

Frailty risk in community-dwelling elderly assisted in Primary Health Care and associated factors

Risco de fragilidade em idosos comunitários assistidos na atenção básica de saúde e fatores associados

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ABSTRACT This is a cross-sectional quantitative study whose objective was to estimate the risk of frailty in community-dwelling elderly and their associated factors. The sample consisted of 179 elderly people enrolled in Family Health Units in Recife (PE). Frailty was evaluated using the Clinical-Functional Vulnerability Index. Sociodemographic data, cognitive evaluation, level of physical activity and nutritional risk/malnutrition corresponded to the independent variables. The prevalence of frailty was equivalent to 13%. The independence test was significant according to gender, age, social security status, and in elderly with impaired cognitive ability and malnutrition. Regarding the development of frailty, people aged 71 to 80 years presented eight times more risk; in the age group of 81 to 90 years, the risk is nine times higher. Elderly people subject to malnutrition have twice the risk, and malnutrition increases by five times the frailty risk. The findings show that some associated factors are immutable, but malnutrition, for example, is susceptible to change, from management in Primary Health Care.

KEYWORDS Primary Health Care. Frail elderly. Frailty.

RESUMO Trata-se de um estudo quantitativo de corte transversal, que teve por objetivo: estimar o risco de fragilidade em idosos comunitários e seus fatores associados. A amostra foi composta por 179 idosos adscritos a Unidades de Saúde da Família do município de Recife (PE). A fragilidade foi avaliada por meio do Índice de Vulnerabilidade Clínico-Funcional. Dados sociodemográficos, avaliação cognitiva, nível de atividade física e risco nutricional/desnutrição corresponderam às variáveis independentes. A prevalência de fragilidade foi equivalente a 13%. O teste de independência foi significativo segundo sexo, idade, situação previdenciária, e nos idosos com capacidade cognitiva comprometida e desnutridos. Sobre o desenvolvimento de fragilidade, idosos com idades entre 71 e 80 anos apresentam oito vezes mais risco; na faixa etária de 81 a 90 anos, o risco é nove vezes superior. Idosos sujeitos a desnutrição possuem o dobro de risco, e a desnutrição aumenta em cinco vezes o risco de fragilidade. Os achados mostram que alguns fatores associados são imutáveis, porém a desnutrição, por exemplo, é passível de modificação, a partir do manejo na atenção básica de saúde.

PALAVRAS-CHAVE Atenção Primária à Saúde. Idoso fragilizado. Fragilidade.

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Introduction

Frailty in the elderly is a clinical state in which individuals present reduced strength, resistance and physiological function, becoming more vulnerable to functional decline, dependence and/or death, when exposed to a stressor¹. It is characterized by weight loss and sarcopenia, which leads to decreased muscle strength, fatigue, postural instability and reduced gait speed, increasing the risk of unfavorable evolution in the face of external aggressions and acute diseases².

The prevalence of frailty increases with age, ranging from 4% to 59% among community-dwelling elderly³. This condition was the main cause of mortality in this scenario, accounting for 27.9% of all deaths^{1,3}. In contrast, it can be prevented and managed through the practice of physical activity, reduction of polypharmacy, caloric and protein support, and vitamin D replacement, interventions that can be performed in primary health care¹.

Considering the definition of frailty and the clinical-functional classification suggested by Moraes et al.⁴, developed for public health purposes, the elderly can be classified into three strata: robust, at risk of fragilization and frail. The frail elder demands great costs for the health system, due to the accomplishment of procedures, not always necessary. At the same time, health promotion strategies and prevention measures require behavioral and lifestyle changes and are not useful for this group, whose components will not have time to benefit from long-term results⁵.

Therefore, it is imperative to incorporate the concept of micro and macromanagement of health. The first is fundamental for the maintenance and/or recovery of the independence and autonomy of the elderly, while macromanagement refers to the sustainability of health care systems, public or private⁵. Considering the impacts of frailty occurrence and the potential for primary care intervention in the prevention and management of this condition, the present study aims to estimate the

risk of frailty in community-dwelling elderly enrolled in Family Health Units (FHU) and their factors associated.

Material and methods

It is a quantitative, population-based and cross-sectional study. The study population consisted of elderly people enrolled in the FHU of Microregion 4.2 in the city of Recife (PE), with a total of 2,907 individuals.

Due to the variability in the prevalence of frailty evidenced in a systematic review², there was no standardization of the criteria for identifying this condition, and due to the insufficiency of Brazilian studies with strong scientific evidence, carried out with elderly residents in the community, a pilot study was conducted with 30 elderly people to establish sample size. The equation was used to study the proportion in the finite population, considering the 95% confidence level, the expected proportion of 0.10, a margin of error of 0.043 and a total population of 2,907, and a sample equivalent to 179 elderly people was defined.

The inclusion criteria for participation in the study corresponded to the minimum age of 60 years and to be assigned to one of the FHU of the area. The elderly institutionalized at the time of data collection were excluded from the study. The selection of participants was done for convenience until the minimum sample size was reached, maintaining the proportionality criterion in the population of origin, in terms of distribution by sex and the elderly enrolled by FHU.

The dependent variable corresponded to the frailty, which was measured using the Clinical-Functional Vulnerability Index (IVCF-20), a screening instrument that classified the elderly as robust, at risk of frailty and frail, based on the evaluation of the main dimensions predictors: age, self-perception of health, activities of daily life, cognition, mood, mobility, communication and presence of multiple comorbidities⁶.

The independent variables were composed of socio-demographic data and cognitive impairment screening, evaluated by the Mini Mental State Examination (MMSE) proposed by Folstein et al.⁷; level of physical activity, verified by the short version of the International Physical Activity Questionnaire (IPAQ-version 8), validated for Brazilian elderly by Mazo and Benedetti⁸; and nutritional risk/malnutrition, investigated through the Mini Nutritional Assessment (MAN), a reduced version presented by Kaiser et al.⁹.

The data collection was performed in a single stage, during a home visit or at the FHU at the time of service, through a face-to-face interview technique, using a semi-structured road map to record the information. In the presence of cognitive impairment, the caregiver answered the requested information, respecting the ethical precepts.

For analyzing the data, the Statistical Package for Social Science (SPSS) software, version 18, was used. In the evaluation of the socioeconomic and health profiles of the elderly, the percentage frequencies were calculated and the distributions of the evaluated factors were constructed.

The Poisson model with robust variance was applied to evaluate the frailty risk. For

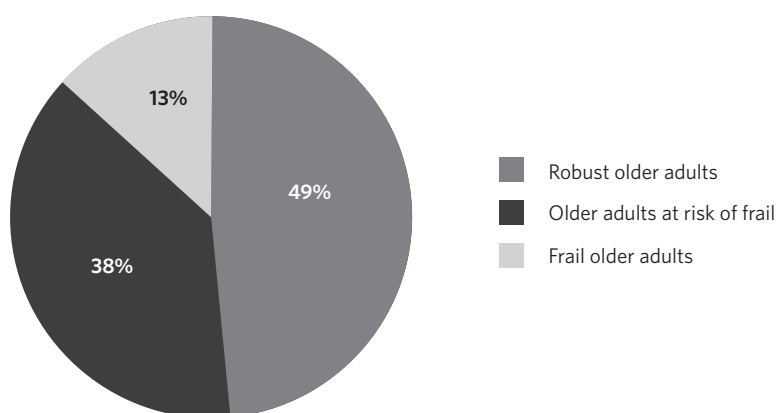
the permanence of the factors in the model, the significance level of 5% was considered, and in cases where the assumptions of the chi-square test were not satisfied, Fisher's exact test was applied. Furthermore, the confidence intervals for the prevalence ratio and the Wald test were calculated in the comparison of the risks between the levels of the variables for the frailty.

The present research complies with the requirements of Resolution n° 466, of December 12, 2012, of the National Health Council, regarding the development of research with human beings, safeguarding the ethical principles of justice, beneficence and non-maleficence, with approval by the Research Ethics Committee of the Health Sciences Center of the Federal University of Pernambuco, opinion n° 1.401.767.

Results

Graph 1 presents the categorization of the elderly for frailty analysis from IVCF-20. Although the robust elderly prevailed around 49%, it is important to highlight that the unfavorable situations (frailty or risk of frailty), when aggregated, represent 51% of the sample.

Graph 1. Prevalence of frailty among the elderly in a microregion of Recife (PE), 2016



Source: Own elaboration.

The distribution of frailty according to sociodemographic factors is described in *table 1*. The highest prevalence of frailty was found in the female elderly (17.4%), white (16.3%), aged between 81 to 90 years (47.4%), without partners (17.3%), living in households with five or more people (33.3%) and without schooling (15.4%). With regard to the social security status, it is verified that the highest prevalence of frailty is found among the elderly who

accumulate retirement and allowance (33.3%).

It is observed that, although the group of the elderly between 60 and 70 years represents 63.7% of the sample, of the 24 elderly people considered fragile, only 3 (12.5%) are in this age group. This finding demonstrates the progressive nature of the prevalence of frailty, as the age advances. The independence test was significant for the factors: sex, age and social security status.

Table 1. Distribution of frailty in the elderly, according to sociodemographic factors of a microregion of Recife (PE), 2016

Variable	Frail elderly N (%)	Non-frail elderly N (%)	p-value ¹
Sex			
Male	3 (5.2%)	55 (94.8%)	0.025*
Female	21 (17.4%)	100 (82.6%)	
Color/Race			
White	7 (16.3%)	36 (83.7%)	0.497
Black	2 (6.9%)	27 (93.1%)	
Brown	15 (14%)	92 (86%)	
Age			
60 to 70	3 (2.6%)	111 (97.4%)	<0.001*
71 to 80	12 (26.1%)	34 (73.9%)	
81 to 90	9 (47.4%)	10 (52.6%)	
Have a partner			
Yes	6 (8%)	69 (92%)	0.071
No	18 (17.3%)	86 (82.7%)	
How many people do you live with			
Anyone	2 (7.4%)	25 (92.6%)	0.109
1 to 2	10 (11.9%)	74 (88.1%)	
3 to 4	6 (12%)	44 (88%)	
5 or more	6 (33.3%)	12 (66.7%)	
Years of education			
None	6 (15.4%)	33 (84.6%)	0.445
1 to 4	11 (15.3%)	61 (84.7%)	
5 to 8	6 (14.6%)	35 (85.4%)	
9 to 11	0 (0%)	18 (100%)	
12 or more	1 (14.3%)	6 (85.7%)	

Table 1. (cont.)

Social security status			
Retired	12 (12.6%)	83 (87.4%)	0.017*
Pensioner	5 (21.7%)	18 (78.3%)	
Retired and pensioner	2 (33.3%)	4 (66.7%)	
Neither retired, nor pensioner	0 (0%)	29 (100%)	
Benefit	5 (21.7%)	17 (78.3%)	
Total	24 (13.4%)	155 (86.5%)	

Source: Own elaboration.

¹ p-value of the Chi-square test for independence (if p-value is less than 0.05, the factor evaluated influences the frailty).

*Variable presented a statistically significant association.

In *table 2*, there is the distribution of the frailty according to the health conditions evaluated. The highest prevalence of frailty was found in the group of elderly individuals with impaired cognitive ability (80%), classified as sedentary by IPAQ (48%), and suffers from malnutrition, according to MAN (66.7%). Furthermore, it is observed that the independence test was significant in all evaluated factors (p-value<0.05), indicating that health conditions are important factors in the

determination of frailty.

Although the elderly with cognitive impairment represent only 5.6% of the total sample, 33.3% of those considered fragile are in this group. As for the sedentary, they represent 14% of the total participants, but represent 50% of the fragile elderly. Regarding nutritional assessment, adding the malnourished elderly and those at risk of malnutrition, these correspond to 38.5% of the sample and 75% of the frail elderly.

Table 2. Distribution of frailty in the elderly, according to health conditions of a microregion of Recife (PE), 2016

Variable	Frail elderly N (%)	Non-frail elderly N (%)	p-value¹
Cognitive capacity			
Satisfactory	16 (9.5%)	153 (90.5%)	<0.001*
Compromised	8 (80%)	2 (20%)	
Physical activity level			
Very active	1 (8.3%)	11 (91.7%)	<0.001*
Active	8 (71%)	105 (92.9%)	
Irregularly active	3 (10.3%)	26 (89.7%)	
Sedentary	12 (48%)	13 (52%)	
Nutrition assessment			
Well nourished	6 (5.5%)	104 (94.5%)	<0.001*
At risk of malnutrition	12 (20%)	48 (80%)	
Undernourished	6 (66.7%)	3 (33.3%)	

Source: Own elaboration.

¹ p-value of the Chi-square test for independence (if p-value is less than 0.05, the factor evaluated influences the frailty).

* Variable presented a statistically significant association.

Table 3 shows the adjustment of the Poisson model for frailty. It can be verified that, according to the socio-demographic variables and health conditions, the age and nutritional classification according to the MAN showed a significant joint influence for frailty.

It is observed that the group aged between 71 and 80 years presents almost eight times more risk (OR = 8.88) of showing frailty than the elderly in the age group of 60 to 70 years. Among the elderly, those aged between 81 to

90 years, the chance of developing frailty was almost nine times higher (OR = 9.69) than that of the younger elderly group.

Regarding the nutritional status, the elderly who present risk for malnutrition have almost twice as much (OR = 2.83) for frailty, in relation to the individuals classified as well nourished, according to MAN criteria. In turn, malnutrition increases by almost five times (OR = 5.48) the risk for frailty.

Table 3. Adjustment of the Poisson model for the frailty in the elderly of a microregion of Recife (PE), 2016

Factor evaluated	Frailty of the elderly		
	OR	CI (95%)	p-value ¹
Age			
60 to 70	1	-	-
71 to 80	8.88	2.63-29.95	<0.001*
81 to 90	9.69	2.50-37.66	0.001*
Nutrition assessment			
Well nourished	1	-	-
At risk of malnutrition	2.83	1.16-6.91	0.022*
Undernourished	5.48	1.76-17.07	0.003*

Source: Own elaboration.

¹ p-value of the Wald statistic (if p-value <0.05, the evaluated level has a higher risk for the study outcome).

* Variable presented a statistically significant association.

Discussions

In line with data from the national and international literature, the present study has found a statistically significant association between being female and the occurrence of frailty¹⁰⁻¹². Intrinsic issues make the woman more exposed to frailty, the main one being the greater propensity for sarcopenia, which is reflected in the loss of lean mass and muscle strength. Such a condition may be justified by lower levels of testosterone compared to men, and abrupt drop in hormone levels due to menopause¹⁰⁻¹³. In addition, as factors associated with frailty, older women experience

a higher prevalence of chronic diseases, poorer nutritional conditions, financial dependence and lower schooling compared to men¹⁰⁻¹³.

An association between the advancing age and the occurrence of frailty has been found, suggesting that this is a progressive condition^{10,14-16}. The cellular oxidative stress accumulated with increasing age is one of the hypotheses that justify the higher prevalence of frailty in the more advanced age groups. Exogenous and endogenous agents can cause damage to DNA, inducing changes in cellular and systemic levels, culminating in several clinical conditions, including frailty¹⁴. In addition, the cellular response is dysregulated

for apoptosis, senescence and repair, resulting in alterations of the inflammatory system and failure in the repair of specific tissues, propitiating the development of frailty^{10,14}.

As in the present investigation, an inverse association between cognitive function and frailty was found in a systematic review. The justification pointed out by the authors was the probable difficulty that elderly people with cognitive impairment present to eat, exercise and walk, which can lead to weight loss and impairment of motor functions, besides favoring the onset and progression of the syndrome¹⁰.

In a systematic review developed by Brigola et al.¹⁶, frail elderly individuals present a higher prevalence of mild cognitive impairment and dementia. The simultaneous presence of these two conditions greatly increases the risk of mortality¹⁶.

The literature illustrates an association between low educational level and economic conditions that are unfavorable to the increased occurrence of cognitive impairment. Such scenario may be related to the less obtaining of stimuli, as well as the difficulties of access to health care, to an adequate food consumption and to the practice of physical activity, culminating in a lower preservation of cognition in aging^{16,17}.

As for nutritional status, the present study found a significant statistical association between malnutrition and frailty, being in line with what is found in other scientific studies. Using MAN, Mello, Engstrom and Alves¹⁰, there is a 15-fold greater risk of frailty for malnourished elderly people or those at risk of malnutrition when compared to well-nourished elderly individuals^{1,10,12,16,18,19}. Such researches indicate that nutritional extremes can anticipate the development of frailty and vulnerabilities, being considered markers for this clinical condition, since they are associated with loss of muscle mass. In addition, cachexia, dehydration and anorexia can also be attributed to weight loss and reduction of Body Mass Index (BMI).

To treat this condition, Morley et al.¹ point out that nutritional supplementation is effective in reversing weight loss. More specifically, protein supplementation increases the proportion of lean mass and gain of muscle strength, thus, potentiating the effects of resisted physical exercises.

Regarding the practice of physical activity, according to what is stated in the literature, an association between sedentarism and frailty was found. Ferrer et al.²⁰ point out that the scarce practice of physical activity increases by seven times the risk for frailty. This finding can be explained by the fact that the reduction of the level of physical activity causes a decrease in the grip strength and slowness of gait – criteria for the diagnosis of frailty. At the same time, muscle weakness, fatigue, malnutrition and sarcopenia culminate in the reduction of physical activity practices by the elderly¹².

In a study developed by Vieira et al.²¹, the most frequently identified component of the phenotype was the level of reduced physical activity. Morley et al.¹ emphasize that the practice of physical activity can be used to manage the frailty, since it improves several markers of this condition, such as gait speed, balance, stability when sitting up and when going up stairs, decreasing the risk of fall. In a review study, the practice of resistance exercises is related to endocrine and immunological alterations capable of minimizing the effects of sarcopenia, and, consequently, to the improvement of frailty²².

Taking into account micromanagement of the clinic, primary care represents a favorable scenario for the early identification of frailty, given the longitudinal follow-up of the people enrolled in the FHU. In parallel, it allows the development of health promotion activities, whether individual or collective, capable of acting against the factors associated with frailty, such as: sedentary lifestyle, malnutrition and cognitive impairment.

Such potentiality is due to its capacity for intersectoral articulation and multiprofessional

composition of the teams, especially those assisted by the Family Health Support Centers (Nasf). Articulation with the Health Academy Program, healthy eating groups, nutritional guidelines, collective activities for cognitive stimulation and sociability compose feasible examples, which do not require a large amount of resources.

Regarding the macromanagement aspect, it is recommended to include the frailty approach in the public health agenda, considering the adverse impact of this condition, from a clinical and social point of view, when not adequately treated. For this purpose, one of the paths consists in qualifying the professionals that deal with the elderly population, as well as in strengthening the health network to meet the demands inherent to the older segment.

Because it is a cross-sectional study, it is not feasible to infer a causal relationship. The variability found in the specialized literature, regarding the instrument for screening the condition of frailty in the elderly, suggests implications of comparability with the findings of the present study.

Conclusions

Researches related to the frailty in the elderly are emphasized as this is a growing area that has attracted the attention of several health

professionals. The present study identified the prevalence of frailty in the elderly associated with socio-demographic factors, such as: age, sex and social security status, health-sedentary conditions, malnutrition and cognitive impairment.

Understanding the dimension of the elderly person and considering the frailty and its multifactorial aspects is to give visibility to this reality, promoting strategies and actions for promotion, prevention and tracking. IVCF-20 is favorable to the identification of frailty in the elderly, and it is recommended in primary care as a practical and rapid alternative in the context of Comprehensive Geriatric Assessment (AGA).

Collaborators

Lins MEM (0000-0001-9712-7275)* contributed to the design, planning, analysis and interpretation of data; critical review of content. Marques APO (0000-0003-0731-8065)* contributed to the design, planning, analysis and interpretation of data; critical review of content; and approval of the final version of the manuscript. Leal MCC (0000-0002-3032-7253)* contributed to the design, planning, analysis and interpretation of data. Barros RLM (0000-0002-1112-1110)* contributed to the design, planning, analysis and interpretation of data. ■

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