Self-perceived health in institutionalized elderly

Javier Jerez-Roig [1]
Dyego Leandro Bezerra Souza [1]
Fabienne Louise Juvêncio Paes de Andrade [1]
Bartolomeu Fagundes de Lima Filho [2]
Rafaela Jordânia de Medeiros [2]
Nayara Priscila Dantas de Oliveira [1]
Sadote Macêdo Cabral Neto [2]
Kenio Costa Lima [1]

Abstract *This study aimed to verify health self-perception, its prevalence and associated factors in institutionalized elderly. A cross-sectional study is presented herein, conducted in 10 Long-Term care Institutions for the Elderly (LTIE) in the city of Natal (Northeast Brazil), between October and December 2013. Sociodemographic variables were analyzed, along with institution-related and health state variables. Descriptive and bivariate analyses were carried out (Chi-squared test, Fisher's exact test or linear trend Chi-squared test), as well as multivariate analysis (logistic regression). The final sample consisted of 127 elderly. The prevalence of negative self-perceived health was 63.19% (CI 95%: 55.07-70.63), and was associated with weight loss (PR: 1.54; CI 95%: 1.19-1.99), rheumatic disease (PR: 1.46; CI 95%: 1.05-2.01) and not-for-profit LTIE (PR: 1.37; CI 95%: 1.03-1.83), adjusted by sex. More than half of the elderly reported negative self-perceived health, which was associated with weight loss, rheumatic disease and type of institution. Actions must be developed to promote better health conditions in LTIE, such as nutrition consulting and physical therapy, to improve quality of life.*

Key words *Aged, Cross-Sectional studies, Geriatric assessment, Homes for the aged, Institutionalization*

[1] Departamento de Odontologia, Universidade Federal do Rio Grande do Norte (UFRN). Av. Senador Salgado Filho 1787, Lagoa Nova. 59010-000 Natal RN Brasil.
javijerez81@hotmail.com
[2] Departamento de Fisioterapia, UFRN. Natal RN Brasil.

Introduction

Advances in medicine and technology have extended human life expectancy, and along with decreased fecundity and mortality rates, have caused an increase in the Brazilian elderly population. Although this phenomenon is a benefit to society, it is also an important challenge if these additional years of life are not lived in adequate health conditions[1].

Health is primordial to guarantee independence, autonomy, and continuity in the contribution of the elderly to society. Especially as the aging process progresses, health issues become more evident, and therefore the self-perception of health becomes mostly negative, interfering in the wellness levels reported by elderly[2].

The search for satisfactory self-perceived health is connected to sociodemographic, economic, cultural, and psychological aspects, as well as to physical capacity conditions. However, there is discrepancy when measuring the latter, due to different contexts in which population is inserted. One of the mechanisms applied to verify these aspects is self-perceived health, which can be measured by assessments carried out by the individuals themselves and/or referred morbidity.

There is strong evidence that self-perceived health is an excellent predictor of objective health, i.e., of the number of chronic diseases, degree of functional disability and depression, resulting in a conjecture of mortality in elderly populations[3]. Also, sociodemographic aspects such as age, sex, education level and income are some of the factors associated with self-perceived health found in literature[2]. Men present a higher capacity of transforming physical disease in emotional suffering, when compared to women; women, in turn, report their health more frequently as "bad" when compared to men[4,5]. Individuals that consider their health to be "bad" present a higher risk of hospitalization, institutionalization and mortality, when compared to those that considered health as "excellent"[2,6,7].

There are few studies on self-perceived health in Latin America, especially in institutionalized elderly[8]. It is important to deepen knowledge on the aspects involved in self-perceived health, enabling the identification of more vulnerable areas and/or elderly subgroups, and contributing to the elaboration of health promotion programs. The objective of the work presented herein is to verify self-perceived health in institutionalized elderly and the factors associated with "bad" self-perceived health.

Methods

A cross-sectional study is presented herein, carried out in ten (71.4%) of the 14 long-term care institutions for the elderly (LTIE) registered in the Sanitary Vigilance of the municipality of Natal (Northeast Brazil). Five institutions were private and five were not-for-profit (there were no public LTIE). The other four (28.6%) LTIE refused to participate in the study. Data were collected from updated medical records of the elderly at each institution, including in the study the individuals at least 60 years old that were present at the institutions throughout the research period. The elderly that were not physically present at the LTIE due to hospitalization, those in terminal state or without sufficient cognitive capacity to answer questionnaires were excluded from the study.

Data were gathered in the period between October and December, 2013, after a pilot study was carried out with 25 elderly at the first LTIE studied. The questionnaires were applied by previously trained researchers, who attended meetings with team members. Self-perceived health was assessed by the question "how do you consider your current health state?". The dependent variable of the study was dichotomized: good perception (categories "excellent" and "good") and bad (categories "regular", "bad" and "very bad")[4,9].

For each elderly, information was collected on sociodemographic conditions (age, sex, race, education level, marital status, number of children, type of LTIE, time and reason for institutionalization, free time occupations, retirement, money administration, health plan and number of elderly per caregiver) and health state (chronic diseases, daily use of medicine, consumption of tobacco and alcohol, practice and level of physical activities, exhaustion, body mass index, weight loss, presence of urinary and fecal incontinence, mobility state, functional and cognitive capacities). The diseases analyzed included: arterial hypertension, diabetes, cancer, pulmonary disease, cerebrovascular accident, dementia (including Alzheimer's), Parkinson's disease, osteoporosis, kidney failure, cardiovascular disease, rheumatic disease, mental illness, depression, dyslipidemia, and other unspecified illnesses. Information was obtained from medical records or provided by personnel at institutions (social assistants, nursing technicians or caregivers).

Cognitive capacity was evaluated by Pfeiffer's Test, which assesses short- and long- term mem-

ory, orientation, information on daily events and mathematical capacity. This instrument enables the classification of the elderly in intact mental function, and slight, moderate or severe cognitive decline, taking into consideration the education level of the individual[10]. Presence or absence of functional disability was considered when the individual presented (or not) dependence in one or more Basic Activities of Daily Life (BADL) of the Katz Index[11].

Body Mass Index (BMI) was calculated from the relationship between the weight (in kg) and the squared height (in m). Weight and height measurements were taken according to the techniques recommended by the *World Health Organization* (1995). An electronic Tanita® scale was utilized, with 150 kg capacity and 100 g precision. Total height was obtained according to the average of two measurements, with an exact-height portable stadiometer (1 mm precision). Classification of the BMI values considered what was established in the Food and Nutrition Surveillance System (SISVAN) (2008) for elderly: underweight (< 22 kg/m^2), eutrophic (≥ 22 and < 27 kg/m^2) and overweight (≥ 27 kg/m^2)[12]. Involuntary weight loss was evaluated by the question "throughout the last year, have you lost more than 4.5 kg or 5% of your body weight unintentionally (without dieting)?"[13]. If the elderly were unsure or did not know, the nutritionists at the institution were consulted.

The short version of the *International Physical Activity Questionnaire* (IPAQ) was applied to evaluate the level of physical activity of the individuals. IPAQ is a transculturally adapted instrument, validated to the Brazilian elderly population, which takes into consideration the time dedicated within the previous week, with minimum duration of ten continuous minutes, to three activities: walking, and moderate or vigorous intensity activities. The overall energy expended (metabolic equivalent of task: MET-minutes/week) was multiplied by the weight of the elderly and divided by 60 kg. The lowest quintiles of these results, stratified by gender, were identified and utilized as cutoff point to classify a low level of physical activity[14].

The work presented herein is part of a wider research project, entitled "Human aging and health: the reality of institutionalized elderly in the city of Natal/RN", approved by the Research Ethics Committee of the Federal University of Rio Grande do Norte. The university approved an amendment to the original project to add other variables and carry out the present study. Sig-

nature of free informed consignment forms was mandatory, either by the elderly or legal tutor, and also by the direct caregiver.

Initially, a comparative analysis was carried out between the individuals included and excluded in/from the study, through chi-squared and Student's T tests. Descriptive statistics of each group were also presented. Inferential statistics were applied to carry out bivariate analysis by chi-squared (or Fisher's exact test) and linear trend chi-squared tests. Magnitude of association was verified by the prevalence ratio for each independent variable regarding the dependent variable, to a significance level of 95%. The variables with *p* values under 0.225 were analyzed by logistic regression to build the multivariate model, using the Stepwise Forward method. Permanence of the variable in multiple analysis depended on the Likelihood Ratio Test, absence of multicollinearity, as well as its capacity of improving the model by the Hosmer and Lemeshow test. Odds ratio was converted into prevalence ration according to Miettinen and Cook[15].

Results

Of a total of 350 residents, 11 (3.1%) individuals refused to answer the questionnaire, 1 (0.3%) was under the age of 60, and 189 (54.0%) were excluded due to incapacity to answer the questionnaire, 4 (1.1%) were hospitalized and 1 (0.3%) was in terminal state.

Comparative analysis between the individuals excluded from the study and those included in the study revealed no statistically significant differences in sociodemographic variables, except that those included in the study presented lower age ($p < 0.01$): 79.4 years (SD:8.2) *versus* 82.8 years (SD:9.4). Regarding health state, it was observed that the participating group presented lower proportions of mobility restrictions ($p < 0.001$), sedentarism ($p < 0.001$), urinary and fecal incontinences ($p < 0.001$), neurological and psychiatric illnesses such as cerebrovascular accident ($p = 0.001$), dementia ($p < 0.001$), and mental diseases ($p = 0.011$). However, the participating group presented higher frequencies of arterial hypertension ($p < 0.001$), diabetes ($p = 0.011$), cancer ($p = 0.046$), osteoporosis ($p = 0.013$), rheumatic disease ($p = 0.001$), depression ($p = 0.022$) and dyslipidemia ($p < 0.001$). Regarding quantitative variables, participants depended on a higher number of medicines 5.5 (SD:3.1) *versus* 4.0 (SD:2.6), presented a higher overall num-

ber of chronic diseases 2.7 (SD:1.5) *versus* 2.2 (SD:1.4) and presented higher BMI 25.4 (SD:6.7) *versus* 19.5 (SD:6.8), with these differences being statistically significant (p ≤ 0,001) by Student's T test. There was no significant difference between groups regarding the occurrence of falls.

The final sample was constituted of 144 elderly, mostly of the female sex (79.2%) and average age 79.4 (SD:8.2). The majority of residents belonged to not-for-profit institutions (64.6%), was retired (91.7%) and did not have private health plan (58.3%). It was verified that 80 (55.6%) individuals had children, with an average number of children 1.9 (SD:2.4). Average residence time was 57.3 months (SD:62.8) and there were 7.1 elderly per caregiver (SD:4.3) at the institutions. The majority depended on medication (97.2%) and the average number of medicines per elderly was 5.5 (SD:3.1).

Regarding lifestyle, only 7 (4.9%) consumed alcohol, 13 (90%) were smokers, 37 (25.7%) were ex-smokers, and 94 (65.3%) were sedentary. Seventy-seven (53.5%) individuals had some type of free time occupation: 30 (20.8%) went out for strolls, 25 (17.4%) were involved with crafts, 14 (9.7%) carried out some type of spiritual activity, 8 (5.6%) carried out domestic activities, and 7 (4.9%) played games. Also, 31 individuals (21.5%) carried out other types of activities or hobbies, including occupational therapy.

One hundred and thirty-six (94.4%) individuals suffered from chronic diseases. More specifically, 92 (63.9%) presented arterial hypertension, 47 (32.6%) suffered from diabetes, 34 (23.6%) from dyslipidemia, 29 (20.1%) presented mental illnesses, 28 (19.5%) suffered from dementia (including Alzheimer's), 23 (16.0%) had osteoporosis, 21 (14.6%) had depression, 18 (12.5%) presented cardiovascular diseases, 17 (11.8%) had rheumatic diseases, 13 (9.0%) had suffered cerebrovascular accidents, 10 (6.9%) had Parkinson's, 10 (6.9%) had cancer, 9 (6.3%) suffered from pulmonary diseases, and 7 (4.9%) presented kidney failure. It was verified that 10 (6.9%) elderly had suffered falls in the previous 30 days, and 59 (41.0%) and 23 (16.0%) presented urinary and fecal incontinences, respectively.

Table 1 shows that 36.8% of the individuals presented mobility restrictions, and 53.5% presented functional disability in one or more BADL. The frequency of cognitive disability, according to Pfeiffer's scale, was 79.9%.

Of the total sample, 10 (6.9%) reported an "excellent" health state, 43 (29.9%) "good", 56 (38.9%) "regular", 23 (16.0%) "bad", and 12 re-

ported "very bad" health state. The prevalence of negative self-perceived health was 63.19% (CI 95%: 55.07 - 70.63). Table 2 shows the bivariate analysis between "bad" self-perceived health and independent variables with *p* value under 0.225 (not included in the multiple model).

Finally, Table 3 shows the final model, with a Hosmer-Lemeshow test value = 0.920. After multivariate analysis, it was verified that negative self-perceived health in institutionalized elderly was associated with involuntary weight loss during the previous year (p = 0.001), rheumatic disease (p = 0.023) and not-for-profit LTIE (p = 0.033), controlled by sex (p = 0.216).

Discussion

The descriptive analysis of the work presented herein showed that approximately 63% of individuals considered their health as "bad". As expected, this proportion was higher than in non-institutionalized Brazilian elderly, whose "bad" self-perceived health rates vary between 11 and 40%[3,9,16,17]. The rates obtained herein were also superior to those identified in other studies with institutionalized elderly[7,18,19]. The only Brazilian study on the subject verified that approximately 51% of the LTIE residents in the city of Pelotas (South Brazil) evaluated their health as "bad"[7]. International studies have reported lower rates: research carried out in China reported a 53% prevalence[18], while a representative sample of LTIE residents in Madrid (Spain) presented 45%[19].

Regarding the methodological criteria applied to assess health perception, several studies have dichotomized this variable, considering the categories "regular/reasonable" and "bad"[2,4,7-9,17] or "regular/bad/very bad"[18], as applied herein. Other authors have included the "regular" category within "good" and "very good/excellent"[3]. Herein it was decided to include "regular" within the negative consideration of health, most common option found in literature, especially because data distribution facilitated inferential analysis.

Concerning the causes for the elevated prevalence of negative self-perceived health identified herein, the two components of health self-assessment should be highlighted. On one hand, this is a partial consequence of more subjective aspects, representation of social and emotional dimensions of health and well-being, which in turn could have been influenced by the ele-

Table 1. Frequency distribution for sociodemographic and health-related variables of institutionalized elderly. Natal, RN, Brazil, 2015.

Variables	n	%	Variables	n	%
Age			Level of physical activity (IPAQ)		
60 to 69 years old	24	16.7	Low	69	48.6
70 to 79 years old	40	27.8	Normal	73	51.4
80 to 89 years old	68	47.2	BMI		
90 years old and over	12	8.3	Underweight	42	31.1
Skin color/race			Eutrophy	44	32.6
White	84	58.3	Overweight	49	36.3
Brown	43	29.9	Weight loss		
Black	15	10.4	Yes	42	29.8
Yellow	1	0.7	No	99	70.2
Indigenous	1	0.7	Mobility		
Education level			Bedridden	3	2.1
Illiterate	27	20.1	Uses wheelchair	19	13.2
Literate/Fundamental I	50	37.3	Walks with aid	31	21.5
Fundamental II	15	11.2	Walks without aid	91	63.2
High school	26	19.4	Functional capacity		
Graduate studies	16	11.9	A (independent)	67	46.5
Marital status			B	28	19.4
Single	64	44.7	C	2	1.4
Married	14	9.8	D	2	1.4
Divorced	19	13.3	E	14	9.7
Widow/er	46	32.1	F (dependent)	8	5.6
Reason for institutionalization			G (not classifiable)	23	16.0
Lack of caregiver	54	38.0	Cognitive state (Pfeiffer)		
Lived alone	22	15.5	Intact	29	20.1
Homeless	4	2.8	Slight cognitive decline	24	16.7
Disease	17	12.0	Moderate cognitive decline	64	44.4
Own choice	11	7.7	Severe cognitive decline	27	18.8
Other reasons	16	11.3			
Several reasons	18	12.7			
Money administration					
Elderly	16	11.1			
Relatives or other person	56	38.9			
Institution	41	28.5			
Institution and relatives	10	6.9			
Institution and elderly	13	9.0			
NA (no income)	6	4.2			

NA: not applicable.

vated frequency of depressive symptoms in the sample[18-19]. On the other hand, negative health evaluation could have a direct relationship with objective indicators, which has been consolidated in scientific literature[18]. Among these indicators, the sociodemographic health determinants must be taken into consideration. In this direction, two studies have identified higher proportions of negative health perception in the Northeast population, which is attributed to worst health assistance and health conditions[9,20]. Also, the institutionalized elderly in the city of Natal are characterized, generally, by a high degree of disability and weak health, although the individuals presenting higher cognitive decline were excluded from the study presented herein[21].

Regarding the factors associated with bad health perception, herein sociodemographic factors, such as age and sex, were not associated with the outcome, as observed in a study carried out in Spain[19]. Multiple analysis showed that negative health evaluation was independently associated with specific health- related variables, such as weight loss in the last year and presence of rheu-

Table 2. Bivariate analysis between negative self-perceived health and independent variables in institutionalized elderly in the city of Natal/RN. Natal, RN, Brazil, 2015.

Variables	Negative self-perceived health			
	n	%	p	PR (CI: 95%)
Age				
60-80	44	62.9	0.935[*]	1.00
81 and over	47	63.5		1.01 (0.79-1.30)
Children				
Yes	47	58.8	0.193[*]	1.00
No	43	69.4		1.18 (0.92-1.51)
Retired				
Yes	86	65.2	0.192[*]	1.00
No	5	45.5		0.70 (0.36-1.35)
Reason for institutionalization: lack of caregiver				
No	53	60.2	0.221[*]	1.00
Yes	38	70.4		1.17 (0.92-1.49)
Physical Activity				
Yes	27	54.0	0.095[*]	1.00
No	64	68.1		1.26 (0.94-1.69)
Hobbies				
Yes	45	58.4	0.205[*]	1.00
No	46	68.7		1.17 (0.92-1.51)
Crafts				
Yes	12	48.0	0.083[*]	1.00
No	79	66.4		1.38 (0.90-2.12)
Other free time occupations				
Yes	24	77.4	0.064[*]	1.00
No	67	59.3		0.77 (0.60-0.98)
Number of elderly per caregiver				
0-6.5	31	70.5	0.136[‡]	1.00
7-8	31	64.6		0.92 (0.69-1.22)
8.5 and over	29	55.8		0.79 (0.58-1.08)
Chronic diseases				
No	2	25.4	0.052[†]	1.00
Yes	89	65.4		2.62 (0.78-8.75)
Dementia				
No	77	66.4	0.107[*]	1.00
Yes	14	50.0		0.75 (0.51-1.11)
Falls				
No	82	61.2	0.092[†]	1.00
Yes	9	90.0		1.47 (1.15-1.88)

Note: contains the variables "age" and those with p values under 0.225 that were not included in the final model. [*] Chi-squared test; [†] Fisher's Exact Test; [‡] Linear trend chi-squared test.
Source: elaborated by the authors

matic disease, as well as with a variable related to the institution (not-for-profit LTIE).

Among these factors, involuntary weight loss was the most strongly associated with negative health self-assessment. It is a variable that can indicate a decline in health, and represents, classically, one of the specific indicators of the frailty phenotype[13]. In a study carried out with institutionalized elderly in the USA, a statistically significant relationship was established between frailty and lower life quality levels. Due to the strong relationship between self-perceived health and life quality, it has been suggested that actions against the frailty process could improve life quality of this increasing population group[22].

The elderly that suffered from chronic diseases presented a higher proportion of negative health self-reports. Alves e Rodrigues[2] carried

Table 3. Bivariate analysis by chi-squared test and multivariate analysis of the variables included in the final model for negative self-perceived health in institutionalized elderly. Natal, RN, Brazil, 2015.

Variables	Negative self-perceived health		PR (CI: 95%)	Adjusted PR (CI: 95%)
	n	%		
Weight loss				
No	55	55.6	1.00	1.00
Yes	34	81.0	1.46 (1.16-1.83)	1.54 (1.19-1.99)
Rheumatic disease				
No	77	60.6	1.00	1.00
Yes	14	82.4	1.36 (1.05-1.76)	1.46 (1.05-2.01)
Type of institution				
For profit	27	52.9	1.00	1.00
Not-for-ptofit	64	68.8	1.30 (0.97-1.74)	1.37 (1.03-1.83)
Sex				
Men	22	73.3	1.00	1.00
Women	69	60.5	0.82 (0.63-1.07)	0.82 (0.60-1.12)

out a cross-sectional study with more than 2,000 elderly in the municipality of Sao Paulo (Southeast Brazil), and established a strong association between health perception and the number of morbidities. Other research corroborated the same finding in institutionalized elderly, along with no association with age or sex[19]. However, herein negative self-perceived health there was no statistically significant association with the presence or number of chronic diseases, and the only chronic pathology that remained in the final model was rheumatic disease.

The patients that present musculoskeletal pathologies frequently suffer pain, mobility restrictions and functional limitations, and these factors could lead to worse quality of life and bad self-perceived health[23]. The additional negative effect of rheumatic disease on the morbidity load has been verified, which in turn affects functionality and life quality[24]. Herein bad self-perceived health was not associated with functional dependency for BADL, in opposition to a study carried out in Spain[19].

Another associated factor identified herein was the type of institution: in not-for-profit LTIE the proportion of residents that considered their health as "bad" was higher than in for-profit LTIE, and this association was significant in the final model. Other authors have not established statistically significant differences in health perception when comparing not-for-profit and for-profit LTIE. In Spain, the profile of residents is not too different depending on the type of LTIE; how-

ever, this is not the case for Brazil[19] (and it must be highlighted that no philanthropic LTIE were available herein).

In Brazil, most LTIE have philanthropic nature. Public LTIE represent than less 7% of the total number; in fact, in Natal there are no public LTIE. Despite the hybrid sociosanitary function of these collective residences, the frequently deteriorated health state of residents causes medical services to prevail over the offer of leisure and social activities, especially in not-for-profit LTIE[25]. Low stimulus to social integration, along with the lack of professionals and social abandonment reality (more characteristic of philanthropic institutions) could explain the higher proportion of elderly that perceived their health as "bad" in this type of LTIE.

At this point, there are some limitations that must be recognized herein. Chronic diseases could have been under-registered, due to the lack of health professionals and subsequent diagnostics. However, the maximum amount of available information was gathered, consulting medical records and interviewing the personnel at institutions and the elderly. Type-II error could have occurred due to the size of the sample, which was affected by the elevated proportion of excluded cases due to cognitive disability to answer questionnaires.

The study presented herein contributes with the representativeness of the sample, obtained thanks to the participation of the majority of LTIE in the city of Natal and also to the low num-

ber of refusals from residents. After a systematic and exhaustive literature review, this is the first study that analyzed the factors associated with self-perceived health in Brazilian institutionalized elderly.

Conclusion

More than 60% of the institutionalized elderly in the city of Natal (Northeast Brazil) considered their health as "bad", which is a high prevalence when compared to other national and international studies. "Bad" self-perceived health was associated with weight loss, rheumatic disease and not-for-profit LTIE, indicating the importance of these variables related to health state and institutionalization characteristics. It is important to develop control actions towards chronic diseases, oriented to the improvement of health in this population group. Considering the knowledge gap that currently exists in scientific literature, more studies are necessary, focused on self-perceived health in institutionalized elderly.

Collaborations

All authors contributed to the conception and design or analysis and interpretation of data; writing of manuscript or critical review; and approval of final version to be published.

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