Frailty syndrome and associated factors in the elderly in emergency care

Síndrome da fragilidade e fatores associados em idosos no pronto atendimento

Síndrome de fragilidad y factores relacionados en ancianos en servicio de emergencias

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Abstract

Objective: To identify the associated factors for frailty syndrome in elderly people treated in an Emergency Care unit.

Methods: A quantitative, descriptive, cross-sectional study with 146 elderly patients treated in an Emergency Care unit in the inlands of the state of Paraíba in August and September 2017. A questionnaire, the Edmonton Frail Scale and the Hwalek-Sengstock Elder Abuse Screening Test were used for sample characterization. The analysis of results was performed using descriptive statistics (absolute and relative frequency, mean, median, standard deviation and coefficient of variation) and inferential statistics (Pearson's chi-square, Fisher's exact test and multiple logistic regression).

Results: Elderly subjects identified as frail were male (58.5%), over 70 years old (80.7%), with no relationship (47.4%), literate (61.0%), not working (54.9%), living with a child and spouse (63.2%), share responsibilities (55.9%) and have more than six children (59.6%). The red triage area predominated (80.0%) among frail elderly people, while the most prevalent type of complaint was acute (41.7%). Most elderly were at risk for violence (58.4%).

Conclusion: Educational level, not working, classification areas and risk for violence were factors associated with frailty syndrome and influenced its outcome.

Resumo

Objetivo: Identificar os fatores associados para a síndrome da fragilidade na pessoa idosa atendida em uma Unidade de Pronto Atendimento.

Métodos: Estudo quantitativo, descritivo, com delineamento de corte transversal, com 146 idosos atendidos em uma Unidade de Pronto Atendimento do interior da Paraíba, nos meses de agosto e setembro de 2017. Foi utilizado um questionário e as escalas de *Edmonton Frail Scale* e a *Hwalek-Sengstock Elder Abuse Screening Test* para a caracterização da amostra. A análise dos resultados foi realizada por meio de estatística descritiva (frequência absoluta e relativa, média, mediana, desvio padrão e coeficiente de variação) e inferencial (Qui-Quadrado de Pearson; Teste Exato de Fisher e Regressão Logística Múltipla).

Resultados: Os idosos identificados como frágeis são do sexo masculino (58,5%), acima de 70 anos (80,7%), sem relacionamento (47,4%), alfabetizados (61,0%), não trabalham (54,9%), residem com filho e cônjuge (63,2%), dividem responsabilidades (55,9%) e têm mais de seis filhos (59,6%). A área de atendimento que predominou entre os idosos frágeis foi a vermelha (80,0%), enquanto que a área de caráter da queixa mais prevalente foi a aguda (41,7%). A maioria deles apresentou risco para a violência (58,4%).

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Conflicts of interest: none to declare.

Conclusão: A escolaridade, a não execução de atividade laboral, as áreas de classificação e risco para violência são fatores que apresentaram associação com a síndrome da fragilidade, e influenciam no seu desfecho.

Resumen

Objetivo: Identificar los factores relacionados con el síndrome de fragilidad en ancianos en un Servicio de Emergencias.

Métodos: Estudio cuantitativo, descriptivo, de corte transversal, con 146 ancianos atendidos en un Servicio de Emergencias del interior del estado de Paraíba, en los meses de agosto y septiembre de 2017. Se utilizó un cuestionario y las escalas de *Edmonton Frail Scale* y *Hwalek-Sengstock Elder Abuse Screening Test* para caracterizar la muestra. El análisis de los resultados se realizó mediante estadística descriptiva (frecuencia absoluta y relativa, promedio, mediana, desviación típica y coeficiente de variación) e inferencial (Prueba χ^2 de Pearson, Prueba Exacta de Fisher y Regresión Logística Múltiple).

Resultados: Los ancianos identificados como frágiles son de sexo masculino (58,5%), de más de 70 años (80,7%), sin una relación afectiva (47,4%), alfabetizados (61,0%), no trabajan (54,9%), residen con el hijo y su cónyuge (63,2%), dividen responsabilidades (55,9%) y tienen más de seis hijos (59,6%). El área de atención que predominó entre los ancianos frágiles fue la roja (80,0%), mientras que el área de carácter de la queja que prevaleció fue aguda (41,7%). La mayoría presentó riesgo de violencia (58,4%).

Conclusión: La escolaridad, la no ejecución de actividad laboral, las áreas de clasificación y el riesgo de violencia son factores que presentaron relación con el síndrome de fragilidad e influyeron en el desenlace.

Introduction

The association of population aging and the increased prevalence of noncommunicable diseases may influence the higher proportion of multimorbidities, disabilities and sequelae requiring comprehensive actions of the health system.[1,2] In addition, the elderly population presents inherent changes in the aging process, which increase the aggravation of this problem.

A commonly observed and possibly presented condition is the geriatric syndrome.[1] It refers to the multicausal frailty syndrome and may be characterized by lower muscle strength and decreased physiological reserve that increase the elderly's exposure to adverse outcomes such as physical dependence and even death.[3]

The frailty process involves the presence of stressors in the body, which limits the return to body homeostasis. The cycle involves the onset of the syndrome in a triad of neuroendocrine dysregulation, sarcopenia and immune dysfunction. It generates a characteristic phenotype composed of weight loss, exhaustion, level of physical activity, muscle strength, and slow gait. Depending on the characteristics presented, elderly subjects can be classified as frail, pre-frail and non-frail.[4,5]

A study was conducted in Juiz de Fora (state of Minas Gerais) with the aim to assess the prevalence and factors associated with frailty among individuals aged 65 years and older. A substantial number of frail elderly individuals was found, while half of the sample was at risk of progression to frailty. Some associated factors identified in this study were advanced age, impaired basic life activities and impaired self-rated health.[6]

In addition, weaknesses in family relationships, the government's omission and the functional dependence are potential factors for the occurrence of violence against the elderly.[7,8] In a population-based study developed with 705 elderly, was found a higher chance to achieve physical and verbal violence outcomes in presence of the frailty condition.[9] However, the number of studies revealing the correlation between risk for violence and frailty is still incipient.[10]

The identification of factors associated with the elderly's frailty will bring evidence related to the need for targeted user embracement and multidimensional assessment of this population at all levels of health care, including Emergency Care Units (ECU), in order to develop planned care for reducing the risks of developing frailty.

Given the above, the research question emerged: what factors influence the onset of frailty syndrome in the elderly treated at an Emergency Care Unit? In search for answers to this question, the aim of the present study was to identify the factors associated with frailty syndrome in the elderly treated at an Emergency Care Unit.

Methods

This is a quantitative, descriptive, cross-sectional study, guided by the *Strengthening the*

Reporting of Observational Studies in Epidemiology (STROBE).[11] It was conducted with elderly people who visited an Emergency Care Unit in the inlands of the state of Paraíba between August and September 2017.

This scenario was chosen because the environment is conducive to minimizing bias during data collection and enables the diversified approach of multipurpose elderly patients in clinics regarding their general health. These aspects resulted in a heterogeneous sample regarding degrees of onset of frailty syndrome.

The sample size was calculated based on the average number of elderly patients treated in the three months before the article submission to the ethics committee, which resulted in a population of 1,721 individuals. The sample calculation was performed by considering the sampling error (e) of 0.08 and 95% confidence level. The final sample had 146 elderly subjects.

Inclusion criteria were the following: people aged 60 years or older who visited the Emergency Care Unit and were in stable health conditions to respond the data collection instruments. These conditions included not being under sedative effects, not presenting any health problem that prevented answering the proposed questions, and not showing any sign of emotional, cognitive or physical instability during presentation of instruments questions. Subjects unable to communicate were excluded.

For data collection, was signed the Informed Consent form (IC) and a structured interview was conducted by the researcher with a questionnaire including sociodemographic variables and some health questions (reason for visiting the Emergency Care Unit). The Edmonton Frail Scale (EFS)[12] was used to assess frailty in elderly people. For the assessment of risk for violence against the elderly, was used the Hwalek-Sengstock Elder Abuse Screening Test (H-S/EAST).[13] Both scales are validated and cross-culturally adapted to Brazilian Portuguese.

The EFS has nine domains for classification as frail, pre-frail and non-frail according to pre-established scores. Scores of 0-4 are classified as non-frail; 5-6 as pre-frail; and 7 or more as frail.[12] In the analysis of the present study, the variable was dichotomized into frail and non-frail. In the H-S/EAST scale, the risk for intrafamilial violence is analyzed through the following score: 1 point is assigned to each affirmative answer, except for items one, six, 12, and 14, where 1 point is assigned to the negative answer. Scores higher than or equal to 3 indicate a high risk for suffering violence.[13]

The dependent variable of the study was defined as frailty, and the independent variables were the characterization data (age, age range, sex, race/color, marital status, schooling, with whom the elderly lives, paid work, economic responsibility and number of children, service department and main complaint) and the risk for violence in the elderly.

For treatment of data, was used the SPSS version 21.0. For the analysis of results, was used descriptive statistics through absolute and relative frequency, mean, median, standard deviation and the coefficient of variation of subjects.

For the crossing between the dependent variable and other data, was used inferential statistics through the Pearson's chi-square test or Fisher's exact test, depending on the number of statistical boxes. For all analyzes, was established $p<0.05$ for statistical significance.

A multivariate analysis was performed to evaluate the chances of the outcome of presence of frailty. To this end, was applied the Adjusted Logistic Regression Model through the forward method with a 95% confidence interval and significance when $p<0.05$. However, for insertion of independent variables in the modeling, was adopted the criterion of $p<0.02$ in bivariate analyzes.

Results

Regarding elderly participants' characteristics (n=146), the age range was from 60 to 93 years, an average of 73.35 years and standard deviation of 8.45. In relation to the age variable, there was a coefficient of variation of 11.52 and a median of 72 years. The variable was dichotomized based on the approximation of the median, and 56.2% of elderly

subjects were aged up to 70 years. Regarding sex, most elderly were men (56.2%), considered themselves as mixed race (38.4%), did not have a stable relationship (54.5%), did not work (78.1%) and were illiterate (71.2%).

Table 1 shows the association between sociodemographic variables and the presence of frailty among the elderly. Those with an overall EFS score[12] of less than or equal to 6 points were classified as non-frail, and scores greater than or equal to 7 were classified as frail. There was a statistically significant association between the variables schooling, work and economic responsibility.

Most elderly subjects classified as frail were male (58.5%), over 70 years old (80.7%), did not have a relationship (47.4%), were literate (61.0%), did not work (54.9%), lived with the child and the spouse (63.2%), shared responsibilities (55.9%) and had more than six children (59.6%).

Table 1. Association between sociodemographic variables and the presence of frailty among interviewed individuals

Variables	Frailty		p-value	Valid/ missing sample
	Frail n(%)	Non-frail n(%)		
Sex				
Female	33(52.4)	30(52.4)	0.19*	145/1
Male	48(58.5)	34(41.5)		
Age				
Up to 70 years	35(55.6)	28(44.4)	0.67*	146/0
> 70 years	67(80.7)	16(19.3)		
Marital status				
In a relationship	29(43.9)	37(56.1)	0.67*	144/2
Not in a relationship	37(47.4)	41(52.6)		
Schooling				
Literate	25(61.0)	16(39.0)	0.02*	145/1
Illiterate	42(40.4)	62(59.6)		
Paid work				
Yes	5(15.6)	27(84.4)	<0.001*	145/1
No	62(54.9)	51(45.1)		
Lives with whom				
Child and spouse	12(63.2)	7(36.8)	0.19*	124/22
Child	7(31.8)	15(68.2)		
Spouse	16(41.0)	23(59.0)		
Other	25(56.8)	19(43.2)		
Economic responsibility				
Dependent on other people	1(16.7)	5(83.3)	0.04**	142/4
Self-sufficient	26(38.2)	42(61.8)		
Share responsibilities	38(55.9)	30(44.1)		
Number of children				
None	5(45.5)	6(54.5)		
One to three children	11(32.4)	23(67.6)		
Four to six children	20(41.7)	28(58.3)	0.07*	134/12
> six children	31(59.6)	21(40.9)		

*Pearson's chi-square test; ** Fisher's Exact Test

Regarding the association of the triage area in the Emergency Care Unit (Table 2), type of complaint, risk for violence and frailty, all variables showed a statistically significant association. The predominant triage area among the frail elderly was red (80.0%), while the most prevalent type of complaint was acute (41.7%), and most people were at risk for violence (58.4%).

Table 2. Association between triage area, type of complaint, risk for violence and presence of frailty of study participants.

Variables	Frailty		p-value	Valid/missing sample
	Frail n(%)	Non-frail n(%)		
Triage area at the ECU				
Green	32(34.4)	61(65.6)	<0.001**	145/1
Yellow	23(62.2)	14(37.8)		
Red	12(80.0)	3(20.0)		
Type of complaint				
Acute	50(41.7)	70(58.3)	0.016*	145/1
Chronic	8(32.0)	17(68.0)		
Risk for violence				
At risk	59(58.4)	42(41.6)	<0.001*	145/1
No risk	8(18.2)	36(81.8)		

ECU - Emergency Care Unit; Pearson's chi-square test; ** Fisher's Exact Test

Variables with a p-value<0.02 were included in the logistic regression model, namely: schooling, work situation, number of children, triage area, type of complaint and risk for violence. However, variables that remained in the model were schooling (OR = 3.19; 95% CI 1.21-8.39), work situation (OR = 8.90; 95% CI 2.52-31.38), yellow triage area (OR = 2.85; 95% CI 1.10-7.38); red triage area (OR = 16.14; 95% CI 2.56-101.58) and risk for violence (OR = 4.24; 95% CI 1.56-11.52) (Table 3).

These findings lead to the conclusion that illiterate, non-working elderly are 3.19 and 8.92 times more likely to have frailty syndrome, respectively. Elderly people at risk for violence are 4.24 times more likely to be frail. In relation to the triage area of the Emergency Care Unit, elderly subjects of the yellow and red areas are 2.85 and 16.14 times more likely to be frail, respectively. The p-value for the Hosmer-Lemeshow test was 0.910, so the p-value greater than 0.05 indicated enough evidence for model acceptance.

The area based on the Receiver Operating Characteristics (ROC) curve for the logistic re-

Table 3. Variables associated with the presence of frailty through adjusted logistic regression among elderly patients treated at the Emergency Care Unit

Variables	OR	CI	*p-value**
Educational level			
Literate	1.00	-	-
Illiterate	3.19	[1.21-8.39]	0.019
Paid work			
Yes	1.00	-	-
No	8.90	[2.52-31.38]	0.001
Triage area at the ECU			
Green	1.00	-	-
Yellow	2.85	[1.10-7.38]	0.030
Red	16.14	[2.56-101.58]	0.003
Risk for violence			
At risk	1.00	-	-
No risk	4.24	[1.56-11.52]	0.005

Adjusted R^2: 0.416; OR - Odds Ratio; CI - Confidence Interval; * Test significance

gression model above was 0.81 (CI 0.74–0.88; p<0.001) for the presence of frailty with excellent discrimination, as shown in figure. 1.

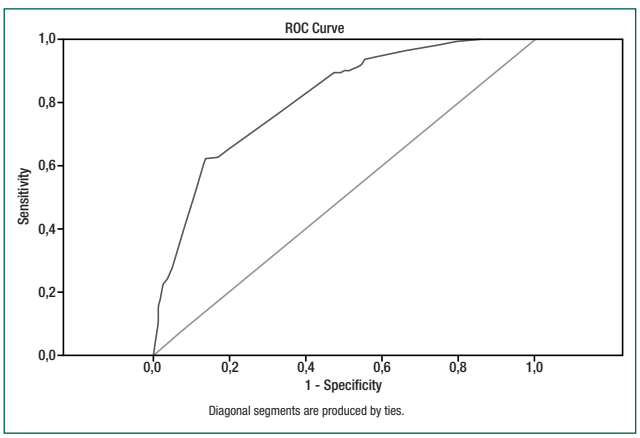

Figure 1. ROC curve based on the logistic regression model of the presence of frailty among the elderly treated at the Emergency Care Unit

Discussion

In the present study, the male population had a higher prevalence of frailty syndrome. This information differs from most studies[14-17] that address the phenomenon of feminization of old age and the higher prevalence of frailty in this population based on the condition of a longer life expectancy, lower mortality rates by external causes, less exposure to occupational hazards, lower tobacco and alcohol consumption, and greater demand for health services among the female population compared to men. Consequently, the female elderly population would be more affected by the frailty syndrome as they experience more aging changes because they reach older age than men.

According to data, 80.7% of the elderly over 70 years old presented frailty syndrome, while this condition was present in 55.6% of those under 70 years old. National and international studies conducted with elderly individuals have found similar results.[14,17,18]

Advancing age tends to be related to the deterioration of functional capacities and the onset of noncommunicable diseases, which potentialize the emergence of functional dependence in the performance of activities of daily living. Frailty is a progressive syndrome based on physiological and pathological changes and decline of systems with direct reflection on the elderly's functionality.[19-21]

Regarding marital status, elderly individuals without a relationship prevailed. This finding corroborates the national literature.[16] The lack or decrease of social relationships may lead to frailty syndrome in elderly subjects, since they would be less active socially.[16]

Regarding education, illiterate elderly people are more likely to develop the frailty syndrome. This is in line with the literature that shows a greater predominance of frailty syndrome in population groups with lower educational level.[16,17]

An association between frailty syndrome and non-working elderly people was identified and this is consistent with the literature,[22,23] since older adults who remain active have better cognitive function and autonomy in daily activities.

In the relationship between the elderly's type of complaint for hospitalization and their frailty, in the present study, 41.7% of the interviewed elderly had acute complaints, which was associated with the frailty syndrome (p=0.01). However, in an international study, frailty was directly related to chronic morbidities and progressive age increase.[24]

The association between the elderly's acute complaint and the frailty syndrome can be explained by the characteristic of the health service studied, an Emergency Care Unit, where acute complaints predominate. These complaints in vulnerable people arise because of deficits in physiological processes

of repair of minor stressors. Frail people are subject to acute complications of chronic diseases, which characterizes the condition of the sample studied.[25]

The Manchester Protocol is used for the risk classification of Emergency Care Unit Users. It allocates the red area to users in need of emergency care at imminent risk of death. In this area, are performed special and invasive procedures. The yellow area is for stabilized patients classified as semicritical and the green area is the space for patients under observation.[26,27]

Another significant element among elderly subjects is the direct association between the risk for violence and frailty. Intra-family violence has appeared as the major producer of risk for violence among the elderly, which potentiates the onset of the frailty syndrome. Brazilian studies highlighted that the frailty condition is associated with higher odds ratios between physical and/or verbal violence, or solely physical violence or verbal violence.[9]

In addition to the association between dependent and independent variables, there is a greater chance of frailty when considering educational level, income, risk for violence and type of care in the Emergency Care Unit. Through logistic regression, was demonstrated a greater chance of frailty in illiterate elderly. This is in line with a Brazilian study on risk factors associated with frailty of the elderly, in which was highlighted the direct association between frailty and elderly individuals with lower educational level (68%), lower income (64%) and higher number of comorbidities (77%).[28]

In the multivariate model in an Asian study, was observed that being at the lowest level of education increased the elderly's relative risk of being pre-frail compared to non-frail. Never having been employed or having had a low-skilled occupation increased the relative risk of being frail compared to being non-frail.[29]

Older people with more severe clinical conditions, i.e., hospitalized in the red triage area of Emergency Care present a catabolic state that decreases their body reserves and contributes to their frailty, regardless of age and pre-hospital functional status. Thus, insertion in the health service in a more severe situation by itself already increases the elderly's chance of frailty,[30] the same way that hospitalization itself is a variable associated with frailty.[31]

From this perspective, the care of frail elderly should include the investigation of violence situations. Moreover, the early diagnosis of these situations may favor protective measures aimed at the frailty syndrome and the occurrence of violence against the elderly.

Based on data found, the presence of frailty in elderly subjects is related to their social and economic context. Thus, interventions aimed at reducing or minimizing the progression of frailty in the elderly population include behavioral factors such as quality of life, social engagement, and family support.[32]

Since this was a cross-sectional study, it was not possible to evaluate the causality nor the longitudinality of the phenomenon in question. Associations and comparisons were made, thereby showing possible risk factors.

Conclusion

Among the studied elderly, frailty predominated in male individuals, over 70 years old, without a relationship, literate, who perform a work activity, live with someone and have more than six children. Regarding the triage area and the type of complaint, the red area and acute complaints prevailed among elderly subjects. In addition, the risk for violence was also associated with frailty, because individuals at risk for violence had higher percentages of the syndrome. The association of these variables was confirmed by the regression model, considering that variables such as schooling, work, yellow and red triage areas and the risk for violence remained in the final model.

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Collaborations

Santos RC, Menezes RMP, Araújo GKN, Marcolino EC, Xavier AG, Gonçalves RG declare they have contributed to the manuscript design, analysis and interpretation of data, article writing, relevant critical review of intellectual content and approval of the final version to be published.

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