Prevalence of sedentarism and its associated factors among urban adolescents

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Abstract

Objective
To evaluate the prevalence and determinants of sedentarism among adolescents living in Pelotas, State of Rio Grande do Sul, Brazil.

Methods
A cross-sectional study was carried out in Pelotas, in 2002. An anonymous, self-administered questionnaire was answered by a representative sample of 960 adolescents with ages ranging from 15 to 18 years old. Those who reported that their participation in some kind of physical activity amounted to less than 20 minutes a day with a frequency of less than 3 times a week were considered to have a sedentary lifestyle. Sociodemographic and behavioral variables were evaluated. The chi-squared test was used for comparisons between proportions. The Poisson regression was used for multivariate analysis with robust adjustment for variances. Corrections were made for study design effects.

Results
Interviews were held with 960 adolescents. Of these, 39% were classified as having a sedentary lifestyle. The prevalence of sedentarism was higher among girls than among boys (prevalence ratio of 2.45; 95% CI 2.06-2.95). The adolescents from lower social levels had the highest percentage of sedentarism (prevalence ratio of 1.35; 95% CI 1.06-1.72). There was an inverse relationship between the adolescent's and the mother's schooling and sedentarism. After adjusting for confounding factors, there was also a positive association between sedentarism and minor psychiatric disturbances, and in relation to sexual activity.

Conclusions
Higher prevalences of sedentarism are associated with girls, low social class, low levels of schooling and being the child of a mother with a low level of schooling.

INTRODUCTION

The regular practicing of physical activity has an inverse relationship with the risk of developing chronic-degenerative diseases and has a positive effect on quality of life and other psychological variables.[5,17,20] Developed countries have, through their institutions and organizations, concentrated their efforts in the field of public health and disease prevention (such as in relation to coronary diseases and hypertension) on the reduction of sedentarism, by means of plans for adopting regular physical activity, in order to improve individual and collective health.[5,17]

In the United States, more than 60% of adults and around 50% of adolescents are considered to be sedentary, according to the National Center for Chronic Disease Prevention and Health Promotion.[5] In Brazil,

data from the Brazilian Institute for Geography and Statistics (Instituto Brasileiro de Geografia e Estatística – IBGE) have shown that 80.8% of adults are sedentary.* Mello et al,[14] in a survey in the city of São Paulo, found a sedentarism prevalence of 68.7% among adults.

Adolescents have been targeted in studies around the world, since they present high indices of risky behavior, such as a decreased habit of regular physical activity,[3,5,16,20] irregular eating habits[1,5,9,16,18] and psychological disturbances.[19] In addition to this, other studies have affirmed that the physical activity habits during adolescence are partially determinant for the levels of physical activity during adulthood.[5,7,22]

There are few studies with samples of Brazilian adolescents. Most of these were performed in schools, and the results presented sedentarism percentages ranging from 42 to 94%.[8,9,10,18,22,23] These findings indicate discrepancies that can be explained by the differences in sampling and methodological processes applied in the research. According to Pinho & Petroski[18] (1990), the difficulty in developing instruments that could determine the habitual levels of practicing physical activity have limited and made it impossible to obtain conclusive information regarding the physical behavior of children and adolescents, considering that more than 30 distinct techniques for measuring physical activity are known.[12]

In the light of the growing concern around the world regarding sedentarism among adolescents, and the few population-based studies made in Brazil, the present study had the objective of determining the prevalence of sedentarism and associated factors among adolescents living in an urban area in southern Brazil.

METHODS

The present investigation formed part of a wide-ranging survey for assessing the health of adolescents in Pelotas, State of Rio Grande do Sul, in a cross-sectional population-based study by means of systematic sampling.

Considering a sedentarism prevalence of 30%, a margin of error of five percentage points, a confidence level of 95% and statistical power of 80, and with a 10% allowance for the possible loss rate, it was estimated that it would be necessary to interview 504 individuals aged 15 to 18 years. The actual sample size of 1039 individuals was justifiable in the light of the multiple objectives of the survey, of which the present study formed part.

The sampling was done in multiple stages, from the 448 census sectors of the urban zone of Pelotas. Of these sectors, 90 were drawn systematically for inclusion in the survey. Following this, one street block was randomly selected from each sector. Next, one street corner was drawn from this block, to form the starting point for the survey. From this corner, 86 homes were visited systematically. When necessary, houses from other blocks were included, which were chosen in a standardized manner so as to complete the number of 86 homes. In total, 7,740 homes were visited by the survey team.

All the adolescents aged between 15 and 18 completed years who were living in the drawn homes were interviewed, after obtaining written consent from the parents or other adult responsible for the adolescent. After weight and height measurements were taken, the adolescents were given a self-administered questionnaire to answer, which had previously been tested, standardized and precoded, containing questions relating to sex, age, the parents' and adolescent's schooling, sexuality, minor psychiatric disturbances, overweight and physical activity.

To determine the prevalence of sedentarism, the questions utilized encompassed the practicing of physical activity at school and outside of school, the time in minutes spent in the daily activity and the frequency in number of times per week.

Adolescents were considered to be sedentary when they said they were not participating in any type of physical activity at school or outside of school, or participating in physical activity for periods of less than 20 minutes a day and with frequencies of less than three times a week.[3]

To define the social class, the classification of the Brazilian Association of Market Research Institutes (Associação Brasileira de Institutos de Pesquisa de Mercado –Abipeme) was utilized,[4] which places individuals into socioeconomic categories according to information on the schooling of the head of the household and the possession of certain "comfort items" such as television set, refrigerator, radio, car and household employees. This classification puts people into the classes A, B, C, D or E, according to the scores attained.

The occurrence of minor psychiatric disturbances was assessed by the Self-Report Questionnaire (SRQ-20).[13] The cutoff point utilized for men was six or more and for women, five or more.

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*IBGE (Fundação Instituto Brasileiro de Geografia e Estatística). Dados sobre exercício físico. Indicadores sociais, 1998. Available at: http://www.sempreemforma.com.br/vida saudavel/infogeral/dados-ibge-exerc-físic.htm [14 nov 2002]

The data on whether the adolescent had already had sexual relationships were obtained via dichotomous questions of "yes" or "no" type.

The data relating to weight were obtained by means of a portable balance with a precision of 0.5 kg. Individuals were weighed without shoes and while wearing light clothes and not carrying heavy objects. The clothes worn were noted and a correction for clothing weight was subsequently made. To measure the height, a portable anthropometer developed by the team was utilized, which had a margin of error of 1 cm. The body mass index (BMI) was calculated using the formula: $BMI = (body\ mass\ in\ kg)^2 / (height\ in\ m)^2$. Adolescents were considered to be overweight when they presented a BMI of greater than or equal to 25 kg^2/m^2, as in Fonseca et al[6] (1998).

The data collected were processed using the EpiInfo 5.0 program, with automatic checking of the amplitude and consistency. Univariate analysis, performed via the SPSS for Windows 8.0 statistical package, verified the frequency of the responses among the variables. For comparisons between proportions, the chi-squared test was utilized. For multivariate analysis, Poisson's regression with robust adjustment for variances was utilized, with checking for delineation effects. The data were analyzed hierarchically: the sociodemographic variables (sex, age, parents' schooling and social class) were entered at the first level; the adolescent's schooling at the second level; and the behavioral variables (minor psychiatric disturbances, overweight and sexual activity) at the third level.

In this hierarchical model, each block of variables for a given level was included, and variables with a value of $p \leq 0.20$ in the likelihood ratio test were kept in the model. In this type of model, variables located within a level that is hierarchically superior to that of a hierarchically inferior variable are considered to be potential confounders of the relationship between this variable and the outcome being studied. On the other hand, variables located within lower levels are considered to be potential mediators of the association. The variables selected within a given level were kept for the subsequent models and were considered to be risk factors for sedentarism, even if they lost their significance through the inclusion of hierarchically inferior variables.

RESULTS

There were 1039 adolescents living in the homes that were visited. Interviews were held with 960, which formed a representative sample of the adolescents living in the urban area of the municipality of Pelotas. For the remaining 79 adolescents, the interview could not be held because the parents or guardians refused authorization, or the adolescent refused to answer the questionnaire, or the adolescent was not found at home after three visits. The loss rate was therefore 7.6%.

In the sample studied, 39% of the adolescents were considered to be sedentary. The Table shows that the prevalence of sedentarism was related to the adolescent's sex, indicating that girls are more sedentary than boys (54.5% and 22.2%, respectively). A greater ten-

Table – Prevalence of sedentarism among adolescents, according to sociodemographic and behavioral variables. Pelotas, 2002.

Variable	N	Prevalence of sedentarism	Prevalence ratio (95% confidence interval)
Sex			
Male	463	22,2%	Reference
Female	497	54,5%	2,45(2,06-2,92)
Age (years)			
18	241	28,9%	Reference
17	221	23,0%	0,99(0,97-1,01)
16	271	27,0%	0,79(0,64-0,98)
15	227	22,5%	0,83(0,66-1,04)
Adolescent's schooling (years)			
≥9	557	36,6%	Reference
5-8	351	39,9%	1,08(0,90-1,30)
≤4	52	57,7%	1,57(1,19-2,08)
Social class			
A B	248	28,9%	Reference
C	366	41,3%	1,43(1,13-1,80)
D E	348	49,6%	1,71(1,38-2,13)
Mother's schooling (years)			
≥9	346	28,4%	Reference
5-8	416	39,2%	1,38(1,12-1,70)
≤4	198	57,1%	2,00(1,58-2,54)
Already had sexual relationship			
No	448	37,4%	Reference
Yes	512	40,4%	0,93(0,78-1,10)
Minor psychiatric disturbances			
No	684	34,1%	Reference
Yes	276	50,9%	1,16(1,00-1,35)
Total	960		

dency towards sedentarism was observed among adolescents aged 17 to 18 years (38.9% and 44.8%). The prevalence of sedentarism was also greater among adolescents who had attended school for up to four years (58.02%), in relation to those who had attended for five to eight years (36.5%) and those who had attended for nine or more years.

The prevalence of sedentarism among adolescents presented an association with social class, as shown in the Table. The frequencies of sedentarism differed between the classes D+E and A+B (prevalence ratio of 1.71; 95% CI 1.38-2.13). The mother's schooling also presented an association with a sedentary lifestyle for the adolescent. The children of mothers with least schooling (up to four years) presented a greater risk of sedentarism (prevalence ratio of 2.00; 95% CI 1.58-2.54), than those whose mothers had had five to eight years of schooling. On the other hand, sedentarism among the adolescents was independent of the father's schooling.

The Table shows that adolescents with indications of minor psychiatric disturbances also presented a more sedentary lifestyle (prevalence ratio of 1.16; 95% CI 1.00-1.35), in relation to those without such disturbances. There was an association between sedentarism and sexual activity among the adolescents, as shown in the Table. The adolescents who reported that they had already had sexual relationships presented lower risk in the non-adjusted first analysis (prevalence ratio of 0.93; 95% CI 0.78-1.10). Sexual activity thus formed a protective factor for sedentarism.

The Figure shows that, at the first level of multivariate analysis, it was found that the lower social classes (D and E) presented a risk of sedentarism that was 1.35 times greater than for classes A and B. Females presented a greater risk of sedentarism than males did (prevalence ratio of 2.35; 95% CI 2.00-2.86). The mother's schooling also presented an association: children of mothers with a low level of schooling presented a risk of sedentarism that was 1.75 times (95% CI 1.01-2.23) greater than for children of mothers with a higher level of schooling. With regard to age, the adolescents tended to present a more sedentary lifestyle as they grew older. The adolescents aged 15 years presented less prevalence of sedentarism (prevalence ratio of 0.82; 95% CI 0.67-0.99), in relation to those aged 18. In other words, being 15 years old was a protective factor in comparison with being 18 years old. At the second level, the adolescent's schooling presented an association with sedentarism,
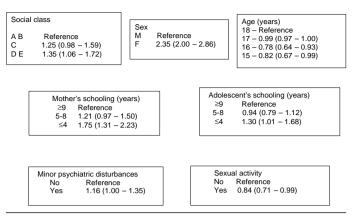

Figure - Final hierarchical model for sedentarism among adolescents (prevalence ratio and 95% confidence interval).

even after adjustment for social class, age, sex and mother's schooling, since adolescents with a low level of schooling presented a risk of sedentarism that was 1.30 times (95% CI 1.01-1.68) greater than for those with more schooling. At the third level, the behavior was analyzed. Those that presented indications of minor psychiatric disturbances also presented a greater risk of sedentarism (prevalence ratio of 1.16; 95% CI 1.00-1.35). To have already had sexual relationships presented an association with lower risk of sedentarism for the adolescent, after adjustment (prevalence ratio of 0.84; 95% CI 0.71- 0.99), and thus was maintained as a protective factor. In other words, having sexual relationships diminished the risk of sedentarism.

DISCUSSION

The present study was formed by a representative sample of the adolescents living in the urban zone of the municipality of Pelotas, in southern Brazil. The response rate was 92.4%, which thus diminishes the possibility that selection bias may have occurred.

The prevalence of sedentarism among the adolescents in Pelotas was 39%: 22.2% for the boys and 54.5% for the girls. This was therefore lower than what was observed by Gomes et al[8] in Rio de Janeiro: 59.8% for boys and 77.8% for girls. In the United States, a survey by the National Centers for Disease Control and Prevention[5] showed a 50% prevalence of sedentarism among adolescents. These differences may be explainable, for example, by the great difficulty in standardizing the methodological processes for measuring sedentarism. The instruments utilized in Brazilian studies over the past decade have differed from each other in many aspects: some have used electronic and mechanical measurement methods,[14,18] while others have made use of self-administered questionnaires that form a record.[10,19,20,23] How-

ever, no instrument has been identical to any other.

The different magnitudes ascribed to physical activity in relation to sedentarism have been another limitation on the studies encountered. Differences in sampling type also represent limitations on comparative analyses. Some studies have been done only among male adolescents,[18] and other among adolescents of different ages.[10,14,18] Some authors, moreover, have measured adolescents, adults and elderly people at the same time,[8] while a good part of the studies relate to school populations.[14,22] There was therefore a need to investigate groups that are more representative of the adolescent population.

The present study has sought to establish parameters relating to the real adolescent population in the region, using a measurement technique for sedentarism that is more appropriate for population-based studies. Self-administered questionnaires that form a record have good applicability to large groups and present low cost.[12]

With regard to the risk factors for sedentarism, the socioeconomic variables presented associations. Adolescents in the social classes D and E presented a risk of sedentarism that was 1.35 times greater than for those in classes A and B. Some studies have presented similar data,[2] thus showing that a state of poverty is a complication in the fight against sedentarism, with possible repercussions in the occurrence of chronic diseases in adulthood.

The adolescents with a low level of schooling also presented a greater risk of sedentarism, as did those whose mothers presented a low level of schooling. Moore et al[16] (1991) showed that the children of active mothers are twice as active as the children of inactive mothers. This result may be attributable to the relationship between schooling and social class, thus forming a direct relationship with the risk of sedentarism, as affirmed by Browson et al[2] (2000).

The boys tended to be more active than the girls.[5,17] The results showed that girls are more sedentary than boys, with a prevalence ratio that is 2.35 times greater. Programs directed towards girls need to be implemented so that they can thus enjoy the beneficial effects on health from reduced sedentarism.

Even though the prevalence of sedentarism in the present study (39%) was within the patterns found in the literature, it is a matter for concern in adolescence. As indicated by some studies, in addition to being a risk factor for large numbers of illnesses at this stage of life,

the risk increases with age, which may indicate that a sedentary lifestyle will be adopted in adulthood. [5,23]

Reynolds et al[20] (1990) verified that psychosocial variables were significantly associated with sedentarism. The results from the present study concord with the data encountered in the literature, in which adolescents with indications of minor psychiatric disturbances present a greater risk of sedentarism (prevalence ratio of 1.16; 95% CI 1.00-1.35). Because of the limitation of cross-sectional studies, it is not possible to say whether they are more sedentary because they present minor psychiatric disturbances, or whether they present minor psychiatric disturbances because they are sedentary, while also emphasizing the possible reversibility of these findings.

There is evidence that overweight and obesity are strongly associated with a sedentary lifestyle.[1,5,17] The present study did not show up such an association, just as in some others in the literature.[9] This is a limitation of cross-sectional studies, which raises the possibility that the methodology utilized for determining the categories of overweight, as measured by the body mass index (BMI), may have presented measurement bias.

Because of its low cost, the methodology utilized in the present study could be reapplied in other locations and thus contribute towards providing data on trends and differentials in sedentarism in different regions of the country.

CONCLUSIONS

The present study has indicated the participation of biological, behavioral and cultural factors in determining sedentarism. Attempts have been made to improve the health conditions and quality of life of adolescents through reducing their sedentarism.[5,17] It is known, however, that such measures, although important, have not been efficacious. There is interference from the communication media in adolescents' daily lives, especially from visual media, and such influence works against adherence to physically active behavior. The main risk factors for sedentarism revealed in this study were low levels of schooling among the adolescents and lower social class, and also the greater risk of sedentarism presented by girls.

Population-based studies are of great importance for furnishing data on the prevalence of sedentarism. Such data allows programs for health promotion and the encouragement of regular physical activity practices to be planned and implemented.

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