80 - THE RELATIONSHIP BETWEEN THE WAIST CIRCUMFERENCE AND LEVEL OF FLEXIBILITY IN TEENAGERS FROM 14 TO 18 YEARS

MARCUS VINICIUS NASCIMENTO FERREIRA;
RAIMUNDO FERNADES SILVA;
DIEGO MORAES DE CARVALHO;
DAVID MARCOS EMÉRITO ARAÚJO;
Universidade Federal do Piauí, Teresina-Piauí- Brasil
marcus_nascimento_@hotmail.com

INTRODUCTION

The obesity juvenile grows rapidly around the globe. Throughout the ages , the habits of man , influenced by its current fast-paced lifestyle , the fast food , the stress of contemporary life, reduced energy expenditure with work activities (or leisure) among others , has put forth a situation of hiperadiposidade , or excess fat mass. As a result of excess body weight, teens may suffer effects of called metabolic syndrome (MORENO et al., 1998; SOAR et al., 2004; BENSIMHON, KRAUS AND DONAHUE, 2006).

The obesity this stage has some specific aspects of this population. Besides the sedentary lifestyle and intake of foods with high calorie, relate to obesity in adolescents the hours of use of television, video games and computers (MISRA AND Kurana , 2008) , driven by a lack of safe places for recreation , shortly that parents have for family interaction , physical inactivity and exposure to the world of advertising consumerist (MILLER and SILVERSTEIN ROSEMBLOOM , 2004) .

However, studies have suggested that the deposition of fat is more important than quantity (VASCONCELOS et al. 2,008; PINTO etal. 2,010; BERGMANN et al. 2010). Excess body fat located in the abdominal region has higher rates of lipolysis and constitutes a risk factor more important than the actual general obesity (FERNANDES et al., 2009; PINTO et al., 2010). Probably, the increase in lipolysis can be one of the factors associated central adiposity to cardiovascular diseases and their risk factors (VASCONCELOS et al., 2008; PINTO et al., 2010 BERGMANN et al., 2010).

There is evidence that individuals with central adiposity in the body are more likely to develop cardiovascular diseases and their risk factors, and that these diseases begin in childhood and adolescence (BERGMANN et al., 2010) and may last throughout life, it is essential to elucidate and address the issue of obesity (central) as soon as possible.

In addition to the metabolic effects, obesity can reduce the functional capacity in thispopulation. It is known that excessive central fat in addition to being a risk factor for several diseases affect physical performance because it limits the movements and leads to early fatigue due to overload that imposes the organization (ACSM, 2000). This scope has the flexibility, physical abilities negatively impacted by excess body mass, and what may be negatively influenced also by central obesity. Adolescents, specifically, the flexibility decreases until puberty and increases during adolescence, reaching a plateau and then decrease again (ALTER, 1999; GUEDES and GUEDES, 1997). Varies by gender, with girls generally have a greater capacity to articulate (LAMARI, CHUEIRE and LAMB, 2005; SECKIN et al., 2005).

Studies of differences in flexibility between individuals have taken into consideration some influencing factors such as anthropometric measurements (Grant et al . , 2001) , body composition (GUEDES And Guedes , 1997), genetics (GRAHAME , 2001), culture (GUEDES and GUEDES, 1997) and diseases (MAK and TSANG , 2004). The commitment of flexibility can cause serious health problems, such as postural changes, muscle pain, breathing difficulties, decreased motor skills in daily, among others (TSANG AND MAK , 2004; PERGHER et al., 2010). Therefore, it is necessary to understand the factors that can influence and / or accelerate the reduction of flexibility and try to hold them, and thus improve the quality of life of the individual.

These years, disturbances triggered by inactivity (and obesity) are responsible for direct and indirect expenditures on public health around 1.5 billion dollars per year for the treatment of various diseases such as diabetes and hypertension (ANGELS, 2006). The inactivity, as well as causing the loss of flexibility (BODAS et al. 2006), develop, among other things; increase the body measures and obesity. The reduction of flexibility when it occurs has associated with muscle damage and biomechanical changes that lead to, for example, femoropatellar dysfunction, pubalgia, back pain and tendinitis (Barlow et al., 2004).

Based on this information, this study aimed to identify the influence of central obesity , measured by waist circumference (WC), the posterior muscular chain flexibility of the back and lower limbs through their evaluation by testing sit-and-reach (TSR) in adolescents in Imperatriz , Maranhão , Brazil . The lack of study of this nature and this target audience, reinforces the need for further scientific activities within the waist circumference levels of flexibility in adolescents.

METODOLOGY

This study has a cross-sectional descriptive-analytical. The population of the study consists of adolescents of both sexes, aged 14 to 18, students from a public school in the city of Imperatriz (Maranhão), selected by availability. Once clarified the purpose of the study, the school provided consent and support for the identification of eligible students, according to the research objectives. All students received and returned signed by the heads of the two routes Term of Free and Informed Consent Form (ICF).

Data were collected during school hours, on school grounds and with prior appointment, combined with the school board. Selected for thestudywere 118 students, volunteers. Studentsunderwentananthropometricassessmentofweight and height for thesamplecharacterization, waistcircumference and flexibility.A massa corporal foi mensurada com o avaliado de pé, de costas para a escala da balança, sobre e no centro da plataforma, ereto com olhar num ponto fixo á sua frente (FERNANDES FILHO, 1999; PROESP-BR, 2009; CHRISTOFARO et al., 2009;BUONANI et al., 2011).

At the height measurement the individual remained in the upright position (PO): a person standing upright, arms at your sides, feet together, trying to touch the instrument to measure the posterior surface of the heel, pelvic girdle, scapular and occiput. The measurement was made with rated at maximum inspiratory apnea, to minimize possible variations in results and the head oriented according to the Frankfurt plane, parallel to the ground (FERNANDES FILHO, 1999; PROESP-BR, 2009). The measurement was measured using a cursor at a 90 ° angle relative to the scale. In this study was used to measure weight and height, scale Soehnle Professional 7755, precisely 100 grams, with meter height built Asimed , with a minimum height of 95 centimeters (cm). The equipment has a maximum capacity of 200 kg for body weight and 230 cm for height. For body mass index was calculated : body mass divided by height (kg/m2).

The waist circumference (WC) was assessed by measuring tape , applied to the average distance between the lower

edge of the ribcage and the top of the iliac crest , parallel to the floor , with the subject standing , with the abdomen relaxed , arms along the body and legs together. The outcome was assessed at the end of expiration and was considered a tolerance of 1 cm (FERNÁNDEZ et al., 2004; BERGMANN et al., 2010; BUONANI et at., 2011; POET et al. , 2012; NETO et al., 2012), measurements were taken in duplicate and the average of the values adopted as a result of the evaluation. For measuring instrument used was the tape metric, T-87, Wiso, 2 cm wide and 200 cm long. The reference values for waist circumference were Fernandez et al. (2004).

Flexibility was measured using the sit-and-reach test (SRT) without the Bank Wells (PROESP-BR, 2007). For this test, a tape measure was extended in soil, 38.1 cm mark this tape was placed a tape of 45 cm perpendicular to the tape. The assessed subject sat with the zero end of the tape measure in between the legs, heels on the tape (perpendicular) in mark of 38.1 cm and about 30 cm apart. With extended knees and hands overlapping, the appraised leaned slowly and held his hands forward as far as possible. The result was measured in centimeters from the farthest position reached on the scale, with the fingertips. The reference values were used for flexibility (DESIGN SPORT BRAZIL, 2007).

For data analysis, descriptive statistics were used to mean (standard deviation) and frequency. The inferential statistics were performed using the relationship between waist circumference and flexibility made by testing linear correlation, with a level of confidence $p < 0.05$ and confidence interval of 95%. The results are presented in tables and graphs. The study data were analyzed using SPSS, version 17.0.

RESULTS

Table 1 shows the characterization of the sample. Are 118 teenagers, aged between 14 and 18 years, and of this total, 53 (fifty three) males and 65 (sixty five) females, with a mean age of 16.05 (± 1.04) years. Anthropometric data were observed average height of 1.63 (± 0.09) m, mean weight of 55.78 (± 10.68) kg and WC of 72.33 (± 8.44) cm. While, the mean BMI of the sample was 20.84 (± 2.96) kg/m2, the WC was 72.33 (± 8.44) and TSR 33.42 (± 10.48) cm.

Table 1.General characteristics of the sample.

GENERAL			
Characteristics	**Average**	**±**	**N**
Age (years)	16,05	1,04	118
Weight (kg)	55,78	10,68	118
Height (m)	1,63	0,09	118
BMI (kg/m^2)	20,84	2,96	118
TSR (cm)	33,42	10,48	118
WC (cm)	72,33	8,44	118

Figures 1 and 2 show the distribution of subjects according to levels of flexibility (PROESP-BR, 2007), achieved the TSR. In Figure 1, are the subject of female students in flexibility: Very Good (10.77%), good (15.38%), Average (36.92%), Low (13.85%) and very Low (23.08%). As shown in Figure 2 are the male subjects, distributed in flexibility: Very Good (30.19%), good (16.98%), Average (20.75%), Low (15.09%) and Very weak (16.98%).

Figure 1.Distribution of female subjects, according to the levels of flexibility (PROESP BR-2007).



Female, number of subjetcs, very weak, weak, regular, good, very good, Flexibility level.

Figure 2.Distribution of male subjects, according to the levels of flexibility(PROESP-BR, 2007).



In Figures 3 and 4 are characterizations waist circumference corresponding to percentiles (90 °, 75 °, 50 °) of the data Fernandez (2004). In Figure 3, there are the female subjects divided into levels circumference: fine (78.46%), moderately high (18.46%), high (0.00%) and very high (3.08% .) In Figure 4, are identified male subjects according to the level of waist circumference: fine (64.15%), moderately high (24.53%), high (9.43%) and very high (1 , 89%). It is noteworthy that the individuals classified in high and very high levels are in the 75 and 90 percentiles, respectively, with values of WC highly related

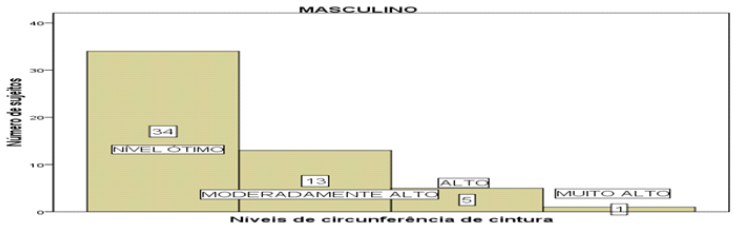
comorbidities in adulthood (Fernández, 2004).

Figure 3.Distribution of female subjects, depending on the values of waist circumference (Fernandez, 2004).



Female, number of subjects, High level, moderate level, high, very high, levels of waist circumference.

Figure 4.Distribution of female subjects, depending on the values of waist circumferenc (Fernandez, 2004).



The values of the correlation between WC and TSR were presented in Table 2, obtained by testing partial correlation coefficient (r) applied to both genders, age was considered a continuous variable, to eliminate the influence of maturational effect, the findings were contrasted with references Dancey and Reidy (2006) to classify the strength of the observed correlations. The correlation between WC (95% CI = 70.8 to 73.9) and TSR (95% CI = 31.5 to 33.5) was characterized as weak negative for males and weak positive for females, both correlations were not statistically significant. Among girls, it was observed between WC and TSR r = 0.015, as for boys was between WC and TSR r = -0.132.

Table 2.Results of correlation tests between variables toilet and TSR.

	TSR (cm)	
	Male (n=53)	**Female (n=65)**
WC (cm)	r= -0,132	r=0,015

DISCUSSION

In this study, the majority of subjects had posterior muscular chain flexibility of the back and lower limbs ranging from reasonable to very good. The evaluation of the TSR also indicated that although most students achieve satisfactory values , a considerable portion of students scored below average, with 36.93 % of girls and 32.07 % boys flexibly from weak to very weak or is, a third of students meets with poor flexibility. The results corroborate Gloria (2011), who in his research found similarities between the level of flexibility of boys and girls, where subjects from 13 to 16 years of age had lost levels, but the boys managed a slight edge over the girls. Nevertheless , there may be a variation in the comparison of test results from sitting achieve, since the execution speed can influence the outcome , as well as the fact that the studies were done with or without the use of bank Wells (LAMARI, 2007), adding another intervening variable analysis of the results. Recent studies indicate that the flexibility it needs to be crafted from childhood, from adolescence because it tends to regress, which can compromise their physical valence in adulthood, so it is important the work of stretching (and flexibility training) in schools, according to age. (TSANG AND MAK, 2004; WEDDING et al., 2006; PERGHER et al., 2010).

In a similar survey (in São Paulo) conducted with 137 individuals of both sexes with a mean age of 10.2 and 14.3 years, found that in females the mean waist circumference was 75.3 and in males the average was 78.5 cm (FERNANDES et al., 2007), in this study the overall average waist circumference was 72.33 (± 8.44) cm, indicating lower values in this sample , which can be caused by several factors factors such as sociodemographic, physical activity level, dietary habits etc. (GIUGLIANO, 2004).

The findings of this study demonstrate that the ratio of the values of waist circumference in the performance of the sit and reach test was not statistically significant, because the correlation between WC (95% CI = 70.8 to 73.9) and TSR (IC 95 = 31.5 to 33.5 %) was characterized as weak negative for males and weak positive for females . Among girls , it was observed between WC and TSR r = 0.015 , while for boys it was found between WC and TSR r = -0.132 , which according to the Pearson correlation coefficient , both were considered low correlation , explaining so there is no direct relationship between waist circumference and the level of flexibility in this sample , as seen in a recent study (PEACE et al., 2012). The analysis of flexibility should be taken broadly. We suggest that the possible variables influencing the flexibility , such as age , sex, maturational development , WC , level of physical activity , physical activity patterns (routine movements) , BMI , among others , may be observed simultaneously in an attempt to elucidate the problem. Considering that the observances segmented (GIUGLIANO , 2004; MELO , OLIVEIRA and ALMEIDA , 2009; PEACE et al., 2012) are failing to address the complexity of the object of study. This study has limitations that need to be considered: there was a predominance of students with optimal level that waist circumference , which may have hampered the range of values in the sample (in this variable) and perhaps a larger sample could have given greater significance to association of variables .

CONCLUSION

In summary, it was observed that the values of WC showed a weak correlation with flexibility, ie only a few subjects in the sample were determined greatest values of supporting toilet with reduced flexibility. It is speculated that the toilet is not sufficient to promote changes in flexibility, however having to measure waist circumference reduced did not improve flexibility. It was evident that having toilet did not correspond with high values in the sample, the damage to the flexibility, inducing the interpretation that the flexibility in these subjects was not affected by varying anthropometric study, but should take into account that the show did not have values Toilet significant high, which can partly explain the results.

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THE RELATIONSHIP BETWEEN THE WAIST CIRCUMFERENCE AND LEVEL OF FLEXIBILITY IN TEENAGERS FROM 14 TO 18 YEARS

ABSTRACT

The research set as a cross-sectional descriptive- analytic in the city of Imperatriz (Maranhão). This study involved a sample of 118 adolescents aged 14-18 years in order to identify the influence of overweight and central obesity levels of flexibility in adolescents . According to the data, body mass index (BMI) of the sample was 20.84 (± 2.96) kg/m2 , a waist circumference (WC) of 72.33 (± 8.44) and test sit and Reach (TSR) of 33.42 (± 10.48) cm . Assessing the levels of flexibility , we found that most teenagers fits the classification of " reasonable " 34 (28.8 %) subjects , while 24 (20.3%) subjects in the classification " good " and others 22 (18.7%) in the classification "very weak " , although 19 (16.1%) are in the classification of " weak " and other 19 (16.1%) were classified as " good" . The female subjects divided into levels of waist circumference : fine (78.46 %) , moderately high (18.46 %) , high (0.00 %) and very high (3.08 %), The subjects males according to the levels of waist circumference : fine (64.15%) , moderately high (24.53 %) , high (9.43 %) and very high (1.89 %) . The results of this study suggest that the values of waist circumference showed a weak correlation with the flexibility ,ie , high or low values in circumference showed no relationship with the flexibility , so this sample , the flexibility of teenagers was not affected by the variation the WC .

KEYWORDS: Waist Circunference, Flexibility, Teenagers.

LA RELATION ENTRE LE TOUR DE TAILLE ET LE NIVEAU DE FLEXIBILITÉ DANS LES ADOLESCENTS DE 14 À 18 ANS.

RÉSUMÉ

Cette présente recherche apparaît comme une étude transversale descriptive -analytique dans la ville de Imperatriz (Maranhão) . Cette étude a compté sur un échantillon de 118 adolescents âgés de 14-18 ans afin de déterminer l'influence des niveaux d' embonpoint et d'obésité centrale de flexibilité dans les adolescents. Selon les données , l'indice de masse corporelle (IMC) de l'échantillon a eu de 20,84 (± 2,96) kg/m2 , un tour de taille (WC) de 72,33 (± 8,44) et le test de s'asseoir et atteindre(TAA) de 33,42 (± 10,48) cm. Dans l'évaluation des niveaux de flexibilité , nous avons identifié que la plupart des adolescents correspond à la classification de " raisonnable "34 (28,8%) des sujets , tandis que 24 (20,3 %) dans le classement «bons» et les autres 22 (18,7%) dans la classification «très faible» , bien que 19 (16,1 %) sont dans le classement des «faible» et 19 autres (16,1%) ont été classés comme «bonne» .Les sujets féminins répartis en niveaux de tour de taille : (78,46 %), modérément élevés (18,46%) , élevé (0,00%) et très élevé (3,08%) , les sujets hommes selon les niveaux de tour de taille : FINE (64,15 %), modérément élevés (24,53%) , élevé (9,43%) et très élevé (1,89%) . Les résultats de cette étude suggèrent que les valeurs du tour de taille ont montré une faible corrélation avec la flexibilité , c'est à dire , des valeurs élevées ou basses de circonférence n'ont montré aucune relation avec la flexibilité , de sorte que cet échantillon , la flexibilité des adolescents n'a pas été affectée par la variation le CC .

MOTS-CLÉS: Tour De Taille, Flexibilité, Adolescents.

LA RELACIÓN ENTRE LA CIRCUNFERENCIA DE LA CINTURA Y LOS NIVELES DE FLEXIBILIDAD EN ADOLESCENES ENTRE 14 y 18 AÑOS

RESUMEN

La presente investigación, se configura como un estúdio transversal descriptivo analítico, realizada enlaciudad de Imperatríz (Maranhão). Este estúdio contócon uma muestra de 118 adolescentes entre 14 y 18 años de edad, com el objetivo de identificar la influencia delexceso de peso corporal y de obesidade central enlos niveles de flexibilidaden adolescentes. Segúnlosdatos, el índice de masa corporal (IMC) médio de lamuestra, fue de 20,84 (+-2,96) kg/m². La circunferencia de cintura (CC) de 72,33 (+-8,44) y eltest de Sentar y Alcanzar (TSA) de 33,42 (+-10,48) centímetros. Enlaavaluación de los niveles de flexibilidad, se identificó que lamayoría de los adolescentes se encuadranenlaclasificación de “razonable”: 34 sujetos (28,8%), mientras 24 sujetos (20,3%) enlaclasificación “muybuena”. Otros 22 (18,7%) se clasifican como “muy pobre”, y otros 19 (16,1%) estanenlaclasificación “buenos”. Los sujetosdel sexo feminino, subdivididos en niveles de circunferencia de cintura, el 78,46%: optimo, el 18,46%: moderadamente alto, 0,00%: alto y muy alto el 3,08%. Los sujetosdel sexo masculino enfunción de los niveles de lacircunferencia de cintura, el 64,15% optimo, el 24,53% moderadamente alto, el 9,43% alto, y muy alto el 1,89%. Los resultados de este estudio, sugieren que los valores de circunferencia de cintura presentaronunapobrecorrelaciónconla flexibilidade, o sea, valores altos o bajos de circunferência no presentaronrelacióndirecta com laflexlibilidad. Después, e esta muestra, la flexibilidade de los adolescentes no fueafectada por lasvariaciones de la CC.

PALABRAS CLAVE: Circunferencia de la cintura, Flexibilidad, Adolescentes

A RELAÇÃO ENTRE A CIRCUNFERÊNCIA DE CINTURA E NÍVEIS DE FLEXIBILIDADE EM ADOLESCENTES DE 14 A 18 ANOS

RESUMO

A presente pesquisa configura-se como um estudo transversal descritivo-analítico realizado na cidade de Imperatriz (Maranhão). Este estudo contou com uma amostra de 118 adolescentes entre 14 a 18 anos, com objetivo de identificar a influencia do excesso de peso e da obesidade central nos níveis de flexibilidade em adolescentes. Segundo os dados, o Índice

de massa corporal (IMC) médio da amostra foi de 20,84 (±2,96) kg/m2, a Circunferência de cintura (CC) de 72,33 (± 8,44) e o teste de Sentar e Alcançar (TSA) de 33,42 (± 10,48) centímetros. Na avaliação dos níveis de flexibilidade, identificou-se que a maioria dos adolescentes enquadra-se na classificação de “razoável” 34 (28,8%) sujeitos, enquanto 24 (20,3%) sujeitos na classificação “muito bom” e outros 22(18,7%) na classificação “muito fraca”, ainda 19 (16,1%) estão na classificação de “fraca” e outros 19 (16,1%) foram classificados como “bom”. Os sujeitos do sexo feminino subdivididos em níveis de circunferência de cintura:ótimo (78,46%), moderadamente alto (18,46%), alto (0,00%) e muito alto (3,08%); Os sujeitos do sexo masculino em função dos níveis da circunferência de cintura: ótimo (64,15%), moderadamente alto (24,53%), alto (9,43%) e muito alto (1,89%). Os resultados desse estudo sugerem que os valores de circunferência de cintura apresentaram fraca correlação com a flexibilidade, ou seja, valores altos ou baixos de circunferência não apresentaram relação direta com a flexibilidade, logo, nesta amostra, a flexibilidade dos adolescentes não foiafetada pela variação da CC.

PALAVRAS-CHAVE: Circunferência de Cintura, Flexibilidade, Adolescentes