Factors Associated with Reintegration to Normal Living After Stroke

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ORIGINAl ARTICLE

SUMMARY

Background and Purpose: Emotional alterations are frequent after stroke. Anxiety is a response due to the fear from disease, although depression is a result of potential disability and restrictive lifestyle. The aim of this study was to investigate the relation between reintegration to normal living (community reintegration) of patients after stroke and their functional disabilities. Subjects and Methods: Data were collected from 44 patients with chronic stroke receiving physical therapy services at Physical Medicine and Rehabilitation Clinic, University Clinical Center of Prishtina. Activities of Daily Living (ADL) were measured with the Barthel index (BI). Reintegration to Normal Living Index (RNLI) was used to measure reintegration into normal social activities, functional capacity was measured with six-minute walk test (6MWT), balance was evaluated with Berg Balance Scale (BBS), and motor functioning was assessed with Fugl-Meyer Motor Assessment (FMA). Results: Based on statistical results it can be concluded that the RNLI score has correlated positively with 6MWT and BI, while age didn’t demonstrate any correlation. Conclusion: Physical impairment has immense impact in reintegration of stroke patients in society. With the improvement of physical state the quality of life is raised too, and stroke patients are easier reintegrated in the society. Patients with stronger reintegration to normal living had better outcomes in daily activity and quality of life.

Keywords: community reintegration, instrumental activities of daily living, stroke.

1. INTRODUCTION

Stroke represents one of the major public health problems worldwide. Despite advances in stroke prevention, diagnosis, treatment and rehabilitation, stroke causes 9% of all the deaths around the world and stroke-related disability has been judged to be one of the most common causes of disability.[1, 5] Internationally recognized best practice care in the early management and rehabilitation of individuals following stroke includes multidisciplinary assessment and treatment by a coordinated team of health care professionals.[4, 6] Patients with stroke should have access to a continuum of care from organized stroke units in the acute phase, to appropriate rehabilitation and secondary prevention measures.[2]

After the completion of rehab in specialized institutions for post-CVA rehabilitation, physical training is required to continue in order to improve the physiological, psychological, social and professional functions and consecutively to decrease the morbidity and mortality amongst patients after CVA.[7, 8]

Emotional alterations are very frequent after stroke. Anxiety is a response to the fear from disease, although depression is a result of potential disability and restrictive lifestyle.

Gait coordination often is compromised after stroke.[9] It is well documented that individuals with chronic stroke often exhibit considerable gait impairments that significantly impact their quality of life.[10] Return to work after stroke plays an important role in reintegration to normal living in the community.[3] Much of the impetus for stroke rehabilitation rests in the desire to regain normal walking, a goal still identified as relevant months or years after acute events. For many people, the reintegration into community life marks the end point of their rehabilitation.[11]

The purpose of this study was to determine whether functional disabilities are in correlation with the level of community reintegration of stroke patients.

2. MATERIALS AND METHODS

2.1. Subjects

Data were collected between January 2008 and December 2008 from patients with stroke seen at Physical Medicine and Rehabilitation Clinic in Prishtina. The subjects were 44 people after stroke were, on average 49,8 years of age (SD=17.4, range=18-80). 20 patients exhibited hemiparesis on the right and 24 on the left side; all reported being right-arm dominant before stroke. All patients received separate functional status examinations by physiatrists upon their admission in Physical Medicine and Rehabilitation Clinic.

People were excluded from the study if they had unstable cardiovascular disease, or had other serious diseases that precluded participation in the study.

2.2. Outcome Measures

The Reintegration to Normal Living Index (RNLI) was developed to assess, quantitatively, the degree to which individuals who have experienced traumatic or incapacitating illness achieve reintegration into normal social activities (e.g. recreation, movement in the community, and interaction in family or other relationships).[12] The RNLI index is made up of 11 declarative statements (e.g. I move around my living quarters as I feel necessary), including the following domains: indoor, community, and distance mobility; self-care; daily activity (work and school); recreational and social activities; family role(s); personal relationships; presentation of self to others and general coping skills. Participants were asked how much they agreed with each item. Each item was rated with a 4-point ordinal scale (1-4) with higher scores indicating a higher level of satisfaction. The scores for each item were summed and then normalized to 100, with a score of 100 indicating that the participants were fully satisfied, scored of 60 through 99 indicating mild to moderate restrictions in self-perceived community reintegration, and scores less than 60 indicating severe restrictions in self-perceived community reintegration.[13]

Walking endurance was measured with the Six-Minute Walk Test (6MWT). It is a functional walking test in which the distance that a patient can walk within six minutes is evaluated.[12] The Berg Balance Scale (BBS) was stroke (ICD-9CM code 434.91) and 10 patients with hemiplegia after hemorrhagic stroke (ICD-9CM, 431.xx code). A baseline was verified measuring patients age, sex, risk factors (including smoking, diabetes, preexisting heart diseases and hypertension). The people after stroke were, on average, 49,8 years of age (SD=17.4, range=18-80). 20 patients exhibited hemiparesis on the right and 24 on the left side; all reported being right-arm dominant before stroke. All patients received separate functional status examinations by physiatrists upon their admission in Physical Medicine and Rehabilitation Clinic.

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Factors Associated with Reintegration to Normal Living After Stroke

used to measure functional balance. It is a 14-item test scale, with a 5 point ordinal scale (0-4). A global score can be calculated out of 56. A score of 0-20 on the BBS represents balance impairment; 21-40 on the BBS represents acceptable balance and 41-56 on the BBS represents good balance.[12]

The Fugl-Meyer Assessment (FMA) is a stroke-specific, performance-based impairment index.[1] It was used to assess motor functioning. Scoring is based on direct observation of performance. Scale items are scored on the basis of ability to complete the item using a 3-point ordinal scale where 0=cannot perform, 1=performs partially and 2=performs fully. Higher scores indicate less impairment in the extremities. Points are divided among the domains as follows: Motor score: ranges from 0 (hemiplegic) to 100 points (normal motor performance). These points are divided into 66 points for upper extremities, and 34 points for the lower extremities. Functional disability was evaluated with the Barthel Index (BI). Original 10-item version refers to the following 10 categories: feeding, bathing, grooming, dressing, bowel control, bladder control, toileting, chair transfer, ambulation and stair climbing. The Index yields a total score out of 100—the higher the score, the greater the degree of functional independence.[12]

2.3. Data Analysis

Descriptive statistics were derived to examine characteristics of the patients and characteristics of their episodes of care, including length of stay, number of days physical therapy was provided, and number of physical therapy sessions per day, and duration of sessions are provided in Table 1.

In this study 44 patients with hemiparesis are included, from which 18 or 40.9% are female and 26 or 59.1% are male. Abridge age of included patients is 49.8 years (SD ± 17.4 years), ranges from 18 – 80 years. The right side is affected in 20 patients or 45.5%. Based on type, 34 or 77.3% of CVA are ischemic type and 10 or 22.7% are hemorrhagic type. The mean length of stay is 29.5 ± 18.2 (5 – 87) days.

Mann-Whitney U tests were used to determine whether there was a significant difference in the mean RNL Index score. For variables that were not normally distributed (ie, upper and lower extremity FMA, BBS, RNL index, BI) log transformation was performed. First, Pearson correlation coefficients (r) were used to determine the associations between the RNL index scores and the following variables: age, BBS scores, FMA upper and lower extremity subscale scores, 6MWT distance, BI scores and length of rehabilitation hospital stay(d). All statistical analyses were performed with SPSS version 12.0 software with a significance level of .05.

3. RESULTS

The individual characteristics of the 44 people after stroke with respect to age, sex, type and hemisphere of stroke, length of rehabilitation hospital stay, No. of days physical therapy was provided, No. of physical therapy sessions per day, and duration of sessions are provided in Table 1.

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| Characteristic | Value
<table>
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<tbody>
<tr>
<td>Demographics</td>
<td>Age, y, X±SD (range) 49.8 ± 17.4 (18 – 80)</td>
</tr>
<tr>
<td></td>
<td>Sex, no. (%) Men 26 (59.1) Women 18 (40.9)</td>
</tr>
<tr>
<td>Stroke characteristics</td>
<td>Side of paresis, no. (%) of subjects Left 24 (54.5) Right 20 (45.5)</td>
</tr>
<tr>
<td></td>
<td>Type of stroke, no. (%) of subjects Ischemic 34 (77.3) Hemorrhagic 10 (22.7)</td>
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<td>Length of rehabilitation hospital stay (d) 29.5 ± 18.2 (5 – 87)</td>
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<td>No. of days physical therapy was provided 20.6 ± 12.6 (5 – 61)</td>
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<td>No. of physical therapy sessions per day 1.5 ± 0.5 (1 – 2)</td>
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<td></td>
<td>Duration of sessions (min.) 34.1 ± 6.5 (25 – 45)</td>
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<tr>
<td>Risk factors</td>
<td>Hypertension 24 (54.5)</td>
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<td>Diabetes 15 (34.1)</td>
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<td>Cardiovascular diseases 13 (29.5)</td>
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<td>Smoking 19 (43.2)</td>
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<td>Table 1. Subject Characteristics</td>
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**Table 1. Subject Characteristics**

<table>
<thead>
<tr>
<th>Measure, X±SD (range)</th>
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<tbody>
<tr>
<td>RNL index (0-100) 62.2 ± 17.5 (39 – 90)</td>
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<tr>
<td>BBS score (0-56) 47.1 ± 6.8 (37 – 56)</td>
</tr>
<tr>
<td>BI score (0-100) 68.0 ± 20.5 (41 – 98)</td>
</tr>
<tr>
<td>6MWT (m) 336.6 ± 82.2 (213.7 – 472.1)</td>
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<tr>
<td>FM TOTAL score (0-114) 66.2 ± 20.1 (38 – 96)</td>
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<tr>
<td>FM arm score (0-66) 44.3 ± 13.8 (16 – 65)</td>
</tr>
<tr>
<td>FM leg score (0-34) 21.9 ± 6.3 (12 – 31)</td>
</tr>
<tr>
<td>Table 2. Subject Measures, a RNL = Reintegration to Normal Living, BBS = Berg Balance Scale, BI = Barthel Index, FMA = Fugl-Meyer Motor Assessment, 6MWT = Six-Minute Walk Test</td>
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<table>
<thead>
<tr>
<th>Variable</th>
<th>Pearson r Correlation with RNL Index Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-0.058, p&gt;0.05</td>
</tr>
<tr>
<td>BBS</td>
<td>0.550, p&lt;0.001</td>
</tr>
<tr>
<td>BI</td>
<td>0.631, p&lt;0.0001</td>
</tr>
<tr>
<td>6MWT</td>
<td>0.648, p&lt;0.0001</td>
</tr>
<tr>
<td>FM total score</td>
<td>0.607, p&lt;0.001</td>
</tr>
<tr>
<td>Length of rehabilitation hospital stay (d)</td>
<td>0.255, p&gt;0.05</td>
</tr>
<tr>
<td>Table 3. Relationship between Reintegration to Normal Living (RNL) Index Scores and Other Variables</td>
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</tbody>
</table>
Factors Associated with Reintegration to Normal Living After Stroke

in the rehabilitation setting was 29.5 days (SD=8.2, range=5-87). Patients received physical therapy, on average, 20.69(SD=12.6, range=5-61). The average number of physical therapy sessions per day was 1.5(SD=0.5, range1-2), and the average time for each session was 34.1minutes (SD=6.5, range=25-45).

From the total number of patients included in this study, 33 or 75% have had at least one of the listed risk factors (hypertension, diabetes, and cardiovascular disease or tobacco users).

RNL index score (X±SD) was 62.2 ± 17.5, range (39-90). BI score (X±SD) was 68.0 ± 20.5 (41-98). RNL index score didn’t have any significant difference amongst male patients (64.3 ± 18.9 ) and female (60.7 ± 16.5 ) (P=0.513), between participants with ischemic CVA (61.9 ± 17.4) and those with hemorrhagic CVA (63.0 ± 18.5) (p=0.863), or amongst the participants with right side hemiparesis (60.1 ± 17.7) and those with left side hemiparesis (63.9 ± 17.4)(P=0.465) (Tab. 2).

The correlations between the RLN Index scores and other variables are shown in Table 3. Higher correlation is expressed amongst RNL index and 6MWT (r = 0.648, P<0.0001), later with BI (r = 0.631, p<0.0001). Lesser correlation, but significant, is demonstrated between RNL index scores and FM total (r = 0.607, P<0.001) and BBS (r = 0.550, P<0.001). There is no significant correlation linking RNL index score with age and rehabilitation period.

4. DISCUSSION

The goal of this study is to demonstrate the correlation between the reintegration of stroke patients in the community and their physical impairment.

Results of our research is showing that majority of stroke patients are not satisfied with the level of reintegration into everyday activities. Mild up to moderate deficits are documented in 55% of stroke patients, (ie, RNL index score 60 – 99), in the meantime 45% are with severe deficits (ie, scores of ≤60). The mean RNL Index score obtained for our sample (62,2) is consistent with the findings obtained in previous studies of people with stroke. [13-15] The findings of our study however are in contrast to those of Carter at al[14], who reported that 55% of their study participants had an RNL Index score of 100.

There are some reasons why our results are different from theirs. Divergence is present due to the fact that their subjects were with aneurismal subarachnoid haemorrhage, and in our research our subjects were with ischemia or haemorrhage. Later in their study 77% of the participants reported no residual physical disability, as measured with the Barthel Index, whereas 45% of the participants in the present study had severe deficits in the performance of activities of daily living. In the original paper by Pang et al[13] are showing that 89% of their research participants have difficulties to perform ADL.

Functional disability was assessed with the Barthel Index, which is a functional measure with clear evidence to support its reliability and validity. RNL Index score increases were significantly correlated with the improvements for disability score(r = .631) (Tab.3). Daneski et al[16] are concluding that poorer discharge basic ADL status was associated with poorer instrumental ADL and community reintegration status.

Based on the obtained results from our research we can conclude that with the decrease of the physical disability level amongst stroke patients, the level of social reintegration is increased. Patients with stronger reintegration to normal living had better outcomes in anxiety, depression, daily activity and quality of life.[14,16]

Walking endurance (ie, 6MWT) showed the highest correlation with the RNL Index scores in a correlation analysis(r=0.648)(Tab.3). This is also in concordance with the original paper by Pang et al[13] where 6MWT distance was significantly correlated with the RNL Index scores in a correlation analysis(r=.347).

Regardless the unassisted walking, older chronic stroke patients are not satisfied with their level of social reintegration. This is in concordance with data from the available literature. Older participants had poorer instrumental ADL, community reintegration and physical functioning.[14,17] Quality of life may deteriorate in some domains over time, even when the disability level is unchanged.[15] The proportion of return to work after stroke was not high and less severe stroke patients, young age were significant predictors of return to work after stroke.[3]

Group exercise training can reduce motor impairments, increase mobility and improve the quality of life of stroke patients of various disability levels. This is in concordance with the results from the available literature. Improvements in balance self-efficacy in older adults and people with stroke have been reported after group-based exercise programs in the form of resistance training, weight-shifting exercises, tai chi, and task oriented training programs. [13,19,20]

Rehabilitation treatment programs can afford achievement of certain level of independence in conducting of daily activities for patients with experienced CVA, through learning of alternative strategies in order to fulfill their tasks and to improve the damaged structures.[6-8,18]

Conventional rehabilitation methods after CVA includes various combinations in order to improve the amplitude of the ROM, muscular strength improvement exercise program, mobilization techniques.[7,10,20]

5. CONCLUSION

Reintegration to normal living of the majority of our patients with severe stroke is very low. From this fact we can conclude that if the patient has severe physical disabilities, ADL outcome is decreased, with subsequent poorer community reintegration. Therefore, physical disability corresponds as a relevant indicator for the level of community reintegration amongst stroke patients.

List of abbreviations
ICD-9CM: International Classification Diseases 9th revision Clinical Modification
ADL: Activity of Daily Living, CVA: Cerebrovascular accident, ROM: Range of Motion

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