LUMEN ET VIRTUS
ISSN: 2177-2789

ASSOCIATION BETWEEN FRAILTY, FALLS, AND COMORBIDITIES IN ELDERLY OUTPATIENTS

https://doi.org/10.56238/levv15n43-052

Submitted on: 16/11/2024 **Publication date:** 16/12/2024

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ABSTRACT

This article analyzes the association between frailty, falls, gender, and comorbidities in elderly patients. The cross-sectional and quantitative research was carried out at the UNICEPLAC outpatient clinic, Brasília, with 61 elderly patients aged between 60 and 85 years, of which 41 were female and 20 were male. The Functional Clinical Vulnerability Index-20 (IVCF-20) was used to assess frailty. The results showed that 30.4% of the frail elderly reported two or more falls in the last year, in contrast to 3.7% of the robust ones, evidencing a risk ratio of 17.76 for falls in frail older adults. The findings suggest that frailty is a significant predictor of falls in older patients, highlighting the need for targeted interventions to mitigate this risk.

Keywords: Frailty. Accidents due to Falls. Old.

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INTRODUCTION

In recent decades, an increase in the proportion of elderly people among the population has been observed both in Brazil and in the world in a process that is conventionally called demographic transition, driven by the increase in life expectancy and the decline in fertility rates. In view of the increase in the elderly population, the growing relevance of the condition of frailty in health care becomes evident. (ANDRADE et al., 2012; OLIVEIRA et al., 2020)

Although there is no unanimity regarding its specific definition, it is understood that frailty in the elderly is a non-optimal clinical condition of a multifactorial nature, which courses with homeostatic disorders and increased vulnerability of the elderly to stressors in the biological, psychic and social spheres. In this sense, it is perceived that frailty is closely connected with the fall in the functional capacity of the elderly. (ANDRADE et al., 2012; OLIVEIRA et al., 2020)

In a study conducted with 442 institutionalized older adults in the Midwest and Southeast regions of Brazil, Mattos and Santiago (2014, p.327) identified that the frailty rate among the sample was 52%, in addition, there was evidence of an association between frailty and older age, illiteracy, comorbidities, and polypharmacy. On the other hand, Maia et al. (2020, p.5041) in a cross-sectional study with 1750 elderly people in Southeast Brazil, using the IVCF-20 questionnaire, revealed that 20.1% of the elderly were frail. (MAIA et al., 2020; MATTOS and SANTIAGO., 2014)

In addition to frailty, another serious challenge to public health is represented by falls among the elderly population, whose consequences range from bruises, abrasions and fractures to death. A study conducted in Brazil indicated that the prevalence of falls in the elderly population ranged from 6.5 to 46.9% between 2002 and 2019. (DIAS et al., 2023)

In view of the trend towards an increase in the number of elderly people who require medical care and the growing relevance of the conditions described above, it is necessary to know how they are related. This study aims to investigate the association between frailty and falls in elderly patients, as well as to identify the comorbidities most present in frail patients and the gender in which this condition is more prevalent.

METHODOLOGY

The present study is characterized as a cross-sectional research, quantitative and descriptive in nature, carried out between September and November 2024. The research was conducted at the UNICEPLAC outpatient clinic, located in the satellite city of Gama in Brasília, in the Federal District, after due authorization by the research ethics committee of

that institution, with the opinion number being 7.0505.755. Elderly people aged 60 years or older who attended the service during the data collection period were interviewed.

To assess the association between frailty and falls in the elderly, the validated questionnaire Clinical Functional Vulnerability Index-20 (IVCF-20) was used. This instrument consists of 20 questions that allow a multidimensional assessment of the level of frailty of the elderly. (MORAES et al., 2016) The questionnaire was applied in its entirety and without changes to all eligible participants. The comorbidities identified in the patients were reported and recorded separately using a digital form.

INCLUSION AND EXCLUSION CRITERIA

The inclusion criteria of this study were elderly patients aged 60 years or older treated at the UNICEPLAC outpatient clinics. Elderly patients who had cognitive or physical disabilities that prevented them from understanding or adequately completing the questionnaire was the exclusion criterion.

DATA COLLECTION

Data collection was carried out through interviews with the selected elderly. During the interviews, after signing the informed consent, the IVCF-20 questionnaire was strictly followed, ensuring the uniformity of the data. The participants answered the questions individually, with the accompaniment of the researchers to clarify doubts without influencing the answers.

STATISTICAL ANALYSIS

After data collection, the results were analyzed using Microsoft Excel and OpenEpi tools. The statistical analysis consisted of estimating the risk of falls in relation to the frailty of the elderly, with the calculation of the risk factor and a 95% confidence interval. The association between frailty and falls was analyzed by comparing groups of elderly people with different levels of frailty, according to the classification obtained by the IVCF-20.

TOOLS USED

The stages of writing and organizing the work will be carried out in Microsoft Word, while Microsoft Excel will be used to organize and tabulate the data collected. The statistical analysis will be done in the OpenEpi software, an open-source tool used for statistical

calculations, including the determination of the risk factor and the construction of confidence intervals.

RESULTS AND DISCUSSION

It was verified through the application of the questionnaire that among the 23 patients classified as frail elderly, 7 had two or more falls in the last year, while only 1 of the 27 patients classified as potentially frail elderly suffered the same number of falls in this period. On the other hand, of the total of 11 patients classified as robust elderly, none reported the occurrence of two or more falls in the last year.

The hazard ratio is significantly greater than 1 (17.76), indicating that frail/potentially frail older adults have a substantially higher risk of suffering two or more falls, in addition, the significant risk difference (15.1%) reveals a considerable difference in the probability of falls between frail/potentially frail older adults and robust older adults. In addition, the etiological fraction in the population is high (93.2%), suggesting that frailty is an important factor in the occurrence of falls in the population studied. The results of the study, therefore, suggest that frailty is a strong predictor of falls in outpatient older adults.

Chart 1 – Classification of patients by level of frailty

IDOSO FRÁGIL	
MENOR QUE 2 QUEDAS	16
MAIOR OU IGUAL A 2 QUEDAS	7
IDOSO PONTENCIALMENTE FRÁGIL	
MENOR QUE 2 QUEDAS	26
MAIOR OU IGUAL A 2 QUEDAS	1
IDOSO ROBUSTO	
MENOR QUE 2 QUEDAS	11
MAIOR OU IGUAL A 2 QUEDAS	0

Source: Prepared by the authors (2024)

Chart 2 – Analysis of the association between fragility and falls

Estimador baseado no risco* e Intervalos de confiança em 95%
Não válido para estudos de casos-controle

Estimativas de pontos		Limites de confiança	
Tipo	**Valor**	**Inferior, Superior**	**Tipo**
Risco nos Expostos	16%	8.07, 28.78	Series de Taylor
Risco nos Não Expostos	0.9009%	0.0, 30.86	Series de Taylor
Risco Total	13.26%	6.645, 24.22	Series de Taylor
Razão do Risco	17.76	0.03596, 8770[1]	Series de Taylor
Diferença do Risco	15.1%	3.517, 26.68°	Series de Taylor
Fração etiológica na pop (FEP)	93.2%	51.57, 100	
Fração etiológica nos expostos (FEE)	94.37%	-100, 99.99	

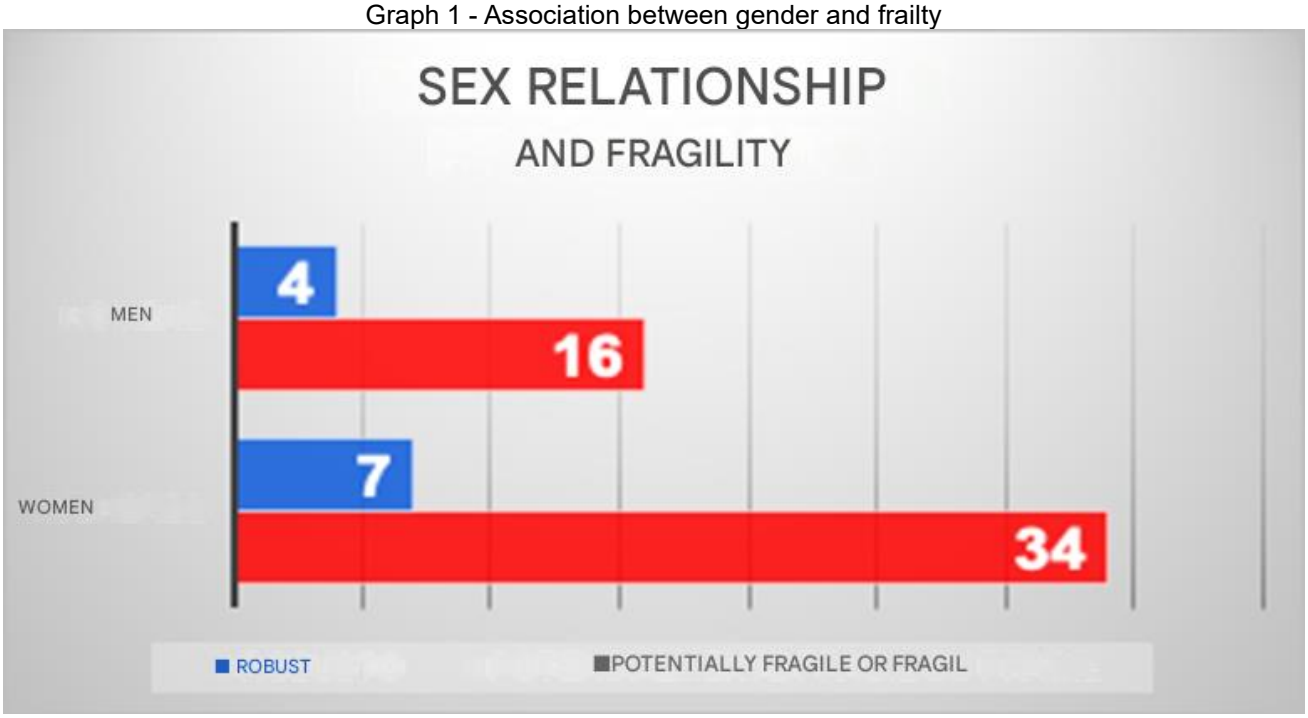
Source: Prepared by the authors (2024)

A study conducted in the city of Ribeirão Preto (SP) with 261 individuals identified a 6.05 times higher risk of falls in elderly people classified as frail by the Tilburg scale. This same study also pointed out that elderly people considered frail by the Groningen scale have a 5.55 times higher risk of falls than non-frail individuals. (GIACOMINI; FHON; RODRIGUES, 2020)

Another study conducted with 323 elderly people demonstrates a positive association between the risk of falls and the presence of conditions characteristic of frailty syndrome in the elderly, such as functional decline, cognitive deficit, advanced age, polypharmacy and depressed mood. (DIAS et al., 2023)

According to Duarte et al (2018), non-frail older adults predominate among those who did not report falls (54.5%), with the most frequent falls in the presence of frailty correlated with decreased grip strength and gait speed, weight loss, and fatigue. (DUARTE et al., 2018) A cross-sectional study with 240 elderly people carried out in São Paulo revealed that the prevalence of falls in frail older adults was 59% higher than in non-frail older adults. (FHON et al., 2013) Such data support the association between frailty and falls in the elderly.

Graph 1 - Association between gender and frailty



Source: Prepared by the authors (2024)

Chart 3 – Analysis of the association between sex and frailty

Estimador baseado no risco* e Intervalos de confiança em 95%
Não válido para estudos de casos-controle

Estimativas de pontos		**Limites de confiança**	
Tipo	**Valor**	**Inferior, Superior**	**Tipo**
Risco nos Expostos	83.72%	69.71, 92.2	Series de Taylor
Risco nos Não Expostos	80%	57.83, 92.51	Series de Taylor
Risco Total	82.54%	71.2, 90.14	Series de Taylor
Razão do Risco	1.047	0.8104, 1.351[1]	Series de Taylor
Diferença do Risco	3.721%	-16.99, 24.43°	Series de Taylor
Fração etiológica na pop (FEP)	3.077%	-14.09, 20.24	
Fração etiológica nos expostos (FEE)	4.444%	-23.4, 26	

Source: Prepared by the authors (2024)

When analyzing the IVCF-20 domains, regarding gender x frailty (graph 1), it was found that 82.92% (34) of the elderly women surveyed were considered frail or potentially frail, while 17.07% (7) were considered robust. Regarding the male gender, 80% (16) were considered frail or potentially frail and 20% (4) considered robust.

There was no significant difference between the groups, according to the statistical analysis, since the Risk Ratio (RR) is close to 1 (1,047), which indicates that there is no substantial difference in the risk of frailty between men and women. The confidence interval (CI) also includes a value of 1, reinforcing the conclusion that there is insufficient statistical

evidence to affirm that there is a significant difference in the prevalence of frailty between older men and women.

Thus, the initial hypothesis that women would be at greater risk of frailty was not confirmed by the data.

A study conducted in Brazil revealed that the male population had a higher prevalence of frailty syndrome. (SANTOS et al., 2020) This finding contrasts with most studies, which highlight a higher incidence of frailty among women. This view is supported by factors such as longer life expectancy, lower mortality rates from external causes, lower exposure to occupational hazards, and reduced tobacco and alcohol consumption. In addition, women seek health services more frequently than men. As a result, older women tend to be more affected by frailty syndrome, facing the changes of aging at older ages. (JESUS et al., 2017; RODRIGUES et al., 2018)

In another study analyzed, no significant difference was identified in relation to the frequencies with which frailty affected each sex. Females had a prevalence of frailty of 18%, while males had a prevalence of 17.1%. In the statistical analyses, no association was found between frailty and gender (GROSS et al., 2018), corroborating the results of the present study.

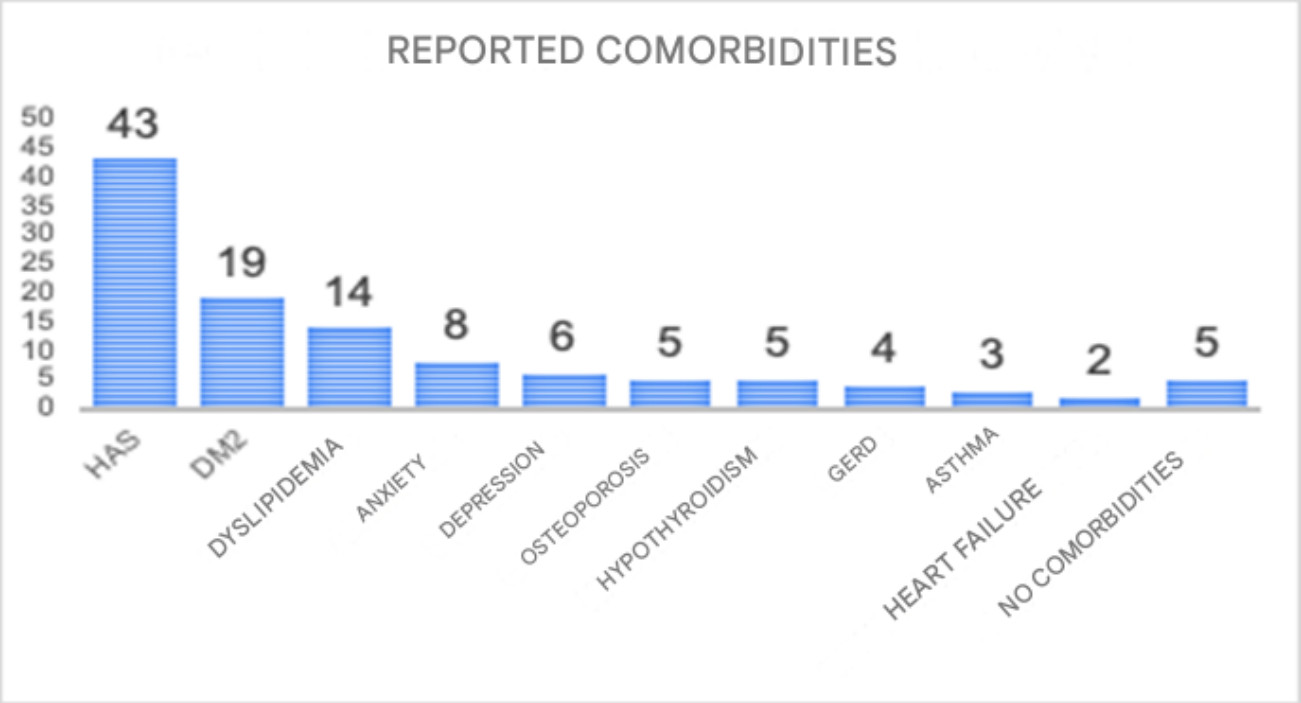
Gross, C.B. et al (2018), highlight in their work that the increase in women's life expectancy does not guarantee good quality of life or satisfactory health, since studies so far do not demonstrate a positive correlation between these variables. Female frailty can be attributed to differences in body composition, as women have less muscle mass and, with aging, are more susceptible to its loss, which affects functional capacity and contributes to frailty. (GROSS et al., 2018)

According to Rodrigues et al (2018), due to their greater longevity, the female population has a greater tendency to frailty compared to the male sex, with an increased risk for the development of chronic and disabling diseases. (RODRIGUES et al., 2018)

Frailty is a complex phenotype, influenced by several factors besides gender, such as age, comorbidities, socioeconomic level, and lifestyle. Frailty is an important health problem in both sexes, and prevention and treatment should be directed to all the elderly. (ANDRADE et al., 2012)

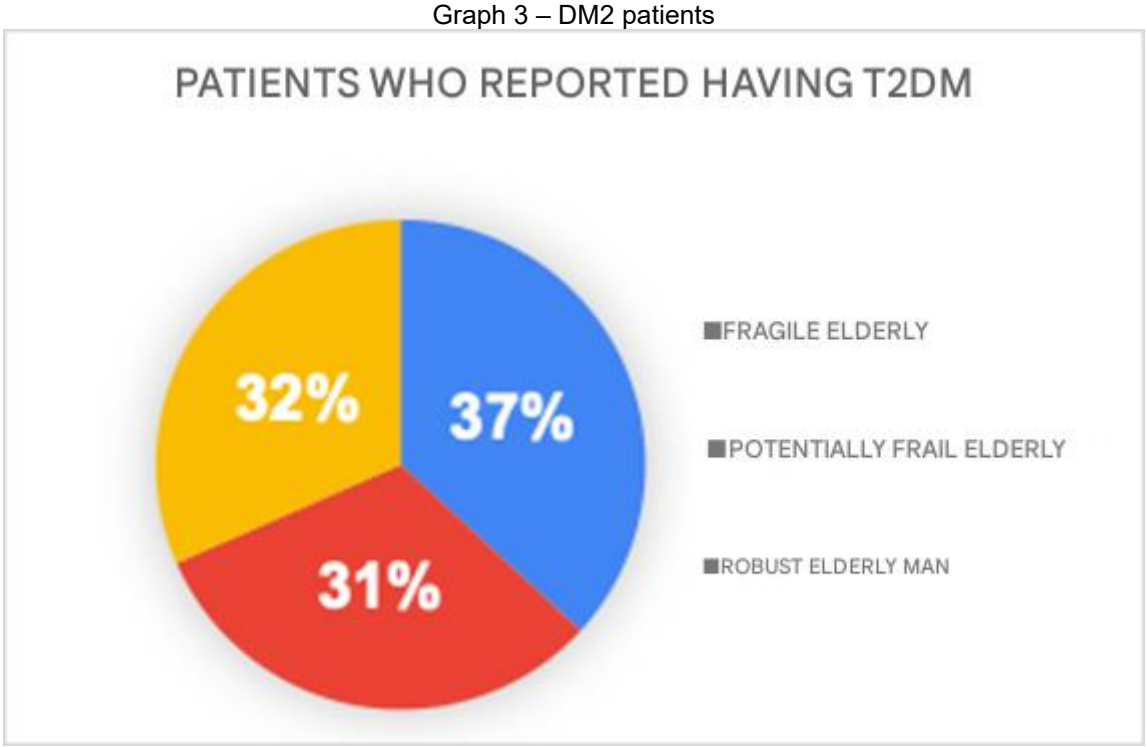
The present study did not control for these other factors, which may be masking the effect of gender, in addition to the relatively small sample size probably influencing the result. A larger sample size could increase the accuracy of the results and decrease the amplitude of confidence intervals.

Graph 2 – Reported comorbidities



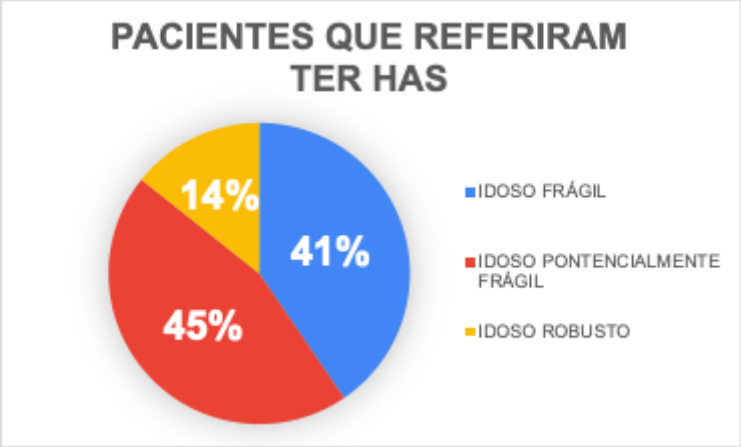
Source: Prepared by the authors (2024)

Graph 3 – DM2 patients



Source: Prepared by the authors (2024)

Graph 4 – Persons with SAH



Source: Prepared by the authors (2024)

Chart 4 – Analysis of the association between comorbidities and frailty

Estimador baseado no risco* e Intervalos de confiança em 95%
Não válido para estudos de casos-controle

Estimativas de pontos		Limites de confiança	
Tipo	**Valor**	**Inferior, Superior**	**Tipo**
Risco nos Expostos	85.71%	71.78, 93.67	Series de Taylor
Risco nos Não Expostos	68.42%	45.81, 84.84	Series de Taylor
Risco Total	80.33%	68.54, 88.52	Series de Taylor
Razão do Risco	1.253	0.9011, 1.742[1]	Series de Taylor
Diferença do Risco	17.29%	-6.133, 40.72°	Series de Taylor
Fração etiológica na pop (FEP)	14.82%	-5.905, 35.55	
Fração etiológica nos expostos (FEE)	20.18%	-10.97, 42.58	

Source: Prepared by the authors (2024)

Regarding the comorbidities reported by the research participants, the main pathologies cited were systemic arterial hypertension (SAH) and type 2 DM, among these, 43 reported having SAH and 19 having DM2, and a single participant was affected by one or more associated diseases. Among other diseases mentioned, the following stood out: dyslipidemia (14 elderly), anxiety (8 elderly), depression (6 elderly), osteoporosis (5 elderly), hypothyroidism (5 elderly), GERD (4 elderly), asthma (3 elderly) and heart failure (2 elderly). 5 elderly people reported not having any comorbidities. (Graph 1)

Comparing frailty x comorbidities, it was found that among the elderly who reported being diabetic, 37% were considered frail elderly, 31% potentially frail elderly and 32% robust elderly. In relation to SAH patients, 41% were categorized as frail elderly, 45% as potentially frail elderly and 14% as robust elderly.

When analyzing the hypothesis about the prevalence of frail elderly people with SAH x DM2, it was observed that the prevalence of frailty is higher in elderly people with SAH compared to those with DM2. The proportion of elderly people with SAH classified as frail or potentially frail is higher than the proportion of elderly people with DM2 in the same category.

The Risk Ratio (RR) is 1.253, indicating that older adults with SAH have a 25.3% higher risk of being classified as frail compared to older adults with T2DM. The 95% confidence interval (CI) for this hazard ratio does not include a value of 1, i.e., there is sufficient statistical evidence to state that this difference is significant at the 5% level (alpha error). The difference in risk is 17.29%, with a CI that does not include zero. This means that the observed difference is not due to chance. The etiological fraction indicates the proportion of cases of frailty that can be attributed to the presence of SAH, and the values found are statistically significant.

Based on the data presented and considering the alpha error of 0.05, there is sufficient statistical evidence to reject the null hypothesis that there is no difference in the prevalence of frailty between older adults with T2DM and older adults with SAH. In other words, the results confirm the initial hypothesis that frailty is more prevalent in the group with SAH.

In this case, it is also important to highlight the limitations of the study, such as the sample size and the lack of control for other factors. However, the results suggest that the presence of SAH is an independent and significant risk factor for frailty in older outpatients.

According to data from the National Household Sample Survey (PNAD), conducted in 2008, 68.7% of the elderly population had at least one non-communicable disease or condition, and 53.3% had hypertension; 24.2% arthritis; 17.3% heart disease; 16.1% diabetes and 12% depression. In addition, approximately 22% of older people had two chronic conditions and 13% had three or more. (BRAZIL, 2014)

In a study carried out by Sousa et al (2022), it was highlighted that, among the elderly at risk, there was a higher prevalence of hypertensive (42.1%), osteoarthritis (47.7%), and osteoporosis (44.7%). In frail individuals, the prevalence of elderly people with depression was 66.7% and with diabetes, 38.7%. The same authors state that the more diseases an elderly person has, the greater the probability of facing functional decline and frailty. (SOUSA et al., 2021) The literature points to a strong relationship between functional decline and conditions such as diabetes, respiratory, heart and osteoarticular diseases, which are linked to obesity, sedentary lifestyle and insulin resistance. (BANDEEN-ROCHE et al., 2015; LENARDT et al., 2016)

FINAL CONSIDERATIONS

The present study confirmed the hypothesis that frailty is associated with a significant increase in the risk of falls in the elderly. The proposed objectives were achieved, evidencing the relevance of fall prevention strategies aimed at this vulnerable group. It is recommended that health professionals carry out frequent assessments of frailty in the elderly, implementing physical exercise programs and educational interventions on safety at home. In addition, it is important to expand the sample in future research to strengthen the conclusions and consider the inclusion of variables such as socioeconomic level and lifestyle. Frailty is a multifactorial phenomenon with increasing relevance that requires interdisciplinary attention to ensure a better quality of life for the elderly.

ACKNOWLEDGMENTS

We thank God first for giving us strength, motivation and wisdom and guiding our steps during the arduous and long journey to make this work. We also thank our advisor, Dr. Lucy de Oliveira Gomes, and our professor, Alessandro Caruso, for all the time, patience and direction invested in this research, playing a fundamental role in the conclusion of this work. Finally, we also thank our families for their advice and support in the most challenging moments of the construction of this work.

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