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Relationship of Physiotherapy Intervention and the Level of Community Reintegration of Stroke Survivors In Accra, Ghana

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Abstract

Background: Stroke is one of the major causes of death and disability in the world. During rehabilitation, there appears to be little or no emphasis placed on reintegrating the stroke survivors into their communities. The study sought out to determine the relationship between physiotherapy and the level of community reintegration among stroke survivors.

Method: This observational study involved 51 stroke survivors referred to physiotherapy departments of selected hospitals in Accra. Participants completed the Reintegration to Normal Living Index and the Modified Rankin Scale at baseline and after 8 weeks of physiotherapy sessions. Wilcoxon's test was used to assess the difference between the baseline and end point scores for reintegration and disability while Chi square and Spearman correlation were used to test for associations between physiotherapy intervention and community reintegration. A p-value of 0.05 was set.

Results: The mean reintegration score at baseline was 55.5±17.00 and 76±14.00 at end point (p = 0.001) while the mean disability score at baseline was 3.43±0.67 and 2.31±0.68 at end point (p = 0.001) showing a significant level of improvement from baseline to endpoint of the reintegration and disability scores. There was a low association between duration of stroke (p=0.008) and duration of physiotherapy (p=0.038) with regards to reintegration 8 weeks post physiotherapy.

Conclusion: Physiotherapy plays a role in the reintegrating of stroke survivors into their communities. Incorporation of community reintegration into rehabilitation programmes for stroke survivors could be useful. Efforts to include physiotherapy to reintegrate stroke survivors could therefore be strengthened.

Keywords: *stroke, community reintegration, stroke survivors*

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INTRODUCTION

The World Health Organization (WHO) defines stroke as a condition with rapidly developing clinical signs of focal loss of cerebral function, with symptoms lasting longer than 24 hours or leading to death, with no apparent cause other than that of vascular origin [1]. Stroke results in immense health and economic burden in the United States and globally [2]. Community-based studies in African countries have shown that cerebrovascular diseases represent 5% to 10% of the causes of death and that the prevalence of important risk factors for stroke (hypertension, diabetes and smoking) are increasing [3, 4]. Men have a 30%-80% greater incidence than women [5] and the difference in incident rates between the sexes is somewhat higher at younger ages but nonexistent at older ages [6].

The goal of rehabilitation is to regain as much independence as possible [7] Upon successful completion of rehabilitation, physical training should follow in order to improve physiological, psychological, social and professional functions and to consecutively decrease the morbidity and mortality for post-stroke survivors [8]. A major component of the management of stroke is aimed at facilitating functional independence and community reintegration [9]. One of the most important elements of stroke rehabilitation that probably gets less attention from rehabilitation professionals, is community reintegration. Reintegration to normal living has been defined as the reorganization of physical, psychological and social characteristics so that the individual can resume well-adjusted living after an incapacitating illness or trauma [10]. Issues revolving around community and role integration can potentially have a profound impact on quality of life of the stroke survivor [11]. For many people, the reintegration into community life marks the end point of their rehabilitation [12]. Regardless of regions in the world, the concept associated with re-integration to normal pattern of social and community life is one of key ideas in rehabilitation.

Numerous international rehabilitation scholars have identified the importance of social and community integration to the well-being of people with disabilities [13]. In addition, the sex of an individual [14, 15] marital status [16] and duration of stroke [14] have been shown to have an influence on community reintegration. For instance, [17] report that divorce is associated with a higher risk of stroke, especially in men. Although it has been identified that functional status alone cannot completely predict reintegration [18], assessing stroke survivors who are at risk of high levels of participation restriction, depressive symptoms and low self-esteem will assist health professionals to devise appropriate rehabilitation [19]. A study [20] also reports that the level of satisfaction with community reintegration is marked by ongoing changes in the goals of the stroke survivors and concluded that formal and informal caregivers need to work with stroke survivors living in the community to facilitate realistic and achievable goals.

Some studies conducted in England [21], Australia [22] and Canada [23] assessed factors associated with community reintegration after stroke. There however appears to be a paucity of information on the level and factors that affect community reintegration in post stroke patients in Accra. Anecdotal evidence during rehabilitation of stroke survivors in Accra, indicate little or no emphasis on reintegrating them into their communities except for more emphasis on improving their activities of daily living [10] conclude that most stroke survivors are reintegrated into their communities except in the areas of work and education and had poor quality of life, however, they were satisfied with physiotherapy services. Similarly, [24] show that physiotherapy duration is not associated with community reintegration. They indicate that post-stroke duration however has a significant association with community reintegration.

Community reintegration is one of the most important aspects of stroke rehabilitation but probably the most underestimated. Our study therefore sought to determine the relationship between physiotherapy and the level of community reintegration among stroke survivors.

METHODS AND MATERIALS

Our observational study was carried out at the physiotherapy outpatient department (OPD) of Korle-Bu Teaching, 37 Military, Ridge and Tema General Hospitals, all in Accra, Ghana. A purposive sampling method was used to recruit male and female post stroke patients referred for OPD physiotherapy at the selected study sites. The number of stroke patients who regularly visited the selected physiotherapy departments monthly for rehabilitation procedures at the time of our study was estimated at 170 as indicated by the Heads of Departments. Thirty percent (30%) which is approximately a third of the total estimated population size was considered the minimum sample size to use for generalization purposes. The number of participants was therefore calculated using the formula

$$n = \frac{z^2 \times pq}{e^2} \ ,$$

[25] where:

n = Minimum sample size

z = the z-score (1.96 for 95% Confidence interval)

(p + q) = 1 where p is the portion of expected respondents expressed as decimal (0.3 which is equivalent of 30% was used)

e = margin of error, expressed in decimals (0.04). The calculated minimum sample size was 20.

Post stroke survivors between 20-60 years, with minimum affectation duration of two to 12 months were recruited. Participants should had received at least one month of consistent physiotherapy, were attending the outpatient unit of the selected physiotherapy departments and were able to walk with minimal or no assistance at the time of data collection. Post stroke survivors with other neurological problems such as multiple sclerosis and Parkinson's disease and those who have suffered stroke more than one year previously were excluded from the study.

Outcome measures

The Reintegration to Normal Living Index (RNLI) and the modified Rankin Scale (mRS) were used to collect data. The RNLI has been widely used in various rehabilitation programmes and studies to evaluate the social reintegration of patients after discharge from rehabilitation and to assess the effectiveness of various rehabilitation programmes. The RNLI was used to assess participants' satisfaction with performance in life activities. It is an 11-item scale that covers areas such as participation in recreational and social activities, movement within the community, and how comfortable the individual is in his or her role in the family and with other relationships. It is scored on a 4-point Likert scale [15] with total values ranging from 11-44 with higher scores indicating better perception of reintegration. The scores are then converted to percentages with the following meanings low reintegration (0-25), mild reintegration (26-50), Moderate reintegration (51-75) and high reintegration (76-100). The RNLI has good test- retest reliability (Intraclass coefficient: 0.83-0.87), good content validity and good discriminant validity [26].The Cronbach's alpha for the Reintegration to Normal Living index questionnaire is 0.90. Cronbach's alpha ranges from 0.73–0.97 [26].

The mRS is one of the most widely used clinical outcome measure for stroke clinical trials. The mRS describes six grades of disability and is widely used to assess global disability post stroke.

A score of five denotes severe disability and bedridden while a score of zero denotes no symptoms at all [27]. Higher scores indicate a higher level of disability and lower scores indicate a lower level of disability. The mRS has excellent test-retest reliability (Kappa w =.95) [28] and excellent inter-rater reliability [29].

Procedure

Participants who completed the study received 16 physiotherapy sessions in total. The exercises were completed in one-hour sessions, twice a week over 8 weeks. Treatment (intervention) sessions consisted of self-stretching and strengthening exercises with strap-on weights and therabands for both lower and upper limbs muscle strengthening. Participants also went through coordination and balance exercises which included standing on a foam and ball passes in multiple directions. Some functional exercises participants went through included sit to stand and vice versa, walking, writing, picking and dropping small items in a bowl.

The authors administered the RNLI and mRS to measure the level of community reintegration and level of disability of the participants during clinic hours of 8am to 5pm. The recruitment period was from November 2012 to May 2013. Copies of the questionnaire were administered on the same day for most participants. The phone numbers of the participants were obtained by the authors and used to keep in touch with them once every week to ensure that they were consistent, attended and received regular physiotherapy services since the authors sought to determine how physiotherapy affected their community reintegration. Participants were requested to complete the RNLI and mRS again after 8 weeks of physiotherapy sessions.

Participants' characteristics were expressed as absolute numbers and percentages for categorical variables and means and standard deviations for continuous variables. A Chi square test was used to test for associations between gender, educational status and scores of the RNLI while a Spearman's correlation test was used to test for correlations between age, duration of stroke, duration of physiotherapy and scores of the RNLI. This was to ascertain the relationship between the two quantitative, continuous variables of age and RNLI scores. After testing for normality using Kolmogorov-Smirnov test the data were skewed. To determine the relationship between physiotherapy and the level of community reintegration a Wilcoxin's, non-

parametric test was used to compare repeated measurements (i.e. baseline and 8 weeks post treatment) on a single sample, to assess whether their population mean ranks differed initially and after 8 weeks.

RESULTS

Fifty-one (51) (which is more than double the minimum required or calculated sample size) participants who consented and satisfied the inclusion criteria were recruited and participated in our study. The majority (66.7%) of the participants were married while 80.4% were educated. Frequency distributions of gender, marital status and educational status are shown in Table 1. Participants' age ranged between 25 and 60 years with more than half (64.7%) at and above the age of 50 years (Table 1). The mean age of the participants was 51.3 ± 9.1 years. Approximately 30% of the participants stroke duration was 4-6 months while a little less than half (47.7%) of the participants physiotherapy treatment durations was one to three months (Table 2)

Table 1: Socio – demographic characteristics of participants

VARIABLES	n	%
Gender		
Male	35	68.6
Female	16	31.4
Marital Status		
Single	2	3.9
Married	34	66.7
Divorced	10	19.6
Widow/Widower	5	9.8
Educational Status		
Educated	41	80.4
Non educated	10	19.6
Age Group (Years)		
25-29	1	2.0
30-34	0	0.0
35-39	7	13.7
40-44	2	3.9
45-49	8	15.7
50-60	33	64.7
TOTAL	51	100

Table 2: Post stroke and physiotherapy durations at the week-8 follow up assessment (n=51)

Duration (months)	Stroke duration (n & %)	Physiotherapy duration (n & %)
1-3	14 (27.5%)	24 (47.1%)
4-6	15 (29.4%)	13 (25.5%)
7-9	9 (17.6%)	8 (15.7%)
10-12	13 (25.5%)	6 (11.8%)

n = Number of participants.   **% = Percentage**

At baseline 41.2% had mild reintegration, however, at endpoint, more than half (54.9%) of the respondents showed high reintegration while none of the respondents had low reintegration at baseline and at end point as shown in Table 3. There were significant improvements in reintegration (p = 0.001) and mRS disability (p = 0.001) scores between baseline and 8 weeks after rehabilitation as depicted in Tables 4 and 5. The levels of improvement in reintegration from baseline to end point (8 weeks) were statistically significant for divorced (p = 0.003), widowed (p = 0.025), males, females, married, educated and non-educated (p = 0.001) as shown in Table 4. The levels of improvement in disability from baseline to end point (8 weeks) were statistically significant for single (p = 0.043), divorced (p = 0.003), widowed (p = 0.005), non-educated

(p=0.002), males, females, married, and educated (p = 0.001) as depicted in Table 5. An assessment of factors that affect levels of reintegration considered at the end of 8 weeks are shown in Table 6.

Table 3: Community reintegration at base line and end point (n=51)

	Mean	Baseline		Endpoint	
Level of reintegration		Frequency	Percent	Frequency	Percent
Low reintegration (Score <26)	-	0	0	0	0
Mild reintegration (Score 26-34)	30±3	21	41.2	3	5.9
Moderate reintegration (Score 35-43)	39.5±1.5	20	39.2	20	39.2
High reintegration (Score 44)	44	10	19.6	28	54.9
Total		51	100	51	100

Table 4: Reintegration to Normal Living Index (RNLI) at baseline and endpoint (n=51)

Variables	Baseline	Endpoint	z-value	p-value
Males	57.8±17.5	80.25±12.25	-4.58	0.001*
Females	50.50±15.25	67.3±14.5	-3.63	0.001*
Single	59.00±10.50	75.00±11.50	-1.41	0.156
Married	56.25±20.5	82.50±26.6	-4.28	0.001*
Divorced	59.00±17.75	75.50±11.51	-3.01	0.003*
Widowed	53.00±20.97	66.50±11.25	-2.24	0.025*
Educated	52.5±16.88	74.75±12.00	-5.24	0.001*
Not educated	68.25±12.00	84.00±9.25	-2.81	0.001*
RNLI	55.5±20.97	76±14.00	-6.16	0.001*

***Significant at 5%**

Table 5: Modified Rankin Scale (mRS) at baseline and endpoint (n=51)

Variables	Baseline	Endpoint	z-value	p-value
Males	3.29±0.71	2.23±0.65	-4.58	0.001*
Females	3.73±0.46	2.53±0.74	-3.63	0.001*
Single	4.00±0.55	2.00±0.25	-1.41	0.157
Married	3.23±0.83	1.92±0.49	-4.28	0.001*
Divorced	3.42±0.51	2.50±0.52	-3.00	0.003*
Widowed	4.00±0.51	3.00±0.30	-2.24	0.025*
Educated	3.47±0.66	2.33±0.71	-5.24	0.001*
Not educated	3.25±0.71	2.25±0.46	-2.81	0.001*
MRS	3.43±0.67	2.31±0.68	5.73	0.001*

*Significant at 5%

Table 6: Association of factors that affect the different levels of reintegration (n=51)

Factors	Low (Score <26) n %	Mild (Score 26-34) n %	Moderate (Score 35-43) n %	High (Score 44) n %	p-value
Gender					
Male	0 (0.0)	3 (100)	9 (45.0)	23 (82.1)	0.052
Female	0 (0.0)	0 (0.0)	11 (55.0)	5 (17.9)	
Education					
Educated	0 (0.0)	3 (100)	17 (85.0)	22 (78.6)	0.602
Non-educated	0 (0.0)	0 (0)	3 (15.0)	6 (21.4)	
Age group					
25-29	0 (0.0)	1 (33.3)	0 (0.0)	0 (0.0)	
30-34	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	
35-39	0 (0.0)	0 (0.0)	1 (5.0)	6 (21.4)	
40-44	0 (0.0)	0 (0.0)	2 (10.0)	0 (0.0)	0.003*
45--49	0 (0.0)	1 (33.3)	4 (20.0)	3 (10.7)	
≥ 50	0 (0.0)	1 (33.3)	13 (65.0)	19 (67.9)	

* Significant at 5%

There was a low association between reintegration and duration of stroke (p= 0.008) and duration of physiotherapy (p= 0.038) as depicted in Figure 1.
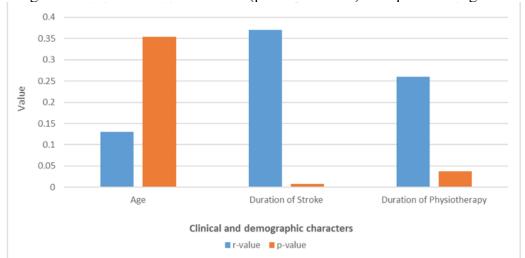

Figure 1: Association between duration of stroke and duration of physiotherapy factors and reintegration at 8-week follow up (n=51)

DISCUSSION

The purpose of the study was to determine the relationship between physiotherapy and the level of community reintegration among stroke survivors. There were significant improvements between both reintegration and disability scores from baseline to the end point after eight weeks of physiotherapy interventions. The findings showed a low association between community reintegration and stroke duration, community reintegration and physiotherapy duration and a negative association between disability and community reintegration. The significant improvement between baseline and end-point reintegration in this study depicts the importance of the reintegration of stroke survivors into their communities and is similar to a report [9] which concluded that physical performance measures including muscle strength and mobility can partially predict health-related quality of life (HRQoL) and community reintegration. The inclusion of necessary measures to ensure that the rehabilitation facilities include set ups that resemble those in their communities and possible follow up into their communities for the continuation of rehabilitation could significantly improve the difference between their baseline and endpoint scores of reintegration [12]. At baseline and end point, males demonstrated higher reintegration and lower disability levels than their female counterparts which is similar to other findings [2] and why this is so should be further explored. The significant level of improvement in both male and female stroke survivors could be

because they have similar perceptions of their level of community reintegration. This is however not so in other studies [15, 14] which show that men are less reintegrated than women into their community. The reduced disability levels for married participants at both baseline and end point as well as the statistically significant level of improvement could be because of the availability of caregivers and possible motivation to recover quickly.

Most participants who reported high levels of integration were above 50 years and educated, which may indicate their sense of understating of the need for independence regarding their current condition. This outcome however contrasts a report which stated that advancing age was coupled with increased disability which negatively affects the extent the individual is reintegrated into the community [30]. A study [14] also reported that there was no significant relationship between age and reintegration but reported a significant relationship between duration of stroke and reintegration [4] which we also found. The reason for this outcome could be that the longer duration of having had a stroke positively influenced participants their ability to develop coping strategies thereby allowing them to better reintegrate into their communities' findings by Obembe.

The significant negative correlation between the level of disability and reintegration found in this study meant that the lower the level

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of disability, the higher the level of community reintegration and is similar to findings by Hamzat and colleagues [11].

There were more males than females with more than half of the participants above the age of 50 years, which is similar to reported epidemiological statistics on stroke [5]. Most of the stroke survivors in this study were married. However, a study [17] reported a sharp contrast of 1.96 (married), 1.52 (unmarried), 2.36 (divorced), and 5.43 (widowed) per 1000 per year to the finding of our study.

There was no control group in this study making any conclusions on the role of physiotherapy in community reintegration difficult. Further studies involving a control group should be considered in order to properly ascertain the impact of physiotherapy on stroke survivor's community reintegration.

CONCLUSION

Study show that physiotherapy plays a role in reintegrating stroke survivors into their communities. This could be better affirmed if analyses of dose-related effect of physiotherapy on reintegration had been considered together with information regarding the weekly frequency of physiotherapy sessions that patients had attended. An emphasis may be placed on incorporating community reintegration into rehabilitation plans of stroke survivors. Further studies should be conducted, dose-related effect and frequency of physiotherapy with a control group over a longer duration to assess the overall impact of physiotherapy on the level of community reintegration of stroke survivors.

DECLARATION

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