

Frailty in community-dwelling older people: prevalence and associated factors

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ABSTRACT

Foundations: Elderly people living in the community are prone to developing frailty, considered as a clinically identifiable state that increases vulnerability to adverse events and predicts disability and mortality in the elderly population. **Objective:** To identify the prevalence and factors associated with frailty in the elderly living in the community. **Materials and method:** This is a cross-sectional and analytical household survey with a quantitative approach conducted with 854 elderly people living in the community. Frailty was measured by Edmonton Frail Scale (EFS). The association between frailty and sociodemographic and clinical condition variables was measured by multiple analysis using logistic regression. **Results:** The prevalence of frailty found in this study was 12.3% (95% CI: 10.1 to 14.5). The logistic regression model showed that the variables statistically associated with frailty were: recurrent fall, use of walking aids, polypharmacy, poor self-rated health, dependence on basic and instrumental activities of daily living. **Conclusion:** The prevalence of frailty in the elderly was low compared to other national studies that employed the SAI. Results indicated potentially modifiable factors associated with frailty. Thus, the investigation of frailty syndrome and its related preventable factors are actions to be included in clinical practice.

Keywords: Aged, Frail elderly, Prevalence, Health, Primary health care.

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INTRODUCTION

The aging process of the world population involves physiological changes, which are associated with sociodemographic factors (sex, marital status, ethnicity), socioeconomic factors (education, income), lifestyle, life events, environment and genetic factors can cause emergence of geriatric syndromes, including fragility¹.

Frailty in the elderly has become a condition of great concern for societies and their health systems with regard to efforts to increase healthy life expectancy and health care in the elderly population²⁻³. The expression fragility has been constantly used by health professionals to characterize the weakest and most vulnerable elderly⁴.

There is still no universally accepted definition of fragility. However, there is a recent understanding of frailty as a complex syndrome involving five components: vulnerability, genesis (risk factors), characteristics (behavior of the complex system), phenotype (physical, nutritional, cognitive, psychological and social) and results health-related adverse events⁴.

Considering the lack of a globally accepted gold standard on the definition of frailty, the most used concept was proposed by Fried et al.⁵, who operationalized frailty as having three or more of the five criteria: unintentional weight loss, self-reported exhaustion, weakness, low walking speed and low physical activity.

Thus, frailty is a clinically identifiable condition that is more vulnerable to unfavorable results due to the imperfect resolution of homeostasis after a stressful event⁶. This clinical condition has negative consequences on the aging process, such as functional disability, increased use of health care and premature death, leading to increased costs and imposing challenges on health system managers⁷.

The prevalence of frailty increases with the rapid growth of the elderly population⁸. However, the prevalence of frailty varies between studies depending on the definition of frailty adopted. A systematic review showed that the prevalence of frailty among elderly people living in the community aged ≥ 65 years ranged from 4.0% to 59.1%⁹.

Elderly people living in the community are prone to developing fragility¹⁰. Risk factors for frailty include sociodemographic factors such as age, sex, marital status, education level and physical factors

such as body composition and mobility limitations¹¹⁻¹⁴. However, a systematic review of longitudinal studies identified a broader range of risk and protective factors, including biological, lifestyle and psychological factors¹⁵.

Although it is a condition of gradual development, the frailty syndrome is susceptible to prevention and rehabilitation, which represents great possibilities for health professionals⁶. With a growing worldwide interest in healthy aging, knowledge of the factors that predispose to frailty in the elderly is essential to support the design of preventive interventions and the development of appropriate public policies, aiming to reduce its incidence and harmful consequences in order to maintain the functional capacity and quality of life in old age. Given this context, this study aims to identify the prevalence and factors associated with frailty in the elderly who live in a community.

MATERIALS AND METHOD

This is a cross-sectional and analytical study, with a quantitative approach carried out in a municipality in the south of Minas Gerais, which, according to the last census, had a population of 9,113 elderly people¹⁶.

The study population was defined based on the universe of elderly people registered in the 14 units of the Family Health Strategy (FHS) in the urban area of Alfenas-MG. Four FHS units were defined as the field of study due to the fact that they have the largest number of elderly people, a total of 1825 subjects, and because it is the field of practice and teaching that is closest to the main researcher. Initially, it was determined that the sample in this study would be composed of 1000 elderly people selected through a stratified random sampling process with proportional sharing. An additional 10% was used for losses and refusals. The number of elderly people removed from each stratum was 334 in ESF 1 (total of 555 elderly people), 293 in ESF 2 (total of 486 elderly people), 255 in ESF 3 (total of 423 elderly people) and 218 in ESF 4 (total 362 elderly people). Of the 1100 elderly people selected, 28 did not accept to participate in the research, 33 died, 46 changed their address and 139 presented one of the exclusion criteria. Considering obtaining a representative sample, the difficulty of recruiting field researchers and at the end of the estimated data collection period, no new

drawings were carried out. Thus, the final sample was composed of 854 participants.

The study included elderly people aged 60 years or older, aware, oriented, able to interact during the interview and to move around even if they used some walking aid device (walker, cane or crutch). The sample excluded elderly people with cognitive alterations detectable by the Mini Mental State Examination - MEEM (the cutoff point was adjusted according to the educational level) 17, with acute infectious disease, with fractures in the lower limbs, undergoing arthroplasty of hip and knee in the last three months, with severe hearing loss and total loss of vision.

The interview with the participants was carried out by field researchers at the elderly's home. These researchers were properly trained and calibrated throughout the study.

The dependent variable was measured by the Edmonton Frail Scale (EFS) 18, a scale for assessing frailty in the elderly, developed in 2009 by researchers from the University of Alberta, Edmonton, Canada and was translated and adapted to the Brazilian context in 2009¹⁹. Such scale assesses nine domains: cognition, general health, functional independence, social support, medication use, nutrition, mood, continence and functional performance, investigated by 11 items. Your maximum score is 17 and represents the highest level of fragility. The scores for the analysis of frailty are: 0-4, there is no frailty; 5-6, apparently vulnerable; 7-8, mild fragility; 9-10, moderate fragility; 11 or more, severe fragility. For data analysis in the present study, the results of the dependent variable were categorized into two levels: without frailty (scores from 0 to 6) and with frailty (greater than and equal to 7 points) 20.

The independent variables studied were those related to sociodemographic conditions and clinical health conditions: age group (60-79 years and \geq 80 years), sex (female, male), live alone (no / yes), education (0 to 4 years and 5 and more years), fall in the last 12 months (yes / no), recurrent fall (presence of two or more falls in the last 12 months - yes / no), hip or leg fractures in the last 12 months (yes / no), use of a walking aid device (cane, crutch, walker - yes / no), polypharmacy (use of 4 or more drugs, except vitamins and herbal medicines - yes / no), psychotropic drugs (drugs belonging to the pharmaceutical classes of antiepileptics, antiparkinsonians, antipsychotics,

anxiolytics, hypnotics and sedatives, antidepressants, psychostimulants, psycholeptics, psychoanalytics and anti-dementia drugs according to the Anatomical Therapeutic Classification - ATC classification system (yes / no) 21.

Still regarding the independent variables, self-perceived health was assessed using the question: "In general, how would you describe your health: excellent, very good, good, reasonable or bad?" 22. The answers excellent, very good, good were recategorized as "good" and the answers reasonable and bad as "bad" 22.

The performance of Basic Activities of Daily Living (BADL) was assessed using the Katz Scale (version updated by the Hartford Institute for Geriatric Nursing), which contains six items with two response options each (1 point for independence and 0 for dependency) 23. Elderly people who scored from 0 to 5 points were considered dependent and those who reached 6 points were independent²⁴. Instrumental Activities of Daily Living (IADL) were assessed using the Brazilian version of the Lawton and Brody Scale²⁵.

This scale contains seven items and each item has three types of response: independence (3), partial dependence (2), total dependence (1), with a maximum score of 21 points. The responses were recategorized as dependent (7 to 20 points) and independent (21 points) to perform IADL²⁵.

The performance of Advanced Activities of Daily Living (AADL) 26 was evaluated through 12 questions involving the social, productive and physical / leisure domains: a) contact with other people by means of letters, telephone or e-mail; b) visiting friends and family at home; c) care or assistance to other people (including personal care, transportation, shopping for family or friends); d) voluntary work outside the home; e) travel outside the city, staying overnight for at least one night; f) participation in any regular exercise program (e.g. sports, physical exercises, walks and body practice groups); g) invites people to come to your home for meals or leisure; h) go out with other people to public places such as restaurant or cinema; i) carrying out some manual activity, crafts or artistic activity; j) participation in organized social activities (clubs, community or religious groups, senior living centers, bingo); l) makes use of computers, including the Internet; m) it directs motor vehicles. The questions were answered considering two answer options:

yes (0) and no (1). Thus, elderly people who scored from 0 to 5 points were considered independent and elderly people who scored 6 or more points were classified as dependent 26.

The abbreviated form of the Geriatric Depression Scale (EDG) 27, which contains 15 items, was used to assess the presence of depressive symptoms. The presence of depressive symptoms was considered to be a score ≥ 6 points on the EDG27.

Fear of falling was assessed using the Brazilian version of the Falls Efficacy Scale - International (FES-I) 28. This instrument has 16 items with four possible answers, with respective scores from one to four. The total score can vary from 16 to 64. A low potential risk of falls was considered a score of 16 to 22 points and a high potential risk of falls was a score of 23 or more points on the FES-I29.

The statistical analysis included the calculation of the bivariate analysis followed by multiple analysis by means of logistic regression. The bivariate analysis was performed using the chi-square test (χ^2), the prevalence ratio (PR) and its respective 95% confidence interval to investigate the existence of associations between independent variables and frailty. For the final analysis, Logistic Regression was used, including in the model the independent variables that were most strongly associated with weakness in the bivariate analysis (up to the level of significance <0.20). For the final analysis, a significance level of 5% ($p < 0.05$) was considered. The data were analyzed using the Med Calc statistical software version 16.4.1.

The present study was approved by the Research Ethics Committee (CEP) of the Hospital das Clínicas of the Ribeirão Preto Medical School (Opinion 1.575.252) and all participants signed or digitally stamped the Free and Informed Consent Form and received a copy of it.

RESULTS

The study included 854 elderly people aged 60 years or over. Regarding sociodemographic characteristics, it was observed that the predominant age group was between 60 and 79 years, which represented 82.7% of the sample under study, with a mean age of 71.87 years ($SD = 7.62$). Most elderly people were female (494; 57.8%), white (642; 75.1%) and married (523; 61.2%). In addition, 757

(88.6%) elderly people lived with their families, 663 (77.6%) reported having up to four years of study, 734 (85.9%) were retired and 341 (39.9%) had family income minimum wage.

The prevalence of frailty found in this study was 12.3%, being higher for females (70.5%) and for the age group between 60 and 79 years (61.9%).

Other characteristics of the group revealed that 263 elderly people (30.7%) fell in the last 12 months, 99 (11.5%) fell recurrently in the last 12 months and 11 (3.6%) had hip or leg fractures in the last 12 months. The use of AMD, polypharmacy and psychotropic drugs were reported by 51 (5.9%), 388 (45.4%) and 208 (24.3%) elderly, respectively. Regarding self-perceived health, 298 (34.8%) consider their health to be poor. As for functional capacity, 82 (9.6%) elderly are dependent for basic daily activities, 582 (68.1%) are dependent for instrumental activities and 384 (44.9%) are dependent for advanced activities. Positive screening for depression was identified in 6.5% (56) of the elderly. Regarding the fear of falling, 34.3% (293) revealed a high potential risk of falling. The results of the bivariate analysis are shown in Table 1.

The variables that, after multiple analysis by logistic regression, remained statistically associated with frailty were: recurrent fall, use of AMD, polypharmacy, poor self-perception of health, dependence on basic and instrumental activities of daily living (Table 2).

DISCUSSION

In the sample of elderly people in the community of the Municipality of Alfenas, the prevalence of frailty was 12.3%, different from that found in other national studies that used the same tool to identify frailty. Cross-sectional study with 339 elderly people (60 years old or more) residing in Juiz de Fora, MG, the prevalence of frailty found was 35.7% 20. In the survey conducted in Montes Claros, MG, with elderly people in the community, the prevalence of frailty was 41.3% 30. Other national studies showed a prevalence similar to that of the present study, but used the components of Fried's Phenotype of Fragility to measure the outcome³¹⁻³². In order to compare the results obtained from the application of the Edmonton Frail Scale (EFS) and the Fried Fragility Phenotype in the same sample, a study

Table 1. Result of the bivariate analysis between frailty and independent variables in elderly people in the community (n = 854).

Independent variables	Fragility				PR*	CI 95%†	p-value
	No		Yes				
	n	%	n	%			
Age range							
60 - 79 years old	642	85,7	65	61,9	1		
80 years old and more	107	14,3	40	38,1	2,95	2,08 - 4,20	< 0,0001
Gender							
Male	329	43,9	31	29,5	1		
Female	420	56,1	74	70,5	1,74	1,16 - 2,58	0,0062
Live by themselves							
No	668	89,2	89	84,8	1		
Yes	81	10,8	16	15,2	1,40	0,86 - 2,28	0,1742
Schooling							
5 and older	183	24,4	8	7,6	1		
0 to 4 years old	566	75,6	97	92,4	3,49	1,72 - 7,05	0,0005
Falling							
No	544	72,6	47	44,8	1		
Yes	205	27,4	58	55,2	2,77	1,94 - 3,95	< 0,0001
Recurrent falling							
No	687	91,7	68	64,8	1		
Yes	62	8,3	37	35,2	4,14	2,95 - 5,83	< 0,0001
Fracture							
No	728	97,2	95	90,5	1		
Yes	21	2,8	10	9,5	2,79	1,62 - 4,81	0,0002
DAM Usage							
No	723	96,5	80	76,2	1		
Yes	26	3,5	25	23,8	4,92	3,47 - 6,97	< 0,0001
Polypharmacy							
No	440	58,7	26	24,8	1		
Yes	309	41,3	79	75,2	3,65	2,39 - 5,56	< 0,0001
Psychotropic							
No	580	77,4	66	62,9	1		
Yes	169	22,6	39	37,1	1,83	1,27 - 2,64	0,0011
Self-perceived health							
Good	528	70,5	28	26,7	1		
Bad	221	29,5	77	73,3	5,13	3,40 - 7,72	< 0,0001
Basic Activities of Daily Living							
Independent	696	90,2	76	9,8	1		
Dependent	53	64,6	29	35,4	3,59	2,50 - 5,16	< 0,0001
Instrumental Activities of Daily Living							
Independent	192	25,6	80	76,2	1		
Dependent	557	74,4	25	23,8	6,84	4,47 - 10,47	< 0,0001
Advanced Activities of Daily Living							
Independent	386	51,5	84	80,0	1		
Dependent	363	48,5	21	20,0	0,30	0,19 - 0,48	< 0,0001
Depressive symptoms-GDS							
Negative screening for depression	715	95,5	83	79,0	1		
Positive screening for depression	34	4,5	22	21,0	3,77	2,57 - 5,54	< 0,0001
Fear of falling							
Low potential risk of falling	521	69,7	39	37,1	1		
Potential high risk of falling	227	30,3	66	62,9	3,23	2,23 - 4,68	< 0,0001

Source: from the authors. * PR - Prevalence ratio; † CI - Confidence Interval; DAM - Marching Assistance Device.

Table 2. Factors associated with frailty in the elderly in the community (n = 854).

Independent variables	PR*	CI95%†	p-value
Recurrent fallin			
No	1		
Yes	3,15	1,44 - 6,89	0,0039
DAM usage			
No	1		
Yes	2,64	1,27 - 5,49	0,0092
Self-perceived health			
No	1		
Yes	2,59	1,41 - 4,74	0,0020
Self-perceived health			
Good	1		
Bad	6,11	3,42- 10,89	<0,0001
Basic Activities of Daily Living			
Independent			
Dependent	2,87	1,42 - 5,80	0,0033
Instrumental Activities of Daily Living			
Independent	1		
Dependent	4,83	2,61 - 8,92	<0,0001

Source: from the authors. * PR - Prevalence ratio; † CI - Confidence Interval, DAM - Walking Aid Device.

carried out in Colombia found similar prevalences (8.9% and 7.9% respectively) 33.

In the world scenario, the prevalence of frailty in the elderly in the community, on average, is 10.7%, varying from 4.0% to 59.1% 9. A recent systematic review and meta-analysis on the prevalence of frailty among elderly people in the community living in low and middle income countries, showed that these data vary from 3.9% (China) to 51.4% (Cuba) 34. This same study identified that the prevalence of frailty in Brazil varies from 7.7% to 41.3% 34. It is worth noting that these disagreements in relation to prevalence are due to the different tools used to measure fragility and also to the characteristics of each population studied.

The condition of fragility implies greater vulnerability to stressful events, with deleterious consequences for the health of the elderly. The identification of factors associated with frailty, then, becomes relevant for directing actions to maintain the independence and functionality of the elderly person.

Among the factors investigated, the occurrence of recurrent falls was associated with the condition of frailty. Other studies indicate an association between recurrent falls and frailty³⁵⁻³⁸. The results of a meta-analysis revealed that frail elderly people showed a higher risk of falls and recurrent falls when compared to robust elderly people³⁹. Fragile elderly people have a decreased capacity for functional reserve, in addition to generally having a greater number of chronic diseases and adverse reactions to medications. Together, such a scenario may imply greater changes and deficits in maintaining balance and coordination, predisposing to an increased risk of falls⁴⁰.

In the present study, frailty was also shown to be associated with the use of a walking aid device (AMD), as well as other studies^{20,41-42}. Studies indicate that AMD are indicators of postural control deficits and risk of falls⁴³⁻⁴⁴. Thus, elderly people who use such devices have more mobility problems than those who do not use⁴⁵, in addition to having a higher risk of falling and suffering an injury⁴⁶. However, no studies were found that specifically

investigated the relationship between the use of AMD and frailty.

Frailty remained associated with polypharmacy, corroborating with other studies^{24, 47}. Polypharmacy in the elderly is associated with several negative health indicators, such as functional impairment, fractures, falls, hospitalization and mortality⁴⁸⁻⁵⁰. Thus, polypharmacy is considered a risk factor for frailty in elderly people, since the overlap of several drugs and their adverse effects can exacerbate this condition^{24,51}.

The association between frailty and negative self-perception of health observed in this study was also recorded in other studies^{24,52-53}. Frailty is characterized by a reduced ability to respond to stress conditions and greater susceptibility to adverse events, which can lead to the worsening of diseases and the increasing cycle of weakness^{24,52}, which may explain the association between frailty and negative self-perception of health.

The frailty syndrome was strongly related to dependence both in instrumental activities and in basic activities of daily living^{30,54-57}. In the literature, this relationship was identified in both cross-sectional and longitudinal studies, demonstrating the need for an early approach by health professionals to avoid the functional decline of the elderly person. A cross-sectional household survey carried out in Brazil with 1,609 elderly people in the community, showed an association with functional disability for basic and instrumental activities of daily living³². Cross-sectional study with 339 elderly people from the community of Juiz de Fora, MG, which also used the EFS, showed an association of frailty and functional dependence to perform instrumental activities of daily living²⁰. A 10-year prospective cohort study found that frail older adults were twice as likely to report functional disability over time compared to non-frail older adults⁵⁸.

The use of EFS proved to be useful for identifying and managing frailty in elderly people living in the community. In addition, it is configured as a low-cost tool, easy and quick to apply and that does not require greater resources for its execution, and can be widely applied in health institutions, especially in the context of primary health care.

This study has as a limitation the data collection time, which made it impossible to carry out a new drawing for the acquisition of new participants.

However, this study used a culturally validated instrument in the Brazilian context to identify the frailty syndrome and has a representative sample for the use of logistic regression models. Furthermore, quality control was used in the stages of the study, such as training and calibrating the interviewers, testing the instruments, ensuring greater reliability to the data analyzed.

CONCLUSION

The prevalence of frailty in the elderly evidenced in this study was 12.3%, that is, low compared to other national studies that used the SAI. However, it was similar to other national studies that used the Fried Fragility Phenotype components to measure the outcome. Frailty was associated with recurrent falls, use of a device to aid gait, polypharmacy, poor self-perception of health, dependence on basic and instrumental activities of daily living.

It is noteworthy that the identification of the prevalence of frailty in elderly people and the understanding of its associated factors are essential for the planning and implementation of health actions aimed at this population, in order to prevent, regress or prevent the progression of this syndrome. .

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