesity: preventing and managing the global epidemic: report of a WHO consultation on obesity. Geneva; WHO; 1998.

SILVA, L. R.; JORGE, S. R.; PEREIRA, J. L. Relação entre gordura corporal, circunferência de cintura, IMC e idade. FIEP Bulletin On-line, v. 78, n. 2, 2008.

SIMÕES, F. S.; FERNANDES FILHO, J. Utilização de indicadores antropométricos de referência em idosos na avaliação dos níveis de saúde. FIEP Bulletin On-line, v. 83, n. 2, 2013.

THOMAS, J. R.; NELSON, J. K.; SILVERMAN, S. J. Métodos de pesquisa em atividade física. Artmed, 2012.

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ABSTRACT

This study aimed to analyze the relationship between the consumption Maximum oxygen (VO2 max) and anthropometric indicators of body composition in healthy adults practitioners of aerobic exercise, aged between 19-59 years (30.61 ± 8.71) in a health club in Santo Antonio de Jesus-Ba. The sample consisted of 49 subjects, 33 (67.35%) were female with an average age of 29.30 ± 7.54 years and 16 (32.65%) were male with an average age of 33.31 ± 10.49 years, the variables were collected from physical assessments performed at the study site. Body mass were observed (kg), height (m), body mass index (kg / m²) and waist circumference (WC), as well as measure of cardiorespiratory fitness (CRF) by VO2max prediction (ml.kg .min), following the recommendations of the American College of Sports Medicine (ACSM, 2014). Descriptive statistics were used and to identify the relationship between anthropometric variables the Pearson correlation, adopting a significance level of p <0.05. Through the collected results can be stated that 42.42% of women had anthropometric waist circumference above the levels recommended by the World Health Organization measures (WHO), although it was found that 24.24% had a cardiorespiratory fitness (CRF) very bad, and only 3.03% obtained an excellent ACR classification. Regarding the male was noted that 50% of these subjects had a waist circumference above the recommended by WHO and in relation to BMI, 43.75% were classified as obese I, 43.75% overweight and only 12.5% They are the standard weight. The results showed that VO2 max showed a strong correlation (r = 0.971) with the CC in males in the studied sample.

KEYWORDS: Vo2 Max. Anthropometric Indicators. Healthy Adults.

RELATION ENTRE LA VO2 MAX ET INDICATEURS ANTHROPOMÉTRIQUES DE LA COMPOSITION CORPORELLE CHEZ PRATICIENS DE L'EXERCICE PHYSIQUE DANS UN GYMNASE À L'ACADÉMIE VILLE SANTO ANTONIO DE JESUS – BA

RÉSUMÉ

Cette étude visait à analyser la relation entre la consommation d'oxygène maximale (VO2 max) et les indicateurs anthropométriques de la composition corporelle chez les adultes sains praticiens d'exercice aérobie, âgés entre 19-59 ans (30,61 ± 8,71) dans un club de santé à Santo Antonio de Jesus-Ba. L'échantillon était composé de 49 sujets, 33 (67,35%) étaient des femmes avec un âge moyen de 29,30 ± 7,54 ans et 16 (32,65%) étaient des hommes avec un âge moyen de 33,31 ± 10.49 ans, les variables ont été recueillies à partir des évaluations physiques effectuées sur le site d'étude. Masse corporelle ont été observés (kg), hauteur (m), l'indice de masse corporelle (kg / m²) et le tour de taille (WC), ainsi que mesure de la capacité cardiorespiratoire (CRF) par prédiction VO2max (ml.kg .min), suivant les recommandations de l'American College of Sports Medicine (ACSM, 2014). Les statistiques descriptives ont été utilisés et d'identifier la relation entre les variables anthropométriques la corrélation de Pearson, l'adoption d'un niveau de p <0,05 de signification. Grâce aux résultats collectés peuvent être déclaré que 42,42% des femmes avaient anthropométrique tour de taille au-dessus des niveaux recommandés par les mesures de l'Organisation mondiale de la santé (OMS), bien qu'il ait été constaté que 24,24% avait une capacité cardiorespiratoire (CRF) très mauvaise, et seulement 3,03% ont obtenu un excellent classement ACR. En ce qui concerne le mâle a été noté que 50% de ces sujets avaient un tour de taille au-dessus du recommandé par l'OMS et par rapport à l'IMC, 43,75% ont été classés comme obèses I, 43,75% en surpoids et seulement 12,5% Ils sont le poids standard. Les résultats ont montré que VO2 max a montré une forte corrélation (r = 0,971) avec le CC chez les hommes dans l'échantillon étudié.

MOTS-CLÉS: VO2 Max. Les indicateurs anthropométriques. Les adultes en santé.

RELACIÓN ENTRE EL VO2 MAX Y INDICADORES ANTROPOMÉTRICOS DE COMPOSICIÓN CORPORAL EN PRATICANTES DE EJERCICIO FÍSICO EN UN GIMNASIO EN LA CIUDAD DE SANTO ANTONIO DE JESUS - BA

RESUMEN

Este estudio tuvo como objetivo analizar la relación entre el consumo de oxígeno máximo (VO2 max) y los indicadores antropométricos de composición corporal en adultos sanos practicantes de ejercicio aeróbico, con edades comprendidas entre 19-59 años (30,61 ± 8,71) en un gimnasio en Santo Antonio de Jesús-Ba. La muestra estuvo constituida por 49 sujetos, 33 (67,35%) eran mujeres con una edad media de 29,30 ± 7,54 años y 16 (32,65%) fueron de sexo masculino, con una edad media de 33,31 ± 10.49 años, se recogieron las variables de las evaluaciones físicas realizadas en el lugar de estudio. La masa corporal se observaron (kg), altura (m), índice de masa corporal (kg / m²) y la circunferencia de la cintura (CC), así como la medida de la capacidad cardiorrespiratoria (CRF) por la predicción del VO2máx (ml.kg .min), siguiendo las recomendaciones del Colegio Americano de Medicina del Deporte (ACSM, 2014). Se utilizó estadística descriptiva e identificar la relación entre las variables antropométricas la correlación de Pearson, la adopción de un nivel de significación de p <0,05. A través de los resultados recogidos se pueden declarado que 42.42% de las mujeres tenía circunferencia de la cintura antropométrica por encima de los niveles recomendados por las medidas de la Organización Mundial de la Salud (OMS), aunque se encontró que 24,24% tenía una aptitud cardiorrespiratoria (CRF) muy mala, y sólo 3,03% obtuvo una excelente clasificación ACR. En cuanto a los varones se observó que el 50% de estos sujetos tenían una circunferencia de cintura por encima de la recomendada por la OMS y en relación con el IMC, 43,75% fueron clasificados como obesos, 43,75% sobrepeso y sólo el 12,5% Son el peso estándar. Los resultados mostraron que VO2 max mostró una fuerte correlación (r = 0,971) con el CC en los hombres en la muestra estudiada.

PALABRAS CLAVE: VO2 Max. Los indicadores antropométricos. Los adultos sanos.

RELAÇÃO ENTRE O VO2 MÁXIMO E INDICADORES ANTROPOMÉTRICOS DE COMPOSIÇÃO CORPORAL EM PRATICANTES DE EXERCÍCIOS FÍSICOS EM UMA ACADEMIA DE GINÁSTICA NA CIDADE DE SANTO ANTÔNIO DE JESUS – BA

RESUMO

Este estudo teve como objetivo analisar a relação entre o Consumo Máximo de Oxigênio (VO2 máx) e indicadores antropométricos de composição corporal em adultos saudáveis praticantes de exercícios físicos aeróbicos, com faixa etária entre 19 a 59 anos (30,61±8,71) em uma academia de ginástica na cidade de Santo Antônio de Jesus-Ba. A amostra foi composta por 49 indivíduos, sendo 33 (67,35%) do sexo feminino com idade média de 29,30±7,54 anos e 16 (32,65%) do sexo masculino com idade média de 33,31±10,49 anos, as variáveis foram coletada a partir de avaliações físicas realizadas no local do estudo. Foram verificadas a massa corporal (kg), estatura (m), índice de massa corpórea (kg/m²) e a circunferência de cintura (CC), além de medida da aptidão cardiorrespiratória (ACR) através da predição VO2 máx (ml.kg.min), seguindo as recomendações do Colégio Americano de Medicina do Esporte (ACSM, 2014). Utilizou-se a estatística descritiva e para identificar a relação entre as variáveis antropométricas à correlação de Pearson, adotando-se um nível de significância de p<0,05. Através dos resultados coletados pode-se afirmar que 42,42% das mulheres apresentaram medidas antropométricas de circunferência de cintura acima dos níveis recomendados pela organização mundial de saúde (OMS), verificou-se ainda que 24,24% apresentaram uma aptidão cardiorrespiratória (ACR) muito ruim, e apenas 3,03% obtiveram uma classificação de ACR excelente. Em relação ao sexo masculino notou-se que 50% desses indivíduos apresentaram a circunferência de cintura acima dos recomendados pela OMS e em relação ao IMC, 43,75% foram classificados com obesidade I, 43,75% sobrepeso e apenas 12,5% estão no peso padrão. Os resultados demonstraram que o VO2 máx apresentou uma forte correlação (r=0,971) com a CC no sexo masculino na amostra pesquisada.

PALAVRAS-CHAVE: Vo2 Máximo. Indicadores Antropométricos. Adultos Saudáveis.