ISSN: 2230-9926

Available online at http://www.journalijdr.com

IJDR

International Journal of Development Research
Vol. 08, Issue, 08, pp. 22533-22537, August, 2018

ORIGINAL RESEARCH ARTICLE OPEN ACCESS

FACTORS ASSOCIATED TO FRAILTY SYNDROME IN ELDERLY HOSPITALIZED

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ARTICLE INFO

Article History:
Received 09th May, 2018
Received in revised form
26th June, 2018
Accepted 07th July, 2018
Published online 31st August, 2018

Key Words:
Elderly. Fragile elderly.
Geriatric Nursing.
Hospitalization.

ABSTRACT

Objective: to evaluate the frailty syndrome in the elderly hospitalized in a teaching hospital. Method: cross-sectional study with 107 elderly hospitalized in a teaching hospital at Campos Gerais, Ponta Grossa – PR, from October 2016 to April 2017. Data collection included the application of the Mini Mental State Examination, Fragility Scale of Edmonton and a sociodemographic and health questionnaire. Data was analyzed using Stata®12 Software. The association was verified through simple linear regression (Fisher's F and Student's T tests), significance level of p 0.05. **Results:** female (58.9%), married (61%), low schooling (71%), living with partner (39.3%), mean age 70.3 years. Regarding to health variables, 99.1% had a disease, 36.5% used medication and 50.5% reported hospitalization in the last 12 months. It was identified that 56.1% presented some frailty level, with a score average of 7.1 points (SD=2.9). The following variables were associated to the frailty syndrome: low schooling (p=0.003), medication (p=0.001), sadness / depression (p=0.001), loss of urine (p=0.001) and hospitalization in the last 12 months (p=0.001). **Conclusion:** The results presented can support the planning of health care, considering the characteristics and demand of the elderly who are hospitalized, contributing to improve the quality of care provided.

Citation: Clóris Regina Blanski Grden, Bruno Aguiar Condas, Luciane Patrícia Andreani Cabral *et al.* 2018. "Factors associated to frailty syndrome in elderly hospitalized", *International Journal of Development Research*, 8, (08), 22533-22537.

INTRODUCTION

In Brazil and in the world, the elderly population growth is an indisputable reality and the identification of the factors favoring the sickness of this age group, with emphasis on fragility, support the planning of collective and individual actions to the elderly people. Fragility is a medical syndrome with innumerable causes and is characterized by a set of clinical manifestations, such as: decreased strength, endurance and physiological function, collaborating to make the individual more vulnerable to dependence and / or death (MORLEY *et al*., 2013).Considered as a dynamic and progressive process, the fragility syndrome is responsible for causing a spiral of decline in various physiological systems. However, it is reversible, especially in the early stages (CESARI *et al*., 2016).

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In this context, authors point out that screening, prevention and / or treatment through interventions with a multiprofessional nature should be performed early (DENT *et al*., 2017; MORLEY *et al*., 2013). In the elderly, the prevalence of the syndrome presents great variability, considering characteristics of the sample and evaluation instrument. In transversal research with 166 elderly women in the community, it was verified that 39.2% of the participants were fragile (DUARTE *et al*., 2016). In a cross-sectional study conducted with 255 elderly people hospitalized in the interior of Minas Gerais, the prevalence of frail elderly individuals represented 26.3% (FARIA *et al*., 2016).Authors emphasize that hospitalization is a risk factor for fragility (FREIRE *et al*., 2017) with repercussions on high-cost and long-term therapeutic procedures, which can overwhelm the public and private healthcare systems (DENT *et al*., 2017; MARCHIORI, TAVARES, 2017). However, there is a shortage of studies that address this syndrome, and associated factors, in the hospital context (PERNA *et al*., 2017; VU *et al*., 2017). In view of the above, the present study aimed at evaluating the fragility syndrome of the elderly hospitalized in a teaching hospital.

MATERIALS AND METHODS

Cross-cutting study, carried out with a convenience sample of 107 elderly people hospitalized in a teaching hospital in Campos Gerais region, Paraná, from October 2016 to April 2017.The selection criteria were: to be 60 years old or older; to obtain a score equal to or over the cutoff point in the Mini Mental State Exam (FOLSTEIN *et al*., 1975; BERTOLUCCI *et al*., 1994); to be hospitalized in a period equal to or over 24 hours in the following sectors: prompt care, medical clinic or surgery. To the participants who did not present cognitive conditions to answer the questions of the research (n=10), the family caregiver was invited, according to the inclusion criteria: being 18 years or older; being a family caregiver; and reside with the deceased for at least three months. It should be emphasized that the participation of the caregiver involved only the answers to the research questionnaire, the fragility evaluation tests were performed with the elderly. The initial stage of data collection included cognitive screening through the Mental State Mini Exam (FOLSTEIN *et al*., 1975).

The test comprised 11 items, grouped into seven categories, each with the objective of evaluating a group of specific cognitive functions: temporal orientation, spatial orientation, immediate memory, attention and calculation, evocation memory, language, and visual constructive ability. The cutoff points were: 13 points for illiterate, 18 for mean and low scholarity, and 26 points for high scholarity (BERTOLUCCI *et al*., 1994). To evaluate the fragility, the Edmonton Fragility Scale (EFS) (ROLFSON *et al*., 2006) was used, culturally adapted to the Portuguese language in Brazil (FABRÍCIO-WEHBE *et al*., 2013). It is an instrument which evaluates nine domains: cognition, health status, functional independence, social support, medicine usage, nutrition, humor, urinary continence and functional performance, distributed in 11 items with a score from 0 to 17. The scores to analyze the fragility are: 0-4, it does not present fragility; 5-6, apparently vulnerable; 7-8, light fragility; 9-10, moderated fragility; 11 or more, severe fragility (FABRÍCIO-WEHBE *et al*., 2013).

A structured instrument specifically designed to the study was used to investigate socio-demographic and health variables, which were categorized according to the statistical recommendation: gender (female, male), age (60 to 69 years, 70 to 80 years, > 80 years), marital status (married, divorced, widowed/widower), scholarity (illiterate, low, mean, high), feeling sad / depressed, presence of disease(s), medicine usage, urine loss and hospitalizations in the last year. Data were tabulated and analyzed using Stata® software, version 12 (StataCorp LP, CollegeStation, TX, USA). Initially the data were submitted to the exploratory analysis and described by measures of frequency, mean and standard deviation (SD).

The data normality was verified by the Kolmogorov-Smirnov test. The results obtained by the previous test met the assumption that the data had normal distribution. Furthermore considering the assumptions, residual analyzes were carried out, the results revealed that there was no evidence that the assumption of homoscedasticity was violated or that a transformation of the response or explanatory variable was necessary. Subsequently, the association between independent and dependent variables was verified through the simple linear regression with Fisher's F and Student's T tests, and the significance level of $p < 0.05$ was used to evaluate the results. The development of the study complied the national and the international standards of research ethics involving human subjects, with approval by the Ethics Committee of the State University of Ponta Grossa, no. 792,978 and CAAE No. 34905214.0.0000.0105.

RESULTS

The study included 107 elderly people of whom 63 (58.9%) were female and 44 (41.1%) were male, with a minimum age of 60 and a maximum of 92 years, mean age of 70.3 years (SD=7.6). There was a predominance of married (n=65, 61%), with low schooling (n=76, 71%), who considered their income satisfactory (n=54, 50.5%) (Table 1). Regarding health variables, 106 (99.1%) had a disease, 39 (36.5%) of the elderly were using medications and 54 (50.5%) reported hospitalization in the last 12 months (Table 1).

Table 1. Number, percentage, mean and standard deviation of sociodemographic and health conditions in elderly hospitalized in a teaching hospital, according to fragility scores, Paraná, Brazil, 2017

Variables	n (%)	Averages (SD)
Gender		
Male	44(41,1)	6,66(3,14)
Female	63(58,9)	7,35(2,74)
Age		
60 to 69	54(51)	6,50(2,73)
70 to 80	42(39)	7,50(3,15)
>80	11(10)	7,91(2,70)
Scholarity*		
Illiterate	21(19,6)	8,95(3,02)
Low	76(71,0)	6,87(2,70)
Mean	5(4,67)	4,60(1,95)
High	5(4,67)	4,60 (2,71)
Marital status		
Married	65(61)	7,00(3,10)
Divorced	12(11)	6,70(3,00)
Widowed/ Widower	30(28)	7,43(2,60)
Sad/ Depresssed		
Yes	72(67,3)	7,72 (±2,78)
No	35(32,7)	5,71 (±2,77)
Diseases		
Yes	106 (99,1)	7,10(±2,92)
No	1 (0,9)	-
Urine loss		
Yes	38(35,5)	8,52 (±2,94)
No	69(64,5)	6,26 (±2,60)
Medicine usage		
Yes	39 (36,4)	8,79(±2,67)
No	68 (63,5)	6,07(±2,59)
Hospitalization		
Yes	54 (50,5)	8,31(±2,70)
No	53 (49,5)	5,79(±2,60)

* Scholarity: high (≥8 years of studying); mean (4-8 incomplete years); low (1-4 incomplete years).

The fragility evaluation identified that 21 (19.6%) elderly were classified as non-fragile, 26 (24.3%) were apparently vulnerable to fragility, 28 (26.2%) presented mild fragility, 17 (15.9%) moderate and 15 (14%) severe. The average score on the EFS was 7.1 points, with a minimum score of 2 points and a maximum score of 14 points.

Bivariate analysis showed a significant association between frailty and schooling, feeling sad / depressed (p=0.001), urine loss (p=0.001), medicine usage (p=0.001), and hospitalization in the last 12 months (p=0.001) = 0.001) (Table 2).

Table 2. Coefficient β of simple linear regression and its confidence intervals (CI 95%), according to sociodemographic and health variables. Ponta Grossa, Paraná, Brazil, 2017

Variables	p-valor*	β Coefficient**	(CI 95%)
Gender			
Male	-	-	-
Female	0,231	0,69	[-0,45;1,83]
Age			
60 to 69	-	-	-
70 to 80	0,134	0,90	[-0,28;1,10]
>80	0,168	1,33	[-0,57; 3,24]
Scholarity			
Illiterate	-	-	-
Low	0,003	-2,09	[-3,42;-0,75]
Mean	0,002	-4,35	[-7,05;-1,66]
High	0,002	-4,35	[-7,05;-1,66]
Marital status			
Married	-	-	-
Divorced	0,744	-0,31	[-2,13;1,53]
Widowed/ Widower	0,464	0,47	[-0,82;1,75]
Sad/ Depresssed			
Yes	-	-	-
No	0,001	-2,10	[-3,14;-0,87]
Diseases			
Yes	-	-	-
No	0,294	-3,10	[-8,91;2,72]
Urine loss			
Yes	-	-	-
No	0,001	-2,26	[-3,35;-1,17]
Medicine usage			
Yes	-	-	-
No	0,001	-2,72	[-3,76;-1,67]
Hospitalization (last 12 months)			
Yes	-	-	-
No	0,001	-2,52	[-3,53;-1,50]

* Scholarity: high (≥8 years of studying); mean (4-8 incomplete years); low (1-4 incomplete years).
**Regarding to the value of the test T for Beta coeficiente.

DISCUSSION

Regarding to the ESF score averages, it was found in this study that they were similar to the national cross-sectional survey with hospitalized elderly people, who indicated an average score of 7.71 points (MEIRA *et al*., 2016). However, it presented a lower score compared to the cross-sectional investigation performed in an emergency service (aversage of 9.85 points) (ANTUNES *et al*., 2015). In contrast to the cross-sectional study of 366 italian elderly hospitalized in which the elderly seemingly vulnerable to the syndrome predominated (66.4%) (PERNA *et al*., 2017), mild fragility was identified in this study. This result can be attributed to the health condition of hospitalized elderly in the present study. Likewise, methodological diferences of selection and evaluation, sociodemographic and health characteristics, may contribute to the variations in the syndrome percentages. Authors of a systematic review point out that the elderly frailty prevalence in developing countries is higher compared to the developed countries (NGUYEN *et al*., 2015), with a variation between 17% and 31% in developing countries.

Regarding to the general characterization of the sample, the findings are similar to the results of researches with hospitalized elderly people (ANTUNES *et al*., 2015; FABRÍCIO-WEHBE *et al*., 2016; MEIRA *et al*., 2016), which indicate a greater number of women (ANTUNES *et al*., 2015; FABRÍCIO-WEHBE *et al*., 2016), with an average age of 70 years (Meira *et al*., 2016), with low scholarity (ANTUNES *et al*., 2015; FABRÍCIO-WEHBE *et al*., 2016)and married (Rodrigues *et al*., 2017). It was observed that in comparison to men, women presented higher scores to frailty, however, unlike other investigations with hospitalized elderly (ANTUNES *et al*., 2015; PERNA *et al*., 2017; VU *et al*., 2017), there was no statistical association between fragility and gender. It can be inferred that this result is due to the quantitative study participants, which represent a local reality of the region in which the research was conducted. In relation to the age, the greatest fragility scores were found in long-lived participants (>80 years). It is understood that the aging process contributes to the decline in physical capacity, a high rate of comorbidities and other deficits, which, according to authors, suggest that older patients score higher on fragility assessment scales (ANTUNES *et al*., 2015). However, unlike other studies with elderly patients hospitalized (PERNA *et al*., 2017; VU *et al*., 2017)there was no statistically significant relationship between the syndrome and the age. Concerning to scholarity, the highest average score for frailty occurred among the illiterate and with low schooling, with a statistically significant association. In cross-sectional and correlational research conducted with elderly patients attending a uremia outpatient clinic in a public hospital inside São Paulo, a moderate inverse correlation was identified between frailty and years of study (p=0.033), in which illiterate participants presented an average score greater fragility (9.57±2.637) (MEIRA *et al*., 2016). The scholarity level is understood as a factor to protect the syndrome, as it provides better access to information and services, as well as financial resources and job opportunities.

Regarding to the marital status, the highest average score was found in the EFS in the elderly widowers, however, this data did not present statistical significance. Differently from the research carried out with the elderly population of a community (CRUZ *et al*., 2017) that demonstrated the association between frailty and widowhood (p=0.012). On the other hand, the variable feeling lonely/depressed presented a statistically significant relationship to the fragility. These data corroborate the research developed with hospitalized elderly people, which found that sadness/depression is a significant variable for the syndrome (p<0.01) (PERNA *et al*., 2017). Similarly, authors (GALE *et al*., 2017) emphasized that feeling sad or depressed increases the risk for frailty (OR=1.85).Regarding to the financial situation, the highest averages in the EFS were present among the elderly who considered their income unsatisfactory, with a negative linear tendency between EFS and income, but with no statistical significance. Investigations indicate that the unfavorable or insufficient financial situation in the elderly population is strongly associated to fragility (ANTUNES *et al*., 2015; GESUALDO *et al*., 2016). It is understood that unfavorable financial condition does not directly interfere with the pathophysiology of the syndrome, but it can significantly affect the quality of life of the elderly as it makes access to adequate food, health services, medication and physical exercise difficult. To health variables, almost all of the sample referred to the disease, in the same way as other investigations about the frailty in the hospitalized elderly (FREITAS *et al*., 2016; PERNA *et al*., 2017), which can be explained by the characteristic of the sample that contemplated the hospitalized elderly. Although comorbidities do not determine the syndrome, its effects on the aging process increase the risk of adverse health events. This is due to the fact that the greater number of complications may potentiate the vulnerability of the elderly, contributing to the elderly fragility (CAMPOS, FELIPPE, 2016). Despite the high number of participants reporting diseases, only one-third of the participants reported medicine usage, and those who achieved a higher EFS score

average. The medicine usage by the elderly is a common therapeutic practice due to the high number of non communicable chronic comorbidities and diseases present in this age group (ANTUNES *et al*., 2015). The significant statistical relationship between fragility and medicine usage found in this research is in line with the international investigation carried out with 115 elderly people aged 65 and older, which highlights the relationship between the syndrome and the polypharmacy (TAN *et al*., 2017).The urine loss is considered a common condition in the elderly (MACIEL *et al*., 2016), caused by changes in the urinary system, typical of the aging process. Of the participants, those who reported positive for this condition had higher EFS scores, with a statistical association to the syndrome. This result is different from that obtained in a study carried out with hospitalized elderly people in Vietnam, in which there was no statistical relation among these variables (VU *et al*., 2017). It was verified that the elderly who were hospitalized in the last 12 months obtained higher EFS score averages. In the same way as the follow-up study with elderly people from Ribeirão Preto, which revealed a higher average score in hospitalized elderly with statistical significance (p=0.001) (FABRÍCIO-WEHBE *et al*., 2016). The variable hospitalization was associated to the syndrome like other studies that identified this relationship (CALADO *et al*., 2016; TAN *et al*., 2017; VERMEIREN *et al*., 2016). It is worth noting that the fragility increases between 1.2 and 1.8 times the risk for hospitalization (VERMEIREN *et al*., 2016), with repercussions for the functional state of the elderly maintenance, making it difficult to recover among the fragility levels. The average EFS score found in this study was similar to that of the national cross-sectional survey of hospitalized elderly people, which indicated a mean score of 7.71 points (MEIRA *et al*., 2016). On the other hand, it presented a lower score compared to the cross-sectional investigation performed in an emergency service (total score average of 9.85 points)(ANTUNES *et al*., 2015).Among the limitations of the study is the cross-sectional design, which does not allow the evaluation the cause and effect relationships. In addition, the sampling is representative of a local community, so that it does not allow to generalize the results to other territories. It is suggested that longitudinal studies be carried out to monitor the fragility syndrome and its relation to associated factors in the elderly from the community.

Conclusion

The study showed that in the elderly hospitalized in a teaching hospital, there was a predominance of mild fragility. It was found that: female participants, older, illiterate, widowed, sad/depressed, who reported urine loss, who used drugs and were hospitalized in the last year scored higher on the EFS. The fragility syndrome was associated to variables: schooling, sadness/ depression, urine loss, medication use and hospitalization. In this context, the importance of the early screening of the syndrome stands out considering the clinical and health variables of this age group. The results presented can support the planning of health care, especially nursing professionals, considering the characteristics and demand of the elderly who are hospitalized, contributing to improve the quality of care provided.

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