Factors associated with negative self-rated health among non-institutionalized elderly in Montes Claros, Brazil

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Abstract *This study aimed to obtain an understanding of the self-rated health among community-dwelling elderly people in the north of Minas Gerais, identifying factors associated with negative self-rated health. We conducted a population-based cross-sectional study with two-stage random sampling. Data collection was carried out in the home of elderly people by trained staff who used questionnaires that had already been validated. To identify the variables associated with negative self-rated health, bivariate analyses were performed, followed by Poisson regression analysis. The study included 686 elderly people (average age = 70.9 years, DP = 8.08), 445 (64.9%) of whom were female. Most were mixed-race (57.1%) and had less than 4 years of schooling (76.3%). On the self-rated health, 291 elderly people (42.4%) had a positive perception of their own health (very good or good); 302 elderly people described their health as "regular" (44.0%) and 93 (13.5%) referred to their own health as "poor" or "very poor". The variables associated with a negative self-rated health were: difficulties in accessing health services, having a fall in the last year, hypertension, heart problems, asthma/bronchitis and any degree of fragility. The results reinforce the fact that multiple factors are associated with negative self-rated health among the elderly, with an emphasis on those related to morbidity.*

Key words *Health of the elderly, Self-Assessment (health), Cross-Sectional studies*

Introduction

Self-rated health is an indicator used in research into health that, despite being subjective, provides a measure of effectiveness that is quick and can be done at low cost on the health of groups in the population[1]. In the last few years, medical journals have been increasing their production in these area[2,3] spotlighting associations with morbidty[2,4-6] and with an emphasis on the elderly population[2-4,7].

An investigation into self-rated health amongst older people has become very relevant for those in Brazil in the last few years. This is because Brazil has an accelerating aging population and this process has both important impacts and challenges for the health service[8]. National studies have already shown that the proportion of negative self-perception of health increases as the person gets older[9,10].

It is reasonable to suggest that common occurrences amongst older people such as the high number of those with non-transmissible chronic illnesses and functional incapacity, influence their own negative perception of their health. However, it is important to investigate how much this perception suffers from being influenced by social conditions and the environment. As this is a subjective evaluation, self-perception of health has a multi-dimensional character which includes life styles, as well as psychological, demographic and socioeconomic aspects[1,2,6,10].

The particularities that are involved in self-rated health justify conducting local and regional studies that can help health managers in the development of strategies to improve the health conditions of the population especially the elderly population which has increased the most in the last few years. The identification of various aspects involved in the perception of health for older people can reveal more vulnerable groups permitting the development of more specific health measures which in turn will be more effective in improving the quality of life of these groups.

The north of Minas Gerais is an area in transition between the south east and the north east of the country. It has some indicators that show a population that is poor and in need with a Gross Domestic Product per capita in the region that is below the state and Brazil as a whole. The household income per capita is lower than what has been observed as the average for the state and it is the second lowest when compared to the rest of the regions in the state. Amongst the 89 municipalities in the region, only three have a high Municipal Human Development Index (IDHM)[11]. In this region there are no registered inquiries that involve self-rated health amongst older people. The objective of this study was to obtain a better understanding of the self-rated health amongst older people in communities living in the principal city in the north of Minas, identifying factors associated with negative self-rated health.

Methods

This was a transversal study that was carried out on non-institutionalized older people resident in the urban area of the municipality of Montes Claros located in the north of Minas Gerais. The process involved two-stage random sampling. In the first stage we used a unit sample from a census area where we randomly selected 42 census areas amongst 362 urban sectors in the municipality. In the second stage we set the number of households to be used according to the population density of individuals aged ≥ 60 years[12]. In this stage the calculation of the number of households to be in the random selection was done based on the expected average of elderly people per household (ratio people/household), in other words, the sectors with higher numbers of older people had more households allocated which created a more representative sample.

The total number of allocated older people for the study was considered as having a conservative prevalence of 50% for the studied event with an estimated population of 30,790 older people[12], with a margin of error of 5% and a level of confidence of 95%. Based on the fact that we used a cluster sample, the number that was identified was multiplied by a factor of correction (deff) of 1.5 and was increased from 20% for eventual losses. The minimum number of people in the study was set using the calculated sample of 684 people.

The following inclusion criteria were used: individuals aged 60 or over and residents in the randomly selected census areas. Older people, whose carers/family members considered unable to fill in the questionnaire form in the study, were excluded. Older people who were not able to participate after three visits to their homes at different days and times were considered as losses, even where appointments had been scheduled.

The collection of data was carried out in the homes of older people between May and July 2013. The interviewers (graduates in nursing)

had been previously trained and they went to census sectors based on points that had been previously selected in each census sector in order to carry out the interviews. The tools used to collect the data were questions that had been validated in other population studies, having an emphasis on telephone research covering vigilance over risk factors and protection against chronic disease[13]. It was previously used in a pilot study in a special and randomly selected census sector to check the understanding of the questions by the interviewees and the abilities of the interviewers. The pilot study showed that there was no need to change the tool for the collection of data and the data collected in this phase was not included in the final analysis.

The dependent variable was self-rated health, evaluated by the question "How would you classify your state of health?". The options to respond were: "Very good", "Good", "Regular", "Bad" or "Very bad". In order to analyze the collected data, the responses were dichotomized and there was an assumption of a positive perception of health for the responses "Very good" and "Good" and a negative perception of health in the sum of the responses being "Regular", "Bad" and "Very bad" following similar studies on the theme that were both national and international[1,2,4,5].

The independent variables that were studied were: gender, age, self-referred race, marital status, family arrangements (the ability to live alone or with other people), level of education, family income, religious practices, type of health services used, having private health insurance or not, having been admitted to hospital in the last 12 months, having registered a fall in the last 12 months, the presence of chronic morbidities that was self-referred (hypertension, heart problems, mellitus diabetes, arthritis/arthritis/rheumatism, osteoporosis, asthma/bronchitis asthma/allergy and urinary incontinence) polypharmacy (the regular use of five or more medications), fragility (assessed by the *Edmonton Frail Scale*) and depression symptoms assessed by the *Geriatric Depression Scale* of 15 items. The last two scales were validated for use in the country for use with the necessary transcultural changes[14,15].

The information collected was analyzed through the program Statistical Package for Social Sciences (SPSS) version 17.0 (SPSS for Windows, Chicago, USA). Bivariate analysis was undertaken and later multiple analysis was done through the use of Poisson's regression, which had robust variance in its multiple analysis. In all of the analysis the Prevalence Ratio (RP)

was calculated with consideration being given to its respective intervals of confidence at 95% (IC95%). For multiple analysis only the variables that showed associations up to the 20% level (p < 0.20) were considered in the bivariate analysis. In the final model after the multiple analysis, only variables that showed associations up to the level of 5% (p < 0.05) was kept.

Analysis was done on the distribution of the frequency including association measures through the Chi-squared test and Poisson's regression with a robust variance. For this step a group of variables were analyzed with bivariate analysis that showed an association up to the level of 20% (p < 0.20). The final model was kept as variables whose Prevalence Ratio (RP) was significant up to the level of 5% (p < 0,05).

All of the participants were given guidance on the research and were given a consent form to be signed (some registered consent digitally) after having their doubts and queries allayed. The research project was approved by the Ethics Committee on Research at the Universidade Estadual de Montes Claros.

Results

The number of elderly people used in the study was 686. Of these 445 (64,9%) were female. The ages in the group varied from 60 to 98 years old with the average age being 70.9 (DP ± ± 8,08). The majority of them declared themselves to be mixed race (57,1%) with up to 4 years of official education (76,3%). These and the rest of the demographic and socioeconomic characteristics can be seen in Table 1.

In relation to the characteristics related to health care (Table 2) it was highlighted that 234 older people (34,1%) stated that they had private health insurance but the type of health service that was most used was the Public Health Service (68.8%). Approximately a fifth of those that were interviewed stated that they had been admitted to hospital in the last 12 months (17.8%). Arterial hypertension was the morbidity that was mentioned the most by the respondents (70.8%). And also they spotlighted arthritis/arthrosis/rheumatism (35.1%) and urinary incontinence (28.3%). It was registered that 161 older people (23.5%) were regular users of five or more medications (polypharmacy). Concerning self-rated health, 291 older people (42.4%) had a positive perception of their own health (Very bad or Good), 302 described their health as "Regular" and 93

Table 1. Sociodemographic and demographic characteristics of elderly in Montes Claros (MG) 2013.

Variable	N	%
Gender		
Female	445	64.9
Male	241	35.1
Age		
60 to 69 years old	341	49.7
70 to 79 years old	239	34.8
Older than 80 years old	106	15.5
Race		
Mixed-race	392	57.1
Black	65	9.5
White	215	31.3
Asia	14	2.0
Marital status		
Single	46	6.7
Married	334	48.7
Stable Union	18	2.6
Divorced/Separated	54	7.9
Widowed	234	34.1
Religion		
Catholic	476	69.4
Evangelical	193	28.1
Other	4	0.6
None	13	1.9
Religious practices		
Yes	562	81.9
No	124	18.1
Level of education		
No formal education	179	26.1
1 to 4 years old of formal education	343	50.0
> 4 years	164	23.9
Family arrangements		
Living alone	82	12.0
Living only with spouse	119	17.3
Living with other family members	481	70.1
Not living with any family members	4	0.6
Family income		
≤ 1 minimum salary	196	28.6
1 to 2 minimum salaries	226	32.9
> 2 minimum salaries	264	38.5

Tables 2. Characteristics related to health care amongst elderly in Montes Claros (MG) 2013.

Variable	N	%
Have private health insurance		
Yes	234	34.1
No	452	65.9
Type of health service most used		
Public (SUS)	472	68.8
Private	29	4.2
Private connected with employment	120	17.5
Unable to respond	65	9.5
Difficulty of use and access to health service		
Yes	269	39.2
No	417	60.8
Depressive symptoms (GDS-15)		
Yes	201	29.3
No	485	70.7
Fragility (Edmonton Scale)		
Without any fragility	290	42.3
With some form of fragility	396	57.7
Admissions to hospital in the last 12 months		
None	564	82.2
Once	72	10.5
More than once	50	7.3
Fall in the last 12 months		
Yes	194	28.3
No	492	71.7
The regular use of five or more medications		
Yes	161	23.5
No	525	76.5
Self-referred morbidity*		
Arterial hypertension	486	70.8
Diabetes	153	22.3
Heart problems	164	23.9
Osteoporosis	171	24.9
Arthritis / arthrosis / rheumatism	241	35.1
Emphysema / chronic bronchitis / DPOC	30	4.4
Asthma/bronchial asthma/allergic bronchitis	37	5.4
Urinary incontinence	194	28.3
Self-perception of state of health		
Very good	30	4.4
Good	261	38.0
Regular	302	44.0
Bad	84	12.2
Very good	9	1.3

* The sum of the percentages is higher due to the fact that the same person refers to more than one morbidity.

(13.5%) referred to their own health as "Bad" or "Very bad".

Tables 3 and 4 show the results of the bivariate analyzes (gross) for associations that were investigated and Table 5 are the variables that kept the final model after the group analysis of the variables. They showed associations with negative self-perception of health: difficulty in accessing health services, registering falls in the last year, arterial hypertension, heart problems, asthma/bronchitis, allergies and some level of fragility according to the Edmonton Frail Scale.

Table 3. Bivariate analysis amongst socioeconomic and demographic variables and self-rated health amongst the elderly, Montes Claros (MG) 2013.

Variable	Self-perception of health				p-value	RP Gross (IC 95%)
	Negative		Positive			
	(n)	(%)	(n)	(%)		
Sex					0.596	1.04(0.91-1.20)
Male	260	65.8	185	63.4		
Female	135	34.2	106	36.4		
Age					0.339	1.09(0.93-1.29)
≥ 80 years	66	16.7	40	13.8		
< 80 years	329	83.3	251	86.2		
Level of education					0.371	0.92(0.79-1.08)
0-4	89	22.5	75	25.8		
> 4	306	77.5	216	74.2		
Family income					0.334	1.08(0.94-1.24)
≤ 1 SM	119	30.1	77	26.5		
> 1 SM	276	69.9	214	73.5		
Family arrangements					0.946	0.99(0.82-1.21)
Living alone	47	11.9	35	12.0		
Living with family members	348	88.1	256	88.0		
Civil Status					0.227	0.92(0.81-1.05)
Without a companion	184	46.6	150	51.6		
Stable Union	211	53.4	141	48.4		
Race					0.060	1.15(0.99-1.34)
Not White	283	71.6	188	64.6		
White	112	28.4	103	35.4		
Religious practices					0.410	1.08(0.92-1.26)
No	76	19.2	48	16.5		
Yes	319	80.8	243	83.5		

Discussion

This study revealed an important prevalence of negative self-perception in the state of health amongst the elderly community in the north of Minas Gerais. A slightly less percentage was registered in a study done in three cities in the interior of Brazil using a similar methodology that showed a frequency of 49.6% of negative self-perception of health[2]. The percentage of 53.8% was observed for regular or bad self-rated health in a large study in Sao Paulo[16].

It should be noted that some studies show percentages far less in relation to negative self-perception of help[6,10]. However such studies group the results of a negative perception as only "bad" and "very bad". There does not appear to be uniformity in the national studies on an adequate "cut off point" to evaluate the factors associated with negative perception of health. This is because some studies considered regular percep-

tion of health as a positive[6,10] perception, others as negative[2,5,9,16] and others conducted analyses with more than two levels of health perception covering negative perceptions, positive perceptions, regular perceptions and intermediate ones[17,18]. Also there are authors that present other classifications with options like "excellent, very good, good, bad or very bad" and they exclude the intermediate option[19]. The studies also show discordance in relation to the process of dichotomization of responses on self-rated health[1,4,20].

The divergence noted in the medical journals on the different cutoff points to measure self-perception of health is not recent[21,22] and it highlights the need for caution in comparing the results between different studies. Such divergences, however, do not mean one less indicator that is not worth using. It represents one measure that is very useful in population studies and reflects the various aspects of care and the use of the health services[1].

Table 4. Bivariate analysis amongst variables related to health and self-rated health amongst the elderly, Montes Claros (MG) 2013.

| Variablel | Self-perception of health | | | | p-value | RP Gross (IC 95%) |
| | Negative | | Positive | | | |
	(n)	(%)	(n)	(%)		
Have private health insurance					0.179	1.11(0.96-1.27)
No	269	68.1	183	62.9		
Yes	126	31.9	108	37.1		
Difficulty of use and access to the health service					0.000	1.33(1.17-1.51)
Yes	199	50.4	98	33.7		
No	196	49.6	193	66.3		
Self-admission to hospital in the last 12 months					0.006	1.25(1.08-1.45)
Yes	77	19.5	34	11.7		
No	318	80.5	257	88.3		
Fall					0.000	1.30(1.15-1.48)
Yes	134	34.1	60	20.7		
No	259	65.9	230	79.3		
Hypertension*					0.000	1.39(1.75-1.65)
Yes	304	77.3	182	62.5		
No	89	22.7	109	37.5		
Diabetes					0.056	1.15(1.00-1.33)
Yes	98	25.1	55	18.9		
No	293	74.9	236	81.1		
Heart problems*					0.000	1.38(1.22-1.57)
Yes	119	30.8	45	15.7		
No	267	69.2	242	84.3		
Arthritis / arthrosis / rheumatism*					0.000	1.37(1.20-1.55)
Yes	165	43.3	76	26.2		
No	216	56.7	215	73.9		
Asthma / bronchial asthma / allergy					0.004	1.44(1.22-1.71)
Yes	30	7.6	7	2.4		
No	363	92.4	284	97.6		
Osteoporosis					0.007	1.23(1.07-1.41)
Yes	112	29.9	59	20.4		
No	262	70.1	230	79.6		
Fragility					0.000	1.68(1.48-1.89)
Yes	190	48.1	54	18.6		
No	205	51.9	237	81.4		
Depressive symptoms					0.000	1.40(1.24-1.58)
Yes	145	36.7	56	19.2		
No	250	63.3	235	80.8		
Polypharmacy					0.000	1.36(1.20-1.53)
Yes	116	29.4	45	15.5		
No	278	70.6	246	85.5		
Urinary incontinence					0.000	1.27(1.12-1.45)
Yes	132	33.5	62	21.3		
No	262	66.5	229	78.7		

In this current study the variables associated with negative perception of health were those that related to chronic health conditions and took into account: registering a fall in the last year, difficulty in accessing health services and fragility as assessed by the Edmonton Frail Scale.

On the chronic conditions, they kept: the final model of arterial hypertension, the register of

Table 5. Results in multi-variate analysis for factors associated with negative self-perception of health amongst the elderly, Montes Claros (MG) 2013.

Variable	p-value	RP	IC95%
Difficulty to access health care	0.000	2.03	1.42-2.90
Registered fall in the last 12 months	0.010	1.69	1.13-2.51
Fragility (Edmonton Frail Scale)	0.000	3.88	2.69-5.89
Self-related hypertension	0.023	1.54	1.06-2.23
Self-related Heart problems	0.046	1.57	1.01-2.46
Self-related asthma / bronchial asthma / allergy	0.039	2.77	1.05-7.29
Race (not white)	0.130	0.73	0.48-1.10
Not having private health insurance	0.520	0.73	0.29-1.88
Admissions to hospital in the last 12 months	0.274	1.01	0.78-1.24
Self-related diabetes	0.900	0.98	0.73-1.32
Self-related arthritis / arthrosis / rheumatism	0.163	1.17	0.83-1.42
Self-related osteoporosis	0.642	0.66	0.13-3.83
Depressive symptoms (GDS-15)	0.128	1.38	0.91-2.08
Polypharmacy	0.197	0.12	0.89-1.42
Self-related urinary incontinence	0.669	1.09	0.72-1.68

some heart problem, asthma/allergic bronchitis/ and bronchial asthma. They are conditions that show the narrow connection to the perception of risk of life and/or the continuous use of medications.

Circulatory diseases constitute the principal group of causes of death in Brazil for both sexes. An association between such conditions and negative self-perception of health observed in this study was registered in Paraná[23]. Another study in the elderly population of the Municipality of Sao Paulo concluded that heart disease presents itself as that which would promote percentage gains in years of life free from incapacity, if it were eliminated in both sexes[24]. It was highlighted that heart related problems have an impact on the quality of an older person's physical and psychological life which often culminates in the reduction of autonomy[25]. Aside from this, cardiovascular diseases have been shown to be associated with the highest level of dependency in daily and instrumental activities (AIVD) which are aspects that are strongly relevant to older people with reference to their health conditions[26]. All of these factors justify a negative self-perception of health amongst people with cardiovascular problems which was observed even in individuals that were younger, according to the study conducted in Paraná[23]. It is worth highlighting that many times the symptoms and the consequences of the diseases, such as pain and the limitation of activities, seem to be strongly associated with self-evaluation of negative health than the diseases themselves as highlighted in a German study on older people with multi-morbidity[27].

The negative self-evaluation of health also showed an association with registers of systemic arterial hypertension (HAS). This is a clinical condition that is irreversible because of what it is as well as the complications that it can lead to or the medication therapy used which can interfere in the various aspects of the patient's life, especially older people[28]. The HAS is a major risk factor for diseases such as cardiac and renal insufficiency. Aside from this, there is a need to control the medications used in a rigorous and prolonged way and all of this contributes to a worse perception of the state of health. Similar associations amongst negative self-rated health and arterial hypertension were also registered in other studies[2,6]. The narrow relationship between self-perception of health and cardiovascular diseases was studied by Arruda et al.[23] that noted that such associations ought to be highlighted to health professionals as they interfere in the way how patients deal with diseases which can aid in the guidance on self-care.

Asthma which is another chronic condition associated with negative self-perception in this study is also known as "bronchial" asthma or "allergic bronchitis" and was investigated amongst the elderly. It is a disease that can be considered as one being able to incapacitate someone and those that are in the advanced ages have a greater risk factor of it becoming very serious and it could even lead to death due to asthma[29]. The

symptoms include intense difficulty in breathing which exacerbates itself, amongst others, such as a lack of physical strength for the patient to do activities. Asthmatic older people use the hospital more frequently and more of them are admitted to hospital. Similar associations were observed in studies conducted with older people in six municipalities in Sao Paulo but they evaluated pulmonary diseases in general[30].

Also in this study we noted associations statistically significant between negative self-perception of health and the register of difficulties in using the health services. These findings can probably be explained by the fact that negative self-perception of health is strongly related to the presence of morbidity, fragility and other conditions that determine the greater need of seeking out health services. In these conditions a more frequent search means greater difficulties in access and use. A large study conducted in Sao Paulo[31] had already highlighted the association between negative self-perception of health and greater access to health services and the results of the studies in Minas Gerais[6] and in Rio Grande do Sul[5] also showed this association.

The occurrence of a fall in the last 12 months also associates itself with a negative self-perception of health. The falls bring with them a lot of damage to an older person's health and amongst them the most common was a facture. Aside from the physical trauma and its results such as pain, fear of falling, functional incapacity and being confined to a bed as well as other consequences, all of the above reduce the independence and quality of life of the older person and in turn brings a worse perception of a person's state of health. This association has already been noted in a previous[32] study and other authors have mentioned the association between negative self-perception of health and the fear[33] of falling or between negative self-perception and low functional capacity including the restriction on movement[34] and difficulties in walking fast[18].

Another variable that showed an association with negative self-perception of health was fragility recognized as a multi-dimensional geriatric syndrome attributed to multi-systemic deteriorations of the reserve abilities that results in vulnerability and the major risk of the occurrence of adverse clinical outcomes. This is a condition determined by multiple factors (biological, psychological and social) that vary from individual to individual[35] and can result in a growing cycle of debility. It is natural, however, that any level of fragility is associated with a negative perception of health. Such associations have already been observed in other studies[36,37] which reiterated, as has been highlighted, that the symptoms and the consequences of the diseases, such as pain and limitations, on activities seem to be more strongly associated negative self-perception of health than the disease in itself.

The results of the present study ought to be interpreted as shedding light on some limitations. This was a transversal study that only looked at the associations between variables without the possibility of defining the causal relationship. It was also noted that the variables were assessed by information from the elderly and although this was a valid procedure which has been used in various studies, there is a memory limitation as a factor that interferes in a negative way. The low level of education of the studied group can also be considered as a limitation, as it has the potential to compromise the understanding of the investigated questions and the quality of the responses. However, in spite of such limitations, this was an approach based on looking at a population which is a segment that is growing nationally, in a region that until then had not been studied in this way.

Conclusion

The findings of this study reinforce the fact that multiple factors show associations with negative self-perception of health for the elderly, with an emphasis on those that are connected to morbidity. This shows the relevance of investigations of self-perception of health for health professionals and managers as they have the potential to raise the alarm to improve the care afforded to older people. Special attention should be given to older people that do not have a positive view of their health condition. This should lead to improvements in dealing with their chronic conditions and minimizing their inabilities through the promotion of quality of life and increasing longevity.

Collaborations

SM Medeiros, LSR Silva, JA Carneiro, GCF Ramos, ATF Barbosa and AP Caldeira participated equally in the different stages of the paper, including drawing up the project, collection and analysis of data and write up of the final version.

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