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Determinants of self-rated health and the influence of healthy behaviors: results from the National Health Survey, 2013

Determinantes da autoavaliação de saúde no Brasil e a influência dos comportamentos saudáveis: resultados da Pesquisa Nacional de Saúde, 2013

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ABSTRACT: ***Objective:*** To investigate the determinants of self-rated health in Brazil and the influence of healthy lifestyles. ***Methods:*** We used data from the National Health Survey (PNS), 2013. The self-rated health was categorized as very good/good, fair, and poor/very poor. Differences in the distribution of self-rated health according to the age group and sex were tested. Logistic regression models were used to test the effects of educational level, race/skin color, and the presence of at least one noncommunicable chronic disease on poor/very poor health perception. In addition, the influence of healthy behaviors was tested controlling for the effects of sociodemographic factors and the presence of at least one chronic disease. ***Results:*** We analyzed 60,202 individuals; about 66.1% rated their health as very good/good and 5.9% as poor/very poor; about 47.1% reported the diagnosis of at least one noncommunicable chronic disease; and only 9.3% reported a "healthy lifestyle" (do not use tobacco products, consume fruits and vegetables properly, and do physical activity during leisure time). Among the sociodemographic factors, age, sex, educational level, and race were significantly associated with self-rated health and the presence of at least one chronic disease. The effects of all healthy behaviors were statistically significant even after controlling for the other determinants. ***Conclusion:*** Although the adoption of healthy lifestyles in Brazil is still insufficient, the association of healthy practices with self-perception of health found in this study is an indication that the Brazilian population is beginning to relate healthy behaviors to their well-being and better health evaluation.

Keywords: Data collection. Morbilidad. Epidemiologic factors. Chronic disease. Healthy lifestyles. Brazil.

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RESUMO: ***Objetivo:*** Investigar os determinantes da autoavaliação de saúde (AAS) no Brasil e a influência dos comportamentos saudáveis. ***Métodos:*** Foram usados os dados da Pesquisa Nacional de Saúde (PNS) de 2013. A AAS foi categorizada em muito boa/boa, regular, ruim/muito ruim. Foram testadas diferenças na distribuição da AAS segundo faixa de idade e sexo e foram usados modelos de regressão logística para investigar os efeitos de grau de escolaridade, raça/cor e presença de pelo menos uma doença crônica não transmissível (DCNT) sobre a AAS ruim/muito ruim. Adicionalmente, testou-se a influência dos comportamentos saudáveis, controlando-se os efeitos dos fatores sociodemográficos e presença de pelo menos uma DCNT. ***Resultados:*** Foram analisados 60.202 indivíduos, 66,1% avaliaram o seu estado de saúde como muito bom/bom, e 5,9%, como ruim/muito ruim; 47,1% referiram o diagnóstico de pelo menos uma DCNT; e apenas 9,3% disseram ter "estilo de vida saudável" (não usa produtos de tabaco, consome frutas e hortaliças e pratica atividade física no lazer). Entre os fatores sociodemográficos, idade, sexo, grau de escolaridade e raça mostraram associações significativas com a AAS, bem como a presença de pelo menos uma DCNT. Os efeitos de todos os comportamentos saudáveis foram significativos, mesmo após o controle dos demais determinantes. ***Conclusão:*** Embora a adoção dos comportamentos saudáveis no Brasil ainda seja insuficiente, a associação dos hábitos saudáveis com a percepção da saúde encontrada neste estudo é um indício de que a população brasileira já começa a relacionar os comportamentos saudáveis ao seu bem-estar e à avaliação melhor da saúde.

Palavras-chave: Inquérito. Morbidade. Determinantes epidemiológicos. Doenças crônicas. Comportamentos saudáveis. Brasil.

INTRODUCTION

Historically, the studies meant to establish that the health status of a population was based on mortality indicators. However, the increased longevity in developed countries brought the need for developing new health indicators, which would include measures of quality of life[1]. Because a long life does not necessarily mean a healthy one, it is, nowadays, a consensus that mortality indicators are not enough in order to properly characterize the status of a population's health[2,3].

Over the past decades, different health indicators that considered morbidity and the disabilities and functional limitations have been proposed in order to complement the studies on mortality[4-6]. In the health surveys, the self-rated health (SRH) has been widely used in order to describe the health status of a population[7], to establish the differences of morbidity in populational subgroups, to compare the needs for services and health resources by geographic areas, and to calculate other mortality and morbidity indicators such as the hope of a healthy life[8-11].

The individual perception of the health status has been considered as an important indicator by itself, because the level of welfare of an individual may influence their lifestyle[12]. On the other hand, the utility of the SRH also comes from its validity, established by their relations with the clinical conditions and with morbidity and mortality indicators[13,14].

Researches have demonstrated that the perception of health, frequently, agrees with the evaluation made by the doctor[15]. In terms of mortality, because researchers confirmed the association between bad SRH and the increased risk of premature death still in the 1980s[16,17], several studies have demonstrated that a bad health perception is an important predictor of lower survival[18-20]. While the "objective" evaluation of the health status of an individual, from the medical point of view, refers to the identification of a disease indicated by a set

of signals, symptoms, and laboratory results, the SRH is subjective, combining physical, emotional, and well-being and life satisfaction components[21,22]. Besides that, studies indicate that a poor health self-perception may occur even in the absence of diagnosis of a disease, suggesting that there are feelings that create a bad perception of one's own health before medical identification of the disease[23].

Brazil is currently going through a period of epidemiological transition, with an expressive growth of chronic noncommunicable diseases (NCDs)[24]. In the new scenario, efforts are being made for the promotion of healthy behaviors[25,26] not only in order to support the policies of prevention of chronic disease but also to improve the quality of life of the Brazilian population.

Using the data from the National Health Survey (*Pesquisa Nacional de Saúde*—PNS) of 2013, this study possessed the objective of investigating the SRH of Brazilians, in order to identify the main sociodemographic determinants, establishing the difference by the occurrence/absence of diagnosis of at least one chronic disease, and analyzing the influence of healthy behaviors in the perception of the health status.

METHODOLOGY

The PNS was a home-based research carried out by the Ministry of Health and the Oswaldo Cruz Foundation in partnership with the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística* – IBGE) in the years of 2013 and 2014. The project was approved by the National Research Ethics Commission (CONEP) in June 2013.

The sample of the PNS is a subsample of the Master Sample of the Integrated System of Household Surveys (*Sistema Integrado de Pesquisas Domiciliares* – SIPD) from IBGE[27]. It was selected by cluster sampling in three stages, with stratification of the primary sampling units (PSUs). In the first stage, for each stratum, the selection of the PSUs was performed by simple random sampling. In the second stage, for each PSU, a fixed number of households were selected in a random manner. In the third stage, for each household, a resident aged 18 years or older was randomly selected.

In total, 81,254 households were visited, of which 69,994 households were occupied. A total of 64,348 household interviews were performed and 60,202 with the selected residents.

In this study, the information of the individual questionnaire was analyzed. The analysis of the SRH was based on the following questions: "In general, how do you evaluate your health?" The answers varied from 1 (very good) to 5 (very bad), which were grouped in three categories (very good/good; regular; and bad/very bad).

The following sociodemographic characteristics were considered: gender (male; female); age range (18 – 29; 30 – 39; 40 – 49; 50 – 59; 60 – 69; and 70+ years); education degree (no instruction/incomplete elementary school; complete elementary school/incomplete high school; complete high school/incomplete college degree; and complete college degree); and race/color (Caucasian/white; black; brown; and other).

The variable presence/absence of a NCD consisted of answers to all the questions related to the diagnosis of chronic diseases: "Has any doctor ever diagnosed you with _____?",

including hypertension, diabetes, heart diseases, stroke (AVC), asthma, arthritis, chronic spine problem, musculoskeletal disorder related to work (MSD), depression, other mental disorder, lung disease, cancer, chronic kidney failure, and other chronic physical or mental disease not previously specified. The presence of NCD was considered when there was at least one affirmative answer and the absence of it when all the answers were negative.

For the analysis of the influence of healthy behaviors on the SRH, the following habits were considered: smoking (currently smokes any tobacco product; has already smoked a tobacco product; and has never smoked); physical activity in leisure (practice of physical activity in leisure at the recommended level – 150 minutes or more of light/moderate physical activities or 75 minutes or more in vigorous physical activity a week); and recommended consumption of vegetables and fruits (consumption of vegetable and fruit at least 5 times a day). In addition, a variable called "healthy lifestyle" was composed, adding up people who possess all the healthy habits.

A statistical application was used, which takes into account the effect of the sampling plan. For the SRH associations, test with the groups of age and gender and the χ^2-homogeneity tests were used. For a multivariate analysis, models of logistic regression were used, presenting as variables the self-assessment answer bad/very bad and as independent variables age, gender, education degree, race/color, and the presence of at least one NCD. In addition to that, the effects of healthy behaviors were tested with controlled sociodemographic factors and the presence of some NCD.

RESULTS

A total of 60,202 individuals investigated by the PNS were analyzed (47.1% male and 52.9% female subjects) (Table 1). The age varied from 18 to 101 years, with a mean value of 43 years and median of 41 years. The distribution by age range showed that 81.9% of them were aged between 18 and 59 years and 18.1% aged 60 years or older.

The results by education degree showed that 38.9% of them do not possess complete elementary school degree and that 12.8% of them possessed a complete college degree. In relation to the color of the skin/race, 47.5% of them reported themselves as white/Caucasian, 42.0%, brown, and 9.2%, black (Table 1).

In relation to one's health self-perception, 66.1% of them evaluated their health as very good or good; 28% as regular; and 5.9% as bad or very bad. Among all the individuals investigated in the PNS, 47.1% reported the diagnosis of at least one chronic disease (Table 1).

As for the healthy behaviors evaluated, 14.7% of them currently smoke tobacco products, 17.5% of them have already smoked a tobacco product, and 67.8% of them have never smoked; 37.3% consumed the recommended amount of fruits and vegetables; and about 22.5% of them practiced physical activity in leisure time at the recommended level. However, on the basis of the data in Table 1, it may be observed that only 9.3% of them possessed a "healthy lifestyle" (did not use tobacco products, consumed an adequate intake of fruits and vegetables, and practiced physical activities in leisure at the recommended level) (Table 1).

Table 1. Distribution of individuals by sociodemographic characteristics, health self-assesment, diagnosis of at least one chronic noncommunicable disease and healthy behaviors. National Health Survey, Brazil, 2013.

Variables	n	%
Gender		
Male	28,357	47.1
Female	31,845	52.9
Age range (years)		
18 – 29	15,701	26.1
30 – 39	13,020	21.6
40 – 49	10,872	18.0
50 – 59	9,742	16.2
60 – 69	6,129	10.2
70 and older	4,738	7.9
Education degree		
Incomplete elementary school	23,438	38.9
Complete elementary school/incomplete high school	9,347	15.5
Complete high school/complete college degree	19,749	32.8
Complete college degree and more	7,668	12.8
Race/color		
Causasian/white	28,573	47.5
Black	5,536	9.2
Brown	25,272	42.0
Other	821	1.3
Self-rated health		
Very good/good	39,810	66.1
Regular	16,887	28.0
Bad/very bad	3,507	5.9
Diagnosis of at least one NCD		
Yes	28,346	47.1
No	31,856	52.9
Intake of fruit and vegetable		
Yes	37,478	37.3
No	22,724	62.7
Practice of physical activity in leisure		
Yes	46,682	22.5
No	13,520	77.5
Smoking of any tobacco product		
Current	8,855	14.7
Past	10,509	17.5
Never smoked	40,838	67.8
Healthy lifestyle		
Yes	54,586	9.3
No	5,616	90.7

NCD: chronic noncommunicable disease.

In Table 2, the distributions of self-evaluation of the health status according to gender and age range are presented. The comparison by age range shows a significant gradient ($p < 0.001$) with the increasing age: the proportion to the very good/good SRH decreases from 81.6%, among people between 18 and 29 years of age, to 41.4%, in the group of those who are 70 years or older. The differences by gender were also observed. The self-perception of health is always worse among women, regardless of their age range. On average, the difference in the proportion of the good/very good SRH for female subjects (62.4%) in relation to that found for male subjects (70.3%) is almost 8%.

Table 2. Distribution of individuals by categories of self-rated health, according to gender and age range. National Health Survey, Brazil, 2013.

Gender/Age range (years)	Self-rated health						p-value
	Very good/good		Regular		Bad/very bad		
	n	%	n	%	n	%	
Male							
18 – 29 years	6,630	85.2	1,021	13.1	131	1.7	
30 – 39 years	4,873	78.5	1,188	19.1	147	2.4	
40 – 49 years	3,449	69.4	1,272	25.6	249	5.0	
50 – 59 years	2,742	58.9	1,600	34.4	315	6.7	< 0.001
60 – 69 years	1,320	49.3	1,104	41.2	254	9.5	
70 years and older	910	44.1	889	43.1	263	12.8	
Total	19,924	70.3	7,074	24.9	1,359	4.8	
Female							
18 – 29 years	6,184	78.1	1,583	20.0	151	1.9	
30 – 39 years	4,951	72.7	1,600	23.5	261	3.8	
40 – 49 years	3,607	61.1	1,884	31.9	411	7.0	
50 – 59 years	2,548	50.1	2,010	39.5	528	10.4	< 0.001
60 – 69 years	1,546	44.8	1,497	43.4	408	11.8	
70 years and older	1,050	39.2	1,239	46.3	387	14.5	
Total	19,886	62.4	9,813	30.8	2,146	6.8	
Total							
18 – 29 years	12,814	81.6	2,604	16.6	283	1.8	
30 – 39 years	9,824	75.5	2,788	21.4	408	3.1	
40 – 49 years	7,056	64.9	3,156	29.0	660	6.1	
50 – 59 years	5,289	54.3	3,610	37.1	843	8.6	< 0.001
60 – 69 years	2,866	46.8	2,600	42.4	662	10.8	
70 years and older	1,960	41.4	2,128	44.9	651	13.7	
Total	39,809	66.1	16,886	28.0	3,507	5.9	

The results of the logistic regression models are presented in Table 3, showing as variable answer, the bad/very bad self-assessment, showed, first, that all sociodemographic factors considered in the study possessed significant effects ($p < 0.01$). As for age, a direct association was evidenced, that is, the older the individual, the higher the bad perception percentage of their own health. As for the differences by gender, women revealed worse SRH than men, and in relation to race/color, the non-Caucasian/white individuals showed a poorer evaluation of their health than that by the Caucasian/white people. The effects of the education degree were highly significant. The odds ratio (OR) of showing a bad/very bad evaluation of their own health was nine times higher among those who possessed incomplete elementary school degree, when compared with those who completed college degree, and seven times higher in the model adjusted by age, gender, race/color, and the presence of at least one NCD.

The results presented in Table 3 show, additionally, the significant effects ($p < 0.01$) of the presence of NCDs on the bad/very bad SRH. The OR was 5.3 times higher among individuals who were diagnosed with at least one of the NCD, when compared with the others, even after the control of sociodemographic factors.

On the other hand, the multivariate logistic regression model presented in Table 4 shows the influence of healthy behaviors on the SRH. Inverse and statistically significant associations were evident for the physical activity at the recommended level and for the adequate

Table 3. Results of the univariate and multivariate models of logistic regression showing the outcome of very bad/bad self-rated health. National Health Survey, Brazil, 2013.

Variables	Crude OR (95%CI)	Adjusted OR (95%CI)
Gender		
Male	1.00	1.00
Female	1.44 (1.28 – 1.61)*	1.23 (1.09 – 1.38)**
Age	1.04 (1.04 – 1.04)*	1.01 (1.01 – 1.02)*
Education degree#		
1	8.98 (6.78 – 11.88)*	6.39 (4.77 – 8.55)*
2	2.50 (1.82 – 3.42)*	2.60 (1.89 – 3.58)*
3	1.68 (1.23 – 2.29)**	1.95 (1.43 – 2.66)*
4	1.00	1.00
Color or race		
White/caucasian	0.68 (0.60 – 0.76)*	0.70 (0.61 – 0.80)*
Nonwhite/caucasian	1.00	1.00
At least one NCD		
Yes	7.56 (6.38 – 8.96)*	5.34 (4.48 – 6.36)*
No	1.00	1.00

*p-value < 1%; **p-value < 5%.
#1-No instruction/incomplete elementary school; 2-Complete elementary school/incomplete high school; 3-Complete high school/incomplete college degree; 4-Complete college degree and more. OR: odds ratio; 95%CI: confidence interval of 95%; NCD: chronic noncommunicable disease.

Table 4. Effect of the healthy behaviors and the variable "healthy lifestyle" on the very bad/bad self-assessment controlled by gender, age, education degree, and race/color and diagnosis of a chronic noncommunicable disease. National Health Survey, Brazil, 2013.

Variables	Crude OR (95%CI)	Adjusted OR[##] (95%CI)	Adjusted OR[###] (95%CI)
Gender			
Male	1.00	1.00	1.00
Female	1.44 (1.28 – 1.61)*	1.29 (1.14 – 1.46)*	1.23 (1.09 – 1.38)**
Age	1.04 (1.04 – 1.04)*	1.01 (1.01 – 1.02)*	1.01 (1.01 – 1.02)*
Education degree[#]			
1	8.98 (6.78 – 11.88)*	5.16 (3.85 – 6.93)*	5.83 (4.36 – 7.80)*
2	2.50 (1.82 – 3.42)*	2.26 (1.64 – 3.12)*	2.45 (1.78 – 3.36)*
3	1.68 (1.23 – 2.29)**	1.81 (1.32 – 2.47)*	1.86 (1.37 – 2.54)*
4	1.00	1.00	1.00
Color or race			
White/caucasian	0.68 (0.60 – 0.76)*	0.71 (0.62 – 0.81)*	0.70 (0.61 – 0.80)*
Nonwhite/caucasian	1.00	1.00	1.00
At least on NCD			
Yes	7.56 (6.38 – 8.96)*	5.27 (4.43 – 6.27)*	5.37 (4.51 – 6.40)*
No	1.00	1.00	1.00
Intake of vegetable and fruit			
Yes	0.79 (0.70 – 0.88)*	0.86 (0.76 – 0.97)**	–
No	1.00	1.00	
Physical activity in leisure			
Yes	0.26 (0.21– 0.31)*	0.45 (0.36 – 0.55)*	–
No	1.00	1.00	
Smoking			
Current	1.98 (1.71 – 2.30)*	1.51 (1.28 – 1.77)*	–
Past	2.04 (1.78 – 2.33)*	1.19 (1.03 – 1.37)**	
Never	1.00	1.00	
Healthy lifestyle			
Yes	0.25 (0.18 – 0.35)*	–	0.39 (0.27 – 0.56)*
No	1.00		1.00

*p-value < 1%; **p-value < 5%.
[#]1-No instruction/incomplete elementary school; 2-Complete elementary school/incomplete high school; 3-Complete high school/incomplete college degree; 4-Complete college degree and more. [##]Considering the three healthy behaviors.[###]Considering the variable "healthy lifestyle".
OR: odds ratio; 95%CI: confidence interval of 95%; NCD: chronic noncommunicable disease.

intake of fruits and vegetables with the bad/very bad perception of one's own health, while the effects of smoking, both for current or past use of tobacco products, were directly associated with the outcome ($p < 0.001$), even after the control of sociodemographic factors and the diagnosis of at least one NCD.

DISCUSSION

The results of the World Health Survey (WHS), a populational-based household survey carried out in Brazil in 2003, evidenced a proportion of very good/good self-assessment of 53%, varying from 47% among women and 60% among men[28]. Ten years later, using exactly the same question used in the previous research, the PNS showed a much higher proportion of good perception for both genders: 66% for the total sample, 62% among women, and 70% among men. By considering the aging Brazilian population and the expressive growth of NCD, this result is, apparently, paradoxical.

In fact, in this study, 47% of the interviewed people reported the diagnosis of at least one NCD. Among these people, the percentage of very good/good self-assessment was significantly lower (48.4%) in relation to the people who did not report the diagnosis of chronic diseases (81.9%). Thus, a likely explanation for the increase in the proportion of Brazilians who assessed their health as very good or good is in the improvement of the quality of life of the Brazilian population in terms of socioeconomic conditions and health assistance[29]. Recent national studies have pointed out the influence of the improvement of socioeconomic conditions and the impact of the reduction of income inequality and the progress made in health attention on the morbidity and mortality indicators[30,31].

Such hypothesis is supported by the large association found in the PNS among the sociodemographic characteristics and the SRH. International and national works had already indicated the effects of socioeconomic conditions on the perception of the health status[32-35]. In complete education, material difficulties, lower social status, and work situation, in addition to environmental factors, have proven themselves as important determinants in health self-perception, following a negative gradient to the poorest social groups[36-39].

Among the socioeconomic indicators, the level of education has been, probably, the most used, being considered more stable than the occupational situation and the outcome, which may vary over time[40]. However, one of the limitations of this study is that the household income *per capita* is still not available for analysis. As pointed out[34], the level of income reflects not only the material needs of life, such as the possibility of having good nutrition and adequate housing, but also it is a social welfare marker.

Another important result of this study was the positive effect of the healthy behaviors considered here: the fact of not smoking, the practicing of physical activities, and the adequate intake of fruit and vegetable. The influence of the lifestyle in the good health self-perception occurred both among people who did not report any NCD and among those who reported at least one disease. Healthy habits effects have also been evidenced in many countries[41-45].

The adoption of healthy behaviors has been growing in Brazil. Notable, for example, is the decrease in the use of tobacco products in Brazil[46], as a result of public policies against smoking, such as the prohibition of its publicity and advertizement, the prohibition of smoking in enclosed places, the limited exposure of products in sales outlets, the warning messages in the packages, and the increased taxes[47]. Individuals who currently use tobacco products may be evaluating their health poorly not only because of some health problem but also for being informed on the harmful effects of smoking. The PNS showed that 52% of current smokers thought about quitting smoking owing to the warnings in the cigarette packages[48] (data not presented in this work).

Efforts are being made, additionally, in order to encourage the practice of physical activities, such as the Health Academy Program (*programa Academia da Saúde*)[49]. Although the benefit of physical activity practice in leisure and the intake of five portions or more of fruits and vegetables are properly recognized for the prevention of various chronic diseases[50], the adoption of these behaviors by the Brazilian population is, without a doubt, not enough.

CONCLUSION

Although the adoption of healthy lifestyles is still little frequent in the Brazilian population, the association of healthy behaviors with the perception of health found in this study, even with the control of the effects of socioeconomic factors and with the presence of at least one NCD, is an indication that the Brazilian population is starting to relate healthy lifestyles to their well-being and to a better assessment of their health.

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