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Original Articles



## The fragility syndrome and risk of fall in the elderly: a descriptive study

Jacy Aurelia Vieira de Sousa<sup>1</sup>, Juliana Andrade Chuertniek<sup>1</sup>, Clóris Regina Blanski Grden<sup>1</sup>, Maynara Fernanda Carvalho Barreto<sup>1</sup>, Péricles Martim Reche<sup>1</sup>

*<sup>1</sup> Ponta Grossa State University*

### ABSTRACT

**Objective:** To analyze the relation between the fragility syndrome and risk of fall in the elderly in a University Opened to Elderly (*Universidade Aberta à Terceira Idade – UATI*). **Method:** Descriptive research with 100 elderly from a UATI in Southern Brazil, from October 2013 to January 2014, using a sociodemographic and clinical questionnaire, fragility scale, and risk of fall score. **Results:** There was a predominance of non-frail elderly (81%) whereas 52% were those without risk of falls. Of those with some level of fragility, the apparently vulnerable ones had higher risk of falls (12%). Statistical significance was observed between the risk of falls and the fragility syndrome. **Discussion:** The associations identified in these studies highlight the importance of further investigation approaching the theme of the many contexts of assistance to the elderly. **Conclusion:** The participation of the elderly in educational programs is essential for the prevention of adverse events to health and the maintenance of independence and the quality of life.

**Keywords:** Frail elderly; Accidental falls; Geriatric nursing.

## INTRODUCTION

Population aging is a challenge to public health because of the increased incidence of nontransmissible chronic diseases and other clinical conditions that may lead to negative outcomes in the life of the elderly. National indicator data show that 77.4% individuals aged 60 years or older report having some chronic disease, whereas almost half of the Brazilian elderly report two or more chronic diseases, which considerably increases the risk of being disabled in the life of the elderly<sup>(1)</sup>.

Among such concerning conditions, there is the development of the fragility syndrome, which corresponds to a clinical condition of vulnerability to stressors. This results in decreased efficiency of homeostasis and higher risk of adverse events, such as cognitive and functional decline, falls, long-term hospitalization, and mortality<sup>(2)</sup>. In light of the research work by the group PF researchers established in Canada (Canadian Initiative on Frailty and Aging – CIF-A), fragility is considered as a multidimensional process, influenced by the complex and dynamic interaction of biological, psychological, cognitive, and social factors<sup>(3)</sup>.

The early identification of the condition of fragility or apparent vulnerability of the elderly in many assistential models is considered a challenge to public health<sup>(4)</sup>. Such detection is essential for the development of strategies to take care of the health of these individuals to minimize the chances of progression to more advanced levels of fragility and to reduce the incidence of adverse events, such as falls, which interfere significantly in the quality of life of the elderly and may lead these individuals to death<sup>(5)</sup>.

The falls, according to the global report of the World Health Organization (WHO), are

defined as an inadvertent displacement of the body to the ground or any other lower level, caused by multiple reasons, resulting or not in damages. Intentional position changes to lean on furniture, against walls, or other objects are excluded<sup>(6)</sup>. Despite representing distinct syndromes, fragility and falls share certain pathophysiological mechanisms, such as sarcopenia, and regular outcomes, such as worsening of the quality of life and reduction of the time of life free of disabilities<sup>(5)</sup>.

The frequency of falls is directly related to the growing age and the level of fragility of the elderly<sup>(6)</sup>, and it may affect the functional capacity and the development of daily activities, increasing the incidence of fractures, hospitalization, and death<sup>(7)</sup>. A national study identified 38.6% prevalence of falls among frail elderly, with higher chance of falls among frail elderly than among non-frail elderly<sup>(5)</sup>.

Considering that factors such as school education may be accounted as protectors for the syndrome of fragility<sup>(8)</sup> and falls<sup>(9)</sup>, it is important to investigate the behavior of those syndromes and the possible relation between them among literate elderly. This way, the study has the objective of analyzing the relation between the fragility syndrome and risk of fall in the elderly of a University Opened to Elderly (*Universidade Aberta à Terceira Idade* – UATI).

## METHOD

It is a descriptive study carried out by a University Opened to Elderly (*Universidade Aberta à Terceira Idade*), in Southern Brazil, from October 2013 to January 2014. The inclusion criteria were the following: (a) being aged 60 years or older, (b) being enrolled between the first and the last semester of the course at the time of the collection, and (c) scoring

above the cutoff point in the cognitive testing of the Mini-Mental State Examination (MMSE)<sup>(10)</sup>. The elderly with previous diagnosis of disease that would impair their participation in the interviews were excluded.

The population of this research consisted of 120 elderly; however, it comprised a sample of 100 participants, as 8 elderly did not agree to participate in the research and 12 were not found in the UATI during collection time. In a private environment, the MMSE was conducted for tracking cognitive alterations in the elderly.

A sociodemographic and clinical questionnaire was used, specifically for the present research, the Edmonton Frail Scale (EFS)<sup>(11)</sup> and Fall Risk Score<sup>(12)</sup>, both translated and validated into Portuguese.

The sociodemographic variables investigated included gender, age range, school education, and financial situation. The clinical variables were health problems, use of five or more medications, feeling of loneliness, fall within the last 12 months, hospitalization, smoking, and drinking.

The EFS is considered viable for daily use and may be used by any professional in the health area, also being easy to use. It evaluated 9 domains, represented by 11 items: cognition, overall health state, functional independence, social support, use of medication, nutrition, humor, continence, and functional performance. The precision of the questionnaire is given by the score, according to the following classification: 0–4, not frail; 5–6, apparently vulnerable; 7–8, slightly frail; 9–10, moderately frail; 11 or more, severely frail<sup>(11)</sup>.

The Fall Risk Score is an easy clinical application instrument, validated in Portuguese and with sensitivity and specificity already estimated with the Brazilian elderly<sup>(12)</sup>. It has

a final score that varies from 0 to 11, considering values that are equal or above 3 indicate the elderly are at risk of fall.

An electronic database was built, in which the data collected were processed in a double entrance for the validation and, subsequently, analyzed using the Statistical Package for the Social Sciences (SPSS) software, version 17.0. Descriptive statistics was applied, through the distribution of absolute and relative frequency, and statistical tests of Fisher and Bonferroni, with statistically significant results considered when  $p < 0.05$  and the confidence index is 95% (95%CI). A linear regression was also performed for the evaluation of the association effect between the fragility syndrome and risk of fall.

The project was approved by the ethics committee (COEP) of the State University of Ponta Grossa (UEPG) and approved under No. 177.693 and CAAE No. 11292812.7.0000.0105. The subjects were clarified about the objectives of the research and the procedures that would be carried out, as well as about the informed content, with all doubts answered by the researchers. Only after the agreement of the interviewee and the signing of the informed consent, the interview was performed. In this study, all ethical and legal aspects were respected.

## RESULTS

In the population studied, there was a predominance of women (93%) and the elderly aged 60–65 years (59%). The minimum and maximum ages identified were, respectively, 60 and 89 years, mean of 65.63 years, of which only 2% were aged 80 years or more. As for the school education, 43% had 11–15 years education. The financial situation of most el-

derly was considered satisfactory, considering 39% reported receiving 3–4 minimum wages (Table 1).

It was observed that 75% elderly reported having health problems and 20% of them felt lonely. Of the interviewees, 26% reported having had falls within the last 12 months and 74% were using polypharmacy, that is, using five or more medications.

In this study, a statistical significance was observed between fragility and the financial situation ( $p = 0.003$ ), health problems ( $p = 0.004$ ), feeling lonely ( $p = 0.000$ ), falls within the last 12 months ( $p = 0.000$ ), and the use of five or more medications ( $p = 0.002$ ) (Table 1).

Table 1. Distribution of frequencies of the sociodemographic and clinical variables of the elderly in a University Opened to Elderly; Ponta Grossa(PR), 2014

Variable	Classification	n (%)	p-value
Age (years)	60–65	59 (59)	0.069
	66–70	26 (26)	
	71–75	10 (10)	
	76–80	03 (03)	
	81 or more	02 (02)	
Gender	Female	93 (93)	0.527
	Male	07 (07)	
School education (years)	0–5	14 (14)	0.083
	6–10	26 (26)	
	11–15	43 (43)	
	16–20	15 (15)	
	21–25	2 (2)	
Financial situation (minimum wage)	<1	2 (2)	0.003*
	1–2	37 (37)	
	3–4	39 (39)	
	>4	21 (21)	
	NR	1 (1)	
Health problems	Yes	75 (75)	0.004*
	No	25 (25)	
Feeling lonely	Yes	20 (20)	0.000*
	No	78 (78)	
	NR	02 (02)	
Fall within the past 12 months	Yes	26 (26)	0.000*
	No	74 (74)	

Smoking	Yes	02 (02)	0.069
	No	98 (98)	
Drinking	Yes	09 (09)	0.224
	No	91 (91)	
Use of five or more medications	Yes	74 (74)	0.002*
	No	26 (26)	
Hospitalization within the last 12 months	Yes	08 (08)	0.069
	No	92 (92)	
Total		100 (100)	

\*Result with significance ( $p < 0.05$ ); NR: not reported  
Source: The authors (2014)

As for the fragility syndrome, 81% elderly were classified as non-frail, without identifying any participants with severe fragility. From those elderly who had some kind of fragility, the risk of falling was predominant in the group of apparently vulnerable ones (12%). The non-frail elderly were, mostly, classified without risk of those events (48%) (Table 2).

Table 2. Relationship between the level of fragility for falls among the elderly attending a University Opened to Elderly; Ponta Grossa (PR), 2014

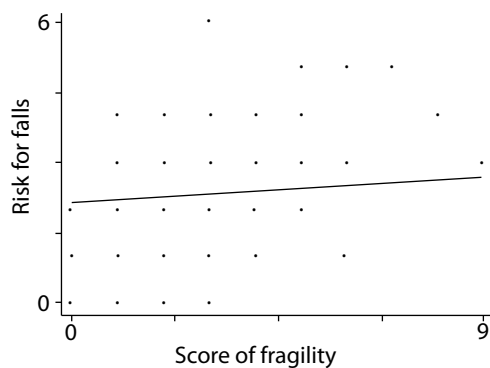
Level of fragility	Risk of falls		
	Yes n (%)	No n (%)	Total n (%)
Non-frail	33 (33)	48 (48)	81 (81)
Apparently vulnerable	12 (12)	04 (04)	16 (16)
Slightly frail	02 (02)	0 (0)	02 (02)
Moderately frail	01 (01)	0 (0)	01 (01)
<b>Total</b>	<b>48 (48)</b>	<b>52 (52)</b>	<b>100 (100)</b>

Source: The authors (2014).

A statistically significant relation between the risk of falls and the fragility syndrome was identified ( $p = 0.001$ ), being observed from the linear trend ( $R^2=0.2179$ ) in Figure 1.

It is observed that the higher the fragility score achieved, through the EFS, the higher the risk of falls among the elderly studying in the UATI (Figure 1).

Figure 1. Relation between the fragility and risk of falls in the elderly of a University Opened to Elderly; Ponta Grossa (PR), 2014



Source: The authors (2014).

## DISCUSSION

The predominance of women in this study follows the global trend of feminization of old age, associated with greater participation of this gender in social and leisure activities<sup>(13)</sup>. The same was the predominance of the age range from 60 to 65 years is a reflex of the population aging process, which will be compatible in the coming years with the projections of gradual increase of the oldest age groups, people who are 80 years or older<sup>(13)</sup>.

High levels of school education reflected the researched population, whose criteria for entering the UATI is to be, at least, literate. Such finding corresponds to that found in the national study in which 78.7% elderly students of a University Opened to Elderly had nine or more years of education<sup>(14)</sup>. This fact suggests there is still a distance between the elderly in the community, especially the most vulnerable ones, and the university, possibly due to assumptions on the use of traditional teaching methods by the institution.

Regarding the financial situation variable, a statistical significance was observed with the occurrence of fragility in this population, repre-

sented by an inverse relation between them, a fact that suggests a strong interference of both in the quality of life of the elderly. Regarding the association identified of fragility with the problems of health variable, authors<sup>(15)</sup> supported the hypothesis that the occurrence of diseases affects the overall health state, making it more vulnerable to the development of several conditions, which includes the fragility syndrome.

Feeling lonely and other psychosocial factors have been considered to be associated with the fragility syndrome<sup>(8)</sup>; however, an international systematic review highlighted the importance of new studies about the causal relation between depression and fragility<sup>(16)</sup>. Nevertheless, it was emphasized the existence of alterations and pathophysiological biomarkers common to both syndromes, a fact reinforcing the relation between them, as observed in this research.

The concomitant use of five or more medications, defined as polypharmacy, comprises a therapeutic tool widely questioned in use with the elderly, especially the frail ones and those with multimorbidities<sup>(17)</sup>. This practice favors the occurrence of falls, dependence and worsening of fragility levels<sup>(17)</sup>, and also increasing chances of medication prescriptions considered inappropriate for this age range<sup>(18)</sup>. When possible, in the case of the elderly students of the UATI, one must encourage the use of nonpharmacological therapies, such as subscribing to physical and recreational activities common to the course, in order to facilitate the management of comorbidities, to improve the quality of life, and to reduce the use of medications.

In the face of close relation between the fragility syndrome and risk of falls, an important international report<sup>(19)</sup> stated the need for health professionals to identify events in the elderly, such as falls, as possible sign of fragility. In this study, a statistical significance was observed

between this syndrome and the risk of falling among the elderly, highlighting the elderly considered as non-frail and apparently vulnerable.

Authors<sup>(20)</sup> indicated that the strategies of care for the prevention of falls in the elderly are essential, such as guidance for the behavioral changes (lifestyle) and environmental alterations (architectural barriers). The same way, the WHO<sup>(6)</sup> stands out, as important interventions for the prevention of falls, the training focused on recovery and maintenance of strength and balance, changes in the environment, and the reduction of specific risk factors such as the review of medications and the use of multiple drugs.

The size and characteristics of the sample are highlighted as the limits of this study, once that, considering the sample comprised robust individuals engaged in several activities available in the UATI researched, it was already expected the finding of a reduced number of the elderly with some level of frailty (slight, moderate, or severe). It is stressed as fundamental to conduct other studies with the elderly who are considered active to unravel the factors related to the development of geriatric syndromes in these groups.

Furthermore, as a cross-sectional study, for simultaneously analyzing cause and effect, it has as a limit the impossibility of verifying whether the fragility syndrome is due to the risk of falls or the other way around, allowing only to related both of them. It is recommended the use of longitudinal studies to best explore the cause relation of effects and outcomes, as well as to deepen the study on this subject.

## CONCLUSION

The study identified the relation between the fragility syndrome and risk of fall in the elderly who studied in a University Opened to Elderly,

which verified a positive linear trend in the relation between them. There was a predominance of non-frail and apparently vulnerable elderly, a fact that corroborates with the characterization of the investigated population.

The participation of educational and sporting programs, such as those developed in the UATI, it is essential for the maintenance of independence, autonomy, social interaction, and improvement in the quality of life. Such activities make important preventive measures for the occurrence of the fragility syndrome, minimizing the risk of falls and other adverse events to the health of the elderly.

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