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Research paper

Dynamics of activities of daily living performance in institutionalized older adults: A two-year longitudinal study

Javier Jerez-Roig, MD [a, b, *], Lidiane Maria de Brito Macedo Ferreira, MD [a], José Rodolfo Torres de Araújo Undergraduate student [c], Kenio Costa Lima, PhD [a]

[a] Postgraduate Program in Collective Health, Odontology Department, Federal University of Rio Grande do Norte (UFRN), Avenida Salgado Filho 1787, CEP 59010-000, Lagoa Nova, Natal-RN, Brazil

[b] Can Misses Hospital, Ibiza, Spain

[c] Postgraduate Program in Health Sciences, Center of Health Sciences, Federal University of Rio Grande do Norte (UFRN), Avenida Gustavo Cordeiro de Farias, s/n, Petrópolis, CEP 59012-570, Natal-RN, Brazil

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ABSTRACT

Background: It is fundamental to analyze the evolution of functioning for the planning of strategies aimed at preventing or delaying dependency. However, there is a lack of studies focused on the evolution of functional performance in institutionalized older adults in Latin America.

Objective: Verify the incidence of functional decline, functional maintenance and functional improvement in the basic activities of daily living (BADL) in institutionalized older adults, as well as analyze the evolution of functional performance.

Methods: A two-year, five-wave longitudinal study is presented herein, with assessments applied every 6 months, carried out in residents of 10 nursing homes in the city of Natal-RN (Brazil). The items ‘eating’, ‘personal hygiene’, ‘dressing’, ‘bathing’, ‘transferring’ and ‘walking’ were assessed by a 5-points Likert scale. Sociodemographic, institution-related and health-related variables were considered for descriptive analyses.

Results: The sample consisted of 280 older adults, of which 150, 53.6% (95% CI: 47.7–59.3%) experienced decline, 94, 33.6% (95% CI: 28.3–39.3%) maintained functional performance, 40, 14.3% (95% CI: 10.7–18.9%) presented improvement at least in one assessment, and only 18 (6.4%; CI 95%: 4.1–9.9%) improved functional performance with no decline over the period. ‘Eating’ presented the highest decline (−0.54 points), followed by ‘walking’ (−0.43), ‘dressing’ (−0.35) and ‘transferring’ (−0.31). The BADL that suffered less decline were ‘toileting’ (−0.22), ‘personal hygiene’ (−0.24) and ‘bathing’ (−0.29).

Conclusions: Half of institutionalized older adults experienced functional decline and less than 15% improved functional performance. ‘Eating’ suffered the most pronounced decline, followed by mobility and self-care activities.

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The aging process of the population is associated with several challenges, which affect public health, such as maintenance of life quality and autonomy, and the delay of disability process.[1] Decline in the performance of daily life activities is one of the main issues affecting older adults, as it limits autonomy and causes dependency. Besides, disability is associated with the immobility syndrome, frailty, increased risk of falls, institutionalization and death, occasionally generating long term care and complications throughout time, plus high economic impact.[2]

The study of functional performance is considered a basic part of an efficient multi-disciplinary geriatric assessment, being more appropriate to operationalize the health care of older adults than the presence and number of chronic diseases.[3] In this way, functional assessment provides important clinical-functional population information to guide professionals and health services.[4] However, in many countries, such as Brazil, functional performance assessments at Nursing Homes (NH) and interventions against activity limitations are still not a routine or systematic

* Corresponding author. Avenida Senador Salgado Filho nº 1787, Lagoa Nova, CEP 59010-000, Natal-RN, Brazil.

E-mail address: javijerez81@hotmail.com (J. Jerez-Roig).

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procedure. Studies that evaluate the functional conditions of institutionalized older adults are also scarce.[5]

It is known that transitions between different states of functional performance occur quite rapidly in the case of older adults, and that higher disability levels entail higher assistance costs.[6] Regarding the disability dynamic process, a hierarchy of functional performance losses has been described in scientific literature. Typically, activity limitations in instrumental activities of daily living, which consist of more complex and demanding tasks to live independently in the community, precede functional decline in basic activities of daily living (BADL).[7,8] Among the latter, self-care tasks such as bathing, dressing and personal hygiene are considered early-loss activities, while mobility-related activities, i.e. walking, transferring or toileting, are mid-loss BADL. At the end of the disability process, eating (a late-loss activity), which is an elementary task, is frequently the last to be affected.[9]

Studying transitions within the process of functional decline is fundamental for the planning of services that will be needed in the future, aimed at preventing or delaying dependency and well as reducing health-associated costs.[6] The majority of the studies carried out with institutionalized older adults are cross-sectional and therefore do not provide information on the evolution of the health state and functioning throughout time.[10] In the NH environment, there is less than ten cross-sectional studies on the evolution of functional decline, all of which carried out in the US, Switzerland and China.[11–16] In Latin America, there is a lack of scientific production in the field of activity limitations, and the longitudinal studies developed up to date were carried out with individuals in community-dwelling settings.[4,17]

This manuscript aims to extend the knowledge base on the dynamics of functioning, through a five-wave prospective study applied to a representative sample in a Northeast Brazil capital. The objective of this study was to analyze the evolution of functional performance in institutionalized older adults during a period of two years. More specifically, the incidences of functional decline, functional maintenance and functional improvement were verified for the BADL, as well as the evolution of functional performance.

Methods

A two-year, five-wave prospective longitudinal study is presented herein, carried out in 10 (71.4%) of the 14 NH registered in the Sanitary Vigilance agency of the city of Natal (Northeast Brazil). Five of the NH were private and five were not-for-profit (no public NH were available); the remaining four NH refused to participate in the study.

The following statistical parameters were considered in the calculation of the sample size, according to the association between the outcome (functional decline) and the independent variable 'cognitive state': 48.6% proportion of cases among the exposed, 27.8% proportion of cases among the non-exposed, 1.78 relative risk, 5% significance level, and power of 80%. Therefore, the calculated sample was 164 people, to which 25% were added to cover possible losses, totaling 205 people.

The sample was collected from the updated registries of the older adults at each NH, including all residents at least 60 years old that were at the institutions during the research period. This age group (≥60 years of age) is considered by the World Health Organization (WHO) to define 'older adults' in a developing country.[18] The older adults that presented total activity limitations in all BADL as well as those in terminal state, coma or under palliative care were excluded from the study.

Data were collected during the periods of October–December 2013 (wave 1), April–June 2014 (wave 2), October–November 2014 (wave 3), April–May 2015 (wave 4) and October 2015 (wave 5). Also, the final wave (last wave) was carried out in April 2016 with the aim of collecting the remaining data from the refreshment sample incorporated in the second wave, which consisted of new residents that were admitted in the NH during the period between wave 1 and wave 2. Residents who passed away or moved from the NH during the study period were not excluded from the analysis.

The BADL considered were: 'eating', 'personal hygiene', 'dressing', 'bathing', 'transferring', 'toilet use' and 'walking'. These items were extracted from the Barthel Index, and for each item there is a 5-point Likert scale, from 0 (incapable) to 4 (totally independent). Therefore, the total score ranges from 0 (incapable) to 28 (totally independent). Functional decline was considered when the final score for all items was lower than the initial score, whereas functional maintenance was considered when there were no changes in the assessments, and functional improvement was considered when the final score was higher in the second of two consecutive assessments, following Burge et al. (2013).[12] This information was reported by the professional who best knew the current care needs of the resident, i.e., nursing assistant or caregiver.

Sociodemographic information was collected to characterize the sample (age, sex, race, education level, marital status, number of children, type of NH, retirement, money administration, free time occupations, private health plan and number of older adults per caregiver) as well as health-related variables (chronic diseases, consumption of tobacco and alcohol, nutritional state, practice of physical activity, mobility state, falls in the previous 30 days, cognitive capacity, daily medication, number and type of medication). This information was obtained from medical records, or provided by the older adults, or by NH personnel in the case of cognitive impairment.

Regarding the evaluation of mobility, the following states were considered, according to the criteria of the caregiver or nursing assistant: walks with aid, walks without aid, uses wheelchair, and bedridden. The cognitive state was evaluated by Pfeiffer's test, which evaluates long- and short-term memory, orientation, information on daily activities and mathematical capacity. This instrument was directly applied to the resident and enables the classification of the older person in intact mental function, and slight, moderate or severe cognitive decline, taking into consideration the education level of the person.[19]

The nutritional state was evaluated by the Mini Nutritional Assessment (MNA), applied by previously trained and calibrated researchers, who directly applied the anthropometry tests to the residents. MNA classifies older adults in three groups: adequate nutritional state (MNA ≥ 24), risk of malnutrition (MNA between 17 and 23.5); and malnutrition (MNA < 17).[20]

The Code of Ethics of the World Medical Association (Declaration of Helsinki) was followed herein. An amendment was approved to the project 'Human aging and health: the reality of institutionalized elderly in the city of Natal/RN' by the Research Ethics Committee of the Federal University of Rio Grande do Norte (UFRN), protocol number 013/2014. Free informed consent forms were filled and signed by the older person or legal tutor, by the direct caregiver, and by the directors of the NH, as determined by the National health Council in Resolution 196/96.

The sample was firstly characterized regarding the sociodemographic, health- and institution-related variables, presenting absolute and relative frequencies. Incidences of maintenance, decline and functional improvement were calculated with the respective 95% confidence intervals (CI 95%). Then the evolution of functional performance was analyzed for each activity during the study period, calculating the total average of functional performance for each BADL and wave. SPSS version 22.0 was utilized for the statistical analysis and Excel was used for the graphical representation of results.

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