



Frailty of old people treated in secondary health care: associated factors

Daiana Muniz Costa¹ 
Isis Laila Oliveira Santana¹ 
Sônia Maria Soares¹ 

Abstract

Objective: To evaluate the association between sociodemographic, economic, clinical, and behavioral characteristics and the degree of frailty of old people treated in secondary health care. **Method:** Cross-sectional, analytical study carried out between May and September, 2018 with 376 old people treated at a Center of Medical Specialties of Belo Horizonte (MG, Brazil) selected by the random systematic sampling method. Data was collected by interviews and tests to assess the frailty phenotype, being analyzed using descriptive statistics, bivariate, and multivariate analysis using the Proportional Odds Model. **Results:** The prevalence of frailty was 25.3%. The variables significantly related to the greater chance of presence of frailty in the old people were female gender, low education, hospitalization and falls in the last 12 months, use of walking aid and absence of physical activity. **Conclusion:** The knowledge on the factors associated with frailty allows to improve the planning of health actions and to intervene in the modifiable factors related to frailty, thus preventing its onset, the occurrence of negative events resulting from this syndrome, or even reversing its stage. The results demonstrate the importance of managers of the secondary health care services implementing a methodology to identify frailties in old people, as well as a health care model for the fragile old person to follow and monitor their clinical conditions.

Keywords: Health of the Elderly. Frail Elderly. Frailty. Secondary Care.

¹ Universidade Federal de Minas Gerais, Escola de Enfermagem, Departamento de Enfermagem Básica, Programa da Pós-Graduação em Enfermagem. Belo Horizonte, Minas Gerais, Brasil.

The authors declare there are no conflicts of interest in relation to the present study.

No funding was received in relation to the present study.

Correspondence
Daiana Muniz Costa
daianamunizcosta@gmail.com

Received: August 10, 2020
Approved: January 22, 2021

INTRODUCTION

Frailty among old people has emerged as an important concept in gerontology and geriatrics. However, there is no consensus on its definition in the literature, nor standard diagnostic criteria to be used in clinical practice and in epidemiological research¹.

The most common definition in the literature² and which is a reference for the present study is in line with the model implemented by Fried et al³ conceptualizing frailty as a geriatric clinical syndrome involving a physiological state of increased vulnerability to stressors, being supported by a triad of alterations related to the human aging process: sarcopenia, dysregulation of the neuroendocrine system, and dysfunction of the immune system³.

Frailty is a worrying condition because it is related to negative health outcomes for the old person⁴. Regarding the factors associated with the frailty syndrome, the most frequent ones pointed out by national and international literature are falls⁴, comorbidities⁵, medication intake⁶, hospitalization⁴, loss of functional capacity⁴, and old age⁷.

The early identification of the predictive characteristics defining the frailty syndrome is important for the development of health care policies, implementation of appropriate interventions aimed at treating or even reversing the onset of the syndrome, thus reflecting on improvement in the quality of life of the old person and on prevention of adverse events caused by frailty⁸.

Studies addressing the prevalence and factors associated with frailty carried out in different contexts, such as the basic health unit,⁹ hospitals¹⁰, long-term institutions¹¹ and in geriatric and gerontology outpatient clinics¹²⁻¹³ were observed in the Brazilian literature, which allows understanding the health conditions of a variety of old people in different contexts reflecting percentages of individuals considered fragile¹⁴. However, there is a scarcity of studies with old people in the context of secondary health care, especially in services which do not offer specific care to the old person.

In view of the results found in the national literature, there is a high prevalence of frailty in the

old population treated in geriatric and gerontology outpatient clinics - between 20.0% to 56.0%^{12-13,15-16}, which explained the need to expand the study of prevalence and associated factors in a specialty outpatient clinic not offering specific care to the old population.

In addition to the scarcity of scientific publications and the high prevalence of frailty in geriatric and gerontology outpatient clinics, it is observed that health care professionals who work in reference services of secondary health care are unaware of specific assessment instruments to treat the old person. Thus, it is expected that the present study can contribute to promote changes in the assistance for old people in need of care in secondary health care units for the treatment of different comorbidities. The professional practice shows that the old person is often seen in these services without any more specific geriatric assessment, which somehow ends up not revealing the health problems extremely specific to aging, such as the condition of fragility.

Given this context, the question is, “what is the prevalence of frailty in old people and the factors associated with this syndrome in an outpatient clinic in Minas Gerais (MG), Brazil?” The hypothesis of the present study is based on the following issue: The prevalence of frail old people seen in a specialty outpatient clinic in Minas Gerais is similar to the prevalence of frailty found in old people seen in geriatric and gerontology outpatient clinics, as well as the factors associated with frailty related to falls, comorbidities, medication intake, hospitalization, loss of functional capacity, and old age.

Therefore, the objective of the present study is to evaluate the association between sociodemographic, economic, clinical, and behavioral characteristics and the degree of frailty of old people seen in the context of secondary health care.

METHOD

This is a cross-sectional and analytical study carried out in a Medical Specialties Center (CEM) of a large philanthropic hospital in Belo Horizonte (MG, Brazil) which has its own management and a

contract with the Municipal Health Department of Belo Horizonte (MG, Brazil).

This outpatient clinic was opened in 2007 and aims to offer interdisciplinary care to users of the Unified Health System (SUS) referred by the Basic Health Units of Belo Horizonte and by the Health Departments of municipalities in Minas Gerais, in addition to post-discharge patients from the main Hospital of which the outpatient clinic is part.

Around 6,000 people circulate there daily, including users, caregivers, and health professionals. The institution offers 31 medical specialties, in addition to the multi-professional team comprising nursing, psychology, nutrition, social work, speech therapy, physiotherapy, and dentistry. It also offers 18 types of exams and small outpatient surgeries and laboratory care.

The individuals who participated in the study were aged 60 years or over, from Belo Horizonte or other cities in Minas Gerais, treated at CEM from May to September 2018, and with cognitive ability identified by the cut-off points of the Mini Mental State Examination (MMSE), according to Bertolucci et al¹⁷. Individuals with neurological diseases preventing them to answer questionnaires, carry out the tests, and who presented any complications on the day of the appointment or exam were excluded.

The sample was defined by the systematic random sampling method. Thus, at the end of each day, the information on all the old people scheduled for the following day was listed to avoid absences of users in the first appointments referred by the Appointment Central, Municipal Oncology Commission, and the Hospitalization Center, since they send the list of users scheduled for the following day on a daily basis.

The old people were included in a list, numbered according to the time of the appointment or exam, and were selected following the sampling interval, which defines the interval between a selected individual and the next individual to be included in the study. To define the sample size, an observational study was carried out at the institution to account for the number of users who met the necessary requirements for carrying out the research.

Therefore, the population size (N) equal to 17,620 old people, a proportion (p) of 50% for frailty in a specialty outpatient clinic, a 95% confidence interval expressed by $Z^2_{\alpha/2}=1.96$, and a maximum tolerable sampling error of estimation $\epsilon=0.05$ were considered. Thus, the measured sample had a total of 376 individuals.

The interviews were carried out by three researchers previously trained in the place where the old person waited for treatment after explaining the research objectives, benefits, and harms, reading and signing two copies of the Informed Consent Form (ICF).

Data was collected using a specific questionnaire for this study. The instruments used were the MMSE¹⁷, Katz Scale¹⁸, Lawton and Brody Scale¹⁹.

The cognitive screening was evaluated by the MMSE, which is widely used and validated in Brazil. This questionnaire comprises questions grouped into categories and represented by groups of specific cognitive functions, such as temporal and spatial orientation, immediate memory, attention and calculation, evocation memory, language, and visual constructive capacity. A total score is derived from the sum of the scores of the categories¹⁷.

The Katz Scale assesses six basic activities related to self-care: bathing, dressing, going to toilet, transferring, feeding, and continence. The final score gives the individual's degree of dependence. Old people who were independent in the six activities were classified as independent, old people who were dependent on one to five activities were classified as partially dependent, and those who were dependent on the six items evaluated were considered as totally dependent¹⁸.

The Lawton and Brody Scale comprises more complex items in daily living, and independence in carrying them out is directly related to the ability of living an independent community life. Based on this scale, the old people were classified as independent when they scored above 27 points, those with a maximum score of 26 points were classified as dependent¹⁹.

To assess the presence of the frailty syndrome, tests and questions were carried out to identify the five items described as components of the frailty phenotype proposed by Fried et al.,³ being them unintentional weight loss, decreased muscle strength, self-reported fatigue and/or exhaustion, slow gait speed, and low level of physical activity.

It was considered unintentional weight loss when the old person declared weight loss greater than or equal to 4.5kg in the last 12 months. The decrease in muscle strength was verified by the hand grip strength obtained with the test of the hydraulic dynamometer *Saehan*, model 5001, where the old person grasped it three times. The highest value was considered, adjusted according to the gender and body mass index, and old people presenting a score below the expected value above fulfilled the criterion for frailty syndrome.

Fatigue and/or exhaustion was measured using two questions from the Brazilian version of the depression scale of the *Center for Epidemiological Studies - Depression CES-D17*. “Feeling the need to make an effort to carry out usual tasks” and “Unable to finish tasks”. The score was given as (0) never/rarely, (1) sometimes, (2) often, (3) always. Old people who chose numbers 2 or 3 in any of the questions met the criterion for frailty²⁰.

The slowness in gait speed was calculated by the time spent to walk 4.6 meters, with three measurements being taken and considering the average value adjusted according to gender and height²¹.

The low level of physical activity was assessed by the reduced version of the instrument Minnesota Leisure Time Activity Questionnaire, which was translated and adapted for Brazil²². The instrument estimates the weekly caloric expenditure from the report of the old person regarding physical activities performed in the last two weeks prior to the assessment. The cut-off value was adjusted by gender, with women scoring for frailty with expenditure <270 kcal, and men with expenditure <383 kcal³.

Those old people who scored positive on three, four or five items were considered frail, those who

scored positive on one or two items were pre-frail, and those who did not score on any item were not frail³.

The data obtained was tabulated, grouped, and analyzed by descriptive statistics, and the frequency of each of the items of the frailty phenotype in the study sample was calculated based on that. A bivariate analysis was carried out to assess the association between independent variables and frailty using the Pearson’s Chi-Square Test and the Fisher’s Exact Test.

The variables that were associated with the dependent variable in the bivariate analysis presenting p -value ≤ 0.20 were considered significant, thus included in the ordinal logistic regression model as independent variables. Some of these variables were grouped for a better analysis of the model.

The Proportional Odds Model (POM) was used for the multivariate analysis since the frailty response variable comes from continuous variables that were subsequently grouped.

The study complied with the ethical and legal precepts guiding research involving human beings set out in Resolution No. 466/2012 of the National Health Council, and No. 510/2016 of the National Health Council of the Ministry of Health, being approved by the Research Ethics Committee of Universidade Federal de Minas Gerais under Opinion No. 2,689,601 and by the Ethics Committee of Santa Casa de Belo Horizonte under Opinion No. 2.833.608.

RESULTS

The sample comprised 376 old people, with 62.0% being females. The mean age was 69.88 years (standard deviation ± 7.38), with a predominance of old women aged 60 to 64 years, accounting for 29.2%. Regarding education, 48.2% had between one and four years of study, and 18.6% were illiterate.

The most frequent morbidity groups were cardiovascular with 32.0%, and metabolic/hormonal with 14.4% of old women. Regarding the number of morbidities, 71.5% had one to four morbidities.

Regarding the use of medication, 45.2% of old women made use of polypharmacy, with medication

acting on the cardiovascular system were 46.6%, on the digestive system and metabolism were 17.3%, and on the nervous system were 12.5%, the most frequent ones.

Regarding hospitalization in the last 12 months, the prevalence was 33.2%, ranging from one to ten hospitalizations. The average number of falls was 2.4, with 23.7% of the old women having at least one fall in the last 12 months. Of the old women interviewed, 11.2% used some kind of walking aid, with the cane being the most prevalent one.

Regarding the practice of physical activity, only 33.5% of the old people performed some kind of physical activity, with 21.3% having a frequency of two to six times a week.

Regarding the functional capacity of the participants, 96.6% were independent for the basic activities of daily living. It was found that among the six variables evaluated, continence was the one with the highest percentage of partially or totally dependent old people, with 38.0% of old people, and the feeding variable was the one with the highest percentage of independent old people, with 100.0% of the sample.

Regarding instrumental activities of daily living, it was observed that 68.6% of old people presented partial dependence. The variable in which the participants had the highest percentage of dependence (partial or total) was travel, with 48.4% of old people, while the variable with the highest percentage of independence was the use of the telephone, with 90.1%.

The prevalence of frailty according to the frailty phenotype was 25.3%, among pre-frail

old people it was 59.0%, and among the non-frail people it was 15.7%.

Regarding the prevalence of each component of the frailty phenotype, it was observed that the low level of physical activity was the variable in which more old people scored for frailty, accounting for 59.0% of them, followed by low muscle strength with 50.5%, self-reported fatigue and/or exhaustion with 30.3%, slow gait speed with 20.2%, and unintentional weight loss in the last 12 months was the least prevalent variable among the five with 18.6%.

There was an association between sociodemographic, economic, clinical-behavioral variables and frailty, as shown in the Table below (Table 1).

The variables that were shown to be associated with frailty in the multivariate analysis, being possible predictors of it, were gender, education, hospitalization and falls in the last 12 months, use of a walking aid device, and physical activity (Table 2).

The chance of an old woman belonging to a group of greater frailty is approximately 1.9 times greater compared to old men.

The old person who does not have education is 2.9 times more likely to belong to a class of greater frailty, and old people with one to four years of education have 2.0 times more chance compared to those old people who have more than five years of education.

The chance of an old person who does not practice physical activity to belong to a group of greater frailty is approximately 7.1 times greater than that of old people who practice physical activity.

Table 1. Distribution of old people according to the frailty phenotype and the sociodemographic, economic, clinical, and behavioral factors and functional capacity analyzed (n=376). Belo Horizonte, MG, 2018.

Variables	Frailty Phenotype			<i>p-value</i>
	Frail (n = 95)	Pre-Frail (N=222)	Not Frail (n = 59)	
	n (%)	n (%)	n (%)	
Gender				
Female	69 (72.6)	133 (59.9)	31 (52.5)	0.027*
Male	26 (27.4)	89 (40.1)	28 (47.5)	
Age group (years)				
60-69	51 (53.7)	112 (50.4)	41 (69.5)	0.000*
70-79	23 (24.2)	87 (39.2)	17 (28.8)	
80 and over	21 (22.1)	23 (10.4)	1 (1.7)	
Place of Birth				
Countryside of Minas Gerais	64 (67.4)	157 (70.7)	45 (76.3)	0.273**
Belo Horizonte and the metropolitan region	17 (17.9)	48 (21.6)	9 (15.2)	
Others	14 (14.7)	17 (7.7)	5 (8.5)	
City of residence				
Belo Horizonte and the metropolitan region	76 (80.0)	182 (82.0)	49 (83.0)	0.875**
Countryside of Minas Gerais	19 (20.0)	40 (18.0)	10 (17.0)	
Race/color				
Brown	62 (65.3)	121 (54.5)	32 (53.4)	
White	17 (17.9)	69 (31.1)	19 (32.8)	0.016*
Black	16 (16.8)	32 (14.4)	8 (13.8)	
Marital status				
Married/common-law marriage	32 (33.7)	100 (45.1)	35 (59.3)	
Widow/er	36 (37.9)	72 (32.4)	9 (15.2)	0.013*
Divorced / Single	27 (28.4)	50 (22.5)	15 (25.5)	
Home arrangement				
Lives with family	83 (87.4)	179 (80.6)	52 (88.1)	0.194*
Lives alone	12 (12.6)	43 (19.4)	7 (11.9)	
Religion				
Catholic	63 (66.0)	138 (62.2)	43 (72.9)	0.291**
Evangelic	27 (28.7)	64 (28.8)	15 (25.4)	
Others	5 (5.3)	20 (9.0)	7 (1.7)	
Education (years)				
Zero	27 (28.4)	34 (15.3)	9 (15.3)	
1-4	51 (53.7)	106 (47.8)	24 (40.7)	0.001*
≥ 5	17 (17.9)	82 (36.9)	26 (44.0)	
Retirement				
Yes	64 (67.4)	168 (75.7)	45 (76.3)	0.271*
No	31 (32.6)	54 (24.3)	14 (23.7)	
Pensioner				
Yes	25 (26.3)	44 (19.8)	7 (11.9)	0.422*
No	70 (73.7)	178 (80.2)	52 (88.1)	

to be continued

Continuation of Table 1

Variables	Frailty Phenotype			<i>p-value</i>
	Frail (n = 95)	Pre-Frail (N=222)	Not Frail (n = 59)	
	n (%)	n (%)	n (%)	
Currently working				
Yes	9 (9.5)	42 (18.9)	11 (18.6)	0.103*
No	86 (90.5)	180 (81.1)	48 (81.4)	
Individual income (minimum wage)				
< 1	11 (11.6)	26 (11.7)	7 (11.9)	
1-3	82 (86.3)	192 (86.5)	49 (83.0)	0.681**
≥ 4	2 (2.1)	4 (1.8)	3 (5.1)	
Morbidity				
Yes	95 (100.0)	219 (98.7)	59 (100.0)	0.735**
No	0 (0.0)	3 (1.3)	0 (0.0)	
Number of morbidities				
Zero	0 (0.0)	3 (1.4)	0 (0.0)	
1-4	56 (59.0)	161 (72.5)	52 (88.1)	0.001**
≥ 5	39 (41.0)	58 (26.1)	7 (11.9)	
Use of medication				
Yes	90 (94.7)	198 (89.2)	56 (94.9)	0.159*
No	5 (5.3)	24 (10.8)	3 (5.1)	
Number of medications				
Zero	5 (5.3)	24 (10.8)	3 (5.1)	
1-4	36 (37.9)	105 (47.3)	33 (55.9)	0.041*
≥ 5	54 (56.8)	93 (41.9)	23 (39.0)	
Body mass index (Kg/m ²)				
< 22	17 (17.9)	32 (14.4)	6 (10.2)	
≥ 22 e ≤ 27	28 (29.5)	96 (43.2)	28 (47.4)	0.128*
> 27	50 (52.6)	94 (42.4)	25 (42.4)	
Hospitalization (last 12 months)				
Yes	49 (51.6)	64 (28.8)	12 (20.3)	<0.000*
No	46 (48.4)	158 (71.2)	47 (79.7)	
Number of hospitalizations (last 12 months)				
Zero	46 (48.4)	158 (71.2)	47 (79.7)	
1-5	48 (50.5)	63 (28.4)	12 (20.3)	<0.000**
6-10	1 (1.1)	1 (0.4)	0 (0.0)	
Falls (last 12 months)				
Yes	31 (32.6)	51 (23.0)	7 (11.9)	0.021*
No	64 (67.4)	171 (77.0)	52 (88.1)	
Number of falls (last 12 months)				
Zero	64 (67.4)	171 (77.0)	52 (88.1)	
1-4	29 (30.5)	47 (21.2)	7 (11.9)	0.048**
≥ 5	2 (2.1)	4 (1.8)	0 (0.0)	

to be continued

Continuation of Table 1

Variables	Frailty Phenotype			<i>p-value</i>
	Frail (n = 95)	Pre-Frail (N=222)	Not Frail (n = 59)	
	n (%)	n (%)	n (%)	
Uses walking aid device				
Yes	32 (33.7)	10 (4.5)	0 (0.0)	<0.000**
No	63 (66.3)	212 (95.5)	59 (100.0)	
Walking aid device				
Does not use	63 (66.3)	212 (95.4)	59 (100.0)	<0.000**
Cane	11 (11.6)	5 (2.3)	0 (0.0)	
Others	21 (22.1)	5 (2.3)	0 (0.0)	
Alcohol consumption				
Never drank	43 (45.2)	94 (42.4)	21 (35.6)	0.093*
Had already drank	41 (43.2)	76 (34.2)	22 (37.3)	
Currently drinks	11 (11.6)	52 (23.4)	16 (27.1)	
Frequency of alcohol consumption				
No	43 (45.2)	94 (42.3)	21 (35.6)	0.358*
Rarely	29 (30.5)	53 (23.9)	17 (28.8)	
1-7 x/week	23 (24.2)	75 (33.8)	21 (35.6)	
Volume of alcohol consumption (glasses)				
Zero	43 (45.3)	94 (42.3)	21 (35.6)	0.442*
1-3	36 (37.9)	73 (32.9)	24 (40.7)	
≥ 4	16 (16.8)	55 (24.8)	14 (23.7)	
Smoking				
No	53 (55.8)	110 (49.6)	24 (40.7)	0.137*
Ex-smoker	32 (33.7)	89 (40.1)	32 (54.2)	
Current smoker	10 (10.5)	23 (10.3)	3 (5.1)	
Cigarette consumption/day				
Zero	53 (55.8)	110 (49.6)	24 (40.7)	0.353*
< 10	15 (15.8)	43 (19.3)	14 (23.7)	
≥ 10	27 (28.4)	69 (31.1)	21 (35.6)	
Years of tobacco consumption				
Zero	53 (55.8)	110 (49.6)	24 (40.7)	0.432**
1-10	7 (7.4)	22 (9.9)	8 (13.6)	
> 10	35 (36.8)	90 (40.5)	27 (45.7)	
Physical activity				
Yes	9 (9.5)	72 (32.4)	45 (76.3)	0.000*
No	86 (90.5)	150 (67.6)	14 (23.7)	
Frequency of physical activity (x/week)				
Zero	86 (90.5)	150 (67.6)	14 (23.7)	<0.000**
1	5 (5.3)	8 (3.6)	2 (3.4)	
2-7	4 (4.2)	64 (28.8)	43 (72.9)	

to be continued

Continuation of Table 1

Variables	Frailty Phenotype			<i>p-value</i>
	Frail (n = 95)	Pre-Frail (N=222)	Not Frail (n = 59)	
	n (%)	n (%)	n (%)	
Katz Scale Classification				
Independence	83 (87.4)	221 (99.5)	59 (100.0)	0.000**
Partial dependence	10 (10.5)	1 (0.5)	0 (0.0)	
Important dependence	2 (2.1)	0 (0.0)	0 (0.0)	
Lawton and Brody Scale Classification				
Independence	13 (13.7)	80 (36.0)	24 (40.7)	0.000**
Partial dependence	81 (85.2)	142 (64.0)	35 (59.3)	
Total dependence	1 (1.1)	0 (0.0)	0 (0.0)	

Source: Data from a Medical Specialties Center in Belo Horizonte developed for research purposes; the Minimum Wage in 2018 was R\$954.00; Significant tests at 0.05; *Chi-square test; **Fisher's exact test.

Table 2. Ordinal logistic regression model of proportional chances, with frailty as the answer (n=376). Belo Horizonte, MG, 2018.

Covariate	B	OR	Wald test (<i>p-value</i>)	Score Test (<i>p-value</i>)
Gender				
Male		1.00		
Female	-0.62	0.54	7.02 (0.008)	
Education (in years)				
Zero	-1.05	0.35	10.48 (0.001)	
1 to 4	-0.72	0.49	8.17 (0.004)	
≥ 5		1.00		
Hospitalization in the last 12 months				
Yes		1.00		
No	0.77	2.16	9.92 (0.002)	9.81 (0.200)
Fall in recent months				
Yes		1.00		
No	0.54	1.72	4.17 (0.041)	
Walking Aid Device				
Yes		1.00		
No	2.33	10.28	30.69 (0.000)	
Physical activity				
Yes		1.00		
No	-2.00	0.14	51.88 (0.000)	

Source: Data from a Medical Specialties Center in Belo Horizonte developed for research purposes; OR: Odds Ratio; *Deviance* Test (*p-value*=0.547).

DISCUSSION

National studies carried out in geriatric and gerontology outpatient clinics showed similar results to those found in the present research (25.3% of frail old people) as in Belém (PA), where the prevalence was 23.0%¹², Juiz de Fora (MG) with 20.0%¹³, Porto Alegre (RS) with 31.0%¹⁶. In a study carried out in an outpatient clinic in Campinas (SP), the prevalence of frailty was higher, with 56.0%¹⁵.

Among the three classifications proposed by Fried et al.³, the highest prevalence observed in the present study was of pre-frail old people with 59.0% of the total respondents, as well as most studies carried out in outpatient clinics.

A longitudinal study using the database of the Health, Well-Being and Aging (SABE) Study followed 1,399 old people who comprised the sample after four years with the aim of evaluating the progression of the frailty syndrome. It showed that almost 51.0% of the old people who were frail at the study onset progressed to the condition of pre-frailty. Among pre-frail old people at the study onset, most remained in this condition, but about 28.0% became non-frail, not scoring in any other component of the syndrome⁸.

The frailty syndrome is preventable and reversible²³. Therefore, it is important that health care teams assess the physical and functional conditions of the old people identifying the condition of pre-frailty or even the syndrome already installed. In view of the result of these assessments, they shall plan health actions aimed at this population group to maintain autonomy and independence²⁴.

Secondary health care plays an essential role in resolving and comprehensively providing care, expanding access to specialized appointments and procedures, articulating the points of the Health Care Network²⁵.

Public health care services need to adapt to the aging population, considering the specific characteristics and needs of the old person²⁶, and have a new perspective no longer on the disease but on the functionality and identification of the risks of frailty.

Several studies carried out in different contexts and countries bring the association of frailty with gender, with the syndrome being more prevalent in women^{3,5}. Regarding the physiological aspect, women are more prone to the development of sarcopenia, which is an intrinsic risk to the development of frailty, and to presenting less muscle strength compared to men³.

The present study showed a significant association between frailty and education, with most frail old people having no or low education (one to four years). Other authors emphasize the significant influence of education on the frailty syndrome^{3,27}.

According to the Brazilian Institute of Geography and Statistics, old people are the segment of population with the lowest level of education and the highest rate of illiteracy. The different educational levels are related to different health habits and opportunities for social mobility, among others²⁸. Health professionals need to identify the educational level of the old person and adapt the measures of guidance and education for self-care according to the level of understanding of this population²⁹.

The present study and others were also associated frailty with hospitalization in the last 12 months³⁰. Hospitalization predisposes old people to exposure to other diseases and adverse events that can further weaken their health. Therefore, it is of utmost importance to carry out strategies to prevent the frailty syndrome or to reverse it, which could decrease the likelihood of the old person being hospitalized and the other negative consequences that hospitalization can cause.

According to the reference used³, frailty is associated with falls of the old person. A systematic review covered 19 studies with a population of 40 to 6,724 old people, aimed to analyze the prevalence of falls and the frailty syndrome, and the association between them. The prevalence of falls of the frail old person varied between 6.7% and 44.0%, and there was evidence that falling is associated with frailty, with an association of 1.8 (95% CI, 1.51-2.13)³¹.

In addition to the physical consequences and increased likelihood of hospitalizations, falling of old people brings repercussions on their functionality and autonomy. It is important that health care

professionals, especially those working in primary and secondary care, discuss measures to prevent falls with the old people and their families to avoid it and its consequences.

Another factor associated with frailty addressed in some studies is the use of a walking aid device. A longitudinal study carried out with 5,450 old people in which frailty was identified according to the criteria of Fried et. al.³ found that 93.0% of frail individuals had mobility difficulties versus 58.0% of non-frail individuals. Among those with mobility difficulties, 71.0% of frail old people and 31.0% of non-frail old people said they have had some help. Of those with difficulties, 63.0% of frail and 20.0% of non-frail individuals used a cane; the use of other aid devices was uncommon³².

The difficulty to walk and the need for a walking aid device are factors directly related to the physical dimension of frailty, such as sarcopenia, and it is possible that frail old people report difficulties to walk and the need for a walking aid device for locomotion³³.

In the present study, the relation between frailty and lower frequency of physical activity was observed. According to a study, the sedentary behavior was a significant predictor of frailty development, with the risk of progressing to physical frailty increasing by 36.0% for each additional hour in sedentary habit³⁴.

It is observed that at the level of the primary health care, there is a greater incentive for actions aimed at preventing and promoting health such as practicing physical activities, compared to secondary health care. In addition, patients who are treated at this level of care have a more complex health profile with greater limitations, a fact that can contribute to a less incentive to practice physical activity by professionals.

Knowing the factors associated with frailty in old people allows actions to be taken to prevent or minimize the negative effects of the syndrome, although there are some factors that cannot be modified³⁰. The study showed some weaknesses regarding the care of old person in the scope of secondary health care, which has a significant volume of treatment at SUS in the entire state of Minas

Gerais, especially regarding the specific competences for the care of the old person. The results presented showed a prevalence of frailty and significant pre-frailty, and some factors associated with frailty that can be modified if they are approached by trained professionals, which was little known in this type of service.

Investments, planning, and implementation of a model of care for the fragile person and the identification of fragility in secondary health care services are necessary. Users of services at this level of health care already have some comorbidity, and therefore it is important that they are monitored to minimize the condition of fragility and the various negative impacts on the old person, their family members, and the health system.

The fact of results referring only to the context in which they were carried out are a possible limitation to the study. We strongly emphasize the approach of a population treated at a service comprising the secondary health care with an expressive volume of care.

CONCLUSION

Among the sociodemographic, economic, clinical, and behavioral characteristics analyzed, it was found that the variables female gender, low education, hospitalization and falls in the last 12 months, use of a walking aid device, and absence of physical activity were associated with fragility.

The identification of factors associated with frailty is important to support the planning of health actions at all levels of care, seeking to guarantee the integrality and continuity of care, intervening in the modifiable factors that are related to frailty to prevent its installation, the occurrence of negative events resulting from this syndrome or even reverse its stage.

Secondary health care is responsible for early diagnosis, control of modifiable factors related to frailty, and monitoring of negative events resulting from this syndrome.

This study demonstrated a high prevalence of frail and pre-frail old people, accounting for

84.3%. Considering some factors associated with frailty that can be modified, in addition to the consequences that the frailty syndrome can bring to the old person, their family, and the health system, it is necessary that these aspects are addressed in secondary health care, which plays an essential role in the care of the individual.

The results presented demonstrate the importance of managers of the secondary health care services implementing a methodology to identify frailties in old people, as well as a health care models for the fragile old person to follow and monitor their clinical conditions.

Thus, the relevance of the development of assistance models at this level of care is emphasized, with the insertion of multidimensional assessment instruments for the old people, which can be incorporated to the early detection of old people in conditions of pre-frailty and fragility. We believe that the results of the present study may raise new questions about care for the old person in the context of secondary health care, with the perspective of expanding gerontic-geriatric care, as well as the development of longitudinal studies to assess significant outcomes related to frailty.

Edited by: Ana Carolina Lima Cavaletti

REFERENCES

- Freire JCG, Nobrega IRAP, Dutra MC, Silva LM, Duarte HA. Fatores associados à fragilidade em idosos hospitalizados: uma revisão integrativa. *Saúde Debate*. 2017;41(115):1199-1211. Available from: <http://dx.doi.org/10.1590/0103-1104201711517>
- Buta BJ, Walston JD, Godino JG, Park M, Kalyani RR, Xue QL, et al. Frailty assessment instruments: Systematic characterization of the uses and contexts of highly-cited instruments. *Ageing Res Rev*. 2016;26:53-61. Available from: <https://doi.org/10.1016/j.arr.2015.12.003>
- Fried LP, Tegen CM, Walston J, Newman AB, Hirsch NC, Gottdiene J, et al. Frailty in older adults: evidence for a phenotype. *J Gerontol Ser A Biol Sci*. 2001;56(3):146-56. Available from: <https://doi.org/10.1093/gerona/56.3.M146>
- Vermeiren S, Vella-Azzopardi R, Beckwee D, Habbig AK, Scafoglieri A, Jansen B, et al. Frailty and the Prediction of Negative Health Outcomes: A Meta-Analysis. *J Am Med Dir Assoc*. 2016;58(4):1-17. Available from: <https://doi.org/10.1016/j.jamda.2016.09.010>
- Pegorari MS, Tavares DMS. Factors associated with the frailty syndrome in elderly individuals living in the urban area. *Rev Latinoam Enferm*. 2014;22(5):874-82. Available from: <http://dx.doi.org/10.1590/0104-1169.0213.2493>
- Herr M, Robine JM, Pinot J, Arvieu JJ, Ankri J. Polypharmacy and frailty: prevalence, relationship, and impact on mortality in a French sample of 2350 old people. *Pharmacoepidemiol Drug Saf*. 2015;24(6):637-46. Available from: <https://doi.org/10.1002/pds.3772>
- Chen S, Honda T, Chen T, Narazaki K, Haeuchi Y, Supertini A, et al. Screening for frailty phenotype with objectively measured physical activity in a west Japanese suburban community: evidence from the SasaguriGenkimon Study. *BMC Geriatr*. 2015;15(36):1-10. Available from: <https://doi.org/10.1186/s12877-015-0037-9>
- Duarte YAO, Nunes DP, Andrade FB, Corona LP, Brito TRP, Santos JLF, et al. Fragilidade em idosos no município de São Paulo: prevalência e fatores associados. *Rev Bras Epidemiol [Internet]*. 2018;21(supl.2):1-16. Available from: <http://dx.doi.org/10.1590/1980-549720180021.supl.2>
- Neves AQ, Silva AMC, Cabral JF, Mattos IE, Santiago LM. Prevalência e fatores associados à fragilidade em idosos usuários da Estratégia Saúde da Família. *Rev Bras Geriatr Gerontol*. 2018;21(6):704-14. Available from: <http://dx.doi.org/10.1590/1981-22562018021.180043>
- Silva LC, Pegorari MS, Dias FA, Marchiori GF, Tavares DMS. Factors associated to the frailty phenotype components among hospitalized elderly patients. *Rev Bras Cineantropom Hum*. 2017;20(6):607-17. Available from: https://www.scielo.br/scielo.php?script=sci_arttext&pid=S1980-00372018000600607
- Fluett MT, Fhon JRS, Oliveira AP, Chiquito LMO, Marques S. Síndrome da fragilidade em idosos institucionalizados. *Rev Bras Geriatr Gerontol*. 2018;21(1):62-71. Available from: https://www.scielo.br/pdf/rbagg/v21n1/pt_1809-9823-rbagg-21-01-00060.pdf

12. Freitas CV, Sarges ESNF, Moreira KEC, Carneiro SR. Evaluation of frailty, functional capacity and quality of life of the elderly in geriatric outpatient clinic of a university hospital. *Rev Bras Geriatr Gerontol.* 2016;19(1):119-28. Available from: <http://dx.doi.org/10.1590/1809-9823.2016.14244>
13. Silva SLA, Vieira RA, Arantes P, Dias RP. Avaliação de fragilidade, funcionalidade e medo de cair em idosos atendidos em um serviço ambulatorial de Geriatria e Gerontologia. *Fisioter Pesqui.* 2009;16(2):120-5. Available from: <http://dx.doi.org/10.1590/S1809-29502009000200005>
14. Pinto Junior EP, Marques CG, Silva AVS, Guimarães MAP, Pedreira RBS, Silva MGC. Prevalência e fatores associados ao fenótipo da fragilidade em idosos brasileiros: uma revisão de literatura. *Rev Kairós.* 2015;18(3):353-66. Available from: <https://revistas.pucsp.br/index.php/kairos/article/viewFile/28125/19779>
15. Melo DM, Falsarella GR, Neri AL. Autoavaliação de saúde, envolvimento social e fragilidade em idosos ambulatoriais. *Rev Bra Geriatr Gerontol.* 2014;17(3):471-84. Available from: <http://dx.doi.org/10.1590/1809-9823.2014.13172>
16. Remor CB, Bós JG, Werlang MC. Características relacionadas ao perfil de fragilidade no idoso. *Sci Med.* 2011;21(3):107-12. Available from: revistaseletronicas.pucrs.br/ojs/index.php/scientiamedica/article/download/.../6716
17. Bertolucci PHF, Brucki SMD, Campacci SR, Juliano Y. O mini-exame do estado mental em uma população geral: impacto da escolaridade. *Arq Neuropsiquiatr.* 1994;52(1):1-7. Available from: <http://dx.doi.org/10.1590/S0004-282X1994000100001>
18. Duarte YAO, Andrade CL, Lebrão ML. Índice de Katz na avaliação da funcionalidade dos idosos. *Rev Esc Enferm USP.* 2007;41(2):317-25. Available from: <http://www.scielo.br/pdf/reusp/v41n2/20.pdf>
19. Lawnton MP, Brody EM. Assessment of older people: self-maintaining and instrumental activier of daily living. *Gerontologist.* 1969;9(3):179-86. Available from: <https://pubmed.ncbi.nlm.nih.gov/5349366/>
20. Batistoni SST, Neri AL, Cupertino APFB. Validade da escala de depressão do Center for Epidemiological Studies entre idosos brasileiros. *Rev Saúde Pública.* 2007;41(4):598-605. Available from: <https://doi.org/10.1590/S0034-89102007000400014>
21. Lindemann U, Najafi B, Zijlstra W, Hauer K, Muche R, Becker C, et al. Distance to achieve steady state walking speed in frail elderly persons. *Gait Posture.* 2008;27(1):91-8. Available from: <https://www.sciencedirect.com/science/article/pii/S0966636207000598>
22. Lustosa LP, Pereira DS, Dias RC, Brito RR, Parentoni AN, Pereira LSM. Tradução e adaptação transcultural do Minnesota Leisure Time Activities Questionnaire em idosos. *Geriatr Gerontol.* 2011;5(2):57-65. Available from: <http://ggaging.com/details/245/pt-BR/translation-and-cultural-adaptation-of-the-minnesota-leisure-time-activities-questionnaire-in-community-dwelling-older-people.n>
23. Cavalcanti Júnior EP, Pereira DS, Dias RC, Brito RR, Parentoni AN, Pereira LSN. Relação das condições de vida e saúde sobre a fragilidade em idosos. *Revista Humanidades e Inovação [Internet].* 2019 [acesso em 03 mai. 2019];6(11):76-87. Available from: <https://revista.unitins.br/index.php/humanidadesinovacao/article/view/1574>
24. Gross CB, Kolankiewicz AC, Schmidt CR, Berlezi EM. Níveis de fragilidade de idosos e sua associação com as características sociodemográficas. *Acta Paul Enferm.* 2018;31(2):209-16. Available from: <http://dx.doi.org/10.1590/1982-0194201800030>
25. Erdmann AL, Andrade SR, Mello ASFR, Drago LC. A atenção secundária em saúde: melhores práticas na rede de serviços. *Rev Latinoam Enferm.* 2013;21(Spec):1-8. Available from: https://www.scielo.br/pdf/rlac/v21nspe/pt_17.pdf
26. Veras RR. Linha de cuidado para o idoso: detalhando o modelo. *Rev Bras Geriatr Gerontol.* 2016;19(6):887-905. Available from: <https://doi.org/10.1590/1981-22562016019.160205>
27. Andrade JM, Duarte YAO, Alves LC, Andrade FCD, Souza JPRB, Lima-Costa MF, et al. Frailty profile in Brazilian older adults: ELSI-Brazil. *Rev Saúde Pública.* 2018;52(Suppl 2):1-17. Available from: <http://dx.doi.org/10.11606/s1518-8787.2018052000616>
28. Instituto Brasileiro de Geografia e Estatística. Síntese de indicadores sociais: uma análise das condições de vida da população brasileira 2016 [Internet]. Rio de Janeiro: IBGE; 2016 [acesso em 07 dez. 2018]. Available from: <https://biblioteca.ibge.gov.br/visualizacao/livros/liv98965.pdf>
29. Nicolato FV, Couto AM, Castro EDAB. Capacidade de autocuidado de idosos atendidos pela consulta de enfermagem na atenção secundária à saúde. *Rev Enferm Cent.-Oeste Min.* 2016;6(2):2199-211. Available from: <http://dx.doi.org/10.19175/recom.v6i2.1016>
30. Carneiro JA, Cardoso RR, Durães MS, Guedes MCA, Santos FL, Costa FM, et al. Frailty in theelderly: prevalence and associated factors. *Rev Bras Enferm.* 2017;70(4):747-52. Available from: <http://dx.doi.org/10.1590/0034-7167-2016-0633>

31. Fhon JRS, Rodrigues RAP, Neira WF, Rojas Huayta VM, Robazzi MLCC. Queda e sua associação à síndrome da fragilidade no idoso: revisão sistemática com metanálise. *Rev Esc Enferm USP*. 2016;50(6):1005-13. Available from: <http://dx.doi.org/10.1590/s0080-623420160000700018>
32. Gale CR, Cooper C, Sayer AA. Prevalence of frailty and disability: findings from the English Longitudinal Study of Ageing. *Age Ageing*. 2015;44(1):162-65. Available from: <https://doi.org/10.1093/ageing/afu148>
33. Cruz DT, Vieira MT, Bastos RR, Leite ICG. Fatores associados à fragilidade em uma população de idosos da comunidade. *Rev Saúde Pública*. 2017;51(17):1-13. Available from: <https://doi.org/10.11606/S1518-8787.2017051007098>
34. Song J, Lindquist LA, Chang LW, Semanick PA, Ehrlich-Jones LS, Sohn MW. Sedentary Behavior as a Risk Factor for Physical Frailty Independent of Moderate Activity: Results From the Osteoarthritis Initiative. *Am J Public Health*. 2015;105(7):1439-45. Available from: <http://dx.doi.org/10.2105/AJPH.2014.302540>