37 - THE RELATIONSHIP OF BODY COMPOSITION AND THE INTENSITY OF PHYSICAL ACTIVITY OF PREPUSCENT CHILDREN

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INTRODUCTION

The physical activity has been recognizing as an important component of a healthy life stile (LARSEN et al, 2000). The practice of this habit during the childhood years might reflect in a reduced risk for health related diseases. Blair et al (1989) suggested a relationship between the practice of physical activity during childhood and its continuity in adulthood. The pre-pubertal period can be considered a critic moment for the formation of healthy physical activity habits. During this phase, the adoption of a stability of routine generated by the participation in the school and the after-school physical activities may cause changes in the eating habits and movement behavior of children (BALL et al, 2001).

Physical inactivity has been demonstrated as being an important factor to the development of children overweight and obesity. In study carried out with 17766 adolescents, Larsen et al, (2000) verified that the practice of moderate physical activity is more associated with stimulation by daily specific environment factors where as the physical inactivity with cultural social demographic factors. Goran (2001) identified the trend of a 0,2 kg/year increase in body mass of children with the same age from 1973 to 1994. The gain in body mass may be related to the reduction of the levels of daily physical activity during growth, thus extending the health risks from the excessive gain in body fat (JOHNSON et al, 2000; ROEMMICH et al, 2000).

Due to the tendency of young children to reduce their daily activity level and consequently raise their levels of adiposity tissues, the American College Sports and Medicine in 1988 suggested guidelines for a more healthy life stile: all young children should be more physically active incorporating this habit to their lives, exercising at least three times or more per week with moderate/high intensity, during 30 minutes or more per day.

The project “Health People 2010” add to this recommendation that the activities should be a facilitator to promote strength, muscle flexibility, and bony structure. Many studies suggest that moderate physical activity promote convincing profits for the cardiovascular conditioning (GUERRA et al, 2001; TWISK, 2001).

Based on the benefits that physical activity may bring to a children health and the considerable changes in lifestyle of children living in large urbane centers, the question of how would be the distribution of the intensity of daily physical activity and its relationship to the body composition of male and female school children of Curitiba/PR, Brazil is still unclear? Therefore, the main objective of this study was to analyze the relationship of the school period with the body composition and the intensity of physical activity of male and female pre-pubescent school children of Curitiba/PR, Brazil.

METHODS

Subjects

Subjects were 103 children randomly selected from private schools of Curitiba/PR, Brazil (55 males and 48 females, aged 7 and 8 years).

Instruments and procedures

To measure the total body mass a “filizola” scale with precision of 100 grams was used, and for height a flexible metric ribbon placed on the wall with scale of 0.1. The body mass index was calculated by the following formula: BMI = (body mass) / (height)^2.

The instrument used to diagnosis the amount of body fat was the CESCORF caliper. Seven skin folds were measured (sub-scapular, triceps, biceps, midaxial, iliac crest, abdominal and medial calf) and the sum of Skin folds calculated in mm.

To measure the daily habitual physical activity the recordation of daily energy expenditure developed for Bouchard et al. (1983) was used during three days of the week: Monday; Tuesday; Saturday. Daily activities of the children were registered in each 15 minutes, being possible to know the level of habitual physical activity through a scale that varies from 1 to 9.

The intensity distribution of the physical activities was separated in three components. Physical inactivity: scale values 1 and 2 (1 MET to 1.5 METS) corresponding to lying or sleeping and seated, like the hours spent in the school classroom, and also the daily activities of leisure as television, computer or video games. Light activity: scale values 3 4 5 (1.6 METS to 3.4 METS), these activities are characterize by low movements like personal hygiene, light domestic work, gardening, drive a car and others. Moderate/high intensity: scale values 6 to 9 (above 3.5 METS) were considered sports training, carpentry, painting, bricklayer, high loads professions.

Statistical Analyses

This is considered an ex-post-fact descriptive study. ANOVA´s two-way were calculated to verify any sex and school period differences. Pearson Moment Correlation was performed to verify the relationship between the dependent measures. The alpha level was stipulated in 0,05.

RESULTS AND DISCUSSION

In table 1 are presented the means and standard deviation for decimal age, body mass and height as a function of sex and school period. The data suggests a similarity between the groups. This result was expected, because the sample consisted of 7 and 8 years old pre-pubescent children. The literature indicates that in this age period male and female children show similar physical growth (MATSUDO & MATSUDO, 1995).

Table 1: Means and standard deviation for Age, Body Mass and Height as a function of sex and school period

	Sex		School Period	
	Male (55)	**Female (48)**	**Morning (38)**	**Afternoon (65)**
Age	8,11± 0,40	8,19 ± 0,41	8,32 ± 0,39	8,08 ± 0,39
Body Mass (kg)	29,54 ± 5,37	29,02 ± 6,44	29,53 ± 5,03	29,13 ± 6,30
Height (cm)	130,81 ± 6,04	129,75 ± 6,98	130,34 ± 6,42	130,30 ± 6,56

The results of the analysis of variance indicated significant sex difference for light physical activity F= 5,89 (1,97), p = 0,01, and for moderate/high physical activity F= 5,87 (1,97), p= 0,01. The interaction and school period did not show

statistical significance. In table 2, means and standard deviation of BMI, sum of skin folds, distribution of the levels of physical activity are presented.

Table 2: Means and standard deviation for BMI, Sum of skin folds and Intensity of physical activity as a function of sex and school period

	Sex		School Period	
	Male	**Female**	**Morning**	**Afternoon**
BMI (kg/m^2)	17,18 ± 2,31	17,03 ± 2,39	17,29 ± 1,92	17,00 ± 2,57
Σ 7 Skin folds (mm)	67,81 ± 36,17	77,42 ± 36,24	78,75 ± 36,51	68,50 ± 37,09
Inactivity	1152,90± 72,26	1143,95± 66,07	1140,39± 67,22	1153,61± 70,47
Light	186,18± 71,12*	215,10 ± 63,42	205,26 ± 70,25	196,38 ± 68,37
Moderate/ High	100,90± 51,22*	80,31 ± 39,36	94,07 ± 47,47	89,69 ± 47,02

Comparing the results of BMI of this sample with the study of COLE (2000), that included six countries (Brazil, Grain-Britain, Hong Kong, Holland, Singapore and United States), children are below the cut point stipulated for overweight and obesity.

Despite the boys presenting sum of skin folds 12,41% less than girls, these values did not show statistical significance differences. In the same way, the sum of skin folds was 13% greater in the children studying in the morning period, however these values were also not significant.

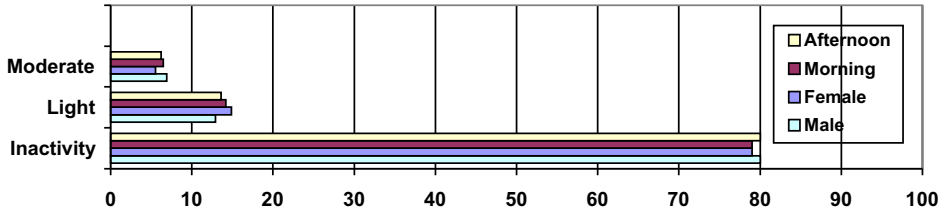
The results for the intensity of physical activity as a function of sex and school period are represented in graphic 1. Children remain about 79% of the day in physical inactivity, independent of sex and school period. Watching television, playing video game and computer corresponds to approximately 226 85 minutes of the day. These results are similar to the findings of Vermorel et al (2002), in a study conducted with French adolescents between 12 and 16 years. Gavarry et al (2003) also verified that even the weekend the children adopts an inactive live style.

The light activities represent about 14% of the children daily activities, where the girls tend to adopt this intensity with more frequency.

The children, independent of sex and the school period expended around 7% of the day in moderate/intense physical activities, although the boys are apparently more active at this level. This result was found in many other studies, guiding us to believe that male children apparently adopt with more frequency this kind of activities (JANZ et al., 2002; BALL et al, 2001; EISENMANN et al, 2003).

For both, sex and school periods, the children from this sample demonstrate to reach the recommendation of the ACSM (1988), to practice moderate/high physical activities from 30 (thirty) minutes/day. These finding supports the Blair (1992) study where children are generally more active than adults.

Graphic1 - Distribution in percentage of the intensity of physical activity as function of sex and school period



The results of the Pearson Moment Correlations are presented in Tables 3 and 4.

Table 3. Correlations between BMI, sum of skin folds and the intensities of the physical activity of male and female children

	Male		**Female**	
	BMI	Σ of Skinfolds	BMI	Σ of Skinfolds
Inactivity	(r = 0,20)	(r = 0,21)	(r = 0,15)	(r = 0,19)
Light	(r = - 0,05)	(r = 0,003)	(r = 0,12)	(r = 0,16)
Moderate/ High	(r = - 0,21)	(r = - 0,30)*	(r = 0,03)	(r = 0,57)

Table 4. Correlations between BMI, sum of skin folds the intensities of the physical activity of children in the morning and the afternoon school period

	School Period			
	Morning		**Afternoon**	
	BMI	Σ 7 Skin folds	BMI	Σ 7 Skin folds
Inactivity	(r = 0,09)	(r = 0,13)	(r = 0,11)	(r = 0,12)
Light	(r = -0,02)	(r = 0,12)	(r = 0,03)	(r = 0,07)
Moderate/ High	(r = 0,16)	(r = - 0,005)	(r = -0,22)	(r = - 0,29)*

The results indicated significant relationships only between the sum of skin folds with moderate/high activity for the boys at the afternoon period, indicating that more time children spent in this intensity smaller will be the values for the sum of skin folds. Similar results had been found in other studies (BALL et al, 2001; MOORE et al, 2003). The study of Janz et al. (2002) showed that for girls this association is more significant with fat free mass than with the adiposities index used in this study.

CONCLUSION

We observed that for this sample the children had reached the recommendations of the ACSM (1988) for practice of moderate/intense physical activities of 30 (thirty) minutes/day. The result also supports previous studies where boys are more active them girls (JANZ et al., 2002; BALL et al, 2001; MOORE et al, 2003).

The results appoint the necessity for children to carry out moderate/high activities to prevent the development of overweight and obesity.

Another interesting finding was that the girls tend to adopt more light activities than the boys, perhaps because the

girls are not receiving stimulations enough to engage themselves in more intensity activities. Other factors, such as the social-cultural interests can be affecting the type of activity selected by girls. New longitudinal research is necessary to test this and others hypothesis.

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THE RELATIONSHIP OF BODY COMPOSITION AND THE INTENSITY OF PHYSICAL ACTIVITY OF PREPUSCENT CHILDREN

ABSTRACT

Objective: Identify the relationship of school period with the body composition and the intensity of physical activity of prepubescent male and female children. **Methods:** For the study, were randomly selected 55 boys and 48 girls, age 7 to 8 years old. Anthropometrics measurements: BMI and sum of 7 skin folds. For the intensity of physical activity the children were divided in three groups according to Bouchard (1983). The physical inactivity corresponding to the values of 1 and 2 (1 to 1,5 METs); light activity 3 4 - 5 (1,6 to 3,4 METs), moderate/high activities 6 to 9 (above 3,5 METs). For data analyses, ANOVA´s two-way and Pearson moment correlations were used, with p<0,05. **Results:** Analyzes of variance showed significant sex differences in light activity, F= 5,89 (1,97), p=0,017 (Boys: 186,18 71,12; girls: 215,10 63,42), and for moderate/high activity F= 5,87 (1,97), p=0,017 (Boys: 100,90 51,22; girls: 80,31 39,36). For boys (r= 0,30) and children attending the afternoon school period (r= - 0,29) the correlation showed significance with the sum of skin folds. **Conclusion:** the results showed that girls tend to do more light activity and boys to be engaged in moderate/high activity, what might be related to less percentage o body fat. To do activities with moderate/high intensity may be a way to prevent children development of overweight and obesity.

Key-words: Children, physical activity and body composition.

LA RELATION D'INSTRUIT LA COMPOSITION DE CORPS ET L'INTENSITÉ D'ACTIVITÉ DE ENFANTS PREPUSCENT

RESUME

Objectice: Identifier la relation de période d'école avec la composition de corps et l'intensité d'activité physique de mâle et femelle prépubère. **Les méthodes:** Pour l'étude, étaient au hasard a choisi 55 garçons et 48 filles, l'âge 7 à 8 années vieilles. Les mesures de Anthropometrics: BMI et la somme de 7 plis de peau. Pour l'intensité d'activité physique que les enfants ont été divisés dans trois groupes selon Bouchard (1893). L'inactivité physique correspondant aux valeurs de 1 et 2 (1 MET à 1.5 MET) ; 3-4-5 d'activité léger (1.6 MET à 3.4 MET), modérer/les hautes activités 6 à 9 (au-dessus de 3.5 MET). Pour les données analyse ANOVA deux façon et les corrélations de moment de Pearson ont été utilisés, avec p, 0.05. **Les résultats:** Analyse de variance différences de sexe significatives montrées dans l'activité légère, F = 5,89 (1,97), p = 0.017 (les garçons : 186.18 ± 71,12 ; les filles: 215,10 ± 63,42), et pour modéré/l'haute activité F= 5,87 (1,97), p=0,017 (les garçons : 100,90 ± 51,22 ; les filles : 80,31 ± 39,36). Pour les garçons (r=0,30) et les enfants assistant la période d'école d'après-midi de th (r = - 0.29) la corrélation a montré la signification avec la somme de plis de peau. **La conclusion:** Les résultats ont montré que les filles ont tendance à faire plus pour allumer l'activité et les garçons être engagés dans modéré/l'haute activité d'intensité, ce que pourrait être relatée à moins de pourcentage de tissu adipeux. Pour faire activies avec modéré/l'haute intensité peut être une façon pour empêcher du développement d'enfants d'obésité et d'obésité.

Les mots clés: Les enfants, l'activité physiques et la composition de corps

LA RELACIÓN DE LA COMPOSICIÓN CORPORAL Y LA DISTRIBUCIÓN DE LA ACTIVIDAD FÍSICA DE LOS NIÑOS E NIÑAS PRE-PÚBER

RESUMEN

Objetivo: Identificar la relación el período escolar con la composición corporal y la distribución de la actividad física de los niños e niñas pre-púber. Métodos: Fueron seleccionados 55 niños del sexo masculino y 48 del sexo femenino entre 7 y 8 años. Medidas antropométricas: IMC y la suma de 7 pliegues cutáneos. Para la distribución de la intensidad de las actividades fueron separadas en tres fajas la escala descrita por Bouchard (1983). Inactividad física correspondiendo a los valores de la escala 1 y 2 (1 a 1,5 METS), actividad leve 3 - 4 - 5 (1,6 a 3,4 METS), intensidad moderada / intensa 6 a 9 (por encima de 3,5 METS). Para el análisis de los resultados fue utilizados ANOVA two way y la correlación de Pearson, con nivel alpha estipulado en p< 0,05 Resultados: Análisis de la varianza presentaron significativo diferencias entre los sexos y actividades leves, F= 5,89 (1,97), p= 0,017 (niños: 186,18 71,12, niñas: 215,10 63,42) y con actividades moderadas / intensas F= 5,87 (1,97), p= 0,017 (niños: 100,90 51,22*, niñas: 80,31 39,36), los niños (r=0,30) y el período de la tarde(r= - 0,29) presentó correlación con la suma de los pliegues. Conclusión: los resultados apuntan que las niñas tienden a realizar actividades leves y los niños las de cuño moderado / intenso, demostrando que a través de una menor adquisición de tejido adiposo en esta fase. Realizar actividades moderada / intensa puede venir a ser la prevención del desenvolvimiento de la obesidad infantil.

Palabras claves: Escolares, actividad física e composición corporal.

RELAÇÃO ENTRE A COMPOSIÇÃO CORPORAL E A INTENSIDADE DE ATIVIDADE FÍSICA DE CRIANÇAS PRÉ-PÚBERES

RESUMO

Objetivo: Identificar a relação do turno escolar com a composição corporal e distribuição da intensidade das atividades física de crianças pré-púberes. **Métodos:** Foram selecionadas 55 crianças do sexo masculino e 48 do sexo feminino entre 7 e 8 anos. Medidas antropométricas: IMC e somatória de 7 dobras cutâneas. Para a distribuição quanto à intensidade das atividades foram separadas em três faixas a escala descrita por Bouchard (1983). Inatividade física correspondendo aos valores da escala 1 e 2 (1 a 1,5 METS), atividade leve 3 4 5 (1,6 a 3,4 METS), intensidade moderada/intensa 6 a 9 (acima 3,5 METS). Para análise dos dados, análise de variância (two way) e a correlação de Pearson, com nível alfa estipulado em p<0,05. **Resultados:** A análise de variância indicou diferença significativa somente para o sexo na atividade leve F= 5,89 (1,97), p=0,017, (meninos: 186,18 71,12; meninas: 215,10 63,42) e para a atividade moderada F= 5,87 (1,97), p=0,017 (meninos: 100,90 51,22; meninas 80,31 39,36). Os meninos (r=0,30) e o turno da tarde (r= - 29) apresentaram correlação com o somatório de dobras. **Conclusão:** os resultados apontam que as meninas tendem a realizar atividades leves e os meninos as de cunho moderado/intensa, o que possivelmente pode estar relacionado com uma menor aquisição de tecido adiposo. Praticar atividades moderadas/intensas pode vir a prevenir o desenvolvimento do sobrepeso e da obesidade na infância.

Palavras-chaves: Escolares, atividade física e composição corporal.