

Prevalence of frailty and associated factors among elderly individuals cared for by Primary Health Care

Prevalência e fatores associados à fragilidade em idosos atendidos na Atenção Primária à Saúde

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ABSTRACT

Objective: to identify the prevalence of frailty and associated factors among elderly individuals cared for within PHC. **Method:** cross-sectional and analytical study conducted between March 2018 and April 2019, with 184 elderly individuals enrolled in a Family Health Strategy unit located in the North of Minas Gerais, Brazil. Sociodemographic and clinical variables were collected, and frailty was identified using the *Índice de Vulnerabilidade Clínico Funcional-20* [Clinical-Functional Vulnerability Index-20]. Descriptive statistics and bivariate and multivariate analyses were performed via logistic regression with a 95% confidence interval and significance level established at $p \leq 0.05$. **Results:** the prevalence of frailty was 9.8% in a sample of 184 elderly individuals. The variables associated with the outcome were: education (illiterate) ($p=0.007$) and age (≥ 80 years old) ($p=0.002$). **Conclusion:** Frailty is commonly found among elderly individuals cared for within PHC. Thus, health promotion and protection and preventive and rehabilitation measures are needed.

Descriptors: Frail Elderly; Health of the Elderly; Prevalence; Risk Factors; Primary Health Care.

RESUMO

Objetivo: identificar a prevalência e os fatores associados à fragilidade em idosos atendidos na atenção primária à saúde. **Método:** estudo transversal e analítico, realizado entre março de 2018 e abril de 2019, com 184 idosos cadastrados em equipe de Estratégia Saúde da Família de uma cidade do norte de Minas Gerais. Foram coletadas variáveis sociodemográficas e clínicas, sendo a fragilidade identificada pelo Índice de Vulnerabilidade Clínico Funcional-20. Realizou-se estatística descritiva, análise bivariada e multivariada por meio da regressão logística com os respectivos intervalos de confiança de 95% e nível de significância de $p \leq 0,05$. **Resultado:** entre os 184 idosos, a prevalência de fragilidade foi de 9,8%. As variáveis associadas ao desfecho foram: escolaridade (analfabeto) ($p=0,007$) e idade (≥ 80 anos) ($p=0,002$). **Conclusão:** o estudo evidencia que a fragilidade é um achado comum entre idosos da atenção primária e medidas de promoção, proteção, prevenção e recuperação da saúde precisam ser implementadas.

Descritores: Idoso Fragilizado; Saúde do Idoso; Prevalência; Fatores de Risco; Atenção Primária à Saúde

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INTRODUCTION

Brazil is the fifth country with the largest elderly population. The elderly population currently represents 14.6% of the total population; i.e., 30 million Brazilian individuals are 60 years old or older⁽¹⁾.

Population aging may be related to improved living conditions and access to health care services, family planning programs, and birth control. These factors directly impacted decreased mortality and fertility rates and increased life expectancy, resulting in continuous population aging⁽²⁾.

Advanced age imposes challenging situations such as chronic diseases, decreased cognition and functional capacity, and the presence of depressive symptoms, conditions that may result in elderly individuals more likely to become frail⁽³⁾.

Even though there is no consensus regarding the term frailty, biological, physical, cognitive, social, and psychological factors are often considered. From this perspective, frailty is seen from a multidimensional perspective, such as the degree of vulnerability to adverse outcomes, that is, elderly individuals' susceptibility to developing health problems such as functional decline, falls, hospitalizations, institutionalization, and death⁽⁴⁾.

Frailty among the elderly is considered a problem worldwide as it is frequently seen in advanced age, though it is not a result of aging alone⁽³⁻⁵⁾. Previous Brazilian studies show a prevalence ranging from 13% and 35.7%⁽⁶⁻⁹⁾.

Given this context, the need to reorient health services is emphasized, especially primary health care (PHC). PHC is the entrance door to the Health Care Network, welcoming patients and heeding their demands. Within the care health provided to the elderly, PHC has the responsibility to identify frail individuals and those at risk, to implement actions intended to maintain their functional capacity and keep them within the community as long as possible, with the maximum autonomy and independence, promoting their quality of life⁽¹⁰⁾.

Hence, instruments are needed to facilitate the stratification and identification of frail elderly individuals or potential risk factors predisposing them to frailty⁽¹¹⁻¹²⁾. In this sense, we highlight the *Índice de Vulnerabilidade Clínica Funcional-20* (IVCF-20) [Clinical-Functional Vulnerability Index-20], a rapid and easy-to-apply instrument designed to screen frailty according to greater vulnerability to functional decline. It was recently validated to be used by PHC health workers in Brazil^(8-9,12).

Therefore, this study's importance lies in the fact that there is a lack of studies addressing frailty among the elderly in developing countries⁽⁴⁾ and a lack of studies, both within Brazil and abroad, using the IVCF-20 to assess frailty^(9,12). There is a need to expand knowledge regarding frail elderly individuals, considering regional and cultural differences in addition to understanding frailty as a multidimensional syndrome^(5,12).

This is a relevant factor to contribute to knowledge and the sensitization of PHC workers, particularly nurses, to support the implementation of evidence-based measures and care actions among frail elderly individuals to prevent, promote and maintain healthy and active aging.

This study's objective was to identify the prevalence of frailty and associated factors among elderly individuals cared for within PHC.

METHODS

This analytical and cross-sectional study addressed elderly individuals enrolled in the Family Health Care (FHS) unit of a city located in the North of Minas Gerais, Brazil.

At the time of data collection, 251 elderly individuals 60 years old or older were enrolled in the FHS unit, where this study was conducted. This facility was chosen because it is located in a region with unfavorable sociodemographic conditions, low educational level, and a high prevalence of elderly individuals in its coverage area.

Individuals aged 60 years old or older and enrolled in the previously mentioned FHS unit were included. Exclusion criteria were elderly individuals unable to answer the questions (due to cognitive deficit or impaired communication) and without a caregiver to assist them if needed.

Of the 251 elderly individuals, 30 refused to participate, one died before data were collected, 31 were not found after three consecutive visits, and 5 moved away. Hence, after applying inclusion and exclusion criteria and considering losses, a sample of 184 elderly individuals remained.

A graduate nursing student from a public university located in Minas Gerais, previously trained and under her advisor's supervision, collected data from March 2018 to April 2019. Training consisted of a theoretical explanation regarding the multidimensional assessment of elderly individuals, practical training, and the reading of studies and texts addressing the topic. Before data collection, the family health team coordinator was sensitized about the study and received clarification regarding its procedures. The list of elderly individuals enrolled in the unit and monitored by the team was provided.

Afterward, data were collected in the participants' homes on a day and time scheduled according to their availability. Interviews lasted one hour on average. Sociodemographic and clinical data were collected using a structured questionnaire addressing sex, race, age, education, marital status, family arrangement, history of falls, the medical diagnosis of diseases, and medications.

The IVCF-20⁽¹²⁾ was used to identify frailty, measuring vulnerability to functional decline. This instrument addresses the multidimensional aspects of an elderly individual's health condition. It is a 20-item instrument with questions distributed

into eight domains: age (1 question), self-perception of health (1 question), functional disabilities (4 questions), cognition (3 questions), mood (2 questions), mobility (6 questions), communication (2 questions), and multiple comorbidities (1 question). The possible scores in each domain are: 0-6 points (robust), 7-14 points (at risk of frailty), 15-40 points (frail)^(8,12), with a global score of 40 points.

The Katz scale⁽¹³⁾ was used to assess the elderly individuals' dependence on the following basic activities of daily living (BADLs): eating, bathing, dressing, toileting, transfer, and traveling. The Different degrees of functional independence are established as follows: 0 – independent in all the six functions; 1 - independent in five functions and dependent in one function; 2 - independent in four functions and dependent in two functions; 3 - independent in three functions and dependent in three functions; 4 - independent in two functions and dependent in four functions; 5 - independent in one function and dependent in five functions; 6 - dependent in all the six functions. Individuals scoring between 0 and 1 are considered the most functional, those scoring 2, 3, or 5 are considered moderately functional, and those scoring 5 or 6 are the least functional⁽¹³⁾.

Dependence on instrumental activities of daily living (IADLs), such as not being able to manage finances, using transportation, shopping, using a telephone/mobile, or administering medications, was assessed with the Lawton-Brody IADL scale. The lowest the score, the worse one's functionality, while higher scores indicate improved functionality. Scores range from 7 points (total dependence); 7<21 points (partial dependence); to 21 points (independence)⁽¹⁴⁾.

Data were inserted in an electronic spreadsheet, Microsoft Excel 2013, and then transferred to the Statistical Package for Social Science (SPSS), version 20.0. Descriptive analysis (simple frequency and percentage) was conducted. The prevalence of frailty was established considering the number of elderly individuals scoring between 15 and 40 points (frail) in the IVCF-20.

Bivariate analysis was performed using the Chi-square test. The variables were categorized according to the IVCF-20, consisting of absence (robust or at the risk of frailty) and presence (frail). Hence, the relationship between each independent variable and the outcome variable (frailty) was obtained. Odds Ratio (OR) was used to measure the association's strength, with a 95% confidence interval (CI).

A logistic regression model was performed to identify the co-variables influencing the outcome with OR measuring the association's strength. Variables with a $p \leq 0.20$ in the bivariate analysis were included in the multivariate model. A level of significance of 0.05 ($p < 0.05$) was considered in the final analysis.

Ethical aspects followed Resolution 466/2012 and the Institutional Review Board at the State University of Montes Claros approved the study project (Opinion No. 2,536,183 and protocol CAAE– 83069017.8.0000.5146).

RESULTS

The prevalence of frailty was 9.8% among the 184 elderly individuals. When both unfavorable conditions (frailty and at the risk of frailty) were aggregated, the prevalence raised to 41.3% of the individuals.

One hundred elderly individuals (54.3%) were women, and 119 (64.7%) reported mixed race. Age ranged from 60 and 97 years old, 69.44 years old on average ($SD \pm 7.667$) (Table 1).

Table 1. Sociodemographic data of the elderly individuals cared for by the Family Health Strategy unit. Montes Claros, MG, Brazil, 2018-2019.

Sociodemographic data	N	%
Sex		
Women	100	54.3
Men	84	45.7
Race		
Caucasian	43	23.4
Afro-descendant	17	9.2
Asian-descendant	4	2.2
Indigenous	1	0.5
Mixed race	119	64.7
Age		
60-64 years old	61	33.2
65-69 years old	50	27.2
70-74 years old	31	16.8
75-79 years old	23	12.5
≥ 80 years old	19	10.3
Schooling		
Illiterate	58	31.5
Literate	126	68.5
Marital Status		
Single	14	7.6
Married	106	57.6
Widowed	45	24.5
Stable union	4	2.2
Divorced	15	8.2
Family Arrangement		
Does not live alone	152	82.6
Lives alone	32	17.4

Table 2 presents the clinical characteristics of the elderly participants. Note that 62 (33.7%) individuals had a history of falls in the last year. Additionally, 136 (73.9%) had heart disease, and 175 (95.1%) were classified as being more functional for BADLs while 95 (51.6%) were independent for IADLs.

Table 2. Clinical data of elderly individuals cared for by the Family Health Strategy unit. Montes Claros, MG, Brazil, 2018-2019.

Clinical data	N	%
History of falls		
No	122	66.3
Yes	62	33.7
Medical diagnosis*		
Cardiovascular disease	136	73.9
Endocrine disease	39	21.2
Metabolic disease	38	20.7
Musculoskeletal disease	19	10.3
Drug class*		
Anticoagulant	17	9.2
Anti-hypertensive	42	22.8
Diuretic	27	14.7
Hypoglycemia	14	7.6
Insulin	10	5.4
Functionality (Katz Scale)		
More functional	175	95.1
Intermediate functionality	5	2.7
Less functional	4	2.2
Dependence (Lawton and Brody Scale)		
Total dependence	6	3.3
Partial dependence	83	45.1
Independence	95	51.6

* Multiple answer variables.

When analyzing the association of frailty with the study variables, education ($p=0.004$), age ($p=0.001$), functionality (Katz Scale) ($p<0.001$), and dependence (Lawton and Brody Scale) ($p<0.001$) were significant at the level of 20% (Table 3).

The following variables were associated with frailty: education (illiterate) (OR=3.979; $p=0.007$) and age (≥ 80 years old) (OR=5.885; $p=0.002$). The results of the multiple analysis are presented in Table 4.

DISCUSSION

A prevalence of 9.8% of frailty was found in this study among elderly individuals enrolled in an FHS unit located

in the North of Minas Gerais, Brazil. One study applied the IVCF-20 in Recife, PE, Brazil, and found a prevalence of 13%⁽⁸⁾, while 16.6% was found in Pombal, PB, Brazil⁽⁹⁾. A higher prevalence is reported when other instruments are used; a prevalence of 69% was found in Ireland⁽¹⁵⁾, 65.25% is reported in a city in the state of Mato Grosso⁽¹⁶⁾, and 35.7% in Juiz de Fora, MG, Brazil⁽⁶⁾.

One study applied the Edmonton Frail Scale to identify frailty among elderly outpatients living in the same city in which this study was conducted and found a prevalence of 41.3%⁽¹⁷⁾. Note that divergences may be related to the different instruments adopted to identify frailty, individuals' profile, studies' settings, or even sample size.

Physiologically, frailty occurs due to modulated oxidative stress caused by endogenous and exogenous agents, which results in changes in cells, deregulating inflammatory processes, apoptosis, necrosis, and proliferation, which can trigger a continuous loss of strength and aerobic resistance, causing decreased functional independence, leading to frailty⁽¹⁸⁾.

Frailty is a multidimensional event related to decreased homeostatic reserve or ability to adapt to biopsychosocial aggressions, and consequently, increased vulnerability to functional decline and its consequences^(13,18). Hence, one should assess and monitor the factors that trigger or aggravate this condition to implement preventive strategies.

Demographic and epidemiological changes are taking place worldwide, and Brazil follows these trends, with an increased number of elderly individuals and feminization of aging due to women's higher life expectancy⁽³⁻⁴⁾. Note that no statistical significance was found in this study; however, diseases of the circulatory system are considered the most significant health problem globally⁽⁴⁾.

Even though dependence to perform BADLs and IADLs are not present in the final model, these are factors known to be related to frailty^(6,18-19). Disability or dependence on performing BADLs and IADLs are frequently described as representing the frailty process, hence associated with increasing severity of frailty⁽¹⁹⁾.

Over time, functional decline tends to increase for both BADLs and IADLs. IADLs demand more cognition and are influenced by one's educational level. Low education may lead to poor socioeconomic conditions and little formal education, leaving elderly individuals more susceptible to health problems such as frailty⁽²⁰⁻²¹⁾.

Dressing and bathing are BADLs that demand strength in the upper and lower limbs, flexibility, fine motor coordination, balance, and cognition. These aspects may decline, especially among the oldest old (80+) and those who present certain health problems. Complaints concerning BADLs may indicate that a process of functional decline is already on the way⁽²²⁾.

Table 3. Association between the dependence, frailty, and independent variables among elderly individuals cared for by the Family Health Strategy. Montes Claros, MG, Brazil, 2018-2019.

Variables	Frailty		OR (IC95%)	p-value
	Yes n (%)	No n (%)		
Sex				
Women	12 (66.7)	88(53.0)	1.773 (0.635 – 4.947)	0.269
Male	6 (33.3)	78 (47.0)		
Race				
Non-Caucasian	15 (83.3)	126 (75.9)	1.587 (0.437 – 5.764)	0.479
Caucasian	3 (16.7)	40 (24.1)		
Schooling				
Illiterate	11 (61.1)	47 (28.3)	3.979 (1.450 – 10.880)	0.004
Literate	7 (38.9)	119 (71.7)		
Age				
≥80 years old	6 (33.6)	13 (7.8)	5.885 (1.898 – 18.250)	0.001
60–79 year old	12 (66.7)	153 (92.2)		
Marital status				
W/o partner	8 (44.4)	66 (39.8)	1.212 (0.455 – 3.231)	0.700
W/ partner	10 (55.6)	100 (60.2)		
Functionality (Katz Scale)				
Less functional	4 (22.2)	0 (0.0)	0.778 (0.608 – 0.996)	<0.001
Highly or moderately functional	14 (77.8)	166 (100)		
Dependence (Lawton and Brody Scale)				
Partial or total dependence	18 (100)	71 (42.8)	2.338 (1.961 – 2.788)	<0.001
Independence	0 (0.0)	95 (57.2)		
History of falls				
Yes	8 (44.4)	54 (32.5)	1.659 (0.620 – 4.442)	0.310
No	10 (55.6)	122 (67.5)		
Cardiovascular disease				
Yes	14 (77.8)	122 (73.5)	1.262 (0.394 – 4.040)	0.694
No	4 (22.2)	44 (26.5)		

OR: odds ratio; CI: Confidence interval.

Table 4. Factors associated with frailty among elderly individuals cared for by the Family Health Strategy unit. Montes Claros, MG, Brazil, 2018-2019.

Variables	OR	CI 95% OR		p-value
		Lower	Upper	
Education (literate)	3.979	1.455	10.880	0.007
Age (≥80 years old)	5.885	1.898	18.250	0.002

OR: odds ratio; CI: Confidence interval.

The inability to perform BADLs and IADLs among elderly individuals is seen as an outcome or factor contributing to the frailty syndrome. Hence, there is a need for more significant care actions directed to the elderly's health, to delay or mitigate functional decline, promoting active aging⁽²³⁾.

Other studies also report that low educational level predicts frailty^(3,24). A low educational level may compromise access to health care, improved financial conditions, and employment, interfering in the individuals' lifestyle and quality of life. That

is, higher levels of unhealthy behavior result in greater risk or vulnerability to frailty.

Evidence shows that a higher educational level is a protective factor against cognitive impairment and frailty among elderly individuals, considering that having less access to information and more impoverished socioeconomic conditions makes elderly individuals more susceptible to health problems^(5,21).

The result regarding age is corroborated by another study⁽⁷⁾, in which individuals aged between 81 and 90 years old were nine times (OR=9.69) more likely to develop frailty than their younger counterparts.

Nonetheless, age by itself is not a good predictor of frailty. While aging is directly associated with frailty, it does not progress homogeneously among individuals^(11,18). Additionally, advanced age is frequently associated with comorbidities, suggesting a more significant risk of frailty among the elderly⁽²⁵⁾.

Elderly individuals 80 years old or older are more vulnerable to decreased or loss of functional ability. Over time, physiological or pathological decline takes place in various systems, impacting one's homeostatic capacity and resulting in unfavorable conditions such as sarcopenia and frailty. The older an individual, the greatest the likelihood s/he will become functionally vulnerable^(9,17).

This study's findings contribute to knowledge concerning frailty among elderly individuals and associated factors, with information for managers, researchers, and workers, especially the nursing staff. These results can support the planning of preventive and health promotion actions and promote future studies to make comparisons between assessment instruments addressing elderly individuals' clinical-functional vulnerability.

This study's limitation includes the fact that few studies, especially international studies, have adopted the IVCF-20 to address frailty among elderly individuals. Hence, further research is needed to compare this study's findings. Another fact is that only the population of a specific location was addressed, which impedes data generalization. Additionally, this is a cross-sectional study in which exposure and outcome are collected at a single point in time, considering a short period. Thus, a temporal relationship, such as to cause and effect, cannot be established.

CONCLUSION

A total of 9.8% of the elderly individuals presented frailty, which appeared associated with education (illiterate) and age (≥ 80 years old). Therefore, these results can support PHC multi-professional

teams, provide knowledge of associated factors, and support the identification of frailty among elderly individuals. It also supports the development of actions directed to this population to avoid or decrease functional impairment.

Preventive measures such as qualifying PHC workers on frailty and the adoption of instruments to identify and screen the factors that contribute to increased frailty can impact the identification of the level of frailty affecting elderly individuals. The multi-professional team's work, especially that of nurses, is essential to implement a comprehensive and multidimensional clinical assessment. The identification on the part of nurses of potentially associated factors can aid the management of care, determining and implementing nursing interventions to prevent frailty. Longitudinal studies are needed to establish causal relationships.

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