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PRE-FRAILTY IN OLDER ADULTS: PREVALENCE AND ASSOCIATED FACTORS

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ABSTRACT

Objective: to analyze pre-frailty prevalence in older adults residing in the community and associated factors.
Method: a cross-sectional study, carried out with 291 elderly people registered in Family Health Strategy units. Pre-frailty was measured using the Edmonton Frail Scale, and the other variables were measured using different instruments. Data were collected from June to August 2018. Data analysis was performed using the Mantel Haenszel chi-square test, Fisher's test and Poisson multivariate regression.
Results: pre-frailty prevalence was 69.42% (95% CI; 63.77%-74.66%). Factors associated with pre-frailty were: low education (PR=1.37; 95% CI: 1.11-1.71), dependence on basic (PR=1.39; 95% CI: 1.22-1.59) and instrumental activities of daily living (PR=1.58; 95% CI: 1.40-1.78), depressed mood (PR=1.58; 95% CI: 1.40-1.78). =1.53; 95% CI: 1.31 1.78), negative self-rated health (PR=1.39; 95% CI: 1.15-1.69), polypharmacy (PR=1.30; CI 95%: 1.13-1.50), and nutritional risk (PR=1.27; 95% CI: 1.09-1.46).
Conclusion: pre-frailty prevalence was higher than that found in other studies that used the same instrument, and the variables associated with this outcome demonstrated the existence of a common phenomenon among older adults. These are important results, as they highlight the need for investment in research and preventive interventions on the clinical, functional and social conditions of this population. Furthermore, it is necessary to invest in professional training programs for the comprehensive care of older adults, especially with regard to frailty assessment and prevention.

DESCRIPTORS: Frailty. Frail elderly. Elderly health. Aging. Prevalence. Association.

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PRÉ-FRAGILIDADE EM PESSOAS IDOSAS: PREVALÊNCIA E FATORES ASSOCIADOS

RESUMO

Objetivo: analisar a prevalência da pré-fragilidade em pessoas idosas residentes na comunidade e os fatores associados.
Método: estudo transversal, realizado com 291 idosos cadastrados em unidades de Estratégia Saúde da Família. A pré-fragilidade foi mensurada por meio da *Edmonton Frail Scale*; e as demais variáveis, com instrumentos diversos. Os dados foram coletados no período de junho a agosto de 2018. A análise dos dados ocorreu por meio dos testes qui-quadrado de Mantel Haenszel, teste de Fisher e regressão multivariada de Poisson.
Resultados: a prevalência de pré-fragilidade foi de 69,42% (IC 95%; 63,77%-74,66%). Os fatores associados à pré-fragilidade foram: baixa escolaridade (RP=1,37; IC 95%: 1,11-1,71), dependência para as atividades básicas (RP=1,39; IC 95%: 1,22-1,59) e instrumentais de vida diária (RP=1,58; IC 95%: 1,40-1,78), humor depressivo (RP=1,53; IC 95%: 1,31-1,78), autoavaliação negativa de saúde (RP=1,39; IC 95%: 1,15-1,69), polifarmácia (RP=1,30; IC 95%: 1,13-1,50) e risco nutricional (RP=1,27; IC 95%: 1,09-1,46).
Conclusão: a prevalência da pré-fragilidade foi acima da encontrada em outros estudos que utilizaram o mesmo instrumento, e as variáveis associadas a esse desfecho demonstraram a existência de um fenômeno comum entre as pessoas idosas. São resultados importantes, pois evidenciam a necessidade de investimento em pesquisas e intervenções preventivas sobre as condições clínicas, funcionais e sociais dessa população. Além disso, é preciso investir em programas de capacitação profissional para o atendimento integral da pessoa idosa, sobretudo no que se refere à avaliação e prevenção da fragilidade.

DESCRITORES: Fragilidade. Idoso fragilizado. Saúde do idoso. Envelhecimento. Prevalência. Associação.

PREFRAGILIDAD EN ANCIANOS: PREVALENCIA Y FACTORES ASOCIADOS

RESUMEN

Objetivo: analizar la prevalencia de la prefragilidad en ancianos residentes en la comunidad y los factores asociados.
Método: estudio transversal, realizado con 291 ancianos registrados en unidades de la Estrategia Salud de la Familia. La prefragilidad se midió con la escala de fragilidad de Edmonton, y las demás variables se midieron con diferentes instrumentos. Los datos fueron recolectados de junio a agosto de 2018. El análisis de datos se realizó mediante la prueba de chi-cuadrado de Mantel Haenszel, la prueba de Fisher y la regresión multivariada de Poisson.
Resultados: la prevalencia de prefragilidad fue del 69,42% (IC 95%; 63,77%-74,66%). Los factores asociados a la prefragilidad fueron: baja escolaridad (RP=1,37; IC 95%: 1,11-1,71), dependencia de actividades básicas (RP=1,39; IC 95%: 1,22-1,59) e instrumentales de la vida diaria (RP=1,58; IC 95%: 1,40-1,78), estado de ánimo deprimido (RP=1,53; IC 95%: 1,31 1,78), autopercepción de salud negativa (RP=1,39; IC 95%: 1,15-1,69), polifarmacia (RP=1,30; IC 95%: 1,13-1,50) y riesgo nutricional (RP=1,27; IC 95%: 1,09-1,46).
Conclusión: la prevalencia de prefragilidad fue superior a la encontrada en otros estudios que utilizaron el mismo instrumento, y las variables asociadas a ese desenlace demostraron la existencia de un fenómeno común entre los ancianos. Estos son resultados importantes, ya que destacan la necesidad de inversión en investigación e intervenciones preventivas sobre las condiciones clínicas, funcionales y sociales de esta población. Además, es necesario invertir en programas de formación profesional para la atención integral del anciano, especialmente en lo que se refiere a la evaluación y prevención de la fragilidad.

DESCRIPTORES: Fragilidad. Anciano frágil. Salud del anciano. Envejecimiento. Prevalencia. Asociación.

INTRODUCTION

One of the specific demands of older adults, and considered a public health problem, is frailty syndrome (FS) in older adults. It is a multidimensional and dynamic syndrome that is situated in the transition between healthy aging and dependence[1], developing as a consequence of the decline in multiple physiological systems[2]. As a clinical condition, it makes individuals vulnerable to several biological, psychological and social factors, such as acute illnesses, injuries, depression and low income[3]. It increases the risk of multiple adverse health outcomes, including hospitalization, disability, disease complications, falls, institutionalization, and death[2,4].

FS relates to dependency and long-term care needs that require more care assistance from the family, society, and health system[5]. Moreover, it negatively impacts the quality of life of older adults and their families as well as entails high social and economic costs[6].

As it is a progressive process, in general, FS presents itself in phases ranging from non-frailty to frailty. Its presence can be detected to any degree through measurements obtained using some instruments such as the Edmonton Frail Scale (EFS)[7–8] and be classified according to certain criteria established in these instruments.

Pre-frailty is the transitional state between non-frailty and frailty and generally has higher frequencies than frailty, indicating that many individuals are at risk of becoming frail[5,8]. In community members aged 65 years and over, pre-frailty prevalence can vary between 38% and 53%, depending on the instrument used in its assessment[4].

This condition usually develops silently, but it is a state in which the physiological reserves are still satisfactory and allow the body to respond adequately to adverse events and with the possibility of recovery[9].

It is known that studies carried out with the objective of investigating pre-frailty in older adults residing in the community are incipient[10], and this is also valid in Brazil[11–14]. The results have shown that some factors are associated with pre-frailty, such as female gender, advanced age, overweight or underweight, number of chronic diseases, greater number of daily medications, impaired mobility, negative perception of nutritional and health status, functional incapacity for instrumental activities of daily living, low education, absence of a partner and cardiovascular disease[10–12,14].

It is recommended to identify the special needs of older adults who are already frail, as well as screening the pre-frailty situation, as it is a reversible condition with the possibility of immediate intervention to delay the FS installation[6,14]. Likewise, it should be taken into account that the early identification of individuals at risk of becoming frail and the factors that are associatedto their condition can provide insights into the mechanisms involved in age-related physical decline and help prevent the onset of disability and early mortality[9].

Considering all this, the study aimed to analyze pre-frailty prevalence in older adults residing in the community and associated factors.

METHOD

This is an analytical cross-sectional study, carried out in the city of Cuiabá, state of Mato Grosso (MT), in 2018. This involved people aged 65 years and/or older, assisted in 11 urban Family Health Strategy (FHS) units, agreed with the *Universidade Federal de Mato Grosso* (UFMT) for practical teaching activities of the undergraduate nursing course.

The sample was calculated using stratified probability sampling based on a population of 1,804 older adults aged 65 years and older, residing in the community. To calculate the sample size, the formula for finite population was considered, with 95% confidence level, 5% sampling error and an

estimated prevalence of 23.4% phenomenon. The sample size was 287 older adults. To this number, four more older adults were added who, during the data collection period, expressed an interest in participating in the research. The final sample consisted of 291 participants.

The strata were composed of FHS units, considering the proportion of the total population of older adults served in each one of them. The selection of participants in each stratum was random. Based on a list made, in which the name of each older adult was placed in alphabetical order and numbered, the drawing was carried out with the help of Microsoft Office Excel 2007. Exclusion criteria were having cognitive impairment and being classified as a frail older adult. Cognitive deficit was assessed using the Mini Mental State Examination (MMSE). Older adults were considered to have compromised cognitive ability if a score of 19 (for illiterates), 23 (one to three years of education), 24 (four to seven years of education) and 28 (seven years or more of education) was not achieved[15]. Older adults detected with blindness, deafness, wheelchair users and bedridden were also excluded, conditions that prevent the assessment of functional performance. Those older adults who were not found at home after three search attempts or who died were replaced, thus carrying out a new draw.

Data were collected from June to August 2018, through interviews with older adults in their homes, carried out by the main researcher accompanied by community health workers. Data on participants' sociodemographic characteristics and health conditions were collected using a structured questionnaire. The Edmonton Frailty Scale (EFS), Katz scale, Lawton & Brody scale, Mini Nutritional Assessment and Yesavage, the Geriatric Depression Scale (GDS-15) were also used.

The dependent variable (apparently vulnerable or pre-frail old adult) was identified by the EFE. The scale has nine domains, distributed in 11 items with a score from 0 to 17. The score can vary between 0 and 4 - no presence of frailty; 5 and 6 - older adult apparently vulnerable or pre-frail; 7 and 8 - slight frailty; 9 and 10 - moderate frailty; and 11 or more - severe frailty[7]. In this study, pre-frail older adults were classified as apparently vulnerable[8]. For the results of the dependent variable, scores from 0 to 4 (absence of frailty) and 5 and 6 (older adult apparently vulnerable) were considered.

Independent variables examined, related to sociodemographic characteristics, were sex, age group, marital status, years of education, family arrangement, occupational status, and individual income. Health conditions were self-reported health, presence of self-reported health problems, number of self-reported health problems, self-reported vision and hearing alterations, some type of fall in the last 12 months, use of medication, physical exercise, use of medications, and polypharmacy (this is defined as taking five or more regular medications[16].

Also, as independent variables, depressive mood, functional independence and nutritional assessment were assessed. Depressive mood was assessed using the Yesavage Geriatric Depression Scale (GDS-15), in which a score equal to or greater than 6 identifies depressive symptoms[17].

To assess functional independence in activities of daily living (ADL), the Katz scale was used[18]. Older adults who did not depend on help to perform any activity were classified as independent, and those who needed help in at least one activity were classified as dependent. To assess instrumental activities of daily living (IADL), the Lawton & Brody scale was adopted (score from 9 to 27 points)[19]. Older adults who scored 19 points or more were classified as independent, and those who scored 18 points or less were classified as dependent.

The nutrition variable was measured using the Mini Nutritional Assessment (MAN)[20]. The scores used to classify older adults were no nutritional risk (12 to 14 points), nutritional risk (8 to 11 points), malnourished (≤ 7 points).

The data obtained were organized in a database using the Epi Info statistical program (version 7.0). Subsequently, a descriptive analysis was performed using tables with relative and absolute

values. In the bivariate analysis, associations between the outcome variable (pre-frailty) and the other exposure variables were identified by calculating the prevalence ratio (PR) using the Mantel-Haenszel chi-square method or Fisher's exact test when necessary, considering the 95% confidence interval.

In the assessment of the Poisson multiple regression model, this was used as a method of hierarchical removal of variables. Only variables with $p<0.10$, in the bivariate analysis, were considered constructing the final multiple model. In the final model, variables with a significance level lower than or equal to $p \leq 0.05$ were maintained. Epi Info (version 7.0) and STATA (version 12.0) were used in the database elaboration and in all statistical analyzes.

The research was conducted within ethical standards and approved by the Research Ethics Committee of the *Universidade Federal de Mato Grosso*. The Informed Consent Form was read and signed by all participants.

RESULTS

Of the 291 surveyed, 202 had pre-frailty. Pre-frailty prevalence found was 69.42% (95% CI; 63.77%-74.66%). Most of them (60.40%) are women, and 47.03% are between 70 and 79 years old, mean age of 71.34 (SD±5.73). Most (50.99%) are married/stable union, 33.66% live only with a spouse/partner, 50.50% have never studied, 85.64% are retired, and 71.02% receive a minimum wage.

As for health conditions, 50.99% of older adults self-rated their health status as regular, 92.57% reported having two or more health problems, the main ones being hypertension (81.68%), osteoporosis (34.16%) and diabetes mellitus (28.71%), 90.59% used medication, and 84.00% used polypharmacy. The main drugs used were antihypertensives (81.68%), calcium (39.11%) and oral hypoglycemic agents (29.21%). More than half of respondents (62.20%) are without nutritional risk, and 56.44% have normal mood. Most of them (65.35%) are independent for BADL, 64.36% for IADL, 90.10% do not perform physical activity, and 66.34% of older adults reported having suffered a fall in the last 12 months.

Table 1 shows the results of the bivariate analysis according to sociodemographic characteristics, in which education up to three years of study and being retired were the variables statistically associated with pre-frailty.

Table 2 shows the results of the bivariate analysis between lipid variables and abdominal obesity. Variables that were statistically associated with pre-frailty were being classified with negative self-rated health, having two or more health problems, making use of any medication, making use of polypharmacy, having suffered some type of fall in the last 12 months, being dependent for BADL and IADL, being classified as nutritional risk, and depressive mood.

Table 3 presents the variables that remained statistically associated with pre-frailty after multiple regression analysis.

Table 1 - Prevalence and prevalence ratio of pre-frailty according to older adults' sociodemographic characteristics, Cuiabá, MT, Brazil, 2018. (n = 291)

Variables	n/N	%	PR (95% CI)	*p*-value
Sex				
Male	80/121	66.12	1	
Female	122/170	71.76	1.08 (0.92-1.27)	0.303
Age group				
65 to 69 years	91/132	68.94	1	
70 to 79 years	95/139	68.35	0.99 (0.84-1.16)	0.916
80 years and older	16/20	80.00	1.16 (0.90-1.48)	0.314
Marital status				
With a partner	99/136	72.79	1	
Without a partner	103/155	66.45	1.09 (0.94-1.27)	0.242
Education (years)				
4 years and older	43/79	54.43	1	
0-3 years of study	159/212	75.00	1.37 (1.11-1.71)	< 0.001
Family arrangement				
Not alone	155/230	67.39	1	
Alone	47/61	77.05	1.14 (0.97-1.34)	0.146
Occupational status				
Employed	12/28	42.86	1	
Retired	190/263	72.24	1.68 (1.09-2.60)	0.001
Family income per capita				
> 1 MW ‡	28/46	60.87	1	
0-1 MW‡	174/245	71.02	1.16 (0.91-1.49)	0.171

*Chi-square test; † Fisher's exact test; ‡ MW – current minimum wage (R$ 954.00)

Table 2 - Prevalence and prevalence ratio of pre-frailty according to older adults' health conditions - Cuiabá, MT, Brazil, 2018. (n=291)

Variables	n/N	%	PR (95% CI)	*p*-value
Self-rated health				
Positive	55/100	55.00	1	
Negative	147/191	76.95	1.39 (1.15-1.69)	< 0.001
Referred health problem				
No	7/11	63.64	1	
Yes	195/280	69.64	1.09 (0.69-1.72)	0.741
Number of health problems				
Up to a problem	15/32	46.88	1	
Two and more	187/259	72.20	1.54 (1.05-2.24)	0.003
Vision alterations (referred)				
No	52/72	72.22	1	
Yes	150/219	68.49	0.94 (0.80-1.12)	0.552
Hearing alterations (referred)				
No	171/247	69.23	1	
Yes	31/44	70.45	1.01 (0.82-1.25)	0.871

Table 2 - Cont.

Variables	n/N	%	PR (95% CI)	*p*-value
Medication use				
No	19/35	54.29	1	
Yes	183/256	71.48	1.31 (0.96-1.80)	0.038
Polypharmacy				
No	139/216	64.35	1	
Yes	63/75	84.00	1.30 (1.13-1.50)	0.001
Falls in last the 12 months				
No	95/155	61.29	1	
Yes	107/136	78.68	1.28 (1.10-1.49)	0.001
Activities of daily living				
Independent	132/211	62.56	1	
Dependent	70/80	87.5	1.39 (1.22-1.59)	< 0.001
Instrumental activities of daily living				
Independent	132/218	60.55	1	
Dependent	70/73	95.89	1.58 (1.40-1.78)	< 0.001
Mini Nutritional Assessment				
No nutritional risk	114/180	62.98	1	
Nutritional risk	88/111	80.00	1.27 (1.09-1.46)	0.002
Mood				
Normal mood	91/162	56.17	1	
Depressive mood	111/129	86.05	1.53 (1.31-1.78)	< 0.001

*Chi-square test; † Fisher's exact test

Table 3 - Analysis of the final Poisson regression model for variables associated with pre-frailty in older adults (n = 291), Cuiabá, MT, Brazil, 2018.

Variables	PR (95% CI)	*p*-value
Years of study		
0-3 years	1.22 (1.01-1.48)	0.038
Activities of daily living		
Dependent	1.13 (1.00-1.28)	0.044
Instrumental activities of daily living		
Dependent	1.29 (1.14-1.46)	< 0.001
Mini Nutritional Assessment		
Nutritional risk	1.15 (1.00-1.31)	0.035
Mood		
Depressive mood	1.22 (1.09-1.36)	< 0.001
Health assessment		
Negative	1.27 (1.06-1.52)	0.009
Polypharmacy		
Yes	1.16 (1.02-1.31)	0.023

*Poisson multiple regression

DISCUSSION

This is possibly one of the first studies that, using the Edmonton Frailty Scale (EFE), investigates pre-frailty in older adults living in the community. Previous research identified data on the prevalence of this health condition, using the same instrument (EFE); however, they did not aim to obtain inferences about the factors associated with the presence of pre-frailty in older adults in the community[3,6,10,21–26]. In these studies, the frequency of pre-frail older adults found was lower than in this research. In international studies, pre-frailty prevalence ranged from 12.9% to 24.4%[6,23–24], and in the national ones, there was a variation between 21.4% and 25.4%[3,6,21–22,25–26].

One of the possible explanations for the high pre-frailty prevalence found in this study may be the lack of methodological standardization among the studies and the use of different parameters for data analysis. It may also be related to a higher risk of frailty among older adults living in a condition of vulnerability. This is the case of the older adults surveyed: many of them have low income and education, have more than two health problems and have suffered some type of fall in the last 12 months. It is known that such events and conditions predispose individuals to the emergence of pre-frailty and the evolution to more complex degrees[9].

In this study, some sociodemographic and health factors were associated with the pre-frailty of the older adults surveyed. The strong association identified between pre-frailty and depressive mood was also found in other studies[27–28]. It has been documented that these two conditions are related to each other, especially depressive symptoms, contributing to the occurrence of frailty in older adults[28]. Individuals with depressed mood may experience weight loss, low physical activity, sadness, social isolation and have difficulty maintaining functional skills, situations that predispose them to FS in older adults[28].

Another important finding is the association between pre-frailty and dependence for BADL and IADL. Other studies that had also used FFI [27–28] had found this association. A likely explanation for this association is that, although they are different health conditions, functional disability and FS are equally complex phenomena and result from the interaction between biological, psychological, clinical, social and environmental factors[6].

Another finding of this investigation was the association between pre-frailty and negative perceived health status. Studies that had used FFI to also assess FS[11–12] presented the same result. Health perception is a health indicator, widely used around the world, which allows obtaining relevant information about people's health status based on information provided by them[12]. Pre-frail older adults are 82% more likely to have negative self-rated health[11–12,28]. In the case of this study, the association found may be due to the fact that people generally have a negative perception of their health due to the presence of morbidities and limitations in carrying out daily activities, conditions that lead them to perceive that their health status is not good.

In the present study, the association between pre-frailty and polypharmacy was perceived, which was also found in other studies on FS[12–13]. It is known that there is a fine line between the risk and benefit of using multiple medications. Although it can prolong the lives of older people, polypharmacy is considered a risk factor for the development of FS[14], because there is the possibility of drug interactions and adverse effects, situations that increase the susceptibility of older adults to the appearance of pre-frailty[26].

The association between pre-frailty and low education is a finding that, in other studies with FFI, was also observed[14,29]. Lower socioeconomic conditions are often linked to pre-frailty[5]. Education does not act directly on the pathophysiology of frailty, but, like other socioeconomic factors, it can influence people's style and quality of life, which, in turn, can contribute to the frailty process[29].

Another association found in this study, between pre-frailty and nutritional risk, was also identified in studies that used FFI and MAN[10,30]. FS and malnutrition are important geriatric syndromes commonly present in older adults, although common and distinct aspects of this relationship are still not well established[30]. A possible explanation for this association may be that the greater susceptibility to malnutrition resulting from the aging process experienced by some people leads to a loss of muscle mass and strength, contributing to the development of sarcopenia and weakness - both FS components[6,10].

This study has limitations. The fact that the information was obtained only at a given moment, as in the sectional design, prevents the temporal sequence assessment between exposure and outcome. The fact that many questions depend on the participants' recall can bring with it memory bias, in which a certain group may remember more of past situations. However, it is worth mentioning that the statistical analysis used can minimize certain interactions and/or confounding, thus allowing a good adjustment of effect measures and preventing the overestimation of association measures.

Among the positive aspects of this investigation, the main one is the fact that it was the first to use EFE to assess factors associated with pre-frailty. The use of EFE is still incipient in Brazil, but it is something important, as it manages to stratify frailty in degrees of complexity and identify older adults at risk of becoming frail, doing so by evaluating not only physical, but also psychological and social criteria. Of the existing instruments for the assessment of FS, EFE works with a perspective considered to be broader for the multidimensional geriatric assessment of the syndrome[8].

The high pre-frailty prevalence in older adults in this investigation makes it clear that there are steps to be taken to prevent it. These results must be considered by health professionals, especially in Family Health Strategy teams, including FS screening in the health assessment of older adults, as it is a health problem that negatively impacts their lives, their families and the health service itself. Early identification can support prevention programs aimed at preventing the worsening of health conditions and promoting better quality of life.

CONCLUSION

The analysis of pre-frailty prevalence in older adults residing in the community and the associated sociodemographic and health factors allowed us to conclude that this prevalence is above that found in other studies that used the EFE. As for sociodemographic factors, there was an association between low education and pre-frailty. Among the health variables, there was an association between dependence for BADL and IADL, negative perception of health, depressive mood, nutritional risk and polypharmacy. Together, these findings show that there are many older adults in the studied community who are at risk for FS and that several health and social factors are associated with the development of this syndrome.

These results show the need for more investment in research that expands the knowledge of this clinical condition, especially intervention studies aimed at investigating effective ways to prevent it. Moreover, it is urgent that health professionals are trained to assist older adults in programs aimed at their specificities, so that they are evaluated and adequately cared for, mainly to minimize the risk of becoming frail.

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NOTES

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CONFLICT OF INTEREST

There is no conflict of interest.

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