

Prevalence of sedentary lifestyle among adolescents

Prevalência de estilo de vida sedentário entre adolescentes

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Descritores

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Abstract

Objective: To identify the prevalence of sedentary lifestyle among adolescents and to know the correlation between the results obtained by two standardized measurement instruments.

Methods: Descriptive, cross-sectional study, which evaluated 132 students aged between 14-18 years. Study variables were: gender, age, physical activity levels with the use of the international physical activity questionnaire in its short version, and average daily steps using the pedometer for at least 4 consecutive days.

Results: The prevalence of sedentarism assessed by questionnaire was 19.7% and the prevalence identified by the pedometer was 8.3% ($p=0.021$). No correlation was identified between the results from instruments. The correlation between the methods was weak ($k=0.021$).

Conclusion: The prevalence of sedentarism was lower when assessed by pedometer and there was no correlation with the results of the evaluation by questionnaire. The correlation was weak between the two measuring instruments.

Resumo

Objetivo: Identificar a prevalência de estilo de vida sedentário entre adolescentes e conhecer a concordância entre os resultados obtidos por dois instrumentos padronizados de medida.

Métodos: Estudo descritivo, transversal, que avaliou 132 estudantes de 14 a 18 anos. As variáveis de estudo foram: sexo, idade, níveis de atividade física com a utilização do Questionário Internacional de Atividade Física em sua versão curta, e média diária de passos com a utilização do pedômetro por, no mínimo, 4 dias consecutivos.

Resultados: A prevalência de sedentarismo avaliada pelo questionário foi de 19,7% e a identificada pelo pedômetro foi de 8,3% ($p=0,021$). Não foi identificada correlação entre os resultados dos diferentes instrumentos. A concordância entre os métodos foi fraca ($k=0,021$).

Conclusão: A prevalência do sedentarismo foi menor quando avaliada pelo pedômetro e não houve correlação com os resultados da avaliação pelo questionário. A concordância foi fraca entre os dois instrumentos de medida.

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Introduction

Sedentarism, recognized as the lack of physical activity is a risk factor for many diseases, such as obesity, hypertension, cardiovascular diseases and diabetes mellitus.⁽¹⁾ The lifestyle of the population in recent decades has contributed to the sedentary lifestyle. The daily life imposes less and less physical activity. The means of transport are increasingly efficient, being preferred to the detriment of walking or other means involving energy expenditure. In addition, the activities carried out in leisure time are usually those that consume less body energy.⁽²⁾

Adolescence is a great period to the development of healthy habits, which may resonate into adulthood. The knowledge of the level of physical activity in adolescents is critical to plan effective measures against sedentarism.⁽³⁻⁵⁾ It is important for nurses and other professionals who deal with adolescent health tools that they quantify the amount of physical activity practiced, identifying sedentary practices.

As health indicators of a population may be measured by the presence of disease, in the evaluation of the sedentary lifestyle the measure regards the level of physical activity, which can be obtained directly (heart rate, physiological markers, calorimetry and motion sensors) or indirectly (using questionnaires, diaries and interviews).^(6,7)

The parameters used for the evaluation of sedentarism are often arbitrary and not applicable in all segments of the population. Among adolescents, validated instruments that can be applied are scarce.

Among the existing indirect methods to evaluate sedentarism there is the short version of the international physical activity questionnaire (IPAQ), which assesses the level of physical activity through the duration and the frequency of walking, moderate and vigorous activities reported by the individual referring to the last week.⁽⁸⁾ The IPAQ short version was validated for adolescents aged from 14-18 years old in Brazil.

Another method that has been used for the assessment of physical activity is the count of daily steps. For this measurement, the equipment used

in some studies with different populations has been the pedometer.⁽⁹⁻¹¹⁾ This is a small device that has a body motion sensor in pendulum, which measures the amount of steps taken by the individual for the period of 1 day.⁽¹²⁾ It has been used for being practical, easy to handle and affordable price, in addition to provide objective measure of the amount of the individual steps in the day.⁽¹³⁾

However, the use of this equipment has not yet been validated among adolescents and there is no definition of specific cut-off points that characterize the presence of sedentary practices in this population. There are cut-off points for definition of sedentary lifestyle with counting steps per day only among adults.⁽¹⁰⁾ Studies that used the measure of steps among adolescents have adopted the same cut-off points used to define the level of physical activity among healthy adults: <5,000 sedentary; 5,000-7,499 low active; 7,500-9,999 somewhat active; 10-12,499 active; and > 12,500 highly active.⁽¹¹⁾

The question is whether the assessment of sedentary performance with the application of validated questionnaire such as the IPAQ may be replaced by another method, such as counting steps by pedometer.

The objectives of this study were: to identify the prevalence of sedentary lifestyle among adolescents and to know the correlation between the results obtained for two standardized measuring instruments.

Methods

Descriptive, cross-sectional study that evaluated students aged from 14-18 years old of state public schools of the eastern region of Goiania, capital of Goiás State. The sample was calculated using the formula for comparing two proportions. For the calculation, we considered the proportion of sedentary adolescents measured by IPAQ, 62.5% according to a level of significance of 5.0%, effect size of 0.8 and power of test of 80.0% The calculation of the sample resulted in 124 participants. Data were collected from 132 adolescents, equaling to 106.5% of sample calculated.

Managers of 11 schools in the region were contacted, informed and after agreement, four schools were included, who have agreed to participate in the research. It was requested from the coordination from each school selected the list of classes with students in the aimed age group. From that list, we drafted the rooms that composed our sample. Study variables were: gender, age, physical activity levels using IPAQ short version and average daily steps according to the pedometer. The IPAQ was applied under the supervision of researchers and their own teens recorded their answers. The pedometer OMRON®, model HJ-105INT was used, with capacity for 100 thousand step count and memory for seven days, being used for a week. The adolescents were told to put the pedometer when they got up and pull it off only to sleep, bathe or when performing some activity in the water. The device was placed at the waist, pinned to the clothes, in order to have contact with the body. For the calculation of the average number of steps per day, we used the pedometers that presented records of four consecutive days or more.

We considered as sedentary, by IPAQ use, the adolescent who presented less than 300 minutes of physical activity per week.⁽¹⁴⁾

As there are no validated cut-off points for the pedometer use among adolescents, a cut-off point has been established through assessing the sensitivity and specificity of both instruments, whereas the IPAQ as gold standard, since this has been validated for use with this population. We defined in the ROC curve, the point of 4,012 steps per day, in which the assessment of both instruments reached highest levels. That was the cut-off point used in this study for the comparison and correlation analyses.

The prevalence of sedentarism, evaluated by the IPAQ and the pedometer was calculated in absolute values and percentages. For the identification of difference between the number of sedentary assessed by two methods was used Descartes rule of signs. Kappa coefficient (k) was applied for the study of agreement between the results obtained by the use of two instruments. Kappa coefficient was interpreted considering weak agreement if <0.40 ,

moderate $0.40-0.75$, and good if >0.75 . The study of correlation between instruments of assessment was performed by linear regression analysis. It was considered as significant p -value <0.05 . Data were analyzed with Statistical Package for the Social Sciences® (SPSS) version 15.0.

The development of study attended national and international standards of ethics in research involving humans and animals.

Results

A total of 132 adolescents were evaluated, 53.0% ($n=70$) females ($p=0.486$). The average age was 15 ± 1.2 years (minimum 14; maximum 18 years). Regarding age range, 44.7% ($n=59$) had less than 15 years ($p=0.223$).

Average steps per day, identified by the pedometer was 9,837 ($\pm 4,918$) (minimum 1,165; maximum 30,752).

The average time spent in physical activity measured by IPAQ was 797.8 (± 567.7) minutes per week, that is, 114.0 minutes per day.

A total of 19.7% ($n=26$) and 8.3% ($n=11$), respectively for the IPAQ and pedometer ($p=0.021$) were identified as sedentary.

There was no correlation between the IPAQ and pedometer instruments ($p=0.471$). The Kappa coefficient was 0.021, demonstrating weak correlation between the instruments (Figure 1).

Discussion

A possible limitation of this study can be pointed as to using IPAQ as a tool for comparison with pedometer. Facing the difficulties of application of that questionnaire, and also of the weaknesses of the validated model for the population studied, composed of students from public schools, this limitation could only be overcome with the comparison of pedometer with other measuring instrument, which also offered direct measures of physical activity and it could be taken as gold standard. Moreover, despite the practicality and the advantages

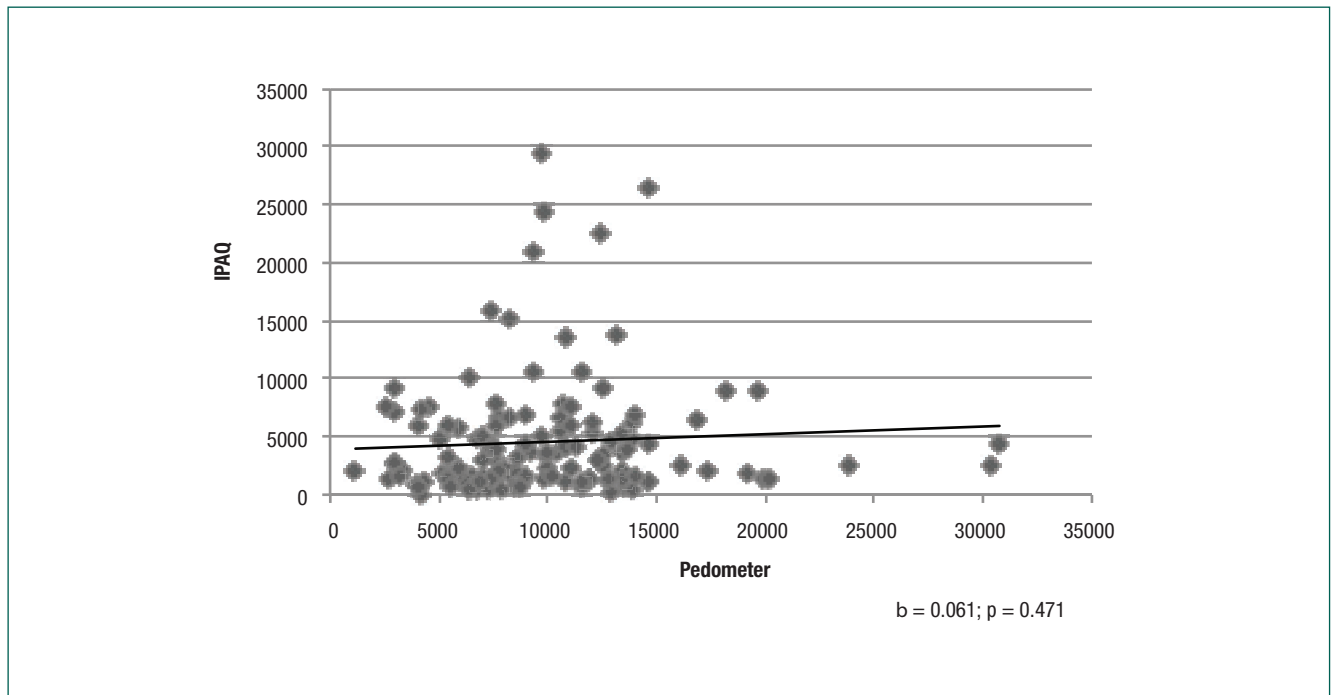


Figure 1. Correlation between the International Physical Activity Questionnaire (IPAQ) and the pedometer, for the assessment of sedentarism in adolescents (n=132)

found in the use of pedometer in the present study, this instrument needs to be tested against direct measurement instruments for assessing the level of physical activity, such as ergospirometers, considered the gold standard, allowing the definition of more specific cut-off points in the number of steps per day, for the evaluation of sedentary lifestyle in adolescents.

The elaboration of strategies to combat the sedentary lifestyle and the prevention of diseases related to physical inactivity as a risk factor go through the identification of adolescents who present this behavior. Thus, the application of instruments such as IPAQ and the pedometer can quantify the amount of physical activity, identifying sedentary adolescents at school or in any environment. These instruments can be widely applicable, since they are easy to use and of low cost.

The prevalence of sedentarism among adolescents, found in this study (19.7%) from the measurement performed with IPAQ, was lower than that found in Malaysian students (20.8%)⁽¹⁵⁾ and also less than adolescents from the Balearic Islands located in the Mediterranean Sea.⁽¹⁶⁾ In two studies

conducted in the city of Pelotas in 2005 and 2012, the authors found prevalence of sedentarism of 69.6 and 69.9%, respectively.⁽¹⁷⁾ All studies mentioned used IPAQ in its short version, in adolescents, in similar age range.

The average daily time measured by IPAQ in this study (114.0 minutes per day) was higher than the average recommended by the World Health Organization for the practice of physical activity. Study with 3,556 adolescents aged from 12-19 years old in the United States identified the average time spent with moderate/intense physical activity of 34 minutes a day and sitting time of 7.5 hours.⁽¹⁸⁾

The IPAQ in its short version presents several disadvantages, especially when applied in adolescents. The main disadvantages identified are the requirement that the participants should quantify the duration and frequency of the various types of physical activity carried out in the previous week, a fact that depends on the memory capacity of each individual,⁽¹⁹⁾ the low degree of accuracy,⁽²⁰⁾ and the fact that it minimizes the importance of walking in a non-structured way.⁽²¹⁾

Adolescents, in this study, presented great difficulty understanding the questions of the instrument, they needed clarification for the majority of them. It is also worth noting that the structure of the questionnaire does not stimulate the fulfillment and sometimes causes confusion in the characterization of the exercise intensity.

The prevalence of sedentarism identified by applying the pedometer (8.3%) in this study was lower than that found for IPAQ (19.7%). A possible explanation for this fact is that the questionnaires and diaries to evaluate physical activity generally minimize the importance of walking as a form of physical activity. Thus, often, "informal" walking performed by the interviewees are not considered or recalled at the time of evaluation.⁽²¹⁾ Pedometer measures all kinds of displacement performed programmatically or in locomotion and leisure activities. Thereby, the pedometer considers as active, individuals who do walk at leisure or work, more precisely measuring than subjective measures such as questionnaires.

The pedometer was a well-accepted instrument by adolescents and the practicality and ease of use have led to a good adherence to this type of evaluation, having encouraged the participation of students in the study.

Average steps per day found were (9,837) less than the average found in a study conducted in Singapore with adolescents aged from 13-16 years old, students of public schools, the authors found 11,913 average steps per day. In another study, conducted in New Zealand, with a similar population, the average number of steps per day was 12,597. However, it is worth noting that these studies were done after a series of government interventions to encourage the practice of physical activity among schoolchildren.⁽²²⁾

Study conducted with students from 14 schools in a region of Poland identified an average of 12 thousand steps per day, also higher than the value found in the present study.⁽²³⁾

The indicated cut-off point for the sample of this study (4,012 steps per day) was lower than the cut-off points established for children of 9,000 steps a day⁽²⁴⁾ and also inferior to the number es-

tablished for adults (5,000 steps per day).⁽²⁵⁾ The cut-off point found in this study is similar to another study conducted in the State of Iowa, Midwest of the United States, which set 3,800 to 4,000 steps as cut-off point for sedentarism in the general population.⁽¹⁰⁾

There was no agreement on the measures undertaken by the IPAQ and the pedometer. Study that validated the IPAQ short version for adolescents in Brazil used the physical activity recall of 24 hours proposed by Bouchard for comparison and presented Kappa coefficient corresponding to a weak/moderate agreement, without statistical significance. It was observed significance only for vigorous activities practiced by boys. This study also found no correlation between the IPAQ and pedometer for the identification of the sedentary lifestyle.

The IPAQ must be used with caution for the assessment of physical activity in adolescents, because they did not consider walking, which is one of the most frequent forms of physical activity in all populations and in any age group. It should be noted that even in the validation study of the instrument among adolescents, the correlation found from IPAQ with the physical activity recall of 24 hours, instrument used for analysis of agreement was weak/moderate.⁽⁸⁾

Conclusion

The International Physical Activity Questionnaire, which is the validated method for evaluation of physical activity among adolescents, when compared to the pedometer, presented higher prevalence of sedentarism, with weak agreement and no correlation between the measures carried out by the two instruments.

Collaborations

Vitorino PVO Barbosa MA; Souza ALL; Jardim PCBV and Ferreira SS declare that collaborated in the design stages of the study, analysis, data interpretation, drafting the manuscript, reviewing relevant intellectual content and final approval of the version to be published.

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