

Leisure-time physical activity among older adults in Brazil: results from the Brazilian National Health Survey – 2013

Vítor Häfele¹, César Augusto Häfele¹, Jeferson Santos Jerônimo¹, Rodrigo Wiltgen Ferreira¹, Steve Anthony Maravillo², Marcelo Cozzensa da Silva¹

¹Universidade Federal de Pelotas (UFPel) – Pelotas (RS), Brazil

²University of California San Diego (USCD) – San Diego (CA), USA

ABSTRACT

Introduction: Health behaviors are fundamental for healthy aging. In this sense, the practice of physical activity is one of the most beneficial factors for the health of individuals. **Objective:** To describe the prevalence of leisure-time physical activity among the older adults and analyze in terms of sociodemographic characteristics, national regions, Federative Units of Brazil, and types of physical activity practiced. **Methods:** Study utilizing data from the Brazilian National Health Survey - 2013. Leisure-time physical activity was analyzed with two distinct cutoff points: 1) Some physical activity - 10 or more minutes/week; 2) Meeting recommended 150 minutes/week of physical activity. **Results:** Nearly 21% of the older adults completed some physical activity, and 13.2% reached the physical activity recommendations. There was no difference in the prevalence of physical activity between men and women. Individuals aged 60-69 years and those with higher income were more active than their peers. As for the national regions, the North had the lowest prevalence of physically active older adults. Among all regions, walking was the most frequent form of physical activity practiced. **Conclusion:** The prevalence of older adults who practiced some physical activity and reached the physical activity recommendations was low, with walking being the most common form of physical activity. Older adults with higher age, low socioeconomic status and from the Northern Brazilian regions were the least active.

Keywords: aged; epidemiology; exercise; health promotion; motor activity.

INTRODUCTION

The older adult population is growing rapidly in Brazil. In 1950, the proportion of individuals aged 60 and over was only 4.3%. This percentage later rose to 6.1% in 1980, and then rose to 10.8% in 2010¹. Estimates of the *Instituto Brasileiro de Geografia e Estatística* (IBGE) indicate that the number of older adults in Brazil will continue to rise, reaching 18.7% in 2030 and 29.7% in 2050². In addition to the increasing proportion of this population, the overall life expectancy among all of them is also growing exponentially. In 1950, life expectancy, on average, was 48 years, which rose to approximately 69.8 years in 2000 and 76 years in 2017³. It is estimated that in 2030, Brazilians will have a life expectancy of 78.6 years⁴.

As individuals age, they become increasingly susceptible to physical, psychological, and social problems, undergoing numerous issues such as cognitive, muscle, bone,

How to cite this article: Häfele et al. Leisure-time physical activity among older adults in Brazil: results from the Brazilian National Health Survey – 2013. *ABCS Health Sci.* 2021;46:e021227. <https://doi.org/10.7322/abcshs.2020076.1530>

Received: Jun 01, 2020

Revised: Oct 20, 2020

Approved: Jan 25, 2021

Corresponding Author: Vítor Häfele -
Universidade Federal de Pelotas - Rua
Luis de Camões, 625 - Três Vendas – CEP:
96055-630 – Pelotas (RS), Brazil -
E-mail: vitorhafele@hotmail.com

Declaration of interests: nothing to declare
Funding: VH received a fellowship from
FAPERGS



This is an open access article distributed under the terms of the Creative Commons Attribution License
© 2021 The authors

cardiorespiratory and functional declines⁵. Nonetheless, these factors influence the development of multi-morbidity, are related to an increased risk of mortality⁶, and negatively affect the healthy life expectancy of the older adults^{7,8}.

In this context, some health behaviors are fundamental for individuals to have healthy aging, in which the practice of physical activity is necessary. Such behavior can generate a series of physical and mental benefits, which aid in the prevention and treatment of chronic non-communicable disease, reduction in the risk of falling, and improving social involvement, among numerous additional health benefits and gains⁵.

According to the Physical Activity Guidelines for Americans⁹, it is recommended that adults and seniors practice 150 minutes of moderate physical activity a week, or 75 minutes of vigorous physical activity a week. An equivalent combination of both moderate and vigorous weekly physical activity is also listed in these recommendations. Furthermore, seniors are suggested to practice balance and muscle strength exercises two or more days a week. However, these guidelines also state that in any case where an older adult is unable to reach 150 minutes of weekly moderate physical activity because of a chronic condition, they're suggested to be as active as their conditions, abilities, and body strength allow⁹.

A study using data from the Brazilian surveillance system of risk and protective factors for chronic diseases (VIGITEL) showed that leisure-time physical activity, in the period from 2009 to 2013, increased among all age groups, except for individuals aged 65 years or more. Regarding physical inactivity, the prevalence remained stable, however, with high rates (approximately 36%)¹⁰.

Therefore, the objective of this study was to describe the prevalence of older adults who practiced leisure-time physical activity based on data received from the 2013 Brazilian National Health Survey *Pesquisa Nacional de Saúde* (PNS) and analyze it according to sociodemographic characteristics, national regions, and Federative Units of Brazil. This article also described the types of physical activities performed by the older adult population in Brazil.

METHODS

Cross-sectional epidemiological research, using secondary data from the 2013 Brazilian National Health Survey PNS, openly available on the IBGE website⁴. The PNS was conducted in every national region with residents of private homes. Sampling was conducted by three-stage conglomerates, with primary units composed of census sectors, secondary units formed by households, and tertiary units by residents aged 18 years and older. For the present study, data were used only for older adults of 60 years of age or more. Data collection was the responsibility of the IBGE and the interviewers were trained in procedures related to data collection. More information on the methodology used in the PNS is available in a previous study¹¹.

For this study, the following variables were used: sex (male and female); age in complete years (divided into decades): 60-69 years, 70-79 years and 80 years or more; income of the previous month in reais (Brazilian currency) from the sum of all PNS questions that contained information regarding wages received in the previous month, among all residents per household, later divided into tertiles (1st tertiary- low income and 3rd tertiary- higher income); macroregions of the country (South, Southeast, Midwest, North and Northeast); and type of physical activity practiced (walking, running, weight training, aerobics - spinning, step, jump - hydrogymnastics, gymnastics - general, located, pilates, stretching and yoga - swimming, wrestling, cycling, sports - soccer basketball, volleyball, tennis - dance and others).

The outcome of the study, leisure-time physical activity, was verified through the following questions: 1) In the last three months, have you practiced any kind of physical exercise or sport? 2) How many days a week do you usually do physical exercise or sports? and 3) In general, on the day you practice exercise or sport, how long does this activity last?

On behalf of the answers received, we were able to verify and validate the time spent per week on leisure-time physical activity. Thus, we categorized the variable in two different ways: 1) Completing some leisure-time physical activity: from 0 to 9 minutes per week of leisure-time physical activity and 10 or more minutes per week; 2) Meeting the recommended 150 minutes per week of physical activity, exclusively through leisure-time physical activity: less than 150 minutes/week of leisure-time physical activity and 150 minutes/week or more. It is noteworthy that the criterion of 10 or more minutes of physical activity per week was used considering two main points: a) only the leisure domain was analyzed; b) according to the recommendations of the guidelines, doing some physical activity, even within its limitations, can generate health benefits⁹.

The descriptive analyses were conducted using Stata 13.1, based on the distribution of relative and absolute frequencies and their respective confidence intervals of 95% and the stratified analysis of leisure-time physical activity with weighting procedures.

All PNS procedures were approved by the Brazilian National Research Ethics Committee (Process 328.159, 26 of June 2013).

RESULTS

A total of 11,177 older adults throughout the country aged 60 years or more were included in the analyses. Table 1 describes the study sample, in which most of the interviewees were female (56.4%), aged between 60 and 69 years (56.4%), of the first tertile of income (lower income) (47%) and residents of the Southeast region (47.9%). Approximately 21% of the older adults performed some type of physical activity in their leisure time. The range of recommended physical activity practice obtained exclusively in leisure time by Brazilian older adults was 13.2%.

Table 2 demonstrates the stratified analyses of physical activity levels by gender, age, income, and geographical region. In general, based on the prevalence values and confidence intervals, both for physical activity equal to/above 10 minutes or physical activity equal to/above 150 minutes per week, there was no difference between men and women. Younger elders, for both evaluations, practiced more physical activity, and this prevalence decreased as age increased. In addition, older adults in the third tercile of income (higher income) performed more physical activity than those of the first tercile (lower income). On behalf of geographical regions, the Southern region had the highest prevalence of physical activity equal to/above 10 minutes per week among older adults (26.9%), with a statistical difference for all regions, except the Midwest region. In the Northern region, the lowest prevalence of physical activity was found in the two analyses performed (12.4% above 10 min/week; 8.9% above 150 min/week). It should be noted that the practice of 150 min/week identified in the Northern region was lower than in the other regions of the country, except for the northeastern region. Among the states, in both analyses, the Federal District was the most active, being only no different from the state of Santa Catarina. It should be noted that among the six most active states for both leisure physical activity

practices, three are from the Southern region (Santa Catarina, Rio Grande do Sul and Paraná).

Figure 1 describes the prevalence of the types of physical activity practiced among the older adults in Brazil. Walking was the most reported type of physical activity (62.5%), followed by gymnastics, in general (9.5%), hydrogymnastics (5.3%), aerobic gymnastics (5%) and weight training (4.3%). In addition, the following activities were reported: swimming, wrestling, cycling, soccer, basketball, volleyball, tennis, and dancing.

DISCUSSION

According to the data presented, most of the Brazilian older adult population did not practice physical activity, that is, only two out of ten older adults in Brazil did some leisure-time physical activity and about one out of ten of them reached the physical activity recommendations. Siquiera *et al.*¹², in a study conducted in 2009 among 23 states of Brazil, found a prevalence of 13% of leisure-time physical activity in the older adults using the cut-off point of 150 min/week. By observing the data from both national studies, stability of physical activity practice among the older adults is identified over the years, which is worrying, knowing the many benefits brought by it to this population group.

This research found no difference in physical activity between women and men. The literature presents different results according to the domain of physical activity studied. Some studies that analyzed the practice of total physical activity of the older adults (leisure-time, transportation, work and domestic) showed no difference in physical activity practice between the sexes^{13,14}, while other studies pointed out that women were more active^{15,16}. Concerning physical activity practiced by older adults in the leisure-time domain, the results also vary, being verified that men are more active¹² or that there is no difference between both genders¹⁶. The findings of the present study may be related to the fact that most older adults reported walking, and this activity is usually practiced in a similar way among older men and women¹⁷.

The present study is consistent and in line with the literature in relation to the decrease in physical activity among the older adults according to the increase in age¹²⁻¹⁴. Research shows that these individuals report fear of falling, perception of poor health and the presence of chronic diseases as barriers to physical activity^{18,19}, which may help to understand the reasons for the results found. On the other hand, it is known that physical activity helps to reduce falls, prevent and treat chronic diseases and improve general health⁹. Thus, efforts are needed to engage older adults in practicing physical activity with pleasurable activities and in safe environments.

The study observed a direct linear trend between household income and leisure-time physical activity. In this sense, a systematic review study with adults and the older adults showed that levels

Table 1: Sample characteristics of older adults from the Brazilian National Health Survey, 2013 (n=11,177).

Variables	N	%	95% CI
Sex			
Male	4,555	43.6	42.0–45.2
Female	6,622	56.4	54.8–58.0
Age (years)			
60-69	6,238	56.4	54.8–58.0
70-79	3,441	30.0	28.5–31.5
80-101	1,498	13.6	12.6–14.8
Income			
1st tertile (lower income)	5,327	47.0	45.4–48.6
2nd tertile	2,160	19.3	18.0–20.6
3rd tertile	3,690	33.7	32.2–35.3
National regions			
South	1,625	15.1	14.0–16.1
Southeast	3,210	47.9	46.3–49.5
Midwest	1,266	6.4	5.9–6.9
North	1,682	5.4	4.9–5.9
Northeast	3,394	25.2	24.0–26.5
Leisure-time physical activity			
<10 min/week	8,821	78.6	77.2–80.0
≥10 min/week	2,306	21.4	20.1–22.8
Meeting recommended of physical activity, exclusively through leisure-time physical activity			
<150 min/week	9,663	86.8	85.7–87.9
≥150 min/week	1,464	13.2	12.1–14.3

Table 2: Leisure-time physical activity by gender, age, income, national regions and states of Brazil. Brazilian National Health Survey, 2013 (n=11,177).

Variables	Leisure-time physical activity (≥10 min/week)*		Leisure-time physical activity (≥150 min/week)	
	%	95% CI	%	95% CI
Sex				
Male	21.4	19.2–23.5	14.1	12.3–16.0
Female	21.6	19.9–23.3	12.4	11.2–13.8
Age (years)				
60-69	25.4	23.6–27.3	16.0	14.5–17.6
70-79	19.2	16.8–21.7	11.3	9.5–13.4
80-101	9.7	7.3–12.7	5.3	3.8–7.4
Income				
1st tertile (lower income)	15.1	13.5–16.8	9.1	7.9–10.5
2nd tertile	19.0	16.3–22.0	10.7	8.8–12.9
3rd tertile	31.7	29.0–34.4	20.2	18.0–22.6
National regions				
South	26.9	23.6–30.4	14.8	12.3–17.6
Southeast	20.9	18.9–23.2	13.0	11.4–14.9
Midwest	23.1	20.2–26.4	15.8	13.3–18.7
North	12.4	9.7–15.7	8.9	5.9–11.4
Northeast	20.6	18.2–23.1	12.8	10.9–14.9
States				
Maranhão	8.3	4.9–13.8	6.7	3.7–12.1
Amapá	10.1	6.0–16.4	6.9	3.9–12.0
Amazonas	10.2	6.4–15.7	6.0	3.2–11.0
Acre	11.7	7.7–17.3	6.1	3.5–10.6
Pará	12.2	7.8–18.6	8.4	4.6–14.7
Rondônia	12.4	8.1–18.6	8.4	4.9–14.3
Espírito Santo	15.1	10.9–20.4	11.4	7.7–16.5
Mato Grosso do Sul	15.5	11.4–20.6	11.2	7.8–15.8
Alagoas	15.6	10.9–21.8	11.1	7.0–17.1
Roraima	16.7	10.7–25.0	9.3	5.1–16.5
Rio Grande do Norte	16.7	12.4–22.1	10.6	7.1–15.6
Rio de Janeiro	17.2	14.3–20.5	10.5	8.3–13.3
Tocantins	17.5	11.7–25.3	12.3	7.2–20.2
Minas Gerais	18.4	14.3–23.2	12.9	9.7–17.1
Paraíba	18.7	13.8–24.9	10.0	6.6–14.7
Pernambuco	19.1	14.9–24.0	13.8	10.2–18.5
Mato Grosso	19.6	14.0–26.7	15.3	10.5–21.9
Goiás	19.8	15.2–25.5	11.5	7.8–16.6
Piauí	20.1	14.6–27.0	9.6	5.8–15.5
Sergipe	20.7	15.9–26.4	13.7	9.7–18.9
Ceará	23.9	19.1–29.4	13.2	9.8–17.6
São Paulo	24.1	20.8–27.6	14.2	11.7–17.2
Paraná	25.5	20.0–31.8	13.0	9.3–18.0
Bahia	26.3	19.8–34.0	16.3	11.0–23.4
Rio Grande do Sul	27.3	22.6–32.6	14.2	10.9–18.2
Santa Catarina	28.4	21.3–36.8	19.2	13.3–26.8
Distrito Federal	42.3	35.7–49.2	31.3	25.2–38.1

*Also included those who performed leisure-time physical activity above 149 minutes per week

of physical activity are associated with socioeconomic variables, especially income, work, and education. Regarding income, the authors identified that in different studies and different countries, income is associated with physical activity in different domains, both in adults and in the older adults. In the leisure domain, individuals with higher income are more active, while in the occupational and commuting domains, the most active subjects are those with lower income. Studies were found with older adults from Israel, Poland, Canada, the United States, Brazil, Colombia, and Finland²⁰.

Other studies carried out in Brazil also analyzed leisure-time physical activity in the older adults and its association with family income. In this sense, the studies of Zaitune *et al.*²¹, conducted in Campinas, São Paulo, and Mourão *et al.*²², conducted in Maceió, Alagoas, demonstrated that older adults, with lower family income and lower per capita income, have significantly lower levels of leisure-time physical activity. More opportunities and easier access to environments favorable to the practice of leisure-time physical activity may explain why individuals with higher income are more active in this context²³.

In relation to the country's macro-regions, this study observed that older adults in the Northern region had a lower level of leisure-time physical activity. The study by Siqueira *et al.*¹², which investigated the leisure-time physical activity of 6,594 older adults from all regions of the country, found a lower prevalence of active older adults in the North and Northeast regions. Another study,

conducted with 4,003 older adult residents in areas covered by basic health units in the South and Northeast regions of Brazil, identified lower levels of physical activity among older adults in the Northeast region¹⁵. In the same sense, Mielke *et al.*²⁴ evaluated leisure-time physical activity and regional differences conducted with the same data of the present study, but with analyses for both adults and older adults. The authors observed that there are differences between the macro-regions of the country. Furthermore, they suggest the need for actions that promote leisure-time physical activity with different approaches for each of the macro-regions of the country.

The type of physical activity most practiced by the older adults was walking, followed by general gymnastics and hydrogymnastics. A previous study, with data from the Brazilian capital, Brasília, also showed that walking was the most practiced form of physical activity among men and women²⁵. Some factors may help explain this finding; for example, walking is part of people's daily lives and is an activity that does not require its own space to be performed nor specific skills or equipment²⁶. Recently, guidelines for physical activity in the Americas have been published⁹. In this document, the recommendation for the older adult population consists of multicomponent activities, involving aerobic activities, muscle strength, balance, and flexibility, which meets the findings of the present study in which most of the older adults have walking as their main form of physical activity. Thus, it becomes a challenge to create alternatives to increase the range of physical activities in which the older adults can be involved.

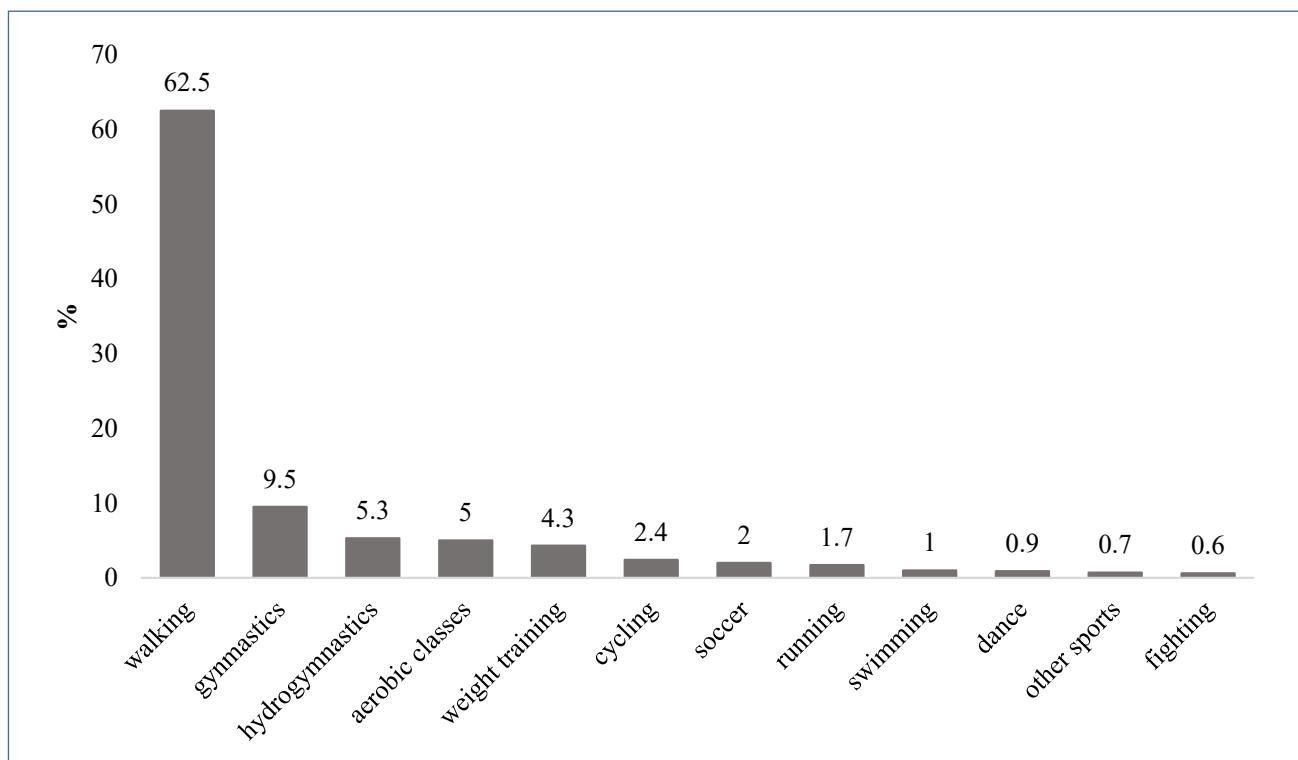


Figure 1: Type of leisure physical activity practiced by the older adults from the Brazilian National Health Survey - 2013 (n=2,306).

As a limitation of the study, we can cite the lack of comparability of the questionnaire used to verify physical activity with the instruments applied by other studies. The use of two cut-off points for physical activity strengthens the study in the sense that, in addition to the importance of achieving the recommendations for physical activity of 150 minutes per week, the World Health Organization (WHO) exposes that practicing some physical activity, even without reaching the recommendations, is more beneficial than being completely inactive²⁷.

It is important to maintain the issues applied by the PNS in relation to physical activity, serving for future national comparisons.

It is concluded that the prevalence of Brazilian older adults who practice some type of leisure-time physical activity and meet the physical activity recommendations was low, with walking being the

most practiced form of physical activity. Older adults with lower income and within the Northern region were the least active.

Through the results found, we are able to identify the need for interventions aimed at increasing the practice of leisure-time physical activity among the older adult population, with special attention to less active groups. In this sense, actions to promote physical activity through public programs in public spaces should be planned and implemented by various sectors such as health, politics, environment, and academia.

ACKNOWLEDGEMENTS

We thank the *Instituto Brasileiro de Geografia e Estatística* (IBGE) for the data.

REFERENCES

- Vasconcelos AMN, Gomes MMF. Transição demográfica: a experiência brasileira. *Epidemiol Serv Saúde*. 2012;21(4):539-48. <https://doi.org/10.5123/S1679-49742012000400003>
- Instituto Brasileiro de Geografia e Estatística (IBGE). *Projeção de População do Brasil por sexo e idade - 1980-2050*. IBGE, 2008.
- Instituto Brasileiro de Geografia e Estatística (IBGE). *Tábuas Completas de Mortalidade por sexo e idade, para o Brasil, para o ano de 2017*. IBGE, 2018.
- Instituto Brasileiro de Geografia e Estatística (IBGE). *Projeções da população: Brasil e Unidades da Federação*. IBGE, 2013.
- World Health Organization (WHO). *World report on ageing and health*. Geneva: WHO, 2015.
- Nunes BP, Flores TR, Mielke GI, Thumé E, Facchini LA. Multimorbidity and mortality in older adults: A systematic review and meta-analysis. *Arch Gerontol Geriatr*. 2016;67:130-8. <https://doi.org/10.1016/j.archger.2016.07.008>
- Campolina AG, Adami F, Santos JLF, Lebrão ML. A transição de saúde e as mudanças na expectativa de vida saudável da população idosa: possíveis impactos da prevenção de doenças crônicas. *Cad Saude Publica*. 2013;29(6):1217-29. <https://doi.org/10.1590/S0102-311X2013000600018>
- Camargos MCS, Gonzaga MR. Viver mais e melhor? Estimativas de expectativa de vida saudável para a população brasileira. *Cad Saude Publica*. 2015;31(7):1460-72. <https://doi.org/10.1590/0102-311X00128914>
- U.S. Department of Health and Human Services. *Physical Activity Guidelines for Americans*. 2nd edition. Washington: 2018.
- Malta DC, Andrade SSA, Santos MAS, Rodrigues GBA, Mielke GI. Tendências dos indicadores de atividade física em adultos: Conjunto de capitais do Brasil 2006-2013. *Rev Bras Ativ Fis Saúde*. 2015;20(2):141-51. <https://doi.org/10.12820/rbafs.v.20n2p141>
- Souza-Júnior PRB, Freitas MPS, Antonaci GA, Szwarcwald CL. Desenho da amostra da Pesquisa Nacional de Saúde 2013. *Epidemiol Serv Saude*. 2015;24(2):207-16. <https://doi.org/10.5123/S1679-49742015000200003>
- Siqueira FV, Facchini LA, Silveira DS, Piccini RX, Tomasi E, Hallal PC. Leisure-Time Physical Activity among Adult and Elderly Individuals in Brazil: A Countrywide Analysis. *J Phys Act Heal*. 2011;8:891-7. <https://doi.org/10.1123/jpah.8.7.891>
- Alves JGB, Siqueira FV, Figueiroa JN, Facchini LA, Silveira DS, Piccini RX, et al. Prevalência de adultos e idosos insuficientemente ativos moradores em áreas de unidades básicas de saúde com e sem Programa Saúde da Família em Pernambuco, Brasil. *Cad Saude Publica*. 2010;26(3):543-56. <https://doi.org/10.1590/s0102-311x2010000300012>
- Peixoto SV, Mambrini JVM, Firmo JOA, Loyola Filho AI, Souza Junior PRB, Andrade FB, et al. Prática de atividade física entre adultos mais velhos: resultados do ELSI-Brasil. *Rev Saude Publica*. 2018;52(Supl. 2):5s. <https://doi.org/10.11606/s1518-8787.2018052000605>
- Siqueira FV, Facchini LA, Piccini RX, Tomasi E, Thumé E, Silveira DS, et al. Atividade física em adultos e idosos residentes em áreas de abrangência de unidades básicas de saúde de municípios das regiões Sul e Nordeste do Brasil. *Cad Saude Publica*. 2008;24(1):39-54. <https://doi.org/10.1590/S0102-311X2008000100005>
- Zaitune MPA, Barros MBA, César CLG, Carandina L, Goldbaum M, Alves MCGP. Fatores associados à prática de atividade física global e de lazer em idosos: Inquérito de Saúde no Estado de São Paulo (ISA-SP), Brasil. *Cad Saude Publica*. 2010;26(8):1606-18. <https://doi.org/10.1590/S0102-311X2010000800014>
- Hallal PC, Andersen LB, Bull F, Guthold R, Haskell W, Ekelund U. Global physical activity levels: surveillance progress, pitfalls, and prospects. *Lancet*. 2012;380(9838):247-57. [https://doi.org/10.1016/s0140-6736\(12\)60646-1](https://doi.org/10.1016/s0140-6736(12)60646-1)
- Moschny A, Platen P, Klaußen-Mielke R, Trampisch U, Hinrichs T. Barriers to physical activity in older adults in Germany: A cross-sectional study. *Int J Behav Nutr Phys Act*. 2011;8:121. <https://doi.org/10.1186/1479-5868-8-121>
- Baert V, Gorus E, Mets T, Bautmans I. Motivators and barriers for physical activity in older adults with osteoporosis. *J Geriatr Phys Ther*. 2015;38(3):105-14. <https://doi.org/10.1519/JPT.0000000000000035>

20. Rodrigues PF, Melo M, Assis M, Palma A. Condições socioeconômicas e prática de atividades físicas em adultos e idosos: uma revisão sistemática. *Rev Bras Ativ Fis Saude*. 2017;22(3):217-32. <https://doi.org/10.12820/rbafs.v.22n3p217-232>
21. Zaitune MPA, Barros MBA, César CLG, Carandina L, Goldbaum M. Fatores associados ao sedentarismo no lazer em idosos, Campinas, São Paulo, Brasil. *Cad Saude Publica*. 2007;23(6):1329-38. <https://doi.org/10.1590/s0102-311x2007000600008>
22. Mourao ARC, Novais FV, Andreoni S, Ramos LR. Atividade física de idosos relacionada ao transporte e lazer, Maceio, Brasil. *Rev Saude Publica*. 2013;47(6):1112-22. <https://doi.org/10.1590/s0034-8910.2013047004904>
23. Pan SY, Cameron C, Desmeules M, Morrison H, Craig CL, Jiang X. Individual, social, environmental, and physical environmental correlates with physical activity among Canadians: a cross-sectional study. *BMC Public Health*. 2009;9:21. <https://doi.org/10.1186/1471-2458-9-21>
24. Mielke GI, Malta DC, Sá GBAR, Reis RS, Hallal PC. Diferenças regionais e fatores associados à prática de atividade física no lazer no Brasil: resultados da Pesquisa Nacional de Saúde-2013. *Rev Bras Epidemiol*. 2015;18(Supl. 2):158-69. <https://doi.org/10.1590/1980-5497201500060014>
25. Malta DC, Moura EC, Castro AM, Cruz DKA, Morais Neto OL, Monteiro CA. Padrão de atividade física em adultos brasileiros: resultados de um inquérito por entrevistas telefônicas, 2006. *Epidemiol Serv Saude*. 2009;18(1):7-16. <https://doi.org/10.5123/s1679-49742009000100002>
26. Lee IM, Buchner DM. The importance of walking to public health. *Med Sci Sports Exerc*. 2008;40(Supl. 1):512-8. <https://doi.org/10.1249/MSS.0b013e31817c65d0>
27. World Health Organization (WHO). Global recommendations on physical activity for health. Geneva: WHO, 2010.