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Factors associated to leisure-time sedentary lifestyle in adults of 1982 birth cohort, Pelotas, Southern Brazil

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Abstract

OBJECTIVE—To assess factors associated to leisure-time physical activity and sedentary lifestyle.

METHODS—Prospective cohort study of people born in 1982 in the city of Pelotas, southern Brazil. Data were collected at birth and during in a visit in 2004-5 when 77.4% of the cohort were evaluated, making a total of 4,297 people studied. Information about leisure-time physical activity was collected using the International Physical Activity Questionnaire. Sedentary people were defined as those with weekly physical activity below 150 minutes. The following independent variables were studied: gender, skin color, birth weight, family income at birth and income change between birth and 23 years of age. Poisson's regression with robust adjustment of variance was used for the assessment of risk factors of sedentary lifestyle.

RESULTS—Men reported 334 min of weekly leisure-time physical activity compared to 112 min among women. The prevalence of sedentary lifestyle was 80.6% in women and 49.2% in men. Scores of physical activity increased as income at birth increased. Those who were currently poor or who became poor during adult life were more sedentary.

CONCLUSIONS—Leisure-time sedentary lifestyle in young adults was high especially among women. Physical activity during leisure time is determined by current socioeconomic conditions.

Keywords

Leisure Activities; Exercise; Socioeconomic Factors; Cohort Studies; Brazil

INTRODUCTION

Physical activity is vital for the prevention and treatment of conditions such as hypertension, ischemic heart disease, diabetes, depression, and some cancers, among others.5 But the prevalence of sedentary lifestyle in the general population is high11 especially during leisure time.1,7,20 The comparability of prevalences of sedentary lifestyle in different studies is

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hindered due to the application of widely varied instruments and definition criteria.16 Recent studies have suggested that exposures during pregnancy or in the first years of life may be associated to the development of chronic diseases.3,15,19 However, few studies have evaluated whether physical activity can be programmed by exposures in the first years of life.

Hallal et al13 found that the prevalence of sedentary lifestyle in children aged ten to 12 was higher among those with higher family income at birth and higher maternal schooling. They did not find an association between sedentary lifestyle and birth weight or weight gain in the first year of life.13 Bearing in mind the relevance of identifying determinants of sedentary lifestyle, the objective of the present study was to assess factors associated to leisure-time physical activity and sedentary lifestyle.

METHODS

Prospective cohort study of people born in 1982 carried out in the city of Pelotas, southern Brazil. The cohort methods are detailed elsewhere.2,23,24 In the follow-up period during 2004-5, leisure-time physical activity was assessed using the International Physical Activity Questionnaire (IPAQ, long version).6 Trained interviewers administered the questionnaire to collect information on different health-related aspects such as weekly frequency of physical activity and average duration of walking and other physical activity, either moderate or vigorous, during a regular week.

Weekly scores of physical activity were estimated by the sum of time reported of walking, moderate physical activity (e.g., recreational sports and biking) and the time spent on vigorous activities multiplied by two (competition sports and running). Those showing a weekly score of less than 150 minutes were considered sedentary based on current recommendations of physical activity.10,14

The mothers of the children studied were interviewed right after delivery and information on family income and birth weight, among others, was collected. Based on family income during 2004-5, it was possible to estimate income change over the study period. The skin color was self-referred by interviewees in 2004-5.

The sample was described as proportions and means. Bivariate analysis was performed using chi-square test to assess heterogeneity and linear trend of ordinal variables. Poisson's regression with robust adjustment for variance was used to assess risk factors of sedentary lifestyle.4 In the adjusted analysis, the variables at the first level - skin color and family income in 1982 - were adjusted for and included in the model if $p<0.2$. Income change was adjusted for skin color and birth weight was adjusted for the variables at the first level.

Verbal informed consent was obtained from the children's parents or guardians during the study period 1982-1986 as it was required at that time when an ethics committee was not available at *Universidade Federal de Pelotas*. More recently, the study was approved by the Research Ethics Committee, affiliated to the National Research Ethics Council (CONEP), and written informed consent was obtained from all subjects.

RESULTS

A total of 4,296 cohort subjects provided information on physical activity. Table 1 shows the pattern of leisure-time physical activity in men and women. Walking was the least preferred physical activity among men (74% did not engage in it) and around 87% of women did not engage in any physical activity, either moderate or vigorous. The weekly score of physical activity was higher among men (334 min/wk) compared to women (112

min/wk). The proportion of men and women with a weekly score equal to zero was 28.7% and 64.5%, respectively.

Mean score of leisure-time physical activity among men was higher at the extremes of income at birth while a direct relationship was seen in women. This association was statistically significant (Figure).

Table 2 displays the prevalence of leisure-time sedentary lifestyle according to independent variables and stratified by gender. The prevalence was higher in women compared to men (80.6% versus 49.2%). Family income at birth was inversely associated to sedentary lifestyle in both men and women. Those who have always been poor or have become poor during adult life were more sedentary. Men with white skin color were more sedentary than those with black or mixed skin color. Birth weight was inversely associated to leisure-time sedentary lifestyle only among women.

Among men, the results of the adjusted analysis showed that skin color was associated to leisure-time sedentary lifestyle: subjects with Black or Mixed skin color were significantly less sedentary than white ones (PR 0.84; 95% CI 0.75;0.94). Income at birth had an inverse relationship with leisure-time sedentary lifestyle. Subjects' current socioeconomic condition was associated with the outcome: sedentary lifestyle was more prevalent among those who have always been poor or have become poor during adult life (Table 3).

Similarly, income at birth was inversely associated to leisure-time sedentary lifestyle among women (Table 4). Current income was a determinant of sedentary lifestyle. Women who have always been poor or have become poor were more sedentary. Birth weight showed an inverse relationship with leisure-time sedentary lifestyle in women, even after adjusting for potential confounders.

DISCUSSION

Longitudinal studies allow to identifying determinants of diseases and risk behaviors. Better understanding factors associated to sedentary lifestyle is crucial today given the benefits of physical activity.5

The application of IPAQ allows the comparison of different studies because this questionnaire can provide standardized information about physical activity worldwide, validated in healthy adults.9 Although results may be inconsistent in the short and the long versions,12 the advantage of the IPAQ - long version is that it allows the assessment of each individual domain of physical activity.

The present study found that leisure-time sedentary lifestyle is highly prevalent among young adults. This finding corroborates other studies that reported high prevalences of sedentary lifestyle in other age groups and more pronounced among women.1,7,20 Monteiro et al18 reported that social and cultural factors are strong determinants of differences in sedentary lifestyle between men and women. They claim that most men associate physical activity to pleasure while women engage in these activities due to health concerns, medical recommendations and esthetics results.1,18 Besides, men tend to be more involved in group activities such as sports while women prefer individual activities such as walking and biking.18

The present study also found that men with white skin color had higher risk of sedentary lifestyle. This finding contrasts with that of studies in developed countries which reported higher prevalences among non-white people.17,22 On the other hand, a study conducted in Pelotas in adults (≥20 years) did not find any differences in sedentary lifestyle by skin color.

7 There has been no study investigating the difference of sedentary lifestyle prevalence according to skin color and stratified by age. An assumption to be tested would be that white people are more sedentary at the beginning of adult life.

Of women studied, 20% were considered non- sedentary during leisure time, and 64.5% had a score of physical activity equal to zero. The pattern of physical activity in the young adults studied is concerning given the benefits of physical activity.5

Several studies have investigated the effect of perinatal variables on health and disease development during life-time.3,15,19 But the association between these variables and sedentary lifestyle, which may be a predisposing factor for disease development, needs to be further explored.

In the present study, birth weight showed an inversely proportional association with the prevalence of sedentary behavior among women. Even after adjusting for gestational age, the magnitude of the association remained unchanged. Hallal et al13 did not find an association in those born in 1993 assessed at the age of 10-12. On the other hand, Rogers et al21 reported a potential effect of prematurity (weight ≤800 g) on motor development and of sedentary lifestyle on physical fitness at the age of 17.21 Victora et al25 reported a direct relationship between birth weight and lean mass in 18-year-old men. Reduced muscle development in low-birth-weight children may explain low levels of physical activity during adolescence.

In regard to leisure-time physical activity, the association between sedentary lifestyle and socioeconomic factors is the most evident. While studies assessing overall sedentary behavior (including physical activities during leisure time, at work, while commuting, and doing housework) have showed a positive association with socioeconomic conditions.11 Other studies on leisure-time physical activity showed that people with lower socioeconomic condition tend to be more sedentary.7,10,20 This can be explained by the fact that they do not have the financial resources required in many leisure activities, e.g., joining a gym. In addition, knowledge on the health benefits of physical activity is associated to higher socioeconomic condition.8

Considering the relevance of physical activity to health, promoting a more active life is a priority in the world's health agenda.26 Some risk factors of sedentary lifestyle such as female gender and lower socioeconomic condition have been consistently identified. Similarly to that seen for other health-related factors, the most disadvantaged populations are also those less physically active, widening the inequality gap in public health in Brazil.

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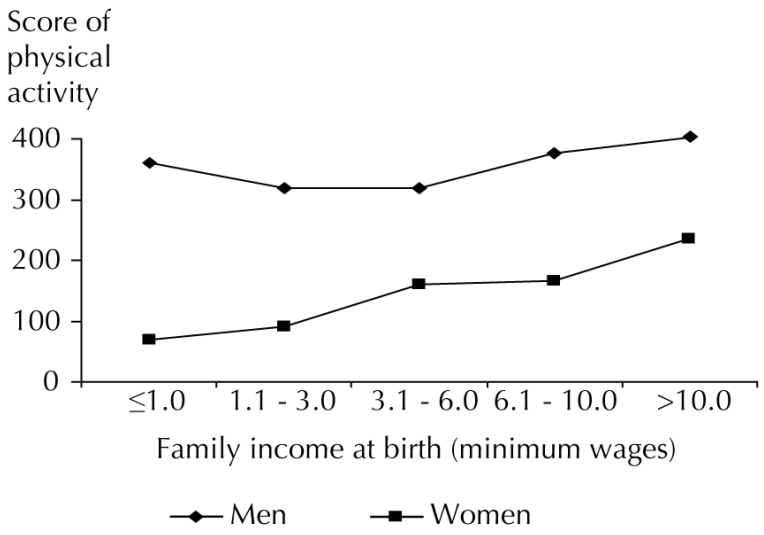

Figure.
Mean score of physical activity (min·wk-1) during adult life by family income at birth. Pelotas, Southern Brazil, 1982 to 2004-5.

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Table 1

Leisure-time physical activity according to type and score of physical activity and stratified by gender. Pelotas, Southern Brazil, 1982 to 2004-5

Variable	Men n = 2.212	Women n = 2.084
Type of physical activity		
Walking		
Did not engage (%)	74.0% n=1636	77.6% n=1617
Mean duration (min·wk-1) * [mean (SD)]	189 (224) n=576	150 (171) n=467
Moderate **		
Did not engage (%)	58.4% n=1291	87.7% n=1827
Mean duration (min·wk-1) *** [mean (SD)]	148 (182) n=921	132 (160) n=257
Vigorous		
Did not engage (%)	51.2% n=1132	86.8% n=1808
Mean duration (min·wk-1) **** [mean (SD)]	229 (236) n=1080	235 (234) n=276
Score of physical activity ***** [mean (SD) - min·wk-1]	334 (478)	112 (286)
Percentile (min·wk-1)		
25	0	0
50	150	0
75	470	90
Maximum (min·wk-1)	5040	3360
Score percent = 0 (min·wk-1)	28.7%	64.5%

* Those who did not engage in walking were excluded from the analysis

** Activities other than walking

*** Those who did not engage in moderate physical activity were excluded from the analysis

**** Those who did not engage in vigorous physical activity were excluded from the analysis

***** Score of physical activity = walking + moderate activity + (vigorous activity x 2)

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Table 2

Estimated prevalence of leisure-time sedentary lifestyle according to independent variables. Pelotas, Southern Brazil, 1982 to 2004-5

Variable	n	%	Men		Women	
			n	%	n	%
Skin color *	0.18 **		0.02 **		0.23 **	
White	3238	65.0	1655	50.7	1583	80.0
Black or Mixed	898	62.6	469	44.4	429	82.5
Family income in 1982 (MW)	< 0.001 ***		0.02 ***		<0.001 ***	
≤1	852	67.1	436	49.1	416	86.1
1.1-3	2126	67.1	1095	51.7	1031	83.5
3.1-6	800	61.2	418	47.6	382	76.2
6.1-10	252	53.6	130	40.0	122	68.0
>10	244	51.2	123	41.5	121	61.2
Income change (1982 → 2004-5)	< 0.001 **		< 0.001 **		< 0.001 **	
Always poor	708	71.3	334	51.8	374	88.8
Non-poor → poor	714	74.0	341	60.4	373	86.3
Poor → non-poor	665	61.8	360	46.4	305	80.0
Never poor	2209	59.9	1177	46.1	1032	75.7
Birth weight (grams) ****	< 0.001 ***		0.81 ***		0.01 ***	
<2500	301	67.8	136	46.3	165	85.5
2500-2999	1021	69.1	451	52.3	570	82.3
3000-3499	1634	63.0	849	46.4	785	80.9
3500-3999	1098	62.8	611	51.2	487	77.0
≥4000	241	57.3	165	48.5	76	76.3
Total *****	4296	64.4	2212	49.2	2084	80.6

MW: Minimum wage

* 150 subjects self-referred as Asian or native

** Chi-square test for heterogeneity

*** Chi-square test for linear trend

**** Information was missing in 23 (0.5%) out of 4,297 subjects in 2004-5

***** Information on leisure-time sedentary lifestyle was missing information in one subject in 2004-5

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Table 3

Crude and adjusted analyses of the association between independent variables and leisure-time sedentary lifestyle among men. Pelotas, Southern Brazil, 1982 to 2004-5

Variable	Crude analysis			Adjusted analysis*		
	PR	95% CI	p-value	PR	95% CI	p-value
Skin color			0.02**			0.01**
White	1	-		1	-	
Black or Mixed	0.87	0.78;0.98		0.84	0.75;0.94	
Family income in 1982 (MW)			0.02***			0.02***
≤1.0	1.18	0.94;1.50		1.26	1.00;1.59	
1.1-3.0	1.25	1.00;1.45		1.29	1.04;1.61	
3.1-6.0	1.15	0.91;1.45		1.16	0.92;1.47	
6.1-10.0	0.96	0.72;1.30		0.97	0.72;1.30	
>10.0	1	-		1	-	
Income change (1982 → 2004-5)			<0.001**			<0.001**
Always poor	1.12	1.00;1.27		1.19	1.05;1.35	
Non-poor → poor	1.31	1.18;1.46		1.32	1.19;1.47	
Poor → non-poor	1.01	0.89;1.14		1.07	0.94;1.22	
Never poor	1	-		1	-	
Birth weight (grams)			0.81***			0.76***
<2500	0.96	0.75;1.21		0.95	0.75;1.21	
2500-2999	1.08	0.90;1.29		1.08	0.90;1.29	
3000-3499	0.96	0.80;1.14		0.95	0.80;1.13	
3500-3999	1.06	0.89;1.27		1.06	0.89;1.27	
≥4000	1	-		1	-	

MW: Minimum wages

*Variables at the first level (skin color and family income in 1982) were adjusted for and included in the analysis if p<0.2. Income change was adjusted for skin color. Birth weight was adjusted for skin color and family income in 1982

**Wald test for heterogeneity

***Wald test for linear trend

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Table 4

Crude and adjusted analyses of the association between independent variables and leisure-time sedentary lifestyle among women. Pelotas, Southern Brazil, 1982 to 2004-2005

Variable	Crude analysis			Adjusted analysis*		
	PR	95% CI	p-value	PR	95% CI	p-value
Skin color			0.23**			0.64**
White	1	-		1	-	
Black or Mixed	1.03	0.98;1.08		0.99	0.94;1.04	
Family income in 1982 (MW)			<0.001***		<0.001***	
<1.0	1.41	1.22;1.63		1.41	1.22;1.64	
1.1-3.0	1.37	1.18;1.58		1.37	1.19;1.58	
3.1-6.0	1.25	1.07;1.45		1.25	1.07;1.45	
6.1-10.0	1.11	0.92; 1.34		1.11	0.92; 1.34	
>10.0	1	-		1	-	
Income change (1982 → 2004-5)			<0.001**			<0.001**
Always poor	1.17	1.12;1.23		1.18	1.12;1.24	
Not poor → poor	1.14	1.08;1.20		1.14	1.08;1.20	
Poor → not poor	1.06	0.99;1.13		1.06	0.99;1.13	
Never poor	1	-		1	-	
Birth weight (grams)			0.01***			0.04***
<2500	1.12	0.97;1.29		1.09	0.95;1.26	
2500-2999	1.08	0.95;1.25		1.06	0.93;1.20	
3000-3499	1.06	0.93;1.21		1.06	0.93;1.20	
3500-3999	1.01	0.88;1.15		1.01	0.89;1.16	
≥4000	1	-		1	-	

MW: Monthly minimum wages

*Variables at the first level (skin color and family income in 1982) were adjusted for and included in the analysis if p<0.2. Income change was adjusted for skin color. Birth weight was adjusted for skin color and family income in 1982

**Wald test for heterogeneity

***Wald test for linear trend