PREVALENCE AND FACTORS ASSOCIATED WITH THE FRAILTY SYNDROME IN OLDER ADULTS IN THE BRAZILIAN FEDERAL DISTRICT

Prevalência e fatores associados à síndrome da fragilidade no idoso do Distrito Federal

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ABSTRACT

INTRODUCTION: Frailty syndrome (FS) in older adults has been recognized as a physiological vulnerability condition associated with aging, resulting from reduced homeostatic reserve and a difficulty of the body to respond adequately to stress, a highly predictive feature of a variety of adverse clinical outcomes including functional decline, institutionalization, and mortality. **OBJECTIVE:** To identify the prevalence and factors associated with FS in a population assisted by an outpatient geriatric unit at a specialized geriatric and gerontological care center in the Brazilian Federal District. **METHODS:** This is an observational, descriptive, cross-sectional and analytical study conducted with older people who were assisted at the specialized center for geriatrics and gerontology of the Brazilian Federal District Health Department. In the baseline evaluation of the participants, data were collected to identify the profile, functional capacity, multimorbidities and clinical outcomes such as falls, as well as the level of frailty, which was classified according to Fried's criteria. Statistical analysis was performed using the chi-square test and Poisson's regression. **RESULTS:** In the present study, 24% of the total sample was considered frail, 32.9% pre-frail and 42.1%, non-frail. Regarding sociodemographic aspects, there was an association of frailty with the higher age group and with lower educational level. Diabetes, systemic arterial hypertension, incontinence, polypharmacy, depression, falls, and cognitive impairment were directly related to higher risk of frailty. **CONCLUSION:** The results obtained were useful to help define measures and strategies to prevent morbidity and mortality as well as to provide better quality of life for older adults. **KEYWORDS:** elderly; frailty syndrome; prevalence; risk factors.

RESUMO

INTRODUÇÃO: A síndrome da fragilidade no idoso (SFI) tem sido reconhecida como uma condição de vulnerabilidade fisiológica associada ao envelhecimento, resultante de uma reserva homeostática reduzida e da dificuldade do organismo em responder adequadamente ao estresse, característica altamente preditiva de uma variedade de desfechos clínicos adversos associados, que incluem declínio funcional, institucionalização e mortalidade. **OBJETIVO:** Identificar a prevalência e os fatores associados à SFI em população assistida por uma unidade ambulatorial de atenção secundária em centro especializado de atendimento em geriatria e gerontologia do Distrito Federal. **MÉTODOS:** Trata-se de um estudo observacional, descritivo, transversal e analítico realizado com idosos atendidos no centro especializado em geriatria e gerontologia da Secretaria de Saúde do Distrito Federal (SES/DF). Na avaliação dos idosos, foram coletados dados para identificação do perfil, capacidade funcional, informações referentes às multimorbididades e desfechos clínicos, como quedas. Os idosos também foram classificados na SFI pelos critérios de Fried. Para a análise estatística, utilizaram-se o teste de χ^2 e a regressão de Poisson. **RESULTADOS:** No presente estudo, 24% da amostra total foi considerada frágil, 32,9% pré-frágil e 42,1% não frágil. Com relação aos aspectos sociodemográficos, houve associação de fragilidade com maior faixa etária e menor nível educacional. Diabetes, hipertensão arterial sistêmica, incontinência urinária, polifarmácia, depressão, quedas e alteração cognitiva tiveram associação com maior risco de fragilidade. **CONCLUSÃO:** Mediante os resultados obtidos, será possível definir medidas e estratégias para prevenção de morbimortalidade e proporcionar melhor qualidade de vida para os idosos. **PALAVRAS-CHAVE:** idoso; síndrome da fragilidade; prevalência; fatores de risco.

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INTRODUCTION

The proportion of older adults in the world population has been growing due to the association of the progressive reduction in mortality and fertility rates. Since the 1960s, Brazil has been following this demographic process, and there is a higher demand for health services resulting from chronic degenerative diseases that can already be observed.^{1,2}

Although age is the main risk factor for a large number of diseases, some older adults live autonomously and independently, which provides a high degree of personal satisfaction, however a substantial portion of this population has health conditions that make them vulnerable to a large number of adverse events, being classified as frail older adults.³

Studies state that frailty syndrome in the older adult (FS) is characterized by the presence of signs and symptoms such as unintentional weight loss, fatigue, decreased grip strength, reduced physical activity, and decreased gait speed, representing an important clinical condition that leads to negative outcomes.⁴⁻⁶

From a public health point of view, the increase in the number of frail older adults is significantly associated with a worsening quality of life and an increased risk of intercurrents, morbidity and mortality, making it essential to adequately follow these patients. Thus, health care costs are higher, and there is a need for regional studies on this subject, since the identification of the prevalence and factors associated with FS should be the goal of any service providing care to this population.^{7,8}

Given all the above, the objective of the present study was to identify the prevalence and factors associated to FS in cases treated at a specialized center in geriatrics and gerontology in the Brazilian Federal District.

METHODS

It is an observational, descriptive, cross-sectional and analytical study. The sample was obtained by the convenience sampling method, and data collection was performed at the Taguatinga Polyclinic, which hosts the specialized center in geriatrics and gerontology of the Federal District Health Department (SES/DF).

The study was submitted to the Research Ethics Committee of the Foundation for Teaching and Research in Health Sciences of the SES/DF and approved by such collegiate under approval certificate number 3 073 593.

The older adults (individuals aged 60 years or older) who met the eligibility criteria of the study were selected from the outpatient clinic of the geriatrics and gerontology

program of the Taguatinga Polyclinic (secondary health care). We analyzed the medical records of all patients followed from September 2015 to September 2018 in the physiotherapy sector.

Participants included older adults who were able to perform the tests proposed for the diagnosis of FS according to Fried et al.⁴ The investigation did not involve participants with sequelae of neurological diseases (cerebrovascular disease, parkinsonism, among other conditions), severe cognitive deficit (evaluated by mini-mental state examination — MEEM —, clock-drawing test, and verbal fluency test), besides older people with amputations. We excluded incomplete medical records that did not contain, for example, adequate information from the physician in charge (medications in use, previously diagnosed clinical comorbidities, and specific complaints related to vulnerability, such as number of falls in the last year or presence of cognitive decline), and assessment of the degree of dependence to perform activities of daily living (ADLs).

The information was collected from the survey of the medical records of the participants in the Track Care® system version 2015, available in the data system of SES/DF and in the physical records of the services provided in the physiotherapy sector of that program.

To identify the socio-demographic profile of the participants and the clinical characteristics, the following variables were used: age, marital status, education and income; number of drugs in use, associated comorbidities, occurrence of a fall in the last 6 months, and presence of urinary incontinence.

The Barthel index was applied to assess the degree of independence to perform basic ADLs;⁹ hand grip strength (HGS) as a functional marker to estimate overall muscle strength;¹⁰ The Timed Up and Go Test (TUG), for functional mobility and risk of possible fall;¹¹ and the usual gait speed test (GS), as a marker of general health.¹²

To classify patients in FS, the dependent variable on the present study, Fried's criteria were adopted: weight loss of 5% of body mass, low grip strength, low gait speed, and self-reported exhaustion and fatigue. If participants presented 1 or 2 symptoms they would be considered pre-frail, and 3 or more, frail.^{4,5}

The survey data were entered into a database developed using EpiData version 3.1 software (Epidata Assoc., Odense, Denmark) and submitted for consistency evaluation. For the analyses of this study, prevalence estimates and 95% confidence intervals (95%CI) were produced. Associations between independent variables and self-rated health were analyzed by the χ^2 test. Poisson's single and multiple regression analyses

were also used to estimate crude and adjusted prevalence (PR) ratios.

The Poisson multiple regression model was developed in 2 stages. In the first, the demographic and socioeconomic variables that presented a significance level lower than 20% ($p < 0.20$) in the association with the dependent variable were introduced; and those with $p < 0.05$ remained in the model. In the second, in addition to the variables that remained in the previous stage, those with health-related behaviors and $p < 0.20$ in the univariate analysis were added; and those with $p < 0.05$ were maintained.

Data analysis was performed with the SVY commands of Stata 12.0 software (Stata Corp., Chicago, United States), using the weights resulting from the sample design and considering the existence of the primary sampling units.

RESULTS

The sample was composed of 439 participants, 349 (70.5%) women and 90 (29.5%), men. The percentage distribution of the sample by socio-demographic and economic variables is shown in Table 1.

In the analysis, the distribution of the risk of frailty regarding the sex variable shows that there was no difference for the cases classified as frail. For the non-frail participants, there was a higher percentage in the male population, although statistically without difference.

In relation to the age group, we observed that there is an association with the risk of frailty: the older the age group, the more cases of frail older adults. In relation to the educational level, the data of this study showed that there is an inverse relationship between the time of schooling and the development of frailty.

Table 1 Percentage distribution of the sample by sociodemographic and economic variables.

Variables	Non-frail		Pre-frail		Frail		p
	n	%	n	%	n	%	
Sex							
Female	139	39.8	124	35.5	86	24.6	0.063
Male	46	51.1	21	23.3	23	25.6	
Age range (years)							
60–69	91	70.5	28	21.7	10	7.8	0.0001*
70–79	56	39.2	55	38.5	32	22.4	
80–89	33	23.1	57	39.9	53	37.1	
> 90	5	20.8	5	20.8	14	58.3	
Level of Education							
Unschooling	107	37	105	36.3	77	26.7	0.019*
Up to 5 years	42	50	20	23.8	22	26.2	
Complete Elementary School	36	54.5	20	30.3	10	15.2	
Has a partner							
No	108	38.8	90	32.4	80	28.8	0.031*
Yes	77	47.8	55	34.2	29	18	
Income							
Up to 2 wages	38	38.8	40	40.8	20	20.4	0.45
Between 3 and 5	137	43.4	97	30.7	82	25.9	
More than 6	10	40	8	32	7	28	

*Significant difference between frailty groups.

The analysis of the multimorbidity factors, presented in Table 2, showed the association of a specific comorbidity with the higher risk of frailty, being significant for diabetes mellitus, heart disease, hypertension, and presence of polypharmacy. Another point that is noteworthy is the presence of this association also in pre-frail participants, in which the presence of multimorbidity was extremely significant.

It is important to emphasize that cognitive changes (mild cognitive decline) and depression also presented association with frailty. Of the sample, 43.1% of frail participants had some degree of depression. Therefore, through detailed statistical evaluation, it is possible to infer that both cognitive decline and depression can be predictors of increased risk of frailty among older adults.

With regard to other comorbidities such as osteoporosis, arthrosis, hypothyroidism, cancer, and visual and hearing problems, no statistically significant relationships with frailty were found.

DISCUSSION

The study observed an incidence of FS in 24% of the sample and association of frailty with higher age and lower educational level. Diabetes, hypertension, urinary incontinence, polypharmacy, depression, falls, and cognitive changes were associated with higher risk of FS.

According to the Brazilian Consensus on Frailty in Older People,¹³ the prevalence of frailty varies between 6.7 and 74.1%. The main sources of variation were the instrument used to classify the degree of frailty in individuals and the evaluation scenario.¹³

Walston et al.¹⁴ studied 4735 community-dwelling adults aged 65 and over. According to Fried's criteria, 6.3% were considered frail, 45.3%, intermediate, and 48.3%, non-frail.³ In the present study, 24% of the total sample was considered frail, 32.9% pre-frail, and 42.1% non-frail. The higher rate of FS in the present study, when compared to that of Walston et al.,¹⁴ is due to the profile of the participants,

Table 2 Percentage distribution of the sample by clinical variables.

Variables	Non-frail		Pre-frail		Frail		OR	CI
	n	%	n	%	n	%		
Polypharmacy								
Yes	64	36.6	86	59.3	69	63.3	2.35*	(1.97–4.43)
Hypertension								
Yes	127	68.6	118	81.4	92	84.4	1.83	(0.97–3.43)
Cardiopathies								
Yes	32	17.3	32	22.1	33	30.3	2.04*	(1.19–3.51)
Diabetes mellitus								
Yes	47	25.4	58	40	47	43.1	1.44*	(1.07–1.37)
Osteoporosis								
Yes	50	27	54	37.2	41	38	1.20	(0.73–1.99)
Arthrosis								
Yes	43	23.2	46	31.7	28	25.7	0.93	(0.56–1.75)
Hypothyroidism								
Yes	25	13.5	29	20	16	14.7	0.98	(0.50–1.92)
Depression								
Yes	46	25.9	49	33.8	47	43.1	1.67*	(1.01–2.74)
Light cognitive decline								
Yes	3	1.6	7	4.8	10	9.2	1.67*	(1.21–2.84)

*Significant difference between the groups of frailty; OR: odds ratio; CI: confidence interval.

as it is a population referred from other units to the reference center in geriatrics; therefore, with a higher prevalence of comorbidities.

Analyzing the group studied, there was a predominance of women. According to the Brazilian Institute of Geography and Statistics (IBGE), 55.5% of the older population are women (feminization of aging), and they tend to have a more frequent presence in health research samples, due to their condition of caregivers and their greater exposure to health treatments throughout life.¹⁵

Despite the predominance of women, there are no statistically significant associations between sex and frailty, as in the study by Buttery et al.,¹⁶ and contrasting with numerous studies that report a higher prevalence of frailty among women. This is due to the greater physiological loss of muscle mass in aging women, in addition to the fact that women are more prone to the development of sarcopenia, an intrinsic risk for the development of FS, which is aggravated by disease overload.

In relation to the age group, there is an association with the risk of FS: the older the age group, the more cases of frail older people. The association between pre-frailty and frailty and the increase age corroborates national and international studies.^{17,18} The influence of aging as a predisposing factor for the development of the frailty process may be related to changes and decline in multiple systems, resulting from the interaction of physiological mechanisms and pathological conditions with current and accumulated health and functional risks.

Although aging can predispose to FS, not all older adults are frail and / or pre-frail, suggesting common but not identical pathways.¹⁹ Thus, it is believed that this syndrome may constitute more pronounced characteristics than those of the normative physiological aging process.

In relation to the educational level, the data of this study showed that there is an inverse relationship between years of schooling and development of frailty. It can be seen that the higher the level of education, the lower the degree of frailty, and only 15.2% of participants who presented frailty had completed elementary school. In contrast, 26.7% of the frail older adults were unschooled, which is consistent with most studies.²⁰

A low level of education can be related to living conditions and vulnerability. Evidence indicates that the level of schooling is a protective factor of adverse effects on the health of older people. Older people with low levels of education may have mental health problems, chronic conditions, including social exclusion, reduced access to information, and unfavorable socioeconomic conditions.²¹

Not having a partner was a significant factor for frailty, corresponding to 28.8% of frail participants, data that corroborate most studies in which the pre-frailty condition was associated with the absence of a partner, a result similar to that found in pre-frail and frail older Mexicans.⁸

A longitudinal investigation in the municipality of São Paulo (SP) found that divorced and widowed older women had, respectively, mortality rates 82 and 35% higher than those observed for married women. In this sense, considering that the marital status is a component of the social support network for the older population, it is assumed that the FS, by means of its complex interaction between clinical and social factors, may be compromised to the detriment of the rupture and/or absence of social ties, considering the decline of physiological reserves and the possibility of the occurrence of an stressful event or factor.²⁰

In a study conducted at the geriatric outpatient clinic of the Hospital das Clínicas da Universidade Estadual de Campinas (UNICAMP) between 2004 and 2006, among 151 older people who were evaluated in relation to the number of diseases, 26.49% had from 1 to 3 diseases, 58.28%, from 4 to 7 and 15.22%, 8 or more chronic diseases.¹⁸ In another study on characteristics related to the frailty profile in the older population from Rio Grande do Sul, systemic arterial hypertension was present in 78% of the participants evaluated, together with osteoarthritis and depression, which are strong predictors of disability.²² However, in our evaluation, osteoarthritis and osteoporosis did not have significant results.

The association between a history of falls in the last 6 months and a diagnosis of frailty indicated that the pre-frail and the frail are the ones that fall the most. According to Nowak and Hubbard,²³ falls and frailty share common characteristics, since they constitute important health problems in older people and are multifactorial phenomena associated with adverse health outcomes. According to the same authors, prevention of falls should occur simultaneously with FS prevention and treatment. In addition to extrinsic factors related to the physical environment, intrinsic factors, such as decreased functional capacity, play a crucial role in falls and their consequences in older adults.²³

The presence of polypharmacy proved to be significant, since the overlap of multiple indiscriminately used drugs and their adverse reactions can exacerbate the condition of frailty. In addition, the association between frailty and chronic diseases in this study indicates that increased drug used may reflect the manifestation of comorbidities.^{17,18}

With regard to depression, 43.1% of the frail older adults in our sample had some degree of depression. Studies conducted in Brazil with older community-dwelling

adults point to a prevalence of indicative of depression of 21%. International surveys also verified the association between FS and depression. A research conducted with older people in China showed that pre-frailty and frailty conditions were associated with an increase in the number of depressive symptoms, with a higher prevalence among the frail.²⁴

It is also believed that depression is one of the risk factors for frailty. Characteristics such as reclusion and inappetence, typical of depression, can trigger loss of muscle mass, strength, and exercise tolerance, items evaluated in FS.²⁴ In this same reasoning, the psychological weight of urinary incontinence can lead to social isolation, depression, and interfere with physical exercise.

For the evaluation of ADLs, scales are proposed that stratify the degree of difficulty, the degree of assistance or dependence to develop certain activities, and the performance or not of the activity. Thus, the individual is classified as dependent if he needs help of another person or when he cannot perform the task. In the literature, several scales aim at assessing functional capacity. Among them, one of the best known nationally is the Barthel index.^{9,25,26} In the present study, it was possible to verify that the greater the frailty, the greater the degree of impairment of an individual's functional capacity.

The main limitation of the study is the fact that the geriatrics and gerontology program is part of the secondary level

of health care, attending only referred patients who meet pre-established criteria for the specialty. Therefore, it is likely that they are older patients with greater clinical complexity. Also, the research occurred in only 1 macro-region in the Federal District.

It is also possible that by not including older people with neurological sequelae, severe cognitive decline, or amputations, the prevalence of FS in this sample was underestimated. Moreover, the type of diagnostic instrument adopted, in this case the Fried phenotype, may have affected the prevalence of FS.

CONCLUSION

In this study, 24% of the total sample was considered frail, 32.9% pre-frail and 42.1% non-frail. It was demonstrated that patients with advanced age, lower level of education, no companions, polypharmacy users, and carriers of various conditions (hypertension, heart disease, diabetes mellitus, depression, and cognitive impairment) are more prone to the diagnosis of frailty according to Fried's criteria. The association was also found for a history of fall in the last 6 months, carriers of 2 or more comorbidities (multimorbidities), and urinary incontinence. Another finding was the relation between gait speed, TUG and handgrip tests and diagnosis, which corroborates these tests as diagnostic or even screening aids.

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