Marco Aurélio Peres[I]

Anelise Viapiana Masiero[II]

Giana Zabarto Longo[II]

Gino Chaves da Rocha[II]

Izabella Barison Matos[II]

Kathie Najnie[III]

Maria Conceição de Oliveira[II]

Marina Patrício de Arruda[II]

Karen Glazer Peres[I]

Self-rated health among adults in Southern Brazil

ABSTRACT

OBJECTIVE: To analyze factors associated with self-rated health in adults.

METHODS: A population-based, cross-sectional study was performed with a sample of 2,051 adults aged between 20 and 59 years, in the city of Lages, Southern Brazil, in 2007. Household questionnaires were applied to obtain data on self-rated health, socioeconomic and demographic conditions, smoking habit, lifestyle and self-reported morbidities. Blood pressure, weight, height and abdominal circumference were measured. multivariable analysis was performed using Poisson regression, adjusted for the sampling design effect and stratified by sex.

RESULTS: Prevalence of positive self-rated health was 74.2% (95% CI: 71.3;77.0), significantly higher in men (82.3%, 95%CI: 79.3;85.0) than in women (66.9%, 95%CI: 63.2;70.7). Poorer, less educated and older men showed higher prevalences of negative self-rated health. After adjustment, high blood pressure levels and reporting chest wheezing were strongly associated with negative self-rated health in men. Prevalence of negative self-assessment was higher in poorer, less educated and older women and in those who showed abdominal obesity. High blood pressure levels, diabetes, chest wheezing and shortness of breath remained associated with the outcome after adjustment in women. The number of morbidities self-reported by women and men showed an association with negative self-rated health.

CONCLUSIONS: Women and individuals who were older, poorer or less educated considered their health condition to be fair or poor. The higher the number of self-reported morbidities, the greater the proportion of individuals with negative self-rated health; the effect of morbidities was greater in women.

DESCRIPTORS: Adult. Self Assessment (Psychology). Life Style. Body Weights and Measures. Socioeconomic Factors. Health Knowledge, Attitudes, Practice. Health Surveys.

[I] Programa de Pós-Graduação em Saúde Coletiva. Centro de Ciências da Saúde. Universidade Federal de Santa Catarina. Florianópolis, SC, Brasil

[II] Centro de Ciências da Saúde. Universidade do Planalto Catarinense. Lages, SC, Brasil

[III] Fundação Oswaldo Cruz. Rio de Janeiro, RJ, Brasil

Correspondence:
Marco Aurélio Peres
Programa de Pós-Graduação em Saúde Coletiva
Centro de Ciências da Saúde
Universidade Federal de Santa Catarina
Campus Universitário Trindade
88010-970 Florianópolis, SC, Brasil
E-mail: mperes@ccs.ufsc.br

INTRODUCTION

Self-rated health has been used in population health surveys because it can be easily applied and it has a high level of validity and reliability. Such assessment is a marker of inequalities among population subgroups, it shows high levels of predictive values of morbimortality and it enables international comparisons to be made.[11,21] Individuals with a negative self-rated health had a relative risk of death almost two times higher than those who considered their health as excellent.[7]

Self-rated health is a subjective measure that combines physical and emotional aspects and one's level of satisfaction with life. Individual perception of health is an important indicator *per se*, once individual levels of well-being can influence quality of life.[19]

Population-based studies on self-rated health are important to know health conditions and to monitor them throughout time. They allow the assessment of effectiveness of health policies, actions and services. Self-rated health can be incorporated into the health surveillance system due to its relatively easy feasibility.

Studies on self-rated health are recommended by the World Health Organization (WHO)[3] and some population-based studies performed in Brazil have followed the WHO recommendations, such as the 2003 World Health Survey,[20] the health module of the 1998 and 2003 National Household Sample Survey (PNAD)[1,5,6] and the state of São Paulo Health and Life Condition Survey.[a]

In view of the importance of such population-based research, the present study aimed to analyze factors associated with self-rated health in adults.

METHODS

A cross-sectional study was performed in the city of Lages, in the state of Santa Catarina, Southern Brazil, between May and October 2007. In 2005, the population of this city totaled 166,733 inhabitants, 97.4% of whom lived in its urban area.[b] In 2000, Lages had a municipal human development index (HDI-M) of 0.813, coming in 74th place among the 293 cities of the state of Santa Catarina and 315th place among the 5,564 Brazilian cities.[c] The representative sample was comprised of 2,051 adults aged between 20 and 59 years (in complete years), living in an urban area (52% of the city's total population).[b] The present study is part of a broader health survey with several outcomes investigated, where a specific sample size calculation, sufficient to estimate the prevalence of self-rated health, was made for each outcome. A 95% confidence level, prevalence of fair and poor self-rated health of 25%,[d] sampling error of 3.5% and a design effect equal to two were adopted. A total of 10% was added to the sample size to compensate for losses and refusals and 20% to control possible confounding factors in the multivariable analysis, totaling 1,531 individuals. A 95% confidence level, power of 80%, expected outcome (negative self-rated health) in the non-exposed group of 20%, ratio between the number of exposed and non-exposed individuals of 20:80 and minimum relative risk to be detected of 1.6 were adopted. The required minimum sample size to analyze these associations was 722 individuals. Analyses were stratified by sex. The EpiInfo software, version 6.04, was used to calculate sample size.

Sample was selected using a two-stage cluster sampling scheme. First, 60 of the 186 census tracts of Lages were randomly selected using a random sampling scheme without replacement. Next, a block was randomly selected and, on it, a corner was thus selected as the starting point of households to be visited, with the field work beginning clockwise. A total of 34 individuals and 17 households were included per census tract.

Exclusion criteria included institutionalized individuals (those staying in prisons, hospices, or hospitals), amputees, bedridden individuals, those with casts, those who could not remain in the adequate position for the required anthropometric measurements and those who were considered handicapped, thus unable to answer the questionnaire. Losses corresponded to residents in randomly selected households that were visited at least four times by the research team, including a minimum of one visit on weekends and another at night time, when the examiner/interviewer could not locate the selected person or when they refused to participate.

Household visits were conducted by ten pairs of interviewers, all supervised. Field interviewers were trained and remained unaware of the study objectives. Data were collected using face-to-face interviews and included the taking of participants' blood pressure in two moments (at the beginning and end of the application of questionnaire) and anthropometric measurements. Training and a pre-test of the questionnaire with 30 adults aged between 20 and 59 years, living in an area covered by a local health unit, were conducted. The pilot study was performed with 90 individuals in one of the randomly selected census tracts. This research project was widely promoted by the local media (most popular radio station, television and local newspaper), aiming to increase adherence. Data collection quality control was performed in 10% of the sample, using telephone interviews conducted by one of the supervisors.

The outcome of the study was self-rated general health, obtained through the following question: "Compared to people of your age, how would you rate your health in general?". "Excellent", "very good" and "good" responses were grouped in the positive self-rated health category, whereas "fair" and "poor" responses were grouped in the negative self-rated health category.

Independent variables included socio-demographic variables, health-related behavior and habits, blood pressure and anthropometric measurements, and

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[a] Cesar CLG, Carandina L, Alves MCGP, Barros MBA, Goldbaum M. Saúde e condição de vida em São Paulo. Inquérito multicêntrico de saúde no Estado de São Paulo – ISA-SP. São Paulo: USP/FSP; 2005.

[b] Instituto Brasileiro de Geografia e Estatística. Estimativas de população. [cited 2007 Jan 15] Available from: http://www.ibge.gov.br/home/estatistica/populacao/estimativa2009/default.shtm

[c] Programa das Nações Unidas para o Desenvolvimento. Atlas do Índice de Desenvolvimento Humano. [cited 2009 Jan 10] Available from: www.pnud.org.br/atlas/tanking/IDH-M

[d] Instituto Brasileiro de Geografia e Estatística. Pesquisa Nacional por Amostra de Domicílio: acesso e utilização de serviços de saúde: 2003. Rio de Janeiro: IBGE; 2005.

self-reported health morbidities. Socio-demographic variables were: age (20 to 29, 30 to 39, 40 to 49 and 50 to 59 years); level of education (≤ 4, 5 to 8, 9 to 11, ≥ 12 complete years); per capita family income in *reais*, calculated as the sum of the previous month income, divided by the number of residents in the house (one minimum wage was equivalent to R$ 380.00 or approximately U$ 211.00 at the time of this study), and categorized according to quartiles (0.026-0.500; 0.510–0.880; 0.890–1.580; 1.590–19.740); self-reported ethnicity (black, mixed, white, Asian, indigenous); and marital status (with a partner and without a partner).

Health-related behavior and habits included smoking (non-smoker, former smoker, and current smoker;[22] level of physical activity (sufficient, ≥ 150 minutes/week, and insufficient, <150 minutes/week), measured by the short version in Portuguese of the International Physical Activity Questionnaire (IPAQ);[10] and problems with alcohol, surveyed with the Cut Down, Annoyed, Guilty, Eye-opener (CAGE) Questionnaire, previously validated in Brasil.[15] Individuals who showed CAGE values ≥ 1 were those considered to have problems associated with alcohol use.

Blood pressure levels were measured at the beginning and end of questionnaire application (at least ten minutes) and the second measurement was considered. Measurements were carried out with the interviewee in a sitting position, with feet on the floor, left arm resting on a table at the level of the heart and palm facing upward. Electronic equipment with a digital reading system (Techline®), which had been adequately calibrated, was used to measure blood pressure levels. Systolic and diastolic pressure levels were categorized into normal and high. Individuals with a systolic pressure >140 mmHg (PAS>140 mmHg) and/or diastolic pressure >90 mmHg (PAD>90 mmHg), or hypertensive individuals who had been regularly using anti-hypertensive drugs were considered to have high blood pressure levels.[4] Body weight was measured with individuals wearing light clothes, barefoot, in an upright position, with the feet together and arms extended alongside the body, with the palms facing the legs. Weight was measured using portable digital scales (Tanita®) with a 0.1 kg accuracy and 150 kg capacity; participants were weighed only once. Height was taken by fixing an inelastic measuring tape on a vertical surface without a skirting board, at a height of 100 cm from the floor, with the use of adhesive tape. Individuals were measured without their shoes, wearing nothing on their heads, standing with their heels together and these, gluteal region, shoulders and head touching the vertical surface of the wall, and looking straight ahead while breathing in. Weight and height were used to calculate the body mass index (BMI). Individuals were categorized as follows: eutrophic (BMI < 25 kg/m^2), overweight (25.0 kg/m$^2 \leq$ BMI ≤ 29.9 kg/m^2) or obese

(BMI ≥ 30 kg/m^2).[22] Measurement of the natural line with the smallest waist circumference was taken with the use of the same measuring tape, with the individual standing and while breathing out. Cut-off values for normality were ≤ 102 cm in men and ≤ 88 cm in women, considering individuals with values higher than these to have abdominal obesity.[18]

Participants were asked about a medical diagnosis of diabetes mellitus, self-reported wheezing in the last 12 months, breathlessness while walking fast on a straight surface or gentle slope, and diagnosis of chronic bronchitis.[17]

The occurrence of episodes of toothache in the six months prior to interview and the number of natural teeth present in each jaw (ten natural teeth or more; fewer than ten natural teeth; no natural teeth) were also assessed.

A variable that combines all self-reported general health and oral conditions was created and categorized as follows: none, one, two, or three or more self-reported morbidities.

Data were entered in duplicate in the Epi-Info software, version 6.04, by previously trained keyboarders. After verifying the reliability of data, statistical analyses were carried out using the STATA statistical package, version 9.0.

All analyses were adjusted for the sample design effect and weighted by frequency of sex, and weights were determined by the ratio between the proportions of sexes in the city population, obtained from the Instituto Brasileiro de Geografia e Estatística (IBGE – Brazilian Institute of Geography and Statistics) and the sample. Descriptive statistics of variables of the sample population were performed and chi-square and linear trend tests were used, when appropriate, to estimate the associations between the outcome and each independent variable. Multivariable analysis was performed using Poisson regression, with the estimation of prevalence ratios for negative self-rated health and respective 95% confidence intervals. Analyses followed a theoretical model of determination, divided into three hierarchical groups of variables. The first, more distal group was comprised of socioeconomic and demographic variables that, hypothetically, influenced group 2 variables – behavioral factors. These, in their turn, influenced group 3's clinical variables, which, finally, had an influence on the outcome of this study. Variables with p<0.20 in the bivariate analysis were selected for the multivariable analysis. First, the variables in group 1 were included in the analysis. Next, the variables in group 2, adjusted among themselves and for group 1 variables, were included in the multiple model. Finally, group 3 variables were included in the model and adjusted among themselves and for groups 1 and 2 variables.

This research project was approved by the Research Ethics Committee of the Universidade do Planalto Catarinense, under protocol 001/2007, in November 2006. Participants in this study signed an informed consent form.

RESULTS

Response rate was 98.6%, which represents 2,022 individuals, of which 61.5% were women. Estimated general prevalence of positive self-rated health was 74.2% (95% CI: 71.3;77.0); among men, this prevalence was 82.3% (95% CI: 79.3;85.0), while, among women, 66.9% (95% CI: 63.2;70.7).

In both sexes, there was a greater proportion of younger individuals, with higher income and level of education and whose ethnicity was white or Asian, who rated their health as positive than those who were poorer, less educated and either black or indigenous. Among men, the absence of a partner was associated with positive self-rated health, whereas ethnicity did not show statistical significance. The highest proportion of positive self-rated health was observed in men with level

of education equal to or higher than 12 years (91.1%), while the lowest proportion was among women with four or less years of study (44.7%) (Table 1).

More non-smoking and eutrophic individuals rated their health as positive. Among men, only smoking was associated with negative self-rated health. The proportion of positive self-rated health was higher in those who had never smoked, followed by former smokers and, last of all, current smokers. To be physically active did not achieve statistical significance with positive self-rated health in men. Among women, in addition to smoking, nutritional status and waist circumference were associated with negative self-rated health. Women who were overweight and obese and those with abdominal obesity considered their health to be negative (Table 2).

The lowest proportions of individuals who rated their health as positive were found in adults with high blood pressure levels, those who reported having diabetes, wheezing, breathlessness, bronchitis and a lower number of natural teeth present. The higher the number of morbidities, the lower the proportion of individuals with positive self-rated health (Table 3).

Table 1. Positive self-rated health, according to demographic and socioeconomic characteristics in adults. City of Lages, Southern Brazil, 2007.

Variable	All (n=2,022)			Men (n=779)			Women (n=1,243)		
	n	%	p	n	%	p	n	%	p
Positive self-rated health (n = 2,002)	1,472	74.2		640	82.3		832	66.9	
Ethnicity (n=2,017)[a]			0.001			0.057			<0.001
White and Asian	969	77.7		421	84.0		548	70.9	
Black, mixed and indigenous	499	67.5		216	78.5		283	60.5	
Per capita household income (n=1,984)[b]			<0.001			<0.001			<0.001
4th quartile	404	87.0		182	89.2		222	84.4	
3rd quartile	392	77.4		177	84.7		215	70.3	
2nd quartile	347	71.0		153	80.1		194	62.8	
1st quartile	300	61.3		116	71.6		184	54.1	
Level of education (years)(n=1,995)[b]			<0.001			<0.001			<0.001
≥ 12	406	89.3		164	91.1		242	87.7	
9 to 11	505	83.6		225	88.9		280	78.2	
5 to 8	369	66.6		182	77.4		187	55.7	
≤ 4	176	50.6		63	60.6		113	44.7	
Age group (years) (n=2,018)[b]			<0.001			<0.001			<0.001
20 to 29	522	84.7		233	89.6		288	79.6	
30 to 39	350	80.0		151	86.3		199	74.0	
40 to 49	356	69.0		144	78.7		212	61.4	
50 to 59	240	58.5		109	69.0		131	49.4	
Marital status (n=2,017)[a]			0.032			0.009			0.273
With a partner	1,410	72.7		442	80.1		565	65.9	
Without a partner	607	77.4		197	87.2		263	69.0	

[a] Chi-square test; [b] Linear trend test.

Table 2. Positive self-rated health, according to health-related habits, nutritional status and waist circumference in adults. City of Lages, Southern Brazil, 2007.

Variable	All (n=2,022)			Men (n=779)			Women (n=1,243)		
	n	%	p	n	%	p	n	%	p
Alcohol problems (n=2,022)[a]			0.293			0.412			0.340
No	1,296	73.8		495	82.8		801	67.2	
Yes	176	77.0		145	80.1		31	60.8	
Smoking (n= 1,935)[a]			<0.001			0.002			<0.001
Has never smoked	845	78.8		341	86.8		504	72.3	
Former smoker	221	69.6		112	78.9		109	59.2	
Current smoker	402	68.5		185	76.4		217	60.6	
Nutritional status (n=1,969)[a]			<0.001			0.317			<0.001
Eutrophic	649	78.6		266	83.6		383	74.1	
Overweight	493	74.9		249	82.5		244	65.9	
Obese	296	66.1		118	79.7		178	56.7	
Waist circumference (n= 1,987)[a]			0.338			0.338			<0.001
Without abdominal obesity	886	80.0		511	82.7		375	75.2	
With abdominal obesity	557	65.1		119	79.3		438	60.8	
Physical activity (n=1,935)[a]			0.153			0.061			0.249
Sufficient	998	75.3		427	83.9		571	67.8	
Insufficient	409	71.3		187	78.2		222	64.3	

[a] Chi-square test

Table 4 shows the crude and adjusted prevalence ratios between negative self-rated health and variables in men. Among socioeconomic and demographic variables, the following were associated with negative self-rated health: per capita income, level of education and age. Poorer, less educated and older men had higher prevalences of negative self-rated health, when compared to richer, more educated and younger ones. Smoking and physical activity lost their association with each other when adjusted for socioeconomic and demographic variables. Among the morbidities analyzed, the following continued to be associated with negative self-rated health after adjustment: having high blood pressure levels and reporting wheezing, whereas breathlessness was on the borderline of association. The number of morbidities was strongly associated with negative self-rated health. Prevalence ratios varied between 2.3 and 5.0 in men with one morbidity and those with three or more morbidities, respectively.

Among women, negative self-rated health was strongly associated with per capita household income, level of education and age. Prevalence of negative self-rated health was higher in poorer, less educated and older women and those who had abdominal obesity. These associations remained after adjustment for more distal variables. Among associated morbidities in the crude analysis, only high blood pressure levels, diabetes, wheezing and breathlessness remained associated with the outcome after adjustment. Like men, the number of morbidities was strongly associated with negative self-rated health (Table 5).

DISCUSSION

A total of ¾ of the population studied rated their health as positive, with significant differences according to sex, age, income and level of education. Older, poorer and less educated individuals and women considered their health to be worse. The higher the number of self-reported comorbidities, the greater the proportion of individuals with negative self-rated health. The magnitude of effect of morbidities in women was higher than in men. These results are in accordance with those from the World Health Survey performed in Brazil and the 1998 National Household Sample Survey.[1,5,20,21]

Levels of education interfere with the perception of health, understanding of information about health promotion and prevention, adoption of healthy lifestyles, adherence to therapeutic treatments and use of health services.[e] By selecting a response, the participant indicates their general health status, considering the physical, social and psychological/mental dimensions. Studies suggest that the physical dimension seems to have more influence on self-rated health.[f]

[e] Ministério da Saúde Comissão Nacional sobre Determinantes Sociais de Saúde. As causas sociais das iniqüidades em saúde no Brasil: relatório final. Brasília, DF; 2008.
[f] Barros MBA. Auto-avaliação de saúde. In: Cesar CLG, Carandina L, Alves MCGP, Barros MBA, Goldbaum M. Saúde e condição de vida em São Paulo. Inquérito multicêntrico de saúde no Estado de São Paulo – ISA-SP. São Paulo: USP/FSP; 2005. p.173-82.

Table 3. Positive self-rated health, according to high blood pressure levels and self-reported morbidities in adults. City of Lages, Southern Brazil, 2007.

Variable	All			Men			Women		
	n	%	p	n	%	p	n	%	p
Blood pressure levels (n=2,016)[a]			<0.01			<0.01			<0.01
Normal	1,041	79.3		416	86.7		625	73.3	
High	426	64.4		222	74.7		204	52.8	
Diabetes (n=2,012)[a]			<0.01			0.01			<0.01
No	1,402	76.1		612	83.2		790	69.5	
Yes	62	46.5		24	61.5		38	38.0	
Wheezing (n=2,019)[a]			<0.01			<0.01			<0.01
No	1,255	79.2		557	86.6		698	72.0	
Yes	215	53.9		82	60.7		133	48.9	
Breathlessness (n=1,933)[a]			<0.01			<0.01			<0.01
No	1,044	84.5		501	86.8		543	81.5	
Yes	376	55.7		113	66.5		263	50.6	
Symptoms of bronchitis (n=2,008)[a]			<0.01			<0.01			<0.01
No	1,420	75.9		618	83.9		802	68.5	
Yes	49	48.9		20	51.3		29	46.8	
Natural teeth present (n=2,018)[b]			<0.001			<0.01			<0.01
≥ 20	1,054	82.6		484	86.6		570	78.1	
10 a 19	247	69.6		104	80.6		143	60.9	
<10	168	47.0		50	56.2		118	42.8	
Joint effects (n=1,905)[b]			<0.001			<0.001			<0.001
No morbidities	460	93.2		217	94.8		243	91.4	
1 morbidity	507	80.5		232	84.1		275	76.6	
2 morbidities	278	69.9		105	78.4		173	63.8	
3 or more morbidities	154	42.7		50	51.5		104	38.1	

[a] Chi-square test; [b] Linear trend test.

The effect of self-rated health on the risk of death varies according to the level of education and income. Poor self-rated health is strongly associated with mortality in adults with high level of education and/or income.[8] The results of this study agree with those of Dachs,[5] who found that 70% of individuals belonging to the first decile of income had a positive self-rated health, whereas this value totaled 87% among those in the upper decile. Higher income is associated with the acquisition of assets and products, including medications, greater access to leisure activities and greater work autonomy, aspects related to health. Individuals with a higher level of education reported multidimensional aspects such as feelings of physical and psychological well-being, being physically active and not having diseases, when compared to those who were less educated. These tend to assess their health by associating it with physical and functional aspects.[12]

The prevalence of negative self-rated health increased significantly with age, as exemplified by what occurred with the results of the State of São Paulo Multicenter Health Survey (ISA-SP).[f] In the present study, younger individuals considered their health to be good. Among these, there was a different in perception according to sex; men rated their health in a more positive way. The proportion of positive self-rated health in women in the 30-to-39-year age group was similar to that of men in the 40-to-49-year age group. By using more health services, women can have a greater proportion of diagnoses of diseases and report more complaints than men.[14-16]

The percentages of dissatisfaction with one's own health increased with age in women, thus corroborating the results of Brazilian[1,21] and international studies.[2,13,g] Smoking, physical activity, diabetes, symptoms of bronchitis and number of natural teeth present lost statistical significance when adjusted for groups of distal

Table 4. Association between negative self-rated health and demographic, socioeconomic variables, health-related types of behavior and self-reported morbidities in adult men. City of Lages, Southern Brazil, 2007.

Variable	Crude			Adjusted		
	PR	95% CI	p	PR	95% CI	p
Ethnicity[a]			0,049			0,306
Black, mixed, indigenous	1,3	1,0;1,8		1,2	0,9;1,6	
Per capita household income[a]			<0,001			0,044
3rd quartile	1,4	0,9;2,2		1,3	0,8;1,9	
2nd quartile	1,8	1,2;2,8		1,6	1,0;2,5	
1st quartile	2,6	1,6;4,2		1,8	1,0;3,2	
Level of education (years)[a]			<0,001			0,001
9 to 11	1,2	0,7;2,3		1,2	0,6;2,1	
5 to 8	2,5	1,5;4,2		1,9	1,0;3,3	
≤ 4	4,4	2,7;7,2		2,6	1,4;4,8	
Age (years)[a]			<0,001			0,001
30 to 39	1,2	0,8;2,1		1,1	0,6;1,8	
40 to 49	2,1	1,3;3,3		1,6	1,0;2,7	
50 to 59	3,0	2,0;4,5		2,4	1,4;3,9	
Marital status[a]			0,012			0,682
Without a partner	0,6	0,5;0,9		1,1	0,7;1,6	
Smoking[b]			0,004			0,131
Former smoker	1,6	1,0;2,6		1,1	0,7;1,9	
Current smoker	1,8	1,2;2,6		1,3	0,9;2,0	
Physical activity[b]			0,087			0,075
Insufficient	1,4	1,0;1,9		1,3	1,0;1,8	
Blood pressure levels[c]			<0,001			0,047
High	1,9	1,4;2,6		1,5	1,0;2,2	
Diabetes[c]			0,001			0,793
Yes	2,3	1,4;3,6		1,2	0,7;2,0	
Wheezing[c]			<0,001			0,004
Yes	2,9	2,1;4,0		1,7	1,2;2,5	
Breathlessness[c]			<0,001			0,057
Yes	2,5	1,9;3,4		1,4	1,0;2,0	
Symptoms of bronchitis[c]			<0,001			0,224
Yes	3,0	2,0;4,5		1,4	0,8;2,4	
Natural teeth present			<0,001			0,182
10-19	1,4	1,1;2,0		0,8	0,5;1,2	
< 10	3,3	2,4;4,4		1,4	0,9;2,2	
Joint effects[d]			<0,001			<0,001
1 morbidity	3,0	1,6;6,0		2,3	1,2;4,5	
2 morbidities	4,1	1,9;8,8		2,7	1,3;5,3	
3 or more morbidities	9,2	4,7;18,1		5,0	2,5;10,1	

[a] Distal variables, adjusted among themselves; [b] Intermediate variables, adjusted among themselves and for group 1 variables; [c] Proximal variables, adjusted among themselves and for groups 1 and 2 variables; [d] Proximal variable, adjusted for groups 1 and 2 variables.

variables, suggesting that these factors act as mediators between social conditions and self-rated health.

The major sources of bias in cross-sectional studies are associated with selection and reverse causality or temporal bias. The hypothetical theoretical model adopted simulates a determination model, although it is not possible to guarantee that the chain of determination established actually occurred. This theoretical exercise is preferable to the mere entry of variables according

Table 5. Association between negative self-rated health and demographic and socioeconomic variables, health-related types of behavior and self-reported morbidities in adult women. City of Lages, Southern Brazil, 2007.

Variable	Crude			Adjusted		
	PR	95% CI	p	PR	95% CI	p
Ethnicity[a]			0,001			0,230
Black, mixed, indigenous	1,4	1,1;1,6		1,1	0,9;1,3	
Per capita household income[a]			<0,001			<0,001
2nd quartile	1,9	1,3;2,8		1,7	1,2;2,5	
3rd quartile	2,4	1,7;3,3		1,9	1,3;2,8	
4th quartile	2,9	2,1;4,2		2,1	1,5;3,0	
Level of education (years)[a]			<0,001			<0,001
9-11	1,8	1,1;2,8		1,5	0,9;2,5	
5-8	3,6	2,4;5,4		2,4	1,5;3,8	
≤ 4	4,5	3,0;6,7		2,6	1,6;4,1	
Age (years)[a]			<0,001			<0,001
30 to 39	1,3	1,0;1,6		1,0	0,8;1,3	
40 to 49	1,9	1,5;2,4		1,6	1,3;1,9	
50 to 59	2,5	2,0;3,1		1,9	1,5;2,4	
Smoking[b]			<0,001			0,160
Former smoker	1,5	1,2;1,9		1,1	0,9;1,4	
Current smoker	1,4	1,2;1,7		1,1	1,0;1,4	
Nutritional status[b]			<0,001			0,975
Overweight	1,3	1,1;1,6		0,9	0,7;1,1	
Obese	1,7	1,4;2,0		1,0	0,7;1,3	
Waist circumference[b]			<0,001			0,034
With abdominal obesity	1,6	1,4;1,8		1,3	1,1;1,6	
Blood pressure levels[c]			<0,001			0,042
High	1,8	1,5;2,1		1,2	1,0;1,4	
Diabetes[c]			<0,001			0,009
Sim	2,0	1,7;2,4		1,3	1,1;1,6	
Chiado no peito[c]			<0,001			0,006
Yes	1,8	1,6;2,1		1,3	1,1;1,5	
Wheezing[c]			<0,001			<0,001
Yes	2,7	2,2;3,3		1,9	1,5;2,4	
Breathlessness[c]			<0,001			0,976
Yes	1,7	1,3;2,2		1,0	0,7;1,4	
Symptoms of bronchiti[c]			<0,001			0,298
10 to 19	1,8	1,4;2,3		1,2	0,9;1,6	
<10	2,6	2,1;3,2		1,2	0,9;1,6	
Joint effects[d]			<0,001			<0,001
1 morbidity	2,7	1,8;4,0		2,2	1,5;3,1	
2 morbidities	4,2	2,8;6,3		2,8	1,9;4,3	
3 or more morbidities	7,2	5,0;10,3		4,2	2,9;6,1	

[a] Distal variables, adjusted among themselves; [b] Intermediate variables, adjusted among themselves and for group 1 variables; [c] Proximal variables, adjusted among themselves and for groups 1 and 2 variables; [d] Proximal variable, adjusted for groups 1 and 2 variables.

to mostly statistical criteria. In the present study, a representative sample of the population aged between 20 and 59 years of the city and a response rate higher than 90% were obtained, in addition to the sample being homogeneously distributed among age groups. However, the proportion of women in the sample was

higher than that of the population, thus leading to the decision of performing global analyses weighted by sex. All data collection instruments adopted in this study have been validated and used in Brazil and abroad. Likewise, measure instruments (weight, height and blood pressure) were calibrated. The data collection team was trained and standardized and this collection underwent quality control, which contributed to the internal validity of the study.

The literature on the theme adopts different forms of outcome categorization. The *Inquérito de Saúde do Estado de São Paulo* (for individuals aged more than 60 years) used the Medical Outcome Study 36-item Short Form Health Survey (SF 36), validated in Brazil. According to Theme-Filha,[21] studies based on health interviews in Barcelona, Spain, and the 1998 PNAD used the following categories: very good, good, fair, poor and very poor, similarly to those adopted by the 2003 World Health Survey in Brazil (very good, good, average, poor and very poor). In the 1996 National Health Interview Survey and Current Population Survey, conducted in the United States, and in the Health and Social Survey, conducted in Quebec, Canada, the alternatives were the same adopted in the present study,[21] whereas the longitudinal study in electrical and gas workers in France (GAZEL study) used a scale with eight categories, ranging from very good to very poor.[9] These methodological differences hinder comparisons among studies.

Older, poorer and less educated individuals and women rate their health as fair or poor. The higher the number of self-reported morbidities, the greater the proportion of individuals with negative self-rated health; among women, the effect of morbidities is greater. It is recommended that self-rated health be integrated with the health surveillance system, once it can be obtained with relative simplicity when population surveys are performed.

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