46 - BODY AND NUTRITIONAL COMPOSITION INDICATORS OF STUDENTS FROM INSTITUTE FEDERAL OF EDUCATION, SCIENCE IS TECHNOLOGY OF THE CEARÁ (IFCE), CAMPUS JUAZEIRO OF THE NORTH

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INTRODUCTION

The anthropometric indicators are used to determinate the nutritional state as well as the health one, being important in the diagnosis and follow-up of the nutritional situation of body growth (OMS, 1995). The anthropometry is the considered to be the most useful method to give the diagnosis of these factors. In the diagnosis of the adolescents' growth deficit, the height/age indicator (ENGSTROM, 2002) has been recommended, being used to evaluate the stunted undernutrition or the continuous stunting of this deficit (SIGULEM et al.,2000). Considering the low sensitiveness of the body mass index (BMI) (SIGULEM et al., 2000; MONTEIRO, et al., 2000; CHIARA et al., 2003) in the evaluation of the amount of the exceeding adipose tissue in adolescents, the OMS recommends the BMI or Quetelet index (weight (kg)/ height (m2) associated to measurements like the tricipital skinfold thickness and subscapular skinfold to the diagnosis of the exceeding adipose tissue or obesity. A research made in Brazil in 1989 using the BMI detected the prevalence of overweight among adolescents of 7.6%, being higher (10.5%) in females (COITINHO et al., 1991).

To the anthropometric profile, before adolescence, the weight is positively allometric in boys and girls, in other words, it increases proportionally height increase. During adolescence, the lean body mass increases rapidly and the difference between the sexes in the lean body mass is bigger than the difference in height and weight. The increase in the lean body mass happens mainly in boys, who present a body fat with a drop to the degree to which the muscle and bone growth accelerates (YLI E WOOD, 1990). This way, the objective of this study is to compare anthropometric and body composition characteristics of students with the purpose of generating reference parameters in the region of Cariri-CE.

METHODOLOGY

This research results from a descriptive, transverse and quantitative field study. The sample is constituted by 60 students (19 males and 41 females) with average age around 16 years old, from Instituto Federal de Educação, Ciência e Tecnologia (IFCE), campus of Juazeiro do Norte, Ceará. All of them were submitted to the body composition and body mass index (BMI), being used a scale from the brand Lider, model P300C with a precision of 100g. The stadiometer was from the brand SANNY and the adipometer from the brand CESCORF to the measurement of the tricipital and subscapular skinfolds to the estimate of the body fat percentage (BFP) through the Slaughter (1988) equation. The results were classified from proposed normative references based in Cole et al. (2000) to the BMI, indicated to classify children and adolescents; For the fat percentage the criterion of reference Lohman apud Petrotsky (2003) was used.

Descriptive statistics of central tendency and dispersion was applied. The Kolmogorov-Smirnov was used to verify the normality of the data distribution in the sample. After verifying the presence of some outliers (extreme considered values) that compromised the normality of the distribution, their withdrawal was made. Inferential statistics was resorted to with test “t” of Student to independent variable to verify differences between the genres.

DISCUSSION AND RESULTS

The table 1 represents the results found for the anthropometric profile related to the body mass (BM), height, body mass index (BMI), tricipital skinfold (TSF), subscapular skinfold (SSF) and to the boby fat percentage (BFP).

Table 1 – Descriptive to anthropometric variables (BM – Body mass, H – Height, BMI – Boby mass index, TSF – Tricipital Skinfold, SSF – Scapular Skinfold and %F – Fat percentage.

	Male				Female				*w*
	Max.	**Mean**	**Min.**	**dp**	**Max.**	**Mean**	**Min.**	**dp**	
BM	85.9	60.2	41.1	10.5	71.0	52.2	39.7	8.42	0.003*
Height	1.81	1.68	1.53	0.8	1.70	1.58	1.43	0.69	0.000*
BMI	29.04	21.6	16.05	3.15	28.08	20.95	16.38	2.75	0.416
TSF	21.6	11.5	5.7	4.96	29.9	15.75	8.2	4.78	0.002*
SSF	27.8	13.2	6.6	6.4	31.6	14.65	7.2	5.49	0.358
BFP	40.3	19.2	9.3	9.4	43.3	25.5	1.1	5.77	0.002*

* Significant Differences between genres w<0,05

The average values for the BMI can be observed showing superior results for the boys when compared with the girls, even without presenting significant differences. On the other hand, the fat percentage shows superior values related to the girls, being proved a significant difference from the test t of Student (w=0.002). The average value of the BMI is found in this study, to the male sex (21,6+3,15) and to the female one (20,95+2,75), was superior to the male genre and inferior to the female one related to the study of Albano e Souza (2001). In relation to the study of Arruda and Lopes (2007) with adolescents of the male genre in Santa Catarina where they presented averages to the fat percentage of 16,1mm, 13,8mm and 13,8mm to respective ages of 15, 16 and 17. Superior indexes were found in a study carried out here.

The variables that presented significant difference between the genres were BM(0,003), height (0,000), TSF(0,002) and BFP(0,002). When Pearson`s correlation test is carried out, a correlation can be observed between the BMI and the moderated BFP (r=0,669). In Table 2 it can be observed a distribution of the BMI in relation to the genre. This way, in most of the

classifications, the boys present an average superior to the girls, but for the normal weight the opposite happened.

Table 2– Frenquency to the Boby Mass Index

	BMI			
	Low weight	Normal weight	overweight	Obesity
Male	15.8%	68.4%	5.3%	10.5%
Female	12.2%	78.0%	2.4%	7.3%
General	13.3%	75.0%	3.3%	8.3%

To Albano e Souza (2001) in a study about the nutritional state of adolescents from a public school in the city of São Paulo, results similar to ours were obtained, observing that to both genres the BMI was classified as normal, presenting the average to the male genre of 20.11kg/m² and to the female genre of de 21.04 kg/m².

Some studies carried out in countries like India, Nigeria and China (BRABIN ET AL., 1997; CHATUVE RDI ET AL., 1996; WANG ET AL., 1998), developed and developing countries like Ireland (HURSON; CO RISH, 1997), presented prevalence of inferior overweight when compared to ours, however, not all of these studies used the same criteria of classification we did. In Table 3 the female genre presents values superior only to the classification of moderately high, whilst to the others it presented inferior values.

Table 3 – Frequency to the Body Fat Percentage

	Body Fat Percentage				
	Low	Adequate	Moderately High	High	Excessively High
Male	5.3%	52.6%	21.1%	5.3%	15.8%
Female	-	46.3%	41.5%	4.9%	7.3%
General	1.7%	48.3%	35%	5%	10%

Even presenting a moderate correlation between the BMI and the BFP, it is observed that in terms of classification of reference related to the women when talking about BMI classify to the nutritional state with 78% of the sample being “normal weight”, moving to the fat percentage in the moment they reach levels higher than the men, who reach 41.5% in a “moderately high classification”. The largest percentage indicates that men and women are in the adequate classification. Due to this, the sample to both tests presents a nutritional state adequate to the health according to the reference criteria.

CONCLUSION

In relation to the fat percentage, there is prevalence of highly elevated indexes to the female genre. However, the same does not happen when verified in BMI, for the reason that men presented superior values. As to the nutritional state classification through BMI, it is verified the adequacy to health, but it can not be considered the fact that this index is the best indicator of this state, for it does not consider aspects related to the distribution of different components of the body composition.

With this in mind, more studies with a larger sample directed to the adequacy of the best and more efficient protocol are proposed in order to obtain and classify the body fat percentage and relate it to the nutritional state. The discussion about the types of activities proposed to the students inside and outside the school is also important for the fact that they can develop a higher lean body mass, influencing in the body weight and consequently in the BMI.

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BODY AND NUTRITIONAL COMPOSITION INDICATORS OF STUDENTS FROM INSTITUTE FEDERAL OF EDUCATION, SCIENCE IS TECHNOLOGY OF THE CEARÁ (IFCE), CAMPUS JUAZEIRO OF THE NORTH.

ABSTRACT

The objective of this study is to compare investigation methods of the nutritional state through the body mass index and the body fat percentage of senior high school students. It results from a transverse study in a sample of 60 people (19 male and 41 female) with average age around 16 years old, from IFCE Juazeiro do Norte, CE. All of them underwent the body composition analysis through the triceps and subscapular skinfolds equating body fat percentage (BFP) in Slaughter equation, body mass and height to the body mass index (BMI). A statistics program was used to the descriptive and inferential analysis in test “t” of student to independent data, with a level of significance of 5%. The results found to the male and female genre were: BMI 21,6+3,15 e 20,95+2,75 and BFP 19,2+9,4, with no significant differences, being larger to the girls (w=0,002). The classification of the nutritional state through BMI indicated 75% with regular weight, whilst the BFP showed only 48.3% with an adequate classification and 50% were overweight. In conclusion, there are high levels of BFP to the girls, the opposite being true to the BMI. However, other body components and eating habits should be investigated, because if BMI is used as the only evaluation criterion of the nutritional state it can not eventually turn to be a good indicator to physically active people.

KEYWORDS: young people, body fat percentage, body mass index.

INDICATEURS DEDE LA COMPOSITION CORPORELLE ET' NUTRITIONNELE CHEZ LES ETUDIANTS DE L'INSTITUT FEDERAL D'EDUCATION, SCIENCE ET TECHNOLOGIE DO CEARA (IFCE), CAMPUS JUAZEIRO DO NORTE

RÉSUMÉ

L'objectil de cette étude est de comparer les méthodes d'investigation de l'état nutritionnel à travers l'indice de masse corporelle et du pourcentage de grasses (%G) des écoliers de l'enseignement moyen. Elle provient d'une étude transversale, sur un échantillon de 60 sujets (19 hommes et 41 femmes) d'un age moyen de 16 ± 1,2 ans, venant de IFCE campus de Juazeiro do Norte, CE. Tous les sujets ont été soumis à l'analyse de composition corporelle (CC) à travers les plis cutanés du triceps (TR), sous-scapulaire (SE) par la mise en équation du pourcentage de graisse (%G) en équation de Slaughter (1988), de la masse corpórelle et stature en indice de masse corporelle (IMC). Il a été utilisé un programme statistique d'analyse descriptive et inférentielle pour les test "t" de student des données isoléss, avec niveau de signification de 5%. Les résultats obtenus pour les sexes masculines et féminin ont été IMC 21,6 ± 3,15 et 20,95 ± 2,75% et %G 19.2 ± 9.4, il n'a été noté différences significatives entre les sexes (p = 0,416) pour le IMC, toutefois le %G a présenté des différences significatives, principalement chez les adolescents (p = 0,002) ; la classification de l'état nutritionnel pour IMC été 75% avec un poids normal, alors que par rapport au %G à peine 48,3% G ont présents une classification correct et et 50% on t un %G supérieur à l'idéal. Nous concluons que pour le G% il y a une prédominance niveaux élevée pour les jeunes femmés, étant noté le contraire pour l'IMC. Cependant nous suggéré que d'autres aspects des composants et des habitudes alimentaires soient analysés, car l'IMC quand utilisé comme unique critère de l'état nutritionnel peut finir par être un bon bon indicateur pour les personnes actives physiquement.

MOTS-CLÉS: jeune, pourcentage de graisse, indice de masse corporelle.

INDICADORES DE LA COMPOSICIÓN CORPORAL Y ESTADO NUTRICIONAL DE LA ESCUELA DE INSTITUTO FEDERAL DE EDUCACIÓN, CIENCIA Y TECNOLOGÍA DEL CEARÁ (IFCE), CAMPUS JUAZEIRO DEL NORTE

RESUMEN

El objetivo del trabajo es comparar los métodos de investigación del estado nutricional por índice de masa corporal y porcentaje de grasa corporal (%G) de los estudiantes de la escuela secundaria. De ello se desprende de una cruzada estudio transversal en una muestra de 60 sujetos (19 varones y 41 mujeres) con edad media 16 ± 1,2 años, procedentes de IFCE campus de Juazeiro do Norte, CE. Todos los sujetos fueron sometidos a análisis de composición corporal (CC) a través del pliegue cutáneo del tríceps (TR), subescapular (SE) para equiparar el porcentaje de grasa (%G) en la ecuación de Slaughter (1988), el peso corporal y la altura para el índice de masa corporal (IMC). Se utilizó el programa estadístico de la prueba descriptiva e inferencial en la "t" de Student para datos independientes, con un nivel de significación del 5%. Los resultados para los hombres y las mujeres fueron: IMC 21,6 ± 3,15 et 20,95 ± 2,75% y %G, no da lugar a diferencias significativas entre sexos (p = 0,416) para el IMC, pero el %G, mostraron diferencias significativas, siendo mayor para las niñas (p = 0,002), la clasificación del estado nutricional por índice de masa corporal mostraron que el 75% del peso normal, mientras que en relación con %G sólo el 48,3 %, con una clasificación adecuada y el 50% están con el %G por encima del ideal. Se concluye que en relación con el G% es una alta prevalencia de las niñas, y viceversa para el IMC. Sin embargo, se sugiere que se están investigando otros aspectos de las partes del cuerpo y hábitos alimentarios, ya que el IMC es usado como el único criterio para evaluar el estado nutricional en última instancia, no puede ser un buen indicador para las personas físicamente activas.

PALABRAS CLAVE: jóvenes, porcentaje de grasa, índice de masa corporal.

INDICADORES DE COMPOSIÇÃO CORPORAL E ESTADO NUTRICIONAL DE ESCOLARES DO INSTITUTO FEDERAL DE EDUCAÇÃO, CIÊNCIA E TECNOLOGIA DO CEARÁ (IFCE), CAMPUS JUAZEIRO DO NORTE.

RESUMO

O objetivo do estudo é comparar os métodos de investigação do estado nutricional através do índice de Massa Corporal e do percentual de gordura (%G) de escolares do Ensino Médio. Decorre de um estudo transversal, em uma amostra de 60 sujeitos (19 masculino e 41 feminino), com média de idade 16+1,2 anos, oriundos do IFCE, campus Juazeiro do Norte, CE, Todos os sujeitos foram submetidos à análise da composição corporal (CC) através das dobras cutâneas de tríceps (TR) e subescapular (SE) para equacionando percentual de gordura (%G), em equação de Slaughter (1988), massa corporal e estatura para o índice de massa corporal (IMC). Utilizou-se programa estatístico para análise descritiva e inferencial, em teste “t” de Student para dados independentes, com nível de significância de 5%. Os resultados encontrados para o gênero masculino e feminino foram: IMC 21,6+3,15 e 20,95+2,75 e %G 19,2+9,4, não obtendo-se diferenças significativas entre gêneros (p=0,416) para o IMC, porém o %G, apresentou diferenças significativas, sendo maior para as moças (p=0,002); a classificação do estado nutricional pelo IMC indicou 75% com peso normal, enquanto que em relação ao %G apenas 48,3% apresentam-se com classificação adequada e 50% estão com o %G acima do ideal. Conclui-se que em relação ao %G há uma prevalência de níveis elevados para as meninas, sendo o contrário para o IMC. Entretanto, sugere-se que outros aspectos componentes corporais e de hábitos alimentares sejam investigados, pois o IMC se usado como único critério de avaliação do estado nutricional pode acabar por não ser um bom indicador para pessoas ativas fisicamente.

PALAVRAS CHAVES: jovens, percentual de gordura, índice de massa corporal.

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