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Association between sociodemographic and health factors and the practice of walking in a rural area

Paula Gonçalves Bicalho [1]
Tatiane Géa-Horta [1]
Alexandra Dias Moreira [1]
Andrea Gazzinelli [1]
Gustavo Velasquez-Melendez [1]

Abstract *The regular practice of walking can contribute to a better quality of life, reducing the risk of cardiovascular disease.* Objective*: To assess the association between sociodemographic and health factors related to adult practice of walking in the Brazilian rural context.* Methods*: Cross-sectional study of 567 adults. The outcome variable was the regular practice of walking (≥150 minutes per week) and the explanatory variables were sociodemographic factors, anthropometric measures, laboratory tests and self-perceived health. The chi-square test and Poisson regression were used in analysis, considering $p \leq 0.05$.* Results*: Only 34.7% of the population practices walking regularly. Women (PR 0.84, 95% CI 0.78-0.89), age of 31-45 years (OR 1.11, 95% CI 1.02-1.22, comparing to 18-30 years), and self-perception of poor/fair health (OR 0.90, 95% CI 0.84-0.97 comparing to people with great/good health) remained independently associated with regular practice of walking.* Conclusion *Age between 31 and 45 years and males were positively associated with walking and the perception of poor/fair health had negative association. These findings may suggest that public policies to encourage physical activity in urban areas should also be applied to rural areas.*

Key words *Motor activity, Walking, Rural areas*

[1] Departamento de Enfermagem Materno-Infantil e Saúde Pública, Universidade Federal de Minas Gerais.
paulag_bicalho@yahoo.com.br

Introduction

Walking as physical activity (PA) may offer significant health advantages, reducing the risk of death due to cardiovascular disease, especially obesity, hypertension and diabetes. About 6% of all deaths worldwide and a significant disease burden is associated with a sedentary lifestyle, or the lack of physical activity. Thus, to avoid non-communicable diseases, it is recommended that adults practice 150 minutes or more of moderate PA, or 75 minutes or more of intense PA per week[1]. In addition to improving quality of life and well-being, physical activity increases bone density and self-esteem, and reduces depression[2-4].

There has been a decline in physical activity among all populations since the 1970s. A 2013 study shows that only 33.8% of the adult population living in state capitals in Brazil got enough exercise in their leisure time. If we look at exercise as a means of getting from one place to another (commuting) this percentage goes down even more, with only 12.1% of adults considered sufficiently active[5]. Studies show that men are more active than women, and that people with less schooling and lower socioeconomic levels are more likely not to practice sufficient physical activity. Studies also show that walking decreases with age and low self-perception of health[5-7]. Daily walking is an effective means to help people become physically active[3,8,9].

Physical activity is a complex behavior influenced by a number of factors, including sociodemographic ones. However, there is disagreement on how much these factors influence physical activity among the Brazilian population[10-12]. Although many authors have investigated physical activity and associated factors in urban populations, there are few such studies conducted in rural areas[13,14], which account for a significant percentage of this country's population (16%)[15]. Furthermore, comparing these populations is difficult because of the different metrics of physical activity used in these studies (objective ones such as accelerometers, or subjective ones such as questionnaires)[16]. In a previous study, these authors assessed the sum of all types of physical activity (physical activities at leisure, work, commuting and household chores), and the association between PA and demographic factors and self-perception of health[17]. We found that the prevalence of physical activity during leisure and commuting time was very low, and that most of the time, among adults, this happened between homes, the store, school and church, all of which are relatively close together. We also found that for longer distances horses and increasingly motorcycles are used.

Given the reality of these rural communities, this study proposes to specifically access the activity of walking among adults. This is a democratic practice that almost anyone can do. It requires no sophisticated equipment or specialized space, can be done alone or as a group, and has the potential to alter the status of the practice of physical activity in rural communities similar to the ones in this study. Walking in this case could be a suitable response to the needs of these communities, in that it is less dependent of government budget or political decisions. In this study we added other exposure variables such as the anthropometric measurements of blood pressure, fasting glucose and HDL cholesterol, which were not included in the previous study[17]. In light of this, the goal of this study is to check the association between sociodemographic and health factors and the practice of walking among adults in a rural area in Brazil.

Methodology

This is a cross-sectional study conducted in Volantes, a community in the district of Ponto dos Volantes and in Caju. Both of these are rural communities in the semi-arid region of Brazil known as the Jequitinhonha Valley in northern Minas Gerais. The population relies heavily on subsistence agriculture, especially manioc, corn, rice and beans. Some people have a few heads of cattle or a small store, but most are farmers and many are migrants in search of work in other cities. These same communities were used by this research group in studies of schistosomiasis and other parasitic and infectious diseases[18]. In 2004, we started looking at chronic, non-infectious diseases and the associated factors in these communities.

The total population was made up of 612 adults aged 18 or over and living in the community for at least a year (census data). Exclusion factors were pregnant women (2) due to the physiological changes in anthropometric data during pregnancy, and people with health problems that made it difficult or impossible to collect the data required. A total of 39 (6.4%) individuals were considered study losses: 22 (3.6%) were not located and 17 (2.8%) refused to participate. Each individual was contacted at least three times

before being written off as a loss. Thus the final study population was made up of 567 adults.

Data was collected between May 2008 and 2009 by graduate and undergraduate students rigorously trained for this purpose. Interviews were conducted face-to-face using a questionnaire.

The practice of walking was assessed using the *International Physical Activity Questionnaire* (IPAQ) long/weekly habit version, which was adapted[17] for use in rural communities as recommended by the group of researchers who created the tool. The questionnaire was applied in face-to-face interviews to all adults 18 or over, living in the communities for at least a year.

After the interview, participants were assessed by anthropometrists who checked their weight, height and waist (circumference). Anthropometric measurements followed standard recommendations[19]. Each measurement was made in triplicate and then averaged. Anthropometrists were trained by a field supervisor for a week, and after that measurements were tested for accuracy and precision[20]. In addition to anthropometric measurements, blood pressure was measured three times using all of the steps in the 7th Report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure[21]. We also collected about 25 mL of blood after a 12 hour fast for glucose and cholesterol determinations.

The exposure variables used in this analysis were:

- Socio-demographic: gender, skin color (white, brown, black), age (18 - 30, 31 - 45, 46 – 59 or ≥ 60 years old), marital status (married/living together, single, or separated/divorced/widowed), and education (0, 1 - 4, 5 – 8 or ≥ 9 years of schooling).
- Self-perception of health, rated by interviewees as excellent/good or fair/poor;
- Anthropometric measurements: BMI using the cutoff points used by the World Health Organization - WHO[22] < 18.5 kg/m^2 (underweight); 18.5 kg/m^2 – 24.9 kg/m^2 (eutrophic); 25.0 kg/m^2 – 29.9 kg/m^2 (overweight) and ≥ 30.0 kg/m^2 (obese), and waist circumference, also classified according to WHO[23] recommendations: normal (< 94.0 cm in men and < 80.0 cm in women); overweight (94.0 - 101.9 cm in men and 80 - 87.9 cm in women); obese (≥ 102 cm in men and ≥ 88 cm in women);
- Labs: HDL cholesterol classified according to the 4th Brazilian Guidelines on dyslipidemias and atherosclerosis prevention of the Brazilian Society for Cardiology Department of Atherosclerosis[24]: normal (≥ 40 mg/dl in men and ≥ 50 mg/dl in women), low (< 40 mg/dl in men and < 50 mg/dl in women), blood pressure classified using the criteria of the 7th Report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of high blood pressure[22]: normal < 140/90 mm Hg and high ≥ 140/90 mmHg; fasting glucose classified using the criteria if the 1st Brazilian Guidelines for the Diagnosis and Treatment of Metabolic Syndrome[25]: normal < 100 mg/dl and altered ≥ 100 mg/dl).

The outcome variable for this study was 150 minutes or more of walking in a normal week. This variable was calculated by adding up all of the time walking in leisure, commuting, and work. Individuals who walked 150 minutes or more during a week were considered active. In other words, they met the requirement for preventing non-communicable diseases. Although the cut-off point used (150 minutes or more in a usual week) is based on the international recommendations for the practice of physical activity by adults, considering the sum of four domains. In this study we used the sum of the minutes walked in the three domains where this practice was present. This strategy has been used in other studies using this same cut-off point to analyze domains separately[26,27], or to analyze only the practice of walking in commuting time, to get from one place to another[28].

The descriptive data analysis includes calculations of the absolute and relative frequencies, as well as the means and standard deviations (SD). Chi-squared was used to analyze statistical differences. A Poisson regression was used to test the simultaneous association between the different variables and individuals walking for 150 minutes or more. For all analyses $p \leq 0.05$ was used to define the statistical significance at the descriptive level. The independent variables were included in the modeling process based on awareness of their potential association with the outcome variable analyzed ($p \leq 0.20$). Initially we used all of the variables with $p \leq 0.20$ in the model, and then withdrew those that showed themselves not to be statistically significant ($p \leq 0.05$). We adjusted the model and ran interaction tests between the independent variables that remained in the final model. The data was processed and analyzed using Stata 12.1 software.

This project was approved by the Federal University of Minas Gerais Ethics Committee for Research on Human Beings, and complies with

Brazilian National Board of Health (CNS) Resolution n. 466 of 12 December 2012.

Results

The majority of the study population was made up of young adults (27%) and the elderly (26%). Those aged 46 to 59 were the smallest percentage (18%) among both men and women. Over half (67%) the population was considered to have brown skin, 66% claimed they are married or living with a partner, and 61% claimed to be in excellent or good health. About 40% claim to have between 1 and 4 years of schooling.

We found a high prevalence of obesity and abdominal obesity among women - 13.8% and 29.2% respectively. Low HDLc was also more prevalent among women (41.4%). Regarding blood pressure, about 30% of the population had altered systolic and/or diastolic blood pressure levels when the data was gathered. 7.9% of the study population had fasting glucose levels ≥ 100 mg/dl, again more prevalent among women than men.

Table 1 shows that the study population averaged 180 minutes of walking in a week, most of it (116 minutes) in commuting time. In terms of gender, we found that men walk more than women, averaging 243.8 (SD = 22.43) and 120 (SD = 13.33) minutes respectively.

Graphic 1 shows the percent individuals walking 150 minutes or more per week. A sum of minutes walked in all domains shows that 34.7% of the study population walks at least 150 minutes a week. Walking in commuting time was enough for 27.3% of the study population to be considered active. In this particular rural population 8.1% of the adults were considered active as they walk 150 minutes or more a week in their jobs. Only 2.3% of the population was considered active when we analyzed walking in leisure time.

Table 2 shows the percentage of individuals walking ≥ 150 minutes a week based on socio-demographic and health-related characteristics. The prevalence of active individuals ($p \leq 0.05$) was highest among men and those with brown or black skin, those viewing their health as excellent or good and those with normal values for waist and blood pressure.

The results of the Poisson regression for the variables associated with walking 150 minutes or more are shown in Table 3. Female versus male (PR 0.84; CI 95% 0.78 – 0.89), age 31 to 45 compared to 18 to 30 (PR 1.11; CI 95% 1.02 – 1.22) and self-perception of health as fair/poor compared to self-perception of health as excellent/good (PR 0.90; CI 95% 0.84 – 0.97) remained independently associated to sufficient time walking. We found no significant interaction between the independent variables remaining in the final model following the Poisson regression.

Discussion

This study found more walking in commuting time (27.3%) and less walking in leisure time (2.3%). Furthermore, we found that being female, being between 31 and 45 years of age and having fair to poor self-perception of health remained independently associated to the practice of walking.

Although walking is accessible and recommended for health promotion, we found that only 2.3% of the population in this study walked 150 minutes or more a week in their leisure time. Data on walking among rural populations is scarce. A recent study in this same population found limited amounts of physical activity in leisure time (10.1%)[17]. As a rule, low frequency of walking and other physical activities in leisure time were also found in other similar populations[29,30]. This is especially true among women[31]. Given the results of a longitudinal study, showing that exercise practiced in leisure time is the type of exercise that most contributes to reducing chronic diseases[32], inactivity or insufficient activity in this domain increases the likelihood of morbi-mortality.

Physical activity is one of the priority themes defined by the National Health Promotion Policy (*Política Nacional de Promoção da Saúde* - PNPS), which includes the need to foster actions, advice and disclosure of such practices across the country. This is one of the agendas for Brazilian public health[33]

One of the aspects discussed by experts in this area is the importance and influence of environmental characteristics on the practice of physical activity by populations[34-38]. Studies show there is a positive relationship between walking and other leisure activities and the surrounding environment, such as the proximity of recreational facilities[39,40]. Thus, the low prevalence of walking in leisure time in this study population may be partly explained by the intrinsic characteristics of a rural area, such the absence of squares, walking paths and gyms. Furthermore, unlike urban ar-

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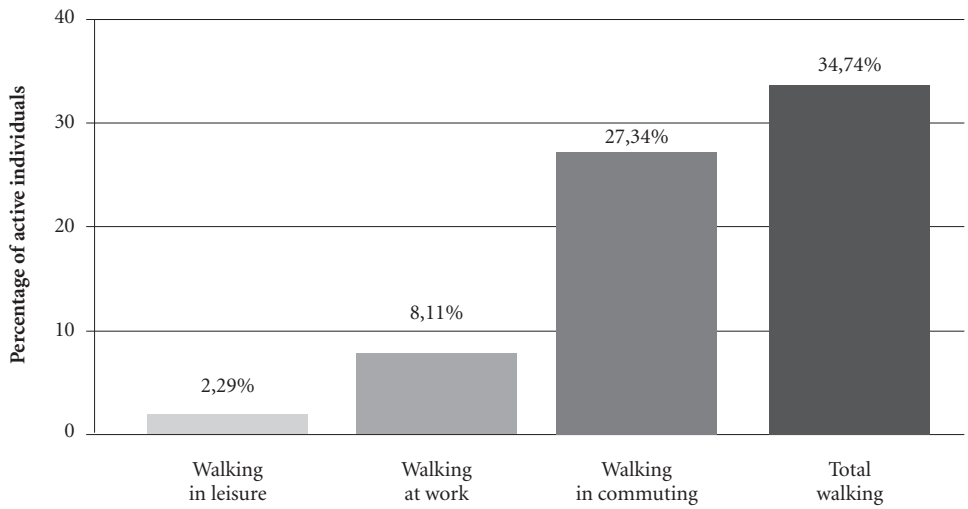
Table 1. Mean and average deviation of time spent walking in the domains of physical activity by gender. Caju/Virgem das Graças, Minas Gerais - 2008/2009.

Walking domain	Total population Mean ± SD (min/week)	Men Mean ± SD (min/week)	Women Mean ± SD (min/week)
Leisure	9.93 ± 2.07	12.42 ± 3.48	7.59 ± 2.33
Commuting	116.34 ± 8.05	151.85 ± 13.70	82.89 ± 8.37
Work	54.0 ± 9.76	79.53 ± 17.02	29.97 ± 9.93
Total	180.27 ± 13.11	243.80 ± 22.43	120.45 ± 13.33

SD - Standard Deviation.



Graphic 1. Percentage of population walking 150 minutes or more in the different domains. Caju/Virgem das Graças, Minas Gerais – 2008/2009.

eas, in rural areas walking tends not to be considered leisure or even physical activity.

In recent decades, the Brazilian government has implemented a number of programs to effect a turnaround in the number of people who are inactive during their leisure time, such as the nation-wide "Academia da Saúde" (Health Academy) and "Agita Brasil" (Shake-it-up Brazil)[41]. The former introduced structural changes to encourage physical activity, and the latter informs the population of the benefits of physical activity[42]. Among the communities studied, equipment such as gyms do not exist to this day, although some facilities do exist in the urban area of Ponto dos Volantes and in Jequitinhonha.

In this study we found that more men than women walk 150 minutes or more a week. Similar results were found when other domains of physical activity are included[43,44]. Despite the difference in the prevalence of walking among men and women in Brazil, there are few studies that incorporate discussions of gender and the social constructs that may be involved in these differences. We speculate that the explanation of these differences may be related to the more predominant role society assigns to women in domestic chores and childcare. This style of life, reaffirmed and reproduced primarily in the rural area, could reflect limited time for leisure[45,46]. Domestic chores occupy a large amount of the day, even for women who work outside the home. This could be the path towards suitable health policies to increase the practice of walking among women, with deeper studies on the habits and behaviors of women living in small rural communities[47].

Regarding walking in commuting time, we found a higher frequency of this type of walking among men than among women. This result

Table 2. Proportion of individuals walking 150 minutes or more/week on a regular basis by socio-demographic and health-related variables. Caju/Virgem das Graças, Minas Gerais - 2008/09.

Variables	Total population		
	n	%	p*
Gender			
Male	123	44.73	< 0.001
Female	60	20.55	
Age (years)			
18-30	44	28.95	0.051
31-45	66	40.00	
46-59	35	34.65	
≥ 60	37	25.00	
Color of skin (observed)			
White	51	27.42	0.024
Brown/Black	132	34.65	
Years of schooling			
Illiterate	50	29.76	0.190
1 - 4	89	37.08	
5 - 8	21	26.92	
≥ 9	21	26.92	
Marital status			
Married/living together	126	33.69	0.097
Single	42	33.07	
Separated/divorced/widowed	15	22.73	
Self-perception of health			
Excellent/Good	124	36.80	0.004
Fair/Poor	51	23.72	
BMI (Kg/m2)			
< 18.5 (underweight)	06	26.09	0.253
18.5 – 24.9 (eutrophic)	129	35.73	
25.0 – 29.9 (overweight)	39	30.23	
≥ 30.0 (obese)	09	18.00	
Waist circumference - WC - (cm)			
Normal: < 94.0 (M); < 80.0 (W)	146	38.02	< 0.001
Overweight: 94 - 101.9(M); 80 - 87.9 (W)	17	20.48	
Obesity: ≥ 102 (M); ≥ 88 (W)	20	20.20	
HDL cholesterol (mg/dl)			
Normal: ≥ 40 (M); ≥ 50 (W)	110	32.26	0.412
Low: < 40 (M); < 50 (W)	56	29.79	
Blood Pressure (mmHg)			
Normal: < 140/90	116	36.36	0.043
Altered: ≥ 140/90	67	27.02	
Fasting Glucose (mg/dl)			
Normal: < 100	173	33.33	0.091
Altered: ≥ 100	10	20.83	

* Chi-squared p value.

is different from what we find in urban areas, where women tend to be more active than men in this domain[44]. One possible explanation of this finding may be that men in rural areas travel longer distances to get to work (data not shown), as they do things like chop wood and clear land,

Table 3. Final Poisson Regression (Prevalence Ratio and CI 95%) using the outcome variable 150 minutes or more of walking. Caju/Virgem das Graças, Minas Gerais - 2008/2009.

Variables	PR (CI 95%)	p-value
Gender		
Male	1.00 (ref.)	-
Female	0.84 (0.78 – 0.89)	< 0.001
Age (years)		
18-30	1.00 (ref.)	-
31-45	1.11(1.02 – 1.22)	0.021
46-59	1.05(0.95 – 1.17)	0.310
≥ 60	0.96 (0.87 – 1.05)	0.352
Self-perception of Health		
Excellent/Good	1.00 (ref.)	-
Fair/Poor	0.90(0.84 – 0.97)	0.004

PR: Prevalence Ratio; CI: Confidence Interval.

which require more travel, while women tend to perform domestic chores that do not require as much moving around.

This study found that those aged 31 to 45 tend to walk more, regardless of gender. In general, studies show that physical activity decreases with increasing age, and that the elderly tend to be more sedentary, even among rural populations[5,7,35,45]. A study conducted in a rural community in China shows that the elderly who remain active are healthier than those who do not[45]. Thus, we reiterate the importance of government policies to promote health and prevent complications in this age group. Walking can be done by the elderly and should thus be incentivized and guided.

In this study, negative self-perception of health was associated to decreased prevalence of walking, reinforcing the idea that perception of health is associated with adopting health-promoting behaviors. Evidence shows that the prevalence of risky behavior is largest among those with negative self-perceptions of health, or in other words, those who consider their health to be fair or poor[47,48].

One of the limitations to this study is the cross-sectional design, the result of being unable to determine the time relationship between variables. Thus the phenomenon of reverse causality may exist in the association between self-perception of health and walking. Regarding external validity, we must remember that the study population may not be representative of the rural population in the country.

The points that mitigate the potential biases are related to the methodological rigor of data collection, with the variables checked in face-to-face interviews with almost all of the resident adult population, and the use of questionnaires validated in Brazil, both of which are challenging in rural areas that are difficult to get to.

Conclusion

We demonstrated that the level of walking in leisure and commuting time is very low in this rural population in Brazil. Even if we add all three domains: work, commuting and leisure, only one in three adults walk enough. The main factors positively associated with walking were age between 31 and 45 and male gender. We also found that fair or poor self-perception of health is negatively associated with the practice of walking.

Considering the benefits of walking, a democratic, accessible and free physical activity that almost anyone can do, healthcare professionals should encourage people to walk. The results of this study can help guide the implementation of public policies to support and stimulate walking in rural communities. They also suggest the need for new studies that dive deeper into the role of gender in rural populations to confirm and further explore the findings.

Collaborations

PG Bicalho worked in the research, methodology, conception and final working of the article; AD Moreira worked in literature review and final working of the article; T Géa-Horta, A Gazzinelli, G Velásquez-Meléndez worked in the research, methodology and final working of the article.

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References

1. World Health Organization (WHO). *Global recommendations on physical activity for health*. Geneva: WHO; 2011.
2. 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):105-114.
3. Hanson S, Jones A. Is there evidence that walking groups have health benefits? A systematic review and meta-analysis. *Br J Sports Med* 2015; 49(11):710-715.
4. World Health Organization (WHO). *Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013-2020*. Geneva: WHO; 2013.
5. Brasil. Ministério da Saúde (MS). *Vigitel Brasil 2013. Vigilância de fatores de risco e proteção para doenças crônicas por inquérito telefônico*. Brasília: MS; 2014.
6. Hallal PC, Andersen LB, Bull FC, Guthold R, Haskell W, Ekelund U. Lancet Physical Activity Series Working Group. Global physical activity levels: surveillance progress, pitfalls, and prospects. *Lancet* 2012; 380(9838):247-257.
7. Rocha SV, Almeida MMG, Araújo TM, Santos LB, Rodrigues WKM. Fatores associados à atividade física insuficiente no lazer entre idosos. *Rev Bras Med Esporte* 2013; 19(3):191-195.
8. Lee IM, Buchner DM. The importance of walking to public health. *Med Sci Sports Exerc* 2008; 40(Supl. 7):512-518.
9. Dias-da-Costa JS, Hallal PC, Wells JC, Daltoé T, Fuchs SC, Menezes AM, Olinto MT. Epidemiology of leisure-time physical activity: a population-based study in southern Brazil. *Cad Saude Publica* 2005; 21(1):275-282.
10. Azevedo MR, Araújo CL, Reichert FF, Siqueira FV, da Silva MC, Hallal PC. Gender differences in leisure-time physical activity. *Int J Public Health* 2007; 52(1):8-15.
11. Baretta E, Baretta M, Peres KG. Nível de atividade física e fatores associados em adultos no Município de Joaçaba, Santa Catarina, Brasil. *Cad Saude Publica* 2007; 23(7):1595-602.
12. Hallal PC, Victora CG, Wells JC, Lima RC. Physical inactivity: prevalence and associated variables in Brazilian adults. *Med Sci Sports Exerc* 2003; 35(11):1894-1900.
13. Monteiro CA, Conde WL, Matsudo SM, Matsudo VR, Bonsenor IM, Lotufo PA. A descriptive epidemiology of leisure-time physical activity in Brazil, 1996-1997. *Rev Panam Salud Publica* 2003; 14(4):246- 254.
14. Silveira IL, Arboés PP, Oliveira SM, Costa STDN, Pinheiro DJMB, Oliveira MTM, Azevedo GB. Prevalência de sintomas do climatério em mulheres dos meios rural e urbano no Rio Grande do Norte, Brasil. *Rev Bras Ginecol Obstet* 2007; 29(8):415-422.
15. Instituto Brasileiro de Geografia e Estatística (IBGE). *Censo demográfico, 2010*. Rio de Janeiro: IBGE; 2010.
16. Fan JX, Wen M, Kowaleski-Jones L. Rural–Urban Differences in Objective and Subjective Measures of Physical Activity: Findings From the National Health and Nutrition Examination Survey (NHANES) 2003–2006. *Preventing Chronic Disease* 2014; 11:E141.
17. Bicalho PG, Hallal PC, Gazzinelli A, Knuth AG, Velásquez-Meléndez G. Atividade física e fatores associados em adultos de área rural em Minas Gerais, Brasil. *Rev Saude Publica* 2010; 44(5):884-893.
18. Gazzinelli A, Velasquez-Melendez G, Crawford SB, LoVerde PT, Correa-Oliveira R, Kloos H. Socioeconomic determinants of schistosomiasis in a poor rural area in Brazil. *Acta Trop* 2006; 99(2-3):260-271.
19. Lohman TG, Roche AF, Martorell R. Anthropometric standardization reference manual. Champaign: Human Kinetics Books; 1988.
20. Klipstein-Grobusch K, Georg T, Boeing H. Interviewer variability in anthropometric measurements and estimates of body composition. *Int J Epidemiol* 1997; 26(supl. 1):174-180.
21. Chobanian AV, Bakris GL, Black H.R, Cushman WC, Green LA, Izzo JLJR., Jones DW, Materson BJ, Oparil S, Wright JTJR, Roccella EJ. National Heart, Lung, and Blood Institute Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. National High Blood Pressure Education Program Coordinating Committee. The seventh report of the Joint National Committee on detection, evaluation, and treatment of high blood pressure: the JNC 7 report. *JAMA* 2003; 289(19):2560-2572.
22. World Health Organization (WHO). *Physical Status: The use and interpretation of anthropometry.* Geneva: WHO; 1995.
23. World Health Organization (WHO). *Obesity: preventing and managing the global epidemic.* Geneva: WHO; 1998.
24. Sposito AC, Caramelli B, Fonseca FAH, Bertolami MC, Neto AA, Souza AD, Lottenberg AM, Chacra AP, Faludi AA, Loures-Vale AA, Carvalho AC, Duncan B, Gelonese B, Polanczyk C, Rodrigues Sobrinho CR, Scherr C, Karla C, Armaganijan D, Moriguchi E, Saraiva F, Pichetti G, Xavier HT, Chaves H, Borges JL, Diament J, Guimarães JI, Nicolau JC, dos Santos JE, de Lima JJ, Vieira JL, Novazzi JP, Faria Neto JR, Torres KP, Pinto Lde A, Bricarello L, Bodanese LC, Introcaso L, Malachias MV, Izar MC, Magalhães ME, Schmidt MI, Scartezini M, Nobre M, Foppa M, Forti NA, Berwanger O, Gebara OC, Coelho OR, Maranhão RC, dos Santos Filho RD, Costa RP, Barreto S, Kaiser S, Ihara S, Carvalho Td, Martinez TL, Relvas WG, Salgado W. IV Brazilian Guideline for Dyslipidemia and Atherosclerosis prevention: Department of Atherosclerosis of Brazilian Society of Cardiology. *Arq Bras Cardiol* 2007; 88:2-19.
25. Sociedade Brasileira de Hipertensão (SBH). I Diretriz Brasileira de Diagnóstico e Tratamento da Síndrome Metabólica. *Revista Brasileira de Hipertensão* 2004; 4:123-159.
26. Mielke GI, Malta DC, Sá GB, Reis RS, Hallal PC. Regional differences and correlates of leisure time physical activity in Brazil: results from the Brazilian National Health Survey-2013. *Rev Bras Epidemiol* 2015; 18(Supl. 2):158-169.
27. Madeira MC, Siqueira FCV, Facchini LA, Silveira DS, Tomasi E, Thumé E, Silva SM, Dilélio A, Piccini RX. Atividade física no deslocamento em adultos e idosos do Brasil: prevalências e fatores associados. *Cad Saude Publica* 2013; 29(1):165-174.
28. Salvador EP, Reis RS, Florindo AA. A prática de caminhada como forma de deslocamento e sua associação com a percepção do ambiente em idosos. *Revista Brasileira de Atividade Física e Saúde* 2009; 14(3):197-205.

29. Raphaelli CO, Azevedo MR, Hallal PC. Association between health risk behaviors in parents and adolescents in a rural area in southern Brazil. *Cad Saude Publica* 2011; 27(12):2429-2440.
30. Brownson RC, Housemann RA, Brown DR, Jackson-Thompson J, King AC, Malone BR, Sallis JF. Promoting physical activity in rural communities. American Journal of *Preventive Medicine* 2000; 18(3):235-241.
31. Matos AC, Ladeia AM. Assessment of cardiovascular risk factors in a rural community in the Brazilian state of Bahia. *Arq Bras Cardiol* 2003; 81(3):297-302.
32. Autenrieth CS, Baumert J, Baumeister SE, Fischer B, Peters A, Döring A, Thorand B. Association between domains of physical activity and all-cause, cardiovascular and cancer mortality. *Eur J Epidemiol* 2011; 26(2):91-99.
33. Brasil. Portaria nº 2.446, de 11 de Novembro de 2014. Redefine a Política Nacional de Promoção da Saúde (PNPS). *Diário Oficial da União* 2014; 11 nov.
34. Gomes GA, Reis RS, Parra DC, Ribeiro I, Hino AA, Hallal PC, Malta DC, Brownson RC. Walking for leisure among adults from three Brazilian cities and its association with perceived environment attributes and personal factors. *Int J Behav Nutr Phys Act* 2011; 8:111.
35. Florindo AA, Garcia LMT, Guimarães VV, Salvador EP, Fonseca FH, Reis RS, Farias JJC. Escore de ambiente construído relacionado com a prática de atividade física no lazer: aplicação numa região de baixo nível socioeconômico. *Rev Bras Cineantropom Desempenho Hum* 2013; 15(2):243-255.
36. Salvador EP, Reis RS, Florindo AA. Practice of walking and its association with perceived environment among elderly Brazilians living in a region of low socioeconomic level. *Int J Behav Nutr Phys Act* 2010; 7:67.
37. Hallal PC, Reis RS, Parra DC, Hoehner C, Brownson RC, Simoes EJ. Association between perceived environmental attributes and physical activity among adults in recife, Brazil. *J Phys Act Health* 2010; 7(Supl. 2):213-222.
38. Hino AA, Reis RS, Sarmiento OL, Parra DC, Brownson RC. The built environment and recreational physical activity among adults in Curitiba, Brazil. *Prev Med* 2011; 52(6):419-422.
39. Pelclová J, Frömel K, Cuberek R. Gender-Specific Associations between Perceived Neighbourhood Walkability and Meeting Walking Recommendations When Walking for Transport and Recreation for Czech Inhabitants over 50 Years of Age. *Int J Environ Res Public Health* 2014; 11(1):527-536.
40. Bauman AE. Updating the evidence that physical activity is good for health: an epidemiological review 2000-2003. *J Sci Med Sport* 2004; 7(Supl. 1):6-19.
41. Amorin TC, Knuth A, Cruz DKA, Malta DC, Reis RS, Hallal PC. Descrição dos programas municipais de promoção da atividade física financiados pelo Ministério da Saúde. *RBAFS* 2013; 18(1):63-74.
42. Brasil. Ministério da Saúde (MS). Programa Nacional de Promoção da Atividade Física "Agita Brasil": Atividade física e sua contribuição para a qualidade de vida. *Rev Saude Publica* 2002; 36(2):254-256.
43. Teixeira IP, Nakamura PM, Kokubun E. Prática de caminhada no lazer e no deslocamento e associação com fatores socioeconômicos e ambiente percebido em adultos. *Rev. bras. cineantropom. desempenho hum* 2014; 16(3):345-358.
44. Huang X, Yang H, Wang HH, Qiu Y, Lai X, Zhou Z, Li F, Zhang L, Wang J, Lei J. The Association Between Physical Activity, Mental Status, and Social and Family Support with Five Major Non-Communicable Chronic Diseases Among Elderly People: A Cross-Sectional Study of a Rural Population in Southern China. *Int J Environ Res Public Health* 2015; 12(10):13209-13223.
45. Salles-Costa R, Heilborn ML, Werneck GL, Faerst E, Lopes CS. Gênero e prática de atividade física de lazer. *Cad Saude Publica* 2003; 19(Supl. 2):325-333.
46. Costa MMM, Nunes JBA. Políticas Públicas de Gênero Voltadas à Mulher do Campo: Uma Caminhada em Busca da Cidadania. *VII Mostra de trabalhos jurídicos científicos*; 2014; Santa Cruz do Sul.
47. Segovia J, Bartlett RF, Edwards AC. An empirical analysis of the dimensions of health status measures. *Soc Sci Med* 1989; 29(6):761-768.
48. Barros MVG, Nahas MV. Comportamentos de risco em trabalhadores da indústria. *Rev Saude Publica* 2001; 35(6):554-563.

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