

# Sedentary lifestyle among adolescents living in the city of Ribeirão Preto (SP)

Luiz Antonio Del Ciampo<sup>1</sup>, Adriana L Louro<sup>1</sup>, Ieda R L Del Ciampo<sup>2</sup>, Ivan S Ferraz<sup>1</sup>



<sup>1</sup>Departament of Puericulture and Pediatrics, Ribeirão Preto Medical School, University of São Paulo.

<sup>2</sup> Medical School, Federal University of São Carlos

**Corresponding author**  
delciamp@fmrp.usp.br

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## Abstract

**Introduction:** Physical inactivity has been pointed out as one of the major public health problems of the 21st century and the benefits of the regular practice of physical activity during adolescence are important for the biological process of growth and development.

**Objective:** To analyze the prevalence of physical inactivity among adolescents enrolled in schools in the city of Ribeirão Preto (SP).

**Methods:** From September 1 to November 30, 2013, a cross-sectional, observational and descriptive study was conducted with adolescents enrolled in 14 state schools in the city of Ribeirão Preto (SP) using the International Physical Activity Questionnaire, short version.

**Results:** A total of 535 adolescents participated, 35% of them boys and 65% girls; 65% were 10 to 14 years old and 35% were 15 to 19 years old; 52.3% studied in the evening period and 10.3% worked part time on a daily basis. Regarding the level of physical activity, 15.5% of the boys and 24.1% of the girls were classified as sedentary ( $p>0.05$ ). 60.4% of the boys performed physical activity of vigorous intensity, while 56.3% of the girls showed preference for physical activity of low or moderate intensity ( $p=0.03$ ). The girls aged 15 to 19 years spent more time sitting during the week, while the girls aged 10 to 14 years were less active during the weekend. 24.2% of the girls aged 10 to 14 years who studied during the morning period and 13.7% of the boys and 18% of the girls who studied during the evening period were classified as sedentary.

**Conclusion:** High rates of sedentary lifestyle were observed among adolescents enrolled in state (or public?) schools in Ribeirão Preto (Brazil). Girls presented higher rates of sedentary lifestyle than boys. Boys performed physical activity of vigorous intensity more frequently than girls. The older girls had higher rates of physical inactivity (hours spent in the sitting position) during the week days compared to the younger ones, while the latter spent more time in physical inactivity during the weekend.

**Keywords:** adolescent behavior, motor activity, sedentary lifestyle.

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## Authors summary

### Why was this study done?

The study was conducted to verify the level of physical activity among adolescents

### What did the researchers do and find?

It is well known that physical activity is one of the important factors that can contribute to good health, especially during the second decade of life, when pubertal development is occurring.

Through an appropriate questionnaire, information was obtained that allowed the classification of adolescents as active or sedentary. The results show that adolescents from these schools in the city of Ribeirão Preto are practicing less physical activities than considered ideal.

### What do these findings mean?

With these results the researchers were able to guide adolescents, their families and the school community (teachers, principals and staff) ways to include more physical activities in their daily lives.

## INTRODUCTION

Adolescence is the period of transition between childhood and adult life, characterized by changes in physical, emotional, sexual and social development and by efforts to achieve the objectives related to the cultural expectations of the society in which the adolescents live<sup>1</sup>. It is a phase during which individuals are subject to the influence of numerous factors that directly interfere with their life and health conditions, such as the regular practice of physical activity and a healthy diet, that may contribute to the physical and intellectual improvement of the organism, which is important for cognitive performance and for the development of intellectual and physical capacity<sup>2</sup>.

The benefits of the regular practice of physical activity during adolescence are important for the biological process of growth and development, exactly because they stimulate socialization, they support self-esteem and body self-knowledge, permit enhanced cardiovascular, metabolic and musculoskeletal functions, and control of body adiposity<sup>3,4</sup>. In addition, they contribute to reducing the risk of acquiring chronic-degenerative diseases such as metabolic syndrome, type 2 diabetes, some types of cancer, and emotional diseases<sup>5</sup>. According to the World Health Organization (WHO), adolescents should practice at least 60 minutes a day of physical activity of moderate and vigorous intensity<sup>6</sup>.

The practice of physical activity as a human behavior is influenced by different personal factors (motivation, attitude and interest), as well as social (family and peer support) and environmental (topography, climate, geographic location) factors<sup>7</sup>. From a social point of view, the influence of parent, friends, relatives and teachers may be direct – by means of behavioral modeling – and/or indirect by means of support of programs and initiatives of society as a whole<sup>8</sup>. Today, it can be seen that a sedentary life style and the reduction of physical activities are highly prevalent in modern western societies. The technological progress, the limitation of activities outside home and the economic development have modified the dietary habits and the quantity of exercise practiced by people<sup>9</sup>. It should be emphasized that behaviors related to physical activity that are established during adolescence will be maintained during adulthood, stabilizing healthier habits and a better life style<sup>10</sup>.

Physical inactivity has been pointed out as one of the major public health problems of the 21st century and the WHO estimates that about 2 million deaths worldwide

can currently be attributed to sedentary behavior<sup>11</sup>. Despite the scientific knowledge accumulated about the benefits of an active life style for health, studies on adolescents in different countries have demonstrated a high prevalence of physical inactivity. During adolescence, the time of physical activity is reduced by about 7% per year with a corresponding increase in periods of sedentarism, mainly in the age range from 12 to 15 years<sup>12</sup>. Although individual factors influencing its practice should be considered, today television, computers and video games as a form of leisure, the concern of parents about the safety of their children and the lack of interest on the part of the schools in promoting this type of activity are recognized as “enemies” of physical activity, contributing to the prevalence of high levels of sedentarism<sup>13</sup>. In view of this scenario, the objective of the present study was to analyze the prevalence of physical inactivity among adolescents enrolled in state schools in the city of Ribeirão Preto (SP).

## METHODS

A cross-sectional, observational, and analytical descriptive study was conducted from September to November 2013 on adolescents enrolled in all state schools located in the West administrative region of Ribeirão Preto (SP), all of them showing the same socioeconomic profile. After obtaining authorization from the State Secretary Office of Education and from the directors of the schools, a first contact was made with the students in order to present the objectives of the study and to extend an invitation to participate. A date for the distribution of the questionnaires and for the beginning of the study was then scheduled. After distribution of the questionnaires with proper explanations about the way they should be answered and after obtaining written informed consent, a new visit to the schools was held on previously scheduled days in order to collect the replies, with a maximum of three visits being defined for this purpose.

The instrument used in the study was the International Physical Activity Questionnaire (IPAQ), short version, which has been developed in order to estimate the level of habitual practice of physical activity in populations of different countries and sociocultural contexts. The IPAQ has been validated and is extensively used<sup>14</sup>. The short version of the IPAQ consists of eight open questions and the information obtained with the replies permits an estimate of the time spent per week in

different dimensions of physical activity or inactivity. The type (walking, moderate activity and vigorous activity), frequency (days per week) and duration (minutes per week) of activity are used to classify individuals according to level of physical activity as sedentary, poorly active and active. With these elements, the following three categories can be established.

**Category 1 (low)**

It is the lowest level of physical activity. Individuals who do not satisfy the criteria for categories 2 and 3 are considered inactive (sedentary) or poorly active.

a) Inactive (sedentary) – individuals who practice no physical activity, i.e., individuals who accumulate zero MET-minutes/week.

b) Poorly active – individuals who reach a total physical activity of less than 600 MET-minutes/week.

**Category 2 (moderate)**

a) Active - individuals who practice vigorous activity three or more day per week for at least 20 minutes or 5 or more days of moderate activity or a walk of at least 30 minutes per day, or 5 or more days of any combination of walking and activities of moderate or vigorous intensity reaching a minimum total physical activity of at least 600 MET-minutes/week.

**Category 3 (high)**

a) Active individuals who practice activity of vigorous intensity for at least 3 days, accumulating at least 1500 MET-minutes/week, or 7 days of any combination of walking and of activity of moderate and vigorous intensity accumulating at least 3000 MET-minutes/week.

With this information, the adolescents were classified into three categories defined by the metabolic equivalent for task (MET)<sup>20</sup>. The total number of minutes of each type of physical activity practiced by the adolescents was multiplied by the respective MET, generating a MET-minutes/week score. For adolescents involved in more than one activity the scores of each activity were summed, yielding the total MET-minutes/week score. Based on this

total score, the adolescents were identified as inactive or sedentary individuals when belonging to category 1, and active when belonging to categories 2 and 3, a fact that permitted their classification into three categories based on their responses: sedentary or inactive, poorly active, and active<sup>14</sup>.

Inclusion criteria were individuals of both sexes aged 10 to 19 years completed who gave written informed consent to participate in the study, with the person responsible signing the same consent form. Exclusion criteria were pregnancy, presence of chronic-degenerative diseases, of genetic syndromes and of any other diseases that would limit habitual activities such as frequenting school, sports activities or work.

The study was approved by the Research Ethics Committee of the University Hospital, Faculty of Medicine of Ribeirão Preto, University of São Paulo. Authorization for the participation of the adolescents was also obtained from the Director's Office of Regional Education of Ribeirão Preto and from the Director of each teaching institution.

The distribution of the absolute and relative frequencies of the Excel program (Windows 8) was used for the description of the variables, stratified by gender. Data were analyzed statistically using the Fisher exact test of the SPSS 16.0 software, with the level of significance set at  $p < 0.05$ .

**RESULTS**

A total of 535 adolescents, 187 (35%) boys and 348 (65%) girls, participated in the study. Regarding age range, 348 (65%) subjects were 10 to 14 years old and 187 (35%) were 15 to 19 years old; 52.3% (280/535) studied in the evening period and 10.3% (55/535) worked part time.

Regarding the level of physical activity, 84.5% (158/187) of the boys and 75.6% (264/348) of the girls were classified as active ( $p = 0.03$ ). Adolescents aged 10 to 14 years had a lower level of physical activity than adolescents aged 15 to 19 years ( $p = 0,507$ ). For the boys, the level of physical activity was similar for the two age ranges, as can be seen in Table 1.

**Table 1:** Distribution of the adolescents according to level of physical activity, age range and sex. Ribeirão Preto, 2013.

Sex	Male				Female			
	10 - 14		15 - 19		10 - 14		15 - 19	
Age range	n	%	n	%	n	%	n	%
Sedentary	19	15.0	10	16.0	58	27.8	26	18.7
Active	107	85.0	51	84.0	151	72.2	113	81.3

Active = categories 2 and 3 of the IPAQ

Table 2 shows that 60.4% (113/187) of the boys performed physical activity of vigorous intensity, whereas 56.3% (196/348) of the girls showed preference for physical activities of low or moderate intensity, with the difference being statistically significant ( $p = 0.03$ ).

Tables 3 and 4 present data regarding the sedentary behavior of the adolescents, obtained from the replies to questions 4a and 4b of IPAQ. These questions concern the time an individual remains sitting throughout the day,

either at work, in school or at home, including the time sitting while studying, resting or doing school work, visiting friends, reading, or watching television.

It was observed that 49.7% (93/187) of the boys and 44% (153/348) of the girls spent more time in sedentary activities, i.e., more than the 5 daily hours of school, but this difference was not statistically significant ( $p = 0.444$ ). Regarding the age ranges and the number of hours spent sitting per week, statistically significant differences were

**Table 2:** Distribution of the adolescents according to intensity of physical activity based on the criteria of the IPAQ and sex. Ribeirão Preto, 2013.

Sex	Male		Female	
	n	%	n	%
Physical activity				
Low	29	15.5	83	23.8
Moderate	45	24.1	113	32.5
Vigorous	113	60.4	152	43.7

**Table 3:** Distribution of the adolescents according to age range and sex based on the total number of hours spent sitting during the week. Ribeirão Preto, 2013

Sex	Male				Female			
	10 - 14		15 - 19		10 - 14		15 - 19	
Age range								
Number of hours spent sitting	n	%	n	%	n	%	n	%
< 30	62	49.6	31	50.8	115	55.0	38	27.3
≥ 30 and < 40	40	32.0	11	18.0	43	20.0	30	21.6
≥ 40 and < 50	17	13.6	15	24.6	39	19.0	57	41.0
≥ 50	6	4.5	4	6.6	13	6.0	14	10.1

obtained only among the girls for the period of less than 30 hours ( $p = 0.001$ ) and of 40 to 50 hours ( $p = 0.001$ ), *i.e.*, the proportion of girls aged 10 to 14 years who remained sitting less than 30 hours during the week was greater than the proportion for the age range of 15 to 19 years. On the other hand, for the period of 40 to 50 hours per week, the prevalence was higher for girls aged 15 to 19 years.

The number of hours spent sitting by adolescents during the weekend differed significantly when the prevalence of sedentarism among girls was compared for a time of more than 20 hours ( $p = 0.001$ ), as can be seen in Table 4.

Table 5 presents the distribution of adolescents according to age range, sex, level of physical activity and study period. Regarding the level of physical activity of those who study in the morning period, 24.2% (37/153) of the girls aged 10 to 14 years and 29.6% (8/27) of those aged 15 to 19 years were classified as sedentary. Among the students of the evening period, 13.7% (7/51) of the boys and 18% (20/112) of the girls aged 15 to 19 years were classified as sedentary, although these differences were not statistically significant ( $p > 0.05$ ).

**Table 4:** Distribution of the adolescents according to age range and sex based on the total number of hours spent sitting during the weekend. Ribeirão Preto, 2013.

Number of hours spent sitting	Male				Female			
	10 - 14		15 - 19		10 - 14		15 - 19	
	n	%	n	%	n	%	n	%
< 10	76	60.0	36	59.0	155	50.0	78	56.1
≥ 10 and < 15	29	23.0	16	26.0	50	24.0	38	27.3
≥ 15 and < 20	10	8.0	5	8.0	22	10.0	18	13.0
≥ 20	11	9.0	4	7.0	33	16.0	5	3.6

**Table 5:** Distribution of the adolescents according to age range, sex, level of physical activity and study period. Ribeirão Preto, 2013.

	Morning								Afternoon							
	Male				Female				Male				Female			
	10 - 14		15 - 19		10 - 14		15 - 19		10 - 14		15 - 19		10 - 14		15 - 19	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Sedentary	15	17	3	30	37	24.2	8	29.6	4	11	7	13.7	22	39	20	18
Active	75	83	7	70	116	75.8	19	70.4	32	89	44	86.3	34	61	92	82

## DISCUSSION

The present study observed a high prevalence of inactivity among adolescents enrolled in public schools in Ribeirão Preto. Many studies have also revealed high prevalence of physical inactivity among adolescents. This represents a problem about the future since this profile of inactivity tends to be maintained over the years<sup>15</sup>.

In a study of 17,928 undergraduate students (average age 20.8) from 23 countries observed a mean prevalence of physical inactivity of 41.4%, ranging from 21.9% to 80.6%; In the same study, students from countries with higher incomes had higher levels of physical activity<sup>16</sup>. In Brazil, a study conducted in the city of Pelotas (RS), Silva *et al.*<sup>17</sup> detected 77.7% active adolescents and 22.3% insufficiently active adolescents, with a greater percentage of activity among males. In the city of Rio de Janeiro, was detected a high prevalence of physical inactivity among adolescents, involving 85% of the boys and 94% of the girls<sup>18</sup>. The same was observed in other Brazilian cities like Pelotas (58.2%) and São Paulo, with a 64.3% rate for both sexes. The prevalence of inactivity was also 62.5% among 3845 adolescents aged 14 to 19 years enrolled in schools of the public network in São Paulo city<sup>19</sup>. It is possible that people from higher income countries have better conditions to perform physical activities, including more adequate sports facilities, more access to information about health promotion and as consequence higher motivation to this type of activity<sup>16</sup>. In Brazil, more public spaces for physical activity and less of a concern for the safety of their adolescents by their parents could explain the differences observed between physical inactivity rates in smaller cities (such as Pelotas<sup>17</sup> and Ribeirão Preto) compared to bigger ones (like Rio of Janeiro<sup>18</sup> and São Paulo<sup>19</sup>). Also, another explanation for the results of this study would be that adolescents who didn't return the questionnaires could increase the proportion of subjects classified as physically inactive, because these individuals could be less motivated to answer them.

In the present study, girls presented higher rates of sedentary lifestyle than boys. Moreover, boys performed physical activity of vigorous intensity more frequently than girls. Alves *et al.*<sup>20</sup> studied the prevalence of physical inactivity among 803 adolescents enrolled in the public education network of the city of Salvador (BA) and detected a general rate of 49.6%, with a higher value among girls<sup>20</sup>. In cities in the southern region of Brazil, some authors detected a prevalence of physical inactivity ranging from 58% to 89%, with a predominance among girls<sup>15,20,21</sup>. Major concerns about the safety of the girls to perform outdoor activities by their parents, biological and emotional malaise caused by menses, among others, may be among cultural, behavioral and biological reasons that would help to explain the fact that the girls present higher rates physical inactivity found in the present study and others. Thus, by spending more time being exposed to sedentary activities and by engaging less in physical activities, girls may be more susceptible to risk factors for health.

The present data show that the time spent in sedentary activities by both age groups was similar on week days, about 50%, and on weekends (40%), in addition to

the five regular hours of study. Furthermore, in this study, the older girls presented higher rates of physical inactivity (hours spent sitting) during the weekdays than younger ones; on the other hand, younger girls had more hours of physical inactivity on weekends. According to Mathews *et al.* older American adolescents spend approximately 60% of their waking time in sedentary activities<sup>22</sup>. Pardo *et al.* detected a 54.8% prevalence of sedentary behavior on week days and a 74.2% prevalence on weekends among the Brazilian adolescents<sup>23</sup>. In this study, it is possible that the factors that interfere with physical activities for adolescents (access to sports facilities, computer use and electronic devices) remain unchanged between weekdays and weekends. With regard to girls, school work could help explain the finding of higher rates of physical inactivity among older adolescents during the week days. On the other hand, it is likely that on weekend younger girls stay longer at home under the supervision of their parents and this could be an explanation of these adolescents present higher rates of physical inactivity in these days.

Thus, physical activity should be understood as a human behavior influenced by social, biological and environmental variables and many factors should be taken into account in the attempt to promote actions that will encourage its practice<sup>24</sup>. The main reasons that lead adolescents to practice physical activity are the acquisition of self-confidence and personal satisfaction, escaping the routine of curricular activities, socializing and stimulating life objectives since sport can be the stage for situations to be experienced during adult life. However, it should be pointed out that a great preoccupation with body image usually is the best stimulus that leads many adolescents to look for sport activities, especially extracurricular ones<sup>25</sup>.

It is also necessary to identify possible barriers that prevent the practice of physical activity such as accessibility, the absence of appropriate places, the lack of encouragement by both the family and public authorities, the lack of company for the activities, etc<sup>7</sup>. And, for the implantation of public policies that will stimulate this practice it is necessary to involve the entire society, from practising subjects to managers, teachers, educators and the media for dissemination and encouragement.

The present study has some limitations. The fact of the present study was conducted on a small group of adolescents and in only one region of the city may be considered a limitation, although there were no differences in the socioeconomic profile of the students from the schools of that region of the city. Another limitation is that a group of the adolescents didn't return the questionnaires; probably inactive teenagers could be less motivated to answer the questionnaires and this could change our findings. Finally, this was a cross-sectional study and possible associations and differences among variables can be only casual.

This study brought more information on physical activity among adolescents living in urban area and also certain characteristics involving this action and it can contribute to a better understanding of this behavior in this population. These findings may help in the adoption of measures by the public authorities to increase physical activity rates among adolescents. However, we recognize

that more studies are needed in order to investigate the prevalence of physical activity among adolescents in other communities and also on some characteristics about this practice, especially to understand better about the barriers and behaviors that prevent this type of activities for adolescents.

In conclusion, this study observed a high prevalence of physical inactivity among adolescents in a public school

in a region of Ribeirão Preto and girls had higher rates of this behavior. In our population, boys performed more vigorous physical activity than girls. The older girls had higher rates of physical inactivity (hours spent in the sitting position) during the week days compared to the younger ones, while the latter spent more time in physical inactivity during the weekend.

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## Resumo

**Introdução:** Adolescência é o período de transição entre a infância e a vida adulta, caracterizado por modificações no desenvolvimento físico, emocional, sexual e social e pelos esforços em alcançar os objetivos relacionados às expectativas culturais da sociedade em que vive.

**Objetivo:** Avaliar a prevalência de inatividade física entre adolescentes matriculados em escolas da cidade de Ribeirão Preto (SP).

**Método:** Estudo transversal, observacional e descritivo realizado entre 01/09/2013 e 30/11/2013, com adolescentes matriculados em 14 escolas estaduais da cidade de Ribeirão Preto (SP), utilizando-se o International Physical Activity Questionnaire, versão curta.

**Resultados:** Participaram 535 adolescentes sendo 35 % masculino e 65 % feminino; 65% tinham entre 10 e 14 anos e 35% entre 15 e 19 anos; 52,3% estudavam no período vespertino e 10,3% trabalhavam meio período ao dia. Quanto ao nível de atividade física encontrou-se 15,5% dos meninos e 24,1% das meninas classificados como sedentários ( $p > 0,05$ ). As moças com idades entre 10 e 14 anos referiram nível de atividade física menor que as da faixa etária dos 15 aos 19 anos ( $p = 0,507$ ). 60,4% dos rapazes realizam atividade física de intensidade vigorosa enquanto 56,3% das moças mostraram preferência por atividades físicas de intensidade baixa ou moderada ( $p = 0,03$ ). As moças na faixa etária dos 15 aos 19 anos passam mais tempo sentadas durante a semana, enquanto que nos finais de semana são menos ativas aquelas com idades entre 10 e 14 anos. Classificou-se como sedentários 24,2% das moças com idades entre 10 e 14 anos que estudam no período da manhã e, no período vespertino, 13,7% dos rapazes e 18% das moças na faixa etária dos 15 aos 19 anos.

**Conclusão:** A prevalência de sedentarismo foi de 21% sendo maior para o sexo feminino na faixa etária dos 10 aos 14 anos, que são menos ativas nos finais de semana e que estudam no período da manhã.

**Palavras-chave:** comportamento adolescente; atividade motora; estilo de vida sedentário.

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