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Factors associated with leisure-time physical activity among residents of urban areas from a municipality in northeastern Brazil

Fatores associados à atividade física no lazer entre residentes de áreas urbanas de um município do nordeste do Brasil

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Abstract – The objective of this study was to analyze factors associated with leisure-time physical activity among residents of urban areas. A cross-sectional epidemiological study was conducted on a representative sample of the urban population of Feira de Santana, Bahia, Brazil, aged 15 years or older. The sample consisted of 3,597 subjects, including 71.4% females and 28.6% males. A questionnaire containing sociodemographic data, self-reported diseases, and leisure-time physical activity was applied. Prevalence ratios and 95% confidence intervals were calculated, adopting a level of significance of $p \leq 0.05$. The frequency of subjects considered to be active during leisure time was 27.7%. Sociodemographic characteristics (gender, income, and educational level) were associated with a higher frequency of physical activity. In conclusion, the frequency of leisure-time inactivity was high in the population from the municipality of Feira de Santana, especially among women, low-income subjects, and subjects with low educational level. These findings contribute to the discussion about the need to implement public health policies and to create spaces for active leisure-time activity.

Key words: Leisure activity; Motor activity; Urban health.

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Resumo – *O estudo teve como objetivo analisar os fatores associados à atividade física no lazer entre residentes em áreas urbanas. Estudo epidemiológico de corte transversal com amostra representativa da população urbana de Feira de Santana, Bahia, Brasil, de 15 anos ou mais de idade. A amostra foi constituída por 3.597 indivíduos, 71,4% do sexo feminino e 28,6% do sexo masculino. Foi utilizado um questionário contendo informações sociodemograficas, doenças referidas e prática de atividade física no lazer. Foram estimadas as razões de prevalência e respectivos intervalos de confiança a 95%. Adotou-se nível de significância estatística de 5% (p≤0,05). Encontrou-se uma frequência de 27,7% de indivíduos considerados ativos no lazer. A análise dos dados revelou que características sociodemográficas (sexo, renda e escolaridade) estavam associadas à maior frequência de atividade física. A população do município de Feira de Santana apresenta uma elevada frequência de indivíduos inativos no lazer, principalmente, entre as mulheres, pessoas de baixa renda e entre aqueles com menor escolaridade. Estes achados fomentam a discussão sobre a necessidade de implementação de políticas públicas de saúde e a criação de espaços de prática do lazer ativo.*

Palavras-chave: *Saúde da população urbana; Atividade motora; Atividades de lazer.*

INTRODUCTION

Physical activity can be understood as an essential attribute of humans and is a protective factor against different adverse health conditions. In addition, physical activity is an interdisciplinary topic that has raised the interest of researchers from different areas, of the media, and of public health agencies.

Regular physical activity is an important component of the life of people and has a significant impact on the prevention and control of chronic non-communicable diseases. From a psychosocial point of view, physical activity contributes to the control of stress, anxiety and depressive symptoms and directly acts on psychological (distraction, self-efficacy and social interaction) and physiological factors (increased synaptic transmission of endorphins)[1]. Rocha et al.[2] emphasized that the participation in leisure-time physical activities favors socialization of the participants and thus contributes to a more optimistic perception of quality of life.

According to estimates of the World Health Organization[3], physical inactivity (a behavior in which individuals do not engage in any leisure-time physical activity or any intense physical effort during work, do not go to work on foot or on a bicycle, and are not responsible for heavy cleaning of the house), accounts for almost 2 million deaths, for 22% of cases of ischemic heart disease, and for 10 to 16% of cases of diabetes and breast and colorectal cancer. Population studies conducted in Brazil have reported a prevalence of general physical inactivity (including all domains of physical activity: leisure time, job-related, transportation, and exercise) of 29.6%[4] and 31.8%[5] among adults. When only the leisure-time domain is considered, the prevalence of physical inactivity increases, with rates ranging from 65.4%[6] to 72.6%[7].

Sedentarism or leisure-time physical inactivity is associated with arterial hypertension and diabetes[7], and an increase in the number of hospital admissions[8]. In addition, leisure-time physical inactivity is more prevalent among women[6], older adults[5], and individuals with low educational levels[7].

The increase in the number of physically inactive individuals is a public health problem and, as mentioned earlier, this problem is aggravated when the leisure-time domain is analyzed separately. In this respect, the challenges and social needs of the Brazilian population require insights into aspects that promote or impair physical activity. This has led to the recognition in the field of Collective Health that discussions about topics related to the body and leisure are urgently needed[9]. Knowledge about leisure-time physical activity and its determinants may serve as the basis for the establishment of interventions that encourage leisure-time physical activities in different populations, thus generating useful data for the development of public policies designed to prevent physical and mental comorbidities.

Within this context, the objective of the present study was to analyze factors associated with leisure-time physical activity among residents of urban areas from a municipality in northeastern Brazil.

METHODOLOGICAL PROCEDURES

A cross-sectional exploratory study was conducted between April and September 2007 in the municipality of Feira de Santana, located 116 km from Salvador, the capital of the State of Bahia, northeastern Brazil. The municipality of Feira de Santana is the second largest city of the state and the 31st of the country. It is located in the plain region between the "Recôncavo" and semiarid tablelands of northeastern Bahia. The estimated population in 2006 was 535,820 inhabitants[10].

The study areas were randomly selected by stratified sampling according to subdistrict based on the census data of the Brazilian Institute of Geography and Statistics (IBGE)[10]. The household was defined as the sampling unit.

Since the study was designed to evaluate the mental health condition of the population aged 15 years or older, sampling procedures considering estimates of psychological morbidity were adopted. The sample was obtained assuming an estimated prevalence of common mental disorders of 25%, a sampling error of 3%, and a 95% confidence interval. On the basis of these parameters, a sample size of 800 subjects was established. Considering the study design effect (cluster sampling), the sample size was doubled to 1600 subjects. Taking into account refusals and losses of about 20%, a size of the sample of 1920 subjects was defined.

The following procedures were adopted for selection of the sample: determination of the percent representation of the population according to urban subdistrict; definition of the percentage of each subdistrict in the sample based on data of the resident population in each subdistrict; listing of the census sectors in each subdistrict; random selection of the census sectors included in the sample from each subdistrict; random selection

of the streets included in the sample from each census sector. All households in the streets selected were included in the sample and all subjects aged 15 years or older living in the selected households were considered to be eligible and comprised the sample of the study. The households were visited up to three times to reduce losses.

The data were collected using a questionnaire that was applied to the eligible residents of the selected households. The questionnaire consisted of sociodemographic data and data regarding self-reported diseases, participation in and time spent on leisure-time activity, engagement in physical activities, and mental health condition. Self-reported medical conditions (diabetes, hypertension, elevated cholesterol, obesity, and heart disease) were assessed by dichotomous questions (yes or no).

For the evaluation of leisure-time physical activity, the subjects were asked whether they participated regularly in physical activities during leisure time and in which type of activity, and to classify the intensity of activity (mild, moderate or heavy). Participants who rated their physical effort during leisure time as moderate (walking, cycling, dance class, or physical activity for at least 2 hours per week) or heavy (running, gymnastics, swimming, ball games, or physical activity for at least 4 hours per week) were classified as active during leisure time. Subjects who reported no participation in physical activities or participation in mild physical activity (card games, chest or domino games, or slow walking for at least 2 hours per week) were classified as inactive during leisure time. The procedure used for the definition of active and inactive was similar to that reported in other studies[11-13].

The SPSS 9.0 and R 2.6.1 software packages were used for creation of the database and analysis of the data. First, the sociodemographic variables and clinical conditions were submitted to descriptive analysis to establish the profile of the population studied. The frequency of leisure-time physical activity was estimated and stratified according to sociodemographic variables (gender, age, income, educational level, and marital status) and clinical conditions (diabetes, hypertension, elevated cholesterol, obesity, and heart disease). Prevalence ratios and their respective 95% confidence intervals were then calculated. Significance was evaluated using Pearson's chi-square test, with $\alpha = 5\%$.

For exploratory data analysis, multiple logistic regression analysis was performed to simultaneously evaluate the factors included in the study. Multiple logistic regression was performed according to Hosmer & Lemeshow[14] as follows: 1) verification of the assumptions; 2) pre-selection of basic variables; 3) pre-selection of the interaction terms; 4) assessment of confounding. For analysis of potentially confounding variables, the magnitude of variation in the estimated coefficients and in the respective odds ratios (OR) of the main exposure variable (leisure-time physical activity) was evaluated. The variable was classified as confounding when the coefficient of the main exposure variable showed a variation higher than 10%. 5) Logistic regression analysis itself was performed adopting a backward procedure for selection of the best model. Variables associated with the response, i.e., variables presenting $p \leq 0.25$, remained in the model. Effect modification was analyzed by the likelihood ratio test, adopting a level of significance of 20%. The complete model included sociodemographic variables (gender, age group, income, educational level, and marital status) and clinical conditions (diabetes, elevated cholesterol, obesity, arterial hypertension, and heart diseases).

Since multiple logistic regression has been developed for use in case-control studies, producing OR and not prevalence ratios, the use of OR obtained by logistic regression is not recommended for study of the effects of high frequency because in these cases the OR overestimates the effect investigated. Since the frequency of leisure-time activity estimated was higher than 25%, it was necessary to calculate prevalence ratios. On the basis of the parameters of the final model, prevalence ratios and their respective confidence intervals were estimated using the Delta method, a program specifically developed for this purpose[15].

The study was conducted in accordance with the ethical guidelines of the Declaration of Helsinki and Resolution No. 196/96 of the Brazilian National Health Council. The study protocols were approved by the Ethics Committee on Human Research of Universidade Estadual de Feira de Santana (protocol 042/06) and all participants signed a free informed consent form.

RESULTS

The sample studied consisted of 3597 subjects aged 15 years or older and living in urban areas of the municipality of Feira de Santana. The characteristics of the sample are shown in Table 1. There were a higher percentage of women (71.4%). Subjects aged 15 to 29 years (38.9%) and married subjects or those living in a stable union (48.7%) were the predominant groups. With respect to income and educational level, 81.7% of the participants earned up to one minimum wage and 47.2% had elementary school.

Table 1. Distribution of urban area residents according to sociodemographic variables (Feira de Santana, Bahia, 2007).

Variable	Frequency	
	n	%
Gender		
Female	2,569	71.4
Male	1,028	28.6
Age (years)		
15-29	1,400	38.9
30-49	1,197	33.3
50-69	770	21.4
≥ 70	230	6.4
Marital status		
Single	1,305	36.4
Married/stable union	1,743	48.7
Divorced/separated	248	6.9
Widowed	285	8.0
Educational level		
Never went to school/reads and writes	240	6.7
Elementary school	1,692	47.2
High school/Higher education	1,656	46.2
Income		
≤ 1 Minimum wage	2,938	81.7
> 1 Minimum wage	658	18.3

Among the clinical conditions reported by the participants, arterial hypertension (24%) and elevated cholesterol (12.3%) were the most prevalent. Heart diseases presented the lowest prevalence (5.0%) (Table 2).

Table 2. Distribution of urban area residents according to clinical condition (Feira de Santana, Bahia, 2007).

Variable	Frequency	
	n	%
Arterial hypertension		
No	2,731	76.0
Yes	862	24.0
Elevated cholesterol		
No	3,150	87.7
Yes	442	12.3
Obesity		
No	3,306	92.0
Yes	288	8.0
Diabetes		
No	3,426	95.3
Yes	169	4.7
Heart disease		
No	3,414	95.0
Yes	180	5.0

The frequency of participation in leisure-time physical activities was low: only 27.3% (n = 981) of the subjects were classified as active during leisure time. Therefore, the frequency of leisure-time inactivity was 72.7% in the population studied. Table 3 shows the association between leisure-time physical activity and sociodemographic characteristics. The frequency of leisure-time physical activity was higher among males, younger subjects, subjects with an income higher than one

Table 3. Engagement in leisure-time physical activities according to sociodemographic characteristics (Feira de Santana, Bahia, 2007).

Variable	Prevalence (%)	PR	95% CI	p
Gender				
Male	46.8	1.00	-	<0.0001
Female	19.5	0.41	0.37-0.46	
Age (years)				
15-29	32.9	1.00	-	<0.0001
30-49	25.6	0.77	0.68-0.88	
≥ 50	21.3	0.64	0.56-0.74	
Income				
> 1 monthly minimum wage	42.1	1.00	-	<0.0001
≤ 1 monthly minimum wage	24.0	0.57	0.51-0.63	
Educational level				
Never went to school/reads and writes	12.1	1.00	-	<0.0001
Elementary school	23.9	0.92	0.89-0.95	
Higher education	33.0	0.88	0.85-0.91	
Marital status				
Married/stable union	18.3	1.00	-	< 0.0001
Divorced/separated/widowed	25.3	0.92	0.87-0.96	
Single	33.4	0.82	0.77-0.86	

PR: prevalence ratio; CI: confidence interval.

minimum wage and higher educational levels, and among singles (Table 3).

Subjects who had none of the clinical conditions investigated (diabetes, elevated cholesterol, obesity, arterial hypertension, or heart diseases) were more active during leisure time than those with some clinical condition (Table 4).

Table 4. Frequency of leisure-time physical activity according to clinical condition (Feira de Santana, Bahia, 2007).

Variable	Prevalence (%)	PR	95% CI	p
Diabetes				
No*	27.8	1.00	-	0.001
Yes	16.0	1.74	1.22-2.47	
Elevated cholesterol				
No*	28.3	1.00	-	<0.001
Yes	20.1	1.40	1.15-1.70	
Obesity				
No*	27.9	1.00	-	0.007
Yes	20.5	1.36	1.07-1.72	
Arterial hypertension				
No*	29.4	1.00	-	< 0.001
Yes	20.6	1.42	1.23-1.64	
Heart disease				
No*	27.9	1.00	-	0.001
Yes	16.5	1.67	1.20-2.32	

PR: prevalence ratio; CI: confidence interval.
* Reference group.

The following variables remained in the final model after multivariate analysis for the simultaneous evaluation of all factors analyzed in the study: gender, income, and educational level. Thus, these variables were significantly associated with leisure-time physical activity (Table 5).

Table 5. Adjusted prevalence ratios and their respective 95% confidence interval between the characteristics studied and leisure-time physical activity obtained by multiple logistic regression analysis.

Variable	PR	95% CI
Gender		
Male*	1.00	-
Female	0.33	0.26- 0.36
Age (years)		
15-29*	1.00	-
30-49	0.81	0.65 - 1.00
> 50	0.81	0.61 - 1.06
Income		
≤ 1 monthly minimum wage	1.00	-
> 1 monthly minimum wage*	0.55	0.45 - 0.68
Educational level		
Never went to school/reads and writes *	1.00	-
Elementary school	0.74	0.62 - 0.88
High school/Higher education	0.45	0.23 - 0.89
Marital status		
Married/stable union	1.00	-
Divorced/separated/widowed	0.79	0.65 - 0.97
Single	0.75	0.55 - 1.05
Diabetes		
No*	1.00	-
Yes	1.37	0.86- 2.17
Elevated cholesterol		
No*	1.00	-
Yes	0.89	0.67 - 1.19
Obesity		
No*	1.00	-
Yes	1.19	0.86 - 1.66
Arterial hypertension		
No*	1.00	-
Yes	1.04	0.82 - 1.30
Heart disease		
No*	1.00	-
Yes	1.34	0.87 - 2.07

PR: prevalence ratio; CI: confidence interval.
* Reference group.

DISCUSSION

The increase of diseases associated with sedentary or hypokinetic behavior has raised the interest of researchers to identify aspects related to this type of behavior, especially in developing countries.

In the present study, a high percentage of the population was classified as inactive during leisure time (almost ¾ of the population). Studies show that a large portion of the population do not meet the current physical activity guidelines[13,16]. The prevalence of physical inactivity is even higher when only leisure-time physical activities are evaluated[13,17,18]. The growth of cities has led to a reduction in spaces available for physical activity and leisure. This fact, together with social problems such as urban violence, long working hours and technological amenities, favors the adoption of sedentary habits.

The prevalence of physical inactivity among adults observed in the present investigation (72.7%) was higher than that reported in other studies. Siqueira et al.[5], using the Short Version of the International Physical Activity Questionnaire (IPAQ) detected a higher prevalence of sedentarism in the northeastern region of Brazil (39%) compared to

the south region (24%). Two other studies used dichotomous questions to evaluate the prevalence of leisure-time physical inactivity and/or sedentarism as done in the present investigation. Zanchetta et al.[6] , studying residents in the State of São Paulo aged 18 to 59 years, found a prevalence of leisure-time physical inactivity of 65.4%. Pitanga and Lessa[7] observed a prevalence of leisure-time sedentarism of 72.5% among adult residents in Salvador, Bahia. Therefore, the prevalence of leisure-time physical inactivity observed here was similar to that obtained in other studies using a similar method.

Two categories can influence the patterns of physical activity: individual characteristics including motivation, self-efficacy, motor skills and other health behaviors, and environmental characteristics including access to work or leisure spaces, costs, barriers of time availability, and sociocultural support[19].

After logistic regression analysis, the sociodemographic variables gender, income and educational level continued to be associated with leisure-time physical activity. Subjects with more years of schooling and higher income showed a higher level of physical activity[17,20]. The lack of physical activity and leisure activity programs offered by the government, as well as the precarious conditions of public leisure spaces in most Brazilian urban centers, might be important barriers to the adoption of an active lifestyle for the population of the municipality studied. Engagement in physical activity is also influenced by gender relationships engagement in physical activity also differs between genders. Men have been shown to be more active than women, especially during leisure time and work[20-24], in agreement with the present findings. Since women work double shifts, their leisure time is reduced and engagement in leisure-time physical activity is therefore restricted[25].

The association between physical activity and socioeconomic indicators has raised the interest of researchers. With respect to the leisure domain, studies have shown that individuals with higher incomes are more active during leisure time[20,26]. The poorest segments of the population have less time to participate in leisure-time physical activities since they tend to live more distant and to spend more time traveling to work. In addition, subjects of low socioeconomic status tend to have more than one job and to work extra hours to compensate for their low income, thus reducing their leisure time[26]. Another aspect is the scarcity of public spaces and leisure activities.

The present investigation showed an association between leisure-time physical activity and educational level, an association also demonstrated in other studies conducted in Brazil[20,27] and in other countries[28,29]. Hallal et al.[30] emphasized that adults with higher educational levels have easier access to knowledge and material living conditions that favor the adoption of healthy practices and habits.

According to Akke at al.[23], physical activity is an important risk modifier for chronic health problems such as coronary diseases, diabetes, hypertension, and obesity. However, no significant associations between leisure-time physical activity and the presence of chronic diseases were observed in the present study. In view of the cross-sectional design of the study that evaluated existing conditions (presence of morbidity and leisure-time physical activity) at a single time point, it is not possible to establish whether the presence of a disease caused the interruption of physical activity, or whether the existence of disease led to more regular physical activities. In this respect, longitudinal studies would provide more satisfactory answers regarding the relationship between the development of chronic diseases and physical activity.

The results obtained here should be interpreted with caution in view of possible limitations of the study. As mentioned earlier, one limitation is the cross-sectional design of the study, which simultaneously evaluates variables regarding the effect of interest and associated factors. Therefore, a reverse causation hypothesis cannot be ruled out, i.e., it is not possible to identify whether leisure-time physical activity influences associated factors or vice-versa. The cross-sectional design of the study impairs the analysis of preceding data. However, the results obtained seem to support evidence of explanatory models regarding the frequency of leisure-time activity in population groups.

The distribution of age groups in the sample was similar to the composition of the population of Feira de Santana aged 15 years or older.

Despite these limitations, the study evaluated an expressive number of subjects (n=3597), including population groups from all subdistricts of the municipality, a fact that permitted to estimate the frequency of leisure-time activity in this municipality and to identify associated factors.

CONCLUSIONS

The present study permitted to identify the frequency of leisure-time physical activity and associated factors in the urban population of Feira de Santana, Bahia .The prevalence of leisure-time physical inactivity was high and similar to that

reported for other regions of Brazil and for other countries. Engagement in leisure-time physical activity was more frequent among men, subjects with higher monthly incomes, and subjects with a higher educational level.

The construction of leisure facilities (courts, walking trails, soccer fields, swimming pools) and the development of educational and health programs that address behavioral changes and encourage the adoption of an active lifestyle will certainly contribute to increase the level of physical activity in the population. The present findings suggest that the establishment of preventive actions can be guided by interventions that increase social integration, including the participation in active leisure-time activities, and by public policies that address a better distribution of income and access to and retention in school. The present results contribute to health management by providing the basis for public health intervention policies.

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