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EVALUATION OF ELDERLY PEOPLE'S ABILITY TO PERFORM ACTIVITIES OF DAILY LIVING

A LONGITUDINAL COMPARATIVE STUDY

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ABSTRACT

Objective: Evaluate and compare elderly people's ability to perform basic and instrumental activities of daily living while living in community or in transition to residences for older people. **Methods**: Longitudinal, comparative and descriptive study. Katz Index and Lawton and Brody Scale were applied to over 65 years old people in three moments: first, fourth and seventh month. In one of the groups, the first moment matched with institutionalization time. Convenience sample made by 57 subjects allocated into two groups. **Results**: There's an increasing in dependency to perform the activities of daily living in both groups during the study. The changes are more marked and more incident in instrumental activities in elder people resident in nursing homes. **Conclusions**: The transition to an institution seems to increase the process of loss of abilities in older people, contributing to their dependence, especially in their ability to perform instrumental activities of daily living.
Descriptors: Aging; activities of daily life; institutionalization; community

INTRODUCTION

For elder people, the most important factor for maintenance of quality of life is functional independence, once this allows them to keep up with the community and enjoy their functional autonomy (Devons, 2002).

Functionality has often been seen as the ability to perform the necessary daily tasks to sustain an independent living standard (such as personal care) and which are implemented as the ability to perform their own basic and instrumental activities of daily living (Crimmins, Hayward, Hagedorn, Saito, & Brouard, 2009).

Functional capacity can be measured through basic activities of daily living (BADL's), instrumental activities of daily living (IADL's) and mobility (Alves et al., 2007).

The association between functional disability, BADL's and IADL's with aging it's an important health state indicator, which provides the planning of actions designed to prevent or delay functional disability, guaranteeing independence and grater quality of life to the elderly (Del Duca, Silva & Hallal, 2009).

BADL applies to the individual self-care, such as feeding, dressing up or personal hygiene. IADL's include tasks as shopping, communication or using transportation means (Del Duca et al., 2009).

Physical disability in older people is characterized as a dysfunction in IADL's (especially in confection of meals, grocery shopping and taking care of the house) and BADL's (especially in showering, eating, dressing up, going to the bathroom and transferring from a bed to a chair) (Pudaric, Sundquist & Johansson, 2003).

The high levels of dependence in IADL's occur due to a bigger need of physical and cognitive integrity that these activities require, in comparison to BADL's (Millan-Calenti et al., 2010).

Women are more dependent in activities such as handling with money (15,8% are unable to do it against 6,7% of men) and using transports (7,9% against 2,3% of men). Men are more dependent in activities such as doing the laundry (37,5% against 23,4% of women) (Millan-Calenti et al., 2010).

Katz Index is a measure usually used to scale the ability of performing BADL's. This measure was initially presented to subjects with chronic illnesses, cardiac pathologies and hip fractures (Mendes, 2008). According to this scale, older people were classified as independent if they were able to perform one of the six proposed activities without any supervision, orientation or any other assistance (Duarte, Andrade & Lebrão, 2007).

The Lawton and Brody Scale for IADL's is the most suitable measure to rate the subject dependence in more complex activities than BADL's. This scale is the most useful for identification of the subjects' level of dependence in the present moment, as well as to identify a recovery or decline of dependence level through time. This scale is easy to apply (between 10 to 15 minutes) and provide auto-referred information about functional abilities. However, this assessment tool may not be sensible to small and important changes in function (Graf & Hartford Institute for Geriatric, 2008). The scale is used mostly due to its "(...) easy application and interpretation, low costs, doesn't require expertise personal to use it, doesn't need to spent much time filling it up and furthermore, due to is value in (early) screening of disability" (Araújo, Pais Ribeiro, Oliveira, Pinto & Martins, 2008, p. 2). Moreover, it's a valid and reliable instrument that has been used in countless studies (Cromwell, Eagar & Poulos, 2003).

In a review about the need of support accordingly to the type of residence, Mitzner, Chen, Kemp and Rogers (2011) refer that higher levels of residential assistance are related to higher difficulties in BADL's, but also in IADL's, even in subjects with similar ambulation skills.

In a comparative study within a group of elderly people on admission to a nursing home and another group living in the community, Mosley and Guyot (1987) refer the importance of the contribute of field dependence to the speeding of post-institutionalization dependence.

Baltes (1996) refers that appears to be a discrepancy between dependent and independent behaviors in a social ecology perspective. While independent behaviors don't seem to cause an environment response, individual dependent behaviors are reinforced by social partners' behaviors.

The purpose of this study is to evaluate and compare elderly people's ability to perform BADL's and IADL's while living in community or in transition to residences for older people.

METHODS

This is a longitudinal, descriptive and comparative study made in Portugal with a sample of elder people. This sample is composed by two sub-samples: one resident in institutions for older people (group 1) and another resident in the community (group 2). In group 1, subjects were assessed in the first month after institutionalization (t0) and 3 and 6 months after that (t1 and t2 correspondingly). The measurements made in group 2 had the same time lags.

Exclusion criteria for both groups where the inexistence of: a) severe neurological pathology, b) cognitive impairment, c) severe sensorial dysfunction; d) existence of severe clinical conditions, and e) recent changes in social dimension, excluding institutionalization for group 1.

The initial sample were composed by 66 subjects, each group with 33. Through the study timeline, group 1 lost 2 of the subjects between t0 and t1 and 4 subjects between t1 and t2 due to deaths. Group 2 lost in the same period 2 and 1 subjects correspondingly. Therefore, the final sample had 57 participants: 27 in group 1 and 30 in group 2 (Table 1).

Table 1 – Number of subjects in the sample between T0 and T2

	T0	T1	T2	Deaths
Total	66	62	57	9
Group 1	33	31	27	6
Group 2	33	31	30	3

Social-demographic, clinical and health care consumption characteristics (number of daily drugs, hospitalizations and medical appointments in the last month, etc.) were measured. Existence of institutionalization or social supports and type of residence structural characteristics that might conditioning the participation in ADL were also assessed.

The ability to perform BADL's was measured by Katz Index (with transcultural validation for Portugal) while Lawton and Brody Scale measured the ability to perform IADL's.

Katz Index, created by Sidney Katz in 1963, measures the functional ability of elder people. Katz established a six hierarchically related items list that indicates the development of function lost in the elder through complex activities, namely BADL's: feeding, personal hygiene, dressing up, using the bathroom, stirring and sphincter control. According to Wallace and Shelkey (2008) the middle grades of functional loss were difficult to specify in certain ADL's. In this study, the elderly were classified as independent (6 points), partially dependent (7 to 10 points), dependent (11 to 17 points) or totally dependent (18 points), accordingly to the classification proposed by Wang, Zheng, Kurosawa, Inaba, and Kato (2009).

The Lawton and Brody Scale, developed in 1969, it's a generic measure that assesses the ability to perform several activities. This scale is compound by eight questions: ability to use the phone, shopping, cooking meals, taking care of the house, transportation, responsibility for their own medication and ability to handle with money (Graf, 2008). The most common method to rate the items is dichotomously, but it can be scored in several ways. In this study, each question was rated with "1" for independent and the different levels of dependence were rated accordingly to the item number of every question. Therefore, the possible score is between 8 points (full independency) and 31 points (full dependency) (Graf, 2008).

The data statistical analysis was made in the software *IBM SPSS (Statistical Package for the Social Sciences) version 20* for *Windows 7*.

Descriptive statistic parameters were used for descriptive analysis, through measures of central tendency (Mean), dispersion (Standard Deviation) and simple and relative frequencies computation. The normality of the sample distribution was tested by the Kolmogorov--Smirnov test. Dealing with a non-normal distribution, non-parametric tests were used for the statistical analysis, namely the Wilcoxon and Mann-Whitney tests. Between-groups comparisons of the mean scores obtained in the several moments of assessment were made using the t student test. Significance level was set to 0.05 (5%).

All ethical procedures were met (informed consent, confidentiality and anonymity) as the Helsinki Declaration on Ethics in Research Involving Human Subjects.

RESULTS

The participants presented an average of 80.2 ± 7.9 years old and the majority of them were female (66.7%). The most frequent marital state was widowed (56.1%). The mean number of pathologies (2.4 ±1.2) and health care consumption, namely appointments in general practitioner (0.7 ± 0.8), hospitalizations (0.4 ± 2.8) and number of daily drugs (4.2 ± 2.3), were referred by the participants. There are statistically significant differences between the two groups in age and number of daily drugs (group 1 has a higher average). Gender, marital state, number of pathologies and hospitalizations doesn't show significant differences (Table 2).

Table 2 - Characteristics of participants

Characteristics	Total (n = 57)	Group 1 (n = 27)	Group 2 (n = 30)	*p value*
Age (years)	80,2 ± 7,9	83,6 ± 5,1	77,1 ± 8,8	0,005
Gender				0,577
Female	38 (66,7)	19 (70,4)	19 (63,3)	
Male	19 (33,3)	8 (29,6)	11 (36,7)	
Marital Status				0,542
Single	5 (8,8)	4 (14,8)	1 (3,3)	
Married	17 (29,8)	4 (14,8)	13 (43,3)	
Widowed	32 (56,1)	18 (66,7)	14 (46,7)	
Divorced	3 (5,3)	1 (3,7)	2 (6,7)	
N.º of referred pathologies	2,4 ± 1,2	2,6 ± 1,1	2,2 ± 1,2	0,204
N.º of medical appointments (last month)	0,72 ± 0,79	0,74 ± 0,90	0,70± 0,7	
N.º of hospitalizations	0,04 ± 0,8	0,1 ± 0,3	0,04 ± 0,2	0,133
N.º of days hospitalized	0,4 ± 2,8	0,8 ± 4	0,4 ± 2,8	0,920
	4,2 ± 2,3	5 ± 2,3	3,4 ± 2,0	0,004

In Katz Index, the scores for BADL's showed an increasing in the mean score of the sample and in both sub-samples, both between t0 and t1 and t1 and t2. Comparing both groups has concluded that lower scores are obtained in group 2 in every tested moments when comparing with group 1 and those differences are statistically significant in t1 and t2 (Table 3).

Table 3 - Average of scores during the evaluation moments

	Total (n = 57)	Group 1 (n = 27)	Group 2 (n = 30)	*p* value
Katz Index scores in t_0	7,1 ± 1,4	7,4 ± 1,6	6,8 ± 1,2	0,101
Katz Index scores in t_1	7,4 ± 1,9	8,5 ± 2,1	7,1 ± 1,4	0,004
Katz Index scores in t_2	8,2 ± 2,3	9,3 ± 2,6	7,3 ± 1,5	0,002
IADL's scores in T0	17,56 ±6,83	20,96 ±5,28	14,50 ± 6,68	0,000
IADL's scores in T1	19,02 ± 7,37	23,96 ± 4,81	14,57 ± 6,39	0,000
IADL's scores in T2	19,74 ± 7,73	25,11 ± 4,66	14,90 ± 6,69	0,000

Quantitative variables: mean ± standard deviation; Katz Index – 6 (independent) to 18 (totally dependent); Lawton and Brody Scale - 8 (full independency) to 31 (full dependency)

* The sample was compound by participants living in institutions for third age (nursing homes)

** The sample was compound by participants living in residences in the community

t_0 – First application of the instruments in a period of 30 days (the absence of home changings in this period was counted in group 1; the first month of admission in the institution was counted in group 2)

t_1 – Assessment made in an average of 4 months after t0

t_2 – Assessment made in an average of 7 months after t0

The scores obtained in Lawton and Brody Scale for IADL's presented a similar pattern to the previous ones, with averages increasing in the whole sample and in both sub-samples. In between-groups comparison, there's a significant difference in each moment (Table 3). In order to analyze the decreased capacity to perform the tasks described in the items of the applied measures, a comparison was made between the differences in means obtained through the study timeline. With this analyze It's possible to verify that, in both groups, there's a significant increasing in the scores for BADL's in every comparisons (t0/t1; t1/t2; t0/t2), although it's more evident in group 1. In IADL's, there are significant changes in every comparisons made in group 1, but in group 2 only the comparison between the first and the last assessment has significant (Table 4).

Table 4 - Comparison of the different mean scores between the several evaluation moments

		Group 1		Group 2	
		Mean/SD	*p*	Mean/SD	*p*
BADL's	Total score_T0 - Total score_T1	-1,0 ± 1,5	0,000	-0,27 ± 0,6	0,03
	Total score _T0 - Total score _T2	-1,8 ± 1,9	0,000	-0,5 ± 0,9	0,005
	Total score _T1 - Total score _T2	-0,8 ± 1,2	0,000	-0,23 ± 0,6	0,05
IADL's	Total score _T0 - Total score _T1	-3,00 ± 4,13	0,000	-0,07 ± 1,68	0,098
	Total score _T0 - Total score _T2	-4,14 ± 4,91	0,000	-0,40 ± 1,13	0,038
	Total score _T1 - Total score _T2	-1,14 ± 3,38	0,040	-0,33 ± 1,21	0,098

DISCUSSION

In this study, it's possible to verify a higher average of ages in institutionalized elderly (83.59 years) than in the ones living in their own houses (77.10 years), having this results a statistically significant difference. This situation reflects the reality in residential institutions for older people, which usually integrates people with more advanced ages (Finlayson, Mallinson & Barbosa, 2005). The same predisposition is observed in some of the results referring to health care consumption, which is higher in institutionalized elderly in advanced ages and with bigger comorbidities, accordingly with the number of reported diseases, although there are no between-groups significant differences. To this level, only the daily number of medicine/drugs presents significant differences.

Yumin, Simsek, Sertel, Ozturk and Yumin (2011) showed that institutionalized elderly people present a higher dependency in instrumental activities of daily living in comparison with elderly people that still live in their houses. The same situation in BADL's and IADL's was possible to verify in this study. In elderly, the transition from their own residence to institutions is frequently associated with family difficulties to ensure the necessary care when the levels of dependency increase.

Therefore, it would be expected to find larger differences between groups in BADL's comparatively to IADL's. However, in t0, which corresponded to the beginning of the transition

to the institution in group 1, no significant differences were found between both groups. Those differences are only present in the following moments and in IADL's.

The scores obtained in Katz Index and Lawton Scale showed also the progressive reduction in ability to perform de BADL's and IADL's in both groups. However, while the decreasing is significant in all the temporal comparisons and in both scales for the group of institutionalized elderly, in group 2 (where the subjects maintained their residence) there are no statistically significant differences between t0 and t1 and t1 and t2 in IADL's. The results are significant only when the values are compared with higher temporal lags (t0/t2). On the other and, the difference in BADL's is also statistically significant, but it's possible to see that medium values had a smaller acceleration through time. As so, the institutionalization may drive to a greater loss of capacity to perform ADL's in older people, such as may be observed in other studies (Dechamps et al., 2010; Forster, Lambley & Young, 2010).

In this analysis of the results should be considered two limitations of the study related to the age difference between the groups and the different ability to perform IAVD's in the start of the study.

CONCLUSION

Bearing in mind that institutionalized elderly people have higher and faster losses in ability to perform ADL's, especially in instrumental activities, it's then important to reinforce Ball et al. (2004) notion that it's vital for institutions to be able to meet the requirements that the whole process of aging has, so the levels of autonomy and functionality of older people can be preserved.

REFERENCES

Alves, L. C., Leimann, B. C. Q., Vasconcelos, M. E. L., Carvalho, M. S., Vasconcelos, A. G. G., Oliveira da Fonseca, T. C., . . . Laurenti, R. (2007). The effect of chronic diseases on functional status of the elderly living in the city of Sao Paulo, Brazil. *Cad Saude Publica, 23*(8), 1924-1930. Retrieved from http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0102-311X2007000800019&lng=en&tlng=pt

Araújo, F., Pais Ribeiro, J., Oliveira, A., Pinto, C., & Martins, T. (2008). Validação da escala de Lawton e Brody numa amostra de idosos não institucionalizados. In I. Leal., J. Pais Ribeiro., I. Silva., & S. Marques (Eds.), *Actas do 7º congresso nacional de psicologia da saúde* (pp. 217-220). Lisboa: ISPA.

Ball, M. M., Perkins, M. M., Whittington, F. J., Hollingsworth, C., King, S. V., & Combs, B. L. (2004). Independence in assisted living. *Journal of Aging Studies, 18(4)*, 467-483.

Baltes, M. (1996). *The Many Faces of Dependency in Old Age*. Cambridge University Press.

Crimmins, E. M., Hayward, M. D., Hagedorn, A., Saito, Y., & Brouard, N. (2009). Change in disability-free life expectancy for Americans 70-years-old and older. *Demography, 46*(3), 627-646.

Cromwell, D. A., Eagar, K., & Poulos, R. G. (2003). The performance of instrumental activities of daily living scale in screening for cognitive impairment in elderly community residents. *J Clin Epidemiol, 56*(2), 131-137.

Dechamps, A., Diolez, P., Thiaudiere, E., Tulon, A., Onifade, C., Vuong, T., . . . Bourdel-Marchasson, I. (2010). Effects of exercise programs to prevent decline in health-related quality of life in highly deconditioned institutionalized elderly persons: a randomized controlled trial. *Arch Intern Med, 170*(2), 162-169. doi: 10.1001/archinternmed.2009.489

Del Duca, G. F., Silva, M. C., & Hallal, P. C. (2009). Disability relating to basic and instrumental activities of daily living among elderly subjects. *Rev Saude Publica, 43*(5), 796-805. Retrieved from http://www.scielo.br/scielo. php?script=sci_arttext&pid=S0034-891020090005 00008&lng=en&tlng=en

Devons, C. A. (2002). Comprehensive geriatric assessment: making the most of the aging years. *Curr Opin Clin Nutr Metab Care, 5*(1), 19-24.

Duarte, Y. A., de Andrade, C. L., & Lebrão, M. L. (2007). Katz Index on elderly functionality evaluation. *Rev Esc Enferm USP,* 41(2), 317-325. Retrieved from http://www.scielo.br/scielo.php?

Finlayson, M., Mallinson, T., & Barbosa, V. M. (2005). Activities of daily living (ADL) and instrumental activities of daily living (IADL) items were stable over time in a longitudinal study on aging. *J Clin Epidemiol, 58*(4), 338-349. doi: 10.1016/j.jclinepi.2004.10.008

Forster, A., Lambley, R., & Young, J. B. (2010). Is physical rehabilitation for older people in long-term care effective? Findings from a systematic review. *Age Ageing, 39*(2), 169-175. doi: 10.1093/ageing/afp247

Graf, C. (2008). The Lawton instrumental activities of daily living scale. *Am J Nurs, 108*(4), 52-62; quiz 62-53. doi: 10.1097/01.NAJ.0000314810.46029.74

Graf, C., & Hartford Institute for Geriatric, N. (2008). The Lawton instrumental activities of daily living (IADL) scale. *Medsurg Nurs, 17*(5), 343-344.

Mendes, S. (2008). Avaliação do risco de dependência funcional em pessoas idosa. (Dissertação de mestrado não publicada). Universidade de Aveiro. Retrieved from: http://www.ideg.pt/_-avaliacao-multidimensional/#sthash.wGGAllWT.dpuf

Millan-Calenti, J. C., Tubio, J., Pita-Fernandez, S., Gonzalez-Abraldes, I., Lorenzo, T., Fernandez-Arruty, T., & Maseda, A. (2010). Prevalence of functional disability in activities of daily living (ADL), instrumental activities of daily living (IADL) and associated factors, as predictors of morbidity and mortality. *Arch Gerontol Geriatr, 50*(3), 306-310. doi: 10.1016/j.archger.2009.04.017

Mitzner, T. L., Chen, T. L., Kemp, C. C., & Rogers, W. A. (2011). Older Adults' Needs for Assistance as a Function of Living Environment. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 55*, 152-156. doi: 10.1177/1071181311551032

Mosley, J., & Guyot, G. (1987). Field dependence in the institutionalized elderly. *Exp Aging Res, 13*(1-2), 57-60. doi: 10.1080/03610738708259301

Pudaric, S., Sundquist, J., & Johansson, S. E. (2003). Country of birth, instrumental activities of daily living, self-rated health and mortality: a Swedish population-based survey of people aged 55-74. *Soc Sci Med, 56*(12), 2493-2503.

Wallace, M. & Shelkey, M. (2008). Reliability and Validity of Katz ADL Index. *American Journal of Nursing*, 108(4), 64-72. doi: 10.1097/01.NAJ.0000315266.66521.e7.

Wang, D., Zheng, J., Kurosawa, M., Inaba, Y., & Kato, N. (2009). Changes in activities of daily living (ADL) among elderly Chinese by marital status, living arrangement, and availability of healthcare over a 3-year period. *Environ Health Prev Med, 14*(2), 128-141. doi: 10.1007/s12199-008-0072-7

Yumin, E. T., Simsek, T. T., Sertel, M., Ozturk, A., & Yumin, M. (2011). The effect of functional mobility and balance on health-related quality of life (HRQoL) among elderly people living at home and those living in nursing home. *Arch Gerontol Geriatr, 52*(3), e180-184. doi: 10.1016/j.archger.2010.10.027

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