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Prevalence of physical activity through the practice of sports among adolescents from Portuguese speaking countries

Prevalência de atividade física através da prática esportiva em adolescentes de países de língua Portuguesa

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Abstract This study evaluated the prevalence of physical activity through the practice of sports in adolescents from schools in two Brazilian cities and a Portuguese school, and its association with independent variables, such as gender and age. A cross-sectional study was conducted of schoolchildren from two cities in Brazil and one in Portugal. The total study sample was 3694 subjects (1622 males and 1872 females). Physical activity levels were assessed using Baecke's questionnaire. Body weight was measured on electronic scales and stature was measured with a portable wooden stadiometer. Numerical variables were expressed as mean, categorical variables were expressed as percentages and the chi-square test analyzed associations. The prevalence of no sport was high (39.7%), being higher in the Portuguese school than in the Brazilian schools ($p < 0.001$). Irrespective of being an adolescent in a Brazilian or Portuguese school, boys showed higher engagement in sports practice than girls ($p < 0.001$). In both, differences were identified between adolescents aged 13 to 15 ($P = 0.001$) and 16 to 17 ($P = 0.001$). The prevalence of physical inactivity among schoolchildren from two cities in Brazil and a school in Portugal was high, with the girls practicing less sport than the boys and with this imbalance likely to be higher in adolescents.

Key words Sports, Physical activity, Adolescents

Resumo Objetivos: Avaliar a prevalência de atividade física por meio da prática de esportes em adolescentes de escolas de duas cidades brasileiras e jovens de uma escola portuguesa e sua associação com variáveis independentes, como sexo e idade. Métodos: Estudo transversal realizado em escolares de duas cidades do Brasil e em adolescentes de uma escola numa cidade de Portugal. A amostra total do estudo foi de 3.694 indivíduos (1.622 meninos e 1.872 meninas). O nível de atividade física foi avaliado usando o questionário Baecke. O peso corporal foi medido por meio de uma balança eletrônica e a estatura foi medida com um estadiômetro portátil. As variáveis numéricas foram expressas em média, as variáveis categóricas foram expressas em porcentagens e o teste do qui-quadrado analisou as associações. Resultados: A prevalência de nenhuma prática esportiva foi elevada (39,7%), sendo mais elevada em adolescentes de uma escola portuguesa do que adolescentes das escolas brasileiras ($p < 0,001$). Independente de ser adolescente de escola brasileira ou portuguesa, os meninos apresentaram maior adesão à prática esportiva do que meninas ($p < 0,001$). Em ambos, foram identificadas diferenças entre adolescentes de 13-15 anos ($p = 0,001$) e 16-17 anos ($p = 0,001$). Conclusões: A prevalência de inatividade física em escolares de duas cidades do Brasil e em uma escola de uma cidade de Portugal foi elevada.

Palavras-chave Esportes, Atividade física, Adolescentes

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Introduction

Currently, coronary heart disease is responsible for the largest number of deaths worldwide^{1,2} and certain variables (diabetes mellitus, hypercholesterolemia, hypertension, overweight, abdominal obesity and physical inactivity) are indicated as important cardiovascular risk factors³⁻⁶.

The promotion of physical activity is an important factor in preventing and treating cardiovascular risk in both pediatric and adult populations. However, despite the well-documented effect of physical activity, a large number of studies have reported a low prevalence of adults engaged in physical activity⁷⁻⁹. Similarly, physical inactivity is observed in pediatric populations¹⁰⁻¹² and this pattern constitutes a concern, as unhealthy habits track from childhood to adulthood⁷.

On the other hand, physical activity is a behavioral variable which is affected by social and demographic aspects and therefore it is necessary to take these variables into account when establishing actions to promote physical activity. Thus, comparisons of physical activity practice between developed and developing settings can determine the burden of these social and demographic aspects.

Thus, the objective of this study was to assess the prevalence of physical activity through sports practice in adolescents from schools in two Brazilian cities and adolescents in a school from a Portuguese city and its association with independent variables, such as gender and age.

Methods

In Portugal, the data collection was carried out in the month of May 2008. All measures were performed by previously trained coaches in a high school located in the metropolitan region of Lisbon, Portugal. Prior to the study, all students with ages ranging from 12 to 18 years were invited to participate and their parents gave written informed consent. In Brazil, adolescents of a similar age range (10-18 years) were interviewed through two school based epidemiological studies which were carried out during the second semester of 2007 and the first semester of 2008 in two medium sized Brazilian cities (Presidente Prudente and Londrina [170km distance between them]).

In Portugal, an epidemiological study was carried out in the city of Sintra (25km far from Lisbon) during 2008. In 2008, Sintra had 7,154

adolescents attended by nine schools and to the development of this study a school was selected by convenience (due its geographical proximity with other two cities). The selected school had 12.1% of all students of the city ($n = 863$) and, after authorization of the school administrative staff, all students regularly registered in the school were invited to participate. After the field work, an overall of 768 students agreed to participate (432 females and 336 males; participation rate 88.9%) and received the authorization of yours parents/legal guardians.

In Presidente Prudente all 36 public and private schools that adolescents attend (11 to 17 years) were considered eligible for the study. In the city, ~30% of the all schoolchildren attend private schools and, therefore, six schools (four public and two private) were selected through draw and all students aged 11-17 were invited to participate. In Londrina, a sample of elementary school students by the respective municipality cluster sampling process opting for data collection class as a whole was obtained. Londrina was divided into 5 geographical areas: north, south, east, west and central. In each region two schools (one public and one private) were chosen by lot, and these schools were stratified and a number of classes were selected to achieve the proportion of each type of school and region. The total study sample was 3694 subjects (1622 males and 1872 females). All procedures were approved by the ethics committee on human experimentation of the institutions involved.

Physical activity level was assessed using the Baecke's questionnaire¹³, which has been previously validated against doubly labeled water¹⁴ and the tri-axial accelerometer¹⁵. The instrument has 16 questions and assesses physical activity in three domains: school, sports and leisure. In our study, leisure-time physical activity was assessed through sports practice, because this kind of activity is common among young people. The adopted outcome was no engagement in sports practice (for those adolescents who were classified as engaged in sports practice, neither the frequency nor previous engagement in sports activities were taken into account).

The ages were assessed and stratified into groups (10-12 years; 13-15 years; 16-17 years). All anthropometric measurements were performed within the school itself. All reviews were barefoot, standing, standing in the center of the scale platform and wearing light clothing. Body weight was measured using electronic scales (to the nearest 0.1 kg and a maximum capacity of

150 kg). Stature was measured with a portable wooden stadiometer (to the nearest 0.1 cm and a maximum extension of 200 cm). The body mass index (BMI) was determined by dividing the weight by the height squared. Adolescents remained standing, barefoot, turned his back to the vertical surface of the device and the head positioned in the Frankfurt plane, the upper limbs relaxed next to the trunk, with your palms facing your thighs with your heels together, touching the vertical portion of the stadiometer and distant medial edges. Adolescents were classified as normal weight or overweight according to the criteria proposed by Cole et al.¹⁶.

Statistics analyses

Data normality was verified by the Komogorov-Smirnov test. Numerical variables were expressed as mean with a confidence interval of 95% (95%CI). A comparison of continuous variables according to the adolescent's gender was performed using the Student's t-test for independent samples. Categorical variables were expressed as percentages and the chi-square test analyzed associations (Yates' correction was used for 2x2 tables). The statistical significance was set at ≥ 0.05 .

Results

In the overall sample the number of males was 1622 (46.4%). Boys and girls presented similar ages ($P = 0.298$), while boys were taller and heavier ($p = 0.001$ for both). On the other hand, BMI was similar in boys and girls (Table 1). The prevalence of overweight among schoolchildren in two cities in Brazil and a school in a town of Portugal was similar, 22.3% and 25.9%, respectively ($p = 0.116$). Figure 1 shows that the prevalence of no sports practice was high (39.7%) whilst being higher in Portugal than Brazil ($P = 0.001$).

Independent of adolescents from schools in two Brazilian cities or a Portuguese school (Figure 2), boys presented higher engagement in sports practice than girls ($P = 0.001$ for comparisons within Brazil and Portugal). Linear trends indicated that lower engagement in sport practice was observed in older adolescents.

Regular engagement in sports practice was higher in boys than girls in all age groups (Figure 3). In Portuguese adolescents, the differences were identified in adolescents of 13-15 years (P

$= 0.001$) and 16-17 years ($P = 0.001$), but not in adolescents of 10-12 years. Similar patterns were observed in all age groups composed of Brazilian adolescents.

Discussion

A cross-sectional study in which we observed high physical inactivity among schoolchildren in two cities in Brazil and a school in a town from Portugal. The difference between the Brazilian and Portuguese schoolchildren was significant, with the largest physical inactivity observed in adolescents from a school in a Portuguese town. Other studies have also had the objective of comparing physical activity in adolescents from cities of different countries. Greguol et al.¹⁷, after comparing the practice of physical activity in adolescents with visual problems in Brazil and Italy found no significant differences for this variable. In a study comparing 20 different countries with a broader age range (18-64 years), Bauman et

Table 1. General characteristics of the adolescents from Portuguese speaking countries.

	Male (N = 1622)		Female (N = 1872)		P
	Mean	95%CI	Mean	95%CI	
Age (years)	13.44	(13.3-13.5)	13.49	(13.4-13.5)	0.298
Weight (kg)	54.78	(54.1-55.5)	50.81	(50.2-51.3)	0.001
Height (cm)	162.32	(161.7-162.9)	157.67	(157.3-158.1)	0.001
BMI (kg/m ²)	20.58	(20.3-20.7)	20.40	(20.2-20.5)	0.174

95% CI = 95% confidence interval.

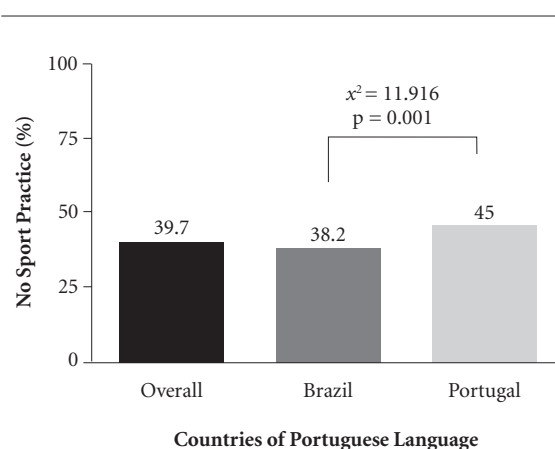


Figure 1. Prevalence of no sports practice in two Portuguese speaking countries.

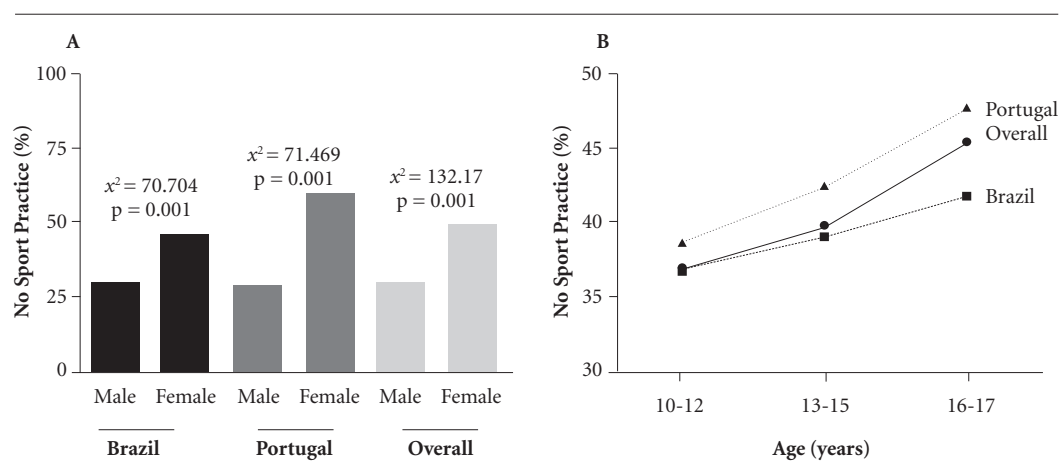


Figure 2. No Sports practice according to sex and age.

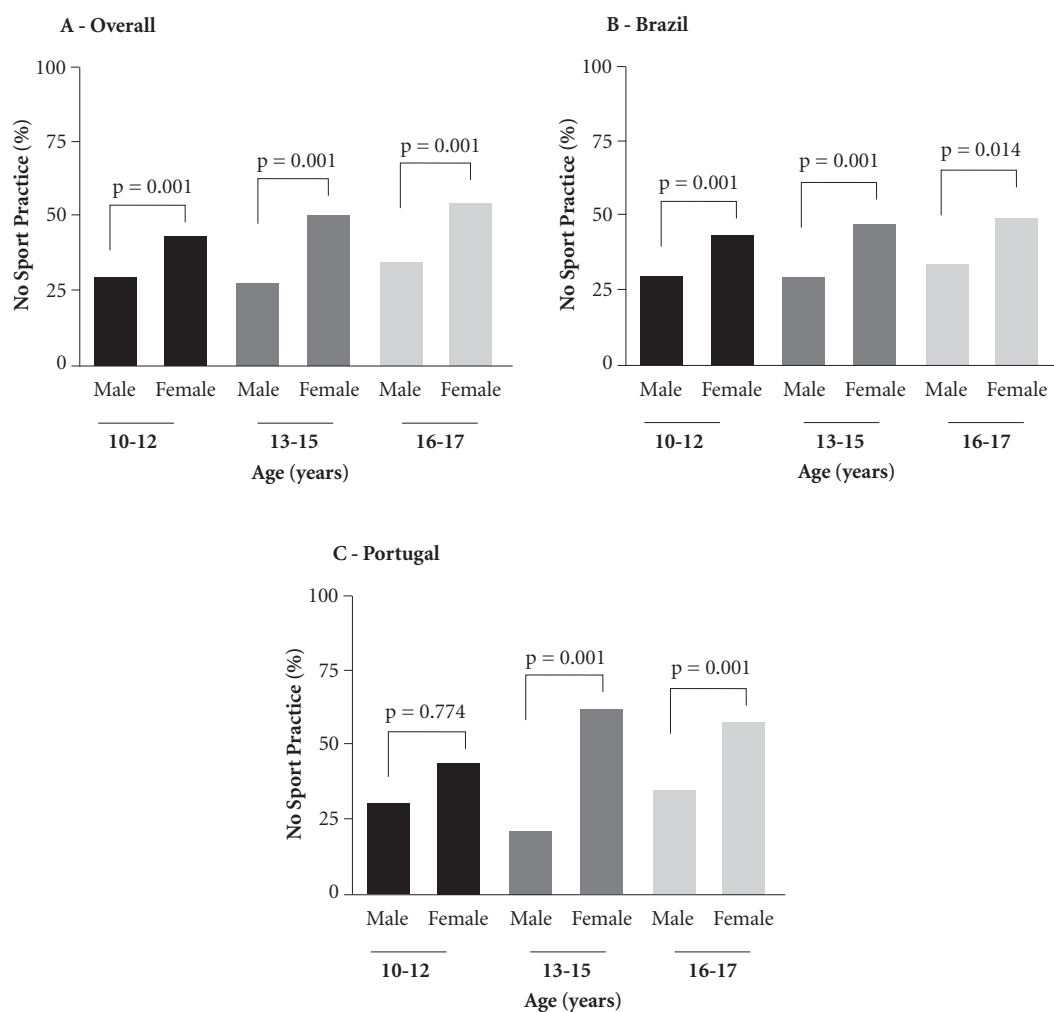


Figure 3. No Sports practice stratified by sex and age.

al.¹⁸ observed that there were high differences in physical inactivity among the countries analyzed.

The prevalence of physical inactivity in our study was approximately 40%. Our results corroborate with other Brazilian research, in which physical inactivity ranged from 39.0%¹⁹ to 56.0%²⁰. On the other hand, our values are much higher than the results observed by Sun et al.²¹ who assessed the physical activity in a population of young Japanese from a city in Toyama (only 22.8% of the boys practiced physical activity seldom or almost never). There are several reasons that may contribute to this discrepancy in the analysis of low physical activity among studies. Methodological factors are a major cause, as using different methodologies to assess physical activity (questionnaires, accelerometers, doubly labeled water) can produce different results.

Even when evaluations are conducted using the same method, for example, questionnaires, there are various forms of coding, the review or not of different domains and several cutoffs. However cultural differences, along with the climate and economic conditions of different countries also have to be considered. In relation to socioeconomic factors, there is no consensus in the literature; these differences could be attributed to the demographic context of the populations studied²², in order to find the determinants of prevalence it is necessary to study the characteristics of the population and not confine the investigation to the individual²³, this is primarily due to the fact that low and middle income countries are undergoing epidemiological transition^{24,25}.

Despite the limitations in being able to make comparisons between studies which use different methods for measuring physical activity, one important point is that there seems to be a consensus that girls tend to be more sedentary than boys²⁶⁻²⁸. Gonçalves et al.²⁹ also observed the relationship between physical activity and gender. In their study the authors analyzed the physical activity in more than 4,000 adolescents. The girls were considered less physically active than the boys, with a prevalence of 67.5% and 48.7%, respectively. One possible hypothesis for these findings is that boys have more freedom to explore longer distances from the home, which in turn contributes to increased physical activity, since larger displacement increases energy expenditure. Boys are more physically active with friends outside of school hours, compared to girls²⁹, contributing to greater physical activity among these adolescents, especially in team sports such as football, which is often practiced in countries such as

Brazil and Portugal. The boys also seem to receive more encouragement from parents to practice physical activity when compared to girls. One of the factors that may influence this is the relationship that parents have with sports and, considering that the prevalence of being physically active in the adult population is higher in men^{7,30}, this can be a determining factor because of the influence that parents have on male children. Furthermore, social support for physical activity seems to positively influence this behavior³¹.

Another factor observed in this study was the inverse relationship between physical activity levels and age (higher physical inactivity in older adolescents). Corder et al.³² in an epidemiological study with an accelerometer found that physical activity tends to decrease with age. Sjostrom et al.³³ found that approximately 30% of adolescents from European countries over the age of 15 years were sedentary. In a systematic review, Seabra et al.²² found that in most studies physical activity decreased with advancing age.

Possible mechanisms of a biological or behavioral nature could explain this decrease, in a review with nonhumans, Ingram³⁴ observed that the reduction in physical activity according to increased age was related to dopamine, since this neurotransmitter is related to adrenalin and noradrenaline, substances stimulating the central nervous system and could contribute in a motivational way to the practice of physical activity. In addition in the move from childhood to adolescence increased responsibilities can arise, since many adolescents begin to work at this time or change their focus to increasing the number of hours they study in order to complete their university education, this reduces their available time which could be associated with the decreased physical activity during this transition. Friendships may also contribute, since at this stage of life seems to be influenced by close friends as to their level of physical activity^{31,35}.

This study has some limitations, the cross sectional design avoids causality statements between variables. Another factor is that the analysis of physical activity was assessed by questionnaire rather than a direct method of measurement of physical activity such as an accelerometer or doubly labeled water. We must also mention that all samples are not representative of Portugal and Brazil; therefore, our findings cannot be generalized to the two countries. On the other hand, the strength of our study is that few studies have compared the practice of physical activity in schoolchildren from different nationalities.

In summary there was a high prevalence of physical inactivity, with the girls practicing less sport than the boys and this imbalance likely to be higher in adolescents aged 16-17 years. This behavior was more pronounced in the schools of two Brazilian cities and a Portuguese school analyzed in the study. Strategies that are conducted in schools and approach the matter with the aim of public health actions to reduce this problem are needed.

Collaborations

DGD Christofaro, RF Araújo, ERV Ronque, C Martins, MS Coelho, A Silva, L Sardinha and ES Cyrino participated equally in all stages of preparation of the article.

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