# 36 - BODY MASS INDEX AND THE PHYSICAL FITNESS OF PRIVATE SCHOOL STUDENTS IN SANTOS-SP

DILMAR PINTO GUEDES JÚNIOR[1-2]
DANIELE TAVARES MARTINS[1]
PATRÍCIA SOARES GONÇALVES[1]
GILBERTO MONTEIRO DOS SANTOS[1]
CARLA NASCIMENTO LUGUETTI[1]
[1] Universidade Santa Cecília - Faculdade de Educação Física e Esporte (FEFESP) – Santos – SP – Brasil.
[2] CEFE – UNIFESP – São Paulo – SP – Brasil; Faculdade de Educação Física (FEFIS) – Santos, SP – Brasil.
ciadofisicodilma@uol.com.br

## INTRODUCTION

Physical aptitude refers to the subjects capability to display an adequate physical performance on his daily activities (BÖHME, 2003). Some researches point to the fact that satisfactory results of the physical fitness and body composition aspects, offer some sort of protection to the emergence and development of organic disturbances, contributing in a positive way to the overall physical fitness and health during adult life (HAMLIN et. al., 2000; LUGUETTI et al, 2010; McGEE, et.al, 2006; NAHAS 2001; TOMKINSON et al., 2003).

Studies show that the low level of physical aptitude in children is connected to obesity development, witch diminishes the life expectancy of the world population (DÓREA, 2004; FERNANDES, et. al. 2007). Statistic data reveals that in the second half of the 20th century, Brazil presented child obesity in 7% of the boy and 9% of the girls (RONQUE, 2005). Aligned with the low level of physical aptitude and child obesity, hypokinetic diseases may emerge, generating disturbances such as peripheral resistance to insulin, type 2 diabetes, hypercholesterolaemia, joint and heart diseases. That is a vicious circle: low standards of physical activity - lower results on aerobic fitness – low level of energy expenditure - higher amounts of body fat - higher overall efforts to perform motor activities - lower patterns of the physical activity habits. A possible solution to minimize this problem, would be increase the participation on programs that promote physical activities as a way to reverse the decline of physical fitness (GUEDES; GUEDES, 1995; GLANER, 2005).

The practice of physical activities. Can bring multiple benefits for health, in childhood, adolescence or any age. Childhood is moment for educational guidance, in the sense that it might stimulate habits and health behavior, that will hopefully crucial be kept through the subject's entire life.

To check up aspects of physical fitness related to health and body composition of children and teens, can contribute in a decisive way to the attempt to promote collective health. There is a need for parameters with brazilian students as a reference, the pre-existing data of students from developed countries don't match the data from countries in development. The differences in social, economical and cultural factors justify the execution of regional studies. In 2003 the Projeto Esporte Brasil (Proesp-BR) evaluated factors of motor skills in children and teenagers from 7 to 16 years of age, having in mind the idea of building indicators that can supply additional monetary assistance for the construction of physical education and sports polities for kids and teens in Brazil (PROESP, 2005).

The aim of this study was to evaluate the body composition and physical fitness related to the health of students from private schools in the city of Santos, São Paulo.

## METHODOLOGY

Two hundred thirty one (231) students from a private school in Santos, São Paulo, that 127 boys and 104 girls, ages from 7 to 10 in the study. The selection criteria for participation were to make sure every one was properly registered as a junior high student in 2008. Students weren't evaluated because: a) restrained from performing physical exercises for medical reasons; b) didn't have a permit from a parent or the adult in charge to take the tests; c) refused to participate; d) didn't show up on the day of the tests.

In order to perform the body composition test, the body mass index was evaluated (BMI, lb.ft ²), based on body weight (lb) and height (ft) (PROESP, 2005; SAFRIT, 1995). For the physical fitness tests, the chosen criteria was the upper limbs explosive force indicators (4lb medicine-ball throw), the speed indicators (21 yards run), and the lower limb explosive force (horizontal jump), according to PROESP patterns (PROESP, 2005; SAFRIT, 1995).

The students performed every test twice, and the highest score was recorded, except for the 9 minute run, that was performed only once. Every test contains a good level of scientific authenticity and they were administered by five fully capacitated physical education teachers, each of them responsible for the gathering of measurement and/or test, in order to prevent variables amongst them and guarantee reliable data results. The chronological age measurements considered the date of birth and the date of the tests.

As a evaluation criteria of the level of physical fitness, normative charts for each age and gender were used (PROESP) (FERREIRA, et.al, 2003). The aptitude results are distributed is assorted in six categories: a) too weak: results under 20 percent ( criteria used as a reference to health risk); b) weak: results between 20 and 40 percent; c) reasonable: results between 40 and 60 percent; d) good: Results between 60 and 80; e) very good: results between 80 and 98; f) excellent: above 98 percent. For data analysis we combined: a) too weak and weak categorized as “bad” (up until 40 percent); b) reasonable and good categorized as “normal” (between 40 and 80 percent); c) very good and excellent categorized as “good” (above 80 percent).

For the statistic analysis, was constructed a descriptive analysis, crossed charts and the Chi-Square test between the BMI charts and the physical aptitude variables chart for each gender. The significance level of 5% was used ($P \leqslant 0,05$).

## RESULTS

The results are displayed on tables 1 and 2.

Table 1: Classification percentage of the body mass index for each age and gender.

| | Male | | | | | Female | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Low weight | Normal | Excess weight | Obese | Total | Low weight | Normal | Excess weight | Obese | Total |
| 7 years | 0% | 53,3% | 36,7% | 10% | 100% | 2,7% | 51,4% | 35,1% | 10,8% | 100% |
| 8 years | 0% | 48,1% | 32,7% | 19,2% | 100% | 0% | 38,1% | 47,6% | 14,3% | 100% |
| 9 years | 0% | 50% | 28,6% | 21,4% | 100% | 0% | 38,1% | 33,3% | 28,6% | 100% |
| 10 years | 0% | 45,2% | 38,7% | 16,1% | 100% | 0% | 40% | 44% | 16% | 100% |
| TOTAL | 0% | 48,8% | 34,6% | 16,5% | 100% | 1% | 43,3% | 39,4 % | 16,3% | 100% |

Table 2: Body Mass Index classification percentage and medicine-ball throw (MBT), 21 yards run (RUN) and horizontal jump(HJ) classification for each gender.

| | | Male | | | | | | Female | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *Too Weak* | *Weak* | *regular* | *Good* | *Very good* | *Total* | *Too Weak* | *Weak* | *regular* | *Good* | *Very good* | *Total* |
| **THR** | *BP* | - | - | - | - | - | - | 0 | 0 | 0 | 100% | 0 | 100% |
| | *N* | 14,5% | 9,7% | 19,4% | 14,5% | 41,9 | 100% | 15,6% | 20,0% | 24,4% | 15,6% | 24,4% | 100% |
| | *EP* | 6,8% | 13,6% | 13,6% | 22,7% | 43,2% | 100% | 7,3% | 22,0% | 19,5% | 22,0% | 29,3% | 100% |
| | *OB* | 4,8% | 9,5% | 4,8% | 19,0% | 61,9% | 100% | 0% | 5,9% | 35,3% | 29,4% | 29,4% | 100% |
| **RUN[1]** | *BP* | - | - | - | - | - | - | 0 | 100% | 0 | 0 | 0 | 100% |
| | *N* | 41,9% | 17,7% | 21,0% | 8,1% | 11,3% | 100% | 46,7% | 35,6% | 2,2% | 13,3% | 2,2% | 100% |
| | *EP* | 56,8% | 20,5% | 6,8% | 11,4% | 4,5% | 100% | 46,3% | 41,5% | 2,4% | 4,9% | 4,9% | 100% |
| | *OB* | 90,5% | 4,8% | 4,8% | - | - | 100% | 82,4% | 11,8% | - | 5,9% | - | 100% |
| **HJ[2]** | *BP* | - | - | - | - | - | - | b | - | - | - | 100% | 100% |
| | *N* | 21,0% | 22,6% | 29,0% | 12,9% | 14,5% | 100% | 33,3% | 20,0% | 15,6% | 13,3% | 17,8% | 100% |
| | *EP* | 47,7% | 6,8% | 13,6% | 25,0% | 6,8% | 100% | 53,7% | 19,5% | 19,5% | 4,9% | 2,4% | 100% |
| | *OB* | 61,9% | 38,1% | - | - | - | 100% | 64,7% | 23,5% | 5,9% | 5,9% | - | 100% |

*1* Statistically significant difference in males (P=0,010)
*2* Statistically significant difference in males (P=0,000) and female (P=0,026)

**DISCUSSION**

The results reveal that 51,1% of the boys and 55,7% of the girls are on the overweight or obesity path. These results are higher in other brazilian studies (FERNANDES, 2006; RONQUE, 2005; COSTA, 2006). A possible explanation for the high levels of overweight in this study, can be credited to the fact that children belong to a private school, so theoretically, their economical and social backgrounds are higher (DUMITH et al., 2008).

The results indicate a low attachment to the regular practice of physical education, given the fact that studies point to a strong relation between the level of health related physical fitness and the physical activities practice by children (SOLLERHED; EJLERTSSON, 2008). Klesges et al.(1993) and Ronque (2005) point out that one of the main factors that contribute to decrease physical activities, is the minimum of 2 hours a day spend in front of the television.

We observed a significant difference between the results in body composition for the 21 yards running tests (p=0,010) for boys and the horizontal jump tests (p=0,000; p=0,026) for both genders. The performances in these tests by obese and overweight kids were the lowest and it may be because those children require a bigger effort and more energy expenditure, to do the same activity at the same intension (BRACCO, 2002). Knowing that childhood obesity can lead to adulthood obesity, we should encourage children to keep regular and balanced physical activities for as long as they are growing, so that they don't display any physical or health events as the reach adulthood.

The medicine-ball throw test didn't show any difference between obese, overweight, normal and low weight children. It may be because the tests were performed in the seated position, which doesn't require body movement from one place to another, stimulating only the upper limbs.

**FINAL CONSIDERATIONS**

The results indicate a high level of overweight and the subjects with overweight and obesity presented a low level of physical aptitude, mainly on the tests that required body dislocation. Therefore, the results might indicate little attachment with regular practices of physical activity within the evaluated sample, given the fact that studies point to a strong relation between the level of physical fitness and the physical activities habits from kids and teenagers.

Extracurricular activities that enhance the practice of collective sports, along with nutritional programs in school cafeterias, can bring down the overweight statistics and increase the index of kids with a healthier life style. Raising the time of Physical Education classes and the development of health concern projects, are procedures that improve physical fitness and health in the students.

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Endereço:
Dilmar Pinto Guedes Júnior
Rua Luiz de Faria, 47 ap. 53, Gonzaga, Santos-SP.
CEP: 11060-480
ciadofisicodilma@uol.com.br

**BODY MASS INDEX AND THE PHYSICAL FITNESS OF PRIVATE SCHOOL STUDENTS IN SANTOS- SP**

**ABSTRACT**

The purpose of this study was to determine the body mass index and the physical fitness of private school students in Santos- SP. Two hundred thirty one students (231 = 127 boys and 104 girls), ages between 4 and 10, performing the following tests: weight, height, horizontal jump, 21 yards run and medicine-ball throw. The results revealed that 51,1% of the boys and 55,7% of the girls are either overweight or obese. A significant difference was observed among the male students concerning the body composition measurements and the 21 yards running tests, the bigger the body composition measurement (overweight or obese), the worse test results. The same tendency was verified on the horizontal jump test for both genders. Children overweight and with high risk of obesity are usually less active. It happens because the low risk children have more body weight and there for and expending more energy to perform their activities. Considering the results, we may conclude that the children evaluated display a high level of overweight and a low level of physical fitness, witch justifies health care programs, specially the ones concerning physical activities.

**KEYWORDS:** Physical aptitude; Children; Obesity; Motor activity.

**L'INDICE DE MASSE CORPORELLE ET DE CONDITION PHYSIQUE DES ELEVES DANS LES ECOLES PRIVEES DANS LA VILLE DE SANTOS-SP**

**SOMMAIRE**

Cette étude visait à évaluer l'indice de masse corporelle et de condition physique des élèves dans lês écoles privées dans la ville de Santos-SP. L'étude a inclus 231 écoliers (127 garçons et 104 filles) âgés entre 7 et 10 ans, ayant subi les tests suivants: poids, taille, saut horizontal, course de 20 mètres et medicine-ball. Les résultats montrent que 51,1% des garçons et 55,7% des filles sont dans la gamme de surpoids ou obèses.Il y avait une différence significative entre les classifications de la composition du corps d'essai et de la course de 20 mètres chez les garçons, où le plus élevé la classification corporelle (surpoids ou obèses) pire les valeurs de l'épreuve. La même tendance a été observée dans l'épreuve du saut horizontal pour les deux sexes. Les enants à risque élevé d'obésité sont généralement moins actives que les enfants ayant un risque faible, c'est parce qu'ils ont un plus grand nombre de poids corporel el une plus grande consommation d'énergie pour accomplir les activités. Considérant les résultats obtenus, nous concluons que les enfants évalués, ont un haut niveau de surpoids et un faible niveau de condition physique, ce qui justifie la nécessité de programmes de promotion de la santé, surtout axée sur l'activité physique.

**MOTS CLÉS**: Conditionnement physique ; enfants ; obésité; activité motrice.

**ÍNDICE DE MASA CORPORAL Y LA APTITUDES FÍSICAS DE LOS ESTUDIANTES EN LAS ESCUELAS PRIVADAS DE LA CIUDAD DE SANTOS-SP**

**RESUMEN**

El presente estudio tuvo como objetivo evaluar el índice de masa corporal y la aptitudes físicas de los estudiantes en las escuelas privadas de la ciudad de Santos-SP. Participaron en este estudio 231 estudiantes (127 niños y 104 niñas), con edades comprendidas entre los 7 y 10 años, que se sometieron a las siguientes pruebas: peso, estatura, salto horizontal, carrera de 20 metros y lanzamiento de medicine-ball. Los resultados revelan que 51,1% de los niños y 55,7% de las niñas están en la franja de exceso de peso u obesos. Se observa que hay una diferencia significante entre las clasificaciones de la composición corporal y el indicador de carrera de 20 metros en el sexo masculino, indicando que cuanto mayor la clasificación de la composición corporal (exceso de peso u obesos) peores son los valores del indicador. La misma tendencia se observó en ambos sexos para el salto horizontal. Niños con alto riesgo de obesidad son en general menos activas que las de bajo riesgo, eso se debe al hecho de tener un mayor peso corporal y mayor gasto energético para realizar las actividades. Considerando los resultados obtenidos, podemos concluir que los niños objeto del estudio, presentan un alto nivel de sobrepeso y un bajo nivel de aptitudes físicas, justificando de esta manera la necesidad de programas de promoción de salud, especialmente enfocados a la práctica de actividades físicas.

**PALABRAS CLAVE:** Aptitud Física; Niños; Obesidad; Actividad Motora

**ÍNDICE DE MASSA CORPORAL E APTIDÃO FÍSICA DE ESCOLARES DE ESCOLA PARTICULAR DE SANTOS-SP**

**RESUMO**

O presente estudo teve por objetivo avaliar o índice de massa corporal e a aptidão física de escolares de escola privada da cidade de Santos-SP. Participaram do estudo 231 escolares (127 meninos e 104 meninas), com idades entre 7 e 10 anos, que realizaram os seguintes testes: peso, estatura, salto horizontal, corrida de 20 metros e arremesso de medicine-ball. Os resultados revelam que 51,1% dos meninos e 55,7% das meninas estão na faixa de excesso de peso ou obesos. Observou-se diferença significante entre as classificações da composição corporal e o teste de corrida de 20 metros no sexo masculino, onde quanto maior a classificação da composição corporal (excesso de peso ou obesos) piores os valores do teste. A mesma tendência foi observada no teste de salto horizontal para ambos os sexos. Crianças com alto risco de obesidade normalmente são menos ativas que crianças com baixo risco, isso se deve ao fato de possuírem maior peso corporal e maior gasto energético para realizar as atividades. Considerando os resultados obtidos, conclui-se que as crianças avaliadas, apresentam alto nível de sobrepeso e um baixo nível de aptidão física, o que justifica a necessidade de programas de promoção de saúde, especialmente voltados à prática de atividades físicas.

**PALAVRAS-CHAVE:** Aptidão Física; Crianças; Obesidade; Atividade Motora