Rev Saúde Pública 2011;45(2)

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Physical activity and correlates among adults living in Ribeirão Preto, Southeastern Brazil

ABSTRACT

OBJECTIVE: To identify physical activity patterns and associated factors among adults.

METHODS: A cross-sectional population-based epidemiological study was conducted in Ribeirão Preto, Southeastern Brazil, in 2006, with a three-stage sampling process. Physical activity patterns were assessed in a weighted sample of 2,197 adults aged 30 years and over, using the International Physical Activity Questionnaire (short version), which has been validated in Brazil. Associated fators were identified using Poisson regression. Prevalence ratios were estimated through points and 95% confidence intervals, in univariate and multiple models. Insufficient versus sufficient practice of physical activity was taken to be the outcome for calculating prevalence ratios.

RESULTS: Sufficient practice of physical activity was presented by 37.5% of the men and 32.1% of the women. The prevalence of insufficient practice was higher than the prevalence of sufficient practice in practically all the categories of variables, for both sexes. Different variables remained in the final models when males and females were considered separately. For males, the following remained in the final model: working for more than ten hours/day [PR = 1.30; 95%CI: 1.07;1.57]; three or more medications taken over the last 15 days [PR = 1.56; 95%CI: 1.16;2.08]; and poor/very poor self-reported health [PR = 1.54; 95%CI: 1.01;2.34]. For females, the following remained: education level of one to three years of schooling [PR = 1.20; 95%CI: 1.02;1.41]; not having any income [PR = 0.78; 95%CI: 0.66;0.93]; and income less than R$ 520.00 [PR = 0.74; 95%CI: 0.60;0.90].

CONCLUSIONS: The prevalence of insufficient practice of physical activity was high. The results suggest that there is a need to implement specific programs to promote physical activity, directed towards men who work for more than ten hours/day, take three or more medications and consider that their health is poor or very poor; and towards women of low income and schooling levels.

DESCRIPTORS: Sedentary Lifestyle. Cross-Sectional Studies. Physical Activity. Correlates.

INTRODUCTION

The demographical transition caused by the decline in fecundity and mortality rates in the population, together with the increase in consumption of saturated fat and alcohol, increase in smoking and decrease in physical activity levels, have contributed collectively towards accumulations of chronic-degenerative diseases, for which preventive actions could produce a better cost-benefit ratio for society.[12]

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Recebido: 24/5/2010
Aprovado: 28/9/2010

Artigo disponível em português e inglês em: www.scielo.br/rsp

Estimates from the World Health Organization (WHO) for the year 2001 showed that 58.5% of deaths due to all causes worldwide resulted from chronic diseases. These estimates indicate that this group of diseases is responsible for around 45.9% of the Disability-Adjusted Life Years (DALY) indicator for the world population.[23] Changes in morbidity-mortality patterns have been targeted by epidemiological studies on the relationship between chronic degenerative diseases and associated factors, among which the pattern of physical activity is highlighted.[14]

Regular practice of physical activities has been shown in the literature to be an important factor for protection against chronic diseases.[7,22] In a systematic review of the literature, Shepard[18] (1995), classified the evidence associating this practice to reduced risk of coronary heart disease, arterial hypertension, kidney disease, type 2 diabetes, osteoporosis, colon and breast cancer, depression and anxiety, among others, as conclusive. Therefore, these diseases should not be considered inevitable in modern society and could be prevented at a lower cost than that of curative and care interventions.[24]

Over recent decades, there has been an increase in the volume of national and international published papers involving the epidemiology of physical activity. However, the availability of different methods for evaluating physical activity patterns in population-based studies makes it difficult to compare the results from different investigations. According to the systematic review carried out by Hallal et al[10] (2007), among the 39 studies that used questionnaires to assess physical activity patterns in Brazil over the past two decades, 69% were conducted with instruments created by the authors themselves. In this light, and with the support from the World Health Organization (WHO), the International Physical Activity Questionnaire (IPAQ) was developed, which has the purpose of assessing physical activity levels in a standardized manner, across the world.[6]

The present study aimed to identify physical activity patterns and associated factors among adults.

METHODS

The data come from the OBEDIARP (Risk factors for overweight, obesity and diabetes mellitus in the municipality of Ribeirão Preto, SP, 2006) Project, which had a cross-sectional population-based design.[21] Adults aged 30 years or more of both sexes, living in the urban area of the municipality of Ribeirão Preto, Southern Brazil, in 2006, composed the sample. The sampling process was developed in three stages. The precision of the estimates was calculated on a sample of 1,205 individuals and corresponded to fixed sampling errors of around 2% (for prevalence below 15% or above 75%) and around 3% (for prevalence between 20% and 80%). The primary sampling unit (2000[a]) was the census tract and the units drawn were the household and the people in the second and third stages, respectively. For the first two stages, a cluster draw method allocated proportionally to size was used. Stratification according to the mean income in the name of the head of the family was introduced in the second stage of the draw. In the third stage, one person aged 30 years or over was drawn from among the (N) residents of the households selected and the stratification took into consideration the composition by age group for each sex,[19] excluding pregnant women or women up to the sixth month after delivery. In total, 930 participants were interviewed, with a response rate of 78%. The variability that was introduced, especially in the third fraction of the sampling, was corrected by attribution of sample weights equal to the number of eligible units of each household, which originated a weighted sample of 2,197 participants.

The practice of physical activity (dependent variable) was assessed by means of the IPAQ instrument (short version), which is recommended by WHO for population-based studies.[6] Based on continuous measurements of the physical activity scores (METs-minutes/week), the participants were initially classified in three levels: "insufficiently active"; "active" and "very active". The participants who accomplished five or more days of any combination of walking and moderate to vigorous-intensity activities, accumulating at least 600 METs-minutes/week were classified as "active". Those who accomplished out seven or more days of any combination of these activities, accumulating at least 3,000 METs-minutes/week, were classified as "very active". The participants who did not reach either of these two criteria were considered "insufficiently active."[b] The categories "active" and "very active" were grouped into a single category, corresponding to sufficient practice of physical activity, and those originally classified as "insufficiently active" composed the category corresponding to insufficient practice of physical activity.

The independent variables were grouped into three different blocks. Block 1 – sociodemographic variables: sex; age (complete years, based on the calculation: [date of the interview – date of birth]/365.25); marital status (living without partner/living with partner); educational level (completed years of formal education) and income (nominal value, in reais, during the month prior to the interview). Block 2 - behavioral variables: smoking habit (nonsmokers/former smokers/smokers); duration of the smoking habit (complete years); abusive consumption of alcohol (using the "Alcohol Use Disorders Identification Test" - AUDIT Questionnaire, which is recommended

[a] Instituto Brasileiro de Geografia e Estatística. Censo Demográfico 2000. Rio de Janeiro; 2000.
[b] Guidelines for Data Processing and Analysis of The International Physical Questionnaire, November 2005 (www.ipaq.ki.se).

by WHO[15] for epidemiological studies, with a cutoff point of ³ 8 for classification of abusive consumption);[13] consumption of medications (use and quantity of medications in the 15 days prior to the interview); work conditions (number of hours worked, on typical days, during the week). Block 3 - variables relating to health: nutritional status, according to specific cutoff points for the body mass index (BMI), according to WHO[25] (eutrophic (BMI: 18.50 to 24.99), pre-obese (BMI: 25.00 to 29.99) and obese (BMI: ≥ 30.00); self-reported health (the participant's perception of his/her state of health, comparing it with that of relatives and friends of the same age) and number of family antecedents of obesity going back to the third ascendant generation.

Data were collected through structured interviews at the participants' homes by a previously trained team. Measurements obtained from volunteers were assessed twice by the interviewers and by a supervising anthropometrist (gold standard) to evaluate the calibration of the interviewers in training.[5] Precision and exactness measurements were calculated, according to Habicht.[9] To minimize typing errors, the data entry fields were validated by means of creating specific amplitudes for the digits (acceptable value intervals and codes for each variable). The typists were previously trained to ensure the quality of the typing process and, for the external consistency test, the data typing was done with double data entry into the formatted databases of the EpiData software, version 2.1 for Windows.

The prevalence of physical activity was stratified by sex and estimated by points and 95% confidence intervals. These estimates were calculated for the set of sociodemographic, behavioral and health-related variables.

To identify the factors associated with insufficient physical activity practice, Poisson regression models were created,[11] in which prevalence ratios in univariate and multiple models were estimated by points and 95% confidence intervals. A "positive" outcome was considered to be insufficient practice, while a "negative" outcome was sufficient physical activity practice. Univariate models were created containing each of the independent variables and the response variable. The variables with p values ≤ 0.25 (Wald test) were candidates for the multiple models. In the final multiple models, only the variables with $p < 0.05$ were kept.

The estimates took into consideration the sample design effect and the analyses were carried out using specific commands (survey commands) of the STATA software, version 8.2 for Windows.

The OBEDIARP Project was approved by the Research Ethics Committee of Escola de Enfermagem de Ribeirão Preto da Universidade de São Paulo, on April 20, 2005 (procedural no. 0528/2005). The participants signed a free and informed consent statement, in accordance with the recommendations of the Resolution 196 of the National Health Council.

Table 1. Sociodemographic characteristics, according to sex. Ribeirão Preto, Southeastern Brazil, 2006.

Characteristic	Male		Female	
	Nw[a]	%[a]	Nw[a]	%[a]
Age Group (years)				
30 to 39	250.8	38.0	404.7	26.3
40 to 49	160.0	24.3	506.9	33.0
50 to 59	125.7	19.0	328.6	21.4
60 or over	123.5	18.7	296.7	19.3
Marital Status				
Without partner	158.7	27.0	421.7	29.5
With partner	429.8	73.0	1007.0	70.5
Educational Level (years)				
Illiterate < 1	24.0	3.6	57.5	3.7
1 to 3	69.3	10.5	192.2	12.5
4 to 7	206.5	31.3	472.8	30.8
8 or more	360.1	54.6	814.4	53.0
Income in reais (terciles)				
No income	133.2	20.2	692.3	45.1
< 520.00	62.8	09.5	375.2	24.4
520.00 to 1100.00	218.4	33.1	226.3	14.7
> 1100.00	245.6	37.2	243.1	15.8

[a] Weighted estimates, taking the design effect into consideration.

RESULTS

Most of the sociodemographic characteristics were similar for both sexes (Table 1). However, there was male predominance in the age group between 30 and 39 years (38%) and female predominance among those with no income (45.1%). A greater percentage of men were from the third tercile of income (37.2%) than of the women (15.8%).

The prevalence of insufficient physical activity practice was higher than sufficient practice for the sociodemographic, behavior and health-related variables among both sexes (Tables 2, 3 and 4). There were exceptions among men who did not make use of medication and among those belonging to the lower third of the "duration of smoking" variable, although these differences were small.

Greater prevalences of sufficient practice were identified among men with less than one year of education (48.8%) and among those between the ages of 50 and 59 years (42.2%). Among women, greater prevalences of sufficient practice were observed between the ages of 30 and 39 years (37.4%) and 50 to 59 years (37.8%) and among those classified in the first third of income (37.2%) (Table 2).

An inverse relationship between the "number of hours of work/day" and prevalence of sufficient practice was observed among men. The variables: "duration of smoking", "use of medications" and "number of medications consumed in the last 15 days", presented an overall association with the dependent variable for male sex ($p < 0.05$) (Table 3).

There was an inverse relationship between the prevalence of sufficient practice and nutritional status among male participants, as well as for the state of health compared with that of their friends. Among the women, a direct relationship was observed for the categories of self-perception of their state of health (Table 4).

The final models were composed of different sets of variables when considering the male and female sexes separately (Table 5). Number of work hours (> 10 h/day), number of medications consumed in the last 15 days and self-reported health ("poor/very poor") remained in the final model for men. For women, educational level ("1-3 years" of education) and income ("1st third of income" and "without income") remained. For the adjusted prevalence ratios, there was a statistically significant ($p < 0.05$) linear trend for the number of hours at work/day and the number of medications

Table 2. Prevalence of physical activity practice, according to sociodemographic factors. Ribeirão Preto, Southeastern Brazil, 2006.

Variable	Male				Female			
	Sufficient		Insufficient		Sufficient		Insufficient	
	Nw[a]	%[a] (95%CI)	Nw[a]	%[a] (95%CI)	Nw[a]	%[a] (95%CI)	Nw[a]	%[a] (95%CI)
Age group (years)								
30 to 39	99.9	40.6 (30.6;51.3)	146.4	59.4 (48.6;69.3)	151.4	37.4 (29.4;46.1)	253.2	62.6 (53.8;70.5)
40 to 49	45.7	28.9 (19.3;40.7)	112.4	71.1 (59.2;80.6)	141.5	27.9 (21.5;35.3)	365.4	72.1 (64.6;78.5)
50 to 59	51.9	42.2 (29.3;56.1)	71.1	57.8 (43.8;70.6)	124.3	37.8 (28.7;47.8)	204.3	62.2 (52.1;71.2)
60 or over	46.8	37.9 (24.8;52.8)	76.7	62.1 (47.1;75.1)	75.8	25.6 (17.7;35.2)	220.9	74.4 (64.7;82.2)
Marital Status								
Without partner	62.9	40.8 (28.3;54.6)	91.2	59.2 (45.3;71.6)	130.8	31.0 (23.8;39.2)	290.9	69.0 (60.7;76.1)
With partner	151.6	35.6 (27.9;44.0)	273.8	64.4 (55.9;72.0)	333.2	33.1 (28.0;38.5)	673.7	66.9 (61.4;71.9)
Educational Level (years)								
Illiterate < 1	11.7	48.8 (21.7;76.5)	12.3	51.2 (23.4;78.2)	13.7	23.9 (10.9;44.4)	43.8	76.1 (55.5;89.0)
1 to 3	19.7	29.5 (16.4;47.2)	47.0	70.5 (52.7;83.5)	51.6	26.9 (18.2;37.7)	140.5	73.1 (62.2;81.7)
4 to 7	77.5	38.8 (28.4;50.2)	122.6	61.2 (49.7;71.5)	153.2	32.4 (26.0;39.4)	319.6	67.6 (60.5;73.9)
8 or more	135.4	37.6 (29.3;46.6)	224.7	62.4 (53.3;70.6)	274.6	33.7 (28.0;39.9)	539.8	66.3 (60.0;71.9)
Income in reais (terciles)								
No income	48.8	37.9 (26.1;51.3)	79.8	62.1 (48.6;73.8)	232.3	33.5 (26.9;40.9)	460.1	66.5 (59.0;73.1)
< 520.00	21.8	34.9 (15.6;60.7)	40.9	65.1 (39.3;84.3)	139.5	37.2 (29.5;45.5)	235.7	62.8 (54.4;70.4)
520.00 to 1100.00	84.8	39.7 (29.0;51.3)	129.1	60.3 (48.6;70.9)	68.5	30.3 (21.5;40.7)	157.7	69.7 (59.2;78.4)
> 1100.00	88.8	36.2 (25.8;48.0)	156.8	63.8 (51.9;74.2)	52.7	21.7 (13.7;32.5)	190.3	78.3 (67.4;86.2)
Total	244.4	37.5 (30.9;44.6)	406.7	62.5 (55.4;69.0)	493.1	32.1 (27.4;37.0)	1044	67.9 (62.9;72.5)

[a] Weighted estimates, taking the design effect into consideration.

Table 3. Prevalence of physical activity practice, according to behavioral factors. Ribeirão Preto, Southeastern Brazil, 2006.

Variable	Male				Female			
	Sufficient		Insufficient		Sufficient		Insufficient	
	Nw[a]	%[a] (95%CI)	Nw[a]	%[a] (95%CI)	Nw[a]	%[a] (95%CI)	Nw[a]	%[a] (95%CI)
Smoking Habit								
Non smokers	92.9	36.6 (27.8;46.3)	160.9	63.4 (53.6;72.1)	306.8	32.2 (27.0;37.9)	643.5	67.8 (62.0;72.9)
Former smokers	99.4	41.8 (31.1;53.2)	138.6	58.2 (46.7;68.8)	104.3	34.9 (27.5;43.1)	194.4	65.1 (56.8;72.5)
Smokers	51.9	32.7 (22.9;44.1)	107.2	67.3 (55.8;77.0)	81.9	28.5 (20.7;37.6)	205.9	71.5 (62.3;79.2)
Duration of Smoking (terciles)*								
< 13 years	67.3	51.8 (37.6;65.7)	62.6	48.2 (34.2;62.3)	66.1	35.2 (24.9;46.9)	121.8	64.8 (53.0;75.0)
13 to 24 years	35.1	28.7 (18.3;41.9)	87.0	71.3 (58.0;81.6)	51.2	27.0 (17.9;38.5)	138.4	73.0 (61.4;82.1)
25 years and more	48.9	33.8 (22.7;46.9)	96.0	66.2 (53.1;77.2)	66.6	32.5 (23.0;43.6)	138.1	67.5 (56.3;76.9)
Abusive Alcohol Consumption								
No dependency (0 to 7)	133.2	36.3 (28.2;45.2)	233.5	63.7 (54.7;71.7)	442.2	32.0 (27.4;37.0)	938.2	68.0 (63.0;72.5)
With dependency (8 to 40)	111.2	39.1 (30.4;48.4)	173.2	60.9 (51.5;69.5)	50.9	32.5 (21.2;46.3)	105.6	67.5 (53.7;78.7)
Use of Medications*								
No	116	50.1 (39.2;60.9)	115.5	49.9 (39.0;60.7)	74.0	32.8 (23.0;44.4)	151.3	67.2 (55.5;76.9)
Yes	128.5	30.6 (23.7;38.5)	291.1	69.4 (61.4;76.2)	419.1	31.9 (27.0;37.2)	892.5	68.1 (62.7;72.9)
Number of Medications*								
None	116	50.1 (39.2;60.9)	115.5	49.9 (39.0;60.7)	74.0	32.8 (23.0;44.4)	151.3	67.2 (55.5;76.9)
1	60.4	33.3 (23.2;45.1)	121.2	66.7 (54.8;76.7)	132.8	31.4 (23.2;41.0)	289.8	68.6 (59.0;76.7)
2	35.7	34.1 (21.1;49.8)	69.18	65.9 (50.1;78.8)	118.9	37.4 (28.8;46.8)	198.9	62.6 (53.1;71.1)
3 or more	32.3	24.3 (12.8;41.2)	100.8	75.7 (58.7;87.2)	167.3	29.3 (23.7;35.4)	403.9	70.7 (64.5;76.2)
Hours of Work/day (terciles)								
< 7 hours	87.7	43.9 (34.4;53.9)	111.9	56.1 (46.0;65.5)	189.5	34.3 (27.4;41.8)	363.1	65.7 (58.1;72.5)
7 to 10 hours	98.7	36.8 (27.1;47.5)	169.6	63.2 (52.4;72.8)	201.4	30.5 (24.5;37.2)	459.1	69.5 (62.7;75.4)
> 10 hours	57.9	31.7 (21.6;43.7)	125.1	68.3 (56.2;78.3)	102.2	31.6 (23.6;40.6)	221.6	68.4 (59.3;76.3)
Total	244.4	37.5 (30.9;44.6)	406.7	62.5 (55.4;69.0)	493.1	32.1 (27.4;37.0)	1044	67.9 (62.9;72.5)

[a] Weighted estimates, taking the design effect into consideration.
* Values "p < 0.05" for F statistics (male).

consumed in the last 15 days, among men. Although among women there was an indication of a linear gradient for educational level, the tendency test did not present statistical significance (p > 0.05).

DISCUSSION

The results from the present study indicated high prevalence of insufficient physical activity practice among both sexes in the municipality of Ribeirão Preto. Regarding sex, different sets of variables remained in the final models, notably, among men, the number of hours at work (> 10 hours/day), consumption of three or more medications/day and self-reported health classified as "poor/very poor". Among the women, low income and educational level remained associated with the outcome.

According to Brown et al[4] (2004), until the mid-1990s, research considered physical activity only during leisure time, because its benefits were attributed to more vigorous activities, such as sports and physical conditioning. Because of the increased prevalence of obesity in the worldwide population, greater attention has been given to the total daily energy expenditure in different domains. In a national survey conducted in Australia, in 2001,[4] the authors concluded that the IPAQ was the instrument that best "captured" the activities carried out in different domains: during leisure time, at work, in housework and in commuting, in comparison with another three questionnaires, among which was the Behavioral Risk Factor Surveillance (BRFSS). The instrument presented the advantage of asking participants about the practice of physical activity in a typical week, since problems could have occurred if such practices took the preceding week as the reference

Table 4. Prevalence of physical activity practice, according to health-related factors. Ribeirão Preto, Southeastern Brazil, 2006.

Variable	Male				Female			
	Sufficient		Insufficient		Sufficient		Insufficient	
	Nw[a]	%[a] (95%CI)	Nw[a]	%[a] (95%CI)	Nw[a]	%[a] (95%CI)	Nw[a]	%[a] (95%CI)
Nutritional Status								
Eutrophic	78	42.2 (31.6;53.5)	107	57.8 (46.4;68.3)	168.1	29.2 (22.9;36.3)	407.3	70.8 (63.6;77.0)
Pre-obese	128.1	39.3 (30.7;48.5)	198	60.7 (51.4;69.2)	186	35.8 (28.3;44.1)	332.7	64.2 (55.8;71.6)
Obese	35.8	28.9 (17.3;43.9)	88.2	71.1 (56.0;82.6)	134.4	31.8 (24.9;39.6)	287.9	68.2 (60.3;75.0)
Self-reported Health								
Excellent	55.6	42.5 (27.2;59.2)	75.3	57.5 (40.7;72.7)	69.6	35.4 (24.6;47.8)	127.1	64.6 (52.1;75.3)
Good	137.8	36.4 (28.6;44.9)	240.8	63.6 (55.0;71.3)	249.3	32.6 (27.1;38.6)	515.2	67.4 (61.3;72.8)
Regular	49	40.6 (27.2;55.5)	71.8	59.4 (44.4;72.7)	136	30.3 (23.1;38.5)	313.3	69.7 (61.4;76.8)
Poor + very poor	1.9	09.3 (01.2;46.3)	18.6	90.7 (53.6;98.7)	38.1	30.2 (19.5;43.4)	88.2	69.8 (56.5;80.4)
Health in Relation to Family								
Worse than yours	89.7	43.4 (32.5;54.8)	117.3	56.6 (45.1;67.5)	144.7	31.6 (24.0;40.2)	313.4	68.4 (59.7;75.9)
The same as yours	135.2	34.7 (26.8;43.4)	254.8	65.3 (56.6;73.1)	271.6	33.1 (27.5;39.1)	549.3	66.9 (60.8;72.4)
Better than yours	19.5	36.1 (19.7;56.4)	34.5	63.9 (43.5;80.3)	76.7	29.8 (22.2;38.5)	181.1	70.2 (61.4;77.7)
Health in Relation to Friends								
Worse than yours	38.7	30.2 (18.4;45.1)	89.7	69.8 (54.8;81.5)	111.6	37.4 (28.5;47.0)	187.2	62.6 (52.9;71.4)
The same as yours	129.4	38.9 (30.1;48.4)	203.1	61.1 (51.5;69.8)	214.7	29.6 (23.9;35.9)	511.2	70.4 (64.0;76.0)
Better than yours	76.2	40.1 (29.8;51.5)	113.8	59.9 (48.5;70.2)	166.8	32.6 (25.9;39.9)	345.5	67.4 (60.0;74.0)
Family History of Obesity								
None	155	38.6 (30.6;47.2)	246.3	61.4 (52.7;69.3)	260.2	31.7 (25.8;38.1)	561.5	68.3 (61.8;74.1)
1	59.9	34.8 (23.4;48.3)	112.2	65.2 (51.6;76.5)	147.9	33.4 (26.7;40.8)	294.8	66.6 (59.1;73.2)
2	27	43.1 (25.4;62.7)	35.7	56.9 (37.2;74.6)	52.7	32.1 (21.0;45.4)	111.8	67.9 (54.5;78.9)
3 or more	2.4	19.5 (04.0;58.2)	9.9	80.5 (41.7;95.9)	27.7	29.4 (18.0;44.1)	66.4	70.6 (55.8;81.9)
Total	244.4	37.5 (30.9;44.6)	406.7	62.5 (55.4;69.0)	493.1	32.1 (27.4;37.0)	1044	67.9 (62.9;72.5)

[a] Weighted estimates, taking the design effect into consideration.

point, given that possible occurrences of holiday or illnesses would make it atypical.

In a study developed by Gómez et al[8] (2005) in the city of Bogotá (Colombia) in 2003, the prevalence of sufficient physical activity practice were 43.8% for men, and 32.1% for women. Although similar to the results found in Ribeirão Preto for women, these values presented a greater magnitude than what was found for men.

Santos et al[17] (2009) observed that the prevalence of sufficient physical activity in the population above 18 years of age was 68.8% for men and 48.3% for women in the Archipelago of the Azores (Portugal) in 2004. In a cross-sectional study with 5,167 participants between 15 and 79 years in Canada in 2002, Pan et al[16] (2009) noted prevalence of 82.8% for men and 75.2% for women. Differences in the lower age limit in relation to that of the OBEDIARP Project participants may explain the higher magnitudes of the prevalence of sufficient physical activity practice in the Archipelago of the Azores and in Canada. However, other factors, besides age, influence the practice of physical activity. In a cross-sectional study conducted in 20 countries, including Brazil, between 2002 and 2004, Bauman et al[2] (2009) concluded that the greater levels found in the more developed countries were due to the fact that they had greater availability of resources for practicing recreational activities and had a greater tradition of promoting physical exercise. These authors observed that the significant contribution that walking had in the levels of physical activity was, in some countries, due to the infrastructure created for this practice and the established regional culture. In this study, the results regarding Brazil indicated that the prevalence of insufficient physical activity practice was 25.6% among men and 34.3% among women. In Ribeirão Preto, the respective prevalences were even greater (62.5% and 67.9% among men and women, respectively).

A set of independent variables similar to the variables in the OBEDIARP Project was considered in the study

Table 5. Crude and adjusted prevalence ratiosa, according to sex. Final model. Ribeirão Preto, Southeastern Brazil, 2006.

Variables	Crude PR	95%CI	Adjusted PR	95%CI
Male				
Hours of Work/day (terciles)				
< 7 hours	1		1*	
7 to 10 hours	1.12	0.89;1.42	1.21	0.95;1.53
> 10 hours	1.21	0.99 ;1.49	1.30	1.07;1.57
Number of Medications				
None	1		1*	
1	1.33	1.04;1.71	1.32	1.03;1.70
2	1.32	0.97;1.78	1.32	0.99;1.77
3 or more	1.52	1.14;2.01	1.56	1.16;2.08
Self-reported Health				
Excellent	1		1	
Good	1.10	0.81;1.50	1.10	0.80;1.51
Regular	1.03	0.71;1.48	0.98	0.68;1.41
Poor + very poor	1.57	1.11;2.22	1.54	1.01;2.34
Female				
Educational Level (years)				
8 or more	1		1	
4 to 7	1.01	0.90;1.14	1.10	0.95;1.27
1 to 3	1.10	0.96;1.26	1.20	1.02;1.41
Illiterate. < 1	1.14	0.91;1.44	1.26	0.99;1.60
Income in reais (terciles)				
> 1100.00	1		1	
520.00 to 1100.00	0.89	0.75;1.05	0.85	0.72;1.02
< 520.00	0.80	0.67;0.94	0.74	0.60;0.90
No income	0.84	0.73;0.98	0.78	0.66;0.93

[a] For the calculation of the prevalence ratios, a "positive" outcome was considered to be insufficient practice and a "negative" outcome was sufficient physical activity practice.
* values $p < 0.05$ for the linear trend test.

by Pan et al[16] (2009). Self-reported health, educational level and family income remained associated with the practice of physical activity. However, the association with educational level presented statistical significance only for women in the final model, as in the OBEDIARP Project. According to Pan et al,[16] people with higher educational levels tend to present better health conditions, better social support and assimilate more easily to the recommendations and the benefits of regular practice of physical activity. Similarly, people with better income have more access, facilities and opportunities to practice physical activity, as well as living in a social environment in which the practice is recognized by others as beneficial to health, which makes adhesion easier. There was no association found between the number of hours of work/day and the outcome.[16] In the present study, the association found between the hours of work/day and insufficient practice of physical activity and the linear trend for the prevalence ratios among men can be explained by the lower time available for leisure activities. Also, it is possible that the work activities of the municipality of Ribeirão Preto are characterized as more sedentary activities, considering the high educational level. According to the Pesquisa Nacional por Amostra de Domicílios (PNAD – National Household Sampling Survey)[20] in 2007, in the Southeastern Brazil, the weekly mean time load dedicated to formal work was higher among men (44.2 hours) than among women (36.7 hours), while the weekly mean values for time dedicated to domestic work among men and women were, respectively, 9.0 and 21.3 hours/week.

Bertoldi et al[3] (2006) found an inverse association between the levels of physical activity and use of medications by the population in the univariate analyses and in the final models in Pelotas, Southern Brazil, in 2002. These findings are confirmed for the male sex in the present study, which reinforces the hypothesis of an association between physical activity and the

medications. In Ribeirão Preto, it was possible to identify the dose-response effect for the prevalence ratios, when investigating the association between the numbers of medications used in the last 15 days and the physical activity pattern. In the study in Pelotas, the authors suggested that the use of medications was not determined only by pharmacological factors, but also by social, anthropological and behavioral patterns and cultural characteristics. These factors might explain, at least partly, why such an association was not found among the women in Ribeirão Preto.

In a study carried out in 2002, in the European Union, with 16,230 participants, using self-reported health as a dependent variable, Abu-Omar et al[1] (2004) observed that people who were more active reported better states of health than did those who were less active. The authors observed, in the multiple models, that the level of physical activity was a significant "predictor" of self-reported health, after adjustment for sex, age, income, educational level, smoking and nationality. Gómez et al[8] (2005) reinforced this hypothesis when they identified, in the population of Bogotá, a direct association between health state self-perception and the practice of physical activity. Similarly, Pan et al[16] (2009) when considering both sexes together, observed that those that classified their health as "poor" presented less chance of being sufficiently active, compared with those who reported excellent health [OR = 0.42 (95%CI: 0.29;0.61)]. Similar results were observed in Ribeirão Preto for men regarding self-reported health and the practice of physical activity. However, the cross-sectional design of these studies has the limitation of reverse causality bias, i.e., insufficient levels of physical activity may lead a person to a "poor/very poor" health state and the reciprocal may be true.

The bias of reverse causality, which is potentially present in studies with cross-sectional designs, reinforces the need to develop cohort studies to better understand the "directionality" of the associations found. On the other hand, though the IPAQ is increasingly being used in population-based studies, the classification of the participants regarding their levels of physical activity is not always in agreement with the recommendations of its organizers. While some authors consider only the total in minutes/week in physical activity practice,[3] regardless of frequency or intensity, others consider the frequency of practice combined with the duration of activity.[8] As well as presenting different physiological models on health, this diversity of classifications makes it difficult to compare results.

Insufficient practice of physical activity is a public health issue, especially in developing countries. The results from the present study suggest that the prevalence of insufficient physical activity practice among the population in Ribeirão Preto is high for both sexes. The associations found indicated that there is a need to elaborate specific strategies for developing programs that stimulate the practice of physical activities. These programs should take into consideration the different sets of factors that remain associated with insufficient practice for each sex. These programs may contribute towards adoption of a healthy life style, as well as preventing chronic-degenerative diseases.

REFERENCES

1. Abu-Omar K, Rutten A, Robine JM. Self-rated health and physical activity in the European Union. *Soz Praventivmed*. 2004;49(4):235-42.
2. Bauman A, Bull F, Chey T, Craig CL, Ainsworth BE, Sallis JF, et al. The international prevalence study on physical activity: results from 20 countries. *Int J Behav Nutr Phys Act*. 2009;6(1):21. DOI:10.1186/1479-5868-6-21
3. Bertoldi AD, Hallal PC, Barros AJD. Physical activity and medicine use: evidence from a population-based study. *BMC Public Health*. 2006;6:224. DOI: 10.1186/1471-2458-6-224
4. Brown W, Bauman A, Chey T, Trost S, Mummery K. Comparison of surveys used to measure physical activity. *Aust N Z J Publ Health*. 2004;28(2):128-34. DOI:10.1111/j.1467-842X.2004.tb00925.x
5. Castro V, Moraes SA, Freitas ICM, Mondini L. Variabilidade na aferição de medidas antropométricas: comparação de dois métodos estatísticos para avaliar a calibração de entrevistadores. *Rev Bras Epidemiol*. 2008;11(2):278-86. DOI:10.1590/S1415-790X2008000200009
6. Craig CL, Marshall AL, Sjostrom M, Bauman AE, Booth ML, Pratt M, et al. International physical activity questionnaire: 12-country reability and validity. *Med Sci Sports Exerc*. 2003;35(8):1381-95. DOI: 10.1249/01.MSS.0000078924.61453.FB
7. Donnelly JE, Hill JO, Jacobsen DJ, Potteiger J, Sullivan DK, Johnson SL, et al. Effects of a 16-month randomized controlled exercise trial on body weight and composition in young, overweight men and women: the Midwest Exercise Trial. *Arch Intern Med*. 2003;163(11):1343-50. DOI:10.1001/archinte.163.11.1343
8. Gómez LF, Duperly J, Lucumi DI, Gámez R, Venegas AS. Nivel de actividad física global en la población adulta de Bogotá (Colombia): prevalencia y factores asociados. *Gac Sanit*. 2005;19(3):206-13. DOI: 10.1157/13075953
9. Habicht JP. Estandarización de métodos epidemiológicos cuantitativos sobre el terreno. *Bol Oficina Sanit Panam*. 1974;76:375-84.
10. Hallal PC, Dumith SC, Bastos JP, Reichert FF, Siqueira FV, Azevedo MR. Evolução da pesquisa epidemiológica em atividade física no Brasil: revisão sistemática. *Rev Saude Publica*. 2007;41(3):453-60. DOI:10.1590/S0034-89102007000300018
11. Kleinbaum DG, Kupper LL, Müller KE, Nizam A. Applied regression analysis and other multivariable methods. 3. ed. Washington, DC: Duxbury Press; 1998.
12. Manton KG. The global impact of noncommunicable diseases: estimates and projections. *World Health Stat Q*. 1988;41(3-4):255-66.
13. Mendonza-Sassi RA, Béria JU. Prevalence of alcohol use disorders and associated factors: a population-based study using AUDIT in southern Brazil. *Addiction*. 2003;98(6):799-804. DOI:10.1046/j.1360-0443.2003.00411.x
14. Norman A, Bellocco R, Vaida F, Wolk A. Total physical activity in relation to age, body mass, health and other factors in a cohort of Swedish men. *Int J Obes*. 2002;26(5):670-5. DOI:10.1038/sj.ijo.0801955
15. Organización Mundial de la Salud. Cuestionario de identificación de los trastornos debidos al consumo de alcohol – AUDIT. Ginebra; 2001.
16. Pan SY, Cameron C, DesMeules M, Morrison H, Craig CL, Jiang XH. Individual, social, environmental, and physical environmental correlates with physical activity among Canadians: a cross-sectional study. *BMC Public Health*. 2009;9:21. DOI:10.1186/1471-2458-9-21
17. Santos R, Santos MP, Ribeiro JC, Mota J. Physical activity and other lifestyle behaviors in a Portuguese sample of adults: results from the Azorean Physical Activity Study. *J Phys Act Health*. 2009;6(6):750-9.
18. Shephard RJ. Physical activity, fitness and health: the current consensus. *Quest*. 1995;47(3):288-303.
19. Silva NN. Amostragem probabilística: um curso introdutório. 2. ed. rev. São Paulo: EDUSP; 2001.
20. Soares C, Sabóia AL. Tempo, trabalho e afazeres domésticos: um estudo com base nos dados da Pesquisa Nacional por Amostra de Domicílios 2001 e 2005. Rio de Janeiro: IBGE, Coordenação de População e Indicadores Sociais; 2007. (Textos para Discussão. Diretoria de Pesquisas, 21).
21. Szklo M, Nieto FJ. Epidemiology: beyond the basics. Gaithersburg: Aspen Publisher; 2000.
22. Warburton DER, Nicol CW, Bredin SSD. Health benefits of physical activity: the evidence. *CMAJ*. 2006;174(6):801-9. DOI:10.1503/cmaj.051351
23. World Health Organization. The world health report 2002: reducing risks, promoting healthy life. Geneva; 2002.
25. World Health Organization. Obesity: preventing and managing the global epidemic: resort of a WHO Consultation. Geneva; 2000. (WHO Technical Report Series, 894).
24. World Health Organization. Preventing chronic diseases: a vital investment: WHO global report. Geneva; 2005.

Research funded by Conselho Nacional de Desenvolvimento Científico e Tecnológico (Procedural No. 505622/2004-1). The authors declare that there are no conflicts of interest.