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Brief Communication

Baseline measure of activities of daily living (ADL) using Katz index of ADL on participants who were recruited to a RCT from a tertiary care hospital in Sri Lanka

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Key words: activities of daily living, Katz index of ADL, elderly, discharge planning, Sri Lanka

Abstract

Objective

Functional status is an important variable in making a discharge plan, especially for elderly patients. Main objective of this study was to assess the limitations in activities of daily living (ADL) among hospitalized elderly patients using Katz index of ADL.

Methods

A sample of 128 elderly (60 years or above) patients, equal number of male and female, admitted to six (06) medical wards of the hospital and stayed at least 48 hours between July and October 2017 were interviewed and observed using the original Katz index of ADL which includes six ADL functions, bathing, dressing, toileting, transferring, continence and feeding. Additional observation was done on patients to rectify the data obtained through the index. Data were analyzed using a computer package to obtain relative grades to assign a letter score ranging from grade A to G, A being the most independent in functioning while G represents total dependency.

Results

Majority, 65 (50.78%), was aged 60-69 years, 51 (39.84%) were 70-79 years. Seventy-seven (60.16%) participants including female (42.19%) and male (17.97%) were not employed. Most prevalent diseases were hypertension 92 (71.88%), and diabetes mellitus 90 (70.31%). Eighty-nine (69.53%) were completely independent (Grade A), 11 (8.59%) were independent (Grade B) except for one of six functions of ADL index, 23 (17.97%) were found to be dependent for at least two functions and, remarkably, only a small number 3 (2.34%) of elderly patients were identified as totally dependent for their ADL.

Conclusion

During the interview and observation, we found that transfer is often associated with mobility. In conclusion, the Katz index of Activities of Daily Living (ADL) was found to be a useful tool to obtain objective and descriptive measures of ADL of elderly patients who were selected for a RCT study.

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Introduction

Sri Lanka is one of the fastest ageing countries in the world. When compared with other regional countries, growth of the elderly population is more rapid in Sri Lanka [1]. For instance, the proportion of those aged 60 years or above was 13 percent in 2015 and it is predicted to increase to 20 percent by 2030 [2]. Furthermore, the population over 60 years is expected to reach almost 30 percent by 2050, with more than 5 percent of the population aged over 80 years [3]. After independence, Sri Lanka has provided all citizens with free health care and free education. As a result, the health and education parameters of Sri Lanka are at a higher position than other developing countries. Increased life expectancy, decreased fertility and decreased mortality rates are the major contributors to the increasing number of elderly in Sri Lanka [3].

Ageing is a natural phenomenon for an individual during his/her lifespan. However, with aging, functional abilities decline leading to poor health outcomes [4]. Lafont and colleagues (2011) reported that elders are predisposed to certain health problems such as chronic diseases and co-morbidity [5]. Moreover, Engelgau and colleagues (2010) showed that non communicable diseases (NCD) are highly associated with ageing and are a leading cause of disability among the elderly [6]. All the above consequences result in an increasing trend of hospitalization among elderly people [7,8]. Furthermore, functional decline among elderly is reported after hospitalization [9,10]. In Sri Lanka, nine out of 10 elders are suffering from some kind of chronic disease [1] which often leads to frequent hospitalization [8].

Although functional decline is frequently seen among hospitalized elderly patients, assessment of activities of daily living (ADL) using standard tools before discharge is not a common practice in Sri Lankan hospitals [11]. Moreover, premature discharge is practiced [12] due to insufficient resources to manage and care for the elderly in hospitals in Sri Lanka [11]. Consequently, elderly patients are often discharged with some kind of functional disability which sometimes increases rates of readmission [13] or even leads to death [7]. In this context, the need to assess the functional status of 'at risk' elderly patients before discharge [7,14] has been highlighted and assessing ADL when designing a discharge plan recommended [9]. However, no reference as to what measures or tools should be utilized at the point of discharge in Sri Lanka was made in these recommendations.

We identified a number of instruments used to measure ADL in elderly people. The Katz index was originally developed to assess physical functioning among older people and people with chronic illnesses in institutionalized settings [15]. However, this index is considered as the most effective instrument to measure the functional status of elderly persons and any patient, regardless of their medical condition [16]. Furthermore, it can be used in a variety of care settings and to compare baseline measurements with periodic or subsequent measures [17]. The index is recommended as a simple, cost effective and reliable measure in clinical practice [18]. Thus, the Katz index of ADL is widely used to measure the functional status of elderly patients in hospital settings [19,20,21]. Although

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the Katz Index of ADL has been used in the community setting in Sri Lanka, [22,23], paucity of published evidence impedes its application in the hospital setting.

Objective

The main objective of this study was to assess limitations in ADL among a selected group of hospitalized elderly patients using the Katz index of ADL.

Methods

Study units

The study sample was drawn from participants recruited for baseline assessment in an ongoing study and were enrolled from six medical wards of a tertiary care hospital in Sri Lanka during July to October 2017. The sample size was 128 with a 1:1 male to female ratio. Sample size was calculated for the randomized control trial (RCT) and was based on the primary outcome of the study; to represent a medium effect size and a change that corresponded to a clinically significant impact. G*Power 3 [24] was used to calculate the sample size. The study participants aged 60 years or above, who were ready to be discharged but had been in the hospital for at least 48 hours or more were included. Elderly patients who did not need follow up care, those who were terminally ill and those where the caregiver could not be identified were excluded. A baseline assessment of ADL using the Katz index was performed before they left the hospital.

Ethics approval was obtained from the Ethics Review Committees (ERC) of the Faculty of Medical Sciences of the University of Sri Jayewardenepura and the relevant teaching hospital.

Assessment of Functional Status

The functional status of the participants was assessed using the Katz index of ADL [25] after obtaining written consent. The Katz index of ADL assesses six basic physical activities of daily living including bathing, dressing, toileting, transfer, continence and feeding. Data related to socio-demographics and disease conditions were obtained using an interviewer administered questionnaire. Socio-demographic data included age, sex, civil status, ethnicity, religion, living arrangements, level of education, employment status, source of income and type of caregiver. Any disease condition present prior to current hospitalization was obtained using the same questionnaire.

A single data collector with a B.Sc. Nursing degree was trained to collect data using the available literature and videos. Moreover, pilot study experience was utilised for further training. Assessment of ADL was carried out by interviewing study participants and observation using a checklist and by obtaining collateral information from caregivers on areas related to bathing, toileting, and continence. The patients were grouped as ‘A, B, C,

D, E, F, G and Other (O) representing levels of independence in ADL. The collected data was tabulated and analyzed using computer packages.

Results

Demographic Data and Disease Conditions

The study sample consisted of 128 elderly patients with an age range from 60-89 years with a male to female ratio of 1:1. A majority of the participants 65 (50.78%) were in the 60–69-year age group followed by 51(39.84%) in the 70–79-year category while the others, 12 (9.38%), were 80-89 years (Table 1). Majority of the participants were Sinhala and Buddhist, with 124(96.88%) being Sinhalese, 3(2.34%) being Tamil and 1(0.78%) being Moor in ethnicity while 116(90.63%) were Buddhist, 10(7.8%) Roman Catholic, 1(0.78%) Hindu and 1(0.78%) Muslim.

Most participants 90(70.31%) were married and 26 (20.31%) were widowed while seven (5.47%) were single and five (3.91%) were divorced. With regard to education, majority 82(64.06%) were educated up to Grade Ten. Twenty-five (19.53%) were educated up to Grade Five, 14(10.94%) were educated up to GCE Advanced Level while only 2(1.56%) participants were educated up to bachelor's degree or diploma level. Only 3(2.34%) participants reported that they did not have any formal education.

Majority 77(60.16%) were not employed, comprising 54(84.37%) females and 23 (35.93%) males. The source of income was not specified by 84(65.63%) while 25(19.53%) obtained their income from a pension and only 14(10.4%) had income from employment. Monthly household income was between 5,000.00- 20,000.00 SLR among 49(38.28%) participants, 22(17.2%) participants stated that their monthly income was less than 10,000.00 SLR, 18(14.06%) participants had no fixed income in their households, while 12(9.38%) were unaware about household income. Except for five participants (3.91%), almost all the participants, 123(96.09%) did not benefit from any kind of health insurance.

With regard to living arrangements, majority 59(46.09%) were living with their spouse and children, 36(28.13%) were living only with children and 20(15.63%) were living only with their spouse. Only three (2.34%) were living alone. However, all the participants had primary caregivers and 53 (50.78%) of them were benefitted with additional caregivers. Most frequent co-morbid conditions were hypertension, 92(71.88%), diabetes, 90(70.31%), asthma/COPD, 43(33.6%), coronary artery diseases/heart failure, 39(30.47%) and renal failure, 23(17.97%) and stroke (6, 4.69%). Three (2.34%) participants reported that they were suffering from respiratory tract infections.

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Table 1: The sociodemographic variables with gender distribution of the participants

Variable	Results		
	Females n=64 N(%)	Males n=64 N (%)	Total n=128 N(%)
Age Group(years)			
60-69	27 (42.18)	38 (59.37)	65(50.78)
70-79	29 (45.31)	22 (34.37)	51(39.84)
80-89	8 (12.50)	4 (6.25)	12 (9.38)
Civil status			
Divorced	4(6.25)	1(1.56)	5(3.91)
Married	31(48.43)	59(92.18)	90(70.31)
Single	4(6.25)	3(4.68)	7(5.47)
Widowed	25(39.96)	1(1.56)	26(20.31)
Ethnicity			
Muslim	1(1.56)	0(0.00)	1(0.78)
Sinhala	63(98.43)	61(95.31)	124(96.88)
Tamil	0	3(4.68)	3(2.34)
Religion			
Buddhism	57(89.06)	59(92.18)	116 (90.63)
Catholic	6 (9.37)	4(6.25)	10 (7.81)
Hindu	0	1(1.56)	1 (0.78)
Islam	1(1.56)	0	1 (0.78)
Level of Education			
Bachelor's degree	0	2(3.12)	2(1.56)
Diploma	0	2(3.12)	2(1.56)
G.C.E (A/L)	8 (12.5)	6(9.37)	14(10.94)
Grade 1-5	13 (20.31)	12(18.75)	25(19.53)
Grade 6 – 10	40 (62.5)	42(65.62)	82(64.06)
No Formal Education	3 (4.68)	0	3(2.34)
Living arrangements			
Alone	1(1.56)	2(3.12)	3(2.34)
Others	2(3.12)	0	2(1.56)
With relatives	6(9.37)	2(3.12)	8(6.25)
With spouse & children	19(29.68)	40(62.5)	59(46.09)
With Spouse (Wife/Husband)	5(7.81)	15(23.43)	20(15.63)
With children	31(48.43)	5(7.81)	36(28.13)
Employment status			
Employed	3(4.68)	17(26.56)	20(15.63)
Not Employed	54(84.37)	23(35.93)	77(60.16)
Retired	7(10.93)	24(37.50)	31(24.22)

Source of income			
Employment	2(3.12)	12 (18.75)	14(10.94)
No Income	1(1.56)	0	1(0.78)
Others	49(76.56)	35(54.68)	84(65.63)
Pension	10(15.62)	15(23.43)	25(19.53)
Savings	1(1.56)	1(1.56)	2(1.56)
Welfare	1(1.56)	1(1.56)	2(1.56)
Monthly Household income (LKR)			
Less than 5,000.00	2(3.12)	2(3.12)	4 (3.13)
5000.00-10,000.00	11(17.18)	7(10.93)	18 (14.06)
10001.00-15,000.00	7(10.93)	6(9.37)	13 (10.16)
15,001.00-20,000.00	8(12.50)	10(15.62)	18 (14.06)
20,001.00-25,000.00	4(6.25)	5 (7.81)	9 (7.04)
25,001.00-30,000.00	5(7.81)	8 (12.50)	13 (10.16)
30,001.00-35,000.00	2(3.12)	1 (1.56)	3 (2.34)
35,001.00-40,000.00	1(1.56)	3 (4.68)	4 (3.12)
40,001.00-45,000.00	4(3.13)	0	4 (3.13)
45,001.00-50,000.00	1(0.78)	6 (9.37)	7 (5.47)
more than 50,000.00	2(1.56)	3 (4.68)	5 (3.91)
No fixed income	11(17.18)	7 (10.93)	18 (14.06)
not mentioned	6(9.37)	6 (9.37)	12 (9.38)
Availability of health insurance			
No	62(96.87)	61(95.31)	123 (96.09)
Yes	2(3.12	3 (4.68)	5 (3.91)
Type of primary caregiver			
Brother / Sister	1(1.56)	0	1(0.78)
Neighbor	0	1(1.56)	1(0.78)
Relative	6(9.37)	2(3.12)	8(6.25)
Son / Daughter	49(76.56)	12(18.75)	61(47.66)
Spouse (Husband / Wife)	8(12.50)	49(76.56)	57(44.53)
Type of secondary caregiver			
Neighbor	1(1.56)	0	1(0.78)
Others	1(1.56)	0	1(0.78)
Relative	1(1.56)	1(1.56)	2(1.56)
Son / Daughter	8(12.50)	40 (62.50)	48(37.50)
Spouse (Husband / Wife)	0	1(1,56)	1(0.78)
None	53(82.81)	22(3.37)	75(58.59)

Results of Katz index of ADL

Majority of participants belonged to Group A (89, 69.53%) who are full independent. Second largest category, Group O (dependent in at least two functions but cannot be classified under C, D, E, or F) consisted of 23 (17.97%) participants. The third largest category, Group B (independent but one of basic ADL is limited) consisted of 11(8.59%) participants. This limitation was mainly in terms of continence. With regard to the partially dependent group, dependence in toileting and transfer were the more frequent disabilities encountered (Figure 1 & Table 2). In total, 29(22.66%) participants reported

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some kind of disability in toileting while 27(21.10%) were disabled in transferring. Remarkably, only three (2.34%) participants were dependent in all six functions (Table 3).

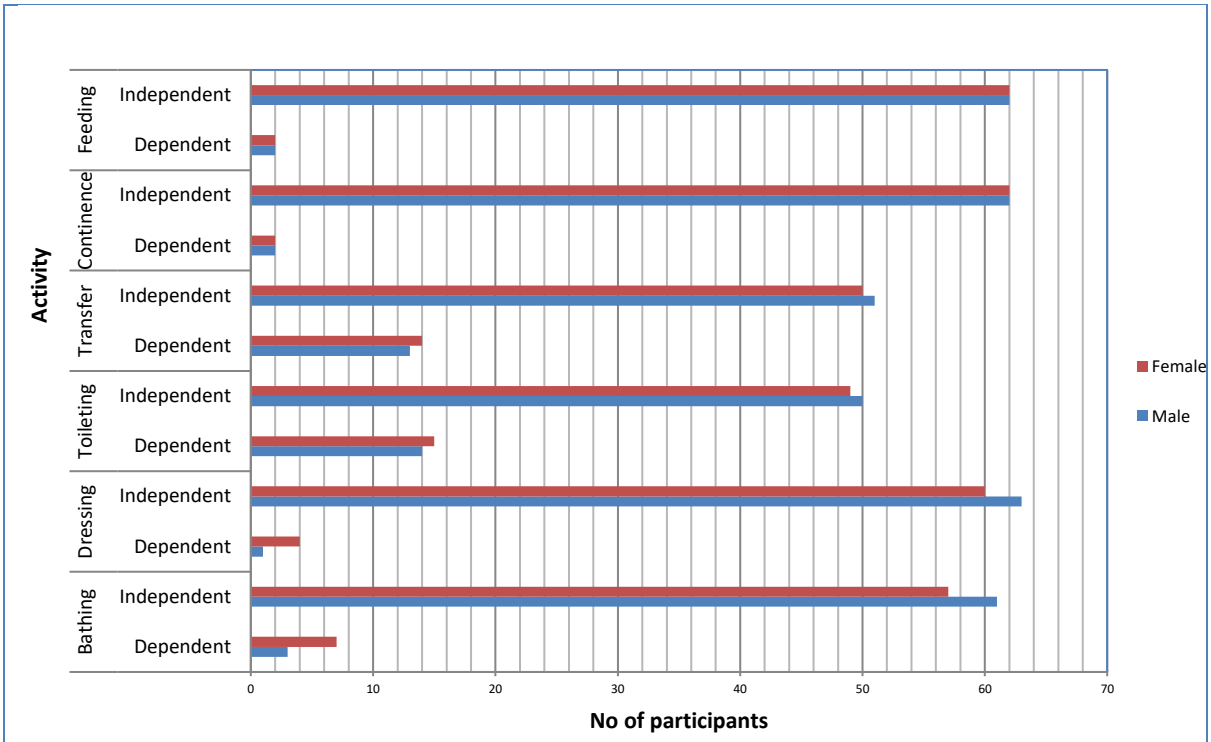

Figure1: Graphical demonstration of the gender distribution of dependency using Katz index of ADL

Table 2: Gender distribution of dependency using Katz index of ADL

Activity	Status	Females n=64 N(%)	Males n=64 N (%)	Total n=128 N(%)
Bathing	Dependent	3 (4.68)	7(10.93)	10(7.81)
	Independent	61(95.31)	57(89.06)	118(92.19)
Dressing	Dependent	1(1.56)	4(6.25)	5(3.91)
	Independent	63(98.43)	60(93.75)	123(96.10)
Toileting	Dependent	14(21.87)	15(23.43)	29(22.66)
	Independent	50(78.12)	49(76.56)	99(77.34)
Transfer	Dependent	13(20.31)	14(21.87)	27(21.10)
	Independent	51(79.68)	50(78.12)	101(78.90)
Continence	Dependent	2(3.12)	2(3.12)	4(3.12)
	Independent	62(96.87)	62(96.87)	124(96.88)
Feeding	Dependent	2(3.12)	2(3.12)	4(3.12)
	Independent	62(96.87)	62(96.87)	124(96.87)

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Table 3: Gender and age group distribution in level of function using the Katz index of ADLs

ADL Grade	Variables Gender & Age group								
	Females n=64 N (%)				Males n=64 N (%)				Total n=128 N (%)
	60-69	70-79	80-89	Total	60-69	70-79	80-89	Total	
A (full Independent)	16 (25.00)	19 (29.68)	7 (10.93)	42 (65.62)	28 (43.75)	16 (25.0)	3 (4.68)	47 (73.43)	89 (69.53)
B (independent in all except one)	3 (4.68	4 (6.25)	1 (1.56)	8 (12.50)	1 (1.56)	1 (1.56)	1 (1.56)	3 (4.68)	11 (8.59)
C (independent in all but depend on bathing and one additional function)	-	-	-	-	-	-	-	-	-
D (independent in all but depends on bathing, dressing, and one additional function)	-	-	-	-	-	-	-	-	-
E (independent in all but bathing, dressing, going to toilet, and one additional function are dependent)	2 (3.12)	-	-	2 (3.12)	-	-	-	-	2 (1.56)
F (independent in all except bathing, dressing, going to toilet, transferring, and one additional function)	-	-	-	-	-	-	-	-	-
G (most dependent level)	2 (3.12)	-	-	2 (3.12)	1 (1.56)	-	-	1 (1.56)	3 (2.34)
O (dependent in at least two functions, which cannot be classified under C, D, E, or F)	5 (7.81)	5 (7.81)	-	10 (15.62)	8 (12.50)	5 (7.81)	-	13 (20.31)	23 (17.97)

Discussion

The main objective of this study was to assess the status of independence in ADL among hospitalized elderly patients using the Katz index of ADL.

The findings of the study were compatible with the demographic profile of Sri Lanka. Firstly, although we recruited equal numbers of males and females into the study, the proportion of females increased with advanced age (Table 1). Secondly, the female widowed were higher than male widowered. Thirdly, although a higher number of males were living either with their spouse or with their children, a relatively large number of females were living only with their children. These findings are compatible with the demographic transition in Sri Lanka [2,3] in which female life expectancy is higher than that of males. A large proportion of caregivers are either sons or daughters. This can be attributed to the fact that, in Sri Lanka, parents living in the extended family are usually cared for by their children who become main caregivers to their parents. Majority of females 54 (84.37%) were not employed, and the source of their income was not specified in 49 (76.56%), probably as their expenses are borne by their relatives.

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ADL are the fundamental skills activities that an individual needs to perform to manage his or her basic needs and covers the areas of personal hygiene, dressing, toileting, continence, transferring and eating. In our study, limitation of ADL (Grade G and Grade O) was 21% (table 3). Only comparable hospital-based study done in Sri Lanka reported that there was 20% limitation in BADL at the discharge [13]. However, findings cannot be compared as the latter has used a different ADL index (Barthel's). Similarly, a study done by Courtney and colleagues in 2012 [20] in a hospital setting in Australia with 128 elderly patients, reported that the majority of participants were independent in their BADL. Another study in Brazil found that no totally dependent patients among the elderly in that study but 18 (86%) were partial dependent while three (14%) were totally independent [26].

The Katz index is based on an underlying theoretical dimension [25] that items are organized in a hierarchy of difficulty or severity [15] from most complex activities, such as bathing/dressing and, to least complex activities such as going to the toilet. Jagger and colleagues [26] suggested that bathing was the first ADL with which people had a difficulty, followed by mobility, toileting, dressing, transfer and feeding. In this study, 'transfer' was associated with 'mobility' during hospitalization. This is in contrast to the findings in Sri Lankan community-based studies [22,23], perhaps the setting was different. However, and therefore, the above results obtained in this sample is incompatible with the Sri Lankan population when the same instrument used in community-based studies in Sri Lanka [22,23].

With regard to limitations in ADL measure, a large majority were independent in all BADL (Group A) while one tenth of them were independent in all except one activity (Group B). Therefore, most of them were able to perform their basic activities of daily living without the help of others. The number in the other extreme, fully dependent level (Group G) were insignificant.

In summary, the globally accepted Katz index of ADL was found to be a useful tool to assess ADL in this group. A remarkable feature of the index is the grading system which is objective as well as descriptive. The analytical framework is also simple to use. Therefore, this index is suitable to assess ADL among elderly patients in tertiary care hospitals in Sri Lanka.

Conclusion

This study measured the level of independence in ADL of elderly patients before being discharged from a tertiary care hospital in Sri Lanka. This baseline data using the Katz index of ADL measure will allow comparisons to be made of the functional status of elderly patients after the follow up period of the RCT is over.

Limitations

A major limitation of this study was that the study participants (study units) were those who had been already recruited to a RCT study. The other limitation was the exclusion of

people who did not have caregivers. Recruitment of equal sex may be a minor limitation as the findings of the study reflected the current demographic and epidemiological pattern in Sri Lanka.

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