

Frailty, profile and cognition of elderly residents in a highly socially vulnerability area

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Abstract *This study aimed to associate frailty with sociodemographic profile and cognition of elderly people living in highly socially vulnerable contexts registered at a Social Assistance Referral Centers in a city of inland São Paulo. This is a cross-sectional and quantitative study with 48 elderly. Data was collected with a sociodemographic interview, the Edmonton Frail Scale and the Montreal Cognitive Assessment, and was analyzed with the Jonckheere-Terpstra test, Spearman's correlation and logistic regression ($\alpha = 5.0\%$). This study was approved under Opinion N° 72182. Of the 48 elderly interviewed, 33.4% were non-frail, 20.8% were apparently vulnerable and 45.8% were frail at some level (mild, moderate or severe). Women (OR = 4.64) and nonwhites (OR = 3.99) were more likely of being frail. The realms with the greatest influence in the determination of frailty were cognition, independence and functional performance, general health and mood, although gender ($p = 0.0373$) and ethnicity ($p = 0.0284$) had a significant association. Worth highlighting is that considering the frailty profile of the elderly warrants the development of specific care strategies for this segment of the population in a vulnerable area, preventing futures complications.*

Key words *Frail elderly, Primary health care, Elderly health, Social vulnerability*

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Introduction

Ageing is a multidimensional and multidetermined process associated with the natural decline of physiological functions that directly affect the experiencing individual. The decline of the various physiological systems can make the elderly vulnerable to the maintenance of homeostasis in the face of stressors, which is not inherent to ageing, called the frailty syndrome¹, whose incidence increases with age²⁻⁴.

A US study reveals that in the age 65-75 years age group, three to seven percent of the elderly are frail. In the 80-90 years age group, this proportion ranges from 20 to 26%, and 32% of people aged 90 years and over suffer from this syndrome⁵.

A study carried out in the Brazilian Northeast showed a prevalence of 17.1% of frailty syndrome, and associated factors were advanced age, comorbidities, dependence on basic and instrumental activities of daily living and negative perception of health status⁶. Similar results were found in a survey conducted in the United States with 7,439 elderly people aged 65 years and over, whose frailty prevalence was 15%, and the main risk factors were advanced age, female gender, low income, racial/ethnic minorities and multiple chronic diseases⁷.

Considering the impact of this syndrome on the quality of life of the elderly, families, caregivers, as well as on health care and social systems, it is a subject of public interest, increasingly addressed by researchers in several parts of the world.

It is worth emphasizing that individuals living in highly socially vulnerable contexts, with poorer financial conditions, lower levels of schooling, less access to health services and lack of social support tend to have a frailer health condition⁸. Social vulnerability is multidimensional because it affects individuals in different ways and intensities. Social vulnerability reflects the sociocultural environment of the individual and denotes lack or difficulty of support from institutions, which hampers citizens' right to exercise their social rights, affecting the ability to react to adverse situations. Thus, in highly socially vulnerable contexts, the risk of illness and harm to the quality of life and well-being of the elderly is greater⁹⁻¹⁰.

The investigation of the characteristics that may influence the establishment of this syndrome is required for the early detection and implementation of appropriate interventions and

strategies in order to delay the condition, in addition to improving the situation of those who are already frail¹¹. Studies in the context of social vulnerability gain particular relevance when they consider the multidimensionality of social factors that can aggravate frailty and other ailments of the elderly⁹. Thus, this study aimed to associate frailty with the sociodemographic profile and cognition of elderly residents in a highly socially vulnerable context enrolled in a Social Assistance Referral Centers in a municipality of inland São Paulo.

Methods

This is a descriptive, cross-sectional study based on the quantitative research method. Forty-eight elderly people aged 60 years and over, enrolled in a Social Assistance Referral Centers (CRAS) in São Carlos, São Paulo (SP), located in a socially vulnerable urban area participated in this research.

The context of housing in which the elderly were interviewed corresponded to highly socially vulnerable areas, according to the Foundation Educational Data Analysis System (SEADE), which classifies census tracts in the State of São Paulo, according to the São Paulo Social Vulnerability Index (IPVS). The IPVS considers socioeconomic and demographic dimensions, so that the first realm includes the head of household's schooling and income and the second realm covers the head of household's age and number of children from zero to four years living in the household¹².

In the research region, according to IPVS, the region belongs to Group 5, high vulnerability, which includes 12.9% of the population of the municipality - 221,950 people. The average nominal income of households does not exceed one-half minimum wage per capita. With regard to demographic indicators, the average age of the heads of households is 42 years. Among female heads of household, 22.1% are under 30 years of age, and the proportion of children under six is 10.5% of the total population of this group¹².

The inclusion criteria of participants in the study were to be elderly, 60 years old or older and enrolled in the CRAS. Exclusion criteria were having serious language or comprehension impairments, which could interfere with the veracity of answers.

Collection proceeded as follows: firstly, data was collected and consisted of access to all available printed medical records where families were

registered in the service. Four hundred thirty-three medical records that included elderly members were identified. We decided not to perform a sample calculation and to carry out the research with all the registered elderly. The residences of all registered elderly were located and were visited by researchers from August 2012 to March 2013.

Of the registered, 385 were not evaluated because there was no one at home at the time of the research in 27% of the residences, 19% refused to participate, 17% had moved, in 10% the address was inexistent, 10% of homes were under construction or rented, 7% were elderly individuals who did not understand the research and were alone, 5% were not at home at the time of the visit and 5% had died. Residences in which no one was found were visited twice by researchers, at different days and hours.

Following previous training on the application of research tools and objectives and ethical aspects, evaluators visited the homes of the elderly and, after consent, started the individual interview at the participant's own home. The average time of each interview was 45 minutes. Interviews were held from Monday through Saturday during business hours.

We used a sociodemographic characterization tool, Edmonton Frail Scale (EFS)¹³ and the Montreal Cognitive Assessment (MoCA)¹⁴. The sociodemographic characterization tool was previously prepared by the researchers with the following issues: gender, schooling, marital status, race and current and previous occupation.

The Edmonton Frail Scale evaluated nine realms, namely: cognition (clock drawing test), functional independence, general health status, social support, medication use, nutrition, mood, continence, and functional performance. According to the answers, the final score indicated the condition of frailty in five categories, that is, non-frail, apparently vulnerable and mild, moderate or severe frailty¹³.

The Montreal Cognitive Assessment (MoCA) tool facilitated the screening of possible cognitive impairment through visual-spatial, executive, naming, memory, attention, language, abstraction, late remembrance and orientation tests. It shows a total score of 30 points and a cutoff score of 26, so that obtaining a score below the cutoff point indicates possible cognitive deficit and the need for further investigation. According to the application instructions of the tool and the schooling of less than 12 years evidenced by respondents, a point was added to the final score of all of them¹⁴.

Data was stored in Microsoft Office Excel software (2010) and analyzed in the "The SAS System for Windows" version 9.2, 2008 in a descriptive and univariate manner. To describe the profile of the sample, we performed descriptive statistics with position and dispersion measurements (mean, standard deviation, minimum and maximum values and coefficient of variation) for continuous variables; and, for categorical variables, absolute (n) and percentage (%) values.

The non-parametric Jonckheere-Terpstra test was used to study the relationship between frailty and categorical variables. Spearman's correlation test was used to study the relationship between frailty and continuous variables (age and schooling), due to the lack of normal distribution of most variables. The main component analysis techniques and univariate regression including sociodemographic variables and frailty level were used. The significance level adopted for the statistical tests was 5% (< 0.05).

All ethical precepts governing research on human beings have been observed and respected, according to Resolution 466/2012 respecting the Declaration of Helsinki. The study was approved by the Research Ethics Committee of the Federal University of São Carlos, on August 14, 2012.

Results

Participants were mostly women (70.8%), had a mean age of 70.3 years (SD = 6.9, minimum 60 and maximum 92 years), 3.2 years of schooling (SD = 2.9), were married (41.7%) or widowed (41.7%), white (62.5%) and retired (41.6%).

In relation to frailty, 33.4% of the elderly were non-frail, 20.8% were apparently vulnerable and 45.8% had frailty at some level, as follows: 25% mild frailty, 10.4% moderate frailty and 10.4% severe frailty.

The association between frailty and sociodemographic profile was verified using the Jonckheere-Terpstra test, which found an association between frailty and gender ($p = 0.0237$) and current occupation, which is housewife ($p = 0.0127$). There was no association between frailty and religion ($p = 0.5632$), marital status ($p = 0.7252$) and retirement ($p = 0.0978$).

In the univariate logistic regression analysis, there was a significant association between frailty and gender ($p = 0.0373$) and race ($p = 0.0284$). Calculation of odds ratio revealed that women were 4.64 times more likely to be frail compared to men, and non-white individuals were 3.99

times more likely to be frail when compared to white individuals. There was no association between frailty and previous occupation, current occupation, retirement, religion and marital status, as can be seen in Table 1.

Correlation between frailty and the numerical variables was performed and the Spearman's correlation coefficient found that there was no statistically significant difference of frailty with age ($r = 1.000$, $p = -0.357$) and schooling ($r = 0.371$; $p = -0.132$).

Regarding the comparison of frailty and cognition, verified using the MoCA tool, 70% of the elderly evidenced a cognitive decline, with a mean of 15.11 (SD = 5.33) points, and the most affected realms were attention, abstraction, visual-spatial function and late remembrance. The correlation of the numerical variables age and schooling in relation to cognition was made and returned no correlation and statistically significant difference with age ($r = 0.0$, $p = 1.0$) and schooling ($r = 0.013$, $p = -0.357$).

The association between frailty and cognition obtained was $p = 0.0968$ and was not statistically significant. For the univariate regression between frailty and MoCA realms, only the attention realm had a significant association with those individuals with a maximal score ($p = 0.002$) and $r^2 = 0.1121$, according to Table 2.

Discussion

In this study, a higher prevalence of women was observed, data that corroborate with both national¹⁵ and international literature¹⁶, which reflects the greater female longevity, a phenomenon

known as feminization of old age. This is due to the lower exposure to certain occupational risk factors, the greater female concern with their own health and self-care, and the frequent use of health services in search of care. In addition, there is a lower prevalence of smoking and alcohol consumption among women and lower exposure to mortality due to external causes when compared to men¹⁶.

The prevalence of older adults shows that ageing in the national setting is recent, unlike developed countries, in which there is a larger proportion of older adults¹⁶. Statistics for developed countries vary with regard to the age of the frail elderly⁵.

There was a preponderance of low schooling among the participants in this study. Previously, there was no appreciation of formal education and socioeconomic conditions were poor, reflecting the difficulty of access to schools¹⁷. Low schooling may influence cognitive deficit, that is, the elderly with low educational level may show a greater cognitive deficit in comparison with older people with more schooling³, besides being associated with negative outcomes such as mental health problems, chronic conditions and frailty¹⁶.

We highlight that, in the context of high social vulnerability, factors such as low schooling may affect the elderly's lifestyle and health. Social vulnerability is associated with factors related to financial conditions, schooling, access to health services and may be an outcome for frailty. Thus, frail elderly in situations of vulnerability must receive life protection to sustain their integrality, human dignity and autonomy⁷.

Most of the elderly were frail (45.8%), followed by non-frail (33.4%) and apparently vulnerable (20.8%). A study carried out in Ribeirão Preto, São Paulo, Brazil, aimed to characterize the sociodemographic profile of the elderly and verify the levels of frailty by gender, functional independence and instrumental activities of daily living. As a result, authors found that 36.3% were non-frail, 24.6% were apparently vulnerable and 39.1% had different levels of frailty, with predominance of female elderly among those with higher levels of frailty¹⁴. Another study with 128 elderly people attended in the Family Health Strategy in Embu das Artes, São Paulo, Brazil found that 30.1% of the elderly were frail, also with women being affected the most¹⁸.

In a study carried out in inland São Paulo with elderly people in a context of highly socially vulnerable context, frailty was assessed according to Fried's phenotype and obtained that 27.3% of

Table 1. Univariate logistic regression analysis for the categorical variables, compared to frailty. São Carlos, SP, 2013.

Variable	p-value	OR*	CI 95%**
Gender	0,0254	4,644	1,095-19,701
Previous occupation	0,7958	1,106	0,517-2,363
Current occupation	0,1022	0,459	0,092-2,280
Retirement	0,4268	0,229	0,021-2,501
Race	0,0239	3,999	1,158-13,814
Religion	0,5305	1,511	0,412-5,540
Marital status	0,8303	0,600	0,112-3,214

*Odds Ratio (OR) – odds ratio for higher score/**Confidence interval of 95% (CI 95%).

Table 2. Univariate analysis between frailty and realms of the Montreal Cognitive Assessment. São Carlos, SP, 2013.

Realms	Score	Beta (EP)	p-value	R ²
Attention	0	1.13937 (1.23654)	0.3616	0.0181
	1	-0.11111 (1.12830)	0.9220	0.0002
	2	0.02564 (1.12841)	0.9820	0.0000
	3	-0.12558 (1.44167)	0.9310	0.0002
	4	-0.79535 (1.43702)	0.5826	0.0066
	5	2.93182 (1.53380)	0.0622	0.0736
Orientation	6	-3.02381 (1.25490)	0.0200	0.1121
	2	0.71739 (2.20154)	0.7460	0.0023
	3	-0.06818 (1.59352)	0.9661	0.0000
	4	-1.34043 (3.07737)	0.6652	0.0041
	5	-0.09375 (0.93420)	0.9205	0.0002
Naming	6	-0.15734 (0.88364)	0.8595	0.0007
	0	1.76087 (2.18874)	0.4252	0.0139
	1	-0.07500 (1.18176)	0.9497	0.0001
	2	0.36555 (0.96749)	0.7073	0.0031
Language	3	-0.80952 (0.87977)	0.3623	0.0181
	0	0.97059 (0.95836)	0.3165	0.0218
	1	0.22500 (1.18134)	0.8498	0.0008
	2	-0.39279 (0.91909)	0.6711	0.0040
	3	-1.88095 (1.30255)	0.1555	0.0434

the elderly evaluated were frail¹⁹. Studies in the area of social vulnerability are especially relevant when it is necessary to stop the concrete situation of the frail elderly and the context in which they are found, and the environmental context is key to understanding health and disease, since literature still has gaps regarding studies with elderly people in socially vulnerable areas²⁰. The divergence found in relation to the prevalence of the frailty syndrome can be explained by the lack of a consensual definition about this syndrome and by the use of different methodologies among the studies. Some of them choose frailty parameters proposed by Fried or Rockwood or apply subjective scales, using all realms or only some of them that evaluate domains of mood, cognition and social support. In addition, it is necessary to consider the different population characteristics that may influence the elderly frailty process²¹.

Frailty was more prevalent among women when compared to men. In this study, women were 4.64 times more likely to be frail compared to men if they were frail, a fact observed in national^{14,18,22} and international studies^{16,23}. The greater prevalence of frailty among women is influenced by the conditions of life marked by gender differences, such as the performance of domestic chores, little economic independence and restricted

social life²¹. In addition, it is worth mentioning their greater longevity and the higher prevalence of chronic diseases when compared to men. Another hypothesis that may explain the higher prevalence is the greater physiological loss of muscle mass with advancing age, making them more prone to the development of sarcopenia²⁴.

In this study, frailty was associated with non-white race/ethnicity, black elderly individuals were four times more likely to show frailty, which is in agreement with findings from the literature^{7,24,25}, since black people are commonly in a highly disadvantageous position when compared to whites, so that the racial issue is a factor that conditions health states²². A Brazilian study indicated that the black race is an indicator of low socioeconomic level and poor health, associated to the high risk of mortality²⁶, contributing factors for the direct or indirect installation of the syndrome. There is also a theory indicating that the black race has an influential genetic marker for the emergence of frailty²⁷.

The identification of frailty characteristics is necessary, considering the high prevalence in the population, besides negatively affecting the ageing process, the increase in the use and costs of health services¹⁹. Due to the incipient amount of specialized geriatrics and gerontology profes-

sionals and the growing number of frail elderly, care is sought in PHC and early diagnosis becomes necessary for the proper handling and management of the cases¹¹, as well as for the planning and development of preventive activities.

In this study, the realms that obtained the greatest influence in determining the frailty situation were cognition, functional independence in daily life activities, general health status, mood and functional mobility.

The association between cognition and frailty has been identified in several studies, such as Brazilian^{28,29}, North American³⁰, Polish³¹, Canadian³² and Mexican³³ works, highlighting cognition as an important factor in the composition of the frailty syndrome phenotype³⁴. Older people with cognitive alterations may show greater difficulty in eating and physical activity, with consequent weight loss and impairment of motor functions, favoring the onset and progression of the syndrome²⁴.

Regarding functional independence, it is worth emphasizing that being frail does not necessarily translate into functional dependence. When the elderly become dependent, the syndrome can first affect the more complex activities and, to a lesser extent, the simplest and mere routine activities²⁴. Elderly people with limitations in activities of daily living have a negative impact on quality of life with increased risk for dependence, institutionalization and death¹⁸.

Functional independence is strongly influenced by elderly's mobility. Ageing brings in sarcopenia, that is, a decrease in muscle mass, which can result in reduced muscle strength, affecting the lower limbs and compromising functional capacity¹⁸.

There appears to be a relationship between depressive symptoms and worse self-perception of health, with a higher prevalence among women¹⁸, a fact evidenced in this study, in which the elderly who reported more frequent depressive symptoms scored for frailty. The increasing trend of association between depressive symptoms and levels of frailty among the elderly may be related to the overlapping coexisting characteristics in such health conditions, such as inactivity, exhaustion and reduced physical activities^{27,35,36}.

In view of the above, it is essential to identify early the frailty syndrome and related factors. PHC workers should identify frailty through quick and easy-to-use tools to generate robust evidence in order to avoid late interventions. Providing care to the elderly must build on care and case management, considering the basic so-

cial protection service of CRAS, emphasizing the need for the facility to redirect its actions, intensifying them through the Comprehensive Family Care Program (PAIF) guidelines to family members³⁷.

The Edmonton Frail Scale in this study detected the frailty profile of the elderly users of a primary welfare care service, and proved to be easy to handle and apply.

This research has some limitations. The cross-sectional contour did not allow the attribution of causality among the variables. The sample size may limit the generalization of results; however, a high number of losses in active search research is expected. In addition, results should be considered preliminary because of the small sample size, which may limit its generalization.

Conclusion

There was a predominance of women and young adults with low schooling in the sample of this study. The realms of the Edmonton Scale with the greatest influence on the occurrence of the frailty syndrome were cognition, functional independence, general health status, mood and functional performance. Frailty was significantly associated with gender and race/ethnicity and current occupation.

Knowing the frailty of the elderly in a highly socially vulnerable context may help in the management and implementation of actions by public social services directed to this segment. Protection and primary care services represent, in most cases, the closest contact with the population and, therefore, have potential for the early diagnosis of elderly's frailty, enabling the planning and intervention of long-term care, avoiding adverse effects that may negatively affect both the quality of life of individuals and the costs of medium and high complexity services later.

Due to the systematic interaction of different factors that contribute to the determination of the frailty situation, it is evident that interventions are also promoted in an integrated way between health care services and social. The identified frailty items themselves show the need to expand the network of support to frail elderly through integration, given the multidimensional nature.

The development of new studies in this theme is necessary in view of the importance of early detection of the frailty syndrome to avoid late interventions and subsidize planning and

treatment aiming at promotion and prevention to provide a better quality of life for the elderly. In addition, discussions and implementation in public policies and services aimed at serving this public may be encouraged to adopt integrated and continuous strategies aimed at caring for the elderly in a socially vulnerable context.

Collaborations

Araújo Júnior FB and Machado ITJ participated in the data collection. Machado ITJ, Araújo Júnior FB, Santos-Orlandi AA and Pergola-Marconato AM participated in the data interpretation and writing of the article. Pavarini SCI and Zazzetta MS conducted the study design and treatment and analysis of the data. All authors performed critical review and approval of the final version of the article.

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