The structure of self-rated health among older adults: the Bambuí health and ageing study (BHAS)

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Aging. Aged, socioeconomic factors. Habits. Living conditions. Health conditions. Health services accessibility. Self-rated health.

Abstract

Objective
To determine factors associated with self-rated health among older adults, considering five dimensions: sociodemographic variables, social support, lifestyle risk factors, health status, and access to/use of healthcare services.
Methods
Of the 1,742 older adults (³60 years) living in the town of Bambuí (southeastern Brazil), 1,516 (87.0%) participated in the study. Information was obtained by means of standardized interviews and physical and laboratory exams.
Results
Self-rated health as good/very good, reasonable, and poor/very poor was reported by 24.7%, 49.2%, and 26.1% of subjects, respectively. The following characteristics showed independent positive associations with worse self-rated health: social ties (dissatisfaction with social network, attendance to clubs and associations), health status (symptoms of depression/anxiety in the last two weeks, sleeplessness in the last 30 days, greater number of prescribed medications used in the last 30 days), and access to/use of healthcare services (complaints when seeking medical care, greater number of medical appointments in the last 12 months, greater number of hospital admissions in the last 12 months). An independent negative association was found with monthly family income (<2.0 *vs* ≥4 minimum wages).
Conclusions
Our results show that self-rated health among older adults is multidimensional in structure, being influenced by socioeconomic conditions, social support, health status (with emphasis on mental health), and access to/use of healthcare services. This structure resembles the definition of health adopted by the World Health Organization (an individual's "physical, mental and social well-being").

INTRODUCTION

The rapid ageing of the population, in both developed and developing countries, has led to a search for simple indicators of health status capable of being used in both health surveys and etiological studies. Self-rated health, determined by means of a simple question – "*Generally speaking, how do you consider your health?*" – or by other equivalent questions, is one of the indicators most used in gerontological surveys, since it provides a robust and consistent predictor for mortality and functional decline.[11] Self-rated health is a better predictor of mortality than objective measures of health status.[11] This reflects an individual's integrated perception of him or herself, which includes biological, psychosocial, and social

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dimensions. [12] Moreover, self-rated health shows good reliability and its validity is equivalent to that of other more complex measures of health status. [19]

In Brazil, few population-base studies have evaluated the distribution of self-rated health among older adults. The most comprehensive data on this subject were collected in the health supplement of the *Pesquisa Nacional por Amostras de Domicílio* (National Household Sample Survey), conducted in 1998 by the *Fundação Instituto Brasileiro de Geografia e Estatística* (Brazilian Institute for Geography and Statistics – IBGE). A study carried out using data from this survey showed that only 24.5% of the elderly population in Brazil rated their own health as good or very good. [16] However, this result must be interpreted cautiously, since the perception of health involves a subjective judgment, which cannot be determined by another person. In the aforementioned survey, 38% of the interviews with older adults were answered by another person. Prior epidemiological studies conducted in Brazil showed that the percentage of older adults that considered their own health as good/very good varied, being of 25% in Bambuí, [17] 44% in Rio de Janeiro, [26] and 70% in São Paulo. [21] To our knowledge, there are no Brazilian studies addressing the factors associated with self-rated health among older adults.

The present study is part of the baseline of a population-based cohort of older adults, and is aimed at determining factors associated with the self-rating of health, considering five dimensions: (a) sociodemographic aspects, (b) social ties, (c) lifestyle , (d) health status, and (e) access to and use of healthcare services.

METHODS

Study area

The municipality of Bambuí is located in the state of Minas Gerais, southeastern do Brazil, at approximately 240 kilometres from state capital Belo Horizonte. At the time of the survey, the municipality's population was 20,573 inhabitants, 73% of which lived in the town. There was one physician for every 1,000 inhabitants and no institutions for the elderly. Life expectancy was 70 years. Major causes of death in the municipality were stroke , Chagas' disease, ischemic heart disease, and chronic obstructive pulmonary disease (mortality rates =110.0; 61.4; 42.5, and 18.9 per 100,000 population, respectively). Bambuí was formerly an endemic area for Chagas' disease, but transmission of the infection by *Trypanosoma cruzi* was interrupted about 20 years ago. Thus mortality by Chagas' disease remains high in this population due to the cohort effect. Further details are described in Lima-Costa et al[17,18] (2000, 2001).

Study population

The study participants were identified based on the complete census of the study area , conducted by our team between November and December 1996. All residents =60 years old as of January 1st 1997 were selected for participation in the study. Of the 1,724 inhabitants in this age group, 92.2% were interviewed and 85.6% were examined (blood tests, blood pressure measurement, and electrocardiogram). Data collection was carried out between January and August 1997. The participants of physical and laboratory exams were similar to the town's population in all aspects considered – namely: age, sex, number of inhabitants in the household, marital status, family income, and schooling. [17] All baseline participants were selected for the present study.

Interview

The following variables – the information for which was obtained at the baseline interview – were considered in the present study: (a) self-rated health *"Considering the last six months, would you say that your health is very good, good, reasonable, poor, or very poor?"*; (b) sociodemographic characteristics (age, sex, schooling, family income, marital status, number of generations living in the household); (c) social ties (attendance to clubs and/or associations, attendance to religious cults, satisfaction with social network); (d) lifestyle (current smoking, alcohol consumption in last 12 months, physical activity during leisure time in last 90 days, fresh fruit or vegetable consumption in last 12 months); (e) disability (inability to perform one or more of the following activities of daily living : bathing, dressing, moving from bed to chair, eating and using the toilet); (f) other indicators of health status (psychological distress in last 15 days, sleeplessness in last 30 days, number of prescribed drugs used in last 90 days, number of non-prescribed drugs used in last 90 days); and (g) indicators of access to and use of healthcare services (main complaints when seeking medical care, number of medical appointments in last 12 months, number of hospital admissions in last 12 months). For further details, see Lima-Costa et al[17] (2000).

Monthly family income was determined by querying the respondent about the total monthly gross income of the household. Family income was categorized into terciles, and the low-income group was defined as the lower tercile (<2.0 minimum wages).

In order to evaluate psychological distress in last 15 days , a version of the 12 questions in the *General Health Questionnaire*.[6] The cutoff point employed was =4. The version used in the present study has been validated in Brazil previously.[20] Insomnia was defined as the presence of any complaint in the last 30 days (difficulty in initiating sleep, disrupted sleep, and/or early morning awakening), at least three times during the week, with any level of inconvenience.[22]

Interviews were conducted by members of the community, selected from among those with at least 11 completed years of schooling. When the respondent was unable to answer to the interview due to cognitive deficit or other health problem, another proxy respondent was used. All interviews responded by a proxy were not considered in the present study. The reliability of the interview was determined by reiterating a random sample of questions from the original questionnaire to 10% of the participants.[17]

Physical measurements and laboratory exams

Blood pressure measurements were carried out with the subject seated, after a five-minute resting period and after at least 30 minutes without caffeine ingestion or smoking. Three measurements were performed, the first of which was discarded. Arterial pressure was considered as the mean of the second and third measurements. For the present analysis, the cutoff points considered were 130 mm/Hg for systolic pressure and 85 mm/Hg for diastolic pressure. Anthropometric measurements were performed with the subject wearing light clothing. Only waist circumference was considered in the present analysis. Cutoff points were 102 cm and 88 cm for men and women respectively. Laboratory exams were performed on blood samples collected after a 12-hour fasting period. The following cutoff points were employed: 110 mg/dl for glycemia, 150 mg/dl for triglycerides, 40 mg/dl for HDL cholesterol in men and 50 mg/dl in women. We considered subjects as suffering from metabolic syndrome when showing increased values in at least three of the five components (waist circumference, triglycerides, HDL cholesterol, blood pressure, and glycemia), considering the cutoff points defined above.[3]

Serological exams for *T. cruzi* infection were performed by hemagglutination and enzyme-linked immunosorbent assay (ELISA). Antibodies were considered as present when both tests were positive.[18]

Data analysis

The characteristics of older adults who rated their health as poor/very poor were compared to those of the remaining subjects. Data analysis was based on Pearson chi-square and linear trend chi-square tests (not presented) and on crude and adjusted odds ratios.[4] Odds ratios were adjusted by multiple logistic regression.[10] The criterion used for the inclusion of variables in the logistic model was association with self-rated health below the 0.20 significance level. Variables that remained associated with this variable below the 0.05 significance level were kept in the final model. Analyses were performed using Stata software, version 7.0.[24]

RESULTS

Of the 1,606 subjects of the Bambuí baseline cohort, 1,516 participated in the present study (90 subjects were excluded for requiring a proxy respondent for the interview). 591 men (39.0%) and 925 (61.0%) women participated in the present study. Participant age ranged from 60 to 95 years (mean =69.0 years).

Self-rated health was good/very good for 375 subjects (24.7%), reasonable for 746 (49.2%), and poor/very poor for 395 (26.1%). Monthly family income was below 2.0 minimum wages for 441 subjects (29.3%), between 2.0 and 3.9 for 568 subjects (37.7%), and between 4.0 and 7.0 for 406 (33.0%).

Table 1 presents the results of the bivariate analysis of sociodemographic factors and social ties indicators associated with self-rated health. Sex, schooling, monthly family income, marital status, attendance to clubs and/or associations, attendance to religious cults, and satisfaction with social network were significantly associated ($p<0.05$) with self-rated health in this analysis.

Regarding lifestyles, significant associations with self-rated health were found for alcohol consumption in the last 12 months, physical exercise during leisure time in the last 90 days, and daily consumption of fresh fruit and/or vegetables. Current smoking showed borderline significance ($p=0.052$) (Table 2).

The following indicators of health status were significantly associated with self-rated health in the bivariate analysis: inability to perform daily living activities, psychological distress in the last 15 days, insomnia in the last 30 days, metabolic syndrome, presence of antibodies against *T. cruzi*, and number of prescribed drugs used in the last 90 days (Table 3).

Major complaints when seeking medical care, number of medical appointments in the last 12 months, and number of hospital admissions in the last 12

months were all significantly associated with self-rated health in bivariate analysis (Table 4).

The following variables remained positively associated with worse self-rated health in the multivariate analysis: dissatisfaction/extreme dissatisfaction with social network, psychological distress in last two weeks, insomnia in last 30 days, number of prescribed drugs used in last 30 days (1-2, 3-4, and =5), complaints when in need of medical care (price of appointment or length of lines, as well as other complains), number of medical appointments in last 12 months (2-3 and =4), and number of hospital admissions in last 12 months (=2). A negative independent association was found with monthly family income (=4 minimum wages). (Table 5).

DISCUSSION

Our results show that the structure of self-rated health in the population studied was associated with four of the five dimensions investigated. Generally speaking, our results confirm those of studies conducted in other countries, which show associations between self-rated health and social support or social ties,[4] health status[23] (including symptoms of depression[8]), access to healthcare services,[5] medical appointments and hospital admissions.[3] Associations between lifestyle risk factors (such as alcohol consumption and smoking) and self-rated health were observed in some[12] but not all[10] studies. In the present study, we found associations between lifestyle and self-rated health in the bivariate analysis, but these associations disappeared after adjustments for confounders. This result is coherent with the lack of association found in this study between self-rated health and metabolic syndrome, and with prior observations of the absence of an association between perceived health and coronary risk profile.[7]

Worthy of note is the independent association found between self-reported health and family income. Studies conducted in developed countries show that self-rated health is strongly influenced by the socioeconomic situation of the older adult and/or of his or her family. Such association has been found in ecological,[11] cross-sectional[15,18] and longitudinal[26] studies. Our results show that such influ-

Table 1 – Self-rated health among older adults, according to sociodemographic characteristics and social ties (The Bambuí Health and Ageing Study, Brazil).

Characteristics	Self rated health				OR (95%CI)
	Poor/very poor		Reasonable/good/very good		
	N	(%)	N	(%)	
Age group (years)					
60-69	228	(57.7)	679	(60.6)	1.00
70-79	121	(30.6)	335	(29.9)	1.07 (0.83-1.39)
≥80	46	(11.7)	107	(9.5)	1.28 (0.88-1.87)
Sex					
Male	118	(29.9)	473	(42.2)	1.00
Female	277	(70.1)	648	(57.8)	1.71 (1.34-2.19)
Schooling (completed years)					
None	172	(43.6)	299	(26.7)	1.00
1-3	118	(29.9)	382	(34.2)	0.54 (0.41-0.71)
4-7	86	(21.8)	333	(29.8)	0.45 (0.33-0.61)
≥8	18	(4.6)	104	(9.3)	0.30 (0.18-0.51)
Monthly family income (in minimum wages)					
<2	152	(38.8)	289	(26.0)	1.00
2.00-3.99	158	(40.3)	410	(36.8)	0.73 (0.56-0.96)
≥4	496	(32.9)	414	(37.2)	0.38 (0.28-0.51)
Marital status					
Married/living together	179	(45.3)	570	(50.8)	1.00
Single	32	(8.1)	116	(10.4)	0.88 (0.57-1.34)
Divorced/separated	27	(6.8)	52	(4.6)	1.65 (1.01-2.71)
Widow(er)	157	(39.8)	383	(34.2)	1.30 (1.02-1.68)
Number of generations living in the household					
Lives alone	65	(16.5)	180	(16.1)	1.00
1	79	(20.1)	245	(21.9)	0.89 (0.61-1.31)
2	170	(43.1)	472	(42.2)	1.00 (0.71-1.39)
≥3	80	(20.3)	221	(19.8)	1.00 (0.68-1.47)
Attendance to clubs and/or associations					
Never/almost never	352	(89.3)	881	(78.6)	1.00
Less than once a month	30	(7.6)	161	(14.4)	0.47 (0.31-0.70)
Once a month or more	12	(3.1)	79	(7.1)	0.38 (0.20-0.71)
Attendance to religious cults					
Less than once a month	12	(3.1)	51	(4.6)	1.00
Once a month or more	209	(53.6)	771	(69.3)	1.15 (0.60-2.20)
Once a week or more	169	(43.3)	290	(26.2)	2.48 (1.28-4.78)
Satisfaction with social network					
Satisfied/very satisfied	329	(83.5)	1015	(90.5)	1.00
Indifferent	25	(6.3)	60	(5.4)	1.28 (0.79-2.08)
Dissatisfied/very dissatisfied	40	(10.2)	46	(4.1)	2.68 (1.72-4.17)

OR: Odds ratio; 95%CI: 95% confidence interval
p: p-value p (chi-square test) p': p-value (linear trend chi-square test)

Table 2 – Self-rated health among older adults, according to lifestyle (The Bambuí Health and Ageing Study, Brazil).

Characteristics	Self-rated health				OR (95%CI)
	Poor/very poor		Reasonable/good/very good		
	N	(%)	N	(%)	
Current smoker					
No	310	(78.5)	929	(82.9)	1.00
Yes	85	(21.5)	192	(17.1)	1.33 (1.00-1.76)
Alcohol consumption in last 12 months					
Never	352	(89.1)	834	(74.4)	1.00
<5 times per week	28	(7.1)	212	(18.9)	0.31 (0.21-0.47)
3-5 times per week	5	(1.3)	23	(2.1)	0.52 (0.19-1.37)
Daily/ almost daily	10	(2.5)	52	(4.6)	0.46 (0.23-0.91)
Physical exercise during leisure time in last 90 days					
Less than once a month	336	(85.1)	857	(76.4)	1.00
At least once a month	26	(6.6)	96	(8.6)	0.69 (0.44-1.08)
3-5 times per week	33	(8.3)	168	(15.0)	0.50 (0.38-0.74)
Daily consumption of fresh fruit and/or vegetables					
No	225	(50.9)	546	(57.0)	1.00
Yes	170	(49.1)	574	(43.0)	0.72 (0.57-0.90)

OR: Odds ratio; 95%CI: 95% confidence interval
p: p-value p (chi-square test) p': p-value (linear trend chi-square test)

ence may occur even between older adults with relatively small differences in income.

An anthropological study conducted among older women living in t Bambuí town showed that the evaluation of the severity and relevance of health-related problems was determined to a greater extent by the subject's ability to face the problem than by the problem itself. This ability was associated with family support and with access to medical care, and increased or decreased along with purchasing power.[6] The associations found in the present survey between worse self-rated health and dissatisfaction with social network and worse socioeconomic conditions are consistent with these observations.

Methodologically speaking, the main limitation of the present work is the cross-sectional nature of the study. Cross-sectional studies do not allow for temporal relationships, given that time information is not available. On the other hand, the study has several advantages. Precautions were taken in order to avoid bias, such as double-blind data collection, instrument reliability verifications, adoption of standardized procedures and equipments, and exhaustive training of field and laboratory teams, in addition to intensive activity inside the community in order to stimulate participation in the study. Thus the quality of the information gathered and the internal validity of the study were ensured. Furthermore, it is important to highlight that one of the

Table 3 – Self-rated health among older adults, according to health status (The Bambuí Health and Ageing Study, Brazil).

Characteristics	Self-rated health				OR (95%CI)
	Poor/very poor		Reasonable/good/very good		
	N	(%)	N	(%)	
Inability to perform activities of daily living * (number of activities)					
None	340	(86.1)	1073	(95.7)	1.00
1	41	(10.4)	37	(3.3)	3.50 (2.21-5.54)
≥2	14	(3.5)	11	(1.0)	4.02 (1.81-8.93)
Psychological distress in last 15 days					
No	89	(22.5)	611	(54.5)	1.00
Yes	306	(77.5)	510	(45.5)	4.12 (3.16-5.36)
Insomnia in last 30 days					
No	173	(44.13)	753	(67.2)	1.00
Yes	219	(55.9)	368	(32.8)	2.59 (2.05-3.28)
Metabolic syndrome					
No	181	(51.0)	628	(60.0)	1.00
Yes	174	(49.0)	418	(40.0)	1.44 (1.13-1.84)
Antibodies for *Trypanosoma cruzi*					
No	194	(52.9)	694	(66.2)	1.00
Yes	173	(47.1)	354	(33.8)	1.75 (1.37-2.23)
Number of prescribed drugs used in last 90 days					
None	32	(8.1)	278	(25.0)	1.00
1-2	86	(21.9)	345	(31.0)	2.16 (1.40-3.35)
3-4	128	(32.6)	292	(26.3)	3.81 (2.50-5.80)
≥5	147	(37.4)	197	(17.7)	6.48 (4.24-9.90)
Number of non-prescribed drugs used in last 90 days					
None	333	(84.7)	907	(81.6)	1.00
1	42	(10.7)	145	(13.0)	0.79 (0.55-1.14)
≥2	18	(4.6)	60	(5.4)	0.82 (0.47-1.40)

*Bathing, dressing, moving from bed to chair, eating and using the toilet
OR: Odds ratio; 95% CI: 95% confidence interval
p: p-value p (chi-square test) p': p-value (linear trend chi-square test)

Table 4 – Self-rated health among older adults, according to access to/use of healthcare services. (The Bambuí Health and Ageing Study, Brazil).

Characteristics	Self-rated health				OR (95%CI)
	Poor/very poor		Reasonable/good/very good		
	N	(%)	N	(%)	
Major complaints when seeking medical care					
No problems reported	80	(20,4)	439	(39,3)	1,00
Complaints about the price of the appointment or the length of lines	169	(43,0)	369	(33,0)	2,51 (1,86-3,39)
Other complaints	144	(36,6)	309	(27,7)	2,56 (1,88-3,49)
Number of medical appointments in last 12 months					
None	276	(24,6)	22	(5,6)	1,00
1	259	(23,1)	51	(12,9)	2,47 (1,46-4,19)
2-3	321	(28,7)	106	(26,8)	4,14 (2,55-6,74)
≥4	265	(23,6)	216	(54,7)	10,23 (6,39-16,36)
Number of hospital admissions in last 12 months					
None	938	(83,7)	252	(63,8)	1,00
1	154	(13,7)	74	(18,7)	1,79 (1,31-2,44)
≥2	29	(2,6)	29	(2,6)	8,86 (5,62-14,00)

Table 5 – Final results of the multivariate analysis of factors associated with self-reported health among older adults (The Bambuí Health and Ageing Study, Brazil).

Characteristics	OR (95%CI)
Monthly family income (in minimum wages)	
2.00-3.99	0.89 (0.65-1.22)
≥4	0.52 (0.36-0.75)
Attendance to clubs and/or associations	
Less than once a month	0.46 (0.29-0.73)
Once a month or more	0.32 (0.16-0.65)
Satisfaction with social network	
Indifferent	0.76 (0.43-1.37)
Dissatisfied/ very dissatisfied	2.54 (1.51-4.28)
Psychological distress in last 2 weeks	2.31 (1.71-3.13)
Insomnia in last 30 days	1.50 (1.14-1.99)
Number of prescribed drugs used in the last 30 days	
1-2	1.65 (1.01-2.70)
3-4	1.76 (1.07-2.89)
≥5	2.35 (1.40-3.93)
Main complaints when seeking medical care	
Complaints about the price of the appointment or the length of lines	1.45 (1.02-2.05)
Other complaints	1.52 (1.06-2.17)
Number of medical appointments in last 12 months	
1	1.87 (1.06-3.29)
2-3	2.20 (1.21-3.99)
≥4	2.79 (1.53-5.09)
Number of hospital admissions in last 12 months	
1	1.00 (0.70-1.43)
≥2	3.91 (2.33-6.57)

OR (95%CI): Odds ratio adjusted by multiple logistic regression for all variables listed in the table (1,487 subjects participated in the final analysis; $p\text{-value}_{Goodness\ of\ Fit} = 0.9739$)

difficulties inherent to studies of the structure of self-rated health is the need for a wide range of information, in order to provide an adequate control of potential confounders. The Bambuí project has a rich data bank, including information on a wide range of aspects related to health and its determinants. This allowed us to explore the influence of several characteristics on self-rated health, including that of health status. Six indicators of health status were considered, four of which were based on information collected during the interview and two of which were based on laboratory exams and physical measurements. Metabolic syndrome and Chagas' disease were chosen for being related to the major causes of death among older adults in the studied area. This wide range of information allowed for a thorough control of potential confounders.

In summary, our results show the multidimensional structure of self-rated health among older adults, which is influenced by socioeconomic conditions, social ties, health conditions (especially psychological distress), and access to and use of healthcare services. This structure is similar to the definition of health as "physical, mental, and social well-being" adopted by the World Health Organization. Further studies using longitudinal data are required in order to establish the temporal relationships between the above mentioned dimensions (and/or their components) and the evolution of self-rated health in this population.

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