Factors associated with functional capacity in older adults in emergency services

Fatores associados à capacidade funcional em pessoas idosas no serviço de emergência

Factores asociados a la capacidad funcional de personas mayores en servicios de emergencia

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Conflicts of interest: nothing to declare.

Abstract

Objective: To relate sociodemographic, economic and clinical variables and having or not having a caregiver, risk for falls and perception of the risk for falls with the functional capacity of older adults in an Emergency Department.

Methods: Analytical cross-sectional study of 197 older adults conducted in the Emergency Department between September 2019 and March 2020. A questionnaire with sociodemographic, economic and clinical information was applied, as well as the instruments: Falls Risk Awareness Questionnaire, Morse Falls Scale, Katz Index and Lawton Scale. The Kruskal Wallis test was used to compare the Katz Index and the Lawton Scale, and the Spearman correlation coefficient was used to associate the Morse Falls Scale with continuous variables. The Mann-Whitney test and the Kruskal Wallis test were used to associate the Falls Risk Awareness Questionnaire with the categorical variables.

Results: Illiterate patients (p<0.0001) with lower income (p=0.0446) had a lower score on the Katz Index, that is, they presented a higher percentage of totally dependent people. Divorced older adults (p=0.0004) without a caregiver (p<0.0001) had a higher score on the Lawton Scale, that is, a greater degree of independence. The greater perception of risk for falls (p=0.0403) was associated with less independence for instrumental activities of daily living. The low risk for falls (p<0.0001) was associated with greater independence for instrumental activities of daily living. There was no association between perceived risk for falls (p=0.2693) and risk for falls (p=0.4984) with the Katz Index.

Conclusion: Lower education and income were associated with dependence for activities of daily living. Being divorced and not having a caregiver were associated with independence in instrumental activities of daily living. There was no association between the perception of risk for falls and the risk for falls with activities of daily living. The greater perception of risk for falls was associated with less independence, and the low risk for falls was associated with greater independence for instrumental activities of daily living.

Resumo

Objetivo: Relacionar variáveis sociodemográficas, econômicas, clínicas e ter ou não cuidador, risco de queda e percepção do risco de quedas com a capacidade funcional em pessoas idosas em um Serviço de Emergência.

Métodos: Estudo transversal e analítico, realizado entre setembro de 2019 e março de 2020, no Serviço de Emergência, com 197 pessoas idosas. Foi aplicado questionário com informações sociodemográficas, econômicas e clínicas; e os instrumentos: Falls Risk Awareness Questionnaire, Morse Falls Scale, Índice de Katz e Escala de Lawton. Para comparar o Índice de Katz e a Escala de Lawton; e associar a Morse Falls Scale com as variáveis contínuas foram utilizados, respectivamente, o teste de Kruskal Wallis e o coeficiente de correlação de Spearman.

Key words:

Accidental falls; Aged; Risk factors; Emergency service, hospital; Activities of daily living; Aging; Caregivers; Surveys and questionnaires

Descritores:

Acidentes por queda; Idoso; Fatores de risco; Serviço de urgencia en hospital; Actividades cotidianas; Envejecimiento; Cuidadores; Encuestas y cuestionarios

Keywords:

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How to cite:


DOI http://dx.doi.org/10.37689/acta-ape/2024A0007233
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Introduction

The age distribution of the world’s population is constantly changing. The increase in the number of older adults and the simultaneous decrease in the number of young people are global trend factors. (1) In Brazil, the Statute of the Older Adult establishes that individuals aged 60 or over must be considered “older adults”. (2) As the natural aging process is continuous and irreversible, even though increasing life expectancy brings advantages, it is also associated with a reduction in the physical and cognitive functions of the human body, which also involves the probability of disease occurrence. (1)

This increase in the number of older adults means that healthcare professionals have to deal more and more with patients who tend to suffer from numerous chronic diseases, which ends up bringing numerous challenges to them regarding the provision of safe care. (3)

According to the literature, older adults with low income, low level of education, morbidities, who live with a family member in multigenerational households and need a caregiver are at risk for social vulnerability and suffering falls, with direct consequences to their functional ability. It is not uncommon to find this profile of older adults in the Emergency Department (ED). (4) Furthermore, the ED has been the gateway to the hospital and older adults. The scope of practice in emergency medicine is expanding to include extended observational stays, more complex diagnostic tests, and increased critical care and intensive care within the ED. Meanwhile, the strain of an overcrowded service becomes more evident every day, as patients spend more and more hours in the ED receiving definitive care and diagnostic tests for conditions that were previously the domain of inpatient services. (5)

For many older adults, hospitalization results in functional decline even though the condition for which they were hospitalized has been cured.
or corrected. The older adult’s stay in the ED can result in complications not related to the problem that led to hospitalization or to their specific treatment for explainable and avoidable reasons. The aging process is often associated with functional changes, such as a decline in muscle strength and aerobic capacity; vasomotor instability; reduced bone density; decreased lung ventilation; altered sensory continence, appetite and thirst; and tendency to urinary incontinence.\(^6\) Hospitalization and bed rest overlap with factors such as forced immobilization, reduced plasma volume, accelerated bone loss, increased closure volume, and sensory deprivation. Any of these factors can lead frail older adults to a state of irreversible functional decline. Many factors that contribute to a cascade of dependence can be identified and avoided by modifying the environment in the ED and providing ambulation and socialization.\(^7\)

The functional dependence of older adults arriving at the ED has increased and is associated with a high level of use of health resources, which also increases with age. Emergency Departments must take into account the characteristics of older adult patients and the proportion of the number of cases they represent in order to organize their physical spaces and implement processes for care centered on the needs of this population,\(^7\) knowing that hospital admissions increase the risk of delirium, hospital infections and mortality, and can ultimately reduce levels of functional capacity. Therefore, health professionals who work in these services need to pay close attention and direct their actions to prevent the functional decline of older adults cared for in the ED.\(^8\)

Older adults may experience loss of functionality during hospitalization, which may be due to the disease that led to hospitalization, previous clinical conditions, the procedures they undergo and poor adaptation of the health system to the demands of an aging and fragile population. This condition is called hospitalization-associated disability (HAD) and can affect 30-60% of hospitalized older adults. In this population, HAD can negatively impact the functional capacity and quality of life and is a predictor of greater use of resources and death.\(^9\)

The functional capacity of older adults can be determined by basic activities of daily living (BADL), which include simple and basic self-care activities, such as eating, bathing, dressing, going to the bathroom and walking; by instrumental activities of daily living (IADL), which assess more complex tasks related to independence and social participation, such as managing finances, shopping, using means of transport, taking care of medications, among others; and by advanced activities of daily living (AADL), which depend on each person’s motivation and are focused on promoting social engagement, building meaningful relationships, developing personal skills and discovering new interests. The BADL, IADL and AADL are measured according to one’s level of dependence or independence to perform the activities.\(^10\)

Therefore, knowing the factors related to functional capacity is important to implement an individualized care plan, respecting the peculiarities arising from aging, according to the potentialities and difficulties of each older adult, aiming to maintain or recover functional capacity during hospitalization. In view of the above, the objective was to relate sociodemographic, economic and clinical variables, having or not having a caregiver, risk for falls and perception of the risk for falls with the functional capacity of older adults in an ED.

### Methods

Analytical cross-sectional study developed in the ED of a teaching hospital linked to the Universidade Federal de São Paulo, state of São Paulo, Southeast Region of Brazil. Data were collected from September 2019 to March 2020 and 197 older adults were included. The inclusion criterion for the study was being 65 years of age or older, as it is a recommendation of the Falls Risk Awareness Questionnaire (FRAQ-Brasil).\(^11\) Older adults who were disoriented and confused were not included, according to what was verbalized by the service nurses at the time of data collection; and neither were those with a record of dementia in their medical records. Nurses from the ED apply
the Confusion Assessment Method (CAM) daily to identify delirium, a condition that leads to acute changes in the level of consciousness and cognitive function. All individuals included in the study remained until the end.

The sample size was calculated using the stratified probabilistic sampling method, proportional to the average number of patients aged 65 and over hospitalized in the six months preceding the study. In the calculation, a confidence level ≥80% and an alpha of 5% were considered, based on characteristics of age, sex, schooling, marital status, occupation, days of hospitalization, family income and morbidity. The result indicated the need for the sample size of 197 patients. A 10-question questionnaire structured by the researchers was used. It contained information such as: age, sex, education, marital status, occupation, days of hospitalization, family income and morbidity. The presence of the caregiver was self-reported by the older adult. Having a caregiver was considered when the older adult had another person, a family member or not, who performed or helped them with BADL or IADL for at least three months, a time considered appropriate to incorporate the guidelines and practice the activity of caregiver.

The hospitalization department was asked daily for a list of patients aged 65 and over admitted to the ED of the hospital. Then, one of the researchers went to the location and consulted the medical records to check if there was a record of dementia and to read the interprofessional team’s evolution regarding the level of consciousness and mental state, making sure the older adult was able to understand and respond to questionnaires and research instruments. Then, contact was made with the patients to confirm that the inclusion criteria were met. Everyone aged 65 and over who met the inclusion criteria were approached and invited to take part in the study. In case of acceptance, they were interviewed individually. The researchers read the instruments in a single moment lasting an average of 40 minutes.

The level of perception and knowledge about falls in the older adult population were assessed using the FRAQ-Brasil instrument, which contains 25 closed questions. The score varies from 0 to 32 points; the higher the number of points, the better the perception and knowledge of the risks for falls. There is no cutoff point established as an adequate level of perception and knowledge about falls.

The risk for falls was assessed using the Morse Falls Scale, which is made up of six criteria: fall history, presence of a secondary diagnosis, impaired gait, use of an intravenous apparatus, impaired gait and impaired mental status. Each evaluated criterion receives a score ranging from 0 to 30 points, totaling a risk score classified as follows: 0-24 low risk; 25-44 medium risk; and equal to or greater than 45 high risk.

Basic activities of daily living were assessed using the Katz Index. For the present study, older adults received 1 point when they were able to carry out the activity independently (without supervision, guidance or assistance) and a score of zero when they were dependent to perform the activity (required supervision, guidance or assistance). The total scale score ranges from 0 to 6 points. The Katz Index score is obtained by adding the points in each of the activities. Interviewees were classified according to their level of dependence as follows: independent (six points), partially dependent (from three to five points) and totally dependent (zero to two points).

The Lawton Scale was used to determine the degree of dependence in relation to IADL regarding the individual’s participation in the social context. It consists of nine questions and each question has three options: the first indicates independence; the second, partial dependence and the third, total dependence. Once the degrees of independence and dependence have been defined, the analysis is performed at three levels, “without help”, “with partial help” and “unable”, assigning 3, 2 and 1 points, respectively, to calculate the score. The maximum score is 27; the higher the score, the greater the degree of independence. In this study, older adults with a score greater than 21 points were classified as independent for IADL. This same cutoff point was adopted in another study conducted in Rio Grande do Sul, Brazil.
A descriptive analysis of sociodemographic (age, sex, education and occupation), clinical (self-reported morbidities and days of hospitalization), and economic characteristics (self-reported monthly family income) was performed, as well as in relation to having a caregiver (yes or no), religion (self-reported) and a network support in the community (yes or no).

The mean, standard deviation, median, minimum and maximum were calculated for continuous variables, and frequency and percentage for categorical variables. The Mann-Whitney test and the Kruskal Wallis test were used to analyze the association between FRAQ-Brasil and categorical variables; the Kruskal Wallis test for the association of the Morse Falls Scale with continuous variables; and the chi-square test to compare the Morse Falls Scale with categorical variables. The Kruskal Wallis test was used to compare the Katz Index with continuous variables, and the chi-square test was used to compare the Katz Index with categorical variables. When necessary, the Likelihood Ratio test was used. The Spearman's correlation coefficient was used to compare the Lawton Scale with continuous variables, and the chi-square test was used to compare it with categorical variables. A significance level of 5% (p-value < 0.05) was adopted and the Statistical Package for the Social Sciences, version 19, was used in the analysis.

The study was approved by the Research Ethics Committee of the Universidade Federal de São Paulo under number CAAE 22113719.6.0000.5505 and approval opinion number 3.766.773 in accordance with resolution 466/2012 of the National Health Council.

### Results

The age of older adults ranged from 65 to 93 years, most were men (n=122; 58.90%), married (n=114; 55.10%), retired (n=155; 74.90%), had incomplete primary education (n=80; 38.80%), an average family income of 2,155.98 (SD±2,054.27) reais (the minimum wage in Brazil was 1,039.00 reais in September 2019), had a caregiver (n=133; 64.3%), reported morbidities (n=191; 97.10%), had no support network (n=137; 66.8%), systemic arterial hypertension (SAH) was the most prevalent (n=159; 76.8%) and an average hospital stay of 5.89 (SD±24.69) days. As presented in table 1, most participants are at high risk for falls and independent in IADL.

**Table 1. Scores of older adults on the Falls Risk Awareness Questionnaire, Morse Falls Scale, Lawton Scale and Katz Index**

<table>
<thead>
<tr>
<th>Scales</th>
<th>n(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRAQ - mean (standard deviation)</td>
<td>20.25(3.76)</td>
</tr>
<tr>
<td>Morse Falls Scale</td>
<td></td>
</tr>
<tr>
<td>Low risk</td>
<td>22(10.3)</td>
</tr>
<tr>
<td>Medium risk</td>
<td>65(31.0)</td>
</tr>
<tr>
<td>High risk</td>
<td>110(58.6)</td>
</tr>
<tr>
<td>Lawton Scale - mean (standard deviation)</td>
<td>22.42(4.89)</td>
</tr>
<tr>
<td>Katz Index</td>
<td></td>
</tr>
<tr>
<td>Independent</td>
<td>110(58.6)</td>
</tr>
<tr>
<td>Partially dependent</td>
<td>65(31.0)</td>
</tr>
<tr>
<td>Totally dependent</td>
<td>22(10.3)</td>
</tr>
</tbody>
</table>

* Results expressed as mean (standard deviation) or quantitative (percentage)

Table 2 shows that illiterate participants had a higher percentage of totally dependent people and a lower percentage of independent people; those with complete primary education had a higher percentage of independents and a lower percentage of completely dependents. Participants classified as independent had higher income than those classified as totally dependent. Older adults with a support network had a higher percentage of independent people and a lower percentage of completely dependent people. Those with walking deficits and those using analgesics had a higher percentage of partially dependent and a lower percentage of independent.

Those surveyed who were divorced and without a caregiver had higher scores on the Lawton Scale than other patients. Those with hypertension, neoplasia and walking deficit had lower scores on the Lawton Scale; and those who use antihypertensives had a lower score compared to those who do not (Table 3).

In this study, there was no statistically significant association between the perception of the risk for falls (p=0.2693) and the risk for falls (p=0.4984) with the Katz Index. It can be seen in table 4 that the better the perception of risk for falls by older adults, the less independent they were in IADL.
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Participants classified as being at low risk for falls were more independent in IADL. Those at medium risk were more independent compared to those at high risk for falls. Independent individuals in BADL showed greater independence in IADL than those partially or totally dependent (Table 5).

Discussion

The results of this study related to the sociodemographic and clinical characteristics of interviewees were similar to those of another study carried out in the ED in the Northeast Region of the country, in which the profile pointed to male older adults, married, with chronic diseases (diabetes mellitus and SAH were the most prevalent), and an average length of hospital stay of 4.3 days.\(^{22}\)

It is important to highlight that most of those surveyed reported having SAH and those who used antihypertensive drugs had a lower score on the Lawton scale. Systemic arterial hypertension is present in almost 70% of the older adult population. This chronic disease has no cure and its treatment aims to alleviate symptoms and prevent complications. When chronic diseases are left untreated, they can take on serious forms resulting in disabilities, compromising the performance of IADL, and directly influencing the quality of life of individuals. Therefore, the hospitalization period should be seen by nurses as an opportunity to guide older adults and their family members about pharmacological and non-pharmacological treatment for SAH.\(^{23}\)
The mean score on the Falls Risk Awareness Questionnaire of participants in the present study corroborated that found in the study conducted with older adults living in various regions of the city of Juiz de Fora (MG). The mean score achieved in the present study may be related to the fact that those surveyed were probably evaluated by nurses during hospitalization in relation to the risk for falls and received guidance to prevent these, since measuring the risk for falls is one of the indicators for evaluation of the hospital quality. It is important to highlight that the low knowledge and perception about falls by older adults represents a risk to their functional independence, since the changes in habits recommended by professionals for the prevention or minimization of accidents may not be followed.

Most of those surveyed had a high risk for falls, such as the result found in older adults hospitalized at the Hospital Escola Emílio Carlos, da Fundação Padre Albino, in Catanduva, São Paulo. Falls in hospitals commonly occur in adults over the age of 65 years, which raises great concern, as falls in this population constitute a major public health problem, often resulting in long-term pain, compromised functional capacity leading to disability, premature admission to a long-term institution for older adults, increased length of hospital stay and mortality.

Most respondents in the study conducted at a university hospital in Brasília, Federal District, were classified as independent for BADL and IADL, as in the present study. Although AADL were not evaluated in that study, it cannot be forgotten that functional capacity can be defined as the ability to carry out activities that enable the person to perform self-care and live independently. Functional capacity can be assessed using instruments that investigate BADL, IADL and AADL. The BADL are related to self-care, such as eating; IADLs are practical life activities with greater cognitive demand and can have social, motivational and contextual influence, such as controlling finances; and AADL are activities related to community involvement and social participation, including attending community centers for older adults.

The need to care for older adults in the ED may involve situations of trauma, acute illnesses or worsening of chronic conditions, and these situations can have a significant impact on the functionality of these patients. One of the main reasons why emergency services can affect the functional capacity of older adults is the risk of complications during care. Another factor that contributes to the impairment of functional capacity is the prolonged period of immobilization or rest required after care in the ED. Furthermore, the ED environment itself can be challenging for older adults. Exposure to noise, bright lights, unfamiliarity with the environment and disruption of daily rhythms can cause stress and disorientation, affecting functional capacity. It can also lead to loss of autonomy, with the need to depend on third parties for performing activities, such as feeding, personal hygiene and mobility.

Therefore, the functional capacity of older adults must be assessed at the time of admission to the ED. In this way, health professionals will be able to identify early the limitations that must be addressed during the hospitalization period.

In this study, illiterate older adults had a higher percentage of totally dependent people, while those with complete primary education and higher income had a higher percentage of independent subjects. Education has a strong relationship with income: individuals with greater education tend to have greater ease in recognizing a health need and seeking care. In this context, older adults with a lower level of education may have less knowledge about preventing health problems and less access to the health network, which in the long term can contribute to complications of chronic non-communicable diseases, leading to inability to perform BADL. In this regard, health professionals must seek strategies to implement educational actions in health with illiterate older adults so they can understand and put into practice guidelines for preventing the risk for falls, seeking to maintain functional capacity for as long as possible.

The percentage of independent older adults was higher among those with a support network. The lack of a social network can contribute to worsen the functional capacity, which is often a decisive factor in the...
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Institutionalization of older adults. Therefore, the presence of a companion, flexibility and longer hospital visits may favor the older adults’ coping with daily adversities and their feeling of loneliness during hospitalization. Those with walking deficits and those who used analgesics had a higher percentage of partially dependent people. Walking deficit and pain lead to changes in speed, cadence, symmetry, time and length of steps and balance, providing a greater risk for falls. When this event occurs in this population, it is often accompanied by dependence for BADL.

Divorced older adults without a caregiver had higher scores on the Lawton Scale. Although in this study divorced people are more independent in IADL, it is known that having someone can be beneficial for functional capacity, as a partner is often a stimulus for older adults remaining independent and taking care of their own health. Another study conducted with the same population in Vitória, Espírito Santo, found a positive association between having a caregiver and being more dependent, corroborating the findings of this study.

Older adults with hypertension, neoplasia and walking deficits had lower scores on the Lawton Scale. These findings can be explained by the tendency for an increasing number of diseases in individuals as they age. If not properly treated, these diseases can cause limitations that prevent older adults from carrying out their IADL independently and safely.

In this study, there was no statistically significant relationship between the perception of risk for falls and the risk for falls with the Katz Index. This result may be related to the fact that most respondents in this study were independent in BADL. Assessing the risk for falls and the perception and knowledge about falls during hospitalization becomes essential to prevent situations in which older adults may put themselves at risk for falls due to not perceiving the risk involved in the activity performed. Note that “risk perception is the person’s interpretation of risks, based on the set of beliefs, values and life experience, which give meaning to each dangerous event, as well as the understanding of a specific threat. It constitutes an organizing and guiding axis for personal decisions and behaviors before, during and after a risk situation”.

In this study, the better the perception of risk for falls, the less independent in IADL the older adult. Those classified as low risk for falls were more independent. The aging process itself entails morphological, functional, biochemical and psychological changes that determine the progressive loss of functional capacity. This gradual loss in the ability to perform IADL tends to allow for a better perception of the risk for falls among older adults, which can be considered positive for their prevention. Furthermore, in another study with the older adult population, a moderate or high risk for falls and some degree of impact on functional capacity were found in most of the sample. Independent respondents for BADL also showed greater independence for IADL. These findings are related to the fact that first the ability to perform IADL is lost and then, BADL are compromised, since IADL require greater physical and cognitive integrity compared to BADL.

This study was limited by the fact that it was developed in a single center and in the ED with care provided to patients only in the public health system. As this may not represent other realities, the results cannot be generalized. Other hospital units, such as rehabilitation, may produce different results than those found in this study.

As the number of older adults grows, the demand for care in the ED increases even more. It is not uncommon for an older adult who has been hospitalized as an emergency and completed treatment for the primary disease to be unable to leave the hospital due to a decline in functional capacity or social problems. These results can contribute to prevent disabilities and preserve functional capacity during hospitalization in the ED because they serve as an alert to the ED health team about the importance of an assessment of functional capacity from hospital admission, as this provides parameters for the care planning centered on the needs and demands of older adults.

Conclusion

In this study, the sociodemographic and economic variables associated with independence for BADL
were, respectively, higher schooling and higher income. Being divorced and not having a caregiver were associated with independence in IADL. The clinical variables: having hypertension, neoplasia and walking deficit and using antihypertensive drugs were associated with dependence in IADL. There was no association between the risk for falls and the perception of the risk for falls with BADL. The greater perception of risk for falls was associated with less independence, and the low risk for falls was associated with greater independence for IADLs.

Collaborations

Souza LF, Santos ESM, Campanharo CRV, Lopes MCBT, Okuno MFP, Torres GV, Nunes VMA and Batista REA contributed to the design of the study, analysis and interpretation of data, writing of the article, relevant critical review of the intellectual content and approval of the final version to be published.

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