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Original Article

Comparison between ability and performance: a study on the functionality of dependent elderly individuals[1]

Flávia Nunes Machado[2]
Adriana Nunes Machado[3]
Sônia Maria Soares[4]

Objective: to compare the ability and performance of Basic Activities of Daily Living of dependent elderly individuals cared for in a geriatric healthcare center. Method: cross-sectional, observational study with quantitative approach. The Functional Independence Measure (FIM) was applied in 109 elderly individuals cared for in a geriatric healthcare center. Of these, 60 individuals were classified as dependent in the case of basic activities of daily living described according to the International Classification of Functionality, Disability and Health (ICF). The process of triangulation reinforced reliability of data, which included information provided by patients and caregivers and that contained in medical files and objective assessment. Results: the average age was 81.0±7.1 with a predominance of women. The difference between ability and performance was statistically significant ($p<0.05$) in most daily tasks. Conclusion: the contribution of this study in using ICF was semi-quantitatively interpreting its qualifiers, which enabled more objective comparisons and inferences, and revealed a clear distance between the performance and ability of these individuals in most of the assessed activities.

Descriptors: Aged; Health of the Elderly; Activities of Daily Living; International Classification of Functioning, Disability and Health; Nursing.

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[2] MSc, RN.
[3] Physician, Hospital das Clínicas, Faculdade de Medicina, Universidade de São Paulo, São Paulo, SP, Brazil.
[4] PhD, Associate Professor, Escola de Enfermagem, Universidade Federal de Minas Gerais, Belo Horizonte, MG, Brazil.

Corresponding Author:
Sônia Maria Soares
Universidade Federal de Minas Gerais. Escola de Enfermagem
Departamento de Enfermagem Básica
Av. Alfredo Balena, 190
Bairro: Santa Efigênia
CEP: 30130-100, Belo Horizonte, MG, Brasil
E-mail: smsoares.bhz@terra.com.br

Introduction

Increased life expectancy does not imply a delay in the onset of disability or chronic diseases. Therefore, additional years of life have increased the proportion of disabled and sick individuals, which generates burdens on families and an increased demand for hospitals and rehabilitation centers[1-3].

The health of an individual is not defined only by his/her chronic diseases or bodily integrity. The determining factor in old age is the independence to perform daily tasks, that is, functionality. An elderly individual is considered healthy when there is no need for any kind of assistance or supervision to perform daily tasks, even in the presence of one or more chronic diseases[1,3-4].

Nurses have an essential role in delivering health care to elderly individuals, which is helping them to develop their self-care potential, which should be encouraged with the support and involvement of family members. The most elementary tasks concerning self-care are called basic activities of daily living (BADL). Independence to perform BADL involves elements of an emotional, physical and social nature. Dependence is a risk factor for mortality in the elderly population and is more relevant than the diseases that lead to it[2,5].

A widely disseminated tool to assess the performance of these activities was developed in the 1980s, the Functional Independence Measure (FIM). The FIM is capable of drawing a profile of patients requesting the assistance of third parties to perform motor and cognitive tasks. It verifies the individuals' performance on a set of 18 tasks included in the subscales of self-care, sphincter control, mobility, locomotion, communication and social cognition. The possible scores range from 18 points (totally dependent) to 126 points (total independence)[6].

In a more recent initiative, still under development, to broadly conceptualize functionality, in 2001 the World Health Organization (WHO) coordinated the development of the International Classification of Functioning, Disability and Health (ICF). This classification was translated into Portuguese [*Classificação Internacional de Funcionalidade, Incapacidade e Saúde* (CIF)] in 2003 by the WHO for the Family of International Classifications in Portuguese. On the one hand, healthcare provided to the elderly is based on an individual's functionality; on the other hand, the ICF provides tools to describe this functionality through a biopsycosocial model[3,7].

This classification describes the functionality of individuals in the environment through its encodings (identify the body's structures and functions, activities and participation, and environmental factors) and qualifiers (indicate the intensity of disability or difficulty and environmental barriers). According to the ICF's terminology, functionality is a broad term encompassing the body's functions and structures as well as an activities component (performance of a task) and participation (involvement of individuals in a real life situation, representing the social perspective of functionality). The concepts presented in this classification are not only a consequence of one's health condition or disease. These are also determined by the context of physical and social environment, cultural differences and attitudes toward impairment. These conceptions deconstruct the idea that incapacity is merely a medical problem or completely created by the social environment[3,7].

Ability, according to the ICF, is linked to an individual's capacity to perform tasks and become involved, considering one's intrinsic limitations, in a standardized environment. It describes the highest level of functionality a person can achieve in a standardized setting. Hence, functionality/ability, measured by the FIM and other scales, is related to the construct *performance* proposed by the ICF, since it describes the involvement of individuals and activities they perform daily. Therefore, this classification takes into account both what it is possible to do in a standardized setting, that is, a test environment, and one's performance in real life[6-7].

An example in which ability surpasses performance is a hemiplegic individual who uses a hand shower to bath in a standing position and the caregiver must soap and rinse from head to toe because the individual's functioning hand is used as support to keep balance while standing. This individual is, therefore, totally dependent in this situation of bathing activity. On the other hand, by placing an ordinary chair under the shower, this individual is able to bath in the sitting position and will wash most or all his/her body without assistance. Nonetheless, performance in daily life can also surpass ability when an individual performs unsafe or risky activities.

As limitations to performing daily activities can influence quality of life[2,8], keeping balance between performance and ability contributes to the health of this population. The health staff should intervene in cases where ability is greater than performance, in order to improve elderly individuals' functional level. The role of professionals when the inverse occurs is to advise the safe performance of activities. Accidents and trauma,

especially domestic events, are factors that increasingly contribute to the functional disability of the elderly[4].

These considerations justify seeking solutions designed to maintain or recover the level of performance of elderly individuals. With the purpose to preserve the functionality of older individuals, this study's objective was to compare the ability and performance of dependent elderly individuals cared for in a geriatric healthcare center in regard to Basic Activities of Daily Living (BADL).

Method

This cross-sectional, observational study with a quantitative approach was developed in the Professor Caio Benjamin Dias geriatric healthcare center located in the Bias Fortes Outpatient Clinic (attached to the *Hospitals das Clinicas*, Federal University of Minas Gerais, Brazil). This center provides integral care to the elderly population within various specialties. These individuals are referred to this center by Primary Health Care (PHC) staff within the Family Health Strategy (FHS) under the Brazilian Health System. To be referred to this center, patients must be 80 years old or older or 60 years old or older presenting one of the following: polypharmacy, multimorbidities or dementia.

Elderly individuals and their companions were invited to participate in the study in January, February and March 2010 during the interval between their arrival to the center and medical consultation. Data were collected on the same day and place. This strategy sought to gain greater participation in the study and to avoid the inconvenience, on the part of the participants, of commuting to the center exclusively to participate in the study. The sample was considerably homogeneous in terms of age and level of dependency, which contributed to the control of intrinsic factors.

The FIM was applied to 109 elderly individuals after they and their companions provided consent through signing free and informed consent forms. Among the participants, 60 were classified as dependent because they scored between 5 (supervision or preparation) and 1 (total assistance) in at least one of the following motor tasks: eating; self-care; bathing; upper body dressing; lower body dressing; toileting; transfers; or locomotion. Those considered dependent to perform BADL continued in the study and had their activities and level of involvement classified according to the ICF.

In this classification, the constructs of the activities and involvement components were described and numerically qualified, represented by numbers from 0 to 4, where 0 expresses no difficulty or impairment, from 0 to 4%, in functionality; 1 indicates mild difficulty (5% to 24%); 2 expresses moderate difficulty (25% to 49%); 3 is related to severe difficulty (40% to 95%); while 4 expresses complete dependency, from 96% to 100%[5].

Since WHO has not yet determined the characteristics of a standardized setting to be adopted to qualify ability, it was considered an appropriate environment for an elderly individual to develop his/her ability, that is, with no architectonic barriers and with encouragement and supervision from family members and caregivers.

We collected information from the elderly individuals and their companions, as well as data from geriatric assessments recorded in medical files. We also assessed the movements, coordination, praxis, and understanding of individuals in following direct instructions. Reliability of data was reinforced by the triangulation process, in which we considered information provided by the patients and companions together with the medical files and objective assessments.

Geriatric assessment is systematized through an Elderly Multidimensional Assessment Protocol. This protocol includes the identification of elderly individuals and their social support networks, review of the main physiological systems, global functional assessment of basic and instrumental activities of daily life, assessment of cognition (including the Mini Mental State Examination), application of the Hachinski ischemia scale, assessment of mood and the application of the Geriatric Depression Scale, a neuropsychiatric inventory, assessment of mobility (walking, falls, fractures, and strength in the upper limbs), communication assessment (vision, speech and hearing), oral health, nutrition, current and past history and socio-familial assessment, environment and caregiver assessment (burden inventory), complementary exams, general estimates (risk of coronary artery disease, estimated renal function, ankle brachial index, risk of stroke, Chalson index), global functional diagnosis, health condition diagnosis, suggestions for interventions (complementary investigation and preventive interventions), curative or palliative actions, rehabilitative actions and the implementation of a care plan.

In order to standardize the application of the FIM and the use of the ICF, the primary author administered the course, "Training for the use of the Functional Independence Measure" with a workload of 10 hours, and the course "International Classification of Functionality,

Disability and Health – Basic module I" with a five hour duration.

The sample size calculation, performed through ANOVA using MINITAB 15, showed power above 80% (alpha error=0.05) to identify a difference greater than 0.5 (minimum variation clinically relevant in the difference between ability and performance), when N equals 60 elderly individuals dependent on the performance of BADL.

Descriptive analysis of demographic and health data was performed. Student's t test was used to test the hypothesis with variables having a normal distribution and Person's coefficient of correlation and the Kruskall-Wallis tests were employed for the non-parametric variables. SPSS 13 for Windows was used for the paired analysis and the Wilcoxon test ($p<0.05$) for the comparison between ability and performance.

In accordance with Resolution 196/96, National Council of Health on research involving human subjects, this study was approved by the Institutional Review Board at the Federal University of Minas Gerais (UFMG) and by the Board of Education, Research and Extension at the Hospital das Clinicas, UFMG (processes No. ETIC 0535.0.203.000-9 and No. 171/09).

Results

The participants' average age was 81.0±7.1. Most (60%) of the studied individuals belonged to the "very old elderly" group that consists of 80 years old or older individuals. The number of women (73%) was much larger than that of men (27%). No statistically significant difference was found in regard to age between the genders.

A total of 172 medical diagnoses were identified, with an average of 2.87±1.3 diagnoses per person. The diseases with greater prevalence were Alzheimer (63.3%), hypertension (53.3%), diabetes *mellitus* (16.6%), cerebrovascular diseases (13.3%), unspecific dementia (10%), Parkinson's disease (10%), osteoporosis (10%), depressive episodes (8%), thyroid disorders (6.6%), and coronary disease (6.6%). A total of 13.3% of the participants reported constipation, even though it does not appear as a medical diagnosis in their profiles. No correlation was found between the number of medical diagnoses and functionality (FIM scores).

In regard to the primary caregivers, most were the participants' children or spouses (76%) and female (96%). The average age of the primary caregivers was 53.8±13.7, while 32% were themselves elderly individuals.

In terms of performance (Table 1), most individuals presented severe impairment in the performance of self-care activities with the exception of eating, drinking, and bladder and bowel management, activities in which "no difficulty" prevailed. Considerably affected items directly depended on autonomy, such as: problem solving (71.7%); daily routine (66.7%); participation in the community life (83%); informal associations (71.2%); and socialization (61.6%). Gender was not related to dependency.

Table 1 - Distribution of Scores Concerning Performance of Activities and Participation. Belo Horizonte, MG, Brazil, 2010 (n=60)

Description	Level of disability* (n %)						
	0	1	2	3	4	8	9
Learning and application of knowledge							
Problem solving	6.7	3.3	3.3	15	71.7	0	0
Tasks and general demands							
Performance of daily routine	3.3	8.3	8.3	13.4	66.7	0	0
Communication							
Communication: verbal reception	23.3	26.7	16.7	20	13.3	0	0
Communication: non-verbal reception	23.3	16.7	11.6	21.7	26.7	0	0
Speech	31.7	18.3	15	11.7	23.3	0	0
Production of non-verbal messages	26.7	13.3	8.3	13.3	38.4	0	0
Mobility							
Standing unsupported	23.3	41.7	8.3	10	16.7	0	0
Transfer: bed/chair/wheelchair	31.7	38.3	6.7	5	18.3	0	0
Walking	15	26.6	21.7	20	16.7	0	0
Climbing/walking down stairs	6.7	18.3	23.3	16.7	33.3	1.7	0
Moving around the house	26.7	31.7	15	5	20	1.7	0

(continue...)

Table 1 - (continuation)

Description	Level of disability* (n %)						
	0	1	2	3	4	8	9
Personal care							
Washing body parts	38.4	18.3	3.3	3.3	36.7	0	0
Washing the whole body	26.7	15	8.3	8.3	41.7	0	0
Drying off	26.7	15	6.7	5	46.6	0	0
Skin care	23.3	21.7	1.7	8.3	43.3	1.7	1.7
Dental care	33.3	10	1.7	1.7	30	0	23.3
Grooming	38.3	13.3	6.7	1.7	40	0	0
Bowel and bladder management	40	15	3.3	8.3	33.4	0	0
Dressing	23.4	13.3	10	8.3	45	0	0
Undressing	23.4	13.3	10	8.3	45	0	0
Putting on socks and shoes	21.7	16.7	5	5	51.6	0	0
Taking off socks and shoes	26.7	15	5	5	48.3	0	0
Choosing appropriate clothes	25	6.7	5	6.7	56.6	0	0
Eating	40	23.3	11.7	8.3	16.7	0	0
Drinking	45	26.7	8.3	6.7	13.3	0	0
Community, social and civic life							
Community life	5.1	6.8	1.7	3.4	83	0	0
Informal associations	8.5	6.7	3.4	10.2	71.2	0	0
Socialization: visiting relatives and friends	8.3	6.7	11.7	11.7	61.6	0	0

*0 – no difficulty; 1 – mild difficulty; 2 – moderate difficulty; 3 – severe difficulty; 4 – total difficulty; 8 – severity not specified; 9 – not applicable

The greatest divergences found in the comparison between the elderly individuals' performances and their abilities to accomplish tasks coincide with tasks on which they had worse performances (Table 2), that is, the individuals' ability is underused in their daily environment. These are problem-solving, completion of their daily routine, most self-care actions, and community, social and civic lives. Communication, mobility, eating, drinking and bowel and bladder management were the ones that showed differences below 0.33.

Table 2 - Differences between the Average Scores Concerning Ability and Performance. Belo Horizonte, MG, Brazil, 2010 (n=60)

Code	Description	Average of differences	p-value
Learning and application of knowledge			
	Problem-solving	0.58	<0.001
General tasks and demands			
	Performance of daily routine	0.55	<0.001
Communication			
	Communication: verbal reception	0.05	0.180
	Communication: non-verbal reception	0.11	0.102
	Speech	0.18	0.026
	Production of non-verbal messages	0.10	0.109
Mobility			
	Standing unsupported	0.13	0.046
	Transfer: bed/chair/wheelchair	0.18	0.020
	Walking	0.16	0.038
	Climbing/walking down stairs	0.19	0.013
	Moving around the house	0.22	0.016
Personal care			
	Washing body parts	0.68	<0.001
	Washing the whole body	0.82	<0.001
	Drying off	0.97	<0.001

(continue...)

Table 2 - (continuation)

Code	Description	Average of differences	p-value
	Skin care	0.93	<0.001
	Dental care	0.83	<0.001
	Grooming	0.87	<0.001
	Bowel and bladder management	0.33	0.002
	Dressing	1.05	<0.001
	Undressing	1.05	<0.001
	Putting on socks and shoes	0.77	<0.001
	Taking off socks and shoes	0.93	<0.001
	Choosing appropriate clothes	0.95	<0.001
	Eating	0.32	<0.001
	Drinking	0.25	0.004
Community, social and civic life			
	Community life	1.12	<0.001
	Informal associations	1.14	<0.001
	Socialization: visit relatives and friends	1.28	<0.001

Discussion

The average age found in this study was high, considering that the life expectancy of Brazilians is 67.5 years old for males and 76.0 years old for women. In terms of gender, a predominance of women (74.3%) was observed, indicating feminization of old age[9-10], a resistance of men to go to health services, or even that men are seldom included in healthcare policies[11]. Studies indicate that the difference in the incidence of disability between genders is virtually nonexistent when the total age is considered and after adjusting for socioeconomic and health factors and indicators of social relations[12].

Because the study setting was a referral center for the elderly with dementia, Alzheimer's disease was the most prevalent diagnosis. Hypertension and diabetes were also frequently found in the studied population, which coincides with the findings of epidemiological studies[2,13]. The inappropriate intake of fluids and diet, inactivity, diabetes and the use of some medications contribute to the high incidence of constipation among the elderly individuals[14].

The participants' functionality was not influenced by the number of medical diagnoses. A study addressing functional status and chronic diseases reports that the number of comorbidities did not significantly impact the FIM score[15]. The results show that the health of elderly individuals, seen as synonymous with independence and functionality, is a concept that adapts very well to the current situation. Diagnostic and technological advancements together with increased life expectancy favor the emergence of comorbidities. Individuals, seeking to preserve their health, need to learn to live with the presence of these comorbidities for the rest of their lives[4].

The main effects of chronic diseases emerge when they are out of control or decompensated[4-5]. The relationship between out-of-control chronic diseases and functional disability was addressed in a systematic review, showing that as the disease becomes more severe, the individual becomes increasingly more dependent, interfering in family relationships and leading to increased social isolation[2].

An agreement with other studies was found in regard to the primary caregivers. Most are female children or spouses of the elderly individuals who are 50 years of age or younger. Given the participation of women in the job market, elderly individuals, in many family arrangements, end up elected caregivers. They are elderly individuals caring for elderly individuals[16].

The greatest difficulties found in the performance of the elderly patients were: problem-solving, performance of daily routines, bathing, choosing and properly dressing with clothes and shoes. Problem-solving and daily routine showed important differences between ability and performance in this study and include the actions of identifying, analyzing, and choosing options to solve an issue as well as to organize time, space and material required to perform a task. These are actions that require autonomy and initiative and are directly influenced by the family environment. When a family member takes the initiative in these decisions and choices, the elderly individual is deprived of these task and allows others to perform them[17]. In addition to physical and cognitive

limitations, the maintenance of autonomy is influenced by the behavior and environment in which the individual interacts[1].

Aging, which leads to a decline in body functions, tends to slow the performance of daily tasks and culminates in one's dependency in the performance of self-care[1]. Therefore, the supervision of elderly individuals during these activities requires time and patience from those assisting them. The differences between ability and performance were important in all the items described in self-care.

A lower level of impairment was found in verbal communication compared to non-verbal communication and the greatest difference between ability and performance was observed in speech. Of all the sensory disabilities, inability to communicate with people due to hearing loss, can be one of the most frustrating consequences. Diminished comprehension, decreased intelligibility of speech, and impaired verbal communication, gradually reduce the elderly individual's social contact and contributes to the emergence of emotional disorders. The use of hearing aids improves attention, reverses the condition of isolation and communication difficulties, improving quality of life. The use of strategies focused on attention, hearing, communication, and lip-reading also improve verbal communication. For these individuals to participate in conversations and have a chance to express themselves, people should speak slowly with their faces turned to them[18-19].

In terms of mobility, the greatest difficulty found was climbing and walking down stairs. Difficulty walking and move around the house, in addition to other functional factors, can also be related to architectonic obstacles found at home, which are conceptualized environmental factors. This fact possibly results in the difference between performance and ability found in the mobility items. Special attention should be paid to environmental factors that increase the likelihood of falls and domestic accidents. These are causes of morbidity and mortality that impact the functionality of the elderly. Efficacious measures to protect individuals against falls include strengthening lower limbs and eliminating domestic obstacles, such as carpets, stairs, poor illumination, objects obstructing walkways and stairs without railing[4].

The highest averages in the differences between ability and performance were found in the activities in the community and in social lives. Disabilities, even if limiting, can be circumvented in order to enable elderly individuals to be more active and participative[20].

One study of nursing care reflects upon power in relation to care. According to it, "reducing power" reduces one's ability to care and does not identify what the patient knows and can do for him/herself. The *knowledge* and the *self* of the individual, the recipient of guidance and care, are not valued. Overly protective care, based on "doing for another" tends to reduce independence and autonomy of those receiving care. In contrast, nurses should advise family members on using the "liberating power of care," which enables those requiring care to use the power they still have and mobilize all their ability to enhance this power to be and to exist. "All that remains of ability in life can and must be constantly mobilized – and this to the brink of death – so that all vital energies prevail over the obstacles in life[21].

Conclusion

During this study, we fully complied with the rules of the functionality instruments. The FIM was conceived to describe functionality, disability and health. The contribution of this study in the use of the FIM, its encoding and qualifiers, was the interpretation of its qualifiers in a semi-quantitative way, which enabled more objective comparisons and inferences, qualifying the broad concept of functionality. Knowledge of the socio-demographic characteristics, functionality and especially the ability and performance of dependent individuals, support the planning and implementation of public policies, establishing a direction and supporting care provided to the elderly population with disabilities, in addition to the teaching of the improvement of functionality and quality of life, and future studies of the same.

It was interesting, when assessing performance during data collection, to encounter patients, and also caregivers, who had their ability underutilized in daily life, and provide guidance in the appropriate techniques to be employed in the care provided to these individuals. In fact, disability can reflect on an individual's independence. However, individuals are capable of activating compensating mechanisms to address these deficits, managing to maintain independence and autonomy. Future studies can be conducted to assess changes of attitude and in the routines of these patients for the short and medium terms, after nurses, who are sensitized in terms of autonomy and independence, provide guidance.

With the quantification of the functionality of dependent elderly individuals, this study revealed a clear distance between the performance and ability

of these individuals in a large part of the assessed daily activities.

Supporting the maintenance of elderly individuals' independence helps to keep these people in their communities, in their family environments, and to prolong their physical and mental health. Encouraging elderly individuals to safely develop their potential for independence is an intervention that can prolong years of life and prevent hospitalizations and diseases caused by immobility.

The elderly population should be considered active subjects in the promotion of their health and the maintenance of their autonomy, being advised regarding care and supported by family and health services. This conception of care assumes that most elderly individuals, even those with limitations, are not totally impaired or dependent.

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