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# Healthy behavior among Brazilian young adults

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## ABSTRACT

**OBJECTIVE:** To estimate the prevalence and factors associated to healthy behavior among young adults.

**METHODS:** A total of 14,193 respondents aged 18–29 years who participated in the system *Vigilância de Fatores de Risco e Proteção para Doenças Crônicas por Inquérito Telefônico* (VIGITEL – Telephone-Based Surveillance of Risk and Protective Factors for Chronic Diseases) carried out in 27 Brazilian capitals in 2006 were studied. Healthy behavior was defined as non-smoking, reported regular physical activity and intake of fruits and vegetables five days or more a week. Data analysis was based on prevalence ratios estimated using Poisson regression.

**RESULTS:** The prevalence of healthy young adults was 8.0%; 39.6% reported two healthy behaviors, 45.3% one; and 7.0% none. In the multivariate analysis, healthy behavior was more commonly seen among those aged 25–29 years with 9 or more years of schooling and who reported engaging in physical activities near home. Inverse associations were found with non-white skin color, consumption of whole milk and fatty meat or poultry, being on a diet, and poor self-perception of health status.

**CONCLUSIONS:** Young adults who show fewer healthy behaviors perceive their health as poor, which suggests that these behaviors negatively affect their own health perception. Positive associations with higher schooling, white skin color, and living near physical activity facilities indicate social inequalities in access to healthy behaviors.

**DESCRIPTORS:** Health Knowledge, Attitudes, Practice. Gender and Health. Socioeconomic Factors. Risk Factors. Chronic Disease, prevention & control. Health Surveys. Brazil. Telephone interview.

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Received: 11/28/2008

Revised: 7/29/2009

Approved: 8/19/2009

## INTRODUCTION

Exposure to risk behaviors such as smoking, unhealthy diet, and physical inactivity usually starts in early adolescence and it consistently persists through adult life.<sup>6</sup> These risk factors are associated to increased risk of chronic non-communicable diseases (CNCD) including cardiovascular diseases, diabetes, and cancer, which are leading causes of morbidity and mortality during adult life. Lifetime experiences and exposures, mostly from childhood to young adulthood, have long-term health impact and can contribute to health inequalities in adult and elder life.<sup>9,12,16</sup>

Epidemiological studies have evidenced that cardiovascular diseases would be a rare cause of death in the absence of main risk factors. The Interheart study was conducted in 52 countries and showed that factors such as dyslipidemia, smoking, hypertension, diabetes, abdominal obesity, psychosocial factors, low fruit and vegetable intake, excess alcohol intake, and physical inactivity account for 90% of population attributable risk in men and 94% in women, affecting all age groups and countries.<sup>25</sup>

Despite widespread knowledge, people find it hard to have a healthier life. On one hand, several risk factors are associated to pleasure, promoted in the media and reinforced by modern consumerism. On the other hand, the health-related impact of behavioral risk factors is felt at more advanced ages as they are associated to conditions of slow and silent development that predominantly affect people after the age of 40.

Public health interventions should promote healthy behavior among young people, preferably since childhood. The World Health Organization (WHO) launched in 2003 the Global Strategy on Diet, Physical Activity and Health that together with the Framework Convention on Tobacco Control constitute global recognition of the impact of these risk factors on people's health and quality of life. These global agreements represent a commitment for political, economic, and social changes at national and international levels to support and promote healthier lifestyles.

There are currently about 20 million adolescents aged 15–19 and 33 million young adults aged 20–29 in Brazil. Young productive people are a major target of marketing strategies of consumption and leisure industry. The knowledge on the association between demographic, socioeconomic, and cultural factors and health behaviors among young adults can

provide input to support the implementation of public policies for health promotion and to meet specific needs of this population.

The objective of the present study was to estimate the prevalence of and factors associated with healthy behaviors among young adults.

## METHODS

Cross-sectional study conducted based on data from the Telephone-Based Surveillance of Risk and Protective Factors for Chronic Diseases (VIGITEL)<sup>b</sup> including a probabilistic sample of adults living in households with fixed telephone line in 26 Brazilian capitals and Federal District in 2006.

VIGITEL has set a minimum sample of 2,000 individuals aged  $\geq 18$  years per city to estimate the prevalence of risk factors in adults with 95% confidence and maximum error of two percent points. Considering 50% prevalence, the error would be 2%.<sup>b</sup> The sampling process consisted of systematic drawing of 5,000 telephone lines per city followed by redrawing of telephone lines in each city and grouping into 25 replicates of 200 lines. All (active) eligible home telephone lines were identified. All individuals aged  $\geq 18$  years living in the household were listed and one of them was drawn to be interviewed. A total of 76,330 telephone calls were made, and 54,369 interviews were complete (71.1%) with response rates ranging between 64.4% (Porto Alegre, RS) and 81.0% (Palmas, TO). Unanswered calls were due to permanently busy lines, lines connected to fax or answering machines or impossibility to locate the adult selected from a household after 10 attempts. The refusal rate was 9.1%, ranging from 5.4% (Palmas) to 15.0% (Porto Alegre). Of 54,369 respondents VIGITEL in 2006, 21,294 were males and 33,075 were females.

Telephone interviews followed a computer-assisted structured questionnaire completed by trained interviewers who received constant supervision.<sup>c</sup>

The survey method was described by Moura et al (2008) and published elsewhere.<sup>19</sup>

From all interviews (54,369) made through VIGITEL, a sample comprising 14,193 respondents aged between 18 and 29, excluding pregnant women ( $n=280$ ) and respondents of Asian ( $n=67$ ) and indigenous ( $n=9$ ) ethnicity, was studied.

<sup>a</sup> Brazilian Ministry of Health. Informações de Saúde. Demográficas e Socioeconômicas. Brasília; 2006 [cited 2008 Jan 06]. Available from: <http://tabnet.datasus.gov.br/cgi/deftohtm.exe?ibge/cnv/popuf.def>

<sup>b</sup> Brazilian Ministry of Health. VIGITEL Brazil 2006. Vigilância de fatores de risco e proteção para doenças crônicas por inquérito telefônico: estimativas sobre frequência e distribuição sócio-demográfica de fatores de risco e proteção para doenças crônicas nas capitais dos 26 estados brasileiros e no Distrito Federal em 2006. Brasília; 2007.

<sup>c</sup> The questionnaire is available from: <http://hygeia.fsp.usp.br/nupens/questionario2006.pdf>.

The dependent variable “healthy behavior” was defined as: mild to moderate leisure-time physical activity for at least 30 minutes five or more days a week or intense activity for at least 20 minutes a day for three or more days a week; fruit and vegetable intake five or more days a week; and non-smoking. Respondents who did not meet one or both criteria were considered unhealthy.

Independent variables were grouped into sociodemographic and behavior characteristics and health indicators. Sociodemographic characteristics were: gender, age (18–24 and 25–29 years old), self-referred skin color (white, black, and mixed), marital status (single, married, separated/divorced/widowed), schooling (0–8, 9–11,  $\geq 12$  years), employment status/employed (yes, no), and physical activity facility in the neighborhood (yes, no). Behavior variables included: regular consumption of fatty meat and/or poultry (yes, no), consumption of whole milk (yes, no), and excess alcohol intake ( $>5$  doses among men and  $>4$  doses among women in the 30 days prior to the interview). Health indicators studied were: body mass index estimated based on self-reported weight and height (BMI  $<25$ , 25–29 and  $>30$  kg/m<sup>2</sup>); current dieting (yes, no) and dieting in the last 12 months (yes, no); medical diagnosis of hypertension (yes, no) and diabetes (yes, no); and self-perceived health status (excellent, good, fair, poor).

The association between healthy behaviors and independent variables was analyzed using Pearson’s chi-square test at a 5% level of significance. Univariate analysis was performed based on prevalence ratios obtained from Poisson’s regression with robust variance. The multivariate analysis was first carried out including independent variables associated to healthy behavior with  $p < 0.20$  in the univariate analysis. The final model included all variables that remained statistically associated ( $p < 0.05$ ) in intermediate analyses.

To correct for different probability of selection due to number of telephone line in the household and number of people living in the same household, weighting factors were assigned to each respondent. Given that fixed telephone coverage is not universal, a weighting factor was used to approach the sample’s sociodemographic composition to that of people aged 18 years and more in each city. Additionally, a second weighting factor was applied to take into account differences between populations of each city and number of individuals selected per city.<sup>19</sup> The analysis was conducted in Stata (version 9.2) using “svy” procedure (including weighting factors) for the analyses of data obtained in complex sampling.

As it was a telephone survey, the informed consent form was replaced by a verbal consent from all respondents

at the time of phone contact. VIGITEL was approved by the *Comitê Nacional de Ética em Pesquisa para Seres Humanos* (Human Research Ethics Committee) of the Brazilian Ministry of Health.<sup>19</sup>

## RESULTS

Of 14,193 respondents included in this study, 50.8% (95% CI: 48.7;53.0) were females and 49.2% (95% CI: 47.0;51.3) were males. Only 8.0% (95% CI: 7.1;8.9) of young adults studied were considered healthy. Among the remaining, 39.6% reported two healthy behaviors, 45.3% reported one healthy behavior, and 7.0% reported none.

Non-smoking was the most common healthy behavior (85.5%) reported followed by regular physical activity (46.4%). Adequate fruit and vegetable intake was the least frequently reported healthy behavior (16.6%).

In the univariate analysis, healthy behavior among young adults was positively associated to age 25–29 years, higher schooling and physical activity facility in the area. Having mixed or black skin color and being divorced/separated/widowed had a negative association with healthy behavior. Gender was not associated to healthy behavior (Table 1).

Young adults with healthy behaviors less frequently reported excess alcohol intake and consumption of fatty meat and/or poultry and whole milk. They also reported less current dieting and dieting in the 12 months prior to the interview (Table 2).

Healthy behavior was negatively associated with self-perceived health status, and a gradient was seen in this association. There was no association between healthy behavior and obesity, hypertension, and diabetes (Table 3).

In the multivariate analysis, healthy behavior was more common among adults aged 25–29 years with 9–11 and  $\geq 12$  years of schooling and who reported physical activity facility in their area. An inverse association was found with mixed or black skin color, consumption of whole milk and fatty meat and current dieting. A negative association remained between healthy behavior and self-perceived health status (Table 4).

## DISCUSSION

The study results showed low prevalence of healthy behaviors among young adults studied. Healthy behavior was influenced by sociodemographic characteristics (gender, age, schooling, and marital status), availability of a physical activity facility in the neighborhood and self-perceived health status. In addition, it was negatively associated to other health behaviors such as risk alcohol consumption.

**Table 1.** Healthy behavior according to sociodemographic characteristics and availability of physical activity facility in the neighborhood among young adults aged 18–29. Brazil, 2006. (N=14,193)

Variable	Healthy behavior % (95% CI)	p-value	PR (95% CI)
Gender			
Male	7.4 (6.3;8.7)		1
Female	8.6 (7.3;10.0)	0.2038	1.16 (0.92;1.45)
Age groups (years)			
18 to 24	7.0 (6.0;8.2)		1
25 to 29	9.7 (8.2;11.3)	0.0044	1.39 (1.11;1.74)
Schooling (years)			
0 to 8	4.9 (3.5;6.7)		1
9 to 11	7.8 (6.8;9.0)		1.61 (1.13;2.28)
12 and +	16.6 (14.3;19.1)	<0.0001	3.40 (2.39;4.85)
Skin color <sup>a</sup>			
White	11.2 (9.6;13.2)		1
Mixed	6.0 (5.1;7.0)		0.53 (0.42;0.67)
Black	6.4 (3.9;10.3)	<0.0001	0.57 (0.34;0.95)
Marital status			
Single	7.9 (7.1;8.9)		1
Married	8.6 (6.4;11.3)		1.08 (0.80;1.47)
Divorced/separated/widowed	3.3 (1.5;7.0)	0.2244	0.42 (0.19;0.90)
Employment status (employed)			
No	8.1 (7.0;9.4)		1
Yes	7.7 (6.5;9.1)	0.6213	0.95 (0.76;1.18)
Physical activity facility			
No	8.8 (7.7;9.9)		1
Yes	5.4 (4.1;6.9)	0.0006	1.64 (1.23;2.19)

<sup>a</sup> Information available for 13,181 young adults

The prevalence of adequate physical activity was close to that found in other studies with young adults but the rate of non-smokers was higher. Fruit and vegetable intake could not be compared to other studies including young adults as they assessed daily intake. In a national survey investigating risk behaviors in the United States, 78% of respondents aged 18–24 consumed less than five servings of fruits and vegetables a day, 43% reported inadequate physical activity and 29% were smokers.<sup>24</sup> Among German college students, it was found that more than 95% consumed less than five servings of fruits and vegetables a day, 60% had inadequate physical activity and 31% were smokers.<sup>13</sup>

Smoking prevalence in the sample studied was also lower than that found among young adults in Chile<sup>5</sup> and other Latin American countries.<sup>23</sup> This lower rate reflects a trend of reduced smoking prevalence in Brazil resulting from successful anti-smoking public policies that have been implemented for the last 20 years. Current ban of smoking in bars and restaurants can further reduce smoking prevalence among

young adults. Studies have demonstrated that young adults are more responsive to anti-smoking actions than older adults, especially when they have to face increasing barriers that prevent them from smoking.<sup>7</sup> A systematic review on the effectiveness of anti-smoking interventions among young adults showed higher success rates of combined individual and institutional/community-based initiatives despite the small number of controlled studies and different approaches.<sup>7</sup>

Fighting smoking is key due to its harmful health effect and association with other risk factors. A prospective study investigating women aged 20–29 showed increased risk of excess alcohol consumption among smokers, and this risk was even higher among those with sex initiation at the age of 15.<sup>18</sup> The association found in the present study between healthy behavior and lower alcohol consumption supports this finding.

Healthy eating and adequate physical activity are behaviors learned during childhood but reinforced during adolescence.<sup>3</sup> In the present study, the finding of a large proportion of young adults with inadequate

**Table 2.** Healthy behavior according to lifestyle factors in young adults aged 18–29. Brazil, 2006. (N=14,193)

Variable	Healthy behavior % (95% CI)	p-value	PR (95% CI)
Excess alcohol intake			
No	5.7 (4.4;7.4)		1
Yes	8.6 (7.6;9.7)	0.0046	0.66 (0.50;0.89)
Regular consumption of fatty meat			
No	10.0 (8.8;11.4)		1
Yes	5.6 (4.5;7.0)	<0.00001	0.56 (0.43;0.73)
Consumption of whole milk			
No	10.4 (8.7;12.3)		1
Yes	6.5 (5.7;7.4)	0.0001	0.63 (0.50;0.79)
Current dieting			
No	14.6 (10.8;19.4)		1
Yes	7.1 (6.3;8.0)	<0.00001	0.49 (0.35;0.67)
Dieting in the last 12 months <sup>a</sup>			
No	11.5 (8.6;15.3)		1
Yes	6.6 (5.8;7.5)	0.0006	0.57 (0.42;0.79)

<sup>a</sup>Information available for 12,487 young adults

eating habits points toward widespread fast food consumption, great availability of industrialized foods, and high cost and difficult preservation of fresh foods. Moreover, healthy behavior was found to be inversely associated to the consumption of fatty meat and whole milk. Despite the existing initiatives to promote healthy eating in Brazil, problems such

as income, the increasing practice of eating out and the low adherence to healthy food in workplace and school cafeterias are all barriers to changes of eating habits.

In Brazil, food insecurity is paradoxically associated with higher rates of obesity, especially among women,

**Table 3.** Healthy behavior according to health indicators in young adults aged 18–29. Brazil, 2006. (N=14,193)

Variable	Healthy behavior % (95% CI)	p-value	PR (95% CI)
Self-perceived health status <sup>a</sup>			
Excellent	12.5 (9.8;15.8)		1
Good	8.5 (7.4;9.9)		0.68(0.52;0.90)
Fair	4.5 (3.4;5.8)		0.36 (0.25;0.51)
Poor	1.4 (0.6;3.4)	<0.0001	0.11 (0.04;0.28)
Hypertension			
No	8.1 (7.2;9.1)		1
Yes	6.0 (4.0;8.9)	0.1531	0.74 (0.49;1.12)
Diabetes			
No	8.0 (7.1;8.9)		1
Yes	10.0 (3.8;2.4)	0.6391	1.26 (0.49;3.23)
Obesity (BMI $\geq$ 30 kg/m <sup>2</sup> ) <sup>b</sup>			
No	8.1(7.3;9.1)		1
Yes	7.2 (4.4;11.6)	0.6260	0.88 (0.54;1.45)
Overweight (25<BMI<30 kg/m <sup>2</sup> ) <sup>b</sup>			
No	7.7 (6.8;8.8)		1
Yes	9.1 (7.3;11.2)	0.2069	1.17 (0.92;1.50)

<sup>a</sup>Information available for 14,165 young adults

<sup>b</sup>Information available for 13,329 young adults

BMI: Body mass index

**Table 4.** Multivariate analysis of healthy behavior characteristics in young adults aged 18–29. Brazil, 2006. (N=14,154)

Characteristics	Healthy behavior	
	PR	(95% CI)
Age groups (years)		
18 to 24	1	
25 to 29	1.28	(1.02;1.60)
Schooling (years)		
0 to 8	1	
9 to 11	1.51	(1.08;2.10)
≥12	2.32	(1.61;3.32)
Skin color		
White	1	
Mixed	0.70	(0.55;0.87)
Black	0.70	(0.41;1.17)
Physical activity facility		
No	1	
Yes	1.56	(1.18;2.07)
Excess alcohol intake		
No	1	
Yes	0.71	(0.54;0.93)
Regular consumption of fatty meat		
No	1	
Yes	0.68	(0.53;0.87)
Consumption of whole milk		
No	1	
Yes	0.72	(0.58;0.90)
Current dieting		
No	1	
Yes	0.51	(0.38;0.70)
Self-perceived health status		
Excellent	1	
Good	0.70	(0.55;0.90)
Fair	0.42	(0.30;0.59)
Poor	0.14	(0.06;0.36)

and changes are only likely to occur with policies for preventing poverty and reducing inequalities.<sup>8,14</sup>

The positive impact of nutritional education among low-income families was demonstrated in a controlled community study, which showed that an intervention including information and cooking classes increased fruit and vegetable intake.<sup>10</sup>

Physical activity can reduce lifetime morbidity. Despite being aware of that, many people claim they lack time, feel embarrassed to engage in collective physical activities or inapt to engage in exercises, and find it not pleasurable.<sup>1,2</sup> Physical activity is also influenced by

opportunities and resources available. In the present study, the availability of adequate physical activity facility in the neighborhood had a positive effect on healthy behavior. A study with health service users found that living near areas suitable for walking and biking increases the chances of engaging in physical activity.<sup>22</sup> And people engaging in physical activity in a community encourage other people to do that.<sup>20</sup>

Our results indicate that healthy behaviors among young adults were associated to their level of education and skin color. A study with young Finnish adults reported that schooling was the most strongly associated factor to smoking.<sup>15</sup> In the United Kingdom, healthier behaviors among children and young adults was found to be positively associated with more favorable socioeconomic conditions.<sup>4</sup> In contrast with other studies,<sup>11,21</sup> we did not find an association between employment status and healthy behavior.

In Finland, an increased prevalence of metabolic syndrome was seen among young adults aged 24–39, especially among males.<sup>15</sup> VIGITEL and other population-based surveys carried out in Brazil will allow monitoring trends of risk behavior prevalence in the long run and targeting specific measures to this group.

Telephone-based surveys have the advantage of lower cost and greater access to remote places. However, there is a disadvantage regarding representativeness of respondents because access to fixed telephone lines is not universal in Brazil and poor population can be underrepresented. Fixed telephone coverage rates in Brazil ranges between 31.4% and 89.9% in the lowest and highest quintiles, respectively, of per capita family income distribution of households in the cities participating in VIGITEL.<sup>20</sup> In this sense, it was identified in the United States lower participation of young adults in telephone-based surveys possibly due to increasing use of cellular phones among them.<sup>16</sup> In Brazil,<sup>4</sup> the effect of telephone coverage on prevalence estimates in population-based surveys was minimal in metropolitan areas with coverage equal to or greater than 70% in the southeastern, southern, and central-western regions. But low telephone coverage in households in the northern and northeastern regions can result in biased estimates that do not correspond to the realities studied. Hence, although a weighting factor was applied to approach the sample's sociodemographic composition to that of the population in the analysis, it was decided not to stratify data per region in the present study.

Despite the relevance of different participation due to local characteristics, high response rate seen in VIGITEL contributed to good quality of data. Bearing in mind that healthy behaviors are even less prevalent

among poor people who usually do not have fixed telephone lines at home, the prevalence of healthy behaviors found in this study may be overestimated, which makes it even more concerning.

Due to its cross-sectional design, the study does not allow any inferences on causality. But it is crucial to know the characteristics associated to healthy behaviors for identifying groups with specific needs and guiding public policies for adequate monitoring of these behaviors.

Declining morbidity and mortality rates due to cardiovascular diseases seen worldwide is a result of prevention actions and better health care.

However, many CNCD determinants cannot be tackled with standard medical care. Only 4% of premature deaths occur due to inadequate care while 40% of them are attributed to individual behaviors

such as dietary patterns, physical activity, smoking, consumption of alcohol and recreational drugs, and sexual behavior.<sup>17</sup>

The finding of a small proportion of young adults engaging in healthy behaviors points to the need to promote positive lifestyle changes among young adults. These actions can only be effective if access to healthy behaviors is also increased and facilitated. Many prevention initiatives with impact on health rely on policies that are implemented outside the health sector such as taxes on tobacco products, regulation of food products, public safety policies, and investments to increase access to leisure and physical activities.<sup>17</sup> As young adults' personal preferences are also strongly influenced by culture of immediate, easy, and purchasable pleasure,<sup>17</sup> understanding the social, cultural, and anthropological aspects related to healthy behaviors is also critical for successful prevention strategies.

## REFERENCES

1. American College of Sports Medicine Position Stand. Exercise and physical activity for older adults. *Med Sci Sports Exerc.* 1998;30(6):992-1008.
2. Andersen RE. Exercise, an Active lifestyle and obesity. *Phys Sportsmed.* 1999;27(10):32-41.
3. Batty DG, Leon DA. Socio-economic position and coronary heart disease risk factors in children and young people. Evidence from UK epidemiological studies. *Eur J Public Health.* 2002;12(4):263-72. DOI:10.1093/eurpub/12.4.263
4. Bernal R, Silva NN. Cobertura de linhas telefônicas residenciais e vícios potenciais em estudos epidemiológicos. *Rev Saude Publica.* 2009;43(3):421-6. DOI:10.1590/S0034-89102009005000024
5. Bustos P, Amigo H, Arteaga A, Acosta AM, Rona RJ. Factores de riesgo de enfermedad cardiovascular en adultos. *Rev Med Chil.* 2003;131(9):973-80.
6. Chen K, Kandel DB. The natural history of drug use from adolescence to mid-thirties in a general population sample. *Am J Public Health.* 1995;85(1):41-7.
7. Delnevo CD, Gundersen DA, Hagman BT. Declining estimated prevalence of alcohol drinking and smoking among young adults nationally: artifacts of sample undercoverage? *Am J Epidemiol.* 2008;167(1):15-9. DOI:10.1093/aje/kwm313
8. Dinour LM, Bergen D, Yeh MC. The food insecurity-obesity paradox: a review of the literature and the role food stamps may play. *J Am Diet Assoc.* 2007;107(11):1952-61. DOI:10.1016/j.jada.2007.08.006
9. Elo IT, Preston SH. Effects of early-life conditions on adult mortality: a review. *Popul Index.* 1992;58(2):186-212. DOI:10.2307/3644718
10. Jaime PC, Machado FMS, Westphal MF, Monteiro CA. Educação nutricional e consumo de frutas e hortaliças: ensaio comunitário controlado. *Rev Saude Publica.* 2007;41(1):154-7. DOI:10.1590/S0034-89102006005000014
11. Hammarström A. Health consequences of youth unemployment. *Public Health.* 1994;108:403-12.
12. Kannel WB, Wilson PW. Comparison of risk profiles for cardiovascular events: implications for prevention. *Arc Intern Med.* 1997;42:39-66.
13. Keller S, Maddock JE, Hannöver W, Thyrian JR, Basler HD. Multiple health risk behaviors in German first year university students. *Prev Med.* 2007;46(3):189-95. DOI:10.1016/j.ypmed.2007.09.008
14. Martin KS, Ferris AM. Food insecurity and gender are risk factors for obesity. *J Nutr Educ Behav.* 2007;39(1):31-6. DOI:10.1016/j.jneb.2006.08.021
15. Mattsson N, Rönnemaa T, Juonala M, Viikari JS, Raitakari OT. The prevalence of the metabolic syndrome in young adults. The cardiovascular Risk in Young Finns Study. *J Intern Med.* 2007;261(2):159-69. DOI:10.1111/j.1365-2796.2006.01752.x
16. McCracken M, Jiles R, Blanck HM. Health behaviors of the young adult U.S. population: behavioral risk factor surveillance system, 2003. *Prev Chronic Dis.* 2007;4(2):A25.
17. McGinnis MJ, William-Russo P, Knickam JR. The case for more active policy attention to health promotion. *Health Aff (Millwood).* 2002;21(2):78-93. DOI:10.1377/hlthaff.21.2.78
18. Morgen CS, Bové KB, Larsen KS, Ger Kjær SK, Grønbæk M. Association between smoking and the risk of heavy drinking among young women: a prospective study. *Alcohol Alcohol.* 2008;43(3):371-5. DOI:10.1093/alcalc/agn001
19. Moura EC, Neto OLM, Malta DC, Moura L, Silva NN, Bernal R. Vigilância de Fatores de Risco para Doenças Crônicas por Inquérito Telefônico nas capitais dos 26 estados brasileiros e no Distrito Federal (2006). *Rev Bras Epidemiol.* 2008;11(Supl 1):20-37. DOI:10.1590/S1415-790X2008000500003
20. Pierce Jr JR, Denison AV, Arif AA, Rohrer JE. Living near a trail is associated with increased odds of walking among patients using community clinics. *J Community Health.* 2006;31(4):289-302. DOI:10.1007/s10900-006-9014-8
21. Reine I, Novo M, Hammarström A. Does the association between ill health and unemployment differ between young people and adults? Results from a 14-year follow-up study with a focus on psychological health and smoking. *Public Health.* 2004;118:337-45.
22. Ross C. Walking, exercising, and smoking: does neighborhood matter? *Soc Sci Med.* 2000;51(2):265-74. DOI:10.1016/S0277-9536(99)00451-7
23. Schargrodsky H, Hernández-Hernández R, Champagne BM, Silva H, Vinuesa R, Silva Açaguer LC, et al. CARMELA: assessment of cardiovascular risk in seven Latin American cities. *Am J Med.* 2008;121(1):58-65. DOI:10.1016/j.amjmed.2007.08.038
24. Solberg LI, Boyle RG, McCarty M, Asche SE, Thoele MJ. Young adult smokers: are they different? *Am J Manag Care.* 2007;13(11):626-32.
25. Yusuf S, Hawken S, Ounpuu S, Dans T, Avezum A, Lanas F, et al. Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study. *Lancet.* 2004;364(9438):937-52. DOI:10.1016/S0140-6736(04)17018-9

SM Barreto e VMA Passos foram apoiados pelo Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq – nº 300908/95 e 300159/99-4, respectivamente; bolsa de produtividade em pesquisa).

L Giatti foi apoiada pela Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES; bolsa PRODOC).

This article underwent the peer review process adopted for any other manuscript submitted to this journal, with anonymity guaranteed for both authors and reviewers. Editors and reviewers declare that there are no conflicts of interest that could affect their judgment with respect to this article.

The authors declare that there are no conflicts of interest.