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Aging in Brazil

Physical Activity, Socioeconomic Conditions, and Diseases Among Older Adults in Southern Brazil

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This report describes the outcomes of an epidemiological study that examined the association among physical activity participation, household income, and the prevalence of chronic diseases among 875 older persons living in southern Brazil. At least one disease or chronic condition was reported by 71.1% of the older adults. The survey identified 59.3% of the older adults as more active. Physical activity levels were found to be independent predictors of disease status. Less active seniors were more than twice as likely to report the presence of disease than were their more active counterparts. In addition, socioeconomic status was found to be significantly related to physical activity participation, with lower income seniors less likely to be physically active. These findings underscore the value of physical activity interventions for preserving health and independence among older Brazilians. Special efforts should be made to design physical activity interventions that target low-income seniors.

Keywords: *physical activity; chronic diseases; elderly people; socioeconomic variables*

The world's population of persons age 60 and older reached 580 million in 2000, and it is estimated that this figure will climb to approximately 2 billion older adults by 2050 (U.S. Census Bureau, 2001). Population

aging is not restricted to the industrially and economically developed world. Demographers forecast that by 2025, the majority of older people will be living in the developing world. Brazil will be among the countries most significantly affected by the aging of society. It is estimated that by 2025, Brazil's older adult population will number 33.4 million, the fourth largest senior population among the developing countries (World Health Organization, 2002). Brazil has already experienced a significant demographic transition, with the proportion of older adults shifting from only 4% of the total population in 1940 to 8.6% in 2000. The older-than-80 age group has increased the most of all age groups (Instituto Brasileiro de Geografia e Estatistica [IBGE], 2004).

In addition to experiencing a demographic transition over the past 50 years, most developing countries have simultaneously experienced an epidemiological transition in which the major causes of morbidity and mortality gradually shift from primarily infectious diseases to an increased impact of chronic conditions and noncommunicable diseases (Cappuccio, 2004). For example, in Brazil in 1950, infectious diseases were responsible for 40% of all deaths and chronic conditions for only 10% of deaths (Mathias & Jorge, 2004). By 1980, this proportion was already changing, with chronic diseases responsible for 40% of deaths and infectious diseases for 10%. The major health problems among older persons in Brazil are related to diseases of the circulatory system (hypertension and heart disease), musculoskeletal and connective tissue diseases (spinal column pain, arthritis, and rheumatism), and by endocrine, nutritional, and metabolic conditions (diabetes) (IBGE, 1998, 2003).

It is now well understood that most chronic conditions result from a combination of genetic and lifestyle factors that interact during the life course. Among the more important lifestyle factors that influence health and well-being are regular physical activity, healthy nutrition, limited intake of alcohol, and not smoking. This report focuses on the study of the relationship between a regular physical activity and the development of

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chronic conditions and noncommunicable diseases in southern Brazil. Attention was focused on physical activity as a lifestyle behavior for several reasons. First, there is a substantial body of scientific evidence that indicates that regular physical activity offers one of the greatest opportunities to extend years of active independent life, reduce disability, and improve the quality of life for older persons (Atienza, 2001; Chodzko-Zajko, 2001; Eakin, 2001; Linnan & Marcus, 2001; Stewart, 2001; U.S. Department of Health & Human Services, 1996). Second, the relationship between physical activity participation and chronic disease development has not been extensively studied in Brazil, particularly among older adults.

Despite a wealth of evidence about the benefits of physical activity, there has been only limited success in convincing older Brazilians to adopt physically active lifestyles. For example, although most older Brazilians are aware of the need to participate regularly in physical activity, levels of participation remain low. A national survey conducted by the Moura et al. (2008) found that appropriate levels of physical activity are practiced by fewer than half of older adults. This survey found that the prevalence of physical inactivity among people older than 65 is 56%, and it is greater among men (65.4%) than among women (50.3%). As for physical activity during leisure time, it is only practiced by 12.7% of the overall population (17.1% of men and 10% of women).

The impact of sedentary lifestyles and physical inactivity on morbidity and mortality has not been extensively studied in Brazil, and there is a need for more epidemiological investigations of the relationships among these measures. Accordingly, the present study examined the association between physical activity and disease among older persons living in a major city in southern Brazil (Florianópolis). Furthermore, because the analyses of national data from other countries, such as the United States (the Third National Health and Nutrition Examination Survey), have indicated that physical activity levels are lowest among low-income groups (King et al., 2001), we also assessed the relationship between socioeconomic status and physical activity participation levels to determine whether this relationship is also found among Brazilian seniors.

Method

This report was based on a representative survey titled *Profile of Old Persons in the Municipality of Florianópolis* (Benedetti, Petroski, & Gonçalves, 2004). Florianópolis is the capital of the state of Santa Catarina in southern Brazil. This in-home survey interviewed a total of 875 older

adults (437 men and 438 women) with an average age of 71.6 ± 7.9 years. It represents 8.4% of the total population (342,315 inhabitants) of the city of Florianópolis. Census tracts (by neighborhoods and gender) and maps were supplied by the IBGE to guide the probabilistic sampling of the study participants. All interviews were conducted by trained interviewers from August to November 2002. The average time taken to conduct each in-home interview was 54 min.

This survey included two standard questionnaires, the International Physical Activity Questionnaire (IPAQ; Marshal & Bauman, 2001) and the Brazil Old Age Schedule questionnaire (Veras, Dutra, Souza, Miolli, & Ventura, 1989; Veras & Dutra, 2001). The IPAQ measures physical activity level in four domains (work, transportation, domestic tasks, and leisure). For this report, the middle level proposed in the original IPAQ was suppressed, following the recommendations from previous surveys using IPAQ with older adults in Brazil (Benedetti, Antunes, Rodrigues-Anez, Mazo, & Petroski, 2007; Benedetti et al., 2004). Therefore, older adults who carried out moderate or vigorous physical activities within the four domains for 150 min per week or more were classified as more active, whereas those who did not reach 150 min per week were classified as less active. Information on sociodemographic variables, living conditions, and health conditions including morbidity, medication, needs, and problems that affect older adults were obtained using the Brazil Old Age Schedule questionnaire. The World Health Organization's (2004) *International Classification of Diseases and Health-Related Problems* (Version 10) was used for disease identification and prevalence assessment (Brazilian Ministry of Health, 2006). Household income was assessed as a proportion of the official Brazilian minimum monthly salary (MMS) level, which was 300 Reais (approximately $100) at the time of data collection. This research was approved by the Ethics Committee for Research on Human Beings (Ministério da Saude/Comissão Nacional de Ética em Pesquisa/Universidade Federal de Santa Catarina) through Protocol 051/2001. A statement of informed consent was obtained from all participants before the initiation of data collection.

A chi-square test was used for the descriptive analyses of the variables. Logistic regression analyses adjusted by gender (male and female) and age (in years) were applied to examine potential independent associations of disease status (presence vs. absence) and physical activity participation (less active vs. more active), as shown in Model 1; Model 2 examined associations of physical activity participation (less active vs. more active) and household income (up to 2 MMS, 2.1–6 MMS, and more than 6 MMS).

Results

Table 1 shows the distribution of older adults by gender for the socioeconomic, disease, and physical activity variables. The data analyses show that the majority of older adults living in Florianópolis were married, and 54% had fewer than 8 years of education, including 20% who were illiterate. Household incomes up to 2 MMS were reported by 45% of the participants in the study. The source of income was mainly from retirement pensions.

As for disease, 71% of the participants reported the presence of at least one disease. Circulatory diseases were the most frequently cited, with arterial hypertension and cardiovascular conditions the most prevalent, followed by musculoskeletal and connective tissue diseases (rheumatism, arthrosis/arthritis, joint pain, and spinal column problems), and endocrine, nutritional, and metabolic diseases (mainly diabetes and thyroid conditions). The majority (73%) of older men and women reported taking at least one medication on a daily basis. Polypharmacy (use of more than five medications per day) was reported by 14% of the study participants.

The survey identified that 59% of the older adults were classified as more active. The mean time per week spent on moderate and vigorous physical activities was 521 ± 270 min. The analysis across the four domains shows that work activity was the one on which they spent the least time. Men seem to have transferred their activities from the workforce to leisure, whereas women appear to have continued their domestic tasks even in advanced age. The leisure activities most cited were participation in social groups, third age dances, bingo, short trips, community meetings, participation in sports, going to the cinema, going to church, walking around the district, doing shopping, and visiting friends and relatives.

The logistic regression analysis adjusted by gender and age with physical activity level (less active and more active) as the independent variable is shown in Table 2. Physical activity levels were shown to be independently associated with the presence of disease. Model 1 showed that less physically active older adults were twice as likely to report the presence of at least one type of disease than were those who were more active. Furthermore, individuals in the highest income category (more than 6 MMS) group were twice as likely to be physically active than individuals in the lowest income category (less than 2 MMS).

Discussion

The present study identified important associations between levels of physical activity participation, household income, and chronic disease

Table 1
Characteristics of the Older Adults Living in Florianópolis, Southern Brazil

Characteristic	Male (n = 437)	Female (n = 438)	Overall (N = 875)
Age group			
60-69	203 (23.2)	200 (22.9)	403 (46.1)
70-79	170 (19.5)	153 (17.4)	323 (36.9)
80 or older	64 (7.3)	85 (9.7)	149 (17.0)
Marital status			
Married	365 (41.75)	173 (19.7)	538 (61.5)
Widowed	41 (4.7)	208 (23.7)	249 (28.4)
Separated or divorced	22 (2.5)	36 (4.2)	58 (6.7)
Single	9 (1.0)	21 (2.4)	30 (3.4)
Schooling			
Illiterate	80 (9.1)	95 (10.9)	175 (20.0)
<8 years	215 (24.6)	261 (29.8)	476 (54.4)
≥8 years	142 (16.3)	82 (9.3)	224 (25.6)
Household income			
Up to 2 MMS	142 (16.2)	255 (29.1)	397 (45.4)
2.1-6 MMS	115 (13.2)	96 (11.0)	211 (24.2)
≥6 MMS	167 (19.1)	81 (9.2	248 (28.3)
Do not know	13 (1.5)	6 (0.7)	19 (2.1)
Source of income[a]			
Retirement pension	382 (43.7)	233 (26.6)	615 (70.3)
Other pension	70 (8.0)	297 (33.9)	367 (41.9)
Work	100 (11.4)	43 (4.9)	143 (16.3)
Relatives and friends	42 (4.8)	61 (7.0)	103 (11.8)
Investments	63 (7.2)	39 (4.5)	102 (11.7)
Others	17 (1.9)	16 (1.8	33 (3.8)
Diseases			
Most frequent (top 5)			
Circulatory system	179 (41.0)	217 (49.5)	396 (50.4)
Musculoskeletal and conjunctive tissue	67 (15.3)	134 (30.6)	201 (26.1)
Endocrine, nutritional, and metabolic	71 (16.2)	107 (24.4)	178 (20.5)
Respiratory system	33 (7.6)	28 (6.4)	61 (8.0)
Digestive system	22 (5.0)	31 (7.1)	53 (6.4)
No disease reported	156 (35.7)	102 (23.3)	258 (28.9)
Physical activity			
Less active	159 (36.4)	197 (45.0)	356 (40.7)
More active	278 (63.6)	241 (55.0)	519 (59.3)

Note: Values are n (%). MMS = minimum monthly salary.
a. Some older adults have reported more than one source of income.

Table 2
Logistic Regression Analyses for Disease and Physical Activity

Analysis	Odds Ratio	95% CI	*p*
Model 1, for disease			
Physical activity			
Less active	2.06	1.49-2.85	<.001
More active	1 (ref)		
Model 2, for physical activity			
Household income			
Up to 2 MMS	1.941	1.36-2.77	<.001
2.1-6 MMS	1.389	0.93-2.08	.110
≥6 MMS	1 (ref)		

Note: Models adjusted by gender (men and women) and age (in years). Model 1: dependent variables = diseases (presence vs. absence), independent variables = physical activity (less active vs. more active). Model 2: dependent variable = physical activity (less active vs. more active), independent variable = household income (up to 2 MMS, 2.1-6 MMS, and ≥6 MMS). CI = confidence interval; MMS = minimum monthly salary.

prevalence among older adults living in southern Brazil. More active older adults living in Florianópolis tend to be those with higher household incomes and fewer health problems.

An association between level of physical activity and the prevalence of diseases has been reported by numerous international organizations, such as the World Health Organization, the Centers for Disease Control and Prevention, and the U.S. Department of Health and Human Services. These groups have suggested that regular physical activity promotes health and prevents many diseases. Our study confirms that these associations are also present in developing countries. The findings from the present study are in agreement with the U.S. Department of Health and Human Services's (1996) *Physical Activity and Health: A Report of the Surgeon General* that identifies physical activity as one of the most effective mechanisms for preserving good health and high quality of life in old age.

Our study is also consistent with previously published research (Dergance et al., 2003; King et al., 2001; Mouton, Calmbach, Dhanda, Espino, & Hazuda, 2000; Wray, Alwin, & McCammon, 2005) that has found that individuals with low levels of income are especially at risk for being sedentary and developing inactivity-related conditions. Our research suggests that interventions to promote physical activity in older Brazilians should focus special attention on low-income older adults who may be more susceptible to sedentary lifestyles associated with the development of chronic

conditions and noncommunicable diseases. These findings have important implications for health policy and practice for older adults in Brazil.

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