

Frailty syndrome in institutionalized older adults in Brazil: prevalence, components, associated factors, and implications for long-term care

Síndrome da fragilidade em pessoas idosas institucionalizadas no Brasil: prevalência, componentes, fatores associados e implicações para o cuidado de longa duração

Síndrome de fragilidad en personas mayores institucionalizadas en Brasil: prevalencia, componentes, factores asociados e implicaciones para los cuidados de larga duración

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Abstract:

Objective: to analyze the prevalence, components, associated factors, and outcomes of frailty syndrome among older adults in long-term care institutions across the five Brazilian regions. **Methods:** a cross-sectional, descriptive, and analytical study involving 4,166 residents. Data collection took place between 2015 and 2018. Frailty was measured using a self-reported instrument, validated in Brazil, based on the Fried phenotype: unintentional weight loss, fatigue, reduced strength, slow walking speed, and low physical activity. The original classification categorized individuals as non-frail (0 components), pre-frail (1–2 components), and frail (≥ 3 components). For the logistic regression models, pre-frail and frail individuals were grouped into a single category: "with frailty" (≥ 1 component). Regional logistic regression models were adjusted. **Results:** the proportion of individuals with at least one frailty component ranged from 81.3% to 85.7%. According to the original phenotypic classification, frailty (≥ 3 components) ranged from 43.5% in the North region to 52.2% in the Southeast region, while pre-frailty ranged from 30.4% to 42.1%. The most frequent component was slow walking speed (65.5%–72.2%), followed by low physical activity (47.7%–58.8%). Functional dependence was associated with the "with frailty" category in all regions, with odds ratios (OR) ranging from 3.61 to 12.57. Multimorbidity and depressive symptoms showed associations in the Northeast and Central-West regions; age ≥ 80 years was associated in the South region; longer duration of institutionalization in the Central-West region; and hospitalization in the Central-West and Southeast regions. **Conclusion:** frailty was highly prevalent, with regional heterogeneity in the associated factors. Its consistent association with functional dependence underscores the need for periodic screening, multidimensional assessment, and multicomponent interventions. Structured exercise programs can improve frailty, physical function, and cognition – even among nursing home residents – supporting the integration of preventive and rehabilitative strategies into institutional care.

Keywords: Frail Elderly; Frailty; Homes for the Aged; Prevalence; Long-Term Care; Geriatric assessment.

Resumo:

Objetivo: analisar a prevalência, os componentes, os fatores associados e os desfechos da síndrome da fragilidade em pessoas idosas institucionalizadas de longa duração nas cinco regiões brasileiras. **Método:** estudo transversal, descritivo e analítico, com 4.166 residentes. A coleta ocorreu entre 2015 e 2018. A fragilidade foi mensurada por instrumento autorreferido validado no Brasil, baseado no fenótipo de Fried: perda de peso não intencional, fadiga, redução de força, lentificação da caminhada e baixa atividade física. A classificação original foi não frágil (0 componentes), pré-frágil (1–2) e frágil (≥ 3). Para os modelos logísticos, pré-frágeis e frágeis foram reunidos na categoria "com fragilidade" (≥ 1 componente). Foram ajustados modelos regionais de regressão logística. **Resultados:** a proporção de pessoas com ao menos um componente de fragilidade variou de 81,3% a 85,7%. Pela classificação fenotípica original, a fragilidade (≥ 3 componentes) variou de 43,5% no Norte a 52,2% no Sudeste, enquanto a pré-fragilidade variou de 30,4% a 42,1%. O componente mais frequente foi lentificação da caminhada (65,5%–72,2%), seguido de baixa atividade física (47,7%–58,8%). Dependência funcional associou-se à categoria "com fragilidade" em todas as regiões, com OR entre 3,61 e 12,57. Multimorbidade e sintomas depressivos apresentaram associações no Nordeste e Centro-Oeste; idade ≥ 80 anos, no Sul; maior tempo de institucionalização, no Centro-Oeste; e hospitalização, no Centro-Oeste e Sudeste. **Conclusão:** a fragilidade foi altamente prevalente e apresentou heterogeneidade regional nos fatores associados. A associação consistente com dependência funcional reforça a necessidade de rastreamento periódico, avaliação multidimensional e intervenções multicomponentes. Os programas estruturados de exercício podem melhorar fragilidade, função física e cognição mesmo em residentes de *Nursing Homes*, sustentando a incorporação de estratégias preventivas e reabilitadoras ao cuidado institucional.

Palavras-chave: Idoso fragilizado; Fragilidade; Instituição de Longa Permanência para Idosos; Prevalência; Assistência de longa duração; Avaliação geriátrica.

Resumen:

Objetivo: Analizar la prevalencia, los componentes, los factores asociados y los desenlaces del síndrome de fragilidad en personas mayores institucionalizadas en centros de larga estancia de las cinco regiones de Brasil. **Método:** Estudio transversal, descriptivo y analítico, con 4.166 residentes. La recopilación de datos se realizó entre 2015 y 2018. La fragilidad se midió mediante un instrumento de autoinforme validado en Brasil, basado en el fenotipo de fragilidad de Fried: pérdida de peso involuntaria, fatiga, disminución de la fuerza, velocidad de la marcha reducida y bajo nivel de actividad física. La clasificación original fue: no frágil (0 componentes), prefrágil (1–2 componentes) y frágil (≥ 3 componentes). Para los modelos de regresión logística, las personas prefrágiles y frágiles se agruparon en la categoría «con fragilidad» (≥ 1 componente). Se ajustaron modelos regionales de regresión logística. **Resultados:** La proporción de personas con al menos un componente de fragilidad osciló entre el 81,3 % y el 85,7 %. Según la clasificación fenotípica original, la fragilidad (≥ 3 componentes) osciló entre el 43,5 % en el Norte y el 52,2 % en el Sudeste, mientras que la prefragilidad osciló entre el 30,4 % y el 42,1 %. El componente más frecuente fue la velocidad de la marcha reducida (65,5 %–72,2 %), seguido del bajo nivel de actividad física (47,7 %–58,8 %). La dependencia funcional se asoció con la categoría «con fragilidad» en todas las regiones, con odds ratios (OR) de entre 3,61 y 12,57. La multimorbilidad y los síntomas depresivos mostraron asociaciones en el Nordeste y el Centro-Oeste; la edad ≥ 80 años, en el Sur; un mayor tiempo de institucionalización, en el Centro-Oeste; y la hospitalización, en el Centro-Oeste y el Sudeste. **Conclusión:** La fragilidad presentó una elevada prevalencia y los factores asociados mostraron heterogeneidad regional. La asociación consistente con la dependencia funcional refuerza la necesidad de realizar cribados periódicos, evaluaciones multidimensionales e intervenciones multicomponente. Los programas estructurados de ejercicio pueden mejorar la fragilidad, la función física y la cognición incluso en residentes de centros residenciales para personas mayores, lo que respalda la incorporación de estrategias preventivas y reabilitadoras a la atención institucional.

Palabras clave: Anciano frágil; Fragilidad; Hogares para ancianos; Prevalencia; Cuidados a Largo Plazo; Evaluación geriátrica.

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INTRODUCTION

Population aging has increased the number of people living with multiple chronic conditions, functional decline, and a need for long-term support. In this context, frailty has become a central concept in gerontological care, as it reflects a reduction in physiological reserve and the capacity to respond to stressors – thereby increasing vulnerability to falls, disability, hospitalization, institutionalization, and death¹.

Frailty should not be confused with advanced age, multimorbidity, or disability, although these conditions often coexist. One of the most widely used models is the phenotype proposed by Fried *et al.*, which consists of unintentional weight loss, exhaustion, low physical activity, slow gait, and reduced strength; individuals exhibiting one or two of these components are considered "pre-frail," while those with three or more are classified as "frail"^{1,2}.

The prevalence of frailty varies depending on the assessment tool, the chosen cutoff point, and the care setting. A classic meta-analysis of nursing home residents estimated a pooled prevalence of 52.3% for frailty and 40.2% for pre-frailty, suggesting that only a small fraction of residents fell outside the spectrum of this syndrome. A 2024 systematic review and meta-analysis confirmed that frailty is more prevalent in nursing homes than in the community, and that it is associated with a reduced capacity to perform activities of daily living, physical inactivity, chronic diseases, depression, poor sleep quality, and a poorer self-perception of health^{3,4}.

Contemporary understanding also extends the concept of frailty beyond its purely physical dimension. Cognitive frailty – characterized by the coexistence of physical frailty and cognitive impairment – has been linked to adverse outcomes. A meta-analysis published in 2025 estimated a pooled prevalence of 22% for cognitive frailty in nursing homes, and another meta-analysis indicated that this condition increases the risk of hospitalization^{5,6}.

Despite the high level of vulnerability found in long-term care facilities for older adults (ILPIs, by their Portuguese acronym), frailty is not necessarily irreversible. Recent meta-analyses show that structured exercise interventions improve measures of frailty and physical function among residents in long-term care settings. A review of 20 clinical trials involving 1,701 residents found significant improvements in frailty, physical and cognition functions – with particularly favorable outcomes observed in sustained programs conducted at least three times per week⁷⁻⁹.

In Brazil, long-term care facilities registered under the Unified Social Assistance System (*Sistema Único de Assistência Social* - SUAS) primarily house individuals experiencing social and health-related vulnerabilities. A Brazilian study on the sociodemographic and epidemiological

conditions of residents in these facilities has made it possible to assess components of the frailty phenotype across all regions, as well as to investigate associated factors and outcomes¹⁰⁻¹².

A specific data analysis was conducted using a self-reported instrument, validated by Nunes *et al.* and based on the Fried phenotype. This analysis allows for moving beyond indirect markers to directly quantify the distribution of frailty components and categories within the studied population^{2,13}.

Contemporary understanding of frailty has shifted from a dichotomous view to a trajectory-based model. Robustness, pre-frailty, frailty, and disability represent related states – though not necessarily linear or irreversible ones. Transitions can occur in either direction and are influenced by acute events, chronic illnesses, physical activity levels, nutrition, cognition, depression, the environment, and the quality of care. This perspective is particularly relevant in ILPIs, where daily exposure to care can either provide protection or accelerate functional decline^{1,14}.

From a pathophysiological standpoint, frailty arises from multisystemic changes. Sarcopenia, chronic low-grade inflammation, neuroendocrine dysfunction, reduced energy efficiency, immune dysregulation, and a diminished capacity to maintain homeostasis interact with existing diseases and psychosocial factors. The result is a reduction in the reserve required to recover from seemingly minor stressors. In a robust individual, an infection or a brief period of bed rest may have only a transient impact; in a frail individual, the same event can trigger delirium, loss of mobility, hospitalization, and new-onset dependency^{1,15}.

In an institutional setting, this vulnerability takes on a particularly complex character. An ILPI is not merely a place where frailty is observed; it is part of the context in which the trajectory of frailty unfolds. Overly protective routines, limited spontaneous movement, restricted personal choice, a lack of structured exercise, and the tendency for staff to take over tasks that residents are still capable of performing themselves can all contribute to physical deconditioning. Conversely, environments that promote mobility, participation, adequate nutrition, cognitive stimulation, and rehabilitation can preserve functional capacity and slow progression^{4,16}.

This study aimed to analyze the prevalence, components, associated factors, and outcomes of frailty syndrome among long-term institutionalized older adults across the five Brazilian regions.

METHODS

This is a cross-sectional, descriptive, and analytical study with a quantitative approach, utilizing data from the national project “Study of the sociodemographic and epidemiological conditions of older adults residing in long-term care institutions registered in the SUAS Census”¹⁰.

The institutional database was derived from the 2014 SUAS Census. The sampling of residents employed a two-stage cluster design. ILPIs were selected across the five Brazilian regions, and up to 20 residents were randomly chosen from each participating institution. By the end of the fieldwork, 4,250 older adults had been assessed. For the frailty analysis, 84 participants were excluded due to incomplete data for the instrument’s components, resulting in an analytical sample of 4,166 residents: 729 in the North region, 873 in the Northeast region, 842 in the Central-West region, 904 in the South region, and 818 in the Southeast region¹⁰.

Data collection was conducted in person between 2015 and 2018 by trained teams. Interviews were answered by the residents themselves or, in cases where physical or cognitive limitations prevented a direct response, by a proxy informant. Depending on the region, between 53.0% and 65.0% of the interviews were conducted using a proxy¹⁰.

The dependent variable was measured using a self-reported screening instrument, validated for older Brazilians by Nunes *et al.* and based on the Fried phenotype. Five components were considered: (1) unintentional weight loss of more than 3kg over the previous 12 months; (2) fatigue, defined by responses indicating high frequency for at least one of two questions derived from the CES-D; (3) self-reported reduction in strength over the last 12 months; (4) reduced walking speed, including reports of walking more slowly, being bedridden, or using a wheelchair; and (5) reduced physical activity level compared to 12 months prior^{2,13}.

According to the original phenotypic classification, participants with no components were classified as non-frail; those with one or two components as pre-frail; and those with three or more as frail. For the logistic regression models in the derived study, the variable was dichotomized into “non-frail” (0 components) and “frail” (≥ 1 component), grouping pre-frailty and frailty together. This analytical choice should be considered when interpreting the prevalence of 81.3% to 85.7%, which represents the presence of at least one component rather than exclusively established phenotypic frailty².

The independent variables were sex, age group, education level, duration of institutionalization, visitation, number of comorbidities, and depressive symptoms. Depressive symptoms were assessed using the GDS-5, and multimorbidity was defined as the presence of two or more chronic diseases¹⁰.

The outcomes analyzed were functional status, falls, and hospitalization. Functional status was classified based on basic activities of daily living: walking across a room, dressing, bathing, eating, getting in/out of bed, and using the toilet. Participants were considered dependent if they required assistance or were unable to perform at least one activity. Data on falls and hospitalizations referred to the preceding 12 months¹⁰.

Descriptive analysis was performed using Stata 15. Logistic regression models were constructed in R 4.4.1 using the `glm` function from the `stats` library, considering five independent models – one for each region. The effects were expressed as Odds Ratios (OR) and 95% confidence intervals¹⁰.

The study was approved by the Research Ethics Committee of the School of Public Health at the Universidade de São Paulo, under CAAE number 44953415.6.0000.542110.

RESULTS

A total of 4,166 residents were included. There was a male predominance in four regions, whereas in the Northeast, 62.1% of the residents were women. The 80-years-or-older age group was the most frequent in the North (45.7%), Northeast (50.5%), and Southeast (40.7%), while the Central-West and South regions showed a more balanced distribution between the 70–79 and 80-years-or-older age groups (Table 1).

Between 44.0% and 55.7% of the residents had no formal education. The most common duration of institutionalization was one to four years, ranging from 39.5% to 45.7%. The majority received regular visits. Multimorbidity was present in 54.3% to 59.4% of the residents. Functional dependency ranged from 55.6% in the Central-West to 68.3% in the Northeast. Falls within the previous 12 months occurred in 21.8% to 24.3% of cases, and hospitalizations in 14.8% to 19.3% (Table 1).

Table 1. Selected characteristics of institutionalized elderly people, by region of Brazil, 2015–2018.

Characteristics (%)	North	Northeast	Central-West	South	Southeast
Male	59.5	37.9	61.9	51.9	51.8
Age ≥80 years	45.7	50.5	37.3	36.4	40.7
Did not attend school	53.8	51.5	55.7	47.3	44.0
Has visitors	64.9	79.4	77.6	75.6	72.0
Depressive symptoms	44.5	45.1	30.2	39.5	50.0
Multimorbidity	59.4	54.3	57.4	56.5	57.0
Functional dependency	62.8	68.3	55.6	65.1	61.1
Falls in the last 12 months	24.3	21.8	22.0	22.6	21.9
Hospitalizations in the last 12 months	18.3	14.8	18.3	19.3	17.2

Slower walking speed was the most frequent component across all regions, ranging from 65.5% in the Southeast to 72.2% in the Northeast. Low physical activity was the second most frequent component, ranging between 47.7% and 58.8%. Reduced strength ranged from 40.8% to 48.3%; fatigue from 34.2% to 49.7%; and unintentional weight loss from 30.4% to 38.0% (Table 2).

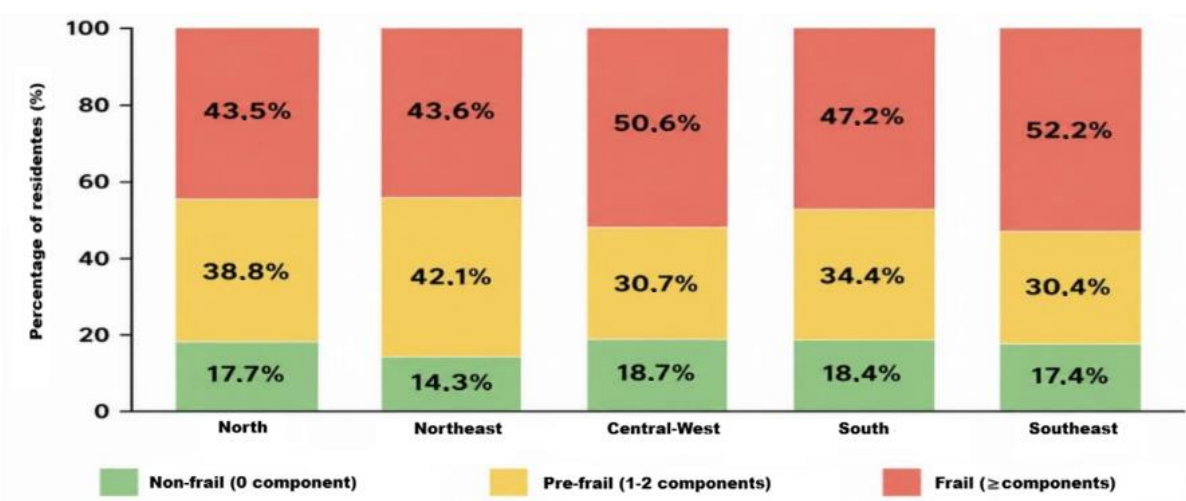
Using the dichotomization applied in the models, the presence of at least one component – referred to as “with frailty” in the derived study – ranged from 81.3% in the Central-West to 85.7% in the Northeast.

When the original phenotype classification was applied, the prevalence of established frailty – defined as the presence of three or more components – was 43.5% in the North, 43.6% in the Northeast, 50.6% in the Central-West, 47.2% in the South, and 52.2% in the Southeast. Pre-frailty ranged from 30.4% in the Southeast to 42.1% in the Northeast. Individuals with no components accounted for only 14.3% to 18.7% across the regions (Figure 1).

Table 2. Components and categories of frailty among institutionalized older adults, by region of Brazil, 2015–2018.

Components/categories(%)	North	Northeast	Central-West	South	Southeast
Weight loss	34.8	33.0	31.1	30.4	38.0
Fatigue	34.2	36.6	36.3	46.1	49.7
Loss of strength	40.8	43.5	48.3	45.7	47.7
Reduced speed	67.7	72.2	68.5	66.1	65.5
Low physical activity	47.7	50.2	55.1	54.9	58.8
Non-frail (0)	17.7	14.3	18.7	18.4	17.4
Pre-frail (1-2)	38.8	42.1	30.7	34.4	30.4
Frail (≥3)	43.5	43.6	50.6	47.2	52.2
≥1 Component	82.3	85.7	81.3	81.6	82.6

Figure 1. Frailty phenotype categories by region among institutionalized older adults. Brazil, 2015–2018.



Functional dependence was the only variable associated with the “frail” category across all regions. The magnitudes were high: North, OR=8.86 (95% CI 2.81–27.94); Northeast, OR=12.57 (4.63–34.09); Central-West, OR=4.15 (2.35–7.33); South, OR=5.81 (3.50–9.65); and Southeast, OR=3.61 (1.98–6.59) (Table 3).

In the Northeast, multimorbidity showed an OR of 4.89 (1.27–18.88), and depressive symptoms showed an OR of 2.99 (1.16–7.69). Having attended school yielded an OR of 0.33 (0.12–0.92) – a result that should be interpreted with caution, given the presence of missing data and the specific characteristics of this indicator.

In the Central-West, the following factors were associated with the “frail” category: institutionalization for five to nine years (OR=3.60; 1.29–10.06) or for ten years or more (OR=2.83; 1.05–7.64), the presence of one morbidity (OR=2.42; 1.11–5.28), multimorbidity (OR=2.28; 1.11–4.66), depressive symptoms (OR=2.47; 1.32–4.61), and hospitalization (OR=3.27; 1.32–8.07) (Table 3).

In the South, being 80 years of age or older was associated with the “frail” category (OR=2.33; 1.24–4.39). In the Southeast, hospitalization showed an OR of 3.19 (1.16–8.80). Sex, receiving visitors, and falls did not show a statistically significant association in any of the regions (Table 3).

Table 3. Statistically significant associations in regional logistic regression models for the presence of ≥ 1 frailty component. Brazil, 2015–2018.

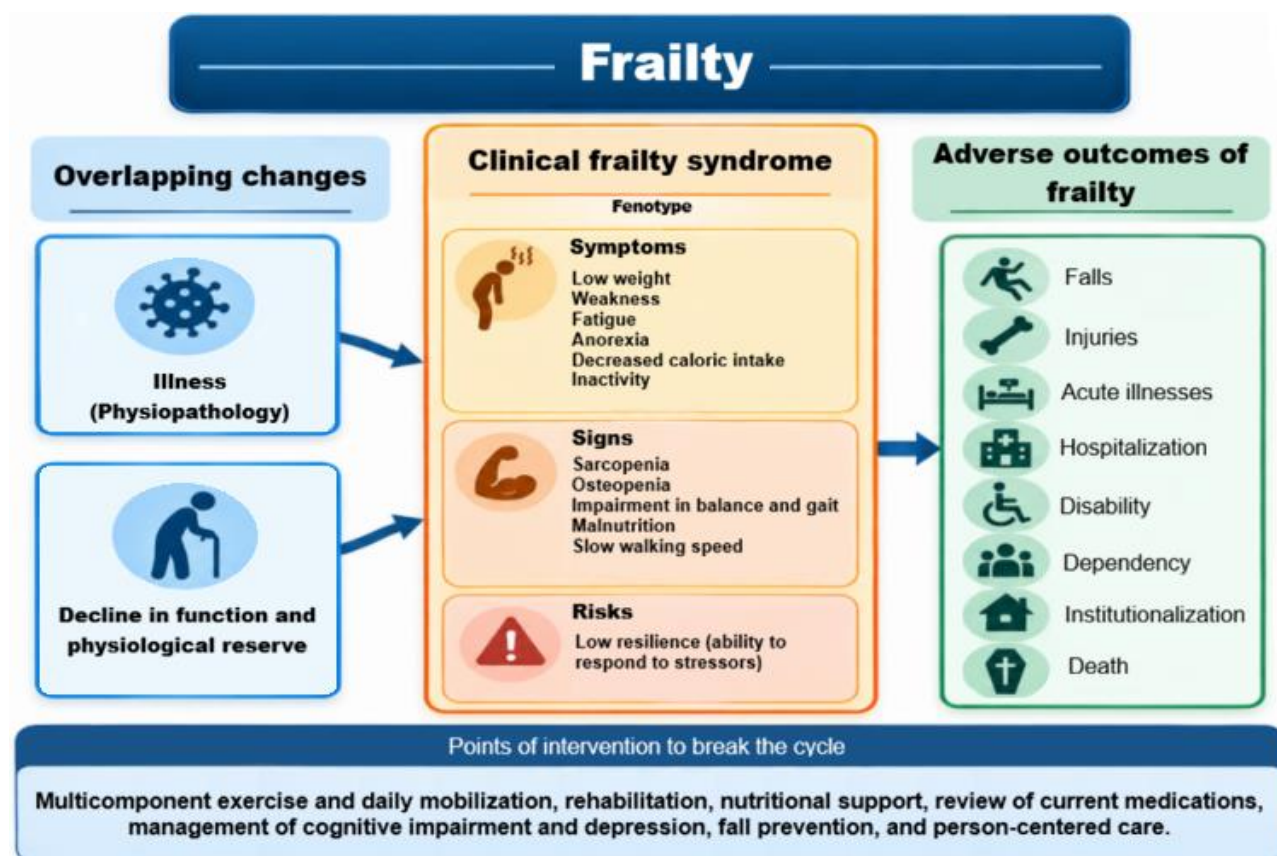
Region	Variable	OR	CI95%	p
North	Functional dependence	8.86	2.81–27.94	<0.001
Northeast	Attended school	0.33	0.12–0.92	<0.05
Northeast	Multimorbidity	4.89	1.27–18.88	<0.05
Northeast	Depressive symptoms	2.99	1.16–7.69	<0.05
Northeast	Functional dependence	12.57	4.63–34.09	<0.001
Central-West	Time 5–9 years	3.60	1.29–10.06	<0.05
Central-West	Time ≥ 10 years	2.83	1.05–7.64	<0.05
Central-West	1 morbidity	2.42	1.11–5.28	<0.01
Central-West	Multimorbidity	2.28	1.11–4.66	<0.05
Central-West	Depressive symptoms	2.47	1.32–4.61	<0.01
Central-West	Functional dependence	4.15	2.35–7.33	<0.001
Central-West	Hospitalization	3.27	1.32–8.07	<0.05
South	Age ≥ 80 years	2.33	1.24–4.39	<0.01
South	Functional dependence	5.81	3.50–9.65	<0.001
Southeast	Functional dependence	3.61	1.98–6.59	<0.001
Southeast	Hospitalization	3.19	1.16–8.80	<0.05

DISCUSSION

This study demonstrates a very high burden of frailty among institutionalized older adults across the five Brazilian regions. However, it is essential to distinguish between two findings: the 81.3% to 85.7% proportion corresponds to the presence of at least one component of the phenotype – as the logistic analysis grouped "pre-frail" and "frail" individuals together – whereas the prevalence of established frailty, defined by the original criterion of three or more components, ranged from 43.5% to 52.2%. This distinction improves comparability with international studies and avoids a conceptual overestimation of the syndrome^{3,4}.

Figure 2 presents a conceptual model of the frailty syndrome, its adverse outcomes, and potential interventions aimed at preventing the syndrome or its worsening, as well as mitigating its adverse outcomes.

Figure 2. Older adults and points of intervention for breaking the cycle of frailty.



Source: the authors.

Frailty as a dynamic and multidimensional state

The high prevalence observed must be interpreted within the context of a concept that is simultaneously clinical, functional, and prognostic. Frailty is not equivalent to the sum of one's medical conditions, nor is it the same as established functional dependence. Rather, it reflects a reduction in reserve and a loss of adaptive capacity. Consequently, two individuals of the same

age and with a similar number of diagnoses may exhibit entirely different responses when faced with the same stressor. This heterogeneity underscores the need for individualized assessment and precludes the use of chronological age as a proxy for frailty status^{1,4}.

Pathophysiological bases and relationship with sarcopenia

Sarcopenia is a central mechanism of physical frailty, though the two concepts are not synonymous. The loss of muscle mass – and, above all, muscle strength – reduces gait speed and the power required for physical transfers, thereby fostering inactivity and dependency. This process interacts with low-grade systemic inflammation, hormonal changes, anabolic resistance, insufficient protein-energy intake, and chronic diseases. Among residents of long-term care facilities, factors such as hospitalizations, periods of bed rest, infections, and reduced food intake can accelerate catabolism and lead to disproportionate losses in function. The fact that a reduction in strength is observed in 40.8% to 48.3% of individuals, and a slowing of gait in 65.5% to 72.2%, suggests that musculoskeletal mechanisms play a significant role in the observed vulnerability profile^{1,15}.

Cognitive frailty and depression

The cognitive dimension broadens the understanding of the phenomenon. The coexistence of physical frailty and cognitive impairment – often termed "cognitive frailty" – is associated with adverse outcomes and higher service utilization. A 2025 meta-analysis estimated a pooled prevalence of cognitive frailty of 22% in nursing homes, while another meta-analysis showed an approximately 79% increase in the odds of hospitalization among individuals with cognitive frailty. The association between depressive symptoms and frailty status in the Northeast and Central-West regions reinforces the need to integrate cognition and mental health into screening processes, thereby avoiding models focused exclusively on physical aspects^{5,6,17}.

The institutional environment as a modulator of the trajectory

Institutionalization can be both a consequence and a modulator of frailty. Frail individuals are more likely to require long-term care; however, once they are institutionalized, the way care is organized can alter their subsequent trajectory. A risk of an overly compensatory model is the development of "learned dependency": tasks are performed by staff for the sake of speed or safety, even when the resident could still carry them out with supervision. The repetition of this pattern reduces opportunities for mobility and the utilization of residual capacity. The restorative principle proposes the opposite: providing the minimum level of

assistance necessary, preserving choices, encouraging participation in daily activities, and establishing individualized functional goals^{4,16}.

Transitions, reversibility, and functional reserve

Frailty should be treated as a potentially modifiable state. While complete reversal may be unlikely in individuals with advanced impairment, stabilization, partial recovery, and the prevention of further deficits represent clinically relevant outcomes. Recent evidence challenges the notion of inevitability: a meta-analysis by Pradana *et al.*, published in 2026, examined 20 clinical trials involving 1,701 nursing home residents and demonstrated significant improvement in frailty, physical function, and cognition; interventions consisting of at least three sessions per week and of longer duration yielded more consistent benefits. Another meta-analysis from 2025 also found a favorable effect of exercise on frailty within long-term care settings⁷⁻⁹.

Functional dependency as a structuring axis

Functional dependence was the only factor associated with frailty across all five regions, and it showed a high magnitude of association. This finding should be understood as a feedback loop: frailty reduces strength, mobility, and exercise tolerance, thereby increasing dependence. Dependence, in turn, reduces exposure to physical activity and social participation, fostering further deconditioning. Falls, hospitalizations, depression, multimorbidity, and polypharmacy can accelerate this cycle. Therefore, the priority in care is not merely to document dependence, but to identify which aspects of function remain preserved and how to maintain them^{12,18}.

Frailty as a marker of care complexity in ILPIs

Frailty can also be used as a marker of complexity for service planning. The number of residents or the number of beds, in isolation, does not reflect the care burden. Two ILPIs, each with 50 residents, may require vastly different staffing, funding, and support from the Unified Health System (*Sistema Único de Saúde - SUS*) if one houses primarily robust individuals, while the other accommodates residents with frailty, dementia, dysphagia, dependency for transfers, and a history of multiple hospitalizations. Incorporating frailty and functionality into resource allocation and staffing models allows for a better alignment of funding and workforce with actual needs, moving away from an approach based on uniform parameters that fail to account for complexity^{1,16}.

Implications for nursing and interprofessional practice

Nursing occupies a strategic position because it identifies subtle changes before they escalate into major events – such as an increased time required to stand up, reduced appetite, a

greater need for assistance, drowsiness, refusal to engage in activities, the onset of incontinence, or a fall. While periodic screening can be coordinated by a nurse, the response must be interprofessional. Physical therapy and physical education focus on strength and mobility; nutrition addresses food intake and weight loss; medicine and pharmacy manage multimorbidity and medications; occupational therapy focuses on participation and the adaptation of activities; psychology and social work address depression, social bonds, and participation; and speech-language pathology focuses on communication and dysphagia^{14,18}.

Proposed care model

The findings support a tiered model. Upon admission, all residents should be screened for frailty, cognition, functionality, nutritional status, and fall risk. Individuals identified as pre-frail or frail should undergo a multidimensional geriatric assessment and receive a care plan with measurable goals. Interventions should prioritize multicomponent exercise, daily mobility, adequate nutrition, medication review, management of pain, sleep, and depression, fall prevention, and participation in meaningful activities. Reassessments should be conducted periodically, as well as following any hospitalization, fall, infection, or loss of functional ability, as these events may represent transitions in health status^{14,16}.

Public policy and research perspective

The National Care Policy creates an opportunity to incorporate frailty as a structural variable within the Brazilian long-term care system. A future national registry could track not only the number of available places but also the distribution of residents according to their level of frailty, dependency, and cognitive impairment. Such information would make it possible to estimate regional needs for staffing, rehabilitation, and primary healthcare support. From a scientific perspective, repeating the survey using a longitudinal design would allow for the study of transitions between states – robustness, pre-frailty, frailty, disability, and death – thereby identifying institutional factors associated with improvement or decline^{19,20}.

The observed phenotypic prevalence is consistent with a meta-analysis that estimated a 52.3% prevalence of frailty in nursing homes, as well as with subsequent evidence indicating a substantially higher prevalence in institutional settings compared to the community. A systematic review and meta-analysis published in 2024, which included 38 studies and over 150,000 participants, confirmed higher levels of frailty in nursing homes and identified associations with low functional capacity, physical inactivity, chronic diseases, and depression^{3,4}.

Slowing of gait was the most prevalent component, followed by low levels of physical activity. This pattern aligns with the institutional profile, where motor limitations, chronic

illnesses, fear of falling, sedentary routines, and environmental barriers can restrict mobility. The high frequency of these components carries significant implications, as both are potentially modifiable through exercise and rehabilitation programs^{4,7,8}.

Current evidence is more optimistic than earlier interpretations that viewed frailty as practically irreversible following institutionalization. A review and meta-analysis published in 2025 demonstrated a favorable effect of exercise on frailty levels in long-term care settings. In 2026, a meta-analysis of 20 clinical trials involving 1,701 nursing home residents found significant improvements in frailty, physical function, and cognition. Interventions conducted three or more times a week and maintained over longer periods yielded favorable results⁷⁻⁹.

This evidence supports a paradigm shift: identifying frailty in long-term care facilities should not merely serve to describe severity or prognosis but should guide intervention. Multicomponent programs should combine strength, balance, gait, and aerobic activities – adapted to functional level – and may be combined with nutritional support, medication review, and cognitive strategies⁷⁻⁹.

The strong association with functional dependence across all regions was the most consistent finding. ORs ranged from 3.61 in the Southeast to 12.57 in the Northeast. The relationship between frailty and disability is bidirectional: frailty increases the risk of functional loss, and once dependence sets in, it fosters inactivity, deconditioning, and a further reduction in physiological reserve. A 2022 systematic review on functional decline in nursing homes showed that 38.9% to 50.6% of residents experienced functional deterioration within one year; identifying cognitive impairment, baseline functional status, urinary incontinence, duration of institutionalization, age, and depression as predictive factors¹⁸.

In terms of care delivery, this result reinforces the need to abandon practices that are overly substitutive. When staff systematically perform tasks that the resident is still capable of doing with supervision or adaptation, it can accelerate disuse and the loss of autonomy. Care should prioritize the principle of doing *with* the person rather than *for* them, preserving residual capacity and participation in daily activities^{16,18}.

Multimorbidity showed an association in the Northeast and Center-West regions. Current literature recognizes chronic diseases as a relevant factor for frailty but highlights that the two conditions are not equivalent. The coexistence of diseases increases physiological and therapeutic burdens and may contribute to polypharmacy, sedation, hypotension, loss of appetite, and reduced mobility. Therefore, frailty assessment must include a systematic review of therapeutic goals and medications^{1,4}.

Depressive symptoms were also associated with frailty in the Northeast and Central-West regions. The relationship between depression and frailty may be bidirectional, mediated by factors such as physical inactivity, sleep disturbances, inflammation, poor dietary intake, social isolation, and a loss of motivation. A review by Liu *et al.* (2024) confirmed that depression is among the factors associated with frailty across various settings. In ILPIs, frailty screening should be integrated with mental health care and genuine opportunities for social participation and meaningful activity⁴.

An association with being aged ≥ 80 years was observed only in the South. Although advanced age is a recognized risk factor, the lack of such an association in other regions reinforces the fact that frailty should not be inferred based solely on chronological age. Individuals within the same age group possess vastly different physiological reserves; the clinical value of screening lies precisely in identifying this heterogeneity^{1,4}.

The duration of institutionalization was associated with the presence of frailty in the Central-West region. Given the cross-sectional design of the study, causality cannot be established: residents may have already been frail upon admission, or a prolonged stay might reflect cumulative exposure to inactivity, the progression of underlying diseases, and increasing dependency. Longitudinal studies are required to distinguish between the selection of more vulnerable individuals for admission and the effects associated with the institutional environment¹⁸.

Hospitalization was associated with frailty in the Central-West and Southeast regions. Frailty increases vulnerability to clinical decompensation and subsequent hospitalizations; conversely, hospital stays can precipitate functional decline, delirium, malnutrition, and immobility, thereby exacerbating frailty. A 2025 meta-analysis on cognitive frailty estimated an approximately 79% increase in the odds of hospitalization, underscoring the importance of preventive strategies and safe care transitions⁶.

The lack of an association between falls and frailty in the regional models warrants cautious interpretation. Individuals who are highly dependent or have severely restricted mobility may have a lower exposure to the risk of falling, simply because they walk less. Therefore, the absence of a statistical association does not imply a lack of clinical significance. Falls remain a key indicator of vulnerability and should be assessed in conjunction with mobility, balance, medications, and the environment^{1,4}.

The high proportion of interviews conducted via proxy respondents must also be taken into account. Although the use of informants is necessary in a population with cognitive and physical impairments, certain components of the phenotype – particularly fatigue and a

subjective reduction in activity – may be less accurately assessed when reported indirectly. Nevertheless, the instrument employed has been validated in Brazil and proved feasible for use in a large-scale survey^{10,13}.

Contemporary perspectives on frailty also highlight its cognitive dimension. A 2025 meta-analysis of 90 studies estimated the prevalence of cognitive frailty in nursing homes to be 22%. Another meta-analysis indicated that cognitive frailty is a predictor of hospitalization. Since the national database used in this study includes cognitive assessments, future research could explore the overlap between physical frailty and cognitive decline, potentially refining risk stratification^{5,6}.

From a public policy standpoint, these findings support the systematic inclusion of frailty within the organization of long-term care. In Brazil, the National Care Policy and the National Care Plan have established a framework conducive to assessing needs, qualifying the workforce, and integrating health and social services. The degree of frailty can help inform decisions regarding staffing levels, the intensity of primary care follow-up, access to rehabilitation, and funding^{19,20}.

It is proposed that ILPIs adopt a structured care cycle: screening upon admission and at regular intervals; multidimensional geriatric assessment for individuals identified as pre-frail or frail; the establishment of individualized goals; multicomponent exercise programs; nutritional assessment; medication review; fall prevention; the management of depressive symptoms and cognitive issues; and re-evaluation following acute health events or hospitalizations^{14,16}.

Key limitations include the cross-sectional study design, which precludes inferences regarding temporality; the absence of sampling weights, which restricts national generalizability; the frequent use of proxy respondents; and the fact that the data were collected between 2015 and 2018. Nevertheless, this remains one of the largest Brazilian analyses of frailty among residents of ILPIs, covering all five regions and enabling regional comparisons of its components, categories, and associated factors¹⁰.

The time elapsed should be viewed as a rationale for repeating the survey, rather than as a reason to disregard its contribution. The findings serve as a baseline predating the National Care Policy. A new data collection effort, employing a comparable methodology and contemporary instruments, would allow for the assessment of changes in the frailty profile and the capacity of ILPIs to prevent or delay decline^{10,19,20}.

Furthermore, recent literature in the field underscores the need to evaluate outcomes beyond the frailty scale itself. Reviews from 2025 and 2026 highlight the benefits of exercise for

gait speed, performance on functional tests, and cognition. Consequently, institutional programs should monitor not only shifts in frailty category but also mobility, function, cognition, quality of life, hospitalizations, and participation^{8,9}.

CONCLUSION

Frailty showed a high prevalence among older adults residing in the long-term care facilities (ILPIs) studied. Based on the original phenotype classification, between 43.5% and 52.2% were classified as frail, and between 30.4% and 42.1% as pre-frail; only 14.3% to 18.7% exhibited none of the components. When pre-frailty and frailty were combined for the purpose of the models, more than 81% of the residents presented with at least one component.

Slow walking speed and low physical activity were the most frequent components. Functional dependence was consistently associated with frailty across all regions, while age, educational level, duration of institutionalization, multimorbidity, depressive symptoms, and hospitalization showed associations that varied by territory.

This regional heterogeneity underscores that uniform strategies are insufficient. Periodic screening for frailty should be integrated into multidimensional assessments and individualized care plans, with a priority focus on mobility, exercise, nutrition, mental health, medication review, and the prevention of functional decline.

Frailty can be modified, even within an institutional setting. Structured exercise interventions improve frailty, physical function, and cognition among nursing home residents, rendering an exclusively compensatory or palliative approach inappropriate for all frail individuals.

It is recommended that future national surveys maintain standardized measurement of frailty components, incorporate assessments of cognitive function and intrinsic capacity, and longitudinally track transitions between robustness, pre-frailty, frailty, disability, and death. Such monitoring could inform quality benchmarks, staffing requirements, and funding models commensurate with the complexity of care provided.

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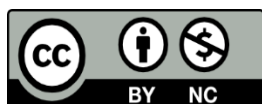
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