

## ORIGINAL ARTICLE

# Sociodemographic and clinical characteristics associated with physical mobility in hospitalized aged individuals

### HIGHLIGHTS

1. Advanced age is related to reduced mobility.
2. Reduced mobility was associated with frailty and *delirium*, which are modifiable variables.
3. Early evaluation and mobilization optimize the care provided to hospitalized aged individuals.
4. The Perme Score can identify factors associated with mobility in wards.

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### ABSTRACT

**Objective:** To analyze the relationship between sociodemographic/clinical characteristics and physical mobility decline in hospitalized aged individuals. **Method:** A cross-sectional analytical study conducted between March 2022 and July 2023 with a probability sample comprised by 547 aged individuals at wards from a public hospital in southern Brazil. A questionnaire with sociodemographic variables, morbidities, physical frailty, *delirium* (Confusion Assessment Method) and physical mobility (Perme Score) was applied. Descriptive statistics and multiple linear models were used to verify associations between the independent variables and the Perme Score, adopting 5% significance. All the analyses were performed in R 4.2.2. **Results:** Mobility decline was associated with age between 70 and 80 years old ( $p=0.007$ ) and  $>80$  years old ( $p<0.001$ ), widowhood ( $p=0.005$ ), physical frailty ( $p<0.001$ ), dementia ( $p<0.001$ ), *delirium* ( $p<0.001$ ), cancer ( $p=0.041$ ) and schizophrenia ( $p=0.045$ ). **Conclusion:** Mobility decline is related to aging and to modifiable factors, whose management during hospitalization can prevent or attenuate functional losses in aged individuals.

**DESCRIPTORS:** Population Characteristics; Frail Elderly; Inpatients; Early Ambulation; Mobility Limitation.

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## INTRODUCTION

Healthy aging is defined as the process of developing and maintaining the functional capacity that sustains well-being in old age<sup>1</sup>. Physical mobility stands out among the core components of this capacity because it enables autonomy, independence and social participation<sup>2</sup>. Mobility decline tends to increase with age, resulting from multifactorial mechanisms that involve physiological alterations inherent to aging, presence of chronic diseases and environmental factors<sup>3</sup>. It is estimated that mobility limitations affect nearly one-third of all people aged at least 70 years old and most of those over the age of 85<sup>4</sup>. In Brazil, national data indicated 15% prevalence, reaching 24% among individuals aged over 70 years old<sup>5</sup>.

Population-based studies reinforce that mobility decline results from the interaction between clinical conditions and socioeconomic determinants. The Health, Well-Being and Aging (*Saúde, Bem-Estar e Envelhecimento, SABE*) study conducted in São Paulo evidenced that aged individuals with a stroke history presented 43% higher prevalence of reduced mobility (PR: 1.43; 95%CI: 1.29–1.58), whereas those affected by osteoarticular diseases presented 35% higher prevalence (PR: 1.35; 95%CI: 1.23–1.49). Insufficient incomes also proved to be associated with a 17% increase in the prevalence of this condition (PR: 1.17; 95%CI: 1.07–1.28)<sup>6</sup>. Such findings corroborate the current literature, which showed that reduced physical mobility is a frequent complication in hospitalized aged individuals. A meta-analysis involving 7,375 older adults estimated the combined prevalence of hospitalization-associated disability at 30% (95%CI: 24%–33%;  $p < 0.001$ ), underscoring the clinical relevance of this phenomenon for the hospitalized aged population<sup>7</sup>.

Although there are population-based studies and reviews on mobility limitations in aged individuals, few surveys describe the combinations of clinical and functional factors in this segment at Brazilian public institutions, an environment where the morbidity profile, care organization and exposure to restriction and rest measures are specific. In addition to that, few national studies used encompassing instruments assessing intrinsic and extrinsic components of mobility in hospital contexts simultaneously. In this sense, applying the Perme Score (originally developed for Intensive Care but capable of recording relevant environmental barriers in wards) can expand the ability to early identify functional risk and guide mobilization strategies.

Given the above, the objective of this study is to analyze the relationship between sociodemographic/clinical characteristics and physical mobility decline in hospitalized aged individuals.

## METHOD

The current study is characterized by its cross-sectional analytical design and was prepared following the guidelines set forth in the *STrengthening the Reporting of Observational Studies in Epidemiology* (STROBE) instrument<sup>8</sup>.

It was conducted in the city of Curitiba, capital of the state of Paraná and located in the Brazilian South region. With an estimated population of 1,829,225 inhabitants, Curitiba ranks eighth among the most crowded cities in the country and presents the highest demographic density in the South region. According to data from the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística, IBGE*), nearly 322,000 of its residents are aged at least 60 years old, which represents 18% of the local population. The IBGE demographic projections indicate that this

percentage will reach 21.90% by 2030, exceeding the predicted national mean of 18.73%. These indicators evidence the ongoing population aging process in the municipality, in consonance with the trends observed both in the national and international context<sup>9</sup>.

The study was developed in clinical and surgical wards from a hospital that exclusively serves the Unified Health System (*Sistema Único de Saúde, SUS*) and is specialized in older adults' care. The hospital offers 145 beds to the SUS: 30 in the Intensive Care Center, six in Observation units and 109 in Hospitalization units. It provides medium-complexity services in the outpatient and in-hospital modalities.

The inclusion criteria were as follows: age at least 60 years old; being hospitalized for clinical or surgical treatments in the wards; and having physical mobility evaluated during the first 48 hospitalization hours. Although the scale was originally developed to be used in Intensive Care units, it was decided to apply it in the clinical and surgical wards, considering both the increased mobility decline noticed in the hospitalized aged population and the relevance of early mobilization for the functional recovery process. This methodological decision allowed systematically assessing the factors related to the mobility limitation risk in the context of clinical and surgical hospitalizations, where changes are frequent and exert direct impacts on the patients' evolution.

The exclusion criteria were the following: clinical instability precluding applying the tests; transfer indication to the Intensive Care Unit; and droplet or aerosol precautions. There were no exclusions related to the Perme Score, only to the aforementioned clinical criteria.

The sample was of the probability type, following a simple random sampling method. A sample calculation for known-size populations was used, referring to the database from the matrix study entitled "*Fragilidade física e os desfechos clínicos, funcionais, psicossociais, nutricionais e na demanda de cuidados em idosos hospitalizados*" ("Physical frailty and clinical, functional, psychosocial and nutritional outcomes and regarding the care demand for hospitalized aged individuals"). The confidence level and the sampling error were set at 95% and 5%, respectively. Thus, considering the values for each parameter, a minimum sample size of 352 individuals was obtained. In this study it was decided to expand the sample size in order to reduce the sampling error, totaling 547 subjects.

Prior to data collection and with the objective of standardizing its conduction and minimizing collection biases, theoretical and practical training sessions were implemented with the evaluators that were part of the research group, comprised by undergraduate, multiprofessional residency and graduate students from a Federal Teaching Institution. The data were obtained between March 2022 and July 2023 at the hospital wards, with a mean of 30 minutes to apply the instruments.

A cognitive screening process was performed as a first step. When a patient presented a lower score than the cutoff point expected for their schooling level (according to the Mini Mental State Examination [MMSE] validated for Brazilian Portuguese<sup>10</sup>), their companion was invited to answer the research questions. The inclusion criteria for the companions were as follows: age at least 18 years old; having provided care to the aged individuals for at least three months; and having their cognition preserved as per MMSE and according to their schooling level for those companions aged at least 60 years old. Both in the case of the aged individuals and of their caregivers aged at least 60 years old, not reaching the minimum score in the cognitive screening test (MMSE) was considered a criterion for not including older adults in the current study. In turn, the exclusion criterion was presenting communication difficulties (speech or hearing).

All the participants and companions were informed about the research objectives and procedures and signed a Free and Informed Consent Form, according to the recommendations set forth in National Health Council Resolution No. 466, dated December 12<sup>th</sup>, 2012.

Data collection consisted in applying a questionnaire adapted from the Brazilian Institute of Geography and Statistics Census (2020)<sup>11</sup>, with the following sociodemographic variables: age, gender, skin color, marital status, schooling, housing arrangement and aged person's income. In addition to that, presence or absence of the following clinical variables was evaluated: Systemic Arterial Hypertension, Diabetes *Mellitus*, Dyslipidemia, Dementia, Stroke, Chronic Kidney Disease, Heart Failure, Chronic Obstructive Pulmonary Disease, Benign Prostatic Hyperplasia, Cancer, Epilepsy, Parkinson's Disease, Atrial Fibrillation, Schizophrenia, Physical Frailty and *Delirium*.

Physical frailty was identified considering the five components of Fried's phenotype<sup>12</sup>, namely: unintentional weight loss, gait speed, hand grip strength, self-reported fatigue/exhaustion, and energy expenditure. Any person presenting at least three of these characteristics is considered frail; in turn, those with one or two of these traits are characterized as pre-frail and aged people not presenting any of these characteristics are considered not frail.

Presence of *delirium* was assessed with the Confusion Assessment Method<sup>13</sup>, validated for Brazilian Portuguese<sup>14</sup>. Four cardinal characteristics are assessed in this construct, namely: 1) Acute onset and fluctuating evolution; 2) Attention deficit; 3) Disorganized thinking; and 4) Change in the level of consciousness. The *delirium* diagnosis is made when criteria 1 and 2 are present, in addition to criteria 3 or 4. Physical mobility was evaluated with the Perme Intensive Care Unit Mobility Score (Perme Score)<sup>15</sup>.

This score provides a physical mobility total that varies from 0 to 32 points, where the higher the value, the lesser the assistance required. The scale has 15 items grouped into 7 categories with scores varying between 3 and 9 points.

The categories are divided as follows: 1) Mental state: alertness level and ability to follow orders; 2) Potential mobility barriers: using mechanical ventilation or non-invasive mechanical ventilation; presence of pain, venous accesses, catheters, tubes and drains; 3) Functional strength: ability to bend the shoulders and hips 45° and 20°, respectively; 4) Bed mobility: changing from the supine position to a seating position and balancing in such position with maximum, moderate or minimal assistance; 5) Transfers: patients' ability to move from a seating to a standing position, maintaining static balance while standing up and ability to move to other surfaces; 6) Gait: ability to walk with or without maximum, moderate or minimal assistance devices; and 7) Endurance: distance travelled in 2 minutes with or without aids<sup>15</sup>.

Although predominantly employed in Intensive Care units, the Perme Score presents significant potential to be used in different scenarios. It is an instrument that allows measuring functional mobility in a fast, objective and specific way, in addition to considering conditions that are extrinsic to the patients<sup>16</sup>, reason why it was used in the current study.

The statistical analysis was performed using descriptive statistics and presenting mean values, standard deviations, medians and maximum/minimum values, in addition to frequency tables where the number of individuals per characteristic was counted, as well as indicating proportions and 95% confidence intervals. For the bivariate analysis, the unadjusted Odds Ratios (ORs) for each variable in relation to the outcome of

interest were estimated. In the multiple logistic regression, the variables that presented a significant association in the bivariate analysis were included, as well as adjustment variables considered relevant due to the study clinical context.

The final model was comprised by all the independent variables without taking into account their statistical significance in the bivariate analysis, so as to express the adjusted chances for each event to take place for all the other variables included. This adjustment was made by means of multiple logistic models in the R 4.2.2 software. The confounding factors were controlled by simultaneously adjusting all the variables in the model, allowing controlling the confounding effects resulting from correlated variables. The association measure used was Odds Ratio (OR) (both adjusted and unadjusted), with its respective 95% confidence intervals.

This study is a subproject from the matrix study entitled "Physical frailty, clinical, functional, psychosocial and nutritional outcomes and regarding care demand in hospitalized older adults", registered in *Plataforma Brasil* and approved by the Committee of Ethics in Research with Human Beings from the Health Sciences Sector of the Federal University of Paraná (Opinion No. 7,412,928) and by its counterpart belonging to the Curitiba Municipal Health Department (Opinion No. 6,667,157). Free and Informed Consent was obtained from all aged individuals or companions before initiating the research, as per National Health Council Resolution No. 466/12. Secrecy and confidentiality of the data were respected according to resolutions No. 510/2016 and No. 580/2018 and other norms in force when the study was conducted.

## RESULTS

Table 1 shows that 68.9% (n=377) of the sample was comprised by white-skinned individuals, with a mean age of 76.2 years old (SD=9.52) and 44.1% (n=241) married people. As for schooling, 24.5% (n=134) had Incomplete Elementary School and 19% (n=104) were illiterate. The predominant monthly income was from 1.1 to 3 minimum wages, corresponding to 45.5% (n=249) of the participants; in turn, most of the subjects (74.4% [n=407]) lived with their spouse and/or children.

**Table 1.** Frequency distribution corresponding to the sociodemographic characteristics of the hospitalized aged individuals. Curitiba, PR, Brazil, 2025

(continue)

	(n*=547)	95%CI <sup>†</sup>
<b>Gender</b>		
Female	296	54.1% (49.9-58.2)
Male	251	45.9% (41.8-50.1)
<b>Age</b>		
Mean (SD <sup>‡</sup> )	76.2 (9.52)	
Median [Min, Max]	76 [60, 101]	
<b>Race/Skin color</b>		
White	377	68.9% (64.9-72.7)
Brown	136	24.9% (21.4-28.7)
Black	30	5.5% (3.9-7.7)
Others	4	0.7% (0.3-1.9)

**Table 1.** Frequency distribution corresponding to the sociodemographic characteristics of the hospitalized aged individuals. Curitiba, PR, Brazil, 2025

(conclusion)

	(n*=547)	95%CI <sup>†</sup>
<b>Marital status</b>		
Married/Stable union	241	44.1% (40-48.2)
Widowed	213	38.9% (34.9-43.1)
Divorced	63	11.5% (9.1-14.5)
Single	27	4.9% (3.4-7.1)
Others	3	0.5% (0.2-1.6)
<b>Schooling level</b>		
Higher Education	23	4.2% (2.8-6.2)
Higher Education (incomplete)	8	1.5% (0.7-2.9)
High School	43	7.9% (5.9-10.4)
High School (incomplete)	0	0% (0-0.7)
5th-8th grade	34	6.2% (4.5-8.6)
5th-8th grade (incomplete)	57	10.4% (8.1-13.3)
1st-4th grade	89	16.3% (13.4-19.6)
1st-4th grade (incomplete)	134	24.5% (21.1-28.3)
Can read and write	40	7.3% (5.4-9.8)
Illiterate	104	19% (15.9-22.5)
Others	15	2.7% (1.7-4.5)
<b>Lives with/in</b>		
Spouse and/or children	407	74.4% (70.9-78.1)
Mother and/or father	4	0.7% (0.3-1.9)
Relatives	36	6.6% (4.8-9)
Caregiver	2	0.4% (0.1-1.3)
**ILPI	14	2.6% (1.5-4.3)
Alone	82	15.0% (12.3-18.3)
Missing	2 (0.4%)	
<b>Aged person's income (minimum wages<sup>††</sup>)</b>		
0-1	157	28.7% (25.2-32.7)
1.1-3	249	45.5% (41.6-49.9)
3.1-5	80	14.6% (12.0-17.9)
5.1-10	5	0.9% (0.4-2.1)
10	0	0% (0-0.7)
No income	25	4.6% (3.1-6.7)
Not reported	31	5.7% (4.1-7.9)

Notes: \*n – Sample size; <sup>†</sup>CI – Confidence Interval; <sup>‡</sup>SD – Standard Deviation; <sup>\*\*</sup>ILPI – *Instituições de Longa Permanência para Idosos* (Assisted Living Facilities); <sup>††</sup>Minimum wages in force in 2022 and 2023: BR\$ 1,302.00 and BR\$ 1,412.00, respectively. Source: The authors (2025).

Table 2 shows the main morbidities affecting the aged individuals: Systemic Arterial Hypertension (73.7% [n=403]); Diabetes *Mellitus* (37.3% [n=204]), Dyslipidemia (30.9% [n=169]), Dementia (21.6% [n=118] and Previous Stroke (20.8% [n=114]).

**Table 2.** Frequency distribution corresponding to the morbidities of the hospitalized aged individuals. Curitiba, PR, Brazil, 2025

Morbidities	n(%)
Systemic Arterial Hypertension	403 (73.7%)
Diabetes Mellitus	204 (37.3%)
Dyslipidemia	169 (30.9%)
Dementia	118 (21.6%)
Previous Stroke	114 (20.8%)
Hypothyroidism	98 (17.9%)
Chronic Kidney Disease	88 (16.1%)
Congestive Heart Failure	88 (16.1%)
Chronic Obstructive Pulmonary Disease	85 (15.5%)
Benign Prostatic Hyperplasia	66 (12.1%)
Cancer	45 (8.2%)
Epilepsy	22 (4.0%)
Parkinson's Disease	20 (3.7%)
Chronic Atrial Fibrillation	14 (2.6%)
Schizophrenia	4 (0.7%)

Source: The authors (2025).

Table 3 allows verifying the association between the Perme Score and the sociodemographic characteristics. Age between 70 and 80 years old yielded a mean 2.6-point reduction in the score and age 80 or more did so by 5.07 points; widowhood reduced the score by 2.84 points; and living with other people (apart from spouse, children, parents and/or siblings or from living alone) yielded a mean reduction of 4.61 points.

**Table 3.** Association between physical mobility, Perme Score and sociodemographic characteristics of the hospitalized aged individuals. Curitiba, PR, Brazil, 2025

Variables	Coef.	95%CI*	p-value†
(continue)			
<b>Gender</b>			
Female	0	Ref.	-
Male	0.15	-1.48; 1.78	0.857
<b>Skin color</b>			
White	0	Ref.	-
Non-white	1.73	0.17; 3.28	<b>0.029</b>
<b>Age group</b>			
60-70	0	Ref.	-
70-80	-2.60	-4.51; -0.70	<b>0.007</b>
80+	-5.07	-7.07; -3.07	<b>&lt;0.001</b>
<b>Schooling level</b>			
Elementary School	0	Ref.	-
High School	1.99	-0.47; 4.46	0.113
Higher Education	-2.22	-5.65; 1.20	0.203
<b>Marital status</b>			
Married/Stable union	0	Ref.	-
Widowed	-2.84	-4.83; -0.85	<b>0.005</b>
Divorced	-0.16	-2.82; 2.51	0.908
Single	-1.69	-6.11; 2.73	0.453
Others	2.61	-7.24; 12.46	0.602

**Table 3.** Association between physical mobility, Perme Score and sociodemographic characteristics of the hospitalized aged individuals. Curitiba, PR, Brazil, 2025

(conclusion)

Variables	Coef.	95%CI*	p-value <sup>†</sup>
<b>Lives with</b>			
Spouse and/or children	0	Ref.	-
Parents and/or siblings	-2.44	-8.00; 3.13	0.39
Alone	3.46	0.99; 5.86	0.061
Others	-4.61	-7.37; -1.86	<b>0.001</b>
<b>Income (Aged person)</b>			
0-1	0	Ref.	-
1.1-3	0.58	-1.17; 2.33	0.515
3.1-5	0.78	-1.69; 3.26	0.533
5.1-10	0.56	-6.98; 8.11	0.883
No income	-1.22	-6.68; 4.25	0.662
Not reported	-1.43	-4.89; 2.03	0.417
R <sup>2</sup> / Adjusted R <sup>2</sup>		0.191 / 0.159	

Notes: \*CI – Confidence Interval; †p-value – Considering a 5% significance level. R<sup>2</sup>: Coefficient of determination.

Source: The authors (2025).

Table 4 allows verifying the association between the Perme Score and the clinical characteristics. Presenting physical frailty reduced the score by 10.3 points; *delirium* diagnoses did so by 3.99 points; being a non-responsive patient reduced the score by 10.1 points and dementia reduced it by 4.63 points, as well as having being diagnosed with cancer (2.36) or schizophrenia (7.23).

**Table 4.** Association between physical mobility, Perme Score and morbidities of the hospitalized aged individuals. Curitiba, PR, Brazil, 2025

(continue)

Variables	Coef.	95%CI*	p-value <sup>†</sup>
Intercept	27.72	25.46; 29.98	<b>&lt;0.001</b>
<b>Frailty</b>			
Not frail	0	Ref.	-
Pre-frail	-1.37	-3.18; 0.43	0.135
Frail	-10.3	-12.40; -8.21	<b>&lt;0.001</b>
<b>Delirium</b>			
No	0	Ref.	-
Non-responsive	-10.1	-16.50; -3.70	<b>0.002</b>
Yes	-3.99	-5.75; -2.24	<b>&lt;0.001</b>
<b>Diabetes Mellitus</b>			
No	0	Ref.	-
Yes	0.1	-1.28; 1.47	0.892
<b>Dementia</b>			
No	0	Ref.	-
Yes	-4.63	-6.46; 2.81	<b>&lt;0.001</b>
<b>Systemic Arterial Hypertension</b>			
No	0	Ref.	-
Yes	1.2	-0.34; 2.73	0.126
<b>Chronic Obstructive Pulmonary Disease</b>			
No	0	Ref.	-
Yes	0.19	-1.63; 2.01	0.838

**Table 4.** Association between physical mobility, Perme Score and morbidities of the hospitalized aged individuals. Curitiba, PR, Brazil, 2025

Variables	Coef.	95%CI*	p-value <sup>†</sup>
(conclusion)			
<b>Epilepsy</b>			
No	0	Ref.	-
Yes	-3.06	-6.27; 0.15	0.062
<b>Congestive Heart Failure</b>			
No	0	Ref.	-
Yes	0.62	-1.20; 2.43	0.505
<b>Previous Stroke</b>			
No	0	Ref.	-
Yes	-1.54	-3.11; 0.04	<b>0.056</b>
<b>Cancer</b>			
No	0	Ref.	-
Yes	-2.36	-4.61; -0.10	<b>0.041</b>
<b>Schizophrenia</b>			
No	0	Ref.	-
Yes	-7.23	-14.29; -0.17	<b>0.045</b>
<b>Chronic Atrial Fibrillation</b>			
No	0	Ref.	-
Yes	-1.57	-5.58; 2.44	0.442
<b>Parkinson's Disease</b>			
No	0	Ref.	-
Yes	-2.61	-5.85; 0.63	0.114
<b>Chronic Kidney Disease</b>			
No	0	Ref.	-
Yes	0.55	-1.43; 2.54	0.585
R <sup>2</sup> / Adjusted R <sup>2</sup>	0.456/0.415		

Notes: \*CI – Confidence Interval; †p-value – Considering a 5% significance level. R<sup>2</sup>: Coefficient of determination.

Source: The authors (2025).

## DISCUSSION

Physical mobility decline in hospitalized aged individuals was associated with age between 70 and 80 years old and over 80, widowhood, physical frailty, dementia, *delirium*, cancer and schizophrenia. These findings are partially convergent with diverse national and international evidence that signals such conditions as determinants for functional impairment during hospitalization periods.

The sociodemographic profile found (with predominance of women, long-lived aged individuals and a higher proportion of white-skinned people) was compatible with the population data from the IBGE (2022) for the municipality of Curitiba (*locus* of the current study), which point to predominance of women (52.8%), white-skinned people (74.4%) and mean incomes of up to 3.7 minimum wages<sup>17</sup>.

The association between advanced age and lesser mobility reinforced trends recorded in population-based research studies such as PNS (2019)<sup>18</sup>, which indicated that functional limitations in activities of daily living are directly related to older age (5.3% from 60 to 64 years old and 18.5% at 75 years old or more). A number of

Brazilian studies conducted in wards also corroborate this functional reduction among hospitalized aged individuals, especially in longer-lived ones<sup>19</sup>.

However, two sociodemographic variables presented divergent results from those found in the literature: “non-white skin color” and “living alone”, both associated with higher Perme scores. The literature indicates deeper functional limitations among black-skinned aged individuals in the community<sup>18</sup>; however, the discrepancy can reflect differences between community and hospital profiles or specific characteristics of the municipal care network. In turn and traditionally associated with higher social vulnerability levels<sup>20</sup>, living alone proved to be a potential indicator of preserved functionality, in line with studies which suggest that independent aged individuals tend to continue living alone out of preference or autonomy<sup>21</sup>. Such findings reinforce the need to re-evaluate assumptions about social support and functionality in hospital contexts.

Assessed with Fried’s phenotype<sup>12</sup>, physical frailty proved to be strongly associated with reduced mobility. The literature signals frailty as one of the main predictors of disability and functional loss in aged people<sup>19</sup>. The association observed in this study expands knowledge by providing novel evidence for people hospitalized in ward units, a gap still found in the national literature.

Hospitalizations are a risk factor that triggers or potentiates cognitive decline, both during the hospitalization period and after discharge, contributing to functional loss<sup>19</sup>. In this sense, the intrinsic causes of mobility decline in dementia are multifactorial and include neurodegenerative alterations, cerebrovascular diseases and age-related musculoskeletal and/or sensory decline. Cognitive alterations and neuropsychiatric symptoms affect the ability to deal with the environment, which can affect mobility<sup>22</sup>.

Dementia diagnoses were also related to lesser mobility, a similar finding to those detected in studies that show the negative impact exerted by cognitive loss, neuropsychiatric symptoms and neurodegenerative alterations on functionality<sup>22</sup>. In turn, hospitalizations tend to potentiate cognitive and functional decline, as described in international studies<sup>19</sup>.

*Delirium* presented an important reduction in mobility, a fact that is compatible with research studies which identified worse motor performance during *delirium* episodes and improvements after their resolution<sup>23-24</sup>. Patients with *delirium* obtained worse results in physical performance tests (Tinetti Scale and Trunk Control Test) and the values improved when *delirium* was resolved<sup>23</sup>. Patients with *delirium* when admitted to the wards presented reduced motor functions in the Hierarchical Assessment of Balance and Mobility test<sup>24</sup>. These results reinforced the importance of including mobility assessments as a sensitive element to screen and manage this condition.

As for cancer, an association with lower physical mobility levels was observed; however, the confidence interval (95%CI: -4.61; -0.10) points to the need to be cautious in the interpretation. Cohort studies such as the Health, Aging and Body Composition Study<sup>25</sup> had already shown higher disability risks among aged people with cancer, especially in the initial treatment phase or during clinical decompensation instances.

Schizophrenia diagnoses presented a significant reduction in physical mobility; however, caution should be exercised when interpreting this result due to the wide confidence interval (95%CI: -14.29; -0.17). These findings converge with diverse evidence that signals early aging, worse motor performance and higher cardiometabolic risk as factors that impair functionality in this population group<sup>6</sup>.

The findings detected in this study provided relevant evidence for the clinical practice by identifying modifiable conditions that directly interfered in physical mobility among hospitalized aged individuals. Using the Perme Score in ward units proved to be a feasible and potentially effective strategy to support early mobilization institutional protocols, devise individualized therapeutic plans, improve functional risk screening at admission and allow ongoing monitoring of motor recovery processes. In addition, applying it can aid preventive interventions targeted at frequent and potentially reversible conditions, such as *delirium* and frailty.

From the hospital management point of view, the results reinforced the need to invest in physical structures, as well as in work processes that favor early mobilization, in addition to expanding the training of multiprofessional teams in terms of geriatric evaluation and of managing geriatric symptoms. Devising care flows targeted at preserving functionality emerges as the fundamental axis to qualify the assistance provided and reduce the adverse effects caused by hospitalizations.

In the Public Policy field, the findings sustain the urgent need to strengthen Primary Health Care (PHC) as a structuring axis in preventing functional decline, articulating intersectoral actions and integrating formal and informal support networks. It is also reinforced that PHC consolidation is still one of the greatest challenges to ensure integrality of the care provided to the aged population, especially in contexts marked by deeper clinical and social vulnerability.

The cross-sectional design stands out as a limitation of this study, as it precludes establishing cause-effect relationships. Another limitation lies in the scarcity of research studies evaluating physical mobility in aged individuals at wards using the Perme Score, which restricts direct comparisons with other scenarios. As a strength, the study gathered representative data from a high-complexity aged population, contributing diverse evidence that can be applied to the SUS care reality and is relevant to improve care, safety and functional recovery during hospitalization periods.

## CONCLUSION

Physical mobility decline was associated with characteristics inherent to aging; however, a number of modifiable variables that can be the target of interventions during hospitalization stood out, especially physical frailty, *delirium* and decompensation instances related to clinical conditions such as cancer and schizophrenia. Early identifying and managing these factors may mitigate functional loss, reinforcing the importance of multidimensional care strategies to prevent mobility decline in hospitalized aged individuals.

The findings contribute to the clinical practice because they reinforce the need for multiprofessional teams to adopt strategies for early mobilization, *delirium* prevention and ongoing functional monitoring. They also support improvements in institutional protocols targeted at the care provided to hospitalized aged individuals and instruct managers in how to implement actions aligned with the public policies devised for older adults' care.

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## REFERENCES

1. OMS - Organização Mundial da Saúde. CIF: Classificação internacional de funcionalidade, incapacidade e saúde. São Paulo: Editora da Universidade de São Paulo; 2022. 336 p.
2. Beauchamp MK, Hao Q, Kuspinar A, Thiyagarajan JA, Mikton C, Diaz T, et al. A unified framework for the measurement of mobility in older persons. *Age Ageing* [Internet]. 2023 [cited 2024 Jun 6];52(Suppl 4):iv82-iv85. Available from: <https://doi.org/10.1093/ageing/afad125>
3. Rantakokko M, Mänty M, Rantanen T. Mobility decline in old age. *Exerc Sport Sci Rev* [Internet]. 2013 [cited 2025 Jul 4];41(1):19-25. Available from: <https://doi.org/10.1097/JES.0b013e3182556f1e>
4. Musich S, Wang SS, Ruiz J, Hawkins K, Wicker E. The impact of mobility limitations on health outcomes among older adults. *Geriatr Nurs* [Internet]. 2018 [cited 2024 Aug 4];39(2):162-169. Available from: <https://doi.org/10.1016/j.gerinurse.2017.08.002>
5. de Andrade FB, Duarte YAO, de Souza Junior PRB, Torres JL, Lima-Costa MF, Andrade FCD. Inequalities in basic activities of daily living among older adults. *Rev Saude Publica* [Internet]. 2019 [cited 2025 Jan 4];52(Suppl 2):14s. Available from: <https://doi.org/10.11606/S1518-8787.2018052000617>
6. do Nascimento CF, Duarte YAO, Chiavegatto Filho ADP. Fatores associados à limitação da mobilidade funcional em idosos do Município de São Paulo, Brasil: análise comparativa ao longo de 15 anos. *Cad Saude Publica* [Internet]. 2022 [cited 2025 Feb 14];38(4):e00196821. Available from: <https://doi.org/10.1590/0102-311X00196821>
7. Loyd C, Markland AD, Zhang Y, Fowler M, Harper S, Wright NC, et al. Prevalence of hospital-associated disability in older adults: a meta-analysis. *J Am Med Dir Assoc* [Internet]. 2020 [cited 2025 Jun 8];21(4):e5. Available from: <https://doi.org/10.1016/j.jamda.2019.09.015>
8. Cuschieri S. The STROBE guidelines. *Saudi J Anaesth* [Internet]. 2019 [cited 2023 Jul 4];13(Suppl 1):S31-S34. Available from: [https://doi.org/10.4103/sja.SJA\\_543\\_18](https://doi.org/10.4103/sja.SJA_543_18)
9. Instituto Brasileiro de Geografia e Estatística (IBGE). Curitiba (PR) | Cidades e Estados [Internet]. Rio de Janeiro: IBGE; 2023 [cited 2025 Nov 15]. Available from: <https://www.ibge.gov.br/cidades-e-estados/pr/curitiba.html>
10. Bertolucci PH, Brucki SM, Campacci SR, Juliano Y. The Mini-Mental State Examination in a general population: impact of educational status. *Arq Neuropsiquiatr* [Internet]. 1994 Mar [cited 2025 Apr 4];52(1):1-7. Available from: <https://pubmed.ncbi.nlm.nih.gov/8002795/>
11. Instituto Brasileiro de Geografia e Estatística (IBGE). Censo Demográfico 2020: Questionário Básico [Internet]. Rio de Janeiro: IBGE; [2019] [cited 2025 Nov 16]. Available from: [https://agenciadenoticias.ibge.gov.br/media/com\\_media/ibge/arquivos/ba7ebcb8ad1eb3d4d1e103c9033d5404.pdf](https://agenciadenoticias.ibge.gov.br/media/com_media/ibge/arquivos/ba7ebcb8ad1eb3d4d1e103c9033d5404.pdf)
12. Fried LP, Tangen CM, Walston J, Newman AB, Hirsch C, Gottdiener J, et al. Frailty in older adults: evidence for a phenotype. *J Gerontol A Biol Sci Med Sci* [Internet]. 2021;56(3):M146-56 [cited 2024 Apr 4]. Available from: <https://doi.org/10.1093/gerona/56.3.m146>
13. Inouye SK, van Dyck CH, Alessi CA, Balkin S, Siegel AP, Horwitz RI. Clarifying confusion: the confusion assessment method: a new method for detection of delirium. *Ann Intern Med* [Internet]. 1990 [cited 2025 Jul 4];113(12):941-8. Available from: <https://doi.org/10.7326/0003-4819-113-12-941>
14. Fabbri RMA, Moreira MA, Garrido R, Almeida OP. Validity and reliability of the portuguese version of

- the confusion assessment method (CAM) for the detection of delirium in the elderly. *Arq Neuropsiquiatr* [Internet]. 2001 [cited 2025 Jun 8];59(2A):175-9. Available from: <https://doi.org/10.1590/S0004-282X2001000200004>
15. Nawa RK, Lettvin C, Winkelman C, Evora PRB, Perme C. Initial interrater reliability for a novel measure of patient mobility in a cardiovascular intensive care unit. *J Crit Care* [Internet]. 2014 [cited 2024 Aug 15];29(3):475.e1-5.e5. Available from: <https://doi.org/10.1016/j.jcrc.2014.01.019>
16. Lenard MH, Cechinel C, Zomer TB, Rodrigues JAM, Binotto MA, Spoladore R. Evidence of the use of the perme intensive care unit mobility score in hospitalized adults: a scoping review. *Rev Latino-Am Enferm* [Internet]. 2025 [cited 2024 Aug 15];33:e4542. Available from: <https://doi.org/10.1590/1518-8345.7491.4542>
17. Instituto Brasileiro de Geografia e Estatística (IBGE). Censo Demográfico 2022 [Internet]. Rio de Janeiro: IBGE; 2024 [cited 2025 Nov 16]. Available from: <https://www.ibge.gov.br/estatisticas/sociais/populacao/9170-censo-demografico.html>
18. Instituto Brasileiro de Geografia e Estatística (IBGE). IBGE, Diretoria de Pesquisas, Coordenação de Trabalho e Rendimento. Pesquisa Nacional de Saúde 2019: percepção do estado de saúde, estilos de vida, doenças crônicas e saúde bucal no Brasil [Internet]. Rio de Janeiro: IBGE; 2020 [cited 2024 Apr 26];4. Available from: [https://agenciadenoticias.ibge.gov.br/media/com\\_mediaibge/arquivos/005355051927a647d3b01a5c8f735494.pdf](https://agenciadenoticias.ibge.gov.br/media/com_mediaibge/arquivos/005355051927a647d3b01a5c8f735494.pdf)
19. dos Santos BP, de Amorim JSC, Poltronieri BC, Hamdan AC. Association between functional disability and cognitive deficit in hospitalized elderly patients. *Cad Bras Ter Ocup* [Internet]. 2021 [cited 2024 Jan 24];29:e2101. Available from: <https://doi.org/10.1590/2526-8910.ctoAO2101>
20. Barrenetxea J, Yang Y, Markides KS, Pan A, Koh WP, Feng Q. Social support and health among older adults - The Singapore Chinese Health Study. *Ageing Soc* [Internet]. 2022 [cited 2025 Jun 14];42(8):1921-37. Available from: <https://doi.org/10.1017/S0144686X20001944>
21. Sakurai R, Kawai H, Suzuki H, Kim H, Watanabe Y, Hirano H, et al. Poor social network, not living alone, is associated with incidence of adverse health outcomes in older adults. *J Am Med Dir Assoc* [Internet]. 2019 [cited 2024 Feb 4];20(11):1438-43. Available from: <https://doi.org/10.1016/j.jamda.2019.02.021>
22. Kallin K, Gustafson Y, Sandman P, Karlsson S. Factors associated with falls among older, cognitively impaired people in geriatric care settings: a population-based study. *Am J Geriatr Psychiatry* [Internet]. 2005 [cited 2025 Jul 4];13(6):501-9. Available from: <https://doi.org/10.1176/appi.ajgp.13.6.501>
23. Bellelli G, Speciale S, Morghen S, Torpilliesi T, Turco R, Trabucchi M. Are fluctuations in motor performance a diagnostic sign of delirium? *J Am Med Dir Assoc* [Internet]. 2011 [cited 2025 Jul 1];12(8):578-83. Available from: <https://doi.org/10.1016/j.jamda.2010.04.010>
24. Gual N, Richardson SJ, Davis DHJ, Bellelli G, Hasemann W, Meagher D, et al. Impairments in balance and mobility identify delirium in patients with comorbid dementia. *Int Psychogeriatr* [Internet]. 2019 [cited 2024 Jul 9];31(5):749-53. Available from: <https://doi.org/10.1017/S1041610218001345>
25. Williams GR, Chen Y, Kenzik KM, McDonald A, Shachar S, Klepin HD, et al. Assessment of sarcopenia measures, survival, and disability in older adults before and after diagnosis with cancer. *JAMA Netw Open* [Internet]. 2020 [cited 2023 Sep 9];3(5):e204783. Available from: <https://doi.org/10.1001/jamanetworkopen.2020.4783>
26. Strassnig M, Signorile J, Gonzalez C, Harvey PD. Physical performance and disability in schizophrenia. *Schizophr Res Cogn* [Internet]. 2014 [cited 2025 Jul 4];1(2):112-1. Available from: <https://doi.org/10.1016/j.scog.2014.06.002>

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The authors have no conflicts of interest to declare.

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