



Prevalence of insufficient physical activity in children from public schools

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ABSTRACT. This study aimed to identify the prevalence of physical inactivity (PI) in schoolchildren of both sexes enrolled in public elementary schools in Goiânia (State of Goiás). A cross-sectional, analytical study with 482 schoolchildren aged six and seven. Those responsible answered a form containing sociodemographic variables, data related to the practice of physical activity (PA) and displacement to school. Children who didn't perform at least 60 minutes of PA per day were considered physically inactive. Descriptive analyses and chi-square statistics were used for the differences in proportions. The prevalence of PI was 31.9% (95% CI: 27.9-36.2), higher in the female students (37.6 - 95% CI: 31.8 to 43.7) compared to the male students (25.6 - 95% IC: 20.2 to 31.5) ($p = 0.004$). There was no difference in prevalence between inactive children from families enrolled or not in the Family Health Strategy (FHS) ($p = 0.969$). The prevalence of PI was high among schoolchildren, with a difference between the sexes. Being enrolled in the FHS didn't change the prevalence of PI, indicating that the actions of health teams in schools need to be re-evaluated. These results indicate the need for programs to encourage the practice of PA among schoolchildren.

Keywords: school health; child; sedentary lifestyle.

Prevalência de inatividade física entre crianças de escolas públicas

RESUMO. O objetivo deste estudo foi identificar a prevalência de inatividade física (IF) em escolares de ambos os sexos, matriculados nas escolas públicas do ensino fundamental de Goiânia (GO). Estudo transversal analítico, com 482 escolares de seis e sete anos. Os responsáveis responderam a um formulário contendo variáveis sociodemográficas, dados relacionados à prática de atividade física (AF) e deslocamento para a escola. Foram consideradas inativas fisicamente as crianças que não realizavam, no mínimo, 60 minutos/dia de atividade física. Para a análise de dados foi utilizada a estatística descritiva e qui-quadrado para as diferenças de proporções. A prevalência de IF foi de 31,9% (IC 95%: 27,9-36,2) sendo maior no sexo feminino (37,6 - IC 95%: 31,8 a 43,7) em comparação ao masculino (25,6 - IC 95%: 20,2 a 31,5) ($p = 0,004$). Não houve diferença na prevalência entre as crianças inativas de famílias cadastradas e não cadastradas na Estratégia Saúde da Família (ESF) ($p = 0,969$). A prevalência de IF foi alta entre os escolares, com diferença entre os sexos. Ser cadastrado na ESF não alterou a prevalência de IF, indicando que as ações das equipes de saúde nas escolas precisam ser reavaliadas. Esses resultados sinalizam a necessidade de programas de incentivo à prática de AF entre escolares.

Palavras-chave: saúde escolar; criança; estilo de vida sedentário.

Introduction

In general, physical inactivity is associated with increased risk of cardiovascular disease in children and adolescents (Lieberman et al., 2011) and is recognized as an important determinant of childhood obesity (Bukara-Radujković & Zdravković, 2009; Griffiths et al., 2016), which is one of the greatest public health challenges of the present century (World Health Organization, 2016). Recently, the World Health Organization approved an Action Plan for obesity

prevention in children and adolescents. The document indicates more physical activity in schools as one of the strategic actions to stem the spread of this epidemic (World Health Organization, 2016).

International guidelines (Barve et al., 2010; US Department of Health Human Services, 2008) and national guidelines (Sociedade Brasileira de Cardiologia, 2005) recommend that children and adolescents have to perform at least 60 minutes daily of moderate to vigorous intensity to present health benefits.

In the United States, the Centers for Disease Control and Prevention (CDC) has developed a Youth Risk Behavior Surveillance System (YRBSS) to monitor risk behaviors among young people. Among the categories monitored, PI stands out as one of these behaviors (US Department of Health and Human, 2014).

In Brazil, a system of surveillance of health risk factors was implemented in schools, entitled National School Health Survey (PeNSE). In 2015, the PeNSE results indicated that 60.8% of the students attending the 6th to 9th grade of elementary education in public and private schools in all Brazilian capitals and in the Federal District were classified as insufficiently active (Instituto Brasileiro de Geografia e Estatística, 2016).

The importance of practicing PA since childhood is also highlighted by other researchers (Gunawardena et al., 2016). However, there are difficulties in comparing prevalences found on the practice of PA by children and adolescents due to methodological divergences and in the logistics for obtaining data in this age group. In turn, the results of the studies have pointed to high prevalence of PI in this population (Andrade Neto, Eto, Pereira, Carletti, & Molina, 2014; Pinto, Silva, Priore, Assis, & Pinto, 2011).

International data show that children are incorporating sedentary behaviors into daily life (Guthold, Cowan, Autenrieth, Kann, & Riley, 2010). In the United States, a cross-sectional, population-based study of children and adolescents aged four to eleven years identified that 37.3% had low levels of PA (Anderson, Economos, & Must, 2008). In the United Kingdom, only half of seven-year-olds practice recommended PA levels (Griffiths et al., 2013).

In Brazil, in 2007, the Health in School Program (PSE) was instituted, an intersectoral policy of Health and Education, aimed at Brazilian public schools. The health teams of the FHS were responsible for evaluating and promoting comprehensive health actions in the school environment, among them the incentive to the regular practice of PA by children health (Brasil, 2009). Nevertheless, Brazilian studies conducted with schoolchildren showed high prevalence of PI. A study performed with high school students from state public schools in the city of São Paulo found a prevalence of PI in adolescents of 62.5% (Ceschini, Andrade, Oliveira, Araújo Júnior, & Matsudo, 2009).

The school environment has been considered ideal for the promotion of physical activities (Kriemler et al., 2011), since it is the place where children spend most of their day. In Brazil, the population-based information on the prevalence of PI among schoolchildren is still scarce. Thus, the

goal of the present study was to analyze the prevalence of PI in children aged 6 to 7 years, enrolled in the municipal public schools of Goiânia, State of Goiás, Brazil.

Material and methods

This is a cross-sectional, analytical, school-based, carried out from April to July 2014, with students between six and seven years old, of both sexes, enrolled in public elementary schools in Goiânia, State of Goiás. Goiânia has a population of approximately 1,302,000 inhabitants and is located in the central region of Brazil.

After authorization of the study by the Municipal Department of Education, we prepared a list of all municipal schools ($n = 155$) and a total of 18,957 children enrolled, aged six to seven years, in January 2014. For the calculation of the sample, it was estimated a prevalence of 37.8% of physically inactive children (Monego & Jardim, 2006), an acceptable error of 6%, 1.8 of drawing effect, significance level of 0.05, totaling a minimum sample of 431 participants. We added 10% for losses ($n = 482$). Twenty-seven out of the 155 schools were drawn to represent all the regions of Goiânia. The schools had 3,521 children enrolled aged six to seven. In each of the schools we included the children who were present and whose parents or legal guardians attended during the period for data collection. Children who were out of the age range of the study or who had special educational needs or motor/functional limitation were excluded.

The researchers held meetings with the principals of the schools drawn and with the parents of the students, who were explained the terms of the study, in a room assigned by the school board for the interview. Data collection was conducted after approval by the Research Ethics Committee of the Pontifical Catholic University of Goiás (opinion number: 611393) and all legal persons signed the Informed Consent Form before being interviewed.

To identify the students' PA habits (outcome variable), a structured form was used, answered by the parents or legal guardian of the child. Data collection tool was adapted from the recommendations of regular PA practice for children, released in 2008 by the United States (*Healthy People 2008* (<http://www.cdc.gov>) (US Department of Health Human Services, 2008) and investigated the practice of PA over the past seven days. This Guideline includes recommendations on the number, types, and intensity of PA that children should perform to achieve important health benefits.

The form used for data collection was previously tested in a pilot test with 40 parents from another non-drawn school to participate in the study to

assess the clarity of the questions. We verified the difficulties of the research assistants and legal guardians for the children in the understanding of the questions and the time spent in each application was measured. Data collected in the pilot study were not incorporated into the sample.

The best PA level was defined as the practice of 60 minutes or more of daily PA for children, from moderate to vigorous intensity. The following PA intensity rating was used: (i) 'moderate' - defined as "[...]any activity sufficient to sweat that increases heart rate [...]" (daily AF); (ii) 'vigorous' - defined as "[...] any activity sufficient to produce strong, rapid breathing that increases heart rate" (US Department of Health Human Services, 2008). Light physical activities (walking, playing musical instruments, gardening) were excluded from the above definition. It was also considered the frequency of PA, the type of trip to school (on foot or by bicycle/car or motorcycle). In this study, the displacement in vehicle or motorcycle was considered as PI.

The following variables were collected: (i) 'data of the child': date of birth (years); sex (male/female); race (white/non-white); child of family enrolled in the FHS (yes/no); preterm (yes/no); displacement to school (walking-bike/vehicle-motorcycle); (ii) 'family data': age of the mother (years) and categorized as < 24 years and ≥ 24 years (Organização das Nações Unidas, 1965); number of people in the residence (1-3/ ≥ 4); maternal schooling (up to elementary/high school or higher);

smokers in the residence (yes/no); (iii) 'physical activity': displacement to school (walking-bike/vehicle-motorcycle); number of times/week performing PA (1x/2x/3x//does not); played or exercised moderately in the last week (yes/no); played or exercised vigorously in the last week (yes/no); performed at least 60 minutes of activities every day (yes/no); performed vigorous activities at least three times a week (yes/no).

Data analysis was performed by the Statistical Package for the Social Sciences (SPSS) for Windows (version 20.0). Percentages of responses to questions regarding PA practice and PA frequency calculations were made according to sex. In the descriptive analysis, the proportions calculations and the respective 95% confidence intervals (95% CI) were used. Similar prevalence was considered when confidence intervals overlapped. Differences in proportions were calculated by the chi-square test and p-values less than 0.05 were considered significant.

Results and discussion

All eligible children and parents or guardians were contacted by the researchers and participated in the study (there was no refusal). Of the 482 children participating in the study, 52.9% were female, 41.9% of the mothers of the children had attended primary school, and the majority of the children were of families enrolled in the FHS (66.1%) (Table 1).

Table 1. Characteristics of children enrolled in public schools, physically inactive and active - Goiânia, State of Goiás, Brazil, 2014.

Characteristics	Total	%	Physically inactive				p-value
			yes		no		
			n	%	n	%	
Gender (n = 482)							
Female	255	52.9	96	37.6	159	62.4	0.004
Male	227	47.1	58	25.6	169	74.4	
Race (n = 480)							
Non-white	312	65.0	107	34.3	205	65.7	0.092
White	168	35.0	45	26.8	123	73.2	
Preterm (n = 480)							
Yes	41	8.5	15	36.6	26	63.4	0.518
No	439	91.5	139	31.7	300	68.3	
Mother age (n = 478)							
≤ 24 years	64	13.4	18	28.1	46	71.9	0.498
> 24 years	414	86.6	134	32.4	280	67.6	
Maternal schooling (n = 482)							
≤Elementary school	202	41.9	70	34.7	132	65.3	0.280
≥High School	280	58.1	84	30.0	196	70.0	
Child of family enrolled in the FHS (n = 481)							
No	163	33.9	52	31.9	111	68.1	0.969
Yes	318	66.1	102	32.1	216	67.9	
Number of people in the residence (n = 482)							
≥ 4 people	359	74.5	118	32.9	241	67.1	0.460
1-3 people	123	25.5	36	39.3	87	70.7	

The prevalence of PI among students was 31.9% (154/482; 95% CI: 27.9-36.2), with the highest prevalence of FI in the female students (37.6 - 95% CI: 31.8 to 43.7) compared to the male students (25.6 - 95% CI: 20.2 to 31.5) ($p = 0.004$). There was no significant difference in the proportion of physically inactive children between those enrolled and non-enrolled in FHS ($p = 0.969$) (Figure 1).

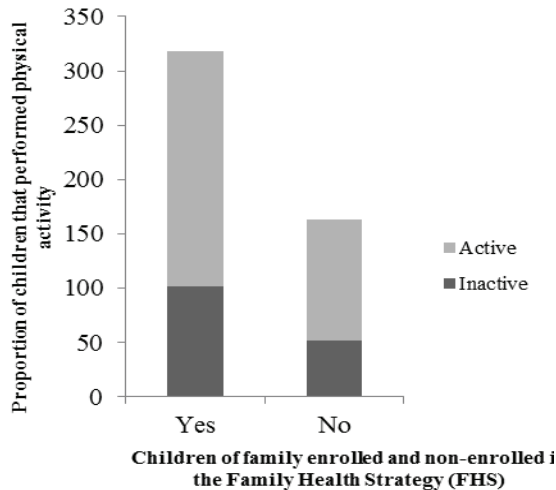


Figure 1. Proportion of children according the practice of Physical Activity (active/inactive) per families enrolled and non-enrolled in FHS – Goiânia, State of Goiás, Brazil, 2014.

There was no difference in the prevalence of PI of children between schools, since there was an overlap of confidence intervals (Figure 2). The prevalence of PI among schoolchildren ranged from 25.6 to 37.6%.

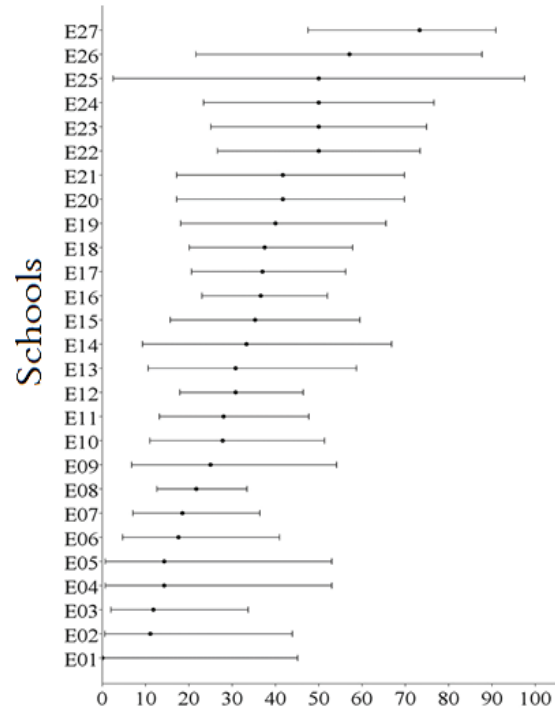


Figure 2. Prevalence of Physical Inactivity of children between schools - Goiânia, State of Goiás, Brazil, 2014.

Table 2 lists the characteristics of schoolchildren classified as inactive, according to sex.

Our results showed that the prevalence of PI was high (~ 32%) among the students studied. It was identified that there was no significant difference for the practice of PA between schoolchildren enrolled in the FHS and those non-enrolled, indicating that there were no changes in PA practice.

Table 2. Characteristics of schoolchildren classified as physically inactive according to sex, Goiânia, State of Goiás, Brazil, 2014.

Variables	Sex				Total		p-value
	Female		Male		N	%	
	N	%	N	%			
Age group of the mother							
< 24 years	8	24.2	10	32.3	18	28.1	0.093
≥ 24 years	88	39.8	46	23.8	134	32.4	
Race							
Non-white	68	39.8	39	27.7	107	34.3	0.509
White	26	31.7	19	22.1	45	26.8	
Number of people in the residence							
≥ 4 people	75	38.1	43	26.5	118	32.9	0.575
≤ 3 people	21	36.2	15	23.1	36	29.3	
Preterm							
Yes	10	47.6	5	25	15	36.6	0.738
No	86	36.9	53	25.7	139	31.7	
Smokers in the residence							
Yes	22	36.1	15	31.9	37	34.3	0.680
No	74	38.1	43	23.9	117	31.3	
Maternal schooling							
≤ High School	89	37.6	57	26.4	146	32.2	0.253
≥ Higher Education	7	38.9	1	9.1	8	27.6	
Displacement to the school							
Car or motorcycle	41	45.1	19	22.6	60	34.3	0.226
Walking or bike	55	33.5	39	27.3	94	30.6	

This finding is worrying, since the encouragement of PA in all age groups is an important public health strategy, representing a fundamental element for health promotion. Other investigators evidenced a high prevalence of PI in Goiânia. A study conducted with children and adolescents (7-14 years) in a single region of the municipality found a higher prevalence of PI than the present study (37.8%) (Monego & Jardim, 2006). Another study carried out in public schools in Goiânia to evaluate a program to promote PA and food choices among adolescents from 13 to 18 years of age showed that the majority of adolescents were inactive or insufficiently active and that there was no difference between schools participants in the project to promote physical activities, indicating that it would need to be reassessed (Ferreira, Lima, Silva, & Camozzi, 2012).

On the other hand, there is now strong evidence of the positive effect of school-based interventions (Dobbins, Husson, DeCorby, & LaRocca, 2013; Kriemler et al., 2011). Among the conclusions pointed out by these researchers, it is highlighted that, in addition to increasing the practice of PA by children and adolescents, the promotion of PA in the school environment is also associated with an increase in out-of-school PA, bringing positive effects on aerobic conditioning (Kriemler et al., 2011) and obesity prevention (Gonzalez-Suarez, Worley, Grimmer-Somers, & Dones, 2009).

In Brazil, similar to the result of this study was the prevalence of PI found in a study carried out in the public school system in Salvador (State of Bahia), with students of both sexes, aged between seven and fourteen years (Pinto et al., 2011). Nevertheless, the percentage recorded in the present study was higher than that observed in a recent cross-sectional study conducted in two municipalities in the State of Espírito Santo, Brazil, which compared the level of PA among schoolchildren between seven and ten years of age enrolled in urban and rural public schools, and showed an overall prevalence of 23.5% PI (Andrade Neto et al., 2014). This difference in prevalence among studies can be explained by the population investigated. In Espírito Santo, the study included children from rural areas who are more active.

Regarding gender, the frequency of PI among girls was higher than that observed among boys in this study. These results are consistent with other national and international studies (Andrade Neto et al., 2014; Kaluski, Mazengia, Shimony, Goldsmith, & Berry, 2009). During childhood and adolescence, the literature points out that male children tend to

do more PA than females (Chung, Skinner, Steiner, & Perrin, 2012; Kaluski et al., 2009). These findings suggest that social and cultural aspects may influence the longer time devoted to the practice of PA and sports by boys, since boys and girls assume different roles in society. The participation of boys in sports and more intense PA is valued and stimulated early.

Among schoolchildren, the majority used an inactive mode of transportation (car or motorcycle) to go to school (34.3%). This finding was lower than that found by another study carried out in the city of Caxias do Sul (State of Rio Grande do Sul), which observed a prevalence of inactive displacement to the school of 47.7% in students aged seven to nine years (Rech et al., 2013). However, it was higher in comparison to another investigation conducted with students (7-10 years) in the State of Santa Catarina (region of greater purchasing power), in which only 20% students used inactive displacement to go to school (Pires-Neto, 2001). These researchers have shown that active displacement has been associated with a practice of PA, thus constituting yet another opportunity for children to be active.

One possible explanation for the small proportion of schoolchildren who use physically active displacements (walking or cycling) to go to school are the characteristics of the environment (physical and social), such as urban violence, traffic safety, lack of sidewalks or bike paths, location of the school and the age of the children. Other researchers have highlighted parents' concerns about the risks their children may face on their way to school (Melo et al., 2013).

Among the benefits of the practice of PA for children, stands out the development of cardiorespiratory, metabolic and musculoskeletal functions (US Department of Health Human Services, 2008). During childhood, most of an individual's growth occurs. Thus, the creation of leisure areas, practice of recreational activities, after school and weekends, walking or cycling instead of using the car, and stimulating family involvement in the practice of PA can contribute to the promotion of a healthy lifestyle among schoolchildren (Griffiths et al., 2013). In addition, a recent clinical trial conducted in Sri Lanka with schoolchildren showed the potential of children to act as promoters of a healthy lifestyle of their parents, being effective in reducing their mothers' weight and increasing their mothers' health (Gunawardena et al., 2016).

It is worth noting the limitations of this study, since the daily practice of PA of the students was quantified through a form answered by the parents or guardians of the children, which can be

influenced by the understanding of the information and educational level of their parents. However, the forms/questionnaires are widely used for population-based studies, because they are easy to apply and less expensive, and the results obtained in the present study achieved a high response rate and confirmed the published data regarding the practice of PA by schoolchildren. Several factors made it difficult to include schoolchildren, such as: most children were not taken to school by parents or legal guardians; many children listed by the Municipal Department of Education as being between six and seven years old were already older, others had never attended school, and some were missing in the days of data collection. Moreover, this study presents limitations to generalization, considering that it is a relatively homogeneous population, with children from the public-school system, who present a different profile of students enrolled in the private network who have a higher socioeconomic level. Nevertheless, regardless of the above limitations, the findings of this study may contribute to the current knowledge about PA in schoolchildren.

Conclusion

This investigation showed that few schoolchildren enrolled in the public school of Goiânia comply with the guidelines of performing 60 minutes of moderate to vigorous PA daily. The study identified a high prevalence of physically inactive children (31.9%), higher in female students. There were no differences between the physically active and inactive children whose families are enrolled in the FHS. Finally, it should be considered that the school environment is a favorable space for health professionals that integrate the FHS to promote actions that stimulate a healthy lifestyle, since sedentary behaviors can be acquired in the early stages of life.

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