








## Demographic and health characteristics associated with hospitalized elderly's mobility

*Características demográficas e de saúde associadas à mobilidade de idosos hospitalizados*

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## ABSTRACT

**Objective:** To evaluate the demographic and health characteristics associated to the mobility of hospitalized elderly. **Method:** Observational, cross-sectional research conducted with 335 elderly people admitted to a teaching hospital. Data collection was performed through a questionnaire and physical examination. Mobility was considered as a dependent variable and demographic and health characteristics were independent. The data were analyzed using the chi-square test. **Results:** It was found that 63% of the elderly were restricted to bed. Mobility was associated to age ( $p<0.05$ ), education ( $p<0.05$ ), presence of chronic disease ( $p<0.05$ ), multimorbidity ( $p<0.05$ ), hospitalization sector ( $p<0.05$ ), length of stay ( $p<0.05$ ), device use ( $p<0.05$ ) and number of devices ( $p<0.05$ ). **Conclusion:** There was a high prevalence of bed-restricted mobility among hospitalized elderly people. The early recognition of factors associated to mobility favors directive preventive actions.

**Keywords:** Hospitalization, Mobility Limitation, Risk Factors, Demographic Indicators, Aged

## RESUMO

**Objetivo:** Avaliar as características demográficas e de saúde associadas à mobilidade de idosos internados. **Método:** Pesquisa observacional, transversal, desenvolvida com 335 idosos internados em um hospital de ensino. A coleta foi realizada por meio de questionário e exame físico. Considerou-se como variável dependente a mobilidade e independente as características demográficas e de saúde. Os dados foram analisados pelo teste qui-quadrado. **Resultados:** Verificou-se que 63% dos idosos apresentaram-se restritos ao leito. A mobilidade mostrou-se associada à faixa etária ( $p<0,05$ ), escolaridade ( $p<0,05$ ), presença de doença crônica ( $p<0,05$ ), multimorbidade ( $p<0,05$ ), setor de internamento ( $p<0,05$ ), tempo de internação ( $p<0,05$ ), uso de dispositivo ( $p<0,05$ ) e quantidade de dispositivos ( $p<0,05$ ). **Conclusão:** Constatou-se alta prevalência de mobilidade restrita ao leito junto a idosos hospitalizados. O reconhecimento precoce dos fatores associados a mobilidade favorece ações preventivas diretas.

**Palavras-chaves:** Hospitalização, Limitação da Mobilidade, Fatores de Risco, Indicadores Demográficos, Idoso

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## INTRODUCTION

The health of the elderly is associated with the ability to conduct their own life or take care of themselves, that is, handle their functionality, autonomy and independence, regardless of the presence of diseases.<sup>1</sup> Among the factors that affect active aging, the leading issues are the major geriatric syndromes due to the loss of functional domains such as immobility, postural instability, cognitive disability, sphincter incontinence, and communicative incapacity, iatrogenic disorders, and family insufficiency.<sup>2</sup>

In the elderly, mobility impairment is often progressive and of variable severity.<sup>3,4</sup> At its maximum severity, it is known as Immobilization Syndrome (IS) or complete immobility. This disability is manifested as the degradation of all joint movements, being caused by multiple factors, especially from neurological and musculoskeletal origins, usually causing hospitalization or prolonged bed rest.<sup>4,5</sup> In SI, the elderly are totally dependent and usually show an advanced cognitive deficit, rigidity, generalized and multiple contractures, aphasia, dysphagia, fecal and urinary incontinence, and skin injuries.<sup>6</sup>

During hospitalization, immobility can be partial or permanent.<sup>7</sup> When immobility is permanent, it is associated with prolonged hospitalization, older age, usually above 85 years, and disease severity.<sup>8</sup> Factors such as metabolic alterations, depression, vestibular, neurological, or cardiovascular diseases, falls, sedentary lifestyle, polypharmacy, and polymorbidity contribute to this condition.<sup>5,6</sup>

It is estimated that 30 to 60% of the elderly develop some degree of immobility after hospitalization.<sup>9</sup> IS is considered a public health problem, given its repercussions on the quality of life and significant contribution to the increase in morbidity and mortality,<sup>7</sup> influencing the demand for highly complex health services and the economic and social burden to their families.<sup>8</sup>

In this context, the decline in mobility in the elderly is a significant predictor of health among the elderly, being a sign of functional limitation, showing the demand for health care proper management to prevent or address adverse events.<sup>10</sup>

Understanding its underlying characteristics, the development and the worsening of mobility, including the epidemiological, demographic, and clinical profile of patients, is paramount for preventive and rehabilitative measures.

## OBJECTIVE

The objective of this study is to evaluate and demonstrate the health status and the demographic characteristics associated with the mobility of hospitalized elderlies.

## METHODS

An Independent Ethics Committee approved this research (approval no. 2.012.327 and registration "CAAE" no. 66782217.9.0000.5689) under the Brazilian resolution 466/12 for clinical trials and the Declaration of Helsinki.

This research is a cross-sectional study conducted under the STROBE guidelines, developed in the inpatient sectors of medical, surgical, infectious diseases, and neurology clinics and in the Intensive Care Unit (ICU) of a teaching hospital in Campos Gerais, Ponta Grossa/PR, Brazil, from September 2017 to

January 2018.

The sample included 335 elderlies from a non-probabilistic, consecutive, convenience sample, in which the researchers select the most accessible members of the population according to their availability. Participants above 59 years, regardless of sex, admitted for hospitalization during the data collection period were included in this research.

The data was collected by a team of trained residents and nursing students at the patient's bedside. This team collected the data by applying a dedicated questionnaire explicitly developed for the study. Sociodemographic and clinical conditions were evaluated with the variables of gender, age group, marital status, schooling (illiterate; low, from one to four years of incomplete study; average, from four to eight years of incomplete studies; high, eight years of schooling or more), ethnics, smoking habits, alcohol consumption, presence of chronic diseases, presence of multimorbidity, body mass index (BMI) (Eutrophic, BMI between 22 and 27; Low weight, BMI<22; Obesity, BMI>27, according to the classification for the elderly, hospitalization sector and length of stay, medication use and quantity of medical devices, and mobility.

Mobility was assessed during the hospitalization period by observation and questions during the anamnesis and physical examination. Mobility was categorized as bed restricted, individual without mobility, dependent, and individual with mobility considering the independent individuals regardless of the assistive technologies or assistance.

The data were compiled in Microsoft Excel 2013® spreadsheets and analyzed with IBM SPSS Statistics 20. Mobility was considered a dependent variable and the independent variables were sociodemographic characteristics, health status, lifestyle, and use of hospital services. The association between the surveyed items was investigated with the nonparametric Fisher's Exact and Chi-Square tests. A p-value ≤0.05 was considered a presumption of the hypothesis that there was an association between the studied variables.

## RESULTS

This study included 355 hospitalized elderly. There was greater prevalence of male patients (54.0%), from 60 to 70 years of age (61.4%), of white ethnics (79.4%), married (47.7%), of low schooling (43.5%), non-alcoholic (84.4%), non-smoking (72.5%), and eutrophic (45.6%). More than 50% of the participants had bed-restricted mobility (Table 1).

Mobility was correlated with age group ( $p<0.001$ ), schooling ( $p<0.001$ ), presence of chronic disease ( $p=0.04$ ), multimorbidity ( $p<0.001$ ), hospitalization sector ( $p<0.001$ ), length of hospital stay ( $p<0.001$ ), use of assistive device ( $p<0.001$ ), and quantity of assistive devices ( $p<0.001$ ) (Tables 1 and 2).

## DISCUSSION

In the present study, there was a high prevalence of bed-restricted mobility among hospitalized elderlies, agreeing with other similar studies. A cross-sectional and analytical observational study with the participation of 94 elderly subjects hospitalized at a medical clinic in Belém do Pará, Brazil, reported that 52.13% of the participants had mobility limitations.<sup>11</sup>

**Table 1.** Lifestyle and Sociodemographic characteristics of elderlies hospitalized at a teaching hospital, according to mobility

Variables	Mobility		Total n (%)	p value
	With mobility n (%)	Bed-restricted (%)		
Mobility	124 (37.0)	211 (63.0)	335 (100.0)	
<b>Sex</b>				
Female	60 (39.0)	94 (61.0)	154 (46.0)	0.28
Male	64 (35.4)	117 (64.6)	181 (54.0)	
<b>Age-group</b>				
60 – 70	94 (45.6)	112 (54.3)	206 (61.4)	<0,001
≥ 71 –79	21 (21.6)	76 (78.3)	97 (28.9)	
≥ 80 or more	9 (28.1)	23 (71.8)	32 (9.5)	
<b>Ethnics</b>				
White	97 (36.4)	169 (63.5)	266 (79.4)	0.39
Others	27 (39.1)	42 (60.8)	69 (20.5)	
<b>Marital status</b>				
Married	67 (41.8)	93 (58.1)	160 (47.7)	0.08
Widow/Widower	40 (34.7)	75 (65.2)	115 (34.3)	
Divorced	12 (38.7)	19 (61.2)	31 (9.2)	
Single	5 (17.2)	24 (82.7)	29 (8.6)	
<b>Schooling</b>				
High	16 (34.7)	30 (65.2)	46 (13.7)	<0,001
Medium	16 (17.5)	75 (82.4)	91 (27.1)	
Low	81 (55.4)	65 (44.5)	146 (43.5)	
Illiterate	11 (21.1)	41 (78.8)	52 (15.5)	
<b>Smoking</b>				
No	92 (37.8)	151 (62.1)	243 (72.5)	0.6
Yes	32 (34.7)	60 (65.2)	92 (27.4)	
<b>Alcoholic</b>				
No	102 (36.0)	181 (63.9)	283 (84.4)	0.39
Yes	22 (42.3)	30 (57.6)	52 (15.5)	
<b>Body Mass Index</b>				
Eutrophic	57 (37.2)	96 (62.7)	153 (45.6)	0.5
Low weight	26 (32.0)	55 (67.7)	81 (24.1)	
Obese	41(40.5)	60 (59.4)	101 (30.1)	

**Table 2.** Clinical characteristics and use of health services by elderlies hospitalized at a teaching hospital, according to mobility

Variables	Mobility		Total n (%)	p value
	With mobility n (%)	Bed-restricted n (%)		
<b>Chronic disease</b>				
No	24 (57.1)	18 (42.8)	42 (12.5)	0.004
Yes	100 (34.1)	193 (65.8)	293 (87.4)	
<b>Multimorbidity</b>				
No	72 (48.6)	76 (51.3)	148 (44.1)	0.000
Yes	52 (27.8)	135 (72.1)	187 (55.8)	
<b>Hospitalization sector</b>				
ICU	3 (2.2)	130 (97.7)	133 (39.7)	0.000
Clinics	121 (59.9)	81 (40.0)	202 (60.2)	
<b>Length of hospital stay</b>				
1 to 3 days	66 (43.1)	87 (56.8)	153 (45.6)	0.001
4 to 7 days	38 (41.7)	53 (58.2)	91 (27.1)	
8 to 15 days	17 (30.3)	39 (69.6)	56 (16.7)	
More than 15 days	3 (8.5)	32 (91.4)	35 (10.4)	
<b>Use of assistive devices</b>				
No	34 (72.3)	13 (27,6)	47 (14.0)	0.000
Yes	90 (31.2)	198 (68,7)	288 (85.9)	
<b>Number of assistive devices</b>				
None	34 (72.3)	13 (27.6)	47 (14.0)	0.000
Up to two devices	85 (47.2)	95 (52.7)	180 (53.7)	
3 or more devices	5 (4.6)	103 (95.3)	108 (32.2)	

In contrast, a retrospective investigation conducted at a geriatric ward of a university hospital in São Paulo, Brazil, observed that 50.7% of the patients had impaired mobility.<sup>12</sup>

This result can be since most of the participants were hospitalized in an ICU, with a prolonged period of hospitalization, using assistive devices, and because they had chronic diseases.<sup>7,8</sup> Also, this prevalence does not distinguish previously bedridden patients from those with no mobility limitations before hospitalization.

A prospective cohort study conducted at the Medical School (FMB) of São Paulo State University (Unesp), Campus Botucatu (Hospital das Clínicas, Faculdade de Medicina de Botucatu), showed that older adults had worse functionality at hospital discharge when compared to before admission. Specifically, about 28% of the elderly had worse function 30 days after discharge compared to 15 days before admission.<sup>13</sup> A prospective cohort study carried out in Denmark found that only 30% of elderly patients who underwent functional decline during hospitalization recovered their autonomy and independence handle their activities within a year after hospital discharge.<sup>14</sup>

These characteristics evidence the demand for intensified care for the elderly. Identifying the vulnerable, daily application of scales, and early mobilization during hospitalization should minimize complications of restricted mobility after discharge. The authors emphasize the importance of the elderly staying in bed for as little time as possible, avoiding the development of functional dependence at the time of hospital discharge.<sup>15</sup> In this context, the nurse, as a member of a multidisciplinary health team, works collaboratively, sharing the nursing process for preserving the functional and rehabilitative activities of the elderly.

As for the factors associated with mobility, the elderly aged 80 years or above had more significant immobility when compared to younger patients of a similar age group. Our findings agree with a cross-sectional study conducted in Bagé, Rio Grande do Sul, Brazil. The authors found a functional decline compromising 6% of biological functions, such as mobility, in patients with 60 years or more, reaching up to about 50% in the oldest old.<sup>16</sup> Furthermore, age is a risk factor for the appearance of immobility, as there are physiological changes with aging with a higher incidence of musculoskeletal problems, skin changes, and decreased muscle mass increasing vulnerability and propensity to immobility.<sup>16</sup>

Low schooling was also associated with immobility due to the restricted information access and the consequence of cumulative restriction to goods and services throughout their life. The lower the level of education, the lower the cognitive assessment performance and consequently the decrease in empowerment and self-care in health, lower search for and access to health education or health services, and other social determinants.<sup>17,18</sup> Oppositely, a higher education level facilitates access to health-related information and lifestyle changes, especially concerning health promotion and applying guidelines for a better quality of life, influencing a positive effect on functional capacity.<sup>17,18</sup> In cross-sectional research with older adults assisted by the Pelotas Unified Health System, low schooling was associated with the frailty of the elderly, an issue correlated with mobility reduction.<sup>18</sup>

The presence of chronic non-communicable diseases

(NCDs) and multimorbidity were also associated with immobility, as also found by other publications of specialized literature.<sup>4,5,19</sup> Musculoskeletal diseases, metabolic disorders, depression, vestibular diseases, and cardiovascular and nervous system diseases are health conditions that commonly cause immobility.<sup>5</sup> As well as restricted mobility, its most serious condition, the immobility syndrome (IS), is responsible for triggering or potentiating chronic diseases.<sup>4</sup>

Furthermore, the presence of NCDs and multimorbidity during hospitalization can delay the rehabilitation process or worsen the clinical condition of these patients, causing the hospital length of stay to be extended, consequently increasing the chances for immobility.<sup>19</sup>

It should be emphasized that most participants had at least one NCD, a condition that requires extra attention from health professionals, especially concerning patients with multimorbidity who demand methods and actions compatible with their weaknesses to prevent the development of dysfunctions and functional disorders caused or exacerbated by the disease itself and the hospitalization process.<sup>6</sup>

We identified that the clinic sector and length of stay were significantly associated with the risk of developing immobility,<sup>7</sup> agreeing with the findings that the elderly hospitalized in an ICU or hospitalized for a longer time were more restricted to the bed, as 91.4% of individuals who were hospitalized for more than fifteen days underwent immobility ( $p= 0.001$ ).<sup>7</sup> Individuals admitted to the ICU are more frequently under restricted mobility, justified by the more extended period of inactivity caused by acute clinical conditions such as the use of sedatives, vasoactive drugs, catheters, renal replacement therapies, hemodynamic instability, prolonged orotracheal intubation, pain, drains, among others issues that hinder mobilization.<sup>7,20</sup>

Oppositely, subjects of outpatients facilities have hemodynamic stability, fewer restrictions, a more active process of rehabilitation with more withdrawal from the bed, and less use of medical devices.<sup>8</sup>

Bed rest time is between 7 to 10 days; from 12 to 15 days, it is characterized as immobilization. It is worth mentioning that the longer the hospital stay, the greater the loss of autonomy and the possibility of harm,<sup>21</sup> affecting several systems such as pulmonary, musculoskeletal, urinary, cardiovascular, gastrointestinal, and integumentary, among others, as well as the risk of hospital infection, jeopardizing the health of the elderly.<sup>22</sup> An integrative review study showed that 25% to 35% of hospitalized elderly lost their functional independence in one or more daily activities in just three days of hospitalization.<sup>22</sup>

The importance of a multi-professional team to observe the patient's mobility and restrictive clinical conditions such as prolonged maintenance time of catheters and venous accesses, physical limitations, and lying in bed for an extended period should be highlighted. The multi-professional team should take appropriate measures for immobility prevention, such as gait exercises, constant bed repositioning, and early hospital discharge whenever possible.<sup>23</sup>

Immobility causes several systematic changes, including cardiovascular, respiratory, musculoskeletal, and digestive disorders. Reduction of respiratory tract ciliary movement, loss of bone and muscle mass, constipation, swallowing disorders, and immune deficiency are examples of immobility-

related diseases.<sup>24</sup>

In this context, the active participation of the physical therapist as a member of the multidisciplinary team contributes significantly to the health care of the elderly. Its performance positively interferes with the consequences of immobility,<sup>24</sup> such as reduced range of motion, increased muscle tension, muscle shortening, and pulmonary and circulatory complications such as edema.<sup>24</sup> In addition to the constant change in position, the importance of joint mobilizations that any professional from the multidisciplinary team can perform after a permanent health education by the physiotherapy team.<sup>24</sup>

Finally, the relevance of health education addressed to the family members and caregivers of hospitalized elderly, aiming to adopt home mobilization exercises and physical activities, may ensure and bring the elderly to their independence and autonomy.<sup>25</sup>

Some limitations of our study are due to the sample size that included different hospital settings, such as clinics and ICUs. Mobility was considered only during the hospitalization period, without collecting mobility data prior to hospitalization. However, these conditions do not minimize the importance of the study and demonstrate the need for a deeper understanding of this prevalent theme in the clinical practice of gerontological care in a hospital setting.

## CONCLUSION

There was a high prevalence of hospitalized elderly with bed-restricted mobility and important associated factors, especially advanced age, low schooling, worsened health conditions, and use of intensive and prolonged medical services.

We emphasize the complexity and challenges of hospitalized elderly, demonstrating that an interdisciplinary gerontological team is of critical importance in all hospital sectors, as it allows the inclusion of those who deliver health care (professionals, caretakers, and family members), ensuring comprehensive and specialized care without jeopardizing the patient.

Therefore, we suggest that the multi-professional team monitors the elderly regarding mobility conditions to identify individuals with potential risk for these conditions, minimize possible iatrogenic events, and deliver proactive preventive measures.

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