

# PHYSICAL ACTIVITY LEVEL OF STUDENTS OF A PUBLIC SCHOOL IN A CITY OF RIO GRANDE DO SUL

## *Nível de atividade física de escolares da rede pública de ensino de um município do Rio Grande do Sul*

## *Nivel de actividad física de escolares de la red pública de enseñanza en un municipio de Rio Grande de Sul*

Original Article

### ABSTRACT

**Objective:** To diagnose the level of physical activity of 15-18-year-old students of a public school in a city of the state of Rio Grande do Sul, Southern Brazil. **Methods:** This is a quantitative cross-sectional study. The short version of the International Physical Activity Questionnaire (IPAQ) was used. The level of physical activity was compared between female and male students using the Mann-Whitney test. Kruskal-Wallis Test was used to compare same-sex individuals at different ages. All the analyses used a significance level of 0.05. **Results:** It was observed that 57.5% (n = 309) of the students were active, 26.3% (n = 141) moderately active and 16.2% (n = 87) inactive, with a higher level of physical activity among male adolescents. It could be found that 59.6% (n = 136) of the boys and 56% (n = 176) of the girls were classified as vigorously active. Activities such as walking are carried out more frequently (5.36 days / week) if compared with the moderate (3.74 days / week) and vigorous activities (2.06 days / week). **Conclusion:** There was a higher prevalence of individuals classified as vigorously active followed by moderately active and extremely inactive. Male adolescents are more active than their female peers.

**Descriptors:** Physical Activity; Adolescent; Assessment in Health.

### RESUMO

**Objetivo:** Diagnosticar o nível de atividade física de escolares entre 15 e 18 anos da rede pública de ensino de um município do Rio Grande do Sul, Brasil. **Métodos:** Estudo quantitativo, do tipo transversal. Aplicou-se o Questionário Internacional de Atividade Física (IPAQ), versão curta. Comparou-se o nível de atividade física entre os sujeitos do sexo feminino e masculino através do Teste de Mann-Whitney. Para comparação dos sujeitos do mesmo sexo nas diferentes idades, foi utilizado o Teste de Kruskal-Wallis. Adotou-se, para todas as análises, o nível de significância de 0,05. **Resultados:** Observou-se que 57,5% (n=309) dos sujeitos eram ativos; 26,3% (n=141), moderadamente ativos; e 16,2% (n=87), inativos, sendo o nível de atividade física estatisticamente superior em adolescentes do sexo masculino. Verificou-se que 59,6% (n=136) destes e 56% (n=176) das adolescentes se classificaram como muito ativos. Atividades como caminhada são realizadas com maior frequência semanal (5,36 dias/semana) em comparação com as atividades de intensidade moderada (3,74 dias/semana) e vigorosa (2,06 dias/semana). **Conclusão:** Houve maior ocorrência de sujeitos classificados como muito ativos, seguidos dos suficientemente ativos e, por último, os insuficientemente ativos. Os sujeitos do sexo masculino demonstraram ser fisicamente mais ativos do que os do sexo feminino.

**Descritores:** Atividade Física; Adolescente; Avaliação em Saúde.

### RESUMEN

**Objetivo:** Diagnosticar el nivel de actividad física de escolares entre los 15 y 18 años de la red pública de enseñanza de un municipio de Rio Grande de Sul, Brasil. **Métodos:** Estudio cuantitativo del tipo trasversal. Se aplicó la versión corta del Cuestionario Internacional de Actividad Física (IPAQ). Se comparó el nivel de actividad física entre los sujetos del sexo

Franciele Dresch<sup>(1)</sup>  
Josefina Bertoli<sup>(2,3)</sup>  
José Raphael Leandro Costa  
Silva<sup>(2)</sup>  
Anderson Simas Frutuoso<sup>(2)</sup>  
Cíntia de la Rocha Freitas<sup>(2)</sup>

1) Lutheran University of Brazil  
(Universidade Luterana do Brasil –  
ULBRA) - Canoas – (RS) - Brazil

2) Federal University of Santa Catarina  
(Universidade Federal de Santa Catarina –  
UFSC) - Florianópolis - (SC) - Brazil

3) Antonio Ruiz de Montoya Superior  
Institute (Instituto Superior Antonio Ruiz  
de Montoya – ISARM) - Psds - (Mnes) -  
Argentina

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femenino y masculino a través de la prueba de Mann-Whitney. Para la comparación entre sujetos del mismo sexo y distintas edades fue utilizada la prueba de Kruskal-Wallis. Se adoptó para todos los análisis el nivel de significancia de 0,05. **Resultados:** Se observó que el 57,5% (n=309) de los sujetos eran activos; el 26,3% (n=141), moderadamente activos; y el 16,2% (n=87), inactivos, siendo el nivel de actividad física estadísticamente superior en adolescentes del sexo masculino. Se verificó que el 59,6% (n=136) de esos y el 56% (n=176) de las adolescentes se clasificaron como muy activos. Actividades como caminata son realizadas con mayor frecuencia semanal (5,36 días/semana) cuando comparadas a las actividades de intensidad moderada (3,74 días/semana) y vigorosa (2,06 días/semana). **Conclusión:** Hubo mayor ocurrencia de sujetos clasificados como muy activos, seguidos de los suficientemente activos y por último los insuficientemente activos. Los sujetos del sexo masculino demostraron estar físicamente más activos que los del sexo femenino.

**Descriptor:** Actividad Motora; Adolescente; Evaluación en Salud.

## INTRODUCTION

Over the last decades, several recommendation guides for physical activity practice have been suggested and published, defining physical activity as any body movement produced by skeletal muscles resulting in energy expenditure above resting levels<sup>(1,2)</sup>.

Current recommendations suggest that teenagers under 17 years old should practice at least 60 minutes of daily physical activity from moderate to vigorous intensity, including muscle-strengthening and stretching activities three days per week. From the age of 18 onwards, the recommendations propose at least 150 minutes of daily moderate aerobic activity or at least 75 minutes of vigorous aerobic activity, as well as muscle-strengthening and stretching training involving major muscle groups twice or more times a week<sup>(3)</sup>.

The development of such activities targets satisfactory levels of health-related physical fitness in order to offer some protection to the arising and development of organic disorders. The improvement of cardiorespiratory parameters, muscular strength and endurance, flexibility, as well as adequate body fat levels are directly associated with lower risks for developing degenerative diseases, along with increased longevity<sup>(4)</sup>.

Several studies have shown the existence of barriers to physical activity practice, including cultural, economic, political, geographical, and personal aspects<sup>(5)</sup>. Age and gender comprise the biological determinants for physical

activity, in a way that age and physical activity exhibit an inversely proportional relationship and males are more involved in physical activity than females<sup>(6)</sup>. Urban violence, socioeconomic status, parent's lifestyle and school environment are highlighted as critical socio-cultural determinants for physical activity<sup>(6,7)</sup>.

Besides these factors, technological advances led people to stay a longer time in front of electronics, thus reducing daily physical activity practice<sup>(8)</sup>. This decrease has been determinant for the aggravation of diseases that affect physical, psychological and emotional health<sup>(8,9)</sup>.

It is very important to emphasize sedentariness as a risk factor for most prevalent non-communicable chronic diseases in the population, which over time directly affect the quality of life<sup>(10)</sup>. As a result, it is no coincidence that the monitoring of physical activity levels in youth population segments has become a major topic of interest among health professionals. The concern for improving quality of life is nowadays a matter of great social importance, leading to a research emergence in that field. Particularly over the last decades, there has been a proliferation of studies and reviews on school-based intervention effectiveness as a competent tool to promote physical activity in children and youth<sup>(4,9,11)</sup>.

A study on an adolescent population pointed out that individuals involved with physical activities at this phase are more likely to be sufficiently active in adulthood<sup>(1)</sup>. Accordingly, the understanding of the singular relationship between physical activity levels and adolescent health is fundamental in order to contribute in a decisive manner to an attempt to public health promotion<sup>(4)</sup>. Therefore, this current study aimed to diagnose the physical activity level of students between 15 and 18 years old from public schools in a municipality in Rio Grande do Sul, Brazil.

## METHODS

This study was delineated as an applied research investigation, seeking the generation of knowledge for practical applications, presenting a quantitative approach to the problem, and translating into numbers the phenomenon studied. According to the purposes set, the research was developed using a cross-sectional study design<sup>(12)</sup>.

The reference population included 6,781 high school students enrolled in public schools in São Leopoldo-RS during the 2006 academic year<sup>(13)</sup>. This municipality was chosen due to its economical importance in the Greater Porto Alegre region, besides hosting a large university.

The data collection took place during the second semester of the 2007 school year. The three largest state schools were selected for the study, being recruited all

adolescents aged 15 to 18 years who were present on the day of data collection. There were no sample losses, because all participants answered the questionnaire correctly. It is highlighted that there was no exclusion of subjects as long as all applicants had no restrictions on physical activity practice. An intentional sample totaling 537 students was obtained.

After previous permission of school administration, teachers responsible for classes and parents and/or guardians of the students, the questionnaire was applied at the participating schools, being the survey given to each subject for its filling. The students spent from 10 to 15 minutes for its completion and doubts were solved by the researchers.

To assess the physical activity level, the International Physical Activity Questionnaire (IPAQ), short form, was applied. The instrument holds acceptable validity scores among Brazilian adolescents of both genders aged over 14 years<sup>(14)</sup>. The physical activity level (PAL) of the subjects was classified according to the IPAQ proposal as follows: high, moderate and low<sup>(15)</sup>. A further categorization classified the results into sufficiently active (for individuals with scores equal or superior to 150 minutes per week) and insufficiently active (for individuals with scores less than 150 minutes per week).

The instrument allows the estimation of total physical activity per week, considering time in minutes registered by each activity category assessed through its MET (resting metabolic rate), where 1 MET is equal to 3.5 ml (kg.min)<sup>(1)</sup>. The MET is defined for each category as follows: walking = 3.3 MET; moderate-intensity physical activity (PA) = 4.0 MET, and vigorous-intensity PA = 8 MET. Accordingly,

the sum of METs of the physical activity per week is given by the formula: (total minutes of walking x 3.3 MET) + (total minutes of moderate-intensity PA x 4.0 MET) + (total minutes of vigorous-intensity PA x 8 MET) .

Data analysis was conducted using SPSS<sup>TM</sup> statistical software, version 15.0. The Kolmogorov-Smirnov test did not result in a normal distribution. Therefore, the Mann-Whitney test was applied to compare the level of physical activity between genders. In order to evaluate the subjects of a single gender at different ages, the Kruskal-Wallis test was performed. A significance level of 0.05 was applied for all analysis.

The research approval was given by the Research Ethics Committee of the Lutheran University of Brazil (*Universidade Luterana do Brasil* - Protocol No. 2007-329H) and all subjects and/or guardians signed the informed consent form.

## RESULTS

A total of 537 students were evaluated, comprising 309 (57.5%) females and 228 (42.5%) males. Using the general PAL classification, it was found that 57.5% (n=309) of the subjects were active, 26.3% (n=141) moderately active, and 16.2% (n=87) inactive.

Concerning the general PAL classification of each gender, similar results were observed in the sample. Regarding female adolescents, 56% (n=173) were considered active, 24.3% (n=75) moderately active, and 19.7% (n=61) inactive. The results for males show that 59.6% of the adolescents (n=136) were classified as active, 28.9% (n=66) moderately active, and 11.4% (n=26) inactive.

Table I – Physical activity level comparison in each age group and between genders represented by METs minutes/week performed by students from the Municipality of Rio Grande do Sul, Brazil, 2007.

Age	Gender	n	Mean	Standard Deviation	p
15	Female	63	4672.27	7020.63	0.531
	Male	35	5959.30	7814.01	
16	Female	87	5281.48	4279.20	0.474
	Male	53	6713.35	6849.18	
17	Female	85	5336.16 <sup>a</sup>	4885.40	0.026
	Male	76	7008.61 <sup>b</sup>	5610.08	
18	Female	74	5145.47	4738.64	0.095
	Male	64	7619.80	8095.62	

Ps.: Means followed by different letters (<sup>a</sup> and <sup>b</sup>) in the same row show significant statistical differences at the level of significance of 5%.

The PAL mean for females was 5,139.74 METs minutes/week and for males 6,950.46 METs minutes/week. The PAL of males was statistically higher than that of females ( $p=0.004$ ) (Table I).

Table II presents the PAL mean of students aged 15-18 years with their statistical comparisons, frequency

and duration means of physical activity performed by the students. A decrease in the weekly practice frequency is exhibited as the intensity of physical activity increases. Mild activities such as walking are performed more frequently than moderate and vigorous-intensity activities.

Table II – Description of physical activity frequency and duration performed by students from the Municipality of São Leopoldo-RS, Brazil, 2007.

Physical Activity	Mean	Standard Deviation
Walking frequency (days/week)	5.36	1.80
Walking duration per day (minutes)	97.38	101.84
Moderate-intensity activity frequency (days/week)	3.74	2.52
Moderate-intensity activity duration per day (minutes)	94.37	98.15
Vigorous-intensity activity frequency (days/week)	2.06	2.16
Vigorous-intensity activity duration per day (minutes)	79.46	102.02

When comparing the overall PAL mean among subjects of the same gender and different ages, females showed no significant difference ( $p=0.128$ ), i.e., the female adolescents presented the same physical activity level regardless of age. A similar result was found for the male subjects ( $p=0.125$ ).

## DISCUSSION

Physical activity levels in youth population segments has turned into interest and concern among health professionals, because of its close association with health-related aspects and more specifically, as a path to identify the impact of sedentariness on human lifestyle<sup>(16)</sup>. In this study, two important factors were recognized when analyzing the PAL data and the subjects stratification by gender. First, the proportion of subjects classified as physically active, regardless of age, was higher among male than female adolescents.

In an investigation using the same measuring instrument as the one from this current study, males were found to be more physically active (33.4%) than females (22.8%)<sup>(1)</sup>. Additionally, females were significantly more inactive (61.5%) than males (22.9%) in another study<sup>(17)</sup>. Another investigation concludes that adolescent groups are not homogeneous, so that the motivation and interest of students to engage in physical activities are influenced by individual factors, such as weight, motor skills, and gender. Regarding the latter, females have a smaller sense of competition than males, which intrinsically seem to be more motivated and self-determined<sup>(18,19)</sup>. This was probably the cause of male

adolescents higher levels of activities when compared to female adolescents in the present study.

This current investigation reported a prevalence of 57.5% of active subjects, being a similar result to that obtained in the mountainous region of the state of Santa Catarina, Brazil<sup>(17)</sup> performed with a sample of 1,024 male adolescents aged 10-17 years. Concerning the habitual physical activity level, the majority showed an active behavior (58.8%), although 29.4% were classified as inactive or very inactive.

The second relevant factor drawn from this study is that the female PAL decreases with advancing age when compared to male. Male adolescents aged 17 years were found to be more physically active than female adolescents with the same age.

The teenagers of both genders seem to realize in a distinct manner the factors that negatively influence physical activity practice. The most common negative factors were based on psychological, cognitive, emotional, cultural, and social dimensions. For males, the most reported barriers were laziness, lack of companion, and time. For females, laziness, lack of companion, and occupation were the most frequent causes<sup>(20)</sup>.

A survey conducted in João Pessoa-PB, Brazil, evaluated the physical activity practice and associated factors in adolescents with a sample comprising high school students (public and private schools) aged 14-19 years. The authors considered a physically active individual the one who practiced more than 300 minutes of weekly physical activity, twice the time considered in our investigation.

Sociodemographic variables, nutritional status, sedentary behavior, health status self-assessment, and participation in physical education classes were analyzed. In agreement with the data obtained in our study, the male adolescents were physically more active than females (66.3% vs. 38.5%). Also, according to the authors, adolescents with parents with higher education, positive health perception and who participated in physical education classes were more likely to be physically active<sup>(21)</sup>.

In another investigation, comprising the participation of 3,145 students (1,590 males and 1,555 females) aged 7-16 years, after applying a battery of tests, young people, especially girls, were found to exhibit a low level of physical fitness<sup>(4)</sup>. This result seems acceptable since other studies<sup>(21,22)</sup>, as our current research, show a lower female physical activity level when compared to males.

Finally, another cross-sectional study pointed out the prevalence of sedentariness of 25.4% from a representative sample of adolescents aged 14-18 years enrolled in public high schools in Florianópolis-SC. Precisely, 21.9% of male adolescents and 27.1% female adolescents were classified as sedentary individuals<sup>(22)</sup>. Lower percentages of physical inactivity regarding both and each gender analysis were observed. However, this investigation conducted in the city of Florianópolis also considered physically active the individuals who practiced more than 300 minutes of weekly physical activity.

With advancing age, physical activity levels did not present statistically significant differences. Based on the intensity, mild activities such as walking are accomplished more frequently in despite of moderate and vigorous-intensity activities. It is important to point out that the data obtained in this present study shows that adolescents seem to be more predisposed and alert in relation to a sedentary lifestyle and physical activity practice. As a result, the implementation of incentive programs to physical activity for them is essential not only for the improvement of the actual health status, but also as an attempt to prepare them for regular physical activity practice in adulthood. The role of the Physical Education teacher is critical at this point, in a way that the professional must monitor the students, motivate them through pedagogical strategies of their interests in order to consolidate the development of healthy lifestyles.

In the present study, the number of investigated subjects allowed the drawing of a similar scenario observed among students of a municipality in Rio Grande do Sul, since the standard deviation and confidence interval of the target population was considered. However, this investigation holds as a limitation the use of a non-probability sampling, impairing the real characterization of the population. The use of indirect measurements of physical activity by

the application of a questionnaire can also be inferred as a shortcoming, despite the worldwide use of the applied instrument and its validation among Brazilian adolescents<sup>(14)</sup>.

## CONCLUSION

From the results obtained in this research, it is concluded that according to the level of physical activity presented, there was a higher incidence of subjects classified as very active, followed by sufficiently active and, finally, insufficiently active. Male adolescents demonstrated to be more physically active than females, including at both general sample classification as at the age of 17 years.

Although it has been demonstrated that the subjects were classified as very active, attention is drawn to the need for adolescents to practice physical activities of greater intensity in order to obtain visible benefits due to the organic adaptations resulting from this type of exercise.

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**First author's address:**

Franciele Dresch  
Av. Dom João Becker, 270/802  
Bairro: Santa Tereza  
CEP 93010-010 - São Leopoldo-RS - Brazil  
E-mail: francivere@yahoo.com.br

**Mailing address:**

Cíntia de la Rocha Freitas  
Universidade Federal de Santa Catarina  
Rua Eng. Agrônomo Andrey Cristian Ferreira, s/n  
Bairro: Trindade  
CEP: 88040-900 - Florianópolis-SC - Brazil  
Email: cintiadelarocha@gmail.com