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Factors Associated with Activities of Daily Living among Stroke Survivors Attending Follow-up Clinics at Teaching Hospital, Karapitiya

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Abstract

Background: Stroke is a leading cause of adult disability in the world. It can affect the activities of daily living (ADL) of stroke survivors. Identifying the factors associated with ADL of stroke survivors is vital to provide proper rehabilitation and to improve the quality of life.

Objectives: To determine the level of dependence on ADL and the factors associated with ADL of stroke survivors.

Methods: A descriptive cross-sectional study was conducted with the participation of 257 stroke survivors attending follow-up neurology and medical clinics after three months of hospital discharge at Teaching Hospital Karapitiya. Convenient sampling technique was used and every consecutive patient who fulfilled the inclusion criteria was invited to participate in the study. Barthel index (BI) was used to assess the ADL and a self-developed interviewer-administered questionnaire was used to assess the socio-demographic and clinical parameters.

Results: The mean (SD) age of the participants was 66.12 ($\pm$11.6) years and 58.8% were males. Among the participants, 80.9% had ischemic strokes. The mean (SD) BI score three months after discharge was 64.7 ($\pm$26.4). Of the participants, 40.8% were severely dependent on the ADL. The level of dependence was negatively correlated with age (r=-0.13, $p<0.05$). Age, marital status, occupation, type of stroke, level of disability at the time of hospital discharge, receiving rehabilitation, and follow-up care were significantly associated with ADL ($p<0.05$). Significant predictors of ADL were level of disability, duration of hospitalization, and regularity of follow-up care treatment ($p<0.05$).

Conclusions: Young age, married, doing a formal occupation, longer hospital stay, receiving continued rehabilitation therapies, and regular follow-up care had better independence on ADL. Therefore, it is vital to plan appropriate rehabilitation interventions to improve ADL.

Keywords: *Activities of daily living, Disability, Rehabilitation, Stroke*

Introduction

Stroke has been ranked as the second-leading cause of death and the third leading cause of disability in the world (1). The percentage of disability-adjusted life years (DALYs) due to stroke is higher in low and middle-income countries compared to high-income countries (2). In Sri Lanka, stroke is considered as the leading cause of adult disabilitiy while the incidence of stroke is predicted to increase with the epidemiological transition (3). Age is one of the most vital non-modifiable risk factors for stroke. Therefore, the prevalence of stroke will be increased with increasing the proportion of older population in the country (4). In Sri Lanka, there is a decline in stroke mortality which has moved from the 5th to the 6th leading cause of in-hospital deaths. However, the number of survivors remaining with disabilities are in an upward trend (4).

Stroke can cause different types of consequences including paresis, motor impairments, memory, cognitive, language and sensory impairments (5). These disabilities can interfere with the activities of daily living (ADL) which affect the overall well-being of a person (6). ADL are the day-to-day activities that a person carried out including self-care activities such as feeding, grooming, bathing, using the toilet, etc. When the patients are unable to carry out self-care activities of daily living, their quality of life can be affected. Moreover, dependence on ADL on others can be a burden to their family as well as the society. According to a previous study conducted in Australia, around 75% of stroke survivors suffer from difficulties to carry out ADL (7). Previous studies demonstrated that there is a significant association between ADL and the quality of life in patients with stroke (8,9). Reduced physical function due to stroke is also associated with depression (10). Therefore, identifying the factors associated with ADL among patients with stroke will be important to provide proper rehabilitation as well as to improve the quality of life.

Several factors can affect the ability to carry out ADL among patients with stroke. According to Pei et al, clinical factors such as the frequency of stroke, type of stroke, nutritional status, and socio-demographic factors such as financial status, and age had a significant effect on the ADL (11). The ADL was decreased when the patient has severe physical disabilities and it is considered a factor that can affect the reintegration to normal life after stroke (12).

Patients with disabilities should receive proper rehabilitation and follow-up care, especially in the community. In the current Sri Lankan setting the facilities and resources for community-based rehabilitation are minimally developed. To the best of our knowledge, no studies have been conducted to assess the activities of daily living and associated factors among stroke survivors in the Sri Lankan context. Therefore, this study was conducted to identify the factors associated with ADL among stroke survivors.

Methods and materials

Study design and sampling

A descriptive cross-sectional study was conducted among community-dwelling stroke survivors who were attending follow-up clinics at Teaching Hospital Karapitiya. Convenient sampling technique was used to collect data. Every consecutive patient admitted to the hospital due to a stroke was invited to participate in the study, if they fulfilled the inclusion criteria (n=289). Patients aged 30-80 years were recruited for the study. Those aged >80 years, patients with other neurological disorders, major psychiatric disorders, and those with disabilities before the onset of stroke were excluded from the study (n=79). The level of dependence and disability were assessed at the time of hospital discharge of 289 patients. Out of 289 patients, 257 patients were followed up after 3 months during their follow up visits at neurology and medical clinics.

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Ethical approval for the study was obtained from the Ethics Review Committee, Faculty of Medicine University of Ruhuna (ref.num-26.05.2015:3.15), and written informed consent was obtained from the patient or next of kin of the patient.

Study instruments

Socio-demographic characteristics (gender, age, occupation, level of education, income, marital status) and clinical parameters (type of stroke, presence of NCDs, duration of hospitalization), rehabilitation, and details regarding follow up care (receiving physiotherapy, Ayurveda treatment, frequency of follow up care, etc.), and support received from the family members were assessed using an interviewer administered questionnaire and records of the patients.

The validated Sinhala version of the BI was used to assess the level of dependence on ADL (13). There are items related to two main categories as self-care and mobility. To assess self-care activities six subscales were used including feeding, grooming, bathing, dressing, bowel and bladder care, and toilet use. The mobility of the patients was assessed using subscales including ambulation, transfers, and stair climbing. The total score of BI varies between 0-100 with 0 indicating the worst dependence on ADL and 100 representing the complete independent state on ADL. Patients were further categorized as totally dependent (score between 0-20), severely dependent (score between 21-60), moderately dependent (score between 61-90), and slightly dependent (score between 91-99). The Modified Ranking Scale (MRS) was used to assess the level of disability among patients at the time of hospital discharge. Data collection was done by the principal investigator who has prior experience in working with stroke survivors.

Data analysis

Data were analysed using the Statistical Package of Social Sciences (SPSS) version 20. Kolmogorov-Smirnov test was used to assess the normality of data. Descriptive statistics, Pearson correlation, one-way ANOVA and independent sample t-test were used to determine the association of those factors with the BI score to determine the associations. The variables which are significantly associated ($p<0.05$) were further analysed using multiple linear regression analysis. The weak correlations were excluded by applying a stepwise manner to identify the independent predictors of the level of dependence of patients with stroke. The $p<0.05$ was considered statistically significant.

Results

Socio-demographic and clinical parameters of the patients

The mean age (SD) of the participants was 66.12 (±11.6) years and 58.8% were males. Of all patients, 39.7% had obtained primary education and the majority of the patients (75.9%) were married. The majority (80.9%) were admitted to the hospital to due ischemic strokes, while 19.1% were admitted with haemorrhagic strokes. Out of the study sample, 36.2% stayed in the hospital for less than three days. The most prevalent comorbid NCD was hypertension (65.0%) followed by diabetes mellitus (31.1%) and dyslipidaemia (36.2%).

The participation in rehabilitation including physiotherapy, speech therapy, and occupational therapy was 51.8%, 14.0%, and 4.7%, respectively. Out of all the patients, 50.2% mentioned that they received Ayurvedic treatment.

Most of the patients (75.9%) were satisfied with the support they received from the family members. Of all patients with stroke, (66.5%) regularly participated for follow-up care. Rehabilitation and follow up care of the patients with stroke are shown in Table 1.

Table 1: Rehabilitation therapies and follow-up care of the stroke survivors (n=257)

Factor	Category	n	%
Rehabilitation (physiotherapy)	Received	133	51.8
	Not received	124	48.2
Rehabilitation (occupational therapy)	Received	12	4.7
	Not received	245	95.3
Ayurvedic treatment	Received	129	50.2
	Not received	128	49.8
Follow up clinic visits	Continue regularly	171	66.5
	Not regular	86	33.5
Support from family members	Very satisfied	58	22.6
	Satisfied	195	75.9
	Not satisfied	4	1.6

The level of dependence on ADL

The mean (SD) BI score at the time of hospital discharge [52.24 ($\pm$26.7)] was significantly lower than the BI score at the time of follow-up after three months [64.7 ($\pm$26.4)]. The level of dependence on ADL according to the BI score is shown in Table 2.

Table 2: Level of dependence of the stroke survivors (n=257)

Level of dependence	At the time of hospital discharge		Follow up (after three months)	
Level of dependence (BI score out of 100)	n	%	n	%
Totally dependent (0-20)	34	16.7	24	9.3
Severely dependent (21-60)	109	42.4	81	31.5
Moderately dependent (61-90)	94	36.6	112	43.6
Slightly dependent (91-99)	8	3.1	7	2.7
Complete physical independent (100)	3	1.2	33	12.8

Factors associated with the level of dependence on ADL

The level of dependence which was assessed using the BI score was negatively correlated with the age (r=-0.13, $p<0.05$). The level of dependence was significantly associated with marital status, employment status, type of stroke, duration of hospitalization, level of disability, receiving physiotherapy and follow-up care. The associations are shown in Table 3.

Those who were married obtained higher mean scores for the BI (67.6$\pm$25.3) than unmarried/widowed participants [$F_{(2, 254)}$=5.3, $p<0.05$]. The level of dependence was significantly different based on the employment status ($p<0.05$). Those who did not have a job/housewives obtained significantly lower scores for the BI than others.

Patients with ischemic strokes had a significantly better level of dependence (67.1$\pm$25) than patients with haemorrhagic strokes (54.8$\pm$29) at $t_{(255)}$=2.98, $p<0.01$. Further, patients with

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no/slight disability at the time of discharge obtained higher scores for the BI than those who had moderate/ severe disability levels [$F(2, 254)=155.9$, $p<0.01$].

Moreover, those who spent more days (more than five days) in the hospital obtained significantly lower ($p<0.05$) BI scores (56.1±32) than others. Those who received physiotherapy obtained significantly lower BI scores (60.9±25) than those who did not receive physiotherapy (68.9±26), $p<0.05$. The level of dependence was significantly lower for those who received Ayurvedic treatment (59.8±25), $p<0.05$ than for those who did not receive (70.3±26), $p<0.05$. Further, the level of dependence was significantly different based on the regularity of follow-up care. Those who participated in regular follow-up care (67.9±25) had a higher level of dependence than those who did not attend follow-up care regularly (58.3±24), ($p<0.05$). Gender, level of education, monthly income, presence of other non-communicable diseases, level of satisfaction with family support, and distance to the hospital was not significantly associated with ADL after three months of discharge ($p>0.05$).

Table 3: Factors Associated with the Activities of daily living of stroke survivors (n=257)

Factor		Mean (SD)	*p*-value
Marital status	Married (n=195)	67.6 (25.3)	0.006**
	Unmarried (n=26)	59 (29.4)	
	Widowed/separated (n=36)	53.3 (27.2)	
Employment	Involve in any occupation (n=85)	63.7 (26.3)	0.036*
	Business (n=41)	75.5 (18.6)	
	Retired (n=54)	63.3 (27)	
	No job/housewife (n=77)	61.2 (28.7)	
Type of stroke	Ischemic (n=208)	67.1 (25)	0.003**
	Haemorrhagic (n=49)	54.8 (29.9)	
	Not received (n=247)	64 (26.6)	
Duration of hospital stay	< 3 days (n=93)	72.7 (23.7)	0.001**
	3-5 days (n=110)	62.2 (23.9)	
	> 5 days (n=54)	56.1 (31.7)	
Level of disability	No/slight disability (n=53)	92.9 (9.5)	0.001**
	Moderate disability (n=58)	81.1 (8.6)	
	Severe disability (n=146)	48 (22.1)	
Rehabilitation (physiotherapy)	Received (n=133)	60.9 (25.8)	0.003**
	Not received (n=124)	68.9 (26.5)	
Ayurvedic treatment	Received (n=129)	59.8 (25.4)	0.001**
	Not received (n=128)	70.2 (26.1)	
Follow-up	Regular (n=171)	68 (25)	0.005**
	Not regular (n=86)	58.3 (24.2)	

* Statistically significant at the level of $p<0.05$
SD- Standard Deviation

Independent predictors of the post stroke level of dependence
The associated variables were further analysed using regression analysis to identify the independent predictors. The results of multiple linear regression showed that the model explained 56% of the variance ($R^2=0.56$). The significant predictors of the level of dependence

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in patients with stroke were level of disability at the time of discharge, duration of hospitalization, regularity of follow up care treatment, [$F(3, 253)=107.1$, $p<0.05$]. Patients with no/slight disability, shorter hospital stay and regular follow-up care had better BI scores than other patients.

Discussion

The main aim of the current study was to identify the level of dependence on ADL and to determine the factors associated with ADL among patients with stroke. As we expected the ability to perform ADL had improved after 3 months of hospital discharge as measured by the BI. The mean BI score was 52.2 at the time of hospital discharge and this finding is in line with a previous study which was conducted in China, where the mean BI score was 50.5 (11). The level of dependence was significantly associated with socio-demographic factors as age, marital status, and employment status. Moreover, the level of dependence was significantly different based on clinical parameters such as type of stroke, duration of hospitalization, level of disability, receiving physiotherapy, and follow-up care. Out of these factors, the level of disability at the time of discharge, duration of hospitalization, and regularity of follow-up care treatment were the independent predictors of the level of dependence on ADL among patients with stroke in our study.

According to Pei et al, socio-demographic factors such as financial status, and age had a significant effect on ADL which is comparatively similar to the current study findings (11). Older age the decline ADL, and further, when the patients have a comparatively better financial status it is easier to access the health care facilities and to follow up the treatment regimen effectively. Although in the present study gender is not significantly associated with ADL, previous literature showed that women had a greater degree of dependence than men (14). Those who are married obtained significantly higher scores for ADL which is in line with a previous study (15). This may be due to the effective role of the family caregivers who take care of their family members and help to recover from the disability. Receiving physiotherapy and rehabilitation is associated with ADL in a previous study (16). These results are comparatively similar to our study findings as in the current study the regularity of follow-up care and receiving rehabilitation are associated with ADL. Further, the cognitive impairment which was measured using MMSE showed a significant association with the level of dependence (17). The current study did not assess the level of cognition and the association with ADL. Therefore, it is not possible to conclude whether cognitive impairment inhibits the recovery process and affects ADL.

The current study was conducted with the participation of 257 stroke survivors and after three months of discharge from the hospital, their level of dependence was measured. The large sample size to represent the patients with stroke is a strength of the study. Further, this study was carried out in Teaching Hospital, Karapitiya which is the major tertiary care hospital in the Southern province of Sri Lanka. Therefore, patients from a vast area of the Southern province attend the clinics. As limitations, the level of cognition and psychological status of the patients were not assessed in the current study. Therefore, the impact of the above-mentioned limitations on the level of dependence cannot be determined based on the current study findings.

The findings of the current study will be important for the health care workers, formal and informal caregivers, and policymakers to arrange proper rehabilitation treatment regimens for patients with stroke. The associated factors with ADL can be taken into account when caring the patients. Further, nursing interventions can be planned to improve the ADL of stroke survivors in future studies.

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Conclusions

Activities of Daily Living of stroke survivors has significantly improved after three months when compared to the level of dependence at the time of discharge. However, a significant percentage of stroke survivors are dependent on ADL. Patients with young age, married, and with proper financial income and proper follow-up care had better level of independence on ADL scores. Patients with a higher level of disability at the time of discharge and long hospital stay had lower BI scores indicating a higher level of dependence. Therefore, it is vital to plan timely rehabilitation interventions to improve ADLs.

Acknowledgement

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