

**ORIGINAL ARTICLE****Clinical and Psychosocial Predictors of Community Reintegration of Stroke Survivors Three Months Post In-Hospital Discharge**Nelson EKECHUKWU<sup>1</sup>, Olubukola OLALEYE<sup>2</sup>, Talhatu HAMZAT<sup>2\*</sup>**OPEN ACCESS**

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**ABSTRACT**

**BACKGROUND:** *There appears to be a dearth of published literature on the biopsychosocial predictors of community reintegration (CR) among stroke survivors. This study aims to investigate the clinical and psychosocial predictors of CR among stroke survivors three months post in-hospital discharge.*

**METHODS:** *Fifty-two stroke survivors took part in this prospective exploratory study. The participants' clinical attributes of motor function (MF), balance (Bal) and psychosocial characteristics of Fall Self-Efficacy (FSE), Balance Self-Efficacy (BSE), Self-Esteem (SEst) and Social Support (SS) were assessed pre-discharge and at three months post-discharge. CR was also assessed at three months post-discharge. Data were analyzed using paired t-test, Pearson's Moment correlation and multiple regressions. Level of significance was set at  $p = 0.05$*

**RESULTS:** *The mean age of the participants was  $61.21 \pm 11.25$  years with mean hospital length of stay of  $5.31 \pm 3.71$  weeks. There were significant differences in the mean MF, Bal, FSE, BSE, SEst and SS scores of the participants pre- and post-discharge ( $p < 0.05$ ). Also, there was a significant correlation between CR and each of MF, Bal, FSE, BSE, SEst and SS. Pre-discharge Age ( $\beta = -0.226$ ,  $p = 0.001$ ) and FSE ( $\beta = 1.387$ ,  $p = 0.040$ ) significantly predicted CR. Post-discharge age ( $\beta = -0.164$ ,  $p = 0.005$ ) and Bal ( $\beta = 0.142$ ,  $p = 0.048$ ). FSE ( $\beta = 1.243$ ,  $p = 0.034$ ) also significantly predicted CR.*

**CONCLUSION:** *Age, Bal and FSE are important predictors of CR among stroke survivors. Therefore, rehabilitation programmes should focus on improving Bal and FSE in order to enhance community reintegration among stroke survivors.*

**KEYWORDS:** *Clinical Attributes, Psychosocial Characteristics, Community Reintegration, Stroke Survivors*

**INTRODUCTION**

Stroke is the second leading cause of death globally. It is a major cause of activity limitation as well as participation restriction among survivors (1). Reports (2,3) suggested an increasing incidence of stroke in Nigeria. The frequency of stroke in hospital populations varied from 0.9% to 4.0%, and it accounted for 0.5% to 45% of

neurological admissions (3). Stroke accounted for 5% to 17% of medical deaths in Nigeria (2,3). Therefore, stroke is a significant health problem in Nigeria and places a huge burden on the health services in the country. Rehabilitation plays an important role in reducing the burden of disability associated with stroke (4). One of the key elements and aims of stroke rehabilitation is community reintegration (4,5).

Community reintegration, an integral part of the concept of participation (6), is often the most underestimated component of stroke rehabilitation (7). It marks the end of rehabilitation for most professionals in the field of stroke rehabilitation. The characteristics of a person's environment such as social support affect participation after stroke (8). Therefore, in addition to promoting physical recovery (clinical attributes), a major goal of stroke rehabilitation is to minimize psychosocial morbidity (psychosocial characteristics) in order to promote the reintegration of stroke survivors into their family and community. There appears to be a dearth of published literature on the biopsychosocial predictors of community reintegration among Nigerian stroke survivors before and after the discharge from in-patient care into the communities. This study investigated the clinical and psychosocial predictors of community reintegration of stroke survivors three months post in-patient discharge.

## METHODS

**Study Design:** A prospective exploratory study was used. The minimum sample size was calculated using the expression of medium effect:  $n = N (Z_1 + Z_2)^2 / ES^2 + 10\%$  expected attrition; where  $n$  = minimum sample size,  $N$  = number of groups = 1,  $Z_1$  =  $\alpha$ - confidence interval at 0.05 = 1.96,  $Z_2$  =  $\beta$ - confidence interval at 0.02 = 0.84, and  $ES$  = medium effect of 0.4.

Fifty-five stroke survivors were recruited into this study from three tertiary hospitals in three geopolitical zones in Nigeria. Stroke patients with cognition deficit or any other known neurological impairment(s) were excluded from the study. However, only 52 stroke survivors completed the study.

**Instruments:** Reintegration to Normal Living Index was used to assess community reintegration of participants (9). State Self-Esteem Scale (10), Social Support Questionnaire (11), Activity-Specific Balance Confidence Scale (12) and Fall Efficacy Scale (13) were used to assess self-esteem, perceived social support, balance self-efficacy and fall self-efficacy of the participants respectively. The Fugl-Meyer Assessment Scale (14) and Berg Balance Scale (15) were used to assess motor function and balance among the participants respectively.

**Procedure:** Ethical approval for the study was obtained from the respective ethical committees of the three tertiary hospitals from which participants were recruited. The procedure for the study was explained to the patients before obtaining their informed consent. Medical history and demographic variables of participants were obtained from their case notes and/or through interview. The clinical attributes of motor function (MF1), balance (Bal1) and psychosocial attributes of Balance Self-Efficacy (BSE1), Fall Self-Efficacy (FSE1), Self-Esteem (SEst1) and Social Support (SS1) of the participants were measured at the point of in-patient discharge (pre-discharge). The level of community reintegration (CR) was assessed at three months post-discharge along with the clinical attributes of motor function (MF2) and balance (Bal2). Similarly, the psychosocial attributes of Balance Self-Efficacy (BSE2), Fall Self-Efficacy (FSE2), Self-Esteem (SEst2) and Social Support (SS2) were assessed three months after in-patient discharge.

**Data analyses:** The data were analyzed using SPSS package version 20.0. Descriptive statistics of mean, standard deviation and percentages were used to summarize the data. Pearson's Moment correlation coefficient was used to evaluate the association between community reintegration and each of the clinical and psychosocial attributes at the points of discharge from in-patient facility and three months after discharge from the health facility. Partial correlation was used to adjust for the influence of patients' physical characteristics. Multiple regression analysis was used to identify the predictors of community reintegration pre- and three months post-discharge. The level of significance was set at  $p = 0.05$ .

## RESULTS

A total of 55 stroke patients (26 males, 29 females) were recruited for this study. However, only 52 (25 males, 27 females) completed the study. One of the participants had a second stroke while the other two changed their places of residence outside the location of study. The mean age of the participants was  $61.21 \pm 11.25$  years with

age range of 31 – 86 years. The mean length of hospital stay was  $5.31 \pm 3.71$  weeks (Table 1).

The mean MF1 and Bal1 scores were  $24.02 \pm 20.01$  and  $9.9 \pm 5.59$  respectively while the mean MF2 and Bal2 scores were  $62.81 \pm 22.05$  and  $36.27 \pm 10.95$  in that order. There was a significant difference between the MF1 and MF2 and between Bal1 and Bal2 scores ( $p < 0.001$ ) of the

Table 1: Demographic Characteristics of the Patients (N = 52).

Variable	Category	n	%
<b>Location</b>	Port Harcourt	24	46.2
	Enugu	17	32.7
	Ibadan	11	21.2
<b>Gender</b>	Male	25	48.1
	Female	27	51.9
<b>Occupation</b>	Farmer	5	9.6
	Trader	11	21.2
	Businessman/woman	10	19.2
	Retiree	8	15.4
	Civil Servant	18	34.6
<b>Age (years)</b>	30 – 39	3	5.8
	40 – 49	2	3.9
	50 – 59	18	34.6
	60 – 69	16	30.8
	70 – 79	10	19.2
	80 – 89	3	5.8
<b>Type of Stroke</b>	Ischaemic	38	73.1
	Haemorrhagic	14	26.9
<b>Laterality of Stroke</b>	Right	29	55.8
	Left	23	44.2
<b>Occurrence of stroke</b>	Once	46	88.5
	Twice	6	11.5
<b>Duration of Stay in hospital ward(weeks)</b>	0.0 - 2.0	6	11.5
	3.0 - 5.0	30	57.7
	6.0 - 9.0	11	21.2
	10.0 - 13.0	4	7.7
	> 13.00	1	1.9
<b>Duration of PT before discharge (weeks)</b>	0.0 - 2.0	27	51.9
	3.0 - 5.0	20	38.5
	6.0 - 9.0	5	9.6

participants. Similarly, there was a significant difference ( $p < 0.05$ ) between psychosocial variables pre- and post-discharge (Table 2).

Table 2: Comparison of the Pre-Discharge and Post-Discharge Variables of the Participants (N = 52).

Variables	Mean	S.D	t	df	Sig. (2-tailed)
MF Pair	MF1	24.02	-17.77	51	0.0001*
	MF2	62.81			
BAL Pair	BAL1	9.94	-18.25	51	0.0001*
	BAL2	36.27			
FSE Pair	FSE1	3.18	-18.60	51	0.0001*
	FSE2	6.30			
BSE Pair	BSE1	24.16	-15.25	51	0.0001*
	BSE2	52.26			
SEst Pair	SEst1	58.6346	-13.46	51	0.0001*
	SEst2	74.1731			
SS Pair	SS1	2.4844	-3.22	51	0.002*
	SS2	2.7858			

\* = Significant difference at  $p = 0.05$ , FSE1 = Fall Self Efficacy pre-discharge, FSE2 = Fall Self Efficacy post-discharge, BSE1 = Balance Self Efficacy pre-discharge, BSE2 = Balance Self Efficacy post-discharge, SEst1 = Self Esteem pre-discharge, SEst2 = Self Esteem post-discharge, SS1 = Social Support pre-discharge, SS2 = Social Support post-discharge, MF1 = Motor Function pre-discharge, F2 = Motor Function post-discharge, Bal1 = Balance pre-discharge, Bal2 = Balance post-discharge

There was a significant correlation between CR and each of MF1 ( $r = 0.53$ ), MF2 ( $r = 0.75$ ), Bal1 ( $r = 0.55$ ) and Bal2 ( $r = 0.76$ ). A significant positive correlation was found between CR and each of FSE1 ( $r = 0.62$ ), BSE1 ( $r = 0.58$ ), SEst1 ( $r = 0.34$ ) and SS1 ( $r = 0.29$ ). Similarly, CR was significantly correlated with FSE2 ( $r = 0.74$ ), BSE2 ( $r = 0.59$ ) and SS2 ( $r = 0.42$ ). After adjusting for participants' socio-demographics and clinical characteristics (study location, age, gender, occupation, duration of stay in hospital, duration of physiotherapy before discharge, stroke laterality, type of stroke and number of stroke occurrence), all the variables remained significantly correlated with CR except SEst1, SEst2, SS1 and SS2 (Table 3).

A multiple regression model was generated to predict community reintegration from age and the pre-discharge variables that were significantly

correlated with community reintegration after adjustment (MF1, Bal1, FSE1 and BSE1). This pre-discharge model significantly predicted community reintegration ( $F_{5,46} = 13.64$ ,  $p < 0.001$ ,  $R^2 = 0.60$ ). However, only age ( $\beta = -0.226$ ,  $p < 0.001$ ) and FSE1 ( $\beta = 1.387$ ,  $p = 0.040$ ) added significantly to the prediction (Table 4). Also, a second multiple regression model was generated to predict community reintegration from age and the post-discharge variables that were significantly correlated with community reintegration after adjustment (MF2, Bal2, FSE2 and BSE2). This post-discharge model also significantly predicted community reintegration ( $F_{5,46} = 23.23$ ,  $p < 0.001$ ,  $R^2 = 0.72$ ). Age ( $\beta = -0.164$ ,  $p = 0.005$ ), Bal2 ( $\beta = 0.142$ ,  $p = 0.034$ ), and FSE2 ( $\beta = 1.387$ ,  $p = 0.040$ ) added significantly to the prediction (Table 4).

Table 3: Correlation between Community Reintegration and the Psychosocial/Clinical Attributes (N = 52) with and without Adjustment of Physical Characteristics.

VARIABLE	TYPE OF CORRELATION			
	Full Correlation (Pearson)		Partial Correlation	
	r	p	r	P
<b>FSE1</b>	0.624	<0.001*	0.493	0.001*
<b>FSE2</b>	0.742	<0.001*	0.609	<0.001*
<b>BSE1</b>	0.576	<0.001*	0.438	0.003*
<b>BSE2</b>	0.598	<0.001*	0.311	0.042*
<b>SEst1</b>	0.349	0.011*	0.106	0.500
<b>SEst2</b>	0.415	0.002*	0.239	0.122
<b>SS1</b>	0.287	0.039*	0.192	0.218
<b>SS2</b>	0.380	0.005*	0.265	0.086
<b>MF1</b>	0.528	<0.001*	0.333	0.029*
<b>MF2</b>	0.748	<0.001*	0.569	<0.001*
<b>BAL1</b>	0.548	<0.001*	0.403	0.007*
<b>BAL2</b>	0.757	<0.001*	0.640	<0.001*

\*= Significant correlation at  $p = 0.05$ , FSE1 = Fall Self Efficacy pre-discharge, SE2 = Fall Self Efficacy post-discharge, BSE1 = Balance Self Efficacy pre-discharge, BSE2 = Balance Self Efficacy post-discharge, SEst1 = Self Esteem pre-discharge, SEst2 = Self Esteem post-discharge, SS1 = Social Support pre-discharge, SS2 = Social Support post-discharge, MF1 = Motor Function pre-discharge, MF2 = Motor Function post-discharge, Bal1 = Balance pre-discharge, Bal2 = Balance post-discharge

Table 4: Regression Model of Community Reintegration for the Predictor Variables Pre-Discharge and Post-Discharge (N = 52).

Model no	Model Summary			Predictor variables	$\beta$	t	Sig.
	R <sup>2</sup>	df	F (sig)				
1	0.60	5, 46	13.64 (<0.001)	<b>AGE</b>	-0.226	-4.312	<0.001*
				MF1	0.024	0.518	0.607
				BAL1	0.042	0.598	0.553
				<b>FSE1</b>	1.387	2.113	0.040*
				BSE1	0.014	0.210	0.834
2	0.72	5, 46	23.23 (<0.001)	<b>AGE</b>	-0.164	-2.932	0.005*
				MF2	0.049	1.354	0.182
				<b>BAL2</b>	0.142	2.035	0.048*
				<b>FSE2</b>	1.243	2.183	0.034*
				BSE2	0.022	0.538	0.593

\* = Significant predictor at  $p = 0.05$ , FSE1 = Fall Self Efficacy pre-discharge, FSE2 = Fall Self Efficacy post-discharge, BSE1 = Balance Self Efficacy pre-discharge, BSE2 = Balance Self Efficacy post-discharge, SEst1 = Self Esteem pre-discharge, SEst2 = Self Esteem post-discharge, SS1 = Social Support pre-discharge, SS2 = Social Support post-discharge, MF1 = Motor Function pre-discharge, MF2 = Motor Function post-discharge, Bal1 = Balance pre-discharge, Bal2 = Balance post-discharge

## DISCUSSION

A total of 52 stroke survivors from three tertiary hospitals in Nigeria participated in this study. The majority of the participants had ischaemic stroke approximately ratio of 3:1. This is incongruence with other studies which reported that the incidence of ischaemic strokes is more than haemorrhagic strokes (16-18).

About 60% of the variation in community reintegration of the participants could be explained by age and the pre-discharge motor function, balance, fall self-efficacy and balance self-efficacy while 75% of the variability in community reintegration could be explained by age and post-discharge motor function, balance, fall self-efficacy and balance self-efficacy. This implies that the CR at three months post-discharge can be predicted from the stroke survivor's age, motor

function, balance and fall self-efficacy at the point of discharge from in-hospital admission. However, CR is better predicted from the values of these variables obtained at three months post-discharge. When all other variables were held constant, age negatively varied with CR by 0.2. This suggests a 0.2 unit decrease in CR with each successive increase in age. Thus, the older a stroke survivor, the more challenging it is for him/her to participate in the community.

Fall self-efficacy (pre-discharge and post-discharge) significantly and positively correlated with community reintegration and remained so even after adjustment for the influence of demographic characteristics. This suggests that stroke survivors with greater confidence against falling had better chances of reintegrating into their communities. Post-hoc regression model revealed that fall related self-efficacy is the strongest predictor of CR among other variables in the models. For a unit increase in the score of fall related self-efficacy pre-discharge, there is expected 1.4 fold increase in CR three months post-discharge. There appears to be a dearth of studies on the direct relationship between fall self-efficacy and community reintegration. Nonetheless, studies (19-23) have shown a relationship between fall self-efficacy and some measures of activities/participation among stroke survivors. In a study by Hellstrom and colleagues (23), fall self-efficacy was reported as a powerful predictor of activities of daily living. Therefore rehabilitation measures should be targeted at improving fall related self-efficacy, and consequently, the community reintegration among stroke survivors. Performance accomplishment, vicarious experience, verbal persuasion and improved physiological states have been reported to be effective in improving self-efficacy (24,25).

Community reintegration was positively, significantly correlated with balance self-efficacy pre- and post-discharge even after adjustment for the physical characteristics of the patients. This suggests that stroke survivors with better balance confidence at the time of discharge and thereafter had a better chance of being reintegrated into the communities. Earlier studies had reported similar findings (19,22,25). In a study by Pang et al (22) on the determinants of satisfaction with

community reintegration in chronic stroke, balance self-efficacy showed the highest correlation with community reintegration. Although evidence has shown balance self-efficacy (BSE) as a significant predictor of stroke related activities and participation (26), post-hoc regression analysis in ~~the~~ our study showed that BSE was not a significant independent predictor of CR. Differences in time since stroke onset in the study of Salbach and co-workers (26) study and ours may account for the variation in findings. The participants in their study were chronic stroke survivors while the participants in the current studies were acute and post-acute stroke survivors. Also, differences in design and outcome measures may be responsible for the disparity in reports. However, this relationship needs to be explored to further delineate the effect of balance self-efficacy on community reintegration.

There was a significant positive correlation between self-esteem and community reintegration. However, after adjustment for the patients' physical characteristics, self-esteem was no longer significantly correlated with community reintegration. Studies (28,29) have shown that low self-esteem has no direct effect on activity/participation. It has been suggested that the negative effect of self-esteem on participation restriction manifests as depressive symptom (28).

The pre-discharge and post-discharge social support scores of the participants were significantly and positively correlated with community reintegration. This suggests that the social support received by a stroke patient is important in the overall recovery and eventual reintegration of survivors into the community. This is in line with the findings of previous studies (30,31) which indicated that improved social support aided the recovery of post-stroke patients. However, after adjustment for the participants' physical characteristics, both the pre-discharge and post-discharge social support scores were no longer significantly correlated with community reintegration. This implies that the influence of social support on community reintegration is dependent on the physical characteristics of the stroke survivors such as age and marital status.

Pre- and Post-discharge Motor Function (MF) scores were significantly and positively correlated

with community reintegration among the stroke survivors. This correlation was maintained even after adjusting for the participants' physical characteristics. This indicates that improvement in motor function of stroke survivors leads to improved reintegration into their communities. This agrees with earlier studies on the relationship between motor function and indices of participation (32-34). However, multiple regression analysis revealed that MF is not an independent predictor of community reintegration. Pang et al (22) similarly reported that motor function was not a significant predictor of community reintegration.

Balance scores at pre-patient discharge and at three months post-discharge significantly correlated with community reintegration of the participants even after adjusting for their physical characteristics. This implies that improved balance function results in better reintegration into the community after stroke. The findings of this study are similar with previous findings (32,34,36). Although the pre-discharge balance score did not initially predict CR significantly, post-discharge balance score was a significant predictor of CR. Reports on the predictability of CR from balance appear conflicting. Schimid et al, (27) posited that balance was not an independent predictor of participation. Pang et al, (23) on the other hand found balance an independent predictor of community reintegration. The differences in the findings from those studies may be related to differences in study designs and characteristics of the study samples. There is a need for more studies to further elucidate the relationship between balance and activity/participation.

In conclusion, the findings of this study have shown that age, balance and fall self-efficacy were important predictors of community reintegration among stroke survivors three months after in-hospital discharge. Therefore, rehabilitation programme for patients with stroke should include interventions aimed at improving balance and fall self-efficacy in order to promote community reintegration among survivors.

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