

Factors Associated with Frailty Among Older Adults Receiving Outpatient Care

Thayara Jocelly Alves Bravo

Federal University of São Carlos

Gustavo Carrijo Barbosa

Federal University of São Carlos

Gabriela Martins-Cavichioli

Federal University of São Carlos

Luana Rafaela Porcatti

Federal University of São Carlos

Anna Clara Simon Landim Silveira

Federal University of São Carlos

Dayane Ferreira Alves

Federal University of São Carlos

Alice Irene Sena Machado

Federal University of São Carlos

Aline Cristina Martins Grato

alinegratao@ufscar.br

Federal University of São Carlos

Research Article

Keywords: Aged, Frailty, Comprehensive Health Care, Health Vulnerability

Posted Date: September 25th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-11142946/v1>

License:  This work is licensed under a Creative Commons Attribution 4.0 International License. [Read Full License](#)

Additional Declarations: No competing interests reported.

Abstract

Introduction: Frailty assessment using the Clinical-Functional Vulnerability Index (IVCF) is essential for tailoring interventions and improving older adults' quality of life.

Objective: To characterize frailty status and identify factors correlated with frailty among older adults receiving outpatient care.

Method: A crosssectional study was conducted between 2023 and 2024 with patients attending a gerontology outpatient clinic. Sociodemographic and health characteristics were assessed, including frailty, cognitive performance, dependence in activities of daily living, and depressive symptoms. Data were stratified by age group and analyzed using Spearman's rank correlation coefficient. All ethical requirements were met.

Results: A total of 92 participants were included. Polypharmacy, frailty, cognitive impairment, and dependence in activities of daily living were prevalent, particularly among participants aged 80 years or older. IVCF scores were significantly correlated with age ($r = 0.381$; $p < 0.001$), years of education ($r = -0.424$; $p < 0.001$), number of medical conditions ($r = 0.246$; $p = 0.018$), cognitive impairment ($r = -0.417$; $p < 0.001$), dependence in basic ($r = -0.532$; $p < 0.001$) and instrumental activities of daily living ($r = -0.468$; $p < 0.001$), and depressive symptoms ($r = 0.292$; $p = 0.005$).

Conclusion: Frailty was correlated with advanced age, lower years of education, more medical conditions, cognitive impairment, functional dependence, and depressive symptoms. These findings highlight the importance of early identification of frailty-related factors and individualized multidimensional assessment.

INTRODUCTION

In Brazil, the older adult population is growing rapidly, with projections indicating that, by 2040, more than 32 million Brazilians will be aged 60 years or older [10]. Although population aging represents social progress, it poses significant challenges for health systems worldwide. Older adults' greater vulnerability to chronic noncommunicable diseases and higher risk of morbidity require the reorganization of health care delivery networks and the implementation of effective, integrated care strategies [27].

Among the conditions that compromise the health and functioning of this population, frailty stands out as a clinical state of vulnerability to adverse health outcomes. This condition may result from factors such as sarcopenia, multimorbidity, polypharmacy, recent hospitalizations, and mild cognitive impairment, or it may already be established, as evidenced by partial or total dependence in activities of daily living [15]. Frailty increases the risk of clinical complications, functional dependence, and mortality, making it a priority in geriatric care [4].

Early identification of frailty and its associated factors is essential for guiding specific, individualized interventions. Of particular relevance in this context is the Clinical-Functional Vulnerability Index (IVCF), a multidimensional tool that assesses eight dimensions predictive of functional decline and/or mortality in older adults: age, self-rated health, activities of daily living, cognition, emotional/behavioral status, mobility, communication, and multimorbidity [15]. The use of such instruments enables the planning of strategies to prevent complications, improve treatment adherence, and reduce the burden on the health care system [15, 27].

Despite advances in the field, gaps remain in knowledge about the determinants of frailty among older adults receiving outpatient care. Most research focuses on hospital settings or populations with established comorbidities, which limits understanding of the factors that contribute to frailty among older adults who, although vulnerable, have a distinct clinical and social profile [5, 15, 22, 23]. This lack of specific evidence hinders the development of care strategies

tailored to the demands of outpatient care, which serves as an essential point of entry for ongoing health monitoring in this population.

Given this gap, studies that further examine factors correlated with frailty among older adults in outpatient settings are warranted to better understand how clinical, functional, and psychosocial variables are related in this context. Thus, this study aims to characterize frailty status and identify factors correlated with this condition among older adults receiving care at a gerontology outpatient clinic at a university hospital.

METHOD

Study design

The study was observational, cross-sectional, analytical, and descriptive and was guided by the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement.

Sample

The sample consisted of older patients receiving care at the gerontology outpatient clinic of the University Hospital of the Federal University of São Carlos (HU-UFSCar), located in the east-central region of the state of São Paulo, Brazil. All patients seen between January 2023 and December 2024 were invited to participate, thus constituting a nonprobability convenience sample.

Eligibility criteria

Participants aged 60 years or older who received outpatient care at the university hospital during the data collection period were included. Participants with severely limiting cognitive, visual, auditory, or motor impairments that compromised their ability to complete the full assessment independently and who were not accompanied by a family member/caregiver who could assist them in completing the assessment protocol were excluded.

Setting

The study was conducted at the gerontology outpatient clinic, a specialized service that provides care to older adults referred by Basic Health Units and Family Health Units in the region. The outpatient clinic team consists of the nurse responsible for the service, a gerontology specialist, as well as undergraduate students in gerontology and graduate students in gerontology and nursing.

The gerontology outpatient clinic opened in June 2019 and has since provided free care through the Brazilian Unified Health System (SUS) to adults aged 60 years or older who are frail or at risk of frailty and to their caregivers. Activities at the service generally include care for older adults and their caregivers, gerontological assessments, development of individualized care plans, cognitive stimulation workshops, and guidance, while integrating teaching, research, and community outreach.

Data collection procedure

Data were collected upon admission to the outpatient clinic after participants signed the informed consent form. The protocol was administered individually to each participant by a previously trained team member under the supervision of a gerontology specialist. Administration of the protocol took approximately 1 hour and included the following components:

- a) Sociodemographic and health characteristics: a questionnaire developed by the authors containing information such as sex, age, marital status, years of education, and race/skin color, as well as health information for each participant, including the number of medical conditions (self-reported clinical diagnoses) and regularly used medications;
- b) Frailty assessment: conducted using the IVCF-20, a highly reliable multidimensional instrument developed in Brazil [15]. The IVCF-20 consists of 20 questions assessing the following dimensions: age, self-rated health, cognition, functional capacity, mood, communication, mobility, and multimorbidity. The maximum possible score is 40 points; individuals scoring up to 6 are classified as robust, those scoring 7–14 as at risk of frailty, and those scoring above 15 as frail [15].
- c) Cognitive function assessment: conducted using the 10-Point Cognitive Screener (10-CS), a brief screening instrument designed to identify cognitive impairment. Developed in Brazil [2], the 10-CS consists of six items assessing verbal fluency, orientation, and memory. Scores range from 0 to 10, with scores of 8–10 considered normal cognitive performance, scores of 6–7 indicative of mild cognitive impairment, and scores of 5 or lower suggestive of severe cognitive impairment.
- d) Assessment of dependence in activities of daily living: for basic activities of daily living (BADLs), the Katz Index of Independence in Activities of Daily Living [11], an instrument that assesses aspects of self-care, was used. Validated for use in Brazil [13], the scale classifies individuals scoring 5–6 as “independent,” those scoring 3–4 as “partially dependent,” and those scoring 0–2 as “highly dependent.” Instrumental activities of daily living (IADLs) were assessed using the Lawton and Brody Instrumental Activities of Daily Living Scale (1969) [12], validated for use in Brazil [25]. Scores on this scale range from 7 to 21, with individuals scoring up to 7 are classified as dependent, those scoring 8–20 as partially dependent, and those scoring 21 as independent.
- e) Assessment of depressive symptoms: conducted using the 15-item Geriatric Depression Scale (GDS-15) [28], validated for use in Brazil [1]. Total scores range from 0 to 15. Scores of up to 5 indicate no depressive symptoms, scores of 6–10 indicate mild depressive symptoms, and scores above 11 indicate severe depressive symptoms.

Statistical analysis

Data were entered into a Microsoft Excel 2016 database and subsequently analyzed using Jeffrey's Amazing Statistics Program (JASP), version 0.18.1. For statistical analysis, participants were divided into two age groups: group I (60–79 years) and group II (80 years or older). Descriptive statistics were used to summarize categorical variables as absolute and relative frequencies and continuous variables as means and standard deviations.

Normality was assessed using the Kolmogorov–Smirnov test. Because the data were not normally distributed ($p = 0.003$), Spearman's rank correlation coefficient was used to assess correlations between the IVCF-20 score and the following continuous variables: age, years of education, number of medical conditions, number of medications, cognitive impairment, dependence in BADLs, dependence in IADLs, and depressive symptoms. Correlations were categorized according to magnitude as weak (< 0.29), moderate ($0.30–0.59$), strong ($0.60–0.99$), and perfect (1.0) [16]. A significance level of 5% was adopted ($p \leq 0.05$).

Ethical aspects

The study followed Resolutions No. 466/2012 and No. 510/2016 of the Brazilian National Health Council, which are intended to ensure the rights and responsibilities of study participants, the scientific community, and the State, while safeguarding participants' confidentiality and privacy throughout all stages of the research. Therefore, in accordance with the Guidelines and Regulatory Standards for Research Involving Human Subjects, the study protocol was

submitted to and approved by the Research Ethics Committee for Human Research at Federal University of São Carlos (CAAE: 90875525.4.0000.5504, under Opinion No. 7.754.346).

RESULTS

Of the 103 older patients seen at the outpatient clinic during the recruitment period, 11 were excluded because they did not complete the study protocol and were not accompanied by a family member or caregiver who could assist them, leaving 92 participants who met the inclusion criteria and comprised the final study sample. Most participants were female (64.1%), with a mean age of 78.6 ± 8.7 years and 5.6 ± 4.5 years of education. Table 1 presents the sociodemographic characteristics of the sample.

Table 1. Sociodemographic characteristics of the sample. São Carlos, São Paulo, Brazil, 2024.

Variable	Total (N = 92) Mean±SD / n (%)	60–79 years (n = 46) Mean±SD / n (%)	80 years (n = 46) Mean±SD / n (%)
Sex			
Male	33 (35.9)	20 (43.5)	13 (28.3)
Female	59 (64.1)	26 (56.5)	33 (71.7)
Age (years)	78.6±8.7	71.8±5.9	85.5±4.5
Marital status			
Married	46 (50.0)	27 (58.7)	19 (41.3)
Single	10 (10.9)	5 (10.9)	5 (10.9)
Widowed	27 (29.3)	7 (15.2)	20 (43.5)
Divorced	9 (9.8)	7 (15.2)	2 (4.3)
Years of education	5.6±4.5	7.8 ±4.9	3.3±2.7
No formal education	11 (11.9)	1 (2.2)	10 (21.7)
1–4 years	44 (47.8)	17 (37.0)	27 (58.7)
5–8 years	15 (16.3)	8 (17.3)	7 (15.2)
≥9 years	22 (23.9)	20 (43.5)	2 (4.3)
Race/skin color			
White	52 (56.5)	25 (54.3)	27 (58.7)
Black	15 (16.3)	5 (10.9)	10 (21.7)
Brown/mixed-race	23 (25.0)	15 (32.6)	8 (17.3)
Asian	2 (2.2)	1 (2.2)	1 (2.2)

SD = standard deviation; n = absolute frequency; % = relative frequency.

Table 2 presents the health characteristics of the sample. Higher percentages were observed among participants aged 80 years or older with respect to the number of medical conditions and medications, frailty, severe cognitive

impairment, and dependence in BADLs and IADLs. Depressive symptoms were absent in most participants in both the 60–79-year group and the group aged 80 years or older.

Table 2. Health characteristics of participants in the sample. São Carlos, São Paulo, Brazil, 2024.

Variable	Total (N = 92) Mean±SD / n (%)	60–79 years (n = 46) Mean±SD / n (%)	80 years (n = 46) Mean±SD / n (%)
Number of medical conditions	3.5±2.0	3.5±1.9	3.5±2.1
≤ 2 medical conditions	28 (30.4)	12 (26.1)	16 (34.8)
3–4 medical conditions	38 (41.3)	22 (47.8)	16 (34.8)
≥ 5 medical conditions	26 (28.2)	12 (26.1)	14 (30.4)
Number of medications	5.5±2.8	5.2±2.7	5.9±2.9
≤ 2 medications	10 (10.9)	7 (15.2)	3 (6.5)
3–4 medications	23 (25.0)	10 (21.7)	13 (28.3)
≥ 5 medications	59 (64.1)	29 (63.1)	30 (65.2)
Total IVCF-20 score	18.2±7.8	14.8±6.7	21.7±7.4
Robust	9 (9.8)	8 (17.3)	1 (2.2)
At risk of frailty	21 (22.8)	14 (30.4)	7 (15.2)
Frail	62 (67.4)	24 (52.2)	38 (82.6)
Total 10-CS score	4.4±3.1	5.5±3.1	3.3±2.7
Normal cognitive performance	19 (20.6)	14 (30.4)	5 (10.9)
Mild cognitive impairment	15 (16.3)	13 (28.3)	2 (4.3)
Severe cognitive impairment	58 (63.0)	19 (41.3)	39 (84.8)
Total Katz Index score	4.2±2.0	4.6±1.8	3.8±2.1
Independent	38 (41.3)	22 (47.8)	16 (34.8)
Partially dependent	31 (33.7)	17 (36.9)	14 (30.4)
Dependent	23 (25.0)	7 (15.2)	16 (34.8)
Total Lawton and Brody Scale score	13.0±5.4	14.5±5.6	11.6±4.7
Independent	15 (16.3)	14 (30.4)	1 (2.2)
Partially dependent	55 (59.8)	25 (54.3)	30 (65.2)
Dependent	22 (23.9)	7 (15.2)	15 (32.6)
Total GDS-15 score	5.1±3.9	4.7±3.9	5.5±3.8
No depressive symptoms	54 (58.7)	29 (63.1)	25 (54.3)
Mild depressive symptoms	30 (32.6)	13 (28.3)	17 (36.9)
Severe depressive symptoms	8 (8.7)	4 (8.6)	4 (8.6)

SD = standard deviation; n = absolute frequency; % = relative frequency; IVCF-20 = Clinical-Functional Vulnerability Index-20; 10-CS = 10-Point Cognitive Screener; GDS-15 = 15-item Geriatric Depression Scale.

Table 3 presents the results of the Spearman correlation test between the IVCF-20 score and the participants' sociodemographic and health variables. Analysis of the overall sample identified significant correlations between frailty and all variables analyzed except the number of regularly used medications. Among participants aged 60–79 years, moderate negative correlations were observed between frailty and cognitive performance ($p = 0.012$; $r = -0.368$), degree of dependence in BADLs ($p = 0.003$; $r = -0.429$), and degree of dependence in IADLs ($p = 0.003$; $r = -0.425$). In the older age group (80 years or older), moderate negative correlations were observed between frailty and years of education ($p = 0.011$; $r = -0.369$), degree of dependence in BADLs ($p < 0.001$; $r = -0.591$), and degree of dependence in IADLs ($p = 0.006$; $r = -0.398$), as well as moderate positive correlations between frailty and the number of medical conditions ($p = 0.022$; $r = 0.337$) and the presence of depressive symptoms ($p = 0.012$; $r = 0.374$).

Table 3. Results of the Spearman correlation test between the IVCF-20 score and the sociodemographic and health variables of the sample. São Carlos, São Paulo, Brazil, 2024.

Variable	Clinical-Functional Vulnerability Index					
	Total (N = 92)		60–79 years (n = 46)		80 years (n = 46)	
	rho	p-value	rho	p-value	rho	p-value
Age	0.381	< 0.001*	-0.011	0.943	0.058	0.699
Years of education	-0.424	< 0.001*	-0.130	0.389	-0.369	0.011*
Number of medical conditions	0.246	0.018*	0.220	0.141	0.337	0.022*
Number of medications	0.141	0.179	0.116	0.441	0.147	0.328
Cognitive performance	-0.417	< 0.001*	-0.368	0.012*	-0.217	0.147
Dependence in BADLs	-0.532	< 0.001*	-0.429	0.003*	-0.591	< 0.001*
Dependence in IADLs	-0.468	< 0.001*	-0.425	0.003*	-0.398	0.006*
Depressive symptoms	0.292	0.005*	0.165	0.272	0.374	0.012*

rho = Spearman's correlation coefficient; * Significant correlation between variables ($p \leq 0.05$); BADLs = basic activities of daily living; IADLs = instrumental activities of daily living.

DISCUSSION

The results of this study showed a high prevalence of frailty among participants, particularly among those aged 80 years or older. The IVCF-20 score was significantly correlated with factors such as advanced age, lower years of education, multimorbidity, cognitive impairment, functional dependence, and depressive symptoms. These findings are consistent with the literature and reinforce the understanding of frailty as a multidimensional condition influenced by clinical, functional, and psychosocial factors [6, 22, 23]. The literature further supports the view that frailty should not be understood solely as a chronological consequence of aging, but rather as the result of the interaction between physiological decline and clinical and social conditions accumulated throughout life [15, 26]. Accordingly, it is essential to direct preventive strategies toward younger age groups to delay or mitigate the onset of functional dependence and vulnerability.

The association found between frailty and lower years of education suggests that social determinants of health influence vulnerability among older adults. Studies indicate that lower years of education compromises understanding of health guidance, reduces treatment adherence, and limits access to self-care resources, thereby contributing to

frailty progression [5, 14]. Therefore, in addition to clinical interventions, it is essential to consider educational and social support strategies when planning outpatient care.

The correlation between frailty and multimorbidity was consistent with previous studies, which indicate that the coexistence of chronic conditions is directly related to polypharmacy and increased vulnerability to adverse outcomes. This scenario contributes to deterioration in functional capacity and a higher risk of hospitalization and mortality [7]. Therefore, continuous monitoring and appropriate management of chronic conditions and medication use are essential to mitigate these risks [24]. In the outpatient setting, systematic monitoring of prescriptions and periodic medication review may help reduce these risks, supporting the maintenance of autonomy and quality of life [20].

Another relevant finding was the correlation between frailty and cognitive impairment, conditions that, when they occur concurrently in the same individual, characterize what is known as cognitive frailty [9]. Evidence indicates that older adults with cognitive deficits have a higher prevalence of frailty, a finding that is due to shared pathophysiological mechanisms such as chronic inflammation and neuroendocrine dysregulation [4, 8, 19]. These findings indicate the need for systematic cognitive assessments as part of outpatient follow-up for this population, as early detection of deficits may support targeted interventions, including family and social support, that can minimize the impact of associated functional decline [3].

Dependence in basic and instrumental activities of daily living was also correlated with frailty, regardless of age group. This relationship confirms that loss of functional autonomy, which increases exposure to falls, hospitalizations, and institutionalization, is one of the central markers of frailty and highlights the relevance of interventions aimed at preserving independence, such as functional rehabilitation programs, encouragement of self-care, and promotion of physical activity [17].

Another aspect identified was the correlation between frailty and depressive symptoms, reinforcing the multifactorial nature of this condition. The presence of depressive symptoms among older adults with frailty has been described in different studies and may accelerate functional decline and hinder adherence to therapeutic interventions [4, 21]. While depression may accelerate progression to frailty by reducing motivation for self-care activities and exercise, frailty may, in turn, intensify depressive symptoms due to loss of autonomy and greater social isolation [18]. These findings reinforce the need to include mental health screening in routine outpatient assessments, facilitating integrated interventions that consider both the physical and psychological dimensions of aging.

The evidence obtained in this study contributes to characterizing the frailty profile of older adults receiving outpatient care, a context that remains underexplored in the literature. While much of the research focuses on hospitalized or institutionalized populations [5, 15, 22, 23], the findings presented here broaden the understanding of factors correlated with frailty in a strategic setting for systematic screening, where continuous follow-up may facilitate early detection and the implementation of preventive strategies.

Some limitations should be considered. The convenience sample does not allow the findings to be generalized to the entire older adult population. In addition, the use of different frailty assessment instruments in other studies makes direct comparisons difficult. Even with these limitations, significant correlations were identified between frailty and functional, cognitive, and psychological variables, reinforcing the relevance of investigating this condition in gerontology outpatient services. Incorporating multidimensional instruments may facilitate the early identification of risk factors and individualized care planning. This can help reduce avoidable hospitalizations, prolong functional independence, and improve quality of life among older adults.

CONCLUSION

The results of this study showed frailty in a substantial proportion of older adults receiving care at a gerontology outpatient clinic, particularly among the oldest patients. Correlations were identified between frailty and factors such as a greater number of medical conditions, cognitive impairment, dependence in basic and instrumental activities of daily living, and depressive symptoms. These findings reinforce the multifactorial nature of frailty and indicate the importance of early identification of these factors in outpatient settings to inform future strategies for individualized assessment and follow-up for older adults.

Declarations

Ethics approval and consent to participate

The study was approved by the Research Ethics Committee for Human Research at the Federal University of São Carlos (CAAE: 90875525.4.0000.5504; Opinion No. 7.754.346). All participants provided written informed consent before data collection.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

Funding

The study was supported by the Coordination for the Improvement of Higher Education Personnel (CAPES) (Grant No. 88887.497734/2020-00), which provided financial support through a master's scholarship for Gabriela Martins-Cavichioli.

Author contributions

Thayara Jocelly Alves Bravo contributed to the conceptualization, methodology, data curation, formal analysis and writing of the original draft.

Gustavo Carrijo Barbosa contributed to the methodology, investigation and writing – review and editing.

Gabriela Martins-Cavichioli contributed to the methodology, investigation and writing – review and editing.

Luana Rafaela Porcatti contributed to the methodology, investigation and writing – review and editing.

Anna Clara Simon Landim Silveira contributed to the methodology, investigation and writing – review and editing.

Dayane Ferreira Alves contributed to the methodology, investigation and writing – review and editing.

Alice Irene Sena Machado contributed to the methodology, investigation and writing – review and editing.

Aline Cristina Martins Grato contributed to the supervision, project administration and writing – review and editing.

All authors read and approved the final manuscript.

Data availability

The datasets generated and analyzed during the current study are not publicly available due to restrictions related to participant confidentiality and ethical requirements but may be available from the corresponding author upon reasonable request, subject to applicable ethical and institutional restrictions.

References

1. Almeida OP, Almeida SA. Reliability of the Brazilian version of the geriatric depression scale (GDS) short form. *Arq Neuropsiquiatr*. 1999;57(2B):421-426. <https://doi.org/10.1590/S0004-282X1999000300013>
2. Apolinario D, Lichtenthaler DG, Magaldi RM, Soares AT, Busse AL, Amaral JR, et al. Using temporal orientation, category fluency, and word recall for detecting cognitive impairment: the 10-point cognitive screener (10-CS). *Int J Geriatr Psychiatry*. 2016;31(1):4-12. <https://doi.org/10.1002/gps.4282>
3. Azarias RSD, Souza BMD, Souza GR, Leão JPA, Castro JP, Guimarães R. Avaliação da relação do declínio cognitivo com declínio funcional em uma instituição de longa permanência para idosos (ILPI) em Belo Horizonte-MG. *Rev Master Ensino Pesqui Ext*. 2020;5(9):15-21. Available from: <https://revistamaster.emnuvens.com.br/RM/article/view/129>
4. Barbosa GC, Caparrol AJS, Melo BRS, Medeiros TJ, Ottaviani AC, Gratão ACM. Factors correlated with the frailty of elderly in outpatient care: difference between age groups. *Esc Anna Nery*. 2022;26:e20210408. <https://doi.org/10.1590/2177-9465-EAN-2021-0408en>
5. Barra RP, Moraes EN, Lemos MMDV, Bonati PCDR, Castro JFM, Jardim AA. Fragilidade e espacialização de pessoas idosas do município de Uberlândia com IVCF-20. *Rev Saude Publica*. 2024;57:9s. <https://doi.org/10.11606/s1518-8787.2023057005273>
6. Brasil AM, Furtado C, Santos APG, Militão M, Nascimento CF, Fraga-Maia H, et al. Vulnerabilidade clínico funcional de idosos acompanhados por uma unidade de cuidados primários à saúde. *Rev Pesqui Fisioter*. 2024;14:e5706. <https://doi.org/10.17267/2238-2704rpf.2024.e5706>
7. Brito GS, Oliveira GS, Silva JA, Penha RM, Barbosa SRM, Almeida RGS, et al. Vulnerabilidade clínico funcional de idosos usuários da atenção primária à saúde: estudo transversal. *Mundo Saude*. 2023;47:e13582022. <https://doi.org/10.15343/0104-7809.202347e13582022P>
8. Ferreira SP, Palma RS, Ribeiro KS, Miranda VCR, Teodoro ECM, Pereira ECA. Prevalência da síndrome da fragilidade e perfil clínico e sociodemográfico dos idosos institucionalizados de Pindamonhangaba/SP. *Fisioter Bras*. 2021;22(6):809-823. <https://doi.org/10.33233/fb.v22i6.4123>
9. Ijaz N, Jamil Y, Brown CH, Krishnaswami A, Orkaby A, Stimmel MB, et al. Role of cognitive frailty in older adults with cardiovascular disease. *J Am Heart Assoc*. 2024;13(4):e033594. <https://doi.org/10.1161/JAHA.123.033594>
10. Instituto Brasileiro de Geografia e Estatística. Censo Demográfico 2022: população por idade e sexo [Internet]. Rio de Janeiro: IBGE; 2023 [cited 2025 Jul 21]. Available from: https://agenciadenoticias.ibge.gov.br/media/com_mediaibge/arquivos/ca93b770f7ef3931bd425cdea60c8b5c.pdf
11. Katz S, Ford AB, Moskowitz RW, Jackson BA, Jaffe MW. Studies of illness in the aged: the index of ADL: a standardized measure of biological and psychosocial function. *JAMA*. 1963;185(12):914-919. <https://doi.org/10.1001/jama.1963.03060120024016>
12. Lawton MP, Brody EM. Assessment of older people: self-maintaining and instrumental activities of daily living. *Gerontologist*. 1969;9(3):179-186. Available from: <https://pubmed.ncbi.nlm.nih.gov/5349366/>
13. Lino VTS, Pereira SRM, Camacho LAB, Ribeiro ST, Buksman S. Cross-cultural adaptation of the Independence in Activities of Daily Living Index (Katz Index). *Cad Saude Publica*. 2008;24(1):103-112. <https://doi.org/10.1590/S0102-311X2008000100010>

14. Marçola AG, Cipolli GC, Donatelli DC, Carneiro Júnior N, Nascimento VB. The look at vulnerability in older population in studies of health sciences: a systematic review. *Geriatr Gerontol Aging*. 2023;17:e0230021. <https://doi.org/10.53886/gga.e0230021>
15. Moraes EN, Carmo JA, Machado CJ, Moraes FL. Índice de Vulnerabilidade Clínico-Funcional-20: proposta de classificação e hierarquização entre os idosos identificados como frágeis. *Rev Fac Cienc Med Sorocaba*. 2021;22(1):31-35. <https://doi.org/10.23925/1984-4840.2020v22i1a7>
16. Moreira TJRV, Santos MR, Moreira AL. Estatística básica. 1st ed. Teresina: EdUESPI; 2021.
17. Nunes AS, Batista MPP, Almeida MHM. Atuação de terapeutas ocupacionais com idosos frágeis. *Cad Bras Ter Ocup*. 2021;29:e2921. <https://doi.org/10.1590/2526-8910.ctoAO2207>
18. Ortiga RIM, Coelho DRL, Araújo PS, Couto MBA, Gonçalves AMS, Monteleone F, et al. A relação entre síndrome de fragilidade e depressão: uma revisão de revisões. *RIAGE Rev Ibero-Am Gerontol*. 2025;7(7):33-40. <https://doi.org/10.61415/riage.266>
19. Pinheiro HA, Mucio AA, Oliveira LF. Prevalência e fatores associados à síndrome da fragilidade no idoso do Distrito Federal. *Geriatr Gerontol Aging*. 2020;14(1):8-14. <https://doi.org/10.5327/Z2447-212320201900072>
20. Ramos DC, Ferreira L, Santos Júnior GA, Ayres LR, Esposti CDD. Prescrição farmacêutica: uma revisão sobre percepções e atitudes de pacientes, farmacêuticos e outros interessados. *Cien Saude Colet*. 2022;27(9):3531-3546. <https://doi.org/10.1590/1413-81232022279.19972021>
21. Rodrigues AO, Souza EHE, Leão LL, Rodrigues VD, Carneiro LRSF, Monteiro Júnior RS. Associação entre sintomas de depressão e fragilidade em pessoas idosas institucionalizadas. *Estud Interdiscip Envelhec*. 2023;28:1-14. <https://doi.org/10.22456/2316-2171.124245>
22. Santos GS, Freitas VLP, Dourado IAT, Oliveira JWR, Santiago JPCB. Fatores associados ao risco de vulnerabilidade clínica e funcional em idosos: uma revisão integrativa utilizando o Índice de Vulnerabilidade Clínico Funcional (IVCF). *Braz J Health Rev*. 2024;7(4):e71681. <https://doi.org/10.34119/bjhrv7n4-192>
23. Santos JAD, Santos SMD, Paulino MD, Carneiro JA, Costa FMD. Prevalência e fatores associados à fragilidade em pessoas idosas hipertensas por meio da Escala de Fragilidade de Edmonton e Índice de Vulnerabilidade Clínico Funcional-20. *Rev Bras Geriatr Gerontol*. 2024;27:e230208. <https://doi.org/10.1590/1981-22562024027.230208.pt>
24. Santos JB, Hott SC. Challenges and perspectives for pharmacotherapeutic monitoring in patients with chronic non-communicable diseases in the SUS: a literature review. *Rev Multidiscip Nordeste Mineiro*. 2025;12(1):1-17. <https://doi.org/10.61164/rnm.v12i1.4170>
25. Santos RL, Virtuoso Júnior JS. Reliability of the Brazilian version of the Scale of Instrumental Activities of Daily Living. *Rev Bras Promoc Saude*. 2008;21(4):290-296. Available from: <https://www.redalyc.org/articulo.oa?id=40811508010>
26. Siqueira BR, Moura RS, Cunha CAP, Gonçalves IM, Sousa MR, Rezende VC, et al. Síndrome da fragilidade do idoso: uma revisão narrativa. *Rev Eletron Acervo Saude*. 2021;13(12):e9329. <https://doi.org/10.25248/reas.e9329.2021>
27. Veras RP. Doenças crônicas e longevidade: desafios futuros. *Rev Bras Geriatr Gerontol*. 2023;26:e230233. <https://doi.org/10.1590/1981-22562023026.230233.pt>
28. Yesavage JA, Brink TL, Rose TL, Lum O, Huang V, Adey M, et al. Development and validation of a geriatric depression screening scale: a preliminary report. *J Psychiatr Res*. 1983;17(1):37-49. [https://doi.org/10.1016/0022-3956\(82\)90033-4](https://doi.org/10.1016/0022-3956(82)90033-4)