

Tânia R Bertoldo Benedetti<sup>1</sup>

Lucélia Justino Borges<sup>1</sup>

Edio Luiz Petroski<sup>1</sup>

Lúcia Hisako Takase Gonçalves<sup>II</sup>

# Physical activity and mental health status among elderly people

---

## ABSTRACT

**OBJECTIVE:** To evaluate the association between physical activity level and mental health status among elderly people.

**METHODS:** This was a population-based survey with a probabilistic sample of 875 elderly people from a city of Southern Brazil, in 2002. The International Physical Activity Questionnaire and the Brazil Old Age Schedule questionnaire were applied. The mental health problems evaluated were depressions and dementia. Total physical activity (leisure-time, occupation, transportation and housework). After descriptive and bivariate analyses, adjusted analyses were performed by means of logistic regression, with adjustment for the factors of total physical activity, leisure-time activity and depression and dementia scores.

**RESULTS:** There were statistically significant inverse associations between dementia and depression with total physical activity and leisure-time physical activity. The odds ratio for total physical activity adjusted for dementia among sedentary subjects in comparison with active subjects was 2.74 (95% CI: 1.85; 4.08), while the respective value adjusted for depression was 2.38 (95% CI: 1.70; 3.33).

**CONCLUSIONS:** The results reinforce the importance of active lifestyles for preventing mental health problems among elderly people. It is inferred that the physical activity was able to reduce and/or delay the risks of dementia, although it cannot be stated that dementia is avoided through physical activity.

**DESCRIPTORS:** Aged. Mental Health. Exercise. Physical Fitness. Aging. Morbidity Surveys.

---

## INTRODUCTION

In the twentieth century, especially after the 1950s, a change in the world's age pyramid occurred. The aging process that previously was restricted to developed countries is taking place in developing countries, and more quickly. According to the World Health Organization (WHO),<sup>a</sup> while in France it took 115 years for its elderly population to double, in China this is going to occur in just 27 years. In Brazil, the projections from the *Instituto Brasileiro de Geografia e Estatística* (Brazilian Institute for Geography and Statistics – IBGE, 2004)<sup>b</sup> indicate that 8.9% of the population is formed by people aged 60 years or over.

This change in the age pyramid has made studies on aging and old age a focus

<sup>1</sup> Programa de Pós-Graduação em Educação Física. Universidade Federal de Santa Catarina (UFSC). Florianópolis, SC, Brasil

<sup>II</sup> Programa de Pós-Graduação em Enfermagem. UFSC. Florianópolis, SC, Brasil

### Correspondence:

Tânia R. Bertoldo Benedetti  
Departamento de Educação Física  
Universidade Federal de Santa Catarina  
Campus Universitário Trindade  
Caixa postal 476  
88040-900 Florianópolis, SC, Brasil  
E-mail: benedetti@cds.ufsc.br

<sup>a</sup> World Health Organization. Active ageing: a policy framework. 2002. Available from URL: [http://whqlibdoc.who.int/hq/2002/WHO\\_NMH\\_NPH\\_02.8.pdf](http://whqlibdoc.who.int/hq/2002/WHO_NMH_NPH_02.8.pdf)

<sup>b</sup> Instituto Brasileiro de Geografia e Estatística. Projeção da população do Brasil por sexo e idade para o período de 1980 -2050. Revisão. Rio de Janeiro; 2004.

of attention, and has led to actions by social and governmental agents, in addition to actions by healthcare professionals.

Among the various disorders that affect the elderly, mental health deserves special attention. Depression and dementia incapacitate elderly people worldwide, since these conditions lead to loss of independence and, almost inevitably, loss of autonomy.<sup>5</sup> Mental disorders affect 20% of the elderly population and, among these, dementia and depression are highly prevalent.<sup>1</sup> In Brazil, approximately 10 million elderly people suffer from depression.<sup>13</sup>

According to WHO,<sup>a</sup> participation in light and moderate physical activities may delay the functional decline. Thus, an active life improves mental health and contributes towards managing disorders like depression and dementia. There is evidence that physically active elderly people present lower prevalence of mental diseases than non-active elderly people do.<sup>a</sup>

The present study had the aim of evaluating elderly people's mental health conditions and correlating them with their physical activity levels.

## METHODS

The study was developed in the municipality of Florianópolis, Southern Brazil, in 2002. In 2000, this municipality had 28,816 elderly people (11,979 men and 16,837 women), distributed in 12 districts and 460 census tracts (IBGE, 2001).<sup>b</sup> All the census tracts were investigated, except for 20, of the following types: army bases and barracks (two); prisons (two); nursing homes (two); tracts without any homes (three) and tracts with fewer than 50 residents (11). The sample selection was random and systematic, by means of interviewing one elderly person at the start of each census tract and another in the middle. There were 19 refusals to participate. Thus, the sample was composed of 875 elderly people: 437 men and 438 women. The data collection took place between August and December 2002.

The team of interviewers for data collection was formed by selecting 50 individuals who were all either university students or graduates. The interviewers were trained by one of the authors and by experts from IBGE, in six weekly meetings lasting four hours each. The content of the training consisted of information about the survey, the importance of the interviewer's role, concepts used, how to go through the census tract and locate the elderly people, how to approach the elderly person in his or her home and specific training on how to apply the interview: how to start, conduct and conclude it. All

the data collection materials and identifications were supplied to the interviewees. The interviewees worked in a certain number of census tracts and respected the territorial limits that are legally defined and established by the IBGE, as shown on the maps and in the tract descriptions used for the 2000 census. The interviewers were remunerated per interview held, received transportation vouchers and could carry out a maximum of four interviews per day. Among the main difficulties that the interviewers described were their fear of violence in the poorer districts and the interviewee's fear of letting the interviewer come into his or her home, along with problems relating to distance and access difficulties in certain regions of the municipality.

The participants firstly answered the Brazil Old Age Schedule (BOAS) questionnaire<sup>c</sup> and then the International Physical Activity Questionnaire (IPAQ), long version.<sup>3</sup> The mean duration of the interviews was 54 minutes each.

The following sections of BOAS were used: demographic identification, socioeconomic data and mental health data. The latter section screened for cognitive deficiency and depression. The scale used in the BOAS questionnaire was a version of the "Short-CARE" instrument (Comprehensive Assessment and Referral Evaluation) that had been validated for Portuguese, using the *Geriatrics Mental Status* (GMS) scale. The screening for cognitive deficiency and depression consisted of 22 questions and their respective subdivisions. To analyze dementia, the classification used was "does not present dementia" (<2 points) and "presents dementia" (≥3 points). For depression, the scores were classified as "does not present depression" (<7 points) and "presents depression" (≥7 points). For 3.7% of the elderly people interviewed (six individuals), the question on depression did not apply, since those subjects presented dementia scores greater than six points. According to Veras,<sup>15</sup> elderly people presenting dementia indicators of more than six points and severe depression indicators of more than 13 points should be excluded from the sample. Thus, high degrees of dementia could be an interference factor in the responses to the depression scale. Therefore, for the purposes of analyzing whether depression was present or not, the number of elderly people considered in the sample was 869.

The long version of IPAQ made it possible to estimate the amount of time per week spent on performing physical activities of moderate to vigorous intensity within different contexts of life (work, domestic tasks, transportation and leisure), and the time spent on more passive activities (carried out in a seated position). The

<sup>a</sup> World Health Organization. Physical activity and older people. 2002. Available from URL: [http://www.who.int/world-health-day/previous/2002/files/whd02\\_factsheet1\\_en.pdf](http://www.who.int/world-health-day/previous/2002/files/whd02_factsheet1_en.pdf)

<sup>b</sup> Instituto Brasileiro de Geografia e Estatística. Sinopse preliminar do censo demográfico 2000. Rio de Janeiro; IBGE; 2001; vol.7.

<sup>c</sup> Veras RP, Dutra S. Questionário BOAS (*Brazil Old Age Schedule*). Versão 2000. Available from URL: <http://www.unati.uerj.br/publi/QuestionarioBoas.rtf>

elderly subjects were considered to be sedentary if the sum of their physical activities in the different domains (leisure, transportation, work and domestic tasks) was less than 150 minutes of moderate or vigorous activities per week. They were considered to be non-sedentary if their sum was greater than this amount.

The mental health and physical activity data from the BOAS questionnaire and IPAQ were analyzed using the SPSS 11.0 software. After descriptive and bivariate analyses, adjusted analyses were performed using logistic regression, with adjustments for the factors of total physical activity, leisure activities and depression and dementia scores.

The research was approved by the Ethics Committee for Research on Human Beings of the Federal University of Santa Catarina (Registration No. 051/2001).

## RESULTS

The mean age of the study population was  $71.6 \pm 7.9$  years, and the ages ranged from 60 to 101 years. In relation to marital status, 61.4% were married, 28.5% widowed, 6.6% divorced and 3.5% single; 66.6% were living with their children, 13.3% alone, 57.8% with their spouse and 18.3% with other people. With regard to schooling, the majority were able to read and write

(80%), although 20% had never been to school; 42.8% had had up to four years of schooling, 11.6% had had five to eight years, 13.7% had had nine to eleven years and 11.9% had had university-level education, of whom the majority were men (18.8%).

To analyze the IPAQ, the frequencies in the domains were presented according to sex and were classified into levels of physical activity. The time spent on moderate and vigorous physical activities was calculated only for the elderly people who performed some type of physical activity (means and standard deviations).

Most of the elderly people (93.5%) were sedentary in the work domain and 25.7% were considered to be active in the leisure domain. The men were less sedentary than the women were (Table 1).

With regard to mental health condition, the prevalence of dementia was 13.8% and the prevalence of depression was 19.7% (Table 2). Statistically significant inverse associations were found for total physical activity and leisure physical activity versus dementia and depression ( $p < 0.001$ ). The odds ratio adjusted for dementia between sedentary subjects (total physical activity) and active subjects was 2.74 (95% CI: 1.85; 4.08), while the respective value for depression was 2.38 (95% CI: 1.70; 3.33).

**Table 1.** Physical activity domains among elderly people, according to sex and physical activity level. Florianópolis, Southern Brazil, 2002.

Domain Physical activity (PA)	Male SED %	Female SED %	Total		Time spent on physical activity (minutes/week)	
			SED %	NSED%	$\chi^2$	sd
Work	90.4	96.6	93.5	6.5	48.2	240.4
Transportation	76.4	84.5	80.5	19.5	157.1	194.1
Domestic tasks	83.7	75.3	79.5	20.5	227.5	411.2
Leisure	69.6	79	74.3	25.7	272.5	259.9
Total PA	36.4	45	40.7	59.3	521.6	270.1

SED: Sedentary  
NSED: Non-sedentary  
sd: standard deviation

**Table 2.** Presence or absence of dementia and depression among elderly people, according to sex and physical activity level. Florianópolis, Southern Brazil, 2002.

Variable	Male		Female		Total	
	SED %	NSED %	SED %	NSED %	SED %	NSED %
Dementia						
No	30.2	59.9	34	48.2	32.2	54
Yes	6.2	3.7	10.9	6.9	8.5	5.3
Depression						
No	27.9	58.3	30.6	43.7	29.2	51.1
Yes	8.6	5.2	14.5	11.2	11.5	8.2

SED: Sedentary NSED: Non-sedentary

## DISCUSSION

The results regarding the frequency of physical activity showed that a majority (59.3%) of the elderly people in Florianópolis were considered to be non-sedentary. The leisure domain contributed most to the men's physical activity level, while domestic tasks contributed most to the women's activity level.

It may be suggested that these data were influenced by cultural questions of conservative education that are still strong in southern Brazil. In other words, women are attributed with domestic tasks and looking after the family throughout their lives, without recognition and without a retirement pension. Men are attributed with the responsibility of supporting their families and find personal and professional recognition in their work, along with a retirement pension. As the men get older, they retire and become pensioners, and at this time, they have an increased amount of free time for participating in leisure activities. Even so, most of them continue not to have any commitment regarding domestic tasks.

Over the years, it has been recorded in the literature that men are less sedentary than women, in all age groups.<sup>4,6</sup> As observed in the present study, this may be explained by the women's small amount of free time, due to the double day of work that they take on, as well as the cultural questions mentioned above, which limit their participation in leisure activities.

By analyzing the mental health of the present study population, it was found that 13.8% had dementia problems. Taking into consideration the cognitive decline intrinsic to aging that has been pointed out in the literature,<sup>2</sup> the presence of dementia found in the present study may be considered high. This suggests that there needs to be special attention to this from all gerontological and other healthcare professionals.

A study carried out in São Paulo, southeastern Brazil,<sup>9</sup> found a prevalence of cognitive deterioration of 6.9%. The percentage was much higher among the elderly people aged 75 years or over (17.7%) than among those aged 60 to 74 years (4.2%). Those authors<sup>9</sup> thus found that cognitive deterioration increased with advancing age. A study on the prevalence of dementia among elderly people in the city of Rio de Janeiro<sup>15</sup> found a frequency of 15%. The prevalence among women living in districts of poorer socioeconomic status was higher. The results from the present study corroborate the prevalence of dementia that has been found in other regions of Brazil and signal the importance of public policies aimed at improving mental health.

Dementia and depression are among the main causes of years of living with incapacities, because they lead to loss of independence and autonomy.<sup>5</sup> Another characteristic is the loss of interest in and/or motivation for joining in physical, cultural and social activities, particularly

among people who suffer from depression. This causes them to decrease their daily activities, thus making them more sedentary in the home and in society.

In this respect, in correlating the levels of physical activity with dementia, it was seen that dementia was less prevalent among the non-sedentary subjects. This finding is backed up in the literature. One study found that the risk of dementia was decreased by a factor of 1.8 among men who walked more than two miles (3,218 meters) per day, in comparison with those who only accomplished up to quarter of a mile per day (402.25 meters).<sup>1</sup> In a longitudinal study among elderly Australians,<sup>12</sup> doing gardening gave rise to a risk of dementia that was 36% lower. On the other hand, going for daily walks gave rise to a risk that was 38% lower among men, although there was no significant relationship among women. The conclusion from that study was that maintaining physical activity, especially daily gardening, reduced the incidence of dementia. A longitudinal study in the United States<sup>8</sup> showed an incidence rate for dementia of 13.0 per 1000 individuals/year for elderly people who exercised three times or more per week, compared with 19.7 per 1000 individuals/year for those who exercised less than three times a week. These results suggested that there was an association between regular exercise and delaying the onset of dementia and Alzheimer's disease among elderly people.<sup>8</sup>

According to the studies cited, and corroborated by the data obtained in the present study, physical activity seems to have a relationship with reduction of the risks of dementia. It cannot be stated that physical activity avoids dementia, but it can be inferred that elderly people with dementia lose interest in engaging in physical activities, which makes them more sedentary. On the other hand, the non-sedentary elderly individuals presented fewer indications of dementia, perhaps because of their participation in different activities, regardless of whether these were domestic, leisure, transportation or work activities.

Although common in all stages of life, depression is more present among the elderly than among the young. Moreover, approximately 40% of the cases of depression among elderly people are undiagnosed.<sup>2</sup> In the present study, the frequency of elderly people presenting indications of depression was 19.7%. Using the same instrument, a study carried out in northeastern Brazil<sup>10</sup> found that 24% of the elderly subjects presented depression, within the age range from 60 to 90 years. In southeastern Brazil,<sup>9</sup> the prevalence of depressive symptoms among elderly people in São Paulo was 18.1%. The highest rate was 19.5%, among people aged 60 to 64 years, whereas this rate was 13% among people aged 75 years and over (13%). In another study carried out among elderly people,<sup>15</sup> the frequency of depression found was 25.8%,<sup>15</sup> i.e. similar to what was found in the present study. Depression is a public health problem

and requires attention in order to avoid unnecessary suffering among elderly individuals who have not been receiving treatment. Such attention would decrease the difficulties of patients' families and consequently the economic costs to society and public authorities.

The association between the levels of physical activity and depression suggests that non-sedentary elderly individuals present lower frequency of depression. This result is in agreement with the literature:<sup>14</sup> a study among elderly people in the Netherlands with and without chronic diseases found an association between depressive mood and unhealthy lifestyles. These authors<sup>14</sup> observed that the appearance of depression was associated with increased cigarette consumption and sedentarism and decreased duration of physical activity, thus showing once again the importance of such practices. In a Canadian study on health and aging, the prevalence of severe depression was 2.6% and of mild depression was 4%. These prevalences were higher among women who reported limitations on their activities due to chronic health problems.<sup>11</sup> In an epidemiological survey among elderly people,<sup>7</sup> those who had had low levels of physical activity for eight years reported more depressive symptoms than did those who had continued to be active or who had increased their levels of physical activity.

Within this context, it is essential to establish guiding public health policy actions in order to promote and maintain active and healthy aging with a better quality

of life. Among the successful examples of this are the public policies for the elderly populations of Canada, Spain, Italy, Portugal and Germany; and their programs: "Active Living" (Alberta, Canada), "In Porto Life is Long" (Porto, Portugal) and Project Wellbeing (Terranuova, Italy), among others. These show that it is possible to promote healthy and successful aging.<sup>a</sup>

In conclusion, the present study found a significant relationship between the levels of physical activity and the state of mental health. That is, this association showed lower prevalence of indicators of depression and dementia among non-sedentary elderly people. The importance of keeping active was reaffirmed, along with the fact that physical activity influences how depressive syndrome is faced, through expanding sociability and corporal stimulation. It can be inferred that physical activity is able to reduce and/or delay the risks of dementia, although it cannot be stated that physical activity avoids dementia.

#### ACKNOWLEDGEMENTS

To Professor Dr. Pedro C. Hallal of the Universidade Federal de Pelotas for his suggestions for the manuscript; to the *Instituto Brasileiro de Geografia e Estatística* (IBGE – Brazilian Institute for Geography and Statistics), Florianópolis section, for their technical support.

---

<sup>a</sup> Benedetti TRB. Atividade física: uma perspectiva de promoção da saúde do idoso no município de Florianópolis. 2004 [doctorate thesis]. Universidade Federal de Santa Catarina, Florianópolis, 2004.

## REFERENCES

1. Abbott RD, White LR, Ross GW, Masaki KH, Curb JD, Petrovitch H. Walking and dementia in physical capable elderly men. *JAMA*. 2004;292,(12):1447-53.
2. Carvalho VFC, Fernandez, MED. Depressão no idoso. In: Papaléo Netto M. Gerontologia. São Paulo: Atheneu; 1996. p.160-73.
3. Craig CL, Marshall AL, Sjöström M, Bauman AE, Booth ML, Ainsworth BE, et al. International physical activity questionnaire: 12-country reliability and validity. *Med Sci Sports Exerc*. 2003;35(8):1381-95.
4. Crombie EK, Irvine L, Williams B, Slane PW, Alder EM, McGinnis AR, et al. Identifying strategies to increase physical activity in sedentary older people: final report. [S.l.]: Chief Scientist Office, Scottish Executive Health Department; 2002.
5. Gordilho A, Sérgio J, Silvestre J, Ramos LR, Freire MPA, Espindola E, et al. Desafios a serem enfrentados no terceiro milênio pelo setor saúde na atenção integral ao idoso. Rio de Janeiro: UnATI/UERJ; 2000.
6. Humpel N, Owen N, Leslie E, Marshall AL, Bauman AE, Sallis JF. Associations of location and perceived environmental attributes with walking in neighborhoods. *Am J Health Promot*. 2004;18(3):239-43.
7. Lampinen P, Heikkinen RL, Ruoppila I. Changes in intensity of physical exercise as predictors of depressive symptoms among older adults: an eight-year follow-up. *Prev Med*. 2000;30(5):371-80.
8. Larson EB, Wang L, Bowen JD, McCormick WC, Teri L, Crane P, et al. Exercise is associated with reduced risk for incident dementia among persons 65 years of age and older. *Ann Intern Med*. 2006;144(2):73-81.
9. Lebrão ML, Laurenti R. Saúde, bem-estar e envelhecimento: o estudo SABE no Município de São Paulo. *Rev Bras Epidemiol*. 2005;8(2):127-41.
10. Leite VMM, Carvalho EMF, Barreto KML, Falcão IV. Depressão e envelhecimento: estudo nos participantes do Programa Universidade Aberta à Terceira Idade. *Rev Bras Saude Matern Infant*. 2006;6(1):31-3.
11. Ostbye T, Kristjansson B, Hill G, Newman SC, Brouwer RN, McDowell I. Prevalence and predictors of depression in elderly Canadians: the Canadian study of health and aging. *Chronic Dis Can*. 2005;26(4):93-9.
12. Simons LA, Simons J, McCallum J, Friedlander Y. Lifestyle factors and risk of dementia: Dubbo Study of the elderly. *Med J Aust*. 2006;184(2):68-70.
13. Snowdon J. How high is the prevalence of depression in old age? *Rev Bras Psiquiatr*. 2002;24(supl 1):42-7.
14. Van Gool CH, Kempen GI, Penninx BW, Deeg DJ, Beekman AT, van Eijk JT. Relationship between changes in depressive symptoms and unhealthy lifestyles in late middle aged and older persons: results from the Longitudinal Aging Study Amsterdam. *Age Ageing*. 2003;32(1):81-87.
15. Veras RP. País jovem: com cabelos brancos. Rio de Janeiro: Relume Dumará; 1994. 224 p.

---

Article based on the doctoral thesis of TRB Benedetti, presented to the Doctoral Program for Nursing, Health Sciences Center, Universidade Federal de Santa Catarina, in 2004.

Research supported by the Brazilian Ministry of Health (Process N. 4345/01); Fundação de Amparo à Pesquisa e Extensão Universitária (project 134/2001).

TRB Benedetti was supported by Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES – sandwich doctorate scholarship; Proc. N. BEX2534/03-7).