

Prevalence of sufficient physical activity in middle-aged women from a Brazilian state capital

Prevalência de níveis suficientes de atividade física em mulheres de meia-idade de uma Capital Brasileira

Adriana Coutinho de Azevedo Guimarães¹

Fátima Baptista²

Abstract – The objective of this study was to describe the prevalence of sufficient physical activity (PA) in middle-aged women from Florianópolis, Santa Catarina, Brazil. The sample included 1,011 women ranging in age from 45 to 59 years. Physical activity was evaluated using the International Physical Activity Questionnaire (IPAQ). The sample was divided into three age groups (A: 45–49; B: 50–54; C: 55–59 years). According to WHO recommendations, 87% of the participants were sufficiently active. Walking (C: 55±41 vs. A: 45±41 min/day; $p=0.013$) and vigorous PA (C: 17±33 vs. A: 13±30 min/day; $p=0.117$) were more frequently performed by women of group C compared to group A. Linear regression analysis showed that total PA did not increase with age ($R^2=0.248$; $p=0.059$), educational level ($R^2=0.259$; $p=0.076$), or body mass index ($R^2=0.072$; $p=0.334$), although total PA tended to be positively associated with age and educational level. In conclusion, 87% of the middle-aged women studied were sufficiently active. Higher levels of PA were observed among women aged 55–59 years, which were mainly a consequence of more frequent walking and vigorous PA.

Key words: Middle age; Physical activity; Prevalence; Women.

Resumo – O principal objetivo deste estudo foi descrever a prevalência de mulheres de meia-idade do município de Florianópolis, SC suficientemente ativas. Participaram 1011 mulheres dos 45-59 anos. A atividade física (AF) foi avaliada por meio do Questionário Internacional de Atividade Física (IPAQ). De acordo com a idade, a amostra foi categorizada em três faixas etárias (A:45–49; B:50–54; C:55–59 anos). Conforme as recomendações da OMS, 87% das participantes foram consideradas suficientemente ativas. O grupo C revelou valores mais elevados de caminhada (C:55±41 vs. A:45±41 min/d; $p=0,013$) e de AF vigorosa (C:17±33 vs. A:13±30 min/d; $p=0,117$) comparativamente ao grupo A. A regressão linear mostrou que a AF total não aumentou com a idade ($R^2=0,248$; $p=0,059$), com a escolaridade ($R^2=0,259$; $p=0,076$), ou com o índice de massa corporal ($R^2=0,072$; $p=0,334$), apesar de uma tendência positiva associada à idade e à escolaridade. Concluindo, 87% das mulheres de meia-idade do município de Florianópolis–SC eram suficientemente ativas; os níveis mais elevados de AF foram observados nas mulheres de 55-59 anos, principalmente, devidos à caminhada e à prática de AF vigorosa.

Palavras-chave: Atividade física; Meia-idade; Mulher; Prevalência.

1 Universidade do Estado de Santa Catarina. Centro de Ciências da Saúde e do Esporte. Departamento de Educação Física. Florianópolis, SC. Brasil.

2 Universidade Técnica de Lisboa. Faculdade de Motricidade Humana. Laboratório de Exercício e Saúde. Lisboa, Portugal.

Received: 25 May 2012
Accepted: 23 May 2013



Licence
Creative Commons

INTRODUCTION

Accumulation of 150 minutes or more of weekly physical activity of at least moderate intensity has been recognized for more than a decade to promote health, to prevent obesity, cardiovascular diseases, type 2 diabetes, some types of cancer and depression, and to reduce all-cause mortality in adults and elderly people^{1,2}. The intensity of physical activity is an equally important determinant, with moderate and particularly vigorous intensity exercise being associated with greater health benefits^{3,4}. In general, an increase in physical activity intensity can correspond to a reduction in the duration necessary for preventing disease and promoting longevity since weekly energy expenditure, which depends essentially on these two parameters (intensity and duration), is the most relevant topic⁵. The World Health Organization (WHO) recommends that adults accumulate at least 150 minutes of weekly aerobic activity of moderate intensity, or 75 minutes of weekly aerobic activity of vigorous intensity, or a combination of moderate and vigorous physical activity of at least 10-minute duration⁶. Additional benefits can be obtained by increasing moderate aerobic activity to 300 minutes per week, or vigorous activity to 150 minutes per week, or a combination of both. A further increase in the quantity of exercise provides even greater health benefits. Adults should perform strength exercises of moderate to high intensity involving large muscle groups two or more times per week.

Physical activity is defined as any body movement produced by the skeletal musculature which results in energy expenditure above resting levels⁷. Moderate physical activity is exercise whose individual perception of effort is situated between 5-6 on a scale of 0 to 10, where 0 corresponds to the absence of effort and 10 to maximum effort³. The WHO recommendation for physical activity includes any type of exercise, irrespective of activity or objective, as long as the threshold of moderate aerobic activity for at least 10 minutes is achieved.

Despite this recommendation for physical activity, a high percentage of individuals (30-40% of Brazilians⁸ and 7-43% of the population in countries such as Japan, Belgium, Taiwan and Saudi Arabia⁹) is still insufficiently active, particularly women, older adults, and subjects of low educational level¹⁰. At an international level, considering both genders and the age group of 15-20 to 65-77 years, the prevalence of sufficient physical activity is high in countries such as China (93%), the Czech Republic (90%), New Zealand (88%), Canada (87%), Hong Kong and Lithuania (85%), United States (84%), and Australia (82%). In Brazil, the prevalence of sufficient physical activity is approximately 70%⁹, ranging from 60% in Pelotas, southern Brazil¹¹, to 70% in São Paulo, southeastern Brazil¹². No data are available for the remaining regions of the country.

More than half of all deaths worldwide are due to insufficient levels of physical activity¹³. Within this context, reducing inactivity and promoting a more active lifestyle seem to be determinant to improve population

health indicators and to reduce healthcare costs¹⁴. In Australia, an increase of 1% in the prevalence of physical activity in the adult population has been estimated to correspond to a reduction of 7 million dollars in costs spent on the treatment of stroke, depression, diabetes, colon and breast cancer, and myocardial infarction¹⁵.

In women, middle age is characterized by biological transformations determined by menopause, which can have adverse consequences on body weight and cardiovascular, metabolic and bone health¹⁶. In addition, these physiological systems are influenced negatively by inactivity. As a consequence, physical activity becomes particularly important during this period of life as a measure to prevent the transformations that occur during this phase¹⁷. The objective of the present study was to describe the prevalence of sufficient physical activity in middle-aged women from the city of Florianópolis, Santa Catarina, Brazil, in order to obtain data that help establish strategies that promote physical activity in this group of the Brazilian population.

METHODOLOGICAL PROCEDURES

A cross-sectional study was conducted in Florianópolis, Santa Catarina, between December 2007 and March 2009. The study was approved by the Ethics Committee of Universidade do Estado de Santa Catarina (Permit No. 15/2007).

The sample size was calculated based on a population of 26,317 women aged 45 to 59 years in the city of Florianópolis, Santa Catarina, Brazil, according to the 2000 Census of the Instituto Brasileiro de Geografia e Estatística (Brazilian Institute of Geography and Statistics). Sample size calculation presented a precision of 2.8% and a level of significance of 95%, with an acceptable error of 5%. Thus, 1,011 middle-aged women were included in the study (a minimum sample size of 1,000 women).

The women were invited to participate voluntarily in the study by employers or education, health, sport, religion and insurance services. All participants were informed about the objectives and procedures of the study and signed a free informed consent form. For analysis of the prevalence of sufficient physical activity according to age, the sample was divided into three age groups (group A: 45–49 years; group B: 50–54 years; group C: 55–59 years).

Sociodemographic data, anthropometric measures, health status, and levels of physical activity (insufficient, active, and very active) were obtained from self-administered questionnaires. Sociodemographic characteristics included age, number of children, years of schooling, and socioeconomic level. Socioeconomic level was divided into three strata (A, B, and C) according to the Brazilian Economic Classification Criteria, the main tool used for classification of the population according to purchasing power¹⁸. The anthropometric measures included body weight, height and body mass index [BMI, weight (kg)/height (m²)]. Health status was evaluated by the number of diseases reported by each participant.

Sufficient levels of physical activity were evaluated using the short version of the International Physical Activity Questionnaire (IPAQ). In Brazil, the questionnaire was validated by the Centro de Estudos do Laboratório de Aptidão Física de São Caetano do Sul¹⁹. The IPAQ was used to determine the number of times the participants had performed at least 10 minutes of continuous walking (3.3 METs), moderate physical activity (4.0 METs), or vigorous activity (8.0 METs) in the last week, including work, domestic, leisure, recreational, and sport activities. The participants were classified as very active when they performed vigorous activity 3 times per week or more (total activity of at least 1,500 MET-min/week), or any physical activity (moderate or vigorous walking) 7 days per week (total activity of at least 3,000 MET-min/week). The participants were classified as active when they performed moderate physical activity or walking 5 times per week or more for ≥ 30 minutes per day, vigorous activity 3 times per week or more for ≥ 20 minutes per day, or any physical activity (moderate or vigorous walking) 5 days per week or more (total activity of at least 600 MET-min/week). Participants who did not meet the requisites for the classification of active or very active were classified as insufficiently active. Active and very active women were classified as sufficiently active. The time spent sitting was also estimated.

Data analysis

Statistical analysis was performed using the SPSS 16.0 program. Descriptive statistics was used for characterization of the sample, calculating the mean, standard deviation and range for continuous variables (age, body weight, height, BMI, walking, and moderate, vigorous and total physical activity) and median and range for discrete variables (number of children, educational level, socioeconomic class, and number of diseases). The prevalence of physical activity levels (insufficiently active, active, and very active) is expressed as percentage based on the ratio between the number of participants per physical activity level and the total number of participants per age group (45-49, 50-55, 56-59 years). Physical activity levels were compared between the three age groups by the chi-squared test. This test was also used to compare the prevalence of different types/intensities of physical activity (walking, moderate and vigorous physical activity) between the three age groups. Linear regression analysis was applied to evaluate the association between total physical activity and determinants of physical activity, specifically sociodemographic and anthropometric characteristics (age, educational level, and BMI). A level of significance of $p < 0.05$ was adopted for all analyses.

RESULTS

The mean age of the women was 49.5 years (45-59 years). The participants had an average of 10 years of schooling, corresponding to high school, and an average of two children (Table 1). Most women belonged to socio-

economic class B (79%). A BMI indicating excess weight ($\geq 25 \text{ kg/m}^2$) was identified in 45% of the women and 58% did not report any disease. The most frequently reported clinical conditions/symptoms were headache (18%), osteoporosis (10%), elevated total cholesterol (7%), hypertension (4%), and asthma (3%).

Analysis of physical activity showed a total daily activity of approximately 90 minutes, including 48 min/day of walking, 28 min/day of moderate activity and 14 min/day of vigorous activity. The total time spent sitting was 282 min/day, i.e., 5 hours of daily sitting, corresponding to 31% of wake time based on an average of 8 hours of daily sleeping time.

Table 1. Sociodemographic characteristics, body composition and physical activity of middle-aged women from Florianópolis, Santa Catarina.

Variable	n	Mean \pm SD	Range
Age (years)	1,011	49.5 \pm 5	45 – 59
Children (n)	903	2.4 \pm 1	1 – 10
Schooling (years)	1,010	10.5 \pm 3	1 – 13
Socioeconomic class*	1,008	2.0 \pm 0	1 – 3
Body weight (kg)	1,011	65.2 \pm 11	38 – 121
Height (m)	1,011	1.60 \pm 0	140 – 181
BMI (kg)	1,011	25.2 \pm 4	16 – 45
Diseases (n)	402	1.2 \pm 0	1 – 4
Walking (min/day)	994	48 \pm 43	0 – 180
Moderate PA (min/day)	995	28 \pm 40	0 – 180
Vigorous PA (min/day)	995	14 \pm 32	0 – 155
Total PA (min/day)	994	91 \pm 75	0 – 420
Time spent sitting (min/day)	1,007	282 \pm 163	0 – 1,007

Results are reported as the mean \pm standard deviation and range.

*Socioeconomic class: 1: (stratum A); class 2: (stratum B); class 3: (stratum C). BMI: body mass index; PA: physical activity.

Table 2 shows the prevalence of physical activity levels in the sample as a whole and according to age group (45-49, 50-54, and 55-59 years). Approximately 87% of the middle-aged women were classified as sufficiently active (active and very active). Differences in the prevalence of physical activity were observed between age groups ($p=0.017$), with a higher prevalence (93.6%) of sufficient physical activity in women of group C (55-59 years) compared to younger women (45-49 years) (84.4%).

Table 2. Prevalence of physical activity levels in the sample of middle-aged women and according to age group.

	Total (n=995)	Group A (n=561)	Group B (n=229)	Group C (n=205)	p-value ^a
Insufficiently active (%)	12.7	15.6	10.5	6.4	0.017
Active (%)	65.4	63.5	67.2	69.1	
Very active (%)	21.9	20.9	22.3	24.5	

Group A: 45-49 years; group B: 50-54 years; group C: 55-59 years.

aLevel of significance for comparison of physical activity level between groups by the chi-squared test.

Figure 1 illustrates the distribution of different types/intensities of physical activity (walking, moderate activity, and vigorous activity) according to age group. Walking was the most prevalent physical activity in all age groups (60 to 70%), followed by moderate activity (approximately 30%) in women aged 45 to 54 years.

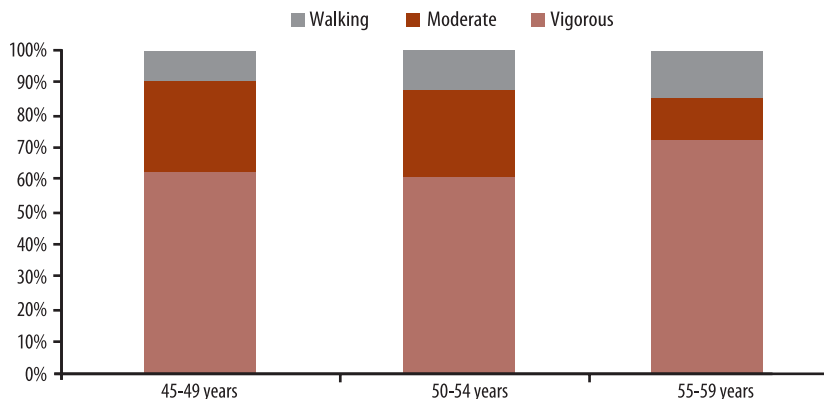


Figure 1. Prevalence of walking, moderate physical activity and vigorous physical activity in middle-aged women according to age group.

Figure 2 shows the relationship between total physical activity and age, educational level and BMI. No association was observed between total physical activity and age ($R^2=0.248$; $p=0.059$), educational level ($R^2=0.259$; $p=0.076$) or BMI ($R^2=0.072$; $p=0.334$), although total physical activity tended to be positively associated with age and educational level.

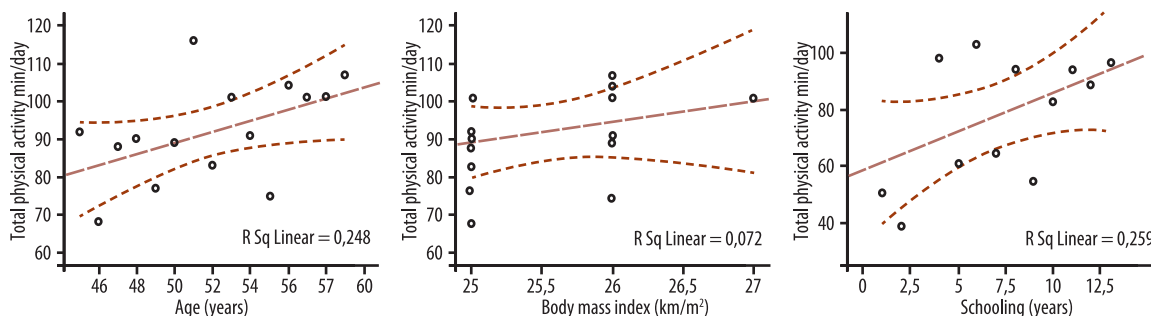


Figure 2. Relationship between mean total physical activity (min/day) and age, BMI and educational level.

DISCUSSION

The main objective of the present study was to describe the prevalence of sufficient physical activity in middle-aged women from Florianópolis, Santa Catarina. The results showed that approximately 87% of the women aged 45 to 59 years are sufficiently active (active or very active). Similar rates have been observed in China, the Czech Republic, New Zealand, Canada, Hong Kong, Lithuania, the United States, and Australia (79 to 93%), where the prevalence of sufficient physical activity was evaluated using the same instrument (IPAQ) as employed here. However, the prevalence of sufficient physical activity of the present population was higher than those reported

for women of the same age range from the State of São Paulo, Brazil, in 2002-2004 (62%)⁹ and in 2009 (71%)²⁰. This difference might be explained in part by the fact that Florianópolis is smaller than São Paulo and women consequently use walking and/or cycling as a means of transport/travel. In addition, in contrast to São Paulo which is a metropolitan city, Florianópolis is located in a coastal region, a fact favoring physical activity¹².

Age, socioeconomic class, educational level, number of children, nutritional status, and physical activity have been indicated as the most determinant factors of an active lifestyle²¹⁻²³. Furthermore, individuals living in coastal areas seem to be more active than those living in metropolitan regions and the countryside¹². The present results suggest that the geographic location of Florianópolis in the coastal region of Santa Catarina contributes to the fact that individuals perform sufficient physical activity.

In contrast to the observation that physical activity decreases with age²³, the prevalence of sufficient physical activity was higher in middle-aged women of the group of 55 to 59 years compared to middle-aged women of the group of 45 to 49 years. These results are higher than those reported for women from other regions of Brazil (Rio Grande do Sul and São Paulo) also evaluated using the IPAQ^{20,25}. The higher prevalence of physical activity in women of this age group may reflect a greater availability of time due to fewer family (independence of children) or professional duties (career consolidation and stability in the labor market)¹⁶, but also the recognition of the importance of physical activity for the prevention and treatment of diseases whose incidence begins to increase in middle age^{5,17}. Women in the age group of 55 to 59 years also presented a shorter duration of inactive sitting (246 vs 299 min/day; $p \leq 0.001$). The time spent sitting while moving in a motor vehicle, working, resting, and watching television or during other types of distraction is associated with a higher risk of diseases such as obesity, hypertension, abnormal glucose metabolism and metabolic syndrome, and also with a higher risk of premature death².

Physical activity is also influenced by educational level^{21,23}. In this respect, individuals with more years of schooling are generally more active because of better financial conditions and consequent access to health resources and guidelines^{7,12,22}. Although physical activity tends to be positively associated with educational level, no significant association between these variables was observed in the present study. On the other hand, the body shape/aesthetics of a woman, which is determined by genetic and hormonal factors (puberty, pregnancy, menopause), as well as by lifestyle habits (eating behavior and physical activity) and health status (clinical conditions), may encourage an increased participation in physical activity.

Walking was the most frequent physical activity performed by the women studied here (approximately 70% of total daily physical activity), with a mean of 48 min/day in the whole population. In addition to its frequent use as exercise particularly among individuals of lower physical fitness, walking is used as active transport. In northern European countries such as Finland, Sweden and Ireland, active transport by walking or cycling significantly

contributes to meet the recommendation of accumulating 30 minutes of daily physical activity²⁶. In Canada, public transit users less frequently need to attend gyms or fitness centers²⁷ since they are more likely to meet the recommended 30 minutes of daily aerobic activity, i.e., 150 minutes per week.

CONCLUSION

The present study showed that 87% of middle-aged women from the city of Florianópolis, Santa Catarina, meet the public health recommendation for physical activity, i.e., accumulation of at least 30 minutes of daily physical activity of moderate intensity for 10 minutes or more on at least 5 days of the week. Walking is the type of physical activity that contributes most to total physical activity.

REFERENCES

1. Pate RR, Pratt M, Blair SN, Haskel WL, Macera CA, Bouchard C. Physical activity and public health. a recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine. *JAMA* 1995;273(5):402-7
2. Owen N, Healy GN, Matthews CE, Dunstan DW. Too much sitting: the population health science of sedentary behavior. *Exerc Sport Sci Rev* 2010;38:105-13.
3. Haskell WL, Lee I-M, Pate RR, Powell KE, Blair SN, Franklin BA, et al. Physical activity and public health: updated recommendation for adults from the American College of Sports Medicine and the American Heart Association. *Med Sci Sports Exerc (Special reports)* 2007;1423-34.
4. Healy GN, Dunstan DW, Salmon JO, Shaw JE, Zimmet PZ, Owen N. Television time and continuous metabolic risk in physically active adults. *Med Sci Sports Exerc* 2008;40:639-45.
5. Brown DW, Brown DR, Heath GW, Balluz L, Giles WH, Ford ES, et al. Associations between physical activity dose and health-related quality of life. *Med Sci Sports Exerc* 2004;36:809-96.
6. WHO. World Health Organization 2011. Global recommendations on physical activity for health, 18-64 years old. 2011. Available from: <http://www.who.int/diet-physicalactivity/physical-activity-recommendations-18-64years.pdf>. [2012 May 28].
7. Caspersen CJ, Zack MM. The prevalence of physical inactivity in the United States. In: *Physical Activity and Cardiovascular health. A national Consensus*. Champaign Il: Human Kinetics, 1997. p. 32-39
8. Monteiro CA, Conde WL, Matsudo SM, Matsudo VR, Bonseñor IM, Lotufo PA. A descriptive epidemiology of leisure-time physical activity in Brazil, 1996-1997. *Rev Panam Salud Publica* 2003;14(4):246-54.
9. 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;6:21. Doi:10.1186/1479-5868-6-21
10. Ezzati M, Lopez A, Rodgers A, Murray C. Comparative quantification of health risks: global of risk factors. Geneva: World Health Organization; 2005.
11. Hallal PC, Matsudo SM, Matsudo VRR, Araújo TA, Andrade DR, et al. Physical activity in adults from two Brazilian areas: similarities and differences. *Cad Saúde Pública* 2005;21(2):50-61.
12. Matsudo SM, Matsudo VR, Araújo T, Andrade D, Andrade E, Oliveira L, et al. Nível de atividade física da população do estado de São Paulo: análise de acordo com o gênero, idade, nível sócio econômico, distribuição geográfica e de conhecimento. *Rev Bras Ciênc Mov* 2002;10(4):41-50.

13. Center Disease of Prevention and Control. Promoting physical activity: a best buy in public health. Hyattsville, MD: CDC, 2000.
14. Garrett NA, Brasure M, Schmitz KH, Schultz MM, Huber MR. Physical inactivity: direct cost to a health plan. *Am J Prev Med* 2004;279-304.
15. Stephenson J, Bauman A, Armstrong T, Smith V, Bellew B. The costs of illness attributable to physical inactivity in Australia. Canberra, Australian Commonwealth of Australia Department of Health and Age Care, and the Australian Sports Commission, 2000.
16. Dennerstein L, Guthrie JR, Clarck M, Leher P, Henderson VW. A population-base study of depressed mood in middle-aged, australian-born women. *Menopause* 2004; 11:563-8
17. Zanesco A, Antunes E. Effects of exercise training on the cardiovascular system: pharmacological approaches. *Pharmacology and Therapeutics* 2007; 114: 17-307.
18. Associação Brasileira de Empresas de Pesquisa (ABEP). Critério de Classificação Econômica Brasil (CCEB). Available from (http://www.abep.org/codigosguias/Criterio_Brasil_2008.pdf). [2008 Nov 17].
19. Pardini R, Matsudo S, Matsudo TAV, Andrade E, Braggion G, Andrade D, et al. Validation of the international physical activity questionnaire (IPAQ): pilot study in brazilian young adults. *Med Sci Sports Exerc* 1997;29:S5-S9.
20. Cruciani F, Timóteo A, Matsudo S, Matsudo V. Nível de atividade física de mulheres maiores de 50 anos de idade participantes de um programa de atividade física estruturada. *Rev Bras Ciênc Mov* 2009;17:14-24.
21. Droomers M, Schrijvers CT, Mackenbach JP. Educational level and decrease in leisure time physical activity: predictors from the longitudinal GLOBE study. *JECH* 2003; 55: 8-562.
22. Martinez-Gonzalez MA, Varo JJ, Santos JL, De Irala J, Gibney M, Kearney J, Martinez JA. Prevalence of physical activity during leisure time in Europe Union. *Med Sci Sports Exerc* 2001;33:6-1142.
23. Seefeldt V, Malina RM, Clark, MA. Factors affecting levels of physical activity in adults. *Sports Med* 2002;32:143-68.
24. Orsini, N, Belloco R, Bottal M, Hagströmer M, Sjöström M, Pagano M, Wolk A. Profile of physical behaviors among Swedish women aged 56-75 years. *Scandinavian Med Sci Sports Exerc* 2008;18:95-10.
25. Kura GG, Ribeiro LS, Niquetti R, Toutinho Filho H. Nível de atividade física, IMC e índices de força muscular estática entre idosas praticantes de hidroginástica e ginástica. *Rev Bras Cien Envelh Hum* 2004;1:30-40.
26. Sjöström M, Oja P, Hagströmer M, Smith BJ, Bauman A. Health-enhancing physical activity across European Union countries: the Eurobarometer study. *J Public Health* 2006;14:291-300.
27. Lachapelle U, Lawrence DF. Transit and Health: Mode of Transport, Employer-Sponsored Public Transit Pass Programs, and Physical Activity. *J Public Health Policy* 2009;30:73-94.

Corresponding author

Adriana Coutinho de Azevedo Guimarães
 Rua Sérgio Gil, 191, apto 403.
 Balneário do Estreito
 88085-340 – Florianópolis, SC, Brasil.
 E-mail: nanaguim@terra.com.br